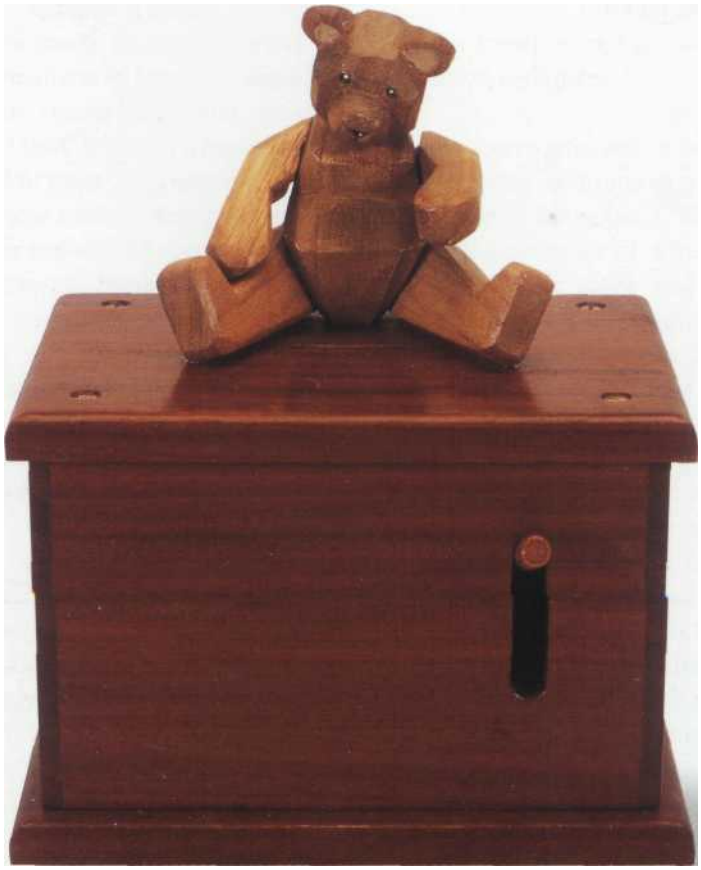
Teddy Bear Bank



When I was a kid about six years old or so, I was obsessed with money! Or as my brothers would have said—still say—I was a "Mr. Mean," a scrooge, a **tightwad,** a hoarder, a miser. Whenever my relatives came around for a visit, I would smile and give kisses, and generally do all the things most kids of that age hate to do, in the hope that my oh-so-wonderful behavior would put me in line for a monetary handout.

It rarely failed! When the moment came to say good-bye, my sycophantic behavior usually paid off, with my doting uncles and aunts vying with each other to give me all their loose change. The funny thing was, I didn't really care about the money as such, I simply enjoyed putting coins in my automated money box!

This project draws its inspiration from my long-gone toy—when the lever is pushed down, it causes the coin to fall through the slot, and causes the bear to raise his arm and nod his head.

MAKING THE TEDDY BEAR BANK

Having studied the working drawings for making the box and carefully selected your wood, set out the various dimensions and cut out the ten component parts—the four sides, the base, the top and the four inside-corner fillets. Cut the rabbets at the corners and glue up. Round over the edges of the base and lid with a quarter-curve profile and fit with countersunk screws.

Trace the side-view profile of the bear through to your chosen wood—best if it's a soft easy-to-carve timber like lime, jelutong or basswood—and cut it out on the scroll saw. Rerun this procedure for the front views. You should finish up with six parts—the head, the body, two arms

and two legs. Drill 1/2"-diameter holes down through the body, up into the head, through the shoulder and into the arm, and fit stubs of 1/2"-dowel for the neck and for the jointed arm.

When you have made the basic parts for the bear, use a knife to swiftly whittle the cutouts to shape. Don't try for anything fancy, just go for uncomplicated and stylized chunky forms.

Finally, having first used a scalpel and sandpaper to tidy up and create a good finish, use a dash of black acrylic paint to detail the nose, eyes and mouth.

PUTTING **IT TOGETHER**

Once you have made the box and all the parts that go to make the bear, then comes the difficult task of putting the whole thing together. It's not so much that any single stage is difficult, but that everything has got to be just right. If one of the control strings is too slack, or the shaft is too tight, or whatever, then the movement won't work.

Start by running 1/16"-diameter holes through the neck and arm stubs. The neck needs a side-to-side hole for the pivot and a front-to-back hole for the control cords, while the arm needs a single front-to-back through-hole for both the control cords and the pivot strings. In essence, the controls are beautifully simple. There are four cords— one to pull the head down, one to pull the head up, one to pull the arm down and one to pull the arm up. And of course, depending upon how you want the action to go, fix either the "up" or the "down" cords to a lightweight tension "pulling" spring so the lever action becomes the positive movement.

Finally, when you are happy with the movement, cut two slots in the box (one for the lever and one for the coins), fit the shaft with its dowels and end plates, glue-fix the bear to the top of the box, run the control cords down into the box and then variously tie the cords to the spring or shaft.

MATERIALS LIST—

TEDDY BEAR

A Head (1)	2″×2″×2″
B Body (1)	2″×2″×3″
C Arms (2)	1″×¾″×3″
D Legs (2)	¾″×2″×3″

Note that all the above pieces are oversize and allow for cutting waste.

BOX

E Front (2)	3″×4¼″×6½″
F Shaft plates (2)	¼″×2″×2″
G Top (1)	½″×5½″×7½″
H Bottom (1)	½″×5¾″×7¾″
I End (2)	⅜″×5″×4¼″
J Corner fillets (4)	⅝″ triangular section at 4½″ long

HARDWARE AND EXTRAS

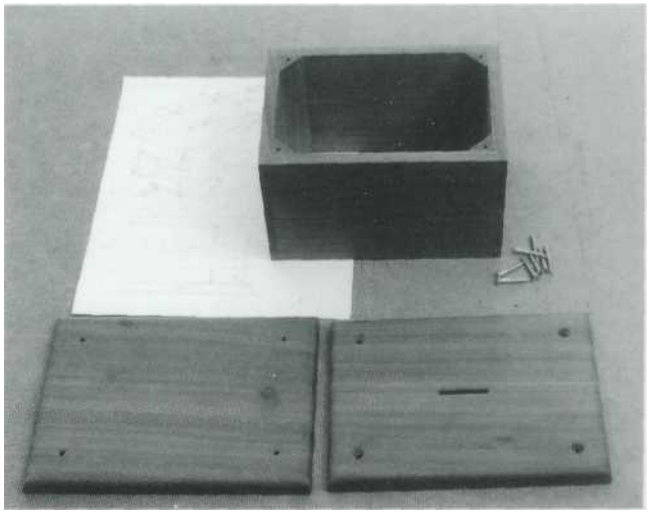
K Drive shaft (1) broomstick dowel—cut to fit
L Slot and lever bars (2) ¼″ dowel—cut to fit
M Strong cord—to fit
N Brass screws—various
O Small quantity of black acrylic paint

Note that all box measurements are to size.

SPECIAL TIP: GLUING

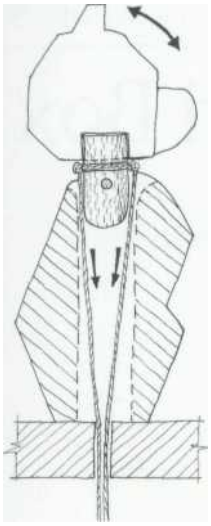
For swiftly fitting and fixing all the control cords, you can't do better than a cyanoacrylate. It's good for holding the knots tight, for little trial-and-error holds, for fixing the bear to the top of the box. In fact, it's just about perfect for everything.

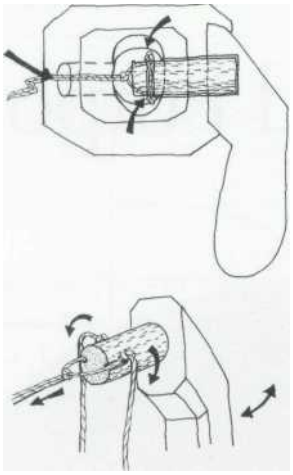
STEP-BY-STEP STAGES



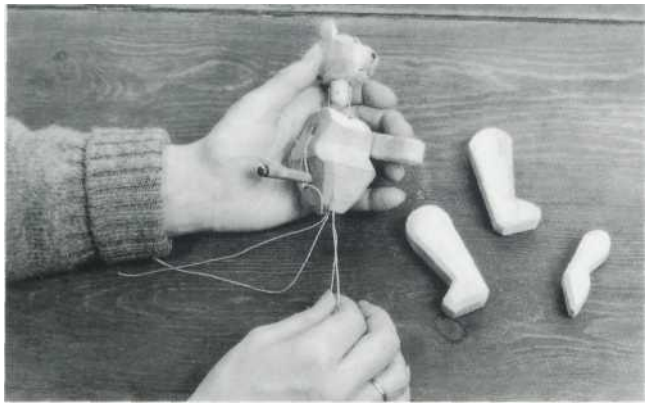
The finished box, with the bottom and top slabs ready to fit. Note how the fixing screws are placed so they run into the corner fillets.

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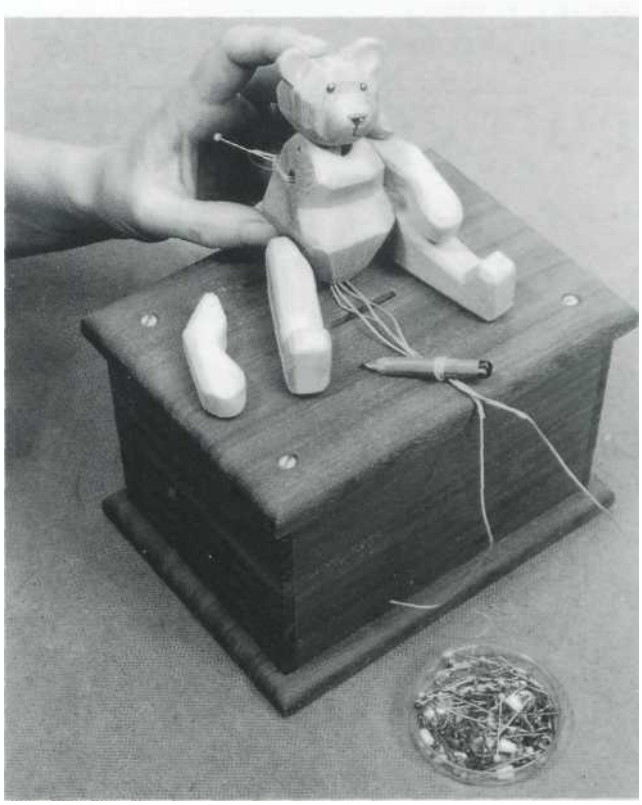
2. Next we string the bear. This cross section shows how the control cords operate the up-and-down movement **of** the head on the pivot. Be sure to use strong twine and nonslip knots. Notice the plan view at top right, show ing how the arm is both pivoted and controlled by the cords. A detail **of** the cord is shown at bottom right. See how one cord pulls and pivots the arm, while the other two cords operate the up-and-down movement.



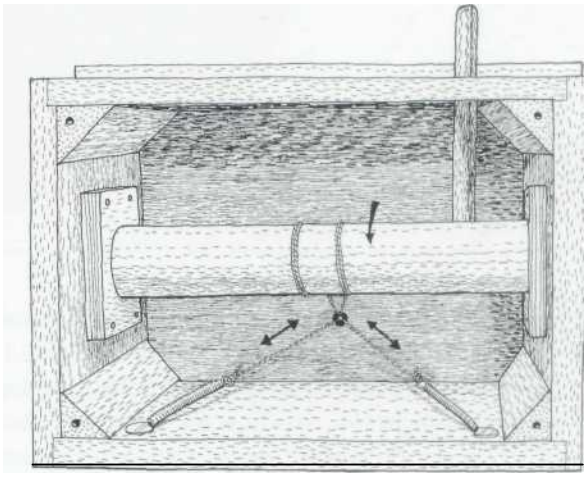
3 Have a **dry** run before you start gluing and fixing. Notice how 1 have left plenty of length to the cords.

SPECIAL TIP: MODELS

If **you** can't **figure** out how the movement works, make a working model with a card, pins and rubber bands. Make a card cutout **of** a bear, fix it to a board with thumbtacks at the joints, and then run cords from the various limbs in such a way that a pull-down on the cord results in the limb flipping up. If you now have rubber bands to pull the limbs back into the original position, then you have achieved an archetypal string-and-spring movement.



Sit the bear in place on top of the box and establish the position **of** the cord hole. If necessary, sand the various mating faces of the limbs and the body, so as to adjust the pose.



5 A view into the underside of the box shows the fixing of the four cords. One cord each from the arm and the head run down to the springs, while the other two cords are wrapped and glued around the shaft. In action, the lever turns the shaft, with the effect that the strings pull down on the arm and head.

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Turned and Pierced Potpourri Box



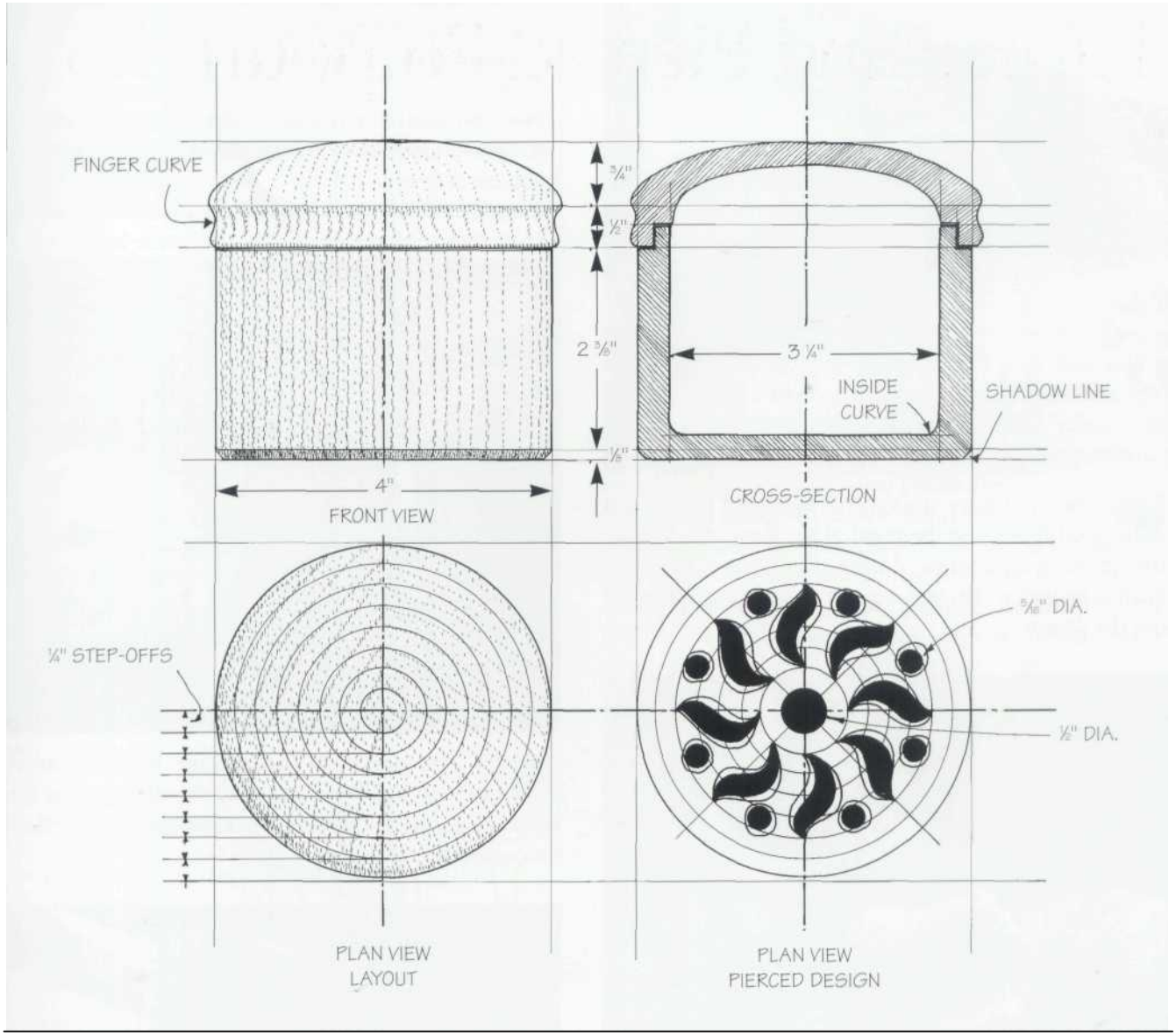
Wood turning, cutting delicate frets with a scroll saw, and whittling are three of my favorite woodworking activities. The problem, when I first started thinking about this project, was how could I incorporate the three techniques to create a single unique item? After a good deal of thought I came up with the notion for this project—a turned box with a pierced lid, with a small amount of knife work in and around the piercing.

The design draws its inspiration from two of my **friends,** one a wood turner and the other a general woodworker. However, they both needed a fresh angle to spark off their talents. Well, to cut a long story short, Gill came up with this great idea that they combine their talents so as to halve their workshop expenses and double their money-making potential. The good news is that they now make the most beautiful turned and pierced containers, and they are both scooping up the rewards!

TURNING THE BOX

Though there are any number of ways of turning a small lidded box of this type and character, the best way is to use the four-jaw chuck technique. The procedure is wonderfully simple and direct. Having mounted the wood in the chuck, you start by turning the wood down to a 4"-diameter cylinder, and parting off the tailstock end of the cylinder for the lid. This done, you hollow turn the box and cut the step on the rim, then take the surface to a good finish and part off.

The next step is perhaps slightly tricky. You remount the lid section on the lathe and start by hollowing out the



lid and cutting the rim to fit the base. Then you remove the lid from the chuck, turn it over so that the expanding jaws of the chuck fit the **inside** of the rim, and finish up by turning the top of the lid. Don't forget to set the **lid** out with the 1/4″ step-off lines to help later when you set **out the** design.

SPECIAL TIP: SCROLL SAW LIMITS

If you like the idea of this project but are planning to change the shape of the turned box, or even change the placing of the pierced holes, be mindful that the overall design is more or less governed by the use of the electric scroll saw. For example: As the saw is unable to cut wood thicker than about ¼ ", the lid can't be high and/or domed. Also, the saw can't be used to fret a pierced design around the box.

All that said, if you are keen to change the pierced design and/or the shape of the lid, you could possibly use a jeweler's piercing saw or perhaps a fine-blade hand fretsaw. It needs a bit of thinking about.

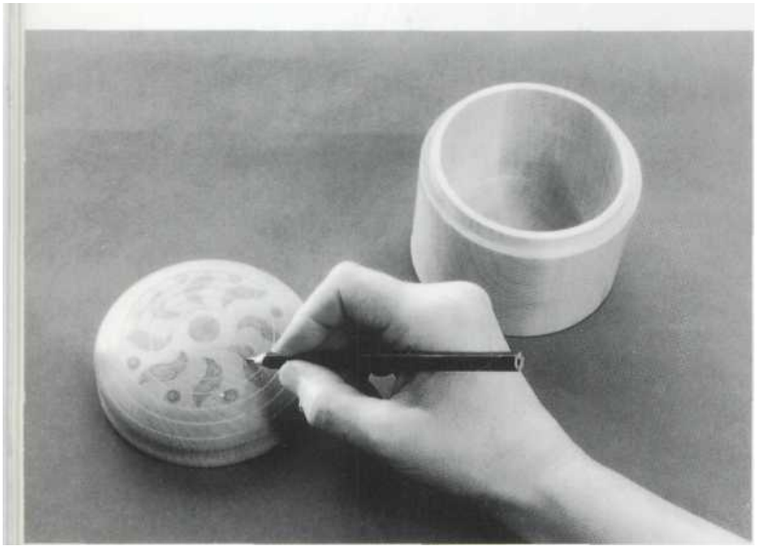
FRETTING, PIERCING AND WHITTLING THE LID

When you have made the turned box, with the lid nicely set out with the 1/4" guidelines, it's time to fret out the design. Pencil-press transfer the design through **to** the wood, bore out round holes with appropriate size bits, drill small **pilot** holes through the "windows" of the design, and fret out the shapes on the scroll saw. Finally, use the point of the knife to trim back the sharp edges of the piercings.

1 When you have sanded and smoothed the lid to a



good finish, use the point of the skew chisel to set the lid out with a series of rings. Space them about 1/4" apart. The idea is that you can use them as a guide to lay out the design.

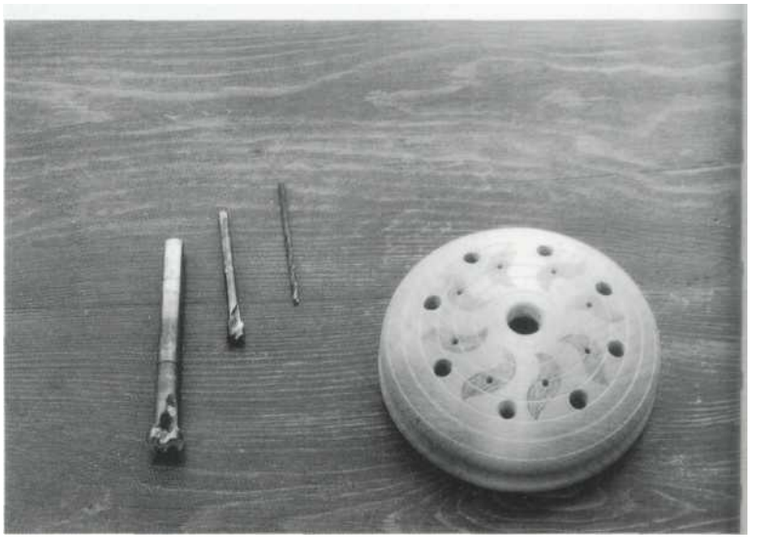


2 Shade in the pierced areas so that there is no doubt about the line of cut. If you are worried about the pencil smudging, then it's a good idea to give the whole lid a quick spray with pencil fixative as used by illustrators.

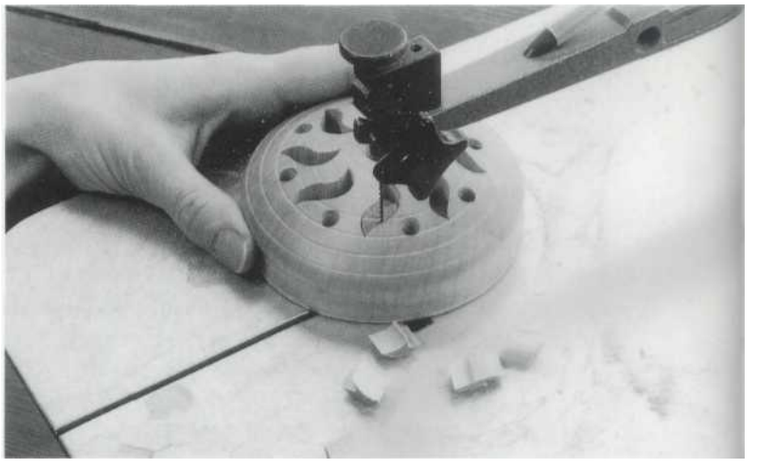
MATERIALS LIST

A Board (1)	4½"×4½"×6"

Note: Because we were a bit short of wood, we decided to laminate two pieces to make the 4½"×4½"×6" section.



3 It's most important that you use Forstner bits for the large holes that make up the design. I say this because they are the only bit types that guarantee **perfect-**every-time holes.



Take two cuts for each end of the little curved shape. Work from the central pilot hole and down toward the point so that the point is crisp and sharp.

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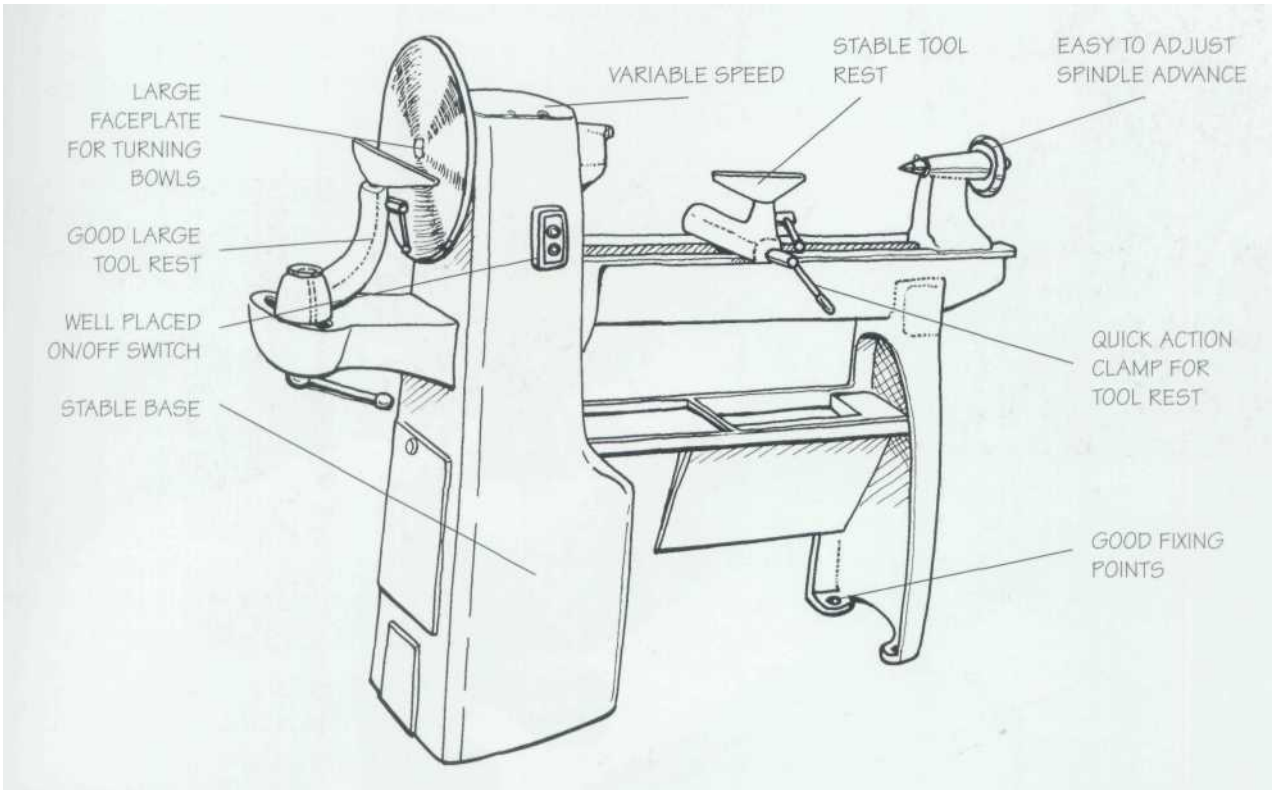
USING THE LATHE AND THE FOUR-JAW CHUCK

Though wood turning is one of the most important **woodworking activities**—vital for making just about everything from chair legs, stair balustrades, and bedposts, to boxes, candlesticks and bowls—it is also one of the most misunderstood of all the woodworking techniques. What happens **with** most beginners is that they purchase an "amateur" machine and a set of "starter" tools, and then become disenchanted when they can't make anything more exciting than small spindles. The problem, of course, is that small machines tend to wobble and shake, and the pronged center and the fixed tailstock center that are supplied **with** most small machines are totally inadequate and almost useless. As a result, many beginners soon get disillusioned and decide to give up wood turning. The **pity of** it **is** that the majority of these disillusioned beginners heap blame on themselves. Of course, what these beginners simply can't know is that turning is the one area of woodworking where the old adage "a poor workman always blames his tools" is a load of bunk! In the context of wood turning, the boring old adage ought more rightly read "poor results are nearly *always* the result of poor tools." All this adds up to the inescapable fact that exciting and varied wood turning can only really be achieved if you have top quality tools and equipment.

So there you go. If you are a beginner looking to get started, the following pointers will show you the way.

Lathe

In essence, a lathe is a woodworking machine used for cutting and shaping wood into a round section. The wood is pivoted and spun between centers and/or held **in** a chuck, while at the same time handheld chisels or gouges are used **to** make the cuts. Though there are many lathe types—small ones, large ones, very long ones, some dedicated to making spindles, some dedicated to making bowls, some with fancy multispeed controls, and so on—experience tells me that a large traditional lathe, with a big motor and a heavy cast-iron frame, is by far the best option. I say this because while a miniature lathe might well be superb for making small items like lace bobbins, it can't be used to make larger pieces like bowls and chair legs. A large lathe, on the other hand, can be used to make everything from lace bobbins to bedposts. As for the cast-iron frame of a large lathe, there's no rust, no vibration, no nothing—it just sits there and does the job! I have a large old English lathe called a Harrison Jubilee, made about 1940. It is a wonderful machine.



LATHE ANATOMY

If the notion of wood turning appeals to you, then be sure to invest in the biggest, best quality lathe that you can afford.

HEADSTOCK AND ***TAILSTOCK***

The headstock, the power-driven unit at the left-hand side of the lathe, carries the bearings in which the spindle revolves. The spindle has an external screw for chucks and **faceplates** and an internal taper for the pronged center. The tailstock, the movable unit at the right-hand side of the lathe, holds a pointed center. The distance between **the** headstock and the tailstock can be adjusted by winding the tailstock center in or out.

TOOL *REST*

The tool rest, sometimes called T-rest, is the unit that moves left or right along the bed on which the tools—meaning the gouges and chisels—are rested. Being mindful that the rest is a fulcrum for the levering action of the tools, it is essential that it can be swiftly and easily moved and put in place.

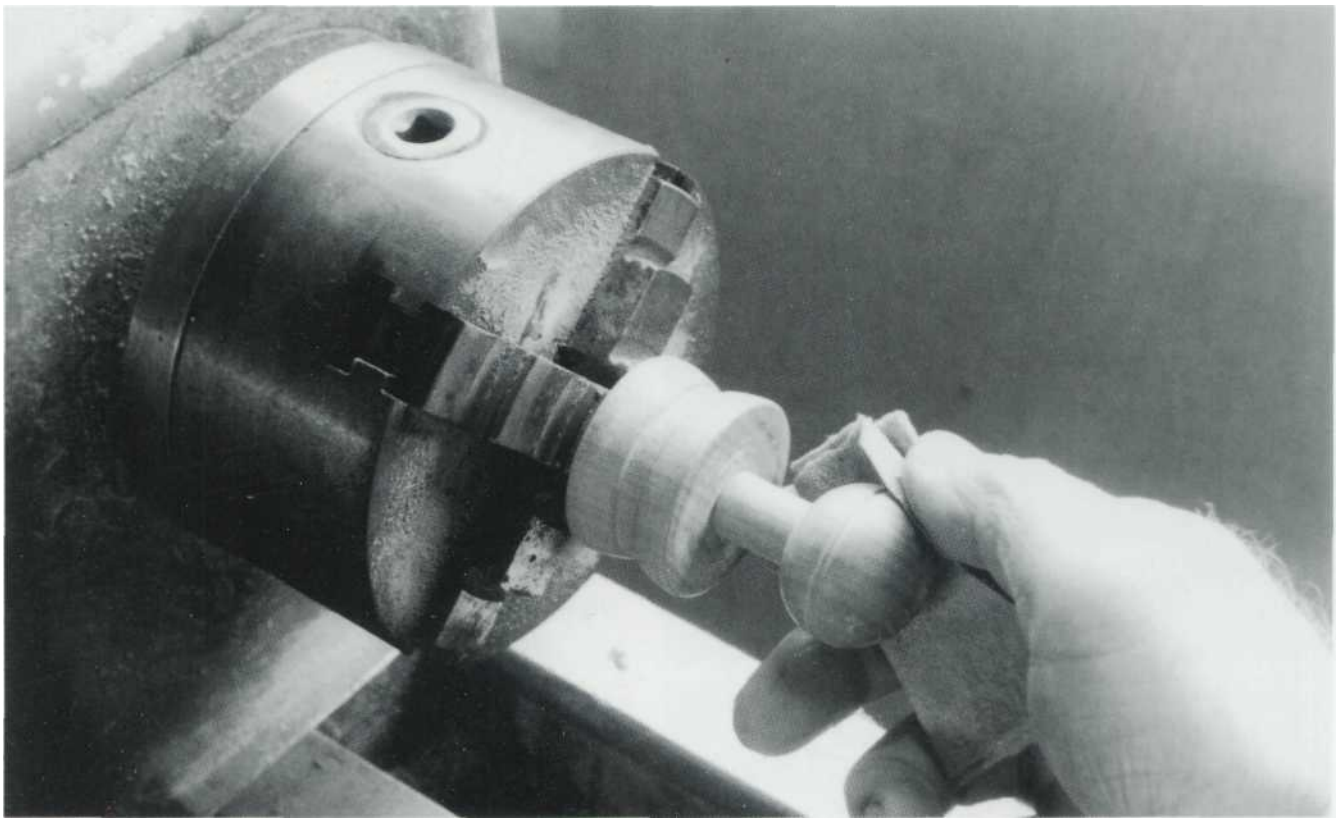
THE BED

The bed is the metal track, rods or rails that link the headstock to the tailstock, upon which the tool rest slides. Since it is vital that you are able to swiftly and easily move the tool rest, it is best to avoid narrow-slot, round-section bar beds that easily get clogged up with dust and shavings.

Four-Jaw Chuck

The four-jaw chuck is a mechanism used to hold the workpiece; it is a device that replaces the pronged center and all manner of other centers. Operated by a chuck key, the four jaws can be opened and closed in unison in such a way that they grip square sections. To my way of thinking the four-jaw chuck is essential. Okay, so four-jaw chucks are expensive—mine cost one-quarter the price of my secondhand lathe—and they do need to be fitted with a guard. But they grip wood without the need to turn it down to a round section—a huge time-saver—and once the wood is in the chuck, you can be confident that it's going to stay put.

When I said at the beginning that you can make just about everything you care to imagine on a large lathe, I should really have added the proviso: but only if you use a four-jaw chuck. You should see me at my lathe. 1 don't mess around with pronged centers or faceplates. 1 threw them away long since. I simply mount everything on the four-jaw chuck and get straight into the job. As well as holding square sections without the need for preparation, the jaws are good for other uses, such as holding rings and containers, holding a large screw—instead of using a screw center—and gripping round sections.



FOUR-JAW CHUCK

The ***advantage*** of *the four-jaw chuck is that you can draw the tailstock center out of the way and approach the workpiece head-on.*

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Heart-Shaped Cheese Board



This project had its beginnings in our ever-pressing need to tidy up our workshop. The problem was, of course, what to do with the mountain of offcuts? I'm sure you know what I mean. The chair, table, box or whatever is finished, and you are left with great heaps of wood. Okay, maybe the longer lengths can be used for the next **job** in line, and the shavings can be used as fuel or as bedding for your chickens, and the dust can be swept up and put in the trash, but what to do with the medium-size bits and pieces that look too good to throw away? Well, after a deal of thought, we came up with the super-brilliant idea of cutting all our small offcuts down to a uniform size, and then laminating the resultant blocks to make cutting boards and surfaces that needed to show end grain. Okay, so it is a solution that involves a l**ot** of time, sweat and effort, but then again, the finished boards can be presented or marketed as choice handcrafted items.

So there you go. If you are up to your knees in offcuts, or you are short of cash and maybe know of a sawmill operator who is looking to give away his trimmings free, then perhaps this is the project for you!

MAKING THE BOARD

Collect all your waste wood and cut it down to the best overall section size. I went for a square section 1 3/4" X 1 3/4", but you can just as well go for 1" X 1" or 1" X 1 1/2"**,** or whatever size best suits your material. And, of course, if **you** want to use a mix of sizes, then no matter, as long as the grain is running along the length and the corners are true at 90°. Having achieved your sawed size, plane the wood down to a smooth finish. When you are happy with the finish, saw it down to 1 1/8" slices. When you have a stockpile of 1 1/8" slices, pencil label the end-grain face, arrange the slices side by side in rows of about 12" long, and spend time working out how best to clamp them together. You can use a couple of G-clamps and a bar clamp, or a jig and wedges; no matter, as long as the arrangement is such that you can apply end pressure without the strips bending or bowing along their length.

Do the gluing-up in two stages: first the blocks side by side **to** make the strips, and then the strips side by side **to** make the slabs. Draw the design of the board on the slab, cut out the profile and sand the end-grain surfaces to a good finish. Fit the whittled feet and the cutting wire, give the whole works a coat of matte varnish and the **project** is finished.

SPECIAL TIP: DRY FIT FIRST

As the success of this project hinges on your being able to glue and clamp dozens of the little blocks together, it is important that you plan out the procedure. The best way is to have a trial dry run, with everything in place except the glue. You need to check out the glue type and make sure that it's suitable, clear an area and make sure that there is room to maneuver, have cloths and newspaper handy, and so on. And then you have to actually clamp-up the wood and see how your arrangement works out. Okay, so maybe my way of working does sound a bit fussy, but the horrible alternative is to have glue smeared all over the place, only to find that the clamp isn't long enough, or you have glued the wrong surfaces, or you are missing some vital piece of equipment.

MATERIALS LIST

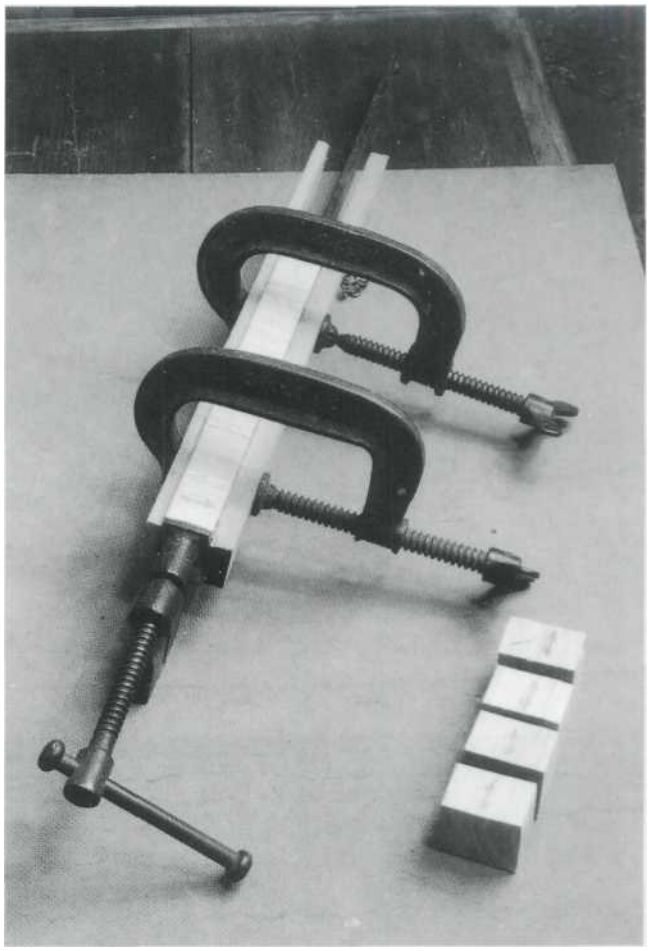
A Board	1¾″×1¾″ offcuts—enough to suit the size of your board
B Feet (1)	1½″×½″×6″
	½″ dowel × 4″ long
C Toggle handle (1)	fancy hardwood
	½″×1″×4″

HARDWARE AND EXTRAS

D Cheese wire (1)	15″ long

Note that all measurements allow for a small amount of cutting waste.

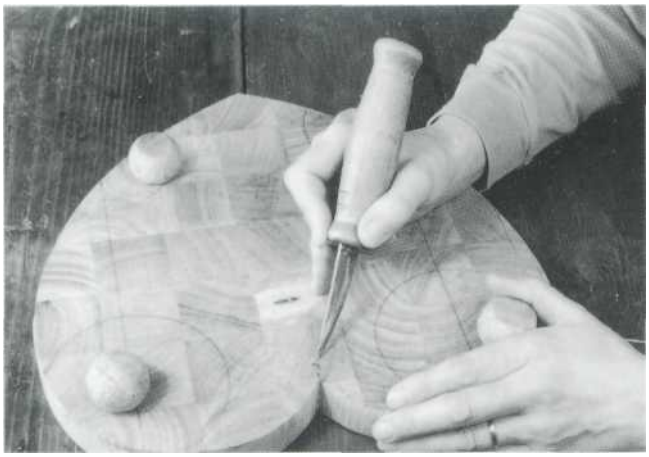
STEP-BY-STEP **STAGES**



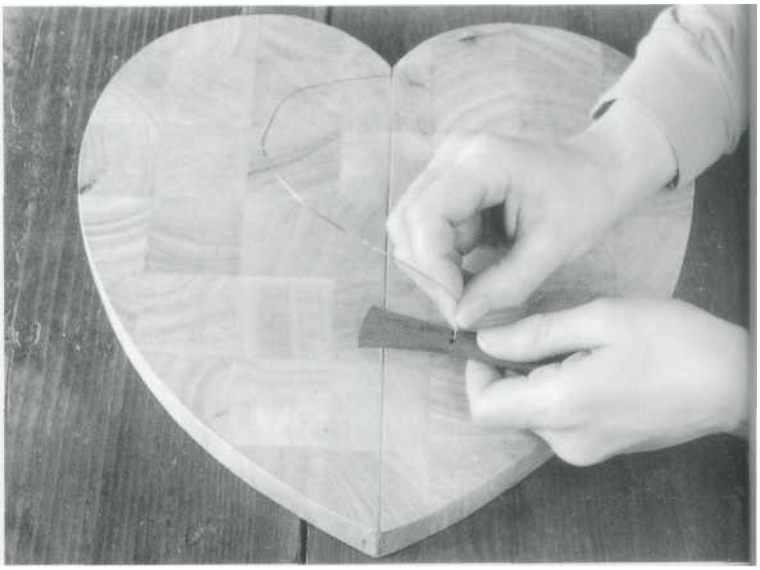
Saw the 1 3/4" X 1 3/4" square section of wooddown into 1 1/8"" thick slices—like slices off a loaf of bread—and then clamp up. With the arrows indicating the run of the grain, you can see how the slices of wood need to be realigned when it comes to gluing.



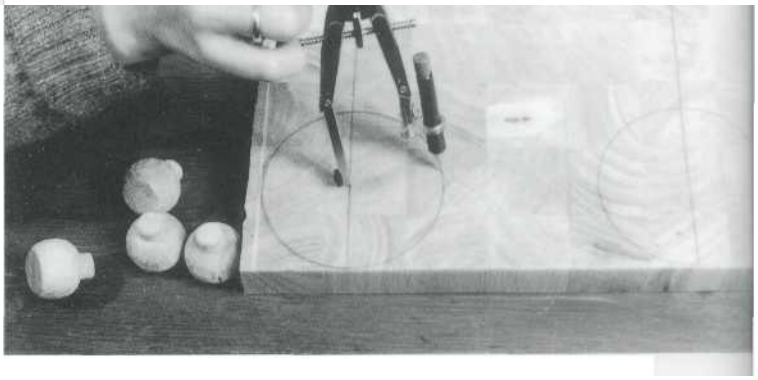
The best way of ensuring that the little ball feet stay in keeping with the total design is to whittle them to shape. I drilled and doweled four little square blocks, cut the corners off the blocks to make rough octagonals, and used a largish sloyd knife for the whittling.



3 To fix the wire, drill a 1/8"-diameter hole, set the wire in the hole and then follow it up with a glued dowel. Make a saw cut between the cheeks, wrap the wire over and around in the cut and follow it up with a glued sliver wedge.



Having whittled a small piece of hardwood to a but terfly shape and sanded it to a super smooth finish run two side-by-side 1/16"-diameter holes through the center of the bow, and knot the wire in place.



And just in case you have an aversion to heart shapes, there is no reason at all why you can't go for just about any shape that takes your fancy. For example, you can simply round the corners of a rectangular board.

DEBRIS COLLECTION AND WOODSHOP SAFETY

Woodshop debris, in the form of offcuts, shavings and sawdust scattered around on the floor and over the surfaces, is a dangerous nuisance. The shavings make the floor slippery and the loose offcuts are potential ankle-breakers. And of course, the wood dust not only clogs the machines, it is a fire risk, it creeps into the home, and it also harms the lungs.

Just how much dust is considered to be dangerous? The Occupational Safety and Health Administration **(OSHA)** suggests that if you can see wood dust floating around in the atmosphere when a shaft of sunlight shines across the workshop, then you have a problem that needs solving.

We tackle the problem in several ways: We cut the amount of dust down at the source by using filtered machines and by producing shavings rather than dust, and we have a large mobile vacuum system that we move around to service the various machines. We also wear a rubber dust/vapor mask for most tasks—like sawing, drilling, and when we are using varnish and such—and a lull-face electric visor-helmet respirator when we are working at the lathe. As to which mask does the better job, the rubber mask is silent but uncomfortable and sweaty, while the electric full-face respirator is a bit heavy and noisy.

In the context of sawdust being bad for your lungs, I reckon that tried-and-trusted traditional American and European woods like ash, oak, beech, maple, willow, pear and pine are generally much safer than exotic species such as mahogany, obeche and iroko. All that said, if you find yourself sneezing, or your nose is running, or your skin develops a rash, then you best go for another wood type.

So what to do if you are really worried about dust and allergic reactions and such? Well, I think that for safety's sake, you need to stay with the following rules of thumb:

■ Whenever possible use hand tool techniques that pro duce shavings rather than dust.

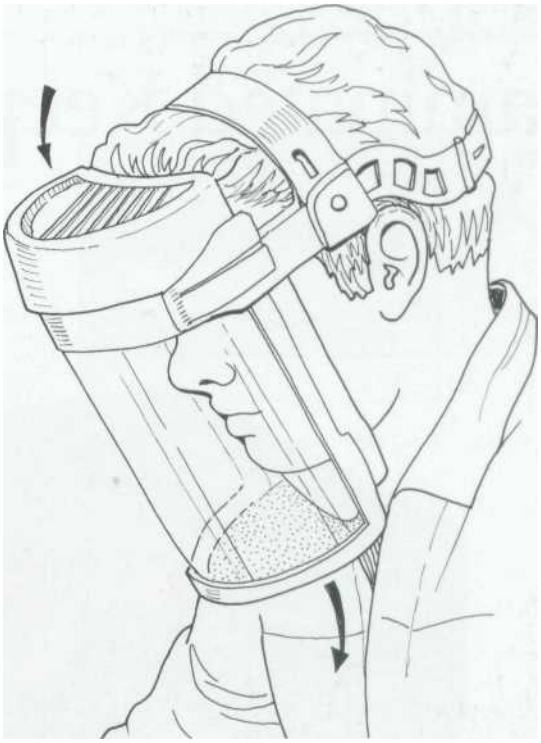
■ Use traditional white-wood species that are non-oily to the touch.

■ Use a vacuum machine to suck up the dust as it is produced—before it gets a chance to puff around the workshop.

■ Wear a full-face mask, and always wash your hands and lace alter work.

■ Always have a thorough sweep-up at the end of the day.

■ If you have a health problem, then ask the advice of your doctor.



ELECTRIC VISOR-HELMET RESPIRATOR

*Though the choice of mask does in many ways depend upon your personal preference—they both have **their plus** points—/ usually wear the full-face respirator when I am working at the lathe, for the plain, simple reason that the **full-face** visor offers additional protection from flying debris.*

Laminated Keepsake Box



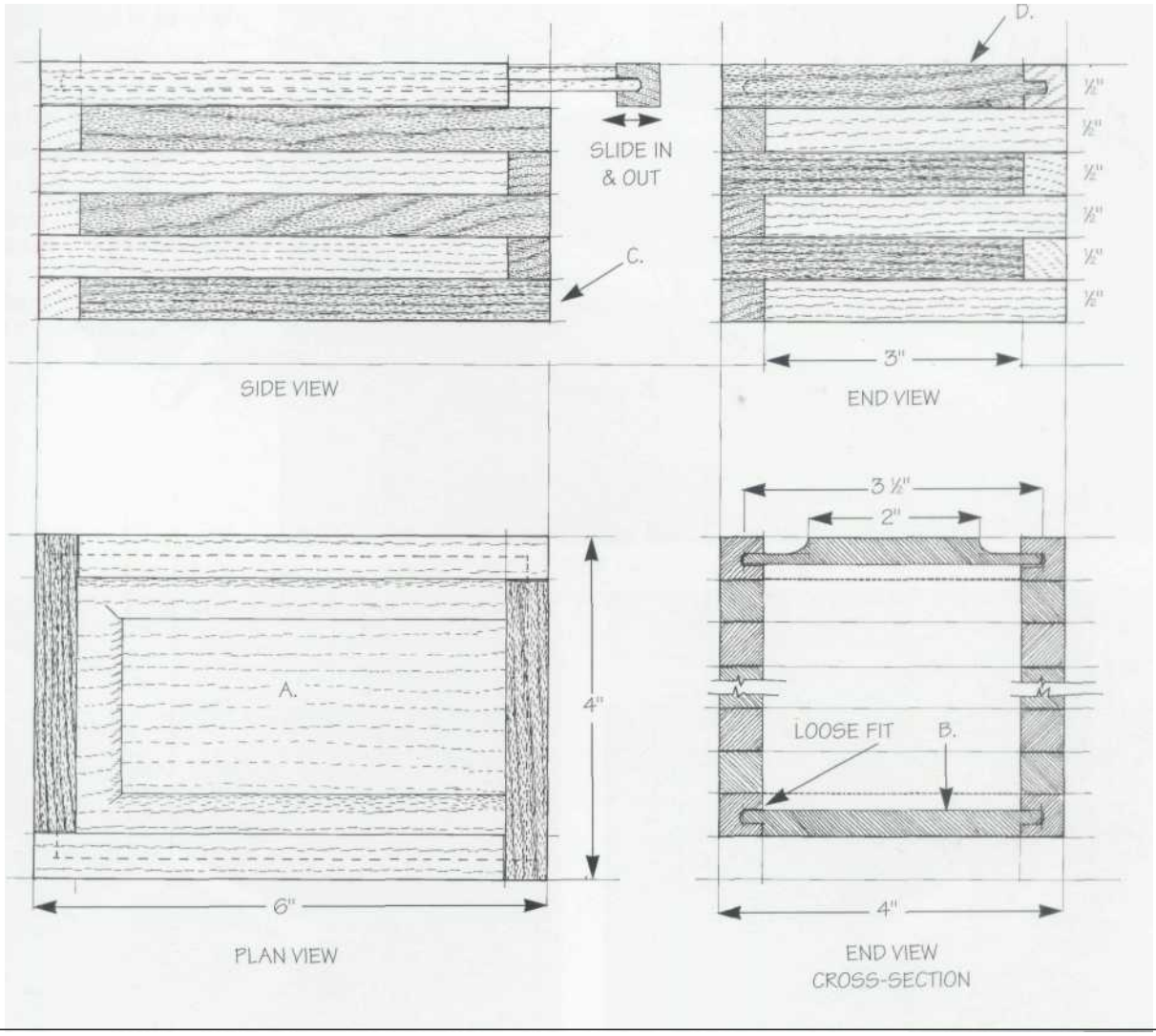
Though you might think that a box is a box is a box and not very exciting, this particular little box is rather special. Not only does it use wood that might otherwise be thrown away, but better yet, the layering technique allows you to very easily modify the length, width and height to suit your own needs. You could call it a "log cabin" box. This refers to the way the sections are layered one on top of another with the ends staggered, just the way the old timers built their log cabins.

MAKING THE BOX

When you have studied the working drawings and seen how the lid and the base boards are set into slots—with the lid being able to slide in and out—then make decisions as to the size of your box, and size and plane the wood accordingly.

If you are going to stay with our design, you need twenty-four 1/2" X 1/2"-square sections in all, twelve long and twelve short. All I did was search through my pile of offcuts, select two colors that went together to make a pleasant counterchange, and then pushed the wood through my portable surface planer. Having planed the wood to a crisp 1/2" X 1/2"-square section, cut the wood to length so that it is perfectly square-ended and slightly oversize. As the long pieces need to end up at 5 1/2"— meaning when they are built into the finished 6"-long box—it's best to cut them at about *5 5/8"*, so you can plane and sand them back to a good fit and finish.

When you have made the twenty-four lengths, pile them up in a dry-run arrangement, in the order they are going to be in the finished box, and pencil mark the top and bottom layers of the stack. Draw in registration marks



so there is no doubting the layered order.

Being very careful that you don't make a mistake, take the eight lengths that go to make the top and the bottom layers and use either a router or a grooving plane to cut the channels. Aim to have the grooves at about 3/16″ wide, 1/4" deep, and centered in the 1/2″ thickness of the wood.

With the channels crisply worked, take the wood that you have chosen for the base and the lid and use a router or a plane to cut the rabbeted edges. While you are at it, use a router or a "round" moulding plane, or even a gouge, to cut the beautiful scooped convex curve that runs down from the top face of the lid through to the rabbet.

Starting at the base and working up, glue the four base lengths together so that the base board is nicely contained, and then layer up in log cabin fashion until the box is complete. Don't forget to leave one of the top-end pieces unglued. This done, test to make sure that the lid is a good fit and leave the box until the glue is set. Glue the short length on the end of the lid board.

Finally, plane and sand the box down to a flush-sided smooth finish, make sure that the lid is a nice easy fit in the grooves, and then wax and burnish to a high sheen.

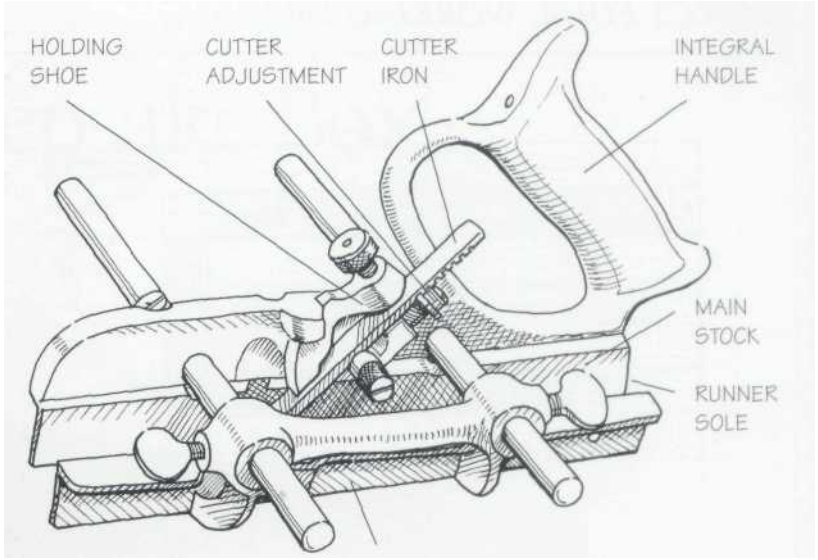
MATERIALS LIST

A Lid (1)	⅜″×3½″×5½″
B Base (1)	⅜″×3½″×5½″
C Long lengths (12)	½″×½″×5⅜″
D Short lengths (12)	½″×½″×3⅜″

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SPECIAL TIP: USING OLD PLANES

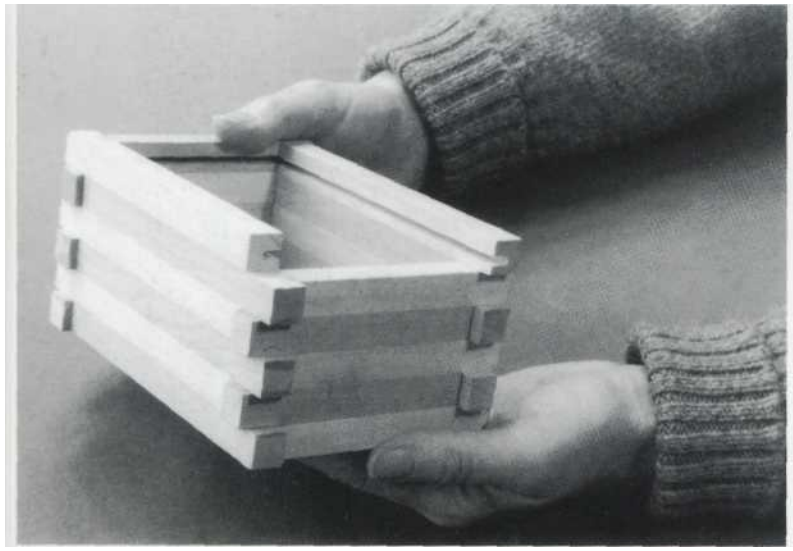
Though there are any number of ways of cutting tongues, grooves and rabbets, I think that the old metal grooving plane takes a bit of beating, meaning one of the old metal Stanley or Record planes. 1 use a Record 043 and 044, both made sometime before 1950. It's true they are no longer made, but 1 picked mine up at a flea market for no more than the cost of a new router bit. The Record 044 has eight blades that range in size from 1/8″ to 9/16".



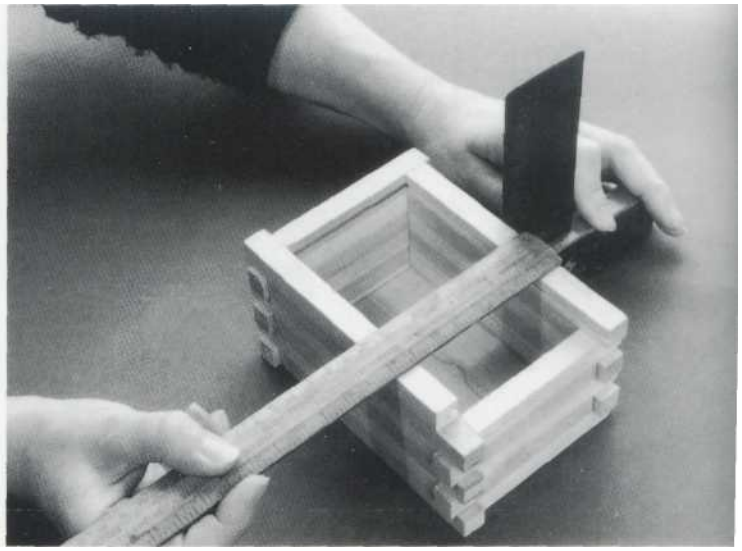
USING OLD PLANES

The classic *Record* 044 grooving *plane is a beauty, easy to tune and pretty foolproof to use.*

STEP-BY-STEP STAGES



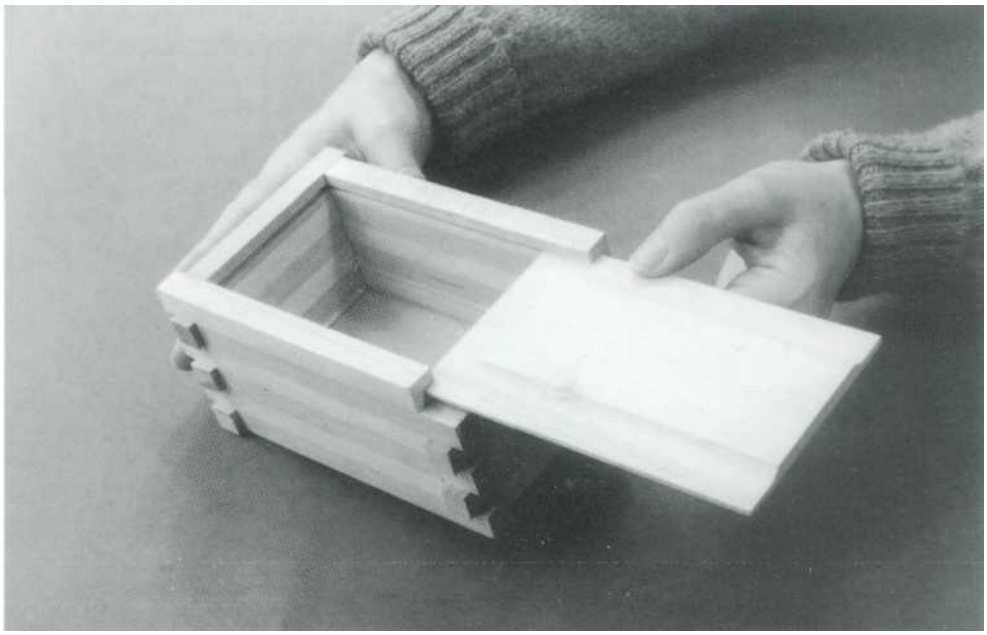
1 With the base dry fitted in place—meaning no glue—layer the square sections up log-cabin style so that the ends stick out beyond the corners. Pay particular attention to the alignment of the grooves.

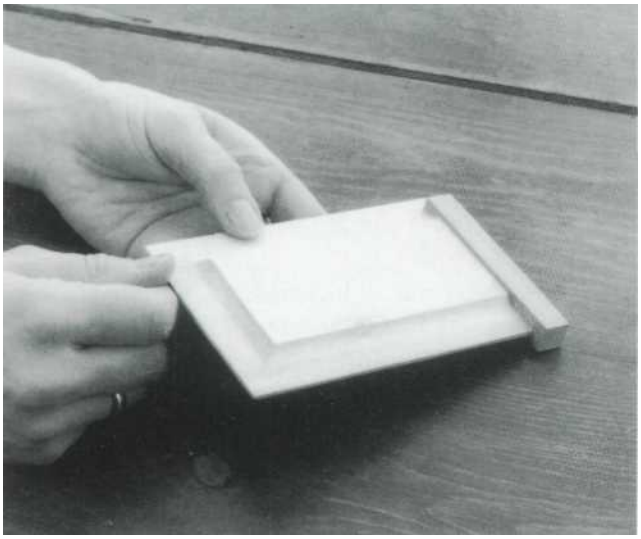


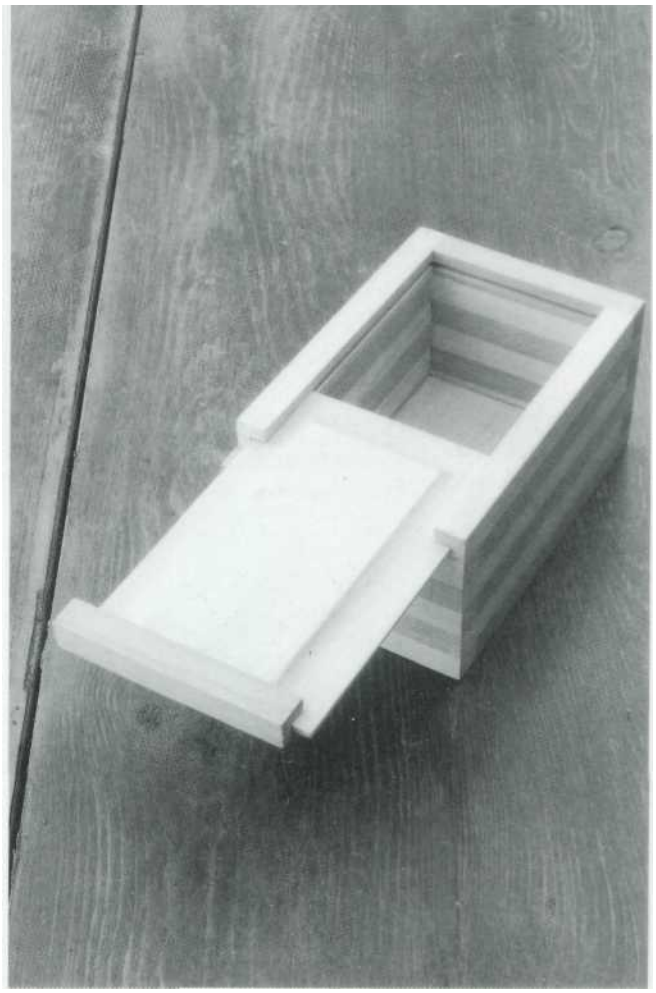
2 When you are happy with the overall shape and alignment of the box, use a ruler and square to check for squareness.

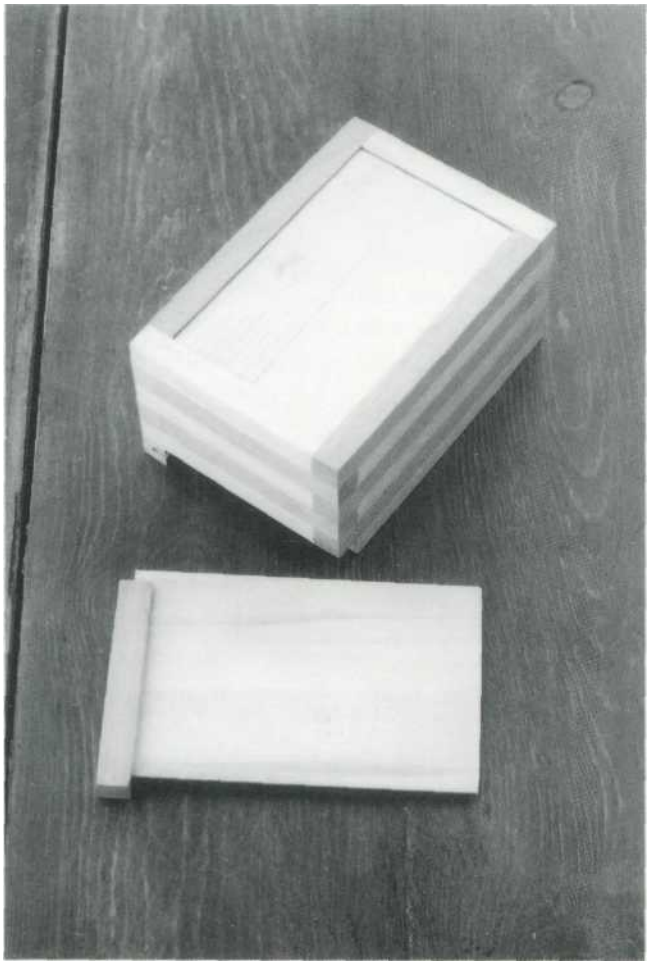
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3 Before you leave the glue to set, make sure that the lid is an easy but snug fit and that it runs right through to the end of the box, so that the end runs into the groove.

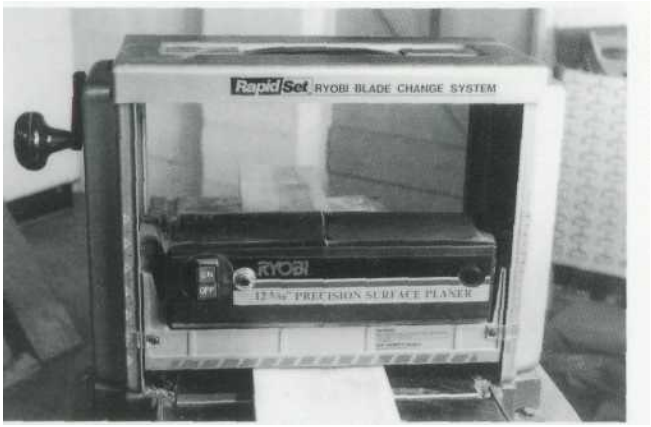








6 If all is correct, the base slab should be well con-unncd, but should fit loosely, so that the box side can move without splitting the base.



The portable surface planer is a great bench machine. All you *do* is *feed the wood in one side, between the cutter blades and the bed, and it comes out* ***the*** *other side nearly finished!*

PORTABLE SURFACE PLANER VS. HAND PLANES

If you are a beginner to woodworking, then sooner or later you will have to make decisions about your overall approach to the subject, or your "working philosophy." One of the main questions that you have to ask **yourself** is, do you want the emphasis to be on the bench power tools—meaning routers, press drills, planers and all **the** rest—or do you want to focus on using hand tools? Most woodworkers 1 know fit in one of four groups:

- Will not use power tools at any price.
- Will grudgingly use the occasional power tool, but much prefers hand tools.
- Enjoys using power tools for most of the work, and tidies up with the hand tools.
- Very much enjoys using power tools and is reluctant to use hand tools.

I reckon that Gill and 1 fit into group two. We much prefer working with hand tools but will sometimes use a power tool to speed things up.

Okay, so you must surely have gathered by now, that we're not very keen on power **tools.** It's not so much that we can't afford to power up, but rather that we both dislike all the dust, debris and noise that power tools generate. To our way of thinking, there is nothing quite so unpleasant as being covered with fine dust and blasted with noise.

All that said, 1 was so tuckered out one day last summer—when I was heavily involved in the strenuous and sweat-making procedure of hand planing a massive rough-sawn oak plank—that I decided, against my better judgment, to invest in a portable planer thicknesser. To cut a long story short—or you could say to plane a fat story thinner (ha!)—when I first saw this machine, I was firmly convinced that it was the beginning of the end of my way of working. My thinking was that it would somehow or other weaken my belief that slow-and-quiet is beautiful. However, there is no denying that it has changed the way 1 work. For example, where I once struggled and strained with a jointer plane, and then a smoothing plane, 1 now pass the wood a few times through the surface planer. In fact, I have to admit that it's a beautifully efficient machine that gets a lot of use. Of course, it is noisy, and 1 do have to house it in its own shed, and I did have to get myself a dust sucker and a full-face respirator mask, but against that, I can now spend much more time playing around with my various grooving, moulding and combination hand planes.

Most experts would agree that the best way is to start with hand tool techniques and then power up when you fully understand your needs.

Miniature Mantle Clock



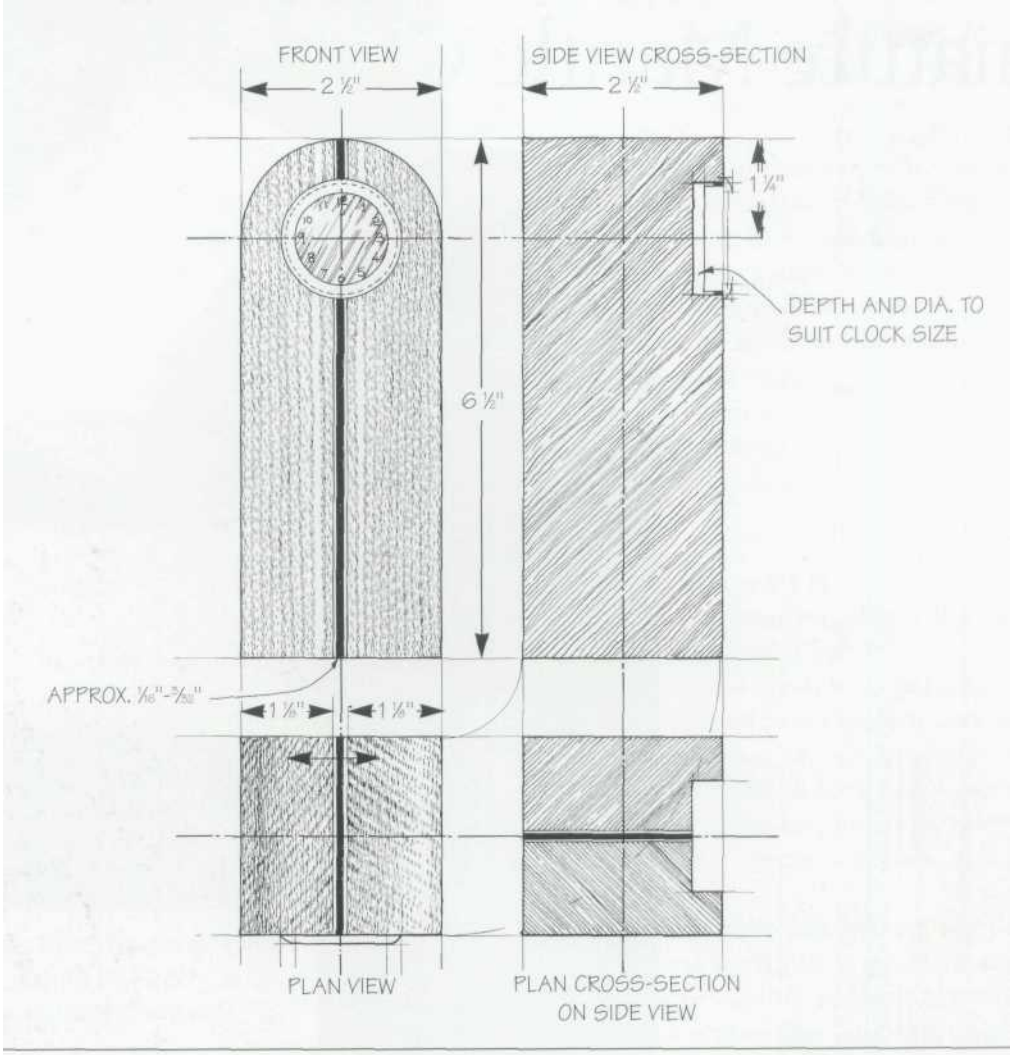
Sometimes, when I am sitting alone in my workshop, I take up one or more pieces of choice wood and feast my eyes on the various colors that make up the character of the grain. To hold the wood up to the light and see the way the grain shimmers and glows, to see how two pieces of wood look when they are held side by side—and then to imagine how the wood might be used for a special project—these are unique quality-time experiences that should not be missed.

This project draws its inspiration from one of my alone - in the workshop musings. The problem was how to bring together three relatively small pieces of choice exotic wood—a scrap of ebony salvaged from an old long-gone piece of furniture, a sliver of silver sycamore veneer left over from a marquetry project, and a short length of dark wood that I've been using to prop open the door. Anyway, I tossed all sorts of ideas around in my head—a small piece of laminated jewelry? a turning? a handle for a knife? a drawer pull? And then it came to me . . . why not make a small clock case!

MAKING THE CLOCK CASE

First things first. Before you do anything else, you need to search out a miniature watch-clock and a Forstner drill bit sized to fit. For example, as my clock (described in the catalog as a "watch-clock miniature suitable for block and drilled recess mounting") measures slightly under 1 5/16" diameter across the span of the back and about 1/4" in depth, I reckoned that I needed a drill size of 1 3/8".

When you have obtained the clock-watch and the drill size to suit, take your chosen pieces of wood and plane and sand the mating faces down to a true finish. This



done, smear white PVA glue on the mating faces and clamp up.

Having waited for the glue to cure, set the compass to a radius of 1 1/4", spike it on the center veneer at a point about 1 3/8" down from top-center, and then strike off a 2 1/2"-diameter half-circle. When you are happy with the way the lines of the design are set out on the wood, move to the band saw and cut out the curve that makes the top of the case.

Use a square to mark out the baseline, double-check that it is absolutely true, and then cut off the waste with a small-toothed backsaw. It's important that the baseline is square to the center line of the block, so spend time getting it right.

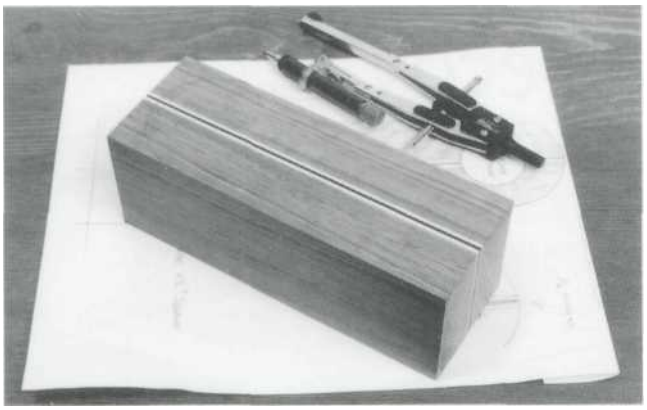
When you are sure that the block sits square and true, move to the drill press and bore out the recess for the clock. Bore down to a depth of about 3/8".

Having bored out the recess, take a scrap of sandpaper and rub down the inside of the recess, so that the clock-watch is a tight push fit. If necessary, use a straight gouge to cut a little scoop for the hand-setting knob that sticks out at the side of clock case. When you have achieved a good fit of the clock-watch in the recess, rub the whole block down on a sheet of fine-grade abrasive paper. Finally, burnish the block with beeswax, slide the clock-watch mechanism in place, and the project is finished.

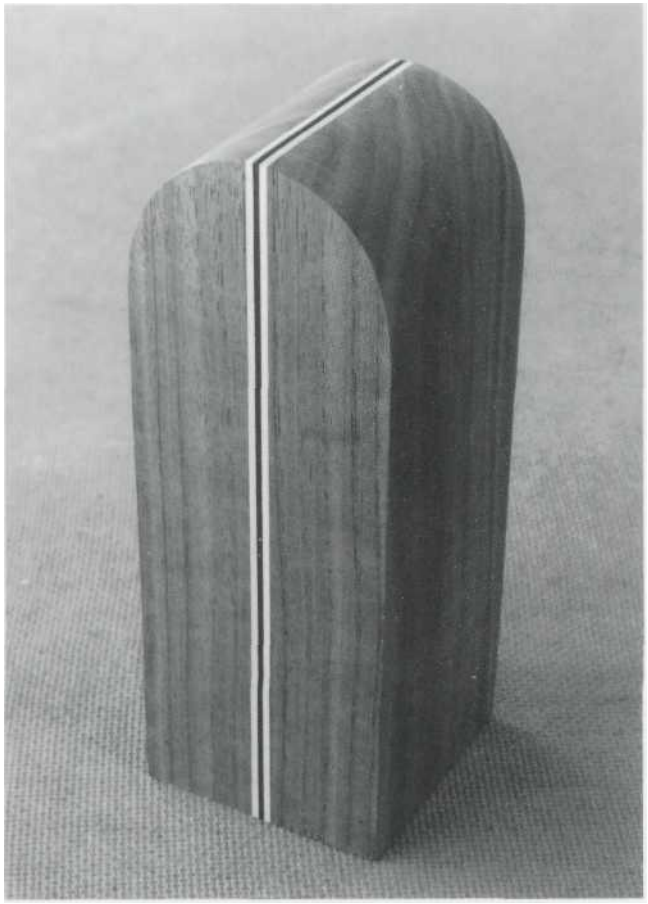
SPECIAL TIP: LAPPING

The best way of rubbing the faces of the block down to a smooth, true finish is to use a technique known as lapping. All you do is mount a sheet of medium-grade abrasive paper to a slab of 1/2"-thick plywood so that the grit side is uppermost. Then clamp the slab in place on the bench, In use, the workpiece is rubbed in the direction of the grain, backwards and forwards. The procedure is rerun with finer and finer grades of paper.

STEP-BY-STEP STAGES



1. pass radius to 1 1/4″ and strike off the arc that makes the top of the case. Make sure that you spike the compass point on the middle of the fine black laminate.



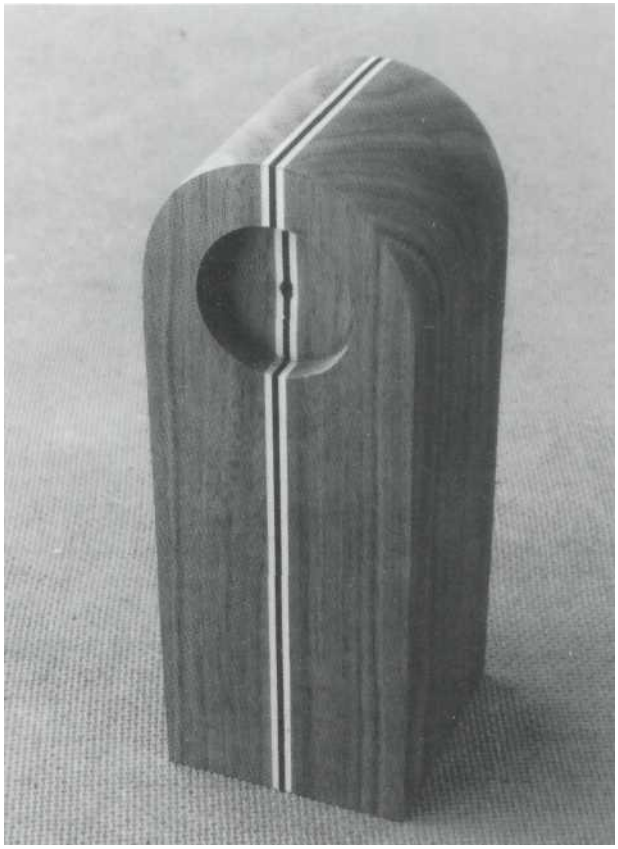
2. laving cut the curve on the band saw, run the faces of the block down on a series of lapping boards. Work through the grit sizes, from a medium-fine through a super-line flour grade. Only work in the direction of the grain, and be careful that you don't blur the sharp corners.

MATERIALS LIST

A Outer faces (2)	1⅛″×2½″×7″
B Central lamination (1)	1/16″-3/32″×2½″×7″
C Side-of-center laminations (2)	1/16″-3/16″×2½″×7″

HARDWARE AND EXTRAS

D Quartz clock-watch, 1 5/16″ diameter—best if it has a push-fit rubber band friction fitting



3. Having selected a Forstner bit sized to fit the diameter of your clock, sink a recess to the appropriate depth. The success of the project hinges on the hole being perfectly placed, so spend time getting it right.

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Swivel-Head Duck Decoy

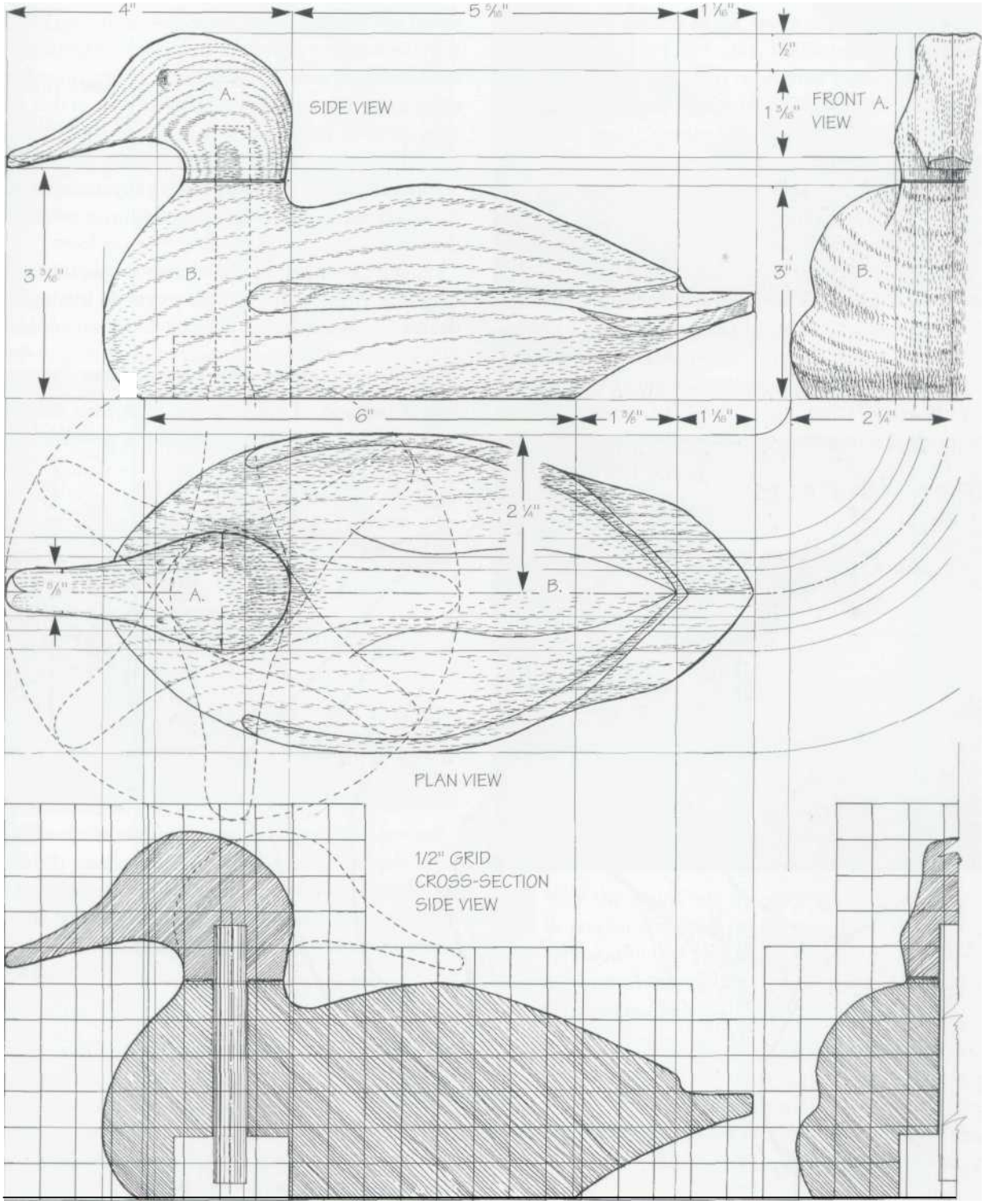


Duck decoys are no more than carved and whittled imitations of the real thing. The word *decoy* comes from the Dutch words *kooj* and *koye* meaning to lure or entice. Though old accounts suggest that decoys were first used by Native Americans, the notion was soon taken up by the white American settlers. It's a wonderfully simple idea: The carved wooden ducks are anchored out in the water, along comes a flock of ducks attracted by the decoys, they circle with a view to settling down on the water, and—Bang!—the hunter is provided with easy targets. Okay, so it's not very sporting, but when one must. . . . Though once upon a time duck decoys were swiftly carved and whittled by the hunters to their own design and then thrown in a corner for next season, they are now considered to be extremely valuable and very collectible examples of American folk art.

MAKING THE DUCK

Having first studied the working drawings, and variously looked at pictures of ducks, collected magazine clippings, made sketches and drawings, and maybe even used a lump of Plasticine to make a model, take your two carefully selected blocks of wood and draw out the profiles as seen in side view. Make sure that the grain runs from head to tail through both the head and the body.

When you are happy with the imagery, use the tools of your choice to clear the waste. I used a band saw, but you can just as well use a bow saw, a straight saw and a


4"
5 5/16"
1 1/16"
1/2"
1 3/16"
FRONT A. VIEW
A.
SIDE VIEW
3 3/16"
B.
3"
B.
6"
1 3/16"
1 1/16"
2 1/4"
2 1/4"
5/8"
A.
B.
PLAN VIEW
1/2" GRID
CROSS-SECTION
SIDE VIEW

rasp, a large coping saw, a gouge and a drawknife, or whatever gets the job done. Next, set the two parts down on the bench—so that you can see them in plain view—and draw the top views out on the partially worked surfaces. Don't fuss around with the details, just go for the big broad shapes. Once again, when you are pleased with the imagery, use the tools of your choice to clear the waste.

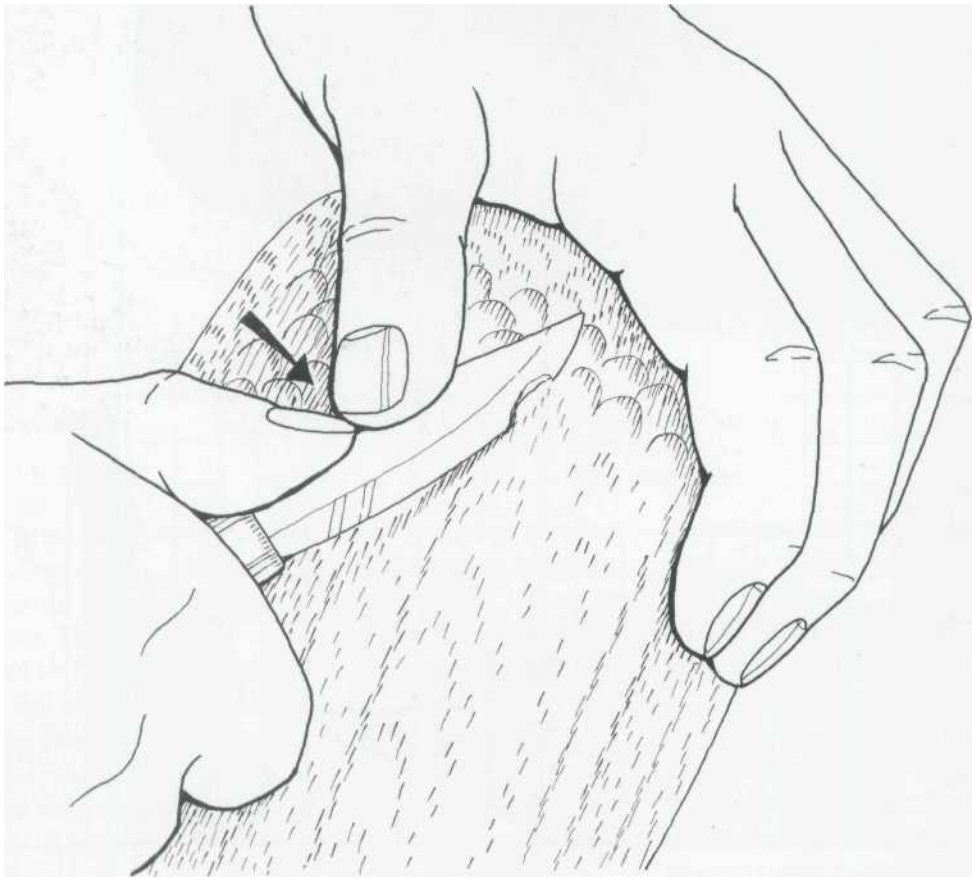
When the shapes have been roughed out, then comes the fun of whittling and modeling the details. Having noticed that this is the point in the project when most raw beginners lose their cool and start to panic, I should point out that there are no hard-and-fast rules. If you want to stand up or sit down, or work out on the porch, or work in the kitchen, or whatever, then that's fine. That said, your wits and your knives need to be sharp, you do have to avoid cutting directly into end grain, and you do have to work with small controlled paring cuts.

Of course, much depends upon the wood and your strength, but 1 find that 1 tend to work either with a small thumb-braced paring cut—in much the same way as when peeling an apple—or with a thumb-pushing cut that is managed by holding and pivoting the **knife** in one hand, while at the same time pushing against the back of the blade with the other hand. Either way, you do have to refrain from making slashing strokes.

When you come to the final modeling, start by sitting down and having a good long look at the duck. Compare it to the working drawings and any photographs that you have collected along the way. If necessary, rework selected areas until it feels right. When you reckon that the form is as good as it's going to get, use a rasp and a pack of graded sandpapers to rub the whole work down to a smooth finish. Avoid overworking any one spot; it is better to keep the rasp/sandpaper and the wood moving, all the while aiming to work on the whole form.

Finally, fit the neck dowel, run a hole down through the duck, drill out the washer recess on the underside of the base and the fixing hole on the front of the breast. Block in the imagery with watercolor **paint, give the** whole works a rubdown with the graded sandpapers, lay on a coat of beeswax or maybe a coat of varnish, and the duck is ready . . . not for shooting, but for showing!

STEP-BY-STEP STAGES



If you are looking to make a strong but controlled cut, you cannot do better than go lor the thumb-pushing paring approach. In action, the cut is managed by holding and pivoting the knife in one hand, while at the same time pushing against the back of the knife with the thumb of the other hand. Notice how the direction of cuts runs at a slicing angle to the run of the grain.

MATERIALS LIST

A Head (1)	1¾″×2½″×4½″
B Body (1)	3½″×5½″×10″
C Neck pivot (1)	½″ dowel×4″ long

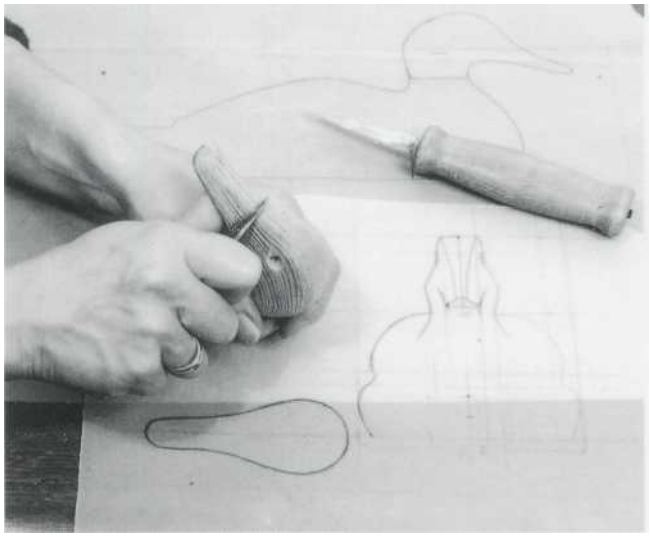
HARDWARE AND EXTRAS

D Glass/plastic eyes (2)

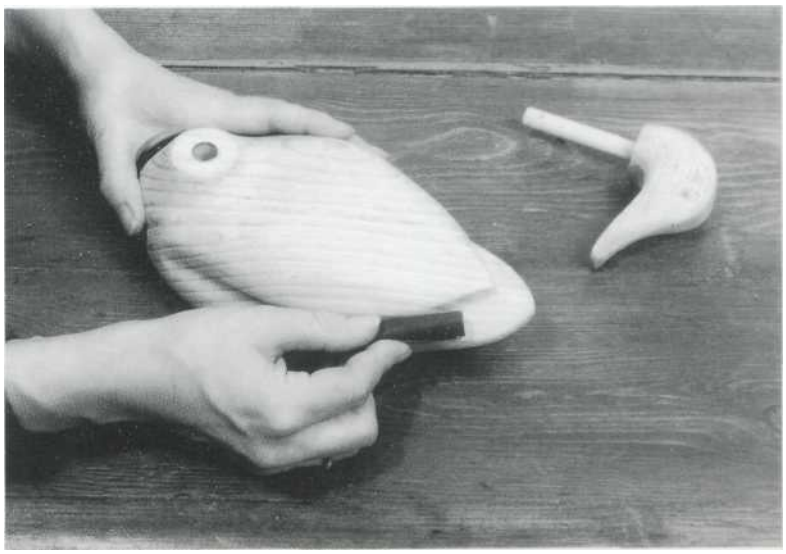
E Plastic washers to fit the dowel (2)

F Watercolor paint as used by artists: gold-yellow, red-brown, dark green, white, gray, blue and black

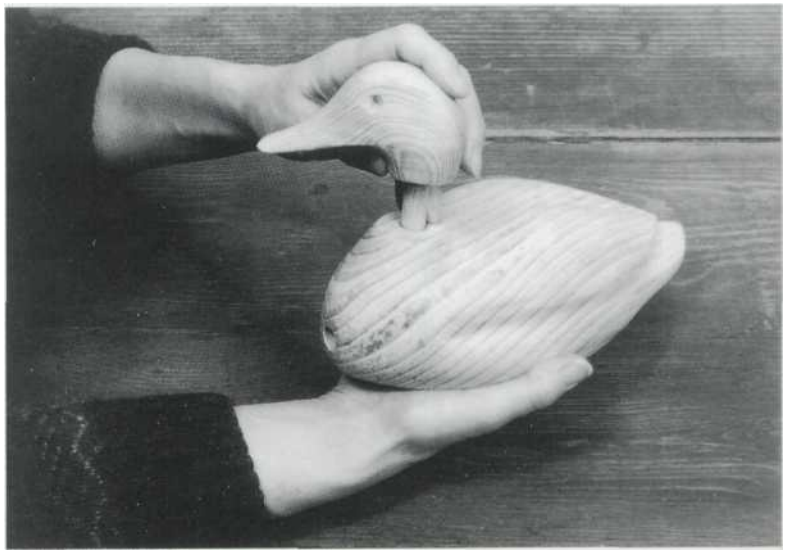
Note that all measurements allow for a small amount of cutting waste.



2 Use the thumb-braced paring cut to shape the characteristic cluck bill. This cut uses the thumb as a lever to increase the efficiency of the stroke. Always be ready to change knives to suit the cut—a small penknife blade for details, and a large sloyd knife when you want to move a lot of wood.



3 Use the graded abrasive papers to achieve a smooth finish. In this instance the paper is wrapped around a dowel that nicely fits the long scooped shape.



4 Slide the dowel into the neck socket and adjust the fit so that the head profile runs smoothly into the body. Be mindful that you might well need to modify the head and/or the body so that the two parts come together for a close-mating fit.

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5 Now, with the washer in place, ease the pin/peg through the breast hole and push it into the dowel hole. Use plastic or leather washers to ensure a good tight-turning fit.

SPECIAL TIP: SAFETY WITH A KNIFE

The degree of safety when using a knife will depend to a great extent on your stance and concentration. Okay, so there is no denying that a knife is potentially a very dangerous tool, and it's not a tool to use when you are tired or stressed, but that said, if the knife is sharp and the wood easy to cut, then you shouldn't have problems.

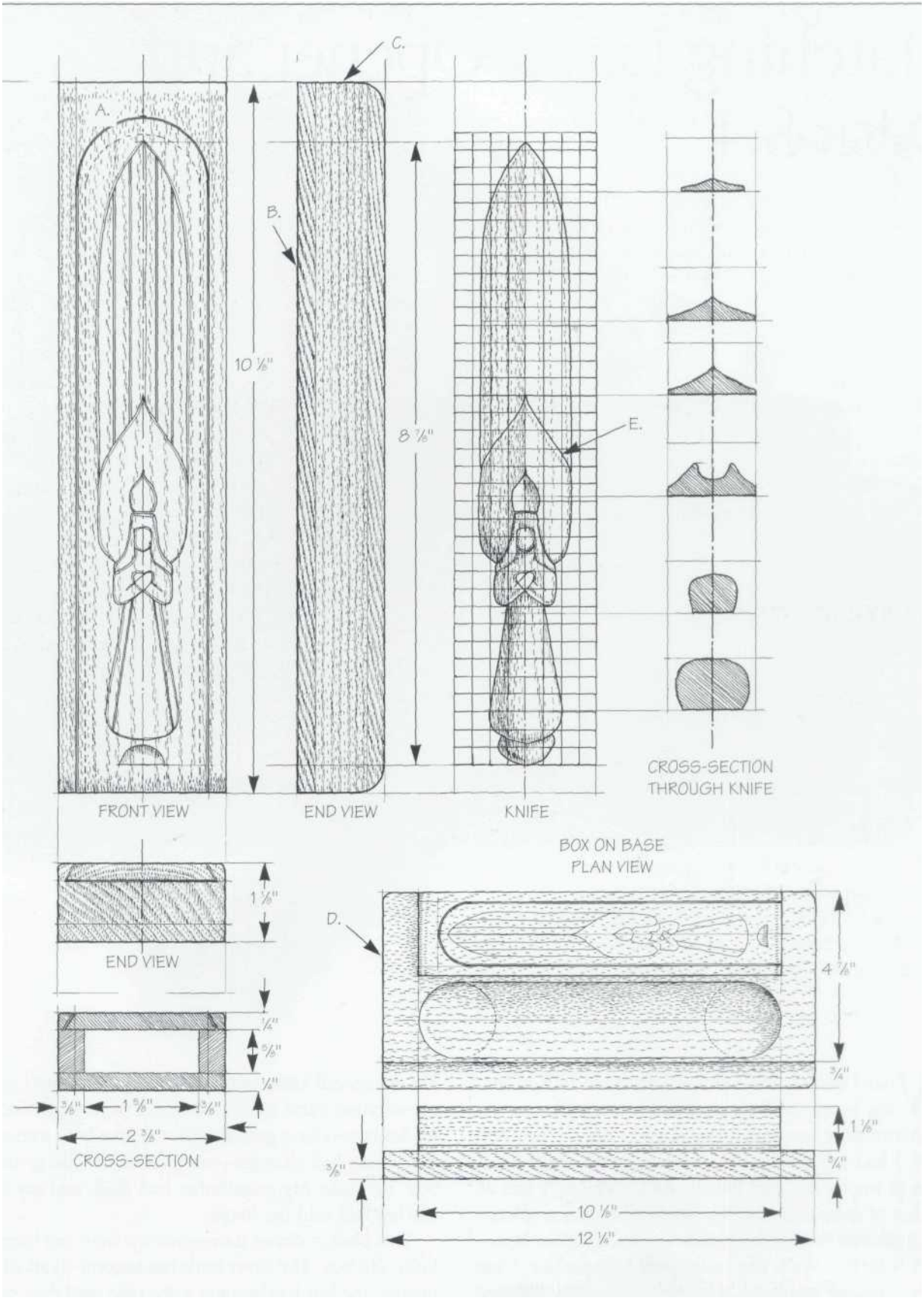
If you have doubts, then have a try out on a piece of scrap wood. And don't forget . . . a good sharp knife is much safer that a blunt one that needs to be worried and bullied into action.

Matching Letter Opener and Desk Set



When I was a school kid, I was obsessed with collecting knives and boxes. I had a box with a secret compartment, a box with a swivel-and-twist lid, and best of all, 1 had a beautiful old pen case dated about 1880, given to me by my grandfather. As for knives, I had all manner of dirks and daggers. My favorite was a stiletto-type knife that had a silver handle and a red leather case—really beautiful! Well, you know what kids are like, I was forever making up games and adventures that involved hiding things. Anyway, to cut a long, sad story short, I hid my special knife and box in my grandfather's garden, my vacation came to an end, and I went to school. And no doubt you have guessed when I came back a year later, everything had changed—no grandfather, no garden, no box, no knife. My grandfather had died, and my grandmother had sold the house.

This project draws its inspiration from my long-gone knife and box. The silver knife has become a carved letter opener, the box has become a pen case, and they both go together to make the perfect desk set.



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MAKING THE BOX

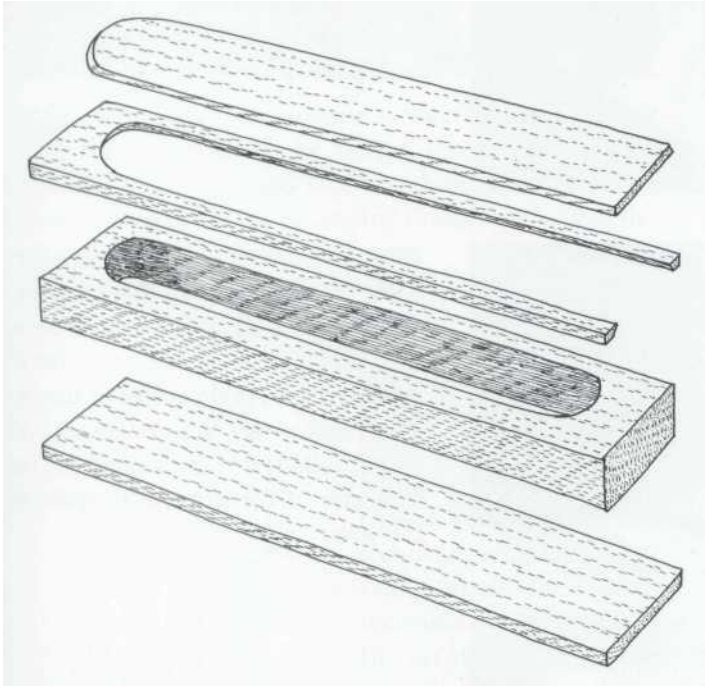
Having studied the working drawings and seen how the box is laminated up from three layers, take your three pieces of carefully chosen wood and pencil label them "lid," "middle" and "base." Set the middle section out with a center line, and use the 1 5/8"-diameter Forstner drill bit and the scroll saw to clear the waste. Clean out the cavity and take it to a good finish.

Take the lid piece and use a pencil, ruler and compass to draw out the design—meaning the shape of the sliding lid. This done, move to the scroll saw, set the table to "tilt," and fret out the lid. You should finish up with a lid edge miter that undercuts the lip of the frame.

When the four component parts for the project—the base, the hollowed-out middle section, the top frame and the lid—are all nicely finished, smear glue on the mating faces, sandwich them together and clamp up. Be sure to wipe up any glue that oozes into the inside of the box, or between the top of the middle section and the undercut lip of the frame.

Finally, the box is glue mounted on a simple pen tray base. Then the whole works is cleaned up with the plane and rubbed down to a smooth, round-cornered finish.

STEP-BY-STEP STAGES



1 When you have made the four component parts for the box—the base, the hollowed-out middle section, the lid, and the frame into which the lid slides—take the finest graded sandpaper and rub the mating faces down to a good finish. Pay particular attention to the inside of the hollow and the mitered edge of the lid frame.

CARVING THE BOX AND THE KNIFE

Carefully draw out the angel design, make a tracing, and then pencil-press transfer the imagery through to both the top of the sliding lid of the box, and the piece of wood that you have chosen for the knife. This done, take the tools of your choice and swiftly set in the lines of the lid design with a V-section trench. I prefer to use the knife to cut the incised lines, but you might well prefer to use a small V-tool.

When you work with the paper knife, start by fretting out the profile on the scroll saw. This done, take a small low-angled shoulder plane and clear the bulk of the waste from the blade. When you are happy with the basic form, use a knife to whittle the details. All you do is set the primary lines in with stop-cuts and then shave the wood down to the level of the cuts, so that selected areas are left standing in relief. For example: When you come to the skirt, slice a stop-cut around the line of the waist, and then shave the wood from the hem through to the waist, until the skirt takes on the characteristic conical and rounded shape. And so you continue, working here and there over the design, all the while setting in stop-cuts and cutting in towards the stop-cuts until you **achieve** what you consider to be a good form.

Finally, rub all the surfaces down to a smooth finish, give the whole works a thin coat of Danish oil, and then use beeswax to burnish to a sheen finish.

MATERIALS LIST

BOX

A Lid (1)	3/8" × 2 1/2" × 12"
B Box center (1)	3/8" × 2 1/2" × 12"
C Middle section (1)	3/4" × 2 1/2" × 12"
D Base (1)	3/4" × 5 3/8" × 12 1/4"
E Knife (1)	3/4" × 1 1/2" × 9 1/2"

Note—I used American cherry throughout.

SPECIAL TIP: CARVING THE DETAILS

If you have any doubts at all as to how the carving ought to go—meaning the shape and the modeling of the details—the best way is to make a full-size Plasticine working model. All you do is roll out the Plasticine to the required 3/4" thickness, cut out the profile as seen in the plan view, and then whittle and model the form in much the same way as you would with the wood. Making and using a model is a winner on many counts. You can easily replace the Plasticine if you make a mistake, you can use the Plasticine to make trial cuts and, best of all, you can use dividers to take step-off measurements directly from the model through to the wood.



2 Transfer the angel design through to the top of the lid, and to the knife. Be mindful that in both instances it's important that the design be perfectly aligned with the center line. Use a hard pencil so that the lines are firmly indented.



3 Use a small penknife to cut the incised lines that make up the design of the lid. Work each V section incision or trench with three cuts—first a single stop-cut down the center of the V to establish the depth, followed by an angled cut to each side of the stop-cut to remove the waste.



4 Having made a Plasticine model to help figure out the intricacies of the design, take a small nosing shoulder-type plane and swiftly reduce the bulk of the waste. Shape the blade by angling down each side of the center line.



5 Use the three-stroke whittling method to block **out** and partially model the various basic forms.

The working order is:

■ Define the perimeter of the form—the skirt, head or whatever—by making stop-cuts straight down into the wood.

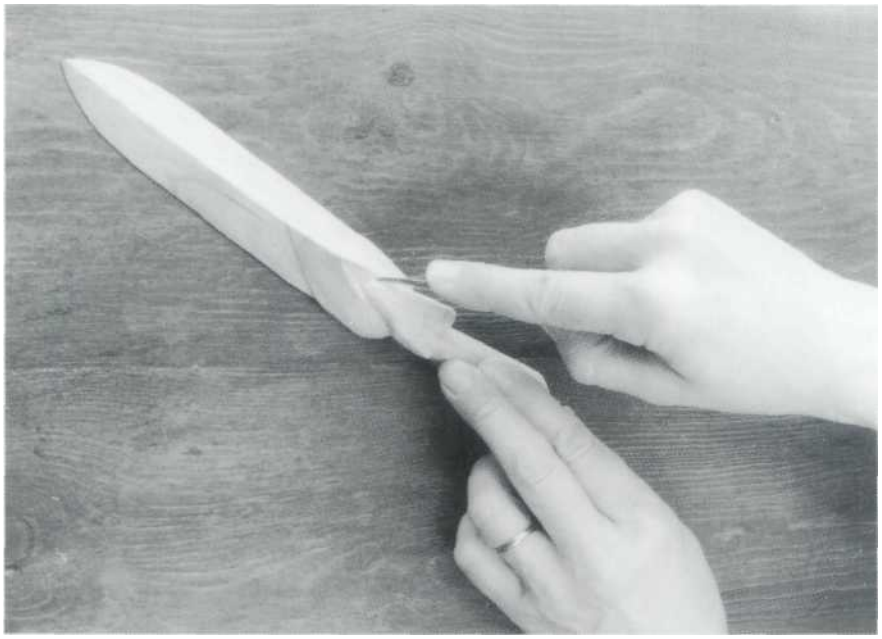
■ Make angled cuts down into the stop-cuts to define the length and breadth of the form.

■ Use restrained easing and paring cuts to rough out the details as seen in the plan side and end views.

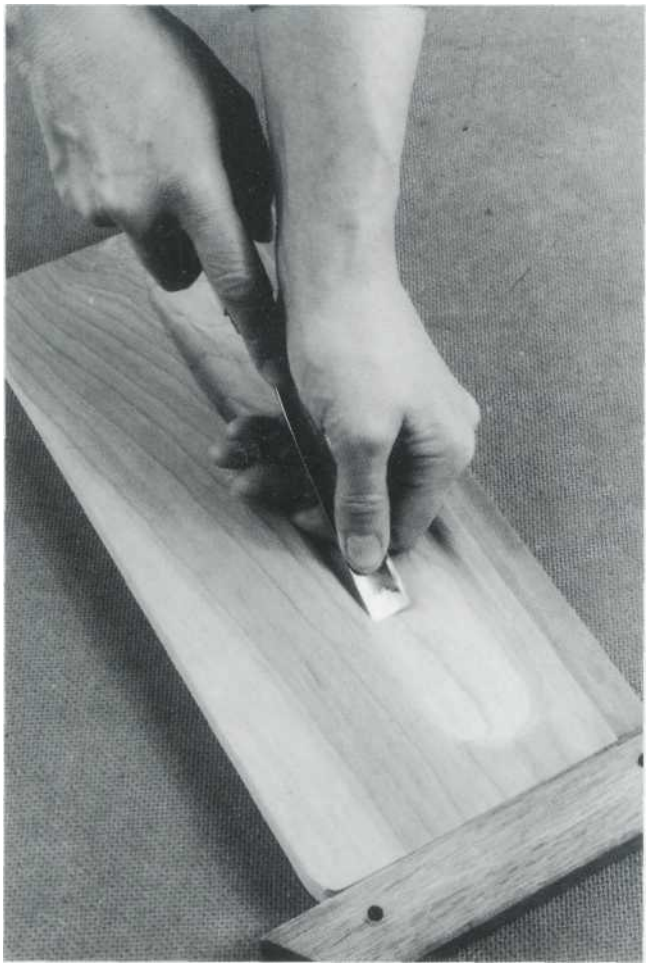


6 The broad modeling is best achieved by using a small-bladed penknife to make thumb-braced paring cuts. The technique wins on at least two counts—the thumb increases the efficiency of the stroke, while at the same time giving you maximum control. The cone shape of the skirt is achieved by first running a stop-cut around the waist, and then paring down at an angle toward the slop-cut.

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7 The V section that goes around the top of the head is achieved by repeatedly making a sequence of three cuts—a deep straight-down stop-cut to establish the depth of the V, followed by two cuts that angle down and in towards the bottom of the stop-cut.



8 Once you have drawn out the shape and position of the pen tray, use a shallow sweep gouge to carve out a smooth-sided dip or depression.

USING THE SCROLL SAW

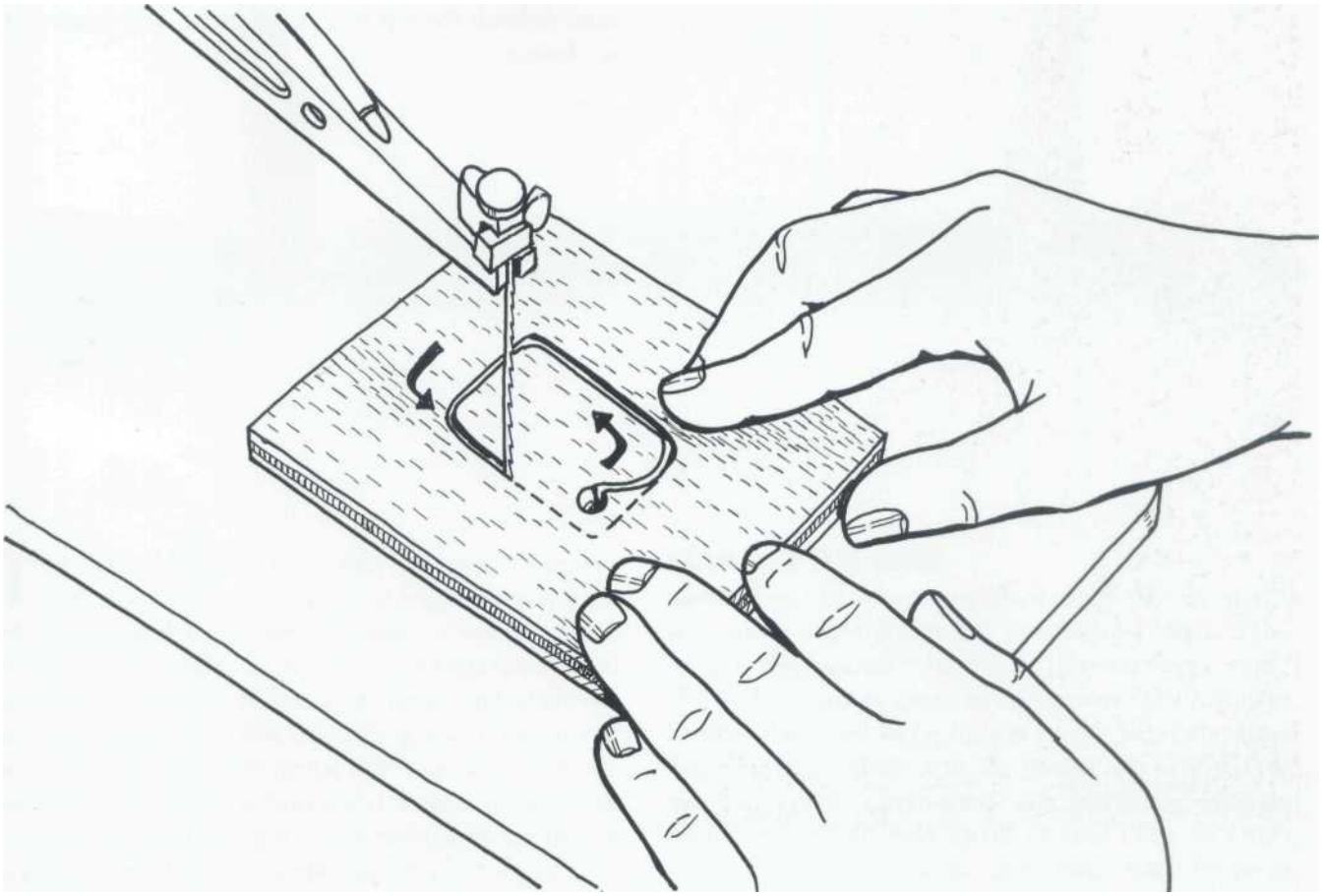
If you are new to woodworking and maybe a bit nervous, and you plan to make small fancy items like boxes, push-along, toys, chair backs or pieces of marquetry—meaning items using thin sections of wood that have a lot of delicately curved (fretworked profiles and pierced holes—then you can't do better than getting an electric scroll saw.

This machine, sometimes called an electric fretsaw or an electric jigsaw, is just about as safe as you can get. In truth, it is so safe that it is one of the few woodworking machines allowed in schools for young kids. In fact, I first saw one of these machines being used in a school by a ten-year-old—to make a jigsaw puzzle. Okay, so they can nip and worry fingers, but the working action is such that anything more than a grazed finger is almost impossible.

The scroll saw has a reciprocating blade, meaning a blade that joggles up and down as if to imitate the movement of a hand fret or coping saw. The bottom end of the blade is clamped in a chuck that is driven by the crankshaft, while the top end of the blade is clamped to the end of a spring-loaded arm. The blade is fitted with the teeth pointing downward, so that it cuts on the downstroke. In use, the workpiece is advanced across the worktable toward the joggling blade, and maneuvered so that the moving blade is always presented with the line of the next cut. The wonderful thing about these saws is that the resultant cut edge is so clean that it hardly needs sanding. If you are thinking about buying and using an electric scroll saw, the following tips and pointers will help you on your way.

Saw Table—There are about six machines currently on the market—German, British, Canadian and American. Though they are all pretty good, it is most important that you get an up-to-date machine that has a table-tilt option. This feature allows you to tilt the worktable so you can make a cut that is variously angled to the working face, as in this project. A good tip is to rub over the work surface with a white candle before use. It lowers the wood-to-table friction so that the workpiece glides rather than staggers.

Blade Clamp—From one machine to another, there are all manner of weird and wonderful mechanisms used to clamp the blade. For example, one machine has a clamping block that is tightened by means of an Allen wrench/



CUTTING A PIERCED WINDOW

In use, the workpiece is maneuvered and advanced so that the moving blade is *presented with the line of the next cut.*

key, another has a pronged finger that supports pin-end blades, and yet another has a clamping block that is tightened by means of a large thumbscrew/wing nut. While each system has its good and bad points, I think overall the large thumb-screw is the best option. I say this because the Allen wrench option soon distorts, and the pin-holding mechanism on some machines is made of butter-soft, easy-to-bend metal.

Blades—The standard scroll saw blade is 5" long and flat-ended. Coming in a whole range of tooth sizes, from coarse through super fine, the blades are designed variously to cut everything from solid wood, plywood and plastic, to thin mild steel, brass and aluminum. If you find that the blade bends and drifts or burns the wood, then chances are it is badly tensioned and/or blunt and needs replacing.

Dust-Blowing *Mechanism*—When the saw is in use, the sawdust piles up and covers the line of cut so that you can't see where you are going. Though most scroll saws have a bellows and tube mechanism that blows the dust away from the drawn line, the pity of it is that the dust **is** blown directly into the user's face—all good fun! If this is a worry to you, then it's best to wear a face mask.

CUTTING AN INTERIOR PIERCED "WINDOW"

A good part of the pleasure of using a scroll saw is its ability to cut a perfect hole or "window" in the middle of a piece of sheet wood. For example, it is perfect for fretting out models, and for making pierced chair back slats—anything that is relatively small and intricate.

The working procedure for piercing enclosed "windows" is:

- Drill a pilot hole through the area of waste big enough to take the blade.
- With the machine unplugged, ease off the tension until the blade goes slack.
- Unhitch the top end of the blade from its clamping block.
- Pass the end of the blade up through the pilot hole and rehitch it to the top block.
- Retension the blade until it "pings" when plucked.
- Hold the workpiece firmly down on the table so that the blade is clear of the sides of the pilot hole, and then switch on the power.
- Fret out the "window" until the waste falls free.
- Finally, switch off the power and then release the ten sion, unhitch the top end of the blade, and remove the workpiece.

Classic Bow Saw



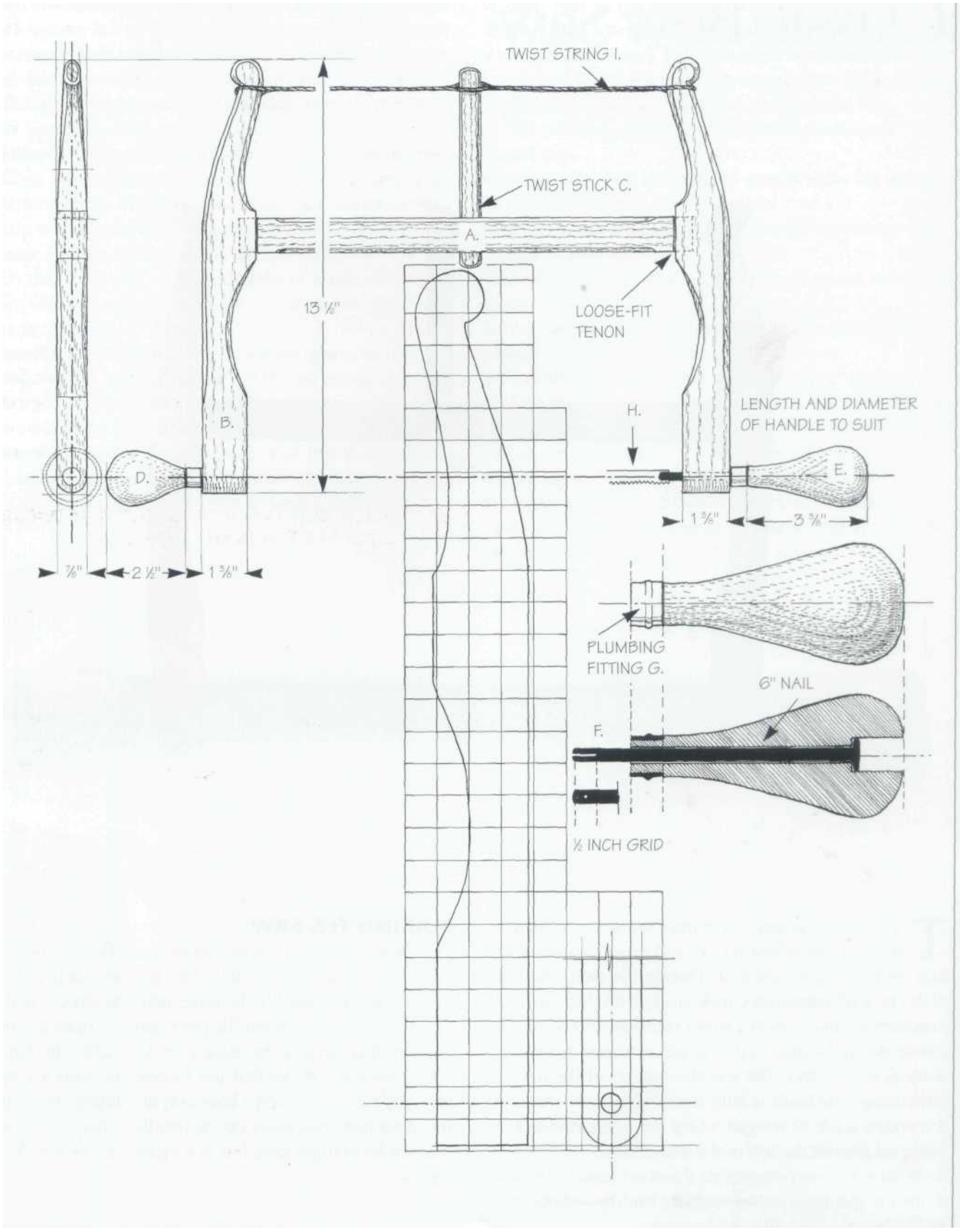
The classic bow saw, sometimes known as a Turner's saw, is a tool whose design and origins go way back into the dim and distant past. Though I've seen bow saws of this type illustrated on Greek vases, in English medieval manuscripts, in Albrecht Durer's etchings, and so on, the classic design is such that it is still as useful for curved work as it ever was. The actual workings of the saw are fascinating: The blade is held under tension by means of a wooden stick or tongue and a twisted twine that is wrapped around the top of the side cheeks.

What else to say, except that if you are looking to make a unique gift for a woodworking buddy—something really special—then this is a beauty!

MAKING THE SAW

First things first—buy your blade. I say this because, if your blade is a different size than the one used in this project, you can modify the other material sizes to suit.

The bow saw is made in three parts. There are the handles that need to be turned on the lathe; the fancy frame sides or cheeks that are fretted out with a scroll saw, coping saw or even a bow saw; and finally, there are the metal parts that make up the handles. Okay, so it does sound a bit complicated, but don't panic, it's as simple as can be.



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SHAPING THE FRAME

Having pencil-press transferred the designs through to the wood, fretted out the shaped ends, and used a straight saw to cut out the crossbar, use a small spokeshave and a plane to skim the three component parts down to a good finish. Cut chamfered edges on the crossbar and the cheeks and generally round over the curved shapes, all as shown in the working drawings.

When you come to cutting the mortise and tenon joints—meaning where the crossbar fits into the end cheeks—all you have to remember is that the joints both need to be a loose fit. The best procedure is to cut the joint for a good push fit, and then trim the ends of the tenon to a rounded finish so that they are an easy rocking fit in the mortise.

Establish the handle centers on the bottom ends of the cheeks. Then run them through with a hole that is a loose fit for your 6" nails. Finally, use a piece of offcut to make the twist stick, sometimes called a toggle or a tongue.

TURNING THE HANDLES

Having studied the working drawings and seen how the two handles are quite different in length, take your chosen piece of wood—we used maple—and turn the two handles in one piece. Make sure the stubs or spigots fit your metal ferrules, and then rub them down on the lathe and part off.

As to how you drill the holes through the handles, it really depends on your workshop and equipment. I found that the best way was to grip and support the handle in the four-jaw chuck—meaning the chuck on the lathe—and then use a drill chuck mounted on the tailstock end of the lathe. The good thing about this method is that it is a foolproof way of making sure that the holes are perfectly centered. All I did was drill the larger diameter recess hole and then follow through with a smaller diameter hole.

When you have made the handles, all nicely smooth and drilled, then comes the tricky business of fitting the metal parts. It's best to start by fitting the ferrules. Take your metal tube (I used two copper plumbing fittings, but you can just as well use a slice off the end of a brass tube) and cut it off so that you have two 1/2″ lengths or rings. Use a file and steel wool to polish the rings to a smooth, shiny finish, and then tap them in place on the turned handle stubs.

Finally, pass the 6" nails through the handles and the ends of the frame, cut them to length with a hacksaw, and cut slots into the ends of the nails so that they fit your chosen bow saw blades. Mark the position of the blade-end holes. Then run 3/32"-diameter holes through the nail ends, so that you can secure the blade ends with small nails or split pins.

PUTTING IT TOGETHER

When you have made all six component parts—the two scrolled cheeks, the crossbar, the two handles and the twist stick—then comes the fun of putting the saw together. Start by fitting the H-frame together. This done, pass the slotted nail ends through the bottom ends of the cheeks and fit the blade with the pins. Make sure that the teeth are looking away from the largest of the two handles. Wrap three or four turns of strong twine/cord around the fancy ends of the cheeks and knot the ends of the cords together to make a loop. Finally, slide the twist stick in place between the turns of twine and twist it over and over so that the cheeks pull apart and the blade is held under tension.

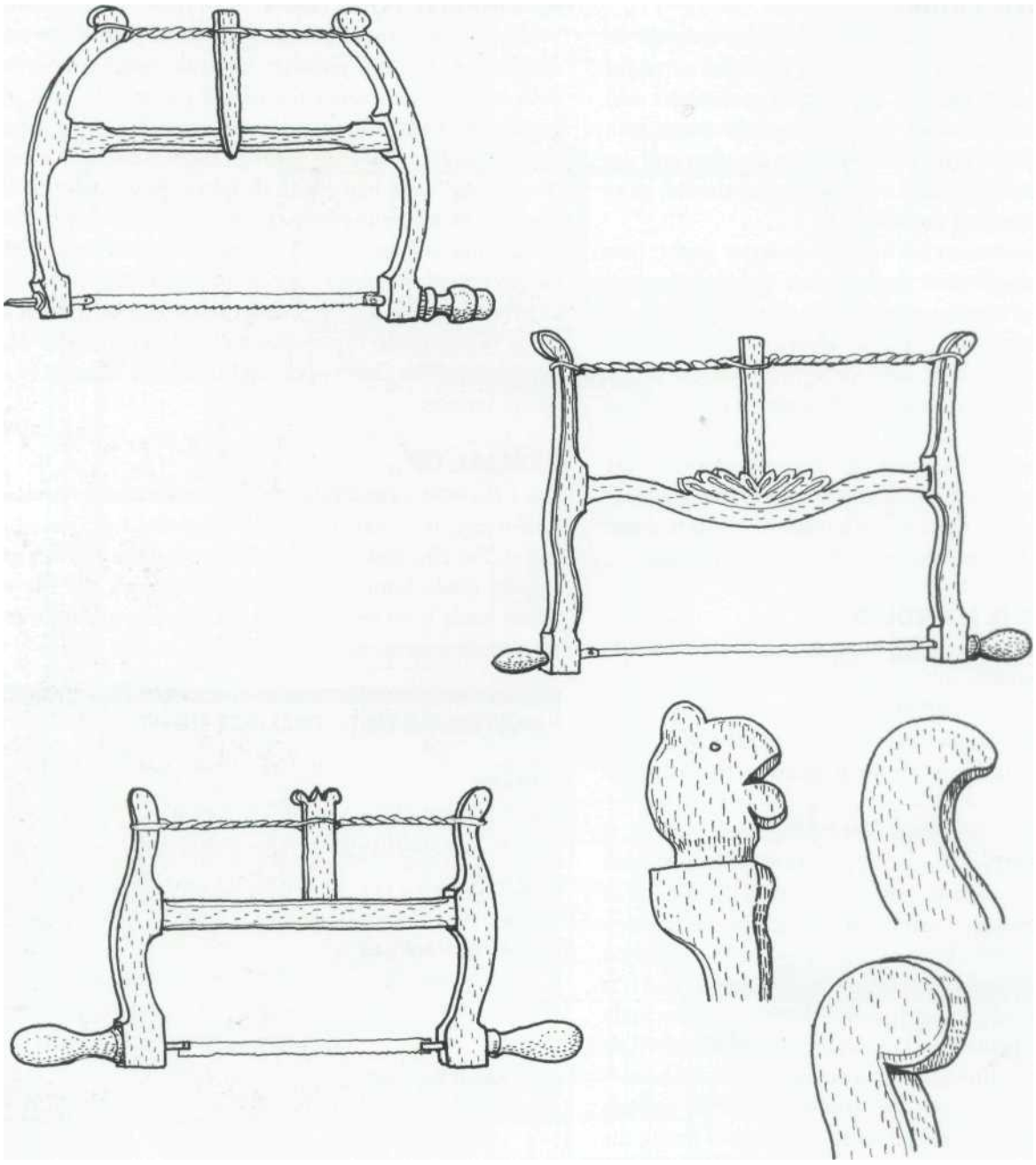
SPECIAL TIP

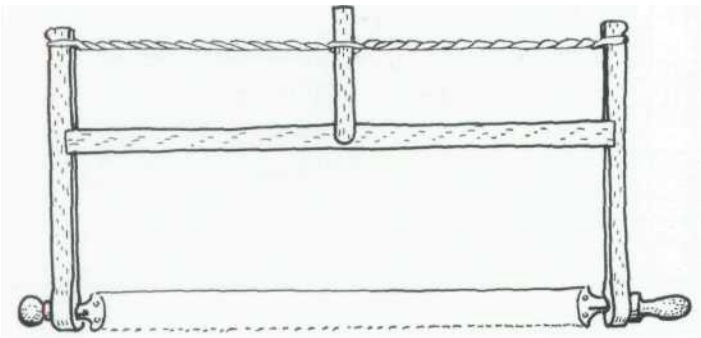
Since the bow saw cheeks are put under a lot of tension and stress, it's vital that you choose the best possible wood. I've checked around and seen that the handles are usually made from beech, maple or ebony, and the H-frame made from beech or ash. We have gone for an ash frame and maple handles.

MATERIALS LIST

FRAME	
A Crossbar (1)	½″×⅞″×12″
B Frame cheeks (2)	⅞″×2″×14″
C Twist stick (1)	¼″×⅜″×6½″
TURNED HANDLES	
D Large handle	2″×2″×14″—this length allows for a good amount of turning waste
E Small support handle (1)	
HARDWARE AND EXTRAS	
F Metal rods to hold the blade	6″ nails (2)
G Metal ferrules	½″-diameter tube (2)
H Bow saw blade	12″ blade
	twist cord, 60″ long
I Strong waxed twine	8′ long
J Split pin	

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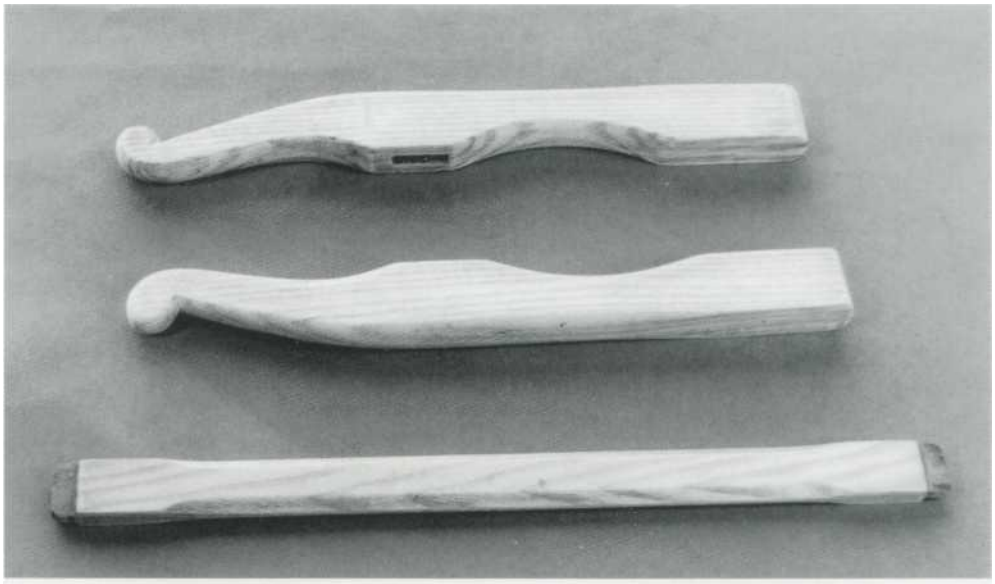


STEP-BY-STEP STAGES

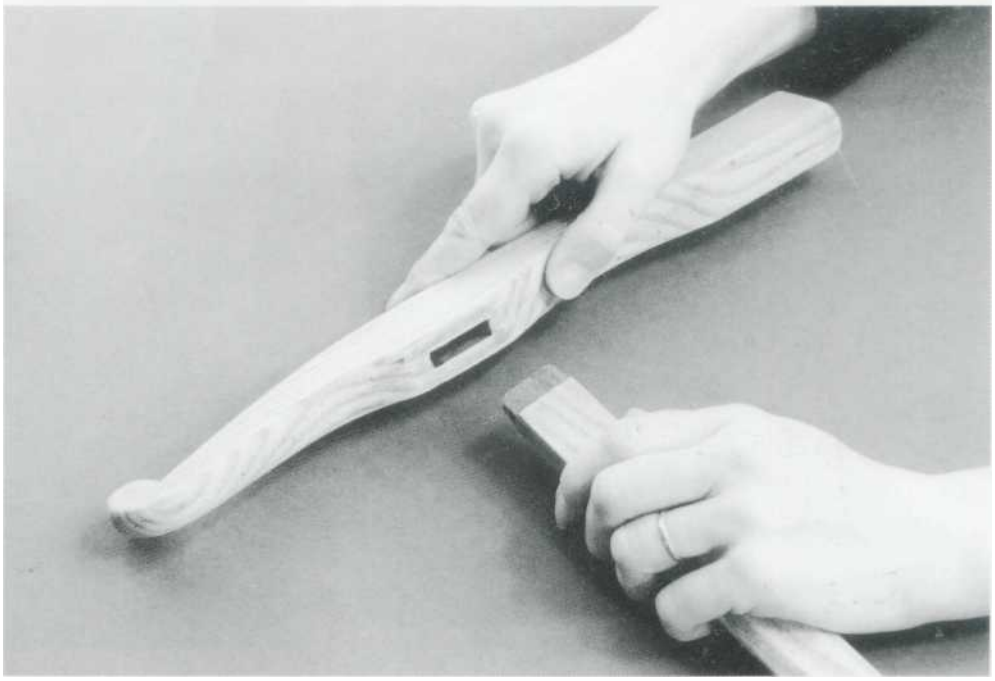
1 An old English bow saw with curved cheeks and stop-chamfered details is shown at top left; an old English bow saw with unusual carved detail at top right. An English bow saw with a whittled twist stick is shown at center left; a selection of carved cheek scroll designs at center right. Shown at bottom, a European bow saw tends to be bigger, with straight cheeks and a much wider blade.

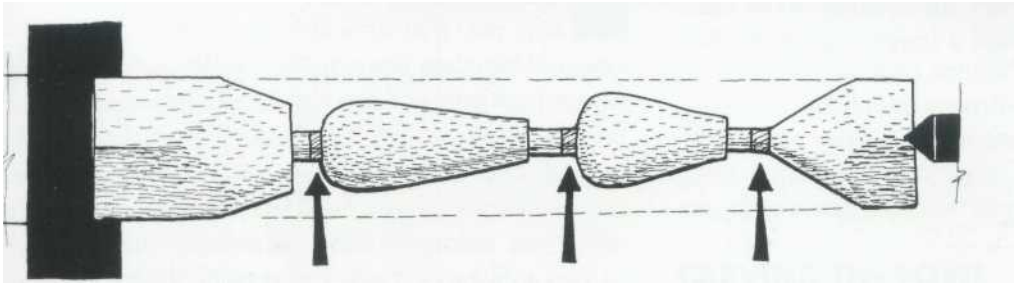
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2 The three parts that go to make the H frame: the two scrolled cheeks and the crossbar. If you look closely at this photograph and compare it to the finished project, you will notice that I had to shorten the crossbar to fit the only available blade.

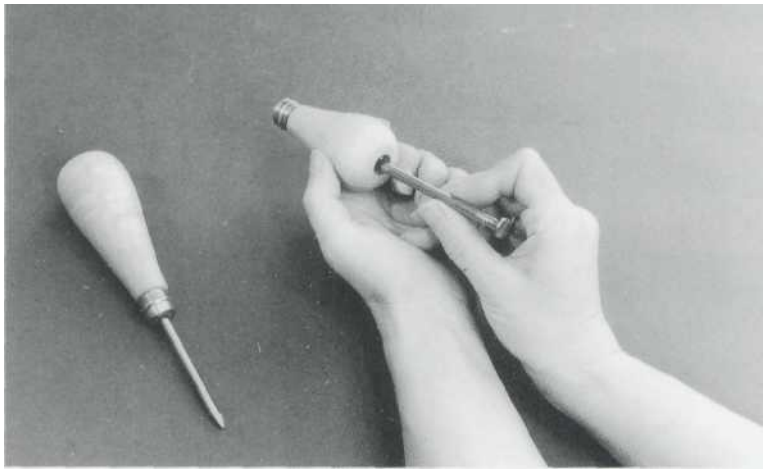


3 Trim and adjust the tenon so that it is a loose rocking fit in the mortise. Notice how the corners of the mortise need to be nipped off at an angle.

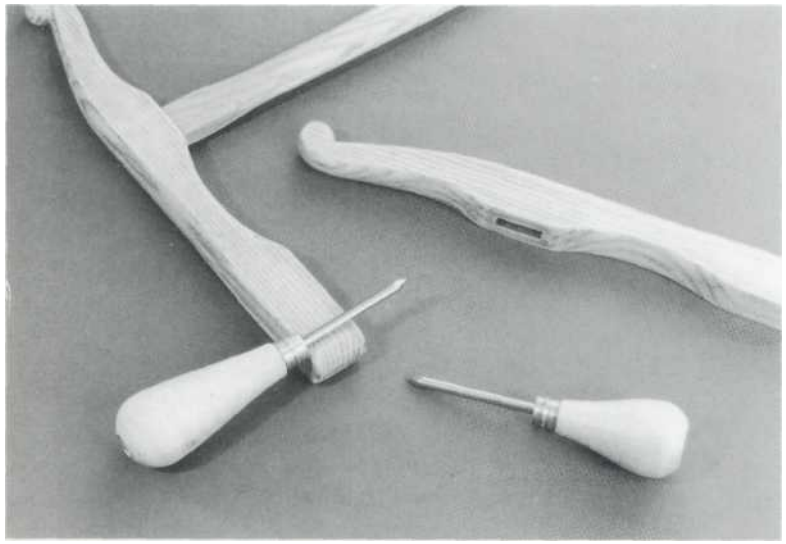




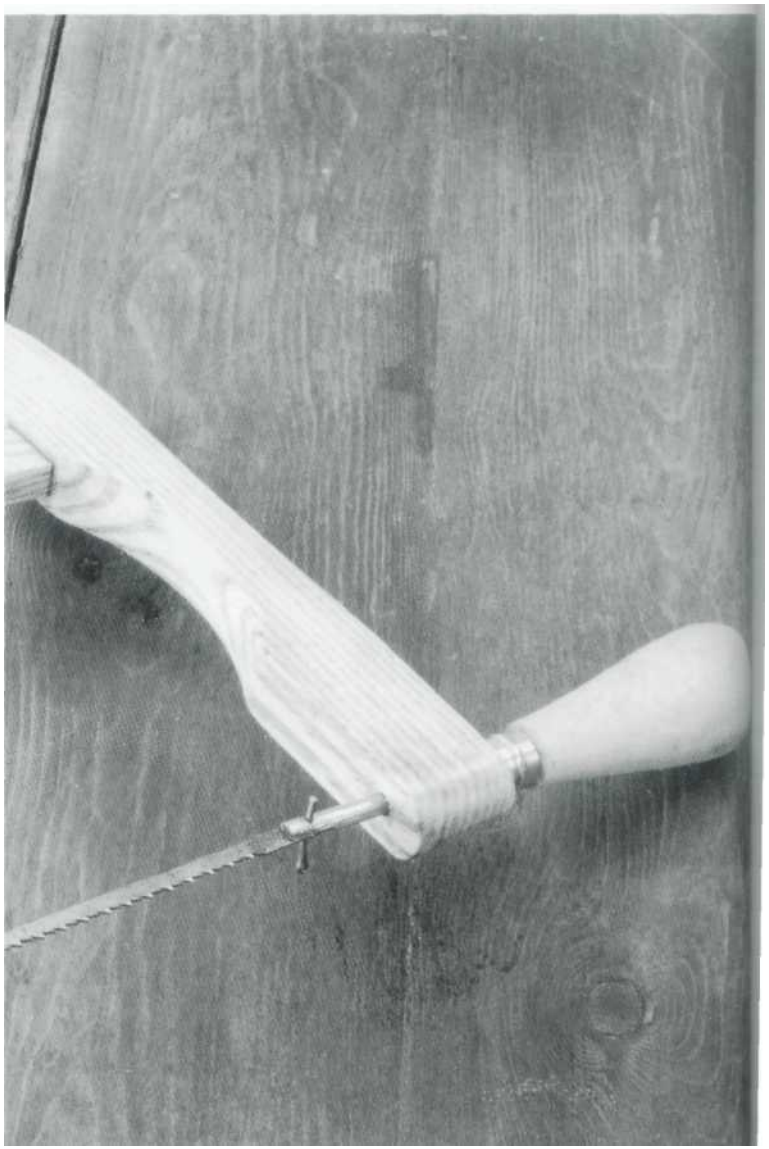
4 The on-lathe sequence—from left to right—the headstock waste, the parting waste, the large handle, the ferrule stub, the parting waste, the small handle, the ferrule stub, and finally the parting and tailstock waste. Note that the arrows indicate the parting waste.



5 Bend the nail slightly and pass it through the handle for a tight captured fit. See how the nail head fits snug and flush in the recess.



6 Check the length of the nail against the width of the frame and then mark the position of the blade slot accordingly. If you need a longer nail stub, then deepen the recess hole.



7 Slide the blade in the slot and fix it in place with a split pin. If at some time you need to fit a slightly longer blade, then you can slide washers on the nail between the ferrule and the cheek.

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Carved Fruit Bowl

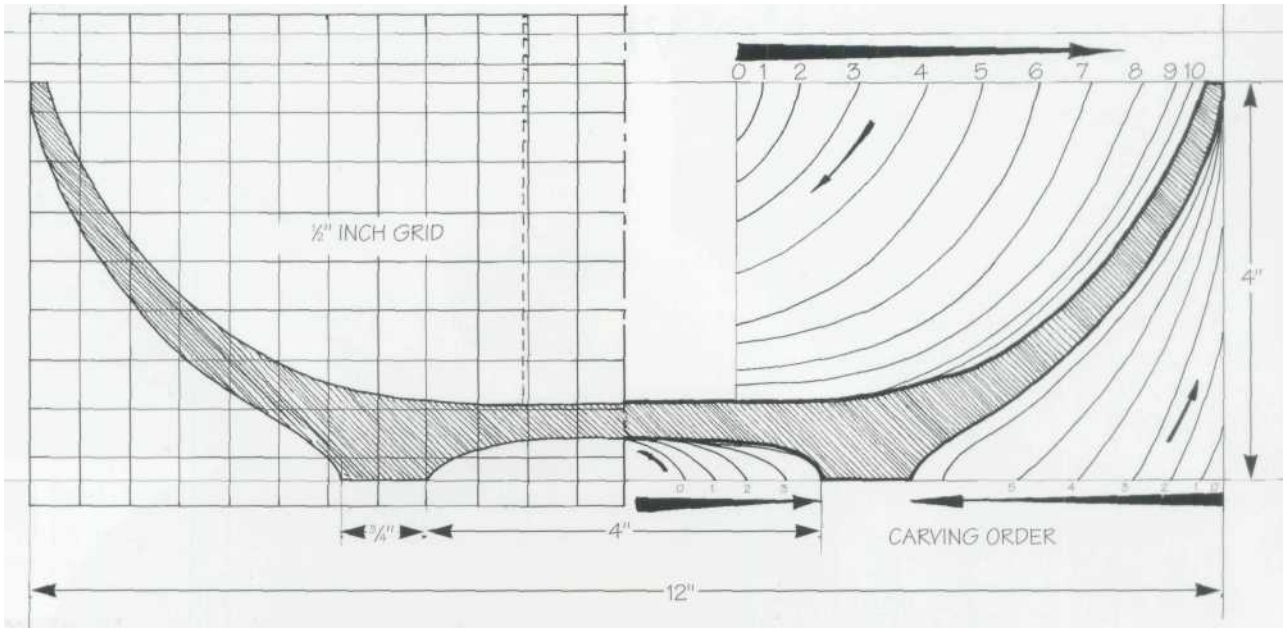


There is something magical about carving bowls. Do you know what I mean? One moment you have a slab of wood—nothing very special, just a piece of wood that might or might not end up on the fire—and the next moment you have a carved bowl that is a useful part and parcel of your life. We have this bowl that my Welsh grandfather made. It wouldn't win prizes and it isn't so beautiful, and it is a bit stained and has somehow been slightly scorched on one side, but for all that, it has always been with me. When 1 was a kid with chicken pox, the bowl was filled with apples and placed beside the bed; it was beside me when I was studying for my exams; it was given to me when I got married, and no doubt I will give it to one of my sons somewhere along the line. It has become an heirloom, something precious!

So there you go, if you are looking to make a special gift, one that might well see the next millennium in and out, then perhaps this is the project for you.

CARVING THE BOWL

Before you do anything else, you need to search out a block of easy-to-carve wood about 4" thick, 12" wide, and 12" along the run of the grain. You could use a wood like lime, a fruit wood, a piece of yellow pine, or whatever, as long as it's relatively easy to carve and free from splits and knots.



Pencil label the two 12" X 12" faces, one "top rim" and the other "foot rim." Now, with the slab set "top rim" face uppermost, first draw crossed diagonals to establish top-center; then use the compass or dividers to scribe out two circles, one with a radius of 6" and one with a radius of 5 1/2". Rerun this procedure on the "foot rim" side of the slab, only this time have the two circles at 2 3/4" radius and 2" radius. When you're happy with the way the wood has been set out, use a band saw to cut out the blank. This clone, move to the drill press and run a good size pilot hole into the center of the "top rim" side of the wood. Drill down to a depth of exactly 3 1/4". 1 used a 2"-diameter Forstner bit, but a l"-diameter would be fine. Being mindful that the bottom of the hole marks both the level of the inside bowl and the thickness of the base, it is vital that you don't go deeper than 3 1/4".

With the workpiece set down on the bench so that the "top rim" lace is uppermost, take a mallet and a straight, shallow sweep gouge and work around the rim of the drilled hole cutting back the waste. The working procedure should go something like this: Work once around the hole scooping out a ring of waste, work around this initial ring scooping out another ring of waste, and so on, all the while backing up until you reach what will become the inside rim of the bowl. When you have cleared one level of waste, return to the edge of the drilled hole and start over. So you continue, clearing the waste level by level until you begin to establish the beautiful shape of the inside of the bowl.

Use whatever tools best do the job. For example, 1 started with the straight gouge and the mallet, then changed to a front-bent gouge, and finally I switched to using a small hooked knife for tidying up.

When the shape of the inside of the bowl is well established, turn the workpiece over so that the base is uppermost, and set to work carving and shaping in much the same way as already described. The carving procedure for the outside of the bowl is pretty straightforward, only this time you need to work in two directions—from the inside edge of the foot ring and in toward the center of the base, and from the outside edge of the foot ring and out and down towards the rim.

And so you resume, carving the inside of the foot ring a little, carving the bold convex shape of the outside of bowl profile, carving the inside of the bowl a tad more, and so on and on, until the wall thickness ranges between about 3/8″ at the rim to 5/8" outside the foot ring. And of course, all along the way, you have to keep your tools razor sharp so that each and every cut is clean, crisp and controlled. As you get nearer to the beautiful bowl shape that is hidden just below the surface of the wood, you have to be more and more cautious with your cuts.

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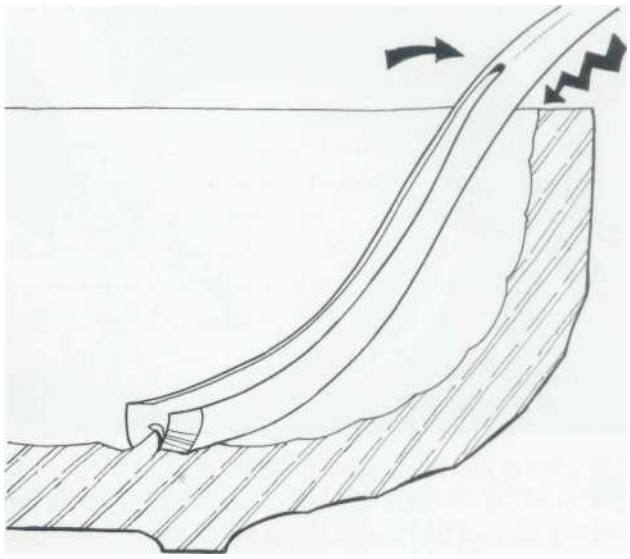
SPECIAL TIPS AND RULES OF THUMB

It's all straight forward, as long as you stay with the following guidelines:

■ Try to set up a work rhythm—carve for a few minutes, then stroke the tool on the stone and strop, then stand back and be critical, and then go back to a few minutes of carving, and so on. You will find that this way of working ensures that everything is controlled . . . the tools slay sharp, you have time to assess your progress, and you don't get tired.

■ As the bowl nears completion, you will find that it is more difficult to grip and hold the bowl. The best way is to either cradle it in your lap or nestle it on a pile of rags.

■ When you are carving the inside of the bowl—when it's nearly finished—you have to be extra careful that you don't lever on and break the relatively fragile rim. To prevent this end, you might need to use one of the bent gouges rather than a straight gouge. I would recommend either a no. 5 bent gouge at about 3/4" wide, or perhaps a no. 7 spoon gouge at about the same width. Be mindful that the flatter the sweep (meaning the shape of the blade in cross section) the greater the chance that the corners of the blade will cut and tear the wood.



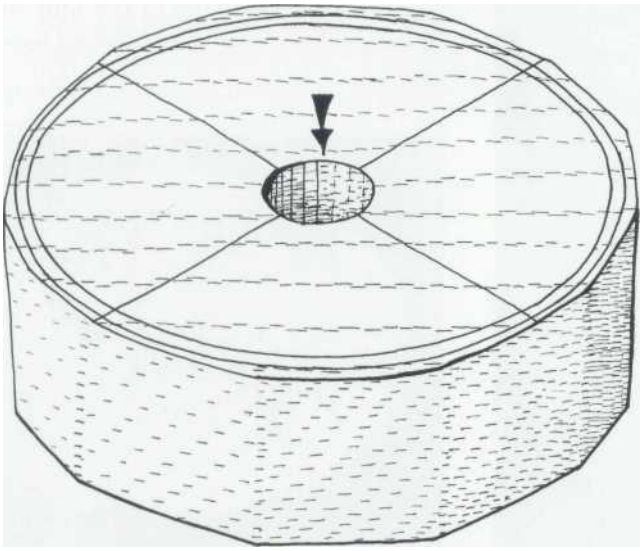
CARVING THE BOWL INTERIOR

*The swooping shape of the bent **gouge** lets you carve the concave curve without levering the shaft of the tool on the **fragile** rim.*

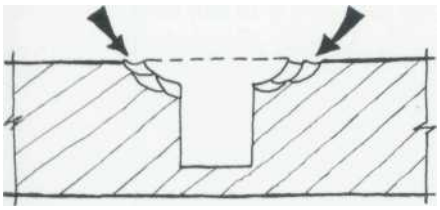
STEP-BY-STEP STAGES

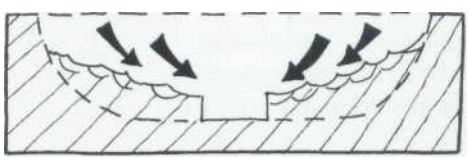
MATERIALS LIST

A Piece of wood (1)	4″×12″×12″—with the grain running along the length, meaning across the bowl



1 Having established the center of the square slab by drawing crossed diagonals and cutting the circular blank, use the 2" diameter Forstner bit to run a 3 1/4-deep pilot hole down into the center (top). Work around the hole clearing the waste (bottom left). Clear the waste level by level, all the while backing up from the pilot hole through to the rim (bottom right).







2 One of the easiest ways to bring the bowl to a good finish is to use a hooked sloyd knife. As you are working around the inside of the bowl, be mindful that all along the way you will need to adjust your angle of cut to suit the ever-changing run of the grain.



3 When you come to carve the inside of the foot—meaning the inside of the base ring—use small, controlled cuts, with one hand pushing and the other guiding and being ready to break. Notice how in this instance you can lever the shank of the tool on the relatively strong foot rim.



4 The beautiful concave curve shape that runs down from the outside of the foot rim is achieved by thrusting down with the blade and levering back with the handle.



5 All along the way you will have to make repeated checks with the caliper. Try to aim for a section that starts relatively thick at the base and gradually tapers up to a thin rim.

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A GOOD WOOD GUIDE FOR CARVING

Wood carving is a wonderfully fulfilling and exciting area of woodworking, but only, if you choose the right wood. When 1 first started carving, I had in mind to carve a female torso, a Venus. I'm sure you know what I mean, a bit like Marilyn Monroe, but more so. Though my teacher told me to use lime, when I arrived at the wood yard and saw the astronomical prices, 1 was swiftly talked into buying—at a quarter of the price of lime—a massive piece of I-don't-know-what.

Well, when 1 got my "bargain" wood back to the workshop, it was a nightmare. The wood was green and wet, it was lull of iron-hard knots, it started to warp and split the moment I started carving, it made my tools rusty, the grain was wild and twisted—I could continue listing its terrible qualities. Yes, I did manage to finish my carving, but at what cost to my strength and sanity? It was truly awful, a sort of mad mix-up between Marilyn Monroe and a glandular Guernsey!

The moral of this sad little tale from my teenage years is there are no shortcuts, and there are very few bargains. You *must* use a piece of good wood. The following listing will help you on your way:

Alder—A sapwood tree common in low-lying areas. A wood traditionally used by North American Indians and early settlers, it is especially good for bowls and general kitchenwares.

American Whitewood—Known variously as tulipwood, basswood, canary wood, and many other names besides, this is a soft, easy-to-carve wood.

Apple—A hard dense, close-grained fruitwood, it comes in small sizes, carves well and takes a good polish. Apple is traditionally used for small items of treen (woodenware), and for kitchenwares.

Beech—A heavy, relatively easy-to-carve wood that has a yellow-gold sapwood and a reddish heart. Beech is particular! good for carved furniture.

Boxwood—A beautiful, pleasant-smelling, butter-smooth wood that is extremely hard and close-grained. If you want to carve items like jewelry, hair combs, small dishes and boxes, then boxwood is a good choice.

Cedar—Pencil Cedar is a favorite wood for carving. It cuts to a clear pink-brown finish.

Cherry—American cherry is a close-grained, hard-to-work, reddish brown wood that comes in relatively small widths. It carves well and can be brought to a wonderful high-shine finish.

Hickory—Straight-grained with a white sapwood and reddish brown heartwood, hickory is often the first choice for large sculptural carvings.

Horse Chestnut—White if it is felled in winter, and yellow-brown if it is felled later in the year, this wood is especially good for carved furniture details and for dairy and kitchenwares.

Holly—A close-grained, ivory-white wood that carves well and takes fine details, it is a good wood for small desktop toys, and kitchenwares.

Lime—English lime is one of my favorite woods. Butter-colored, close-grained and easy to carve, it is the traditional choice for architectural work, like mirror surrounds, coats-of-arms, small sculptures and interior trim. Though linden or basswood are often described as being the same as lime, they are to my way of thinking quite different.

Maple—Soft maple is the traditional choice for general carvers—used for making such things as furniture, domestic wares and musical instruments—while rock maple is preferred for heavier items like sports gear and some laundry wares.

Pear—A pink-brown wood that has a close-grained, satiny finish. It's really good for kitchenwares.

Plum—One of my favorite woods. Though it is certainly very difficult to carve, the color and texture are special—especially good for small presentation pieces.

Sycamore—A hard, light-colored wood, it carves and finishes well. Sycamore is a top choice for dairy and kitchenwares, where it is important that the wood leave no smell or taint.

Yellow Pine—White to reddish light brown, it is good for large sculptural carvings and interior details. It has been used traditionally in shipbuilding and interior joinery. If you order the wood unseen, be sure to specify "smooth first growth." If you don't, there is a good chance that you will be given poor-grade, coarse and knotty second growth.

Gilded Scroll Shelf

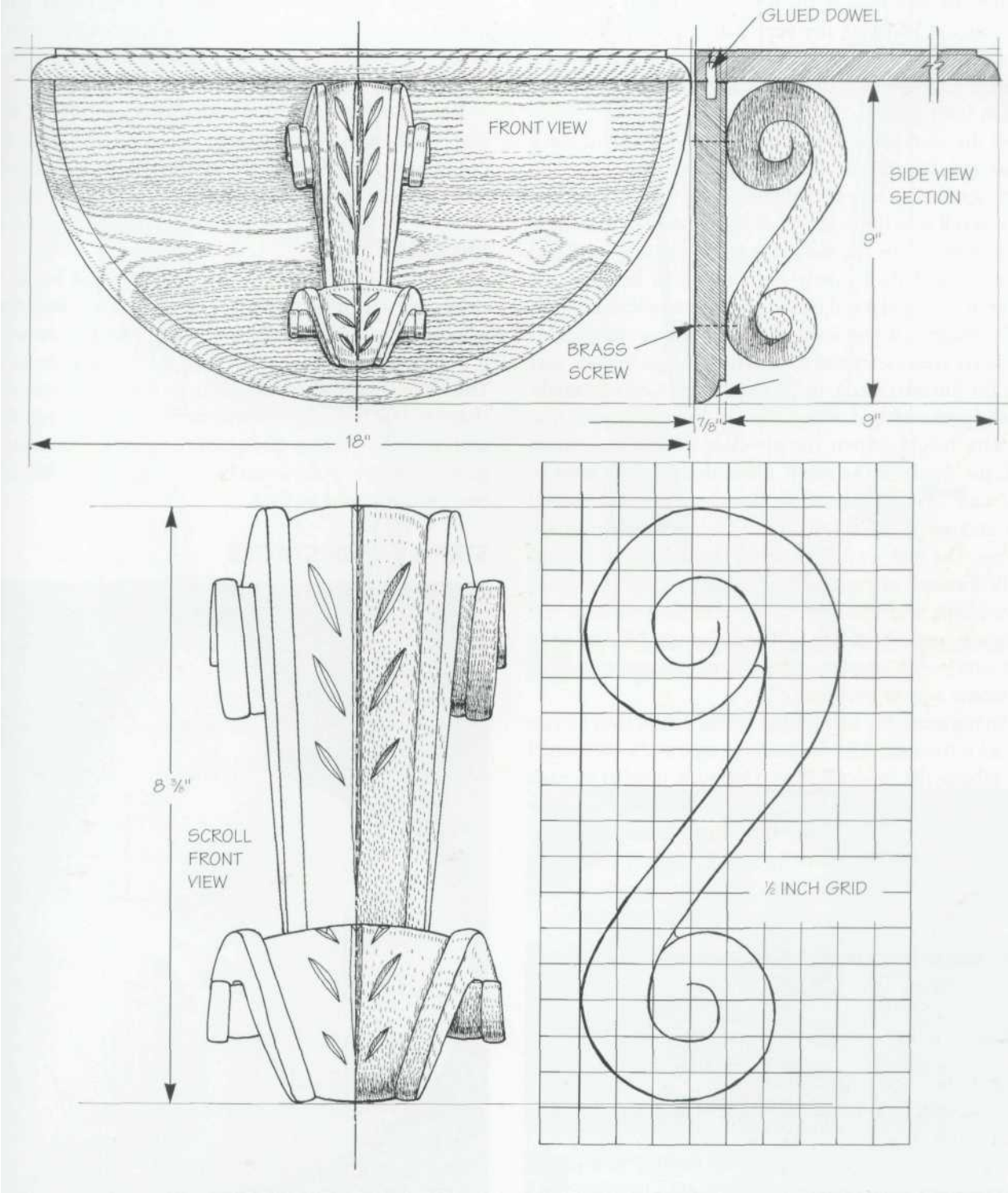


My dictionary defines a console shelf as being an ornamental bracket—especially one used to support a bust—while a scroll is described as being a decorative carving in the form of a stylized roll of parchment. Okay, not very exciting you might think, just a shelf and a bracket. But give the shelf a semicircular form and an ogee-type lip profile, embellish the scroll with a wee bit of carving and coat of gold paint, and then put the two together, and suddenly—Pow!—you have a really special eye-catching item, a truly unique and dynamic piece of woodwork.

MAKING THE SHELF

The actual shelf is very straightforward—really no more than two half-circles butted and dowelled at right angles. That said, you do have to be mindful at the layout stage that the top board—the one that will become the shelf surface—needs to measure the radius of the circle from front to back, plus the thickness of the wood.

Use a compass, ruler and square to set out the wood: Fret the two forms out with a band saw. Use a router or moulding plane to cut the lip profile. Then use glue and hidden dowels to butt the forms together at right angles.



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MAKING THE BRACKET

Having chosen your block of easy-to-carve wood, press transfer the side view of the scroll through to the wood and then cut it out on the band saw. Then run a center line down the front lace. Next, take some masking tape and use it to establish the tapered shape of the scroll as seen in front view.

Set the workpiece side-down on the bench and use a mallet and shallow-sweep straight gouge to lower the side of the scroll. The best way of visualizing the lowered side of the scroll is to think of it as a mountain road that starts at the center of the big end of the scroll, curls around and downhill, and then slowly back uphill to finish at the center of the small scroll. Staying with this mountain-and-roads imagery, if you leave the scroll on its side, and if you lower your viewpoint to bench level, you will see that with the finished scroll, the scroll centers—or you might say the peaks around which the roads curl—are both at the same height. When you are clear in your own mind as to the shape of the scroll, carve down to the level of the "road" on one side of the scroll, then flip the scroll over and work the other side in identical mirror-image reverse. The best way of ensuring that the scroll is symmetrical as seen in front view is to slightly lower the "road" on one side and then the other, and then back to the other side, and so on. You will find that this little-by-little approach—with constant reference to the center line—is the easiest way to proceed.

Having made the sides of the scroll, turn it over so you can see it front-on. Use the masking tape and a soft pencil to establish the 1/4"-wide track that runs parallel to each side edge. When you are happy with the guidelines, use a knife and gouge to work and model the central area until it is lowered by about 3/16" and is slightly convex.

When you have what you consider is a well-formed and modeled scroll, use the graded sandpapers to rub it down to a smooth finish. Make sure that all the nooks and creases are crisp and clean. This done, draw the stylized foliage imagery on the front face of the scroll, incise it with the knife, and then give the whole works a coat of matte white undercoat paint, followed by a coat of best-quality gold paint.

Run a couple holes in from the back of the shelf support, use brass screws to fix the bracket to the shelf, and finally give the whole works a coat of thin varnish and/or a burnishing with beeswax polish.

MATERIALS LIST

SHELF BRACKET

A Top of shelf (1)	7/8" × 9 7/8" × 18"
B Back board (1)	7/8" × 9" × 18"
C Carved bracket (1)	4" × 5" × 10"

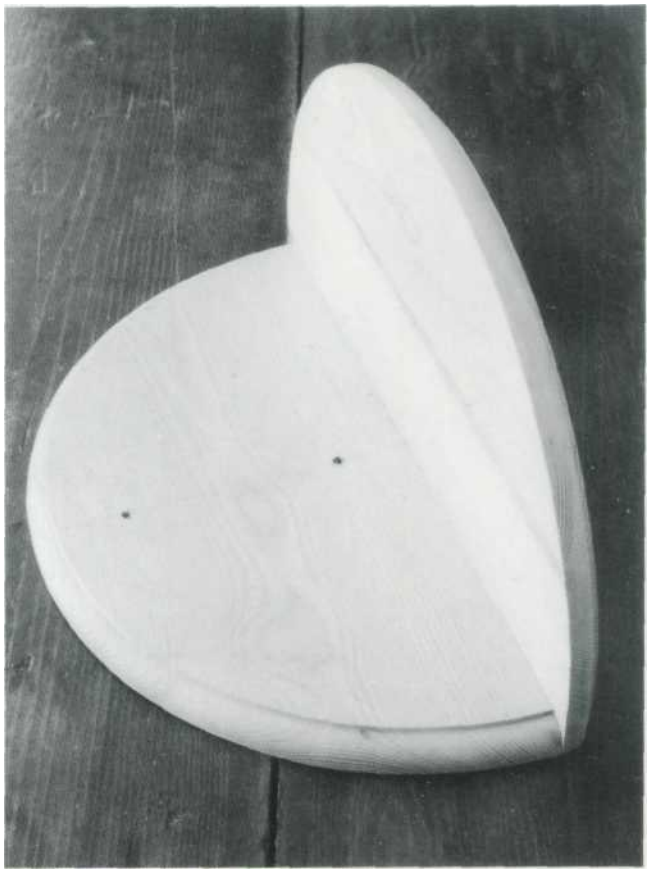
HARDWARE AND EXTRAS

D 2" brass countersunk screws (2)
E White matte undercoat paint
F Best-quality yellow-gold paint or gilding paste

SPECIAL TIP

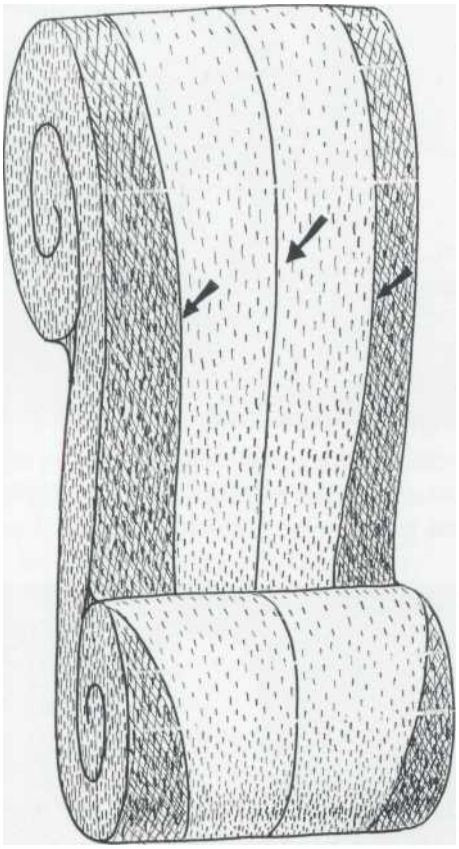
Though generally in woodcarvmg your wood has to be attractive, straight-grained, free from splits and knots and relatively easy to carve, there are times when, as the wood is to be painted, you don't have to worry about its looks. This being the case, you could go for an inexpensive, characterless but easy-to-carve variety like jelutong. That said, if you relish the notion of the project but want to go for a uniform plain wood blond look, then 1 think your best choice would be lime.

STEP-BY-STEP STAGES

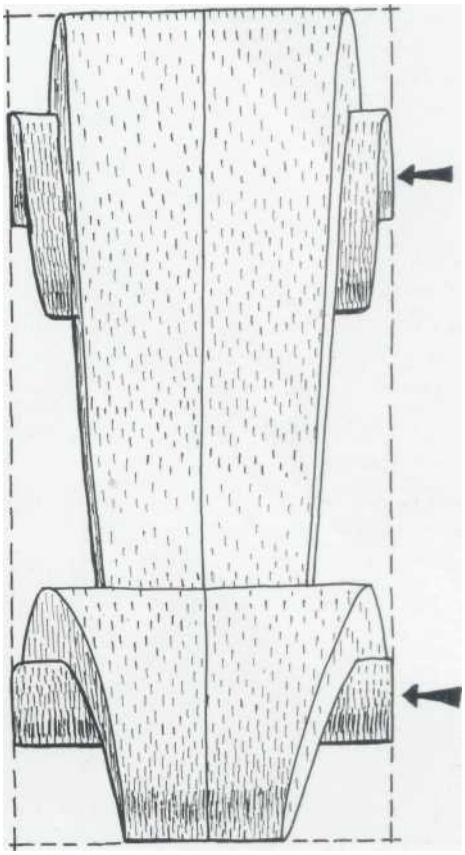


1 Butt the two halves of the shelf together and fit with glue and secret dowels.

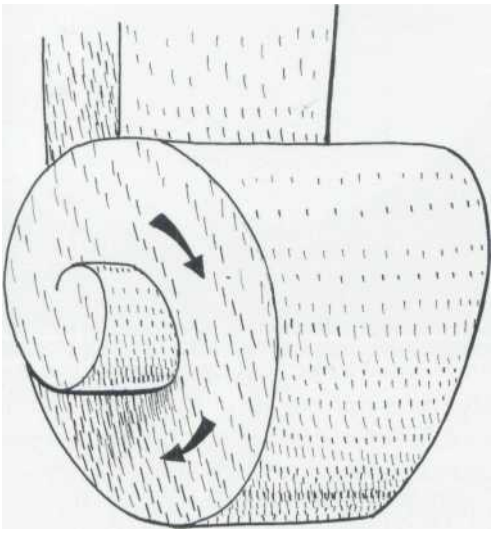
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2 When you have made the blank and used the masking tape to establish the shape of the bracket as seen in front view, shade in the waste that needs to be cut away. Note that the arrows indicate the center line and the sides.



3 If you have carved it correctly, you will see that the scroll peaks are at the same level.



4 The mountain road analogy perfectly describes how the side-face curls down, around and up. Be watchful as you lower the "road" that the "cliff face—meaning the face that in this view goes vertically up from the road and through to the peak—is cleanly worked.



5 Use a knife to clean up the sides and to deepen the stop-cut that defines the depth and shape of the camber.



6 The incised cuts are best worked with three strokes: one stop-cut to set in the center line and to establish the depth of the incision, followed up by an angled cut at each side to establish the width of the incision and to remove the waste.



7 Be careful when you are working the top of the small scroll that you don't dig too deeply into what will be end grain.



8 Having used a ruler and square to draw in the center line, do a dry-run fit of the scroll. Establish the position of the screw holes by taking your eye-level down to the face of the wood and identifying the scroll-to-shelf contact points.

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GILDING THE SCROLL BRACKET

Woodworkers are forever coming up with new and exciting ideas. I'm sure you know what I mean. One moment you are hall way through a project, and the next . . . Eureka! A new idea or variation springs to mind. And so it was with this project. The moment I had finished describing how to carve the bracket and give it a lick of gold paint, it suddenly occurred to me that perhaps it would be more in keeping with the wood carving tradition to gild the bracket.

Though gilding is a technique that requires a good deal of time and patience, the end result is stunning, well worth the effort. There are two methods of gilding: oil and water. 1 have opted for what is best described as the shortcut oil technique. That is to say, I follow the whole procedure for the gold painting, and then finish up with the gilding.

THE GILDING PROCEDURE

Give the finished carving a couple of coats of matte white undercoat paint followed by a coat of gold paint, and wait for the paint to dry. Then take a piece of fine-grade sandpaper and rub the carving down to a smooth-to-the-touch finish—the smoother the better.

Being mindful that the oil gold size dries in about 25 minutes, give a small area at the back of the bracket a swift thin coat. When the size is tacky—almost dry—slide one of the gold leaf sheets out onto the plywood and cut it into small postage-stamp pieces. Press straight down with the lull length of the blade.

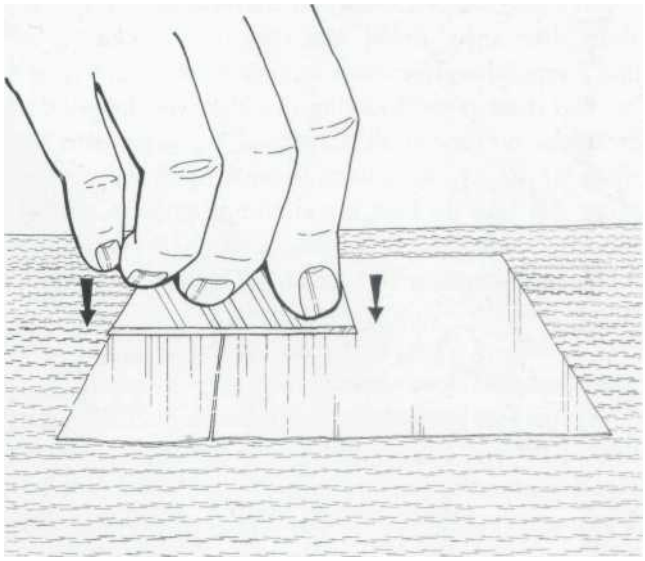
Now for the tricky part! Take the brush or tip, pass it a couple of times over your hair to increase the static, and then touch it down so that it picks up a small piece of gold leaf. Lay the gold leaf down onto the tacky size and dab it into place with a pad of lint-free cotton cloth. Take up the second piece of gold leaf and lay it down alongside the first so that there is a slight overlap. Continue until the whole surface of the bracket is covered in gold.

Finally, dust the surface with a dry brush to remove loose pieces of gold, and the job is done.

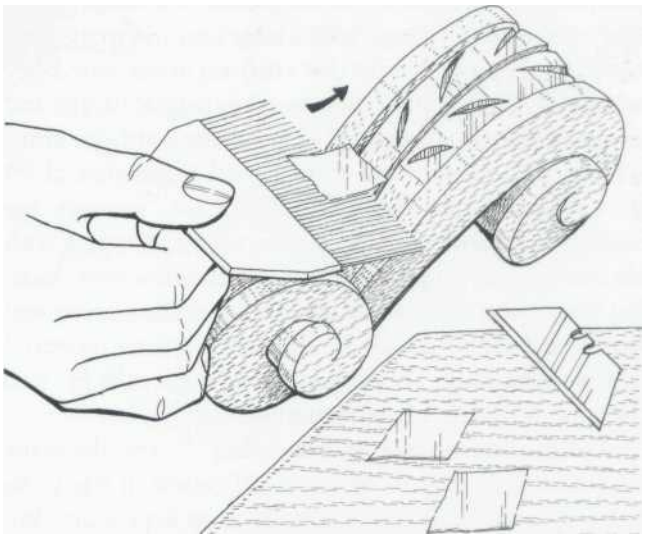
MATERIALS LIST: OPTION

A Quick-drying oil gold size
B 25-leaf book of gold leaf—or metal leaf (imitation gold) at a quarter of the price
C Gilder's brush or tip
D Craft knife blade
E Piece of easy-to-hold plywood (12″×12″)

STEP-BY-STEP STAGES



1 Having made sure that everything is clean, dry and free from dust—your hands, the blade and the plywood—take the blade and press the whole length of the cutting edge down hard on the gold leaf. Make the cut by slightly rocking the blade.



2 Wipe the brush over your hair to increase the static, then swiftly pick up the gold leaf and lay it down on the tacky gold size. Press the leaf down with a clean cotton pad.

COMBINATION AND MULTIPLANES

I don't like routers. Okay, so maybe they are the best thing since sliced bread. Yes, they do a wonderful job, and 1 agree that they aren't as expensive as they used to be, and there is no doubting that they get the job done in almost no time at all. I know all the arguments. The thing is, I don't like routers because of all the dust and noise. But how do I cut my moldings, grooves, tongues, rounds, hollows and all the other profiles? Well, the beautifully simple answer is, 1 use an old Stanley 45 combination plane.

The Stanley 45 is, to my way of thinking, one of the most beautiful woodworking tools ever invented.

It came into being at the end of the nineteenth century, when there was a huge push by the iron plane manufacturers to come up with a single do-it-all plane. You have to remember that up until that time, every type and size of slot, tongue, fillet and fancy profile needed to be worked with a dedicated plane. Can you imagine? If you were a keen woodworker in the nineteenth century, it's likely you would have needed 40 to 50 or more different wooden moulding planes!

The Stanley 45 is a quality tool, more like a hand-built gun than a plane. It has a main body piece with a sledge-skate sole runner and a rosewood handle; a cutter clamp and integral depth gauge with a large knurled wheel; two nickel steel outrigger arms that are fixed to the main body with screws; a middle section with an integral handle and sledge-skate sole runner that fits onto the outrigger arms; a fence with a rosewood runner; and a selection of 45 plus cutting irons. And as if all that isn't enough, my Stanley 45 is covered in fancy caste motifs; dripping with chrome and nickel plate; heavy with thumbscrews, locking nuts, wing nuts, adjusting screws, cutting spurs and knobs; and supplied with the set of cutting irons packaged in a wooden wallet. Better yet, the whole works fits into the most attractive tin presentation box.

And just in case you are wondering . . . yes, the plane does indeed live up to its looks. Of course, it has to be carefully tuned and the irons need to be kept sharp, but that said, it is a most efficient tool.

Setting up the Plane

As to why Stanley stopped making the "45" way back in the 1960s, who can say. They are still being sought by today's woodworkers, and though they are relatively easy to obtain, the main problem is that most secondhand 45's come disassembled and without the necessary setting, tuning and using instructions.

And just in case you are one of the growing army of avid user-collectors who have a secondhand Stanley 45, and would dearly like to know how it needs to be sorted and tuned, then help is at hand.



STANLEY COMBINATION PLANE
The legendary Stanley 45 *in action.*

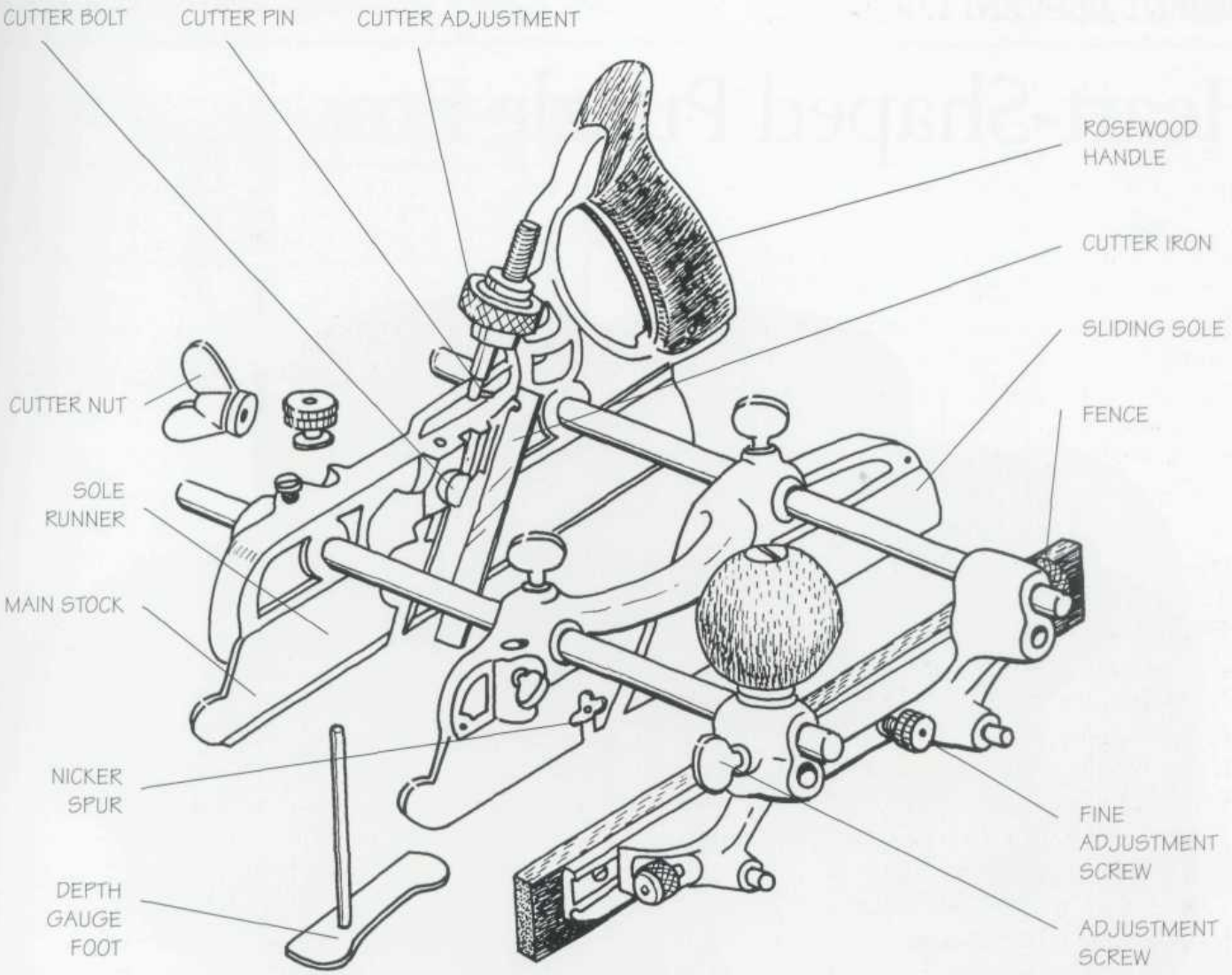
The order of setting up or tuning—the way I do it—is as follows. I first select a cutting iron and check that the edge is clean and well honed. If necessary, I wipe it on the oilstone and use a slipstone and a strop to bring the cutter bevel to a razor-sharp, 35° edge. This done, I fit the cutting iron into the groove and adjust the wing nut so that the iron is held in position. Next, I slide the middle sole runner on the outrigger arms and slide it up to the body of the plane so that the blade has a runner at each side edge. If I am going to cut across the run of the grain, I set the spurs so that the little cutter or nicker blade is in the down position. Lastly, I measure and set the fence and the plane is ready for action.

Okay, the plane is well set up and tuned, you have a nice straight-grained piece of wood in the vise, and you are ready to go. The first thing to do is get a household candle and wipe it over the sole and fence of the plane. Certainly it sounds a bit strange, but a couple strokes with the candle will dramatically reduce the friction—it will just about cut your sweat by half. And just in case you don't believe me, try it without the candle—ha!

When you are ready to go, with the depth gauge set, set the runners down on the workpiece so that the fence is hanging over the side edge of the workpiece. Clench that fence hard up against the side edge, and then take repeated passes until the groove, tongue or profile is cut. The best procedure is to start at the end of the wood furthest away from you, and then gradually back up. Of course, you might need to adjust the depth of cut, but if you have it all together, with the plane nicely tuned and set up, the rest is easy.

As 1 said at the beginning, the Stanley 45 is a beautiful tool: no dust, no deafening noise, no need for a mask or ear plugs, no motors or dangling cables. Just a sweet slickkk ... slickkk . . . as the paper-thin shavings curl up.

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STANLEY PLANE ANATOMY

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Heart-Shaped Puzzle Box



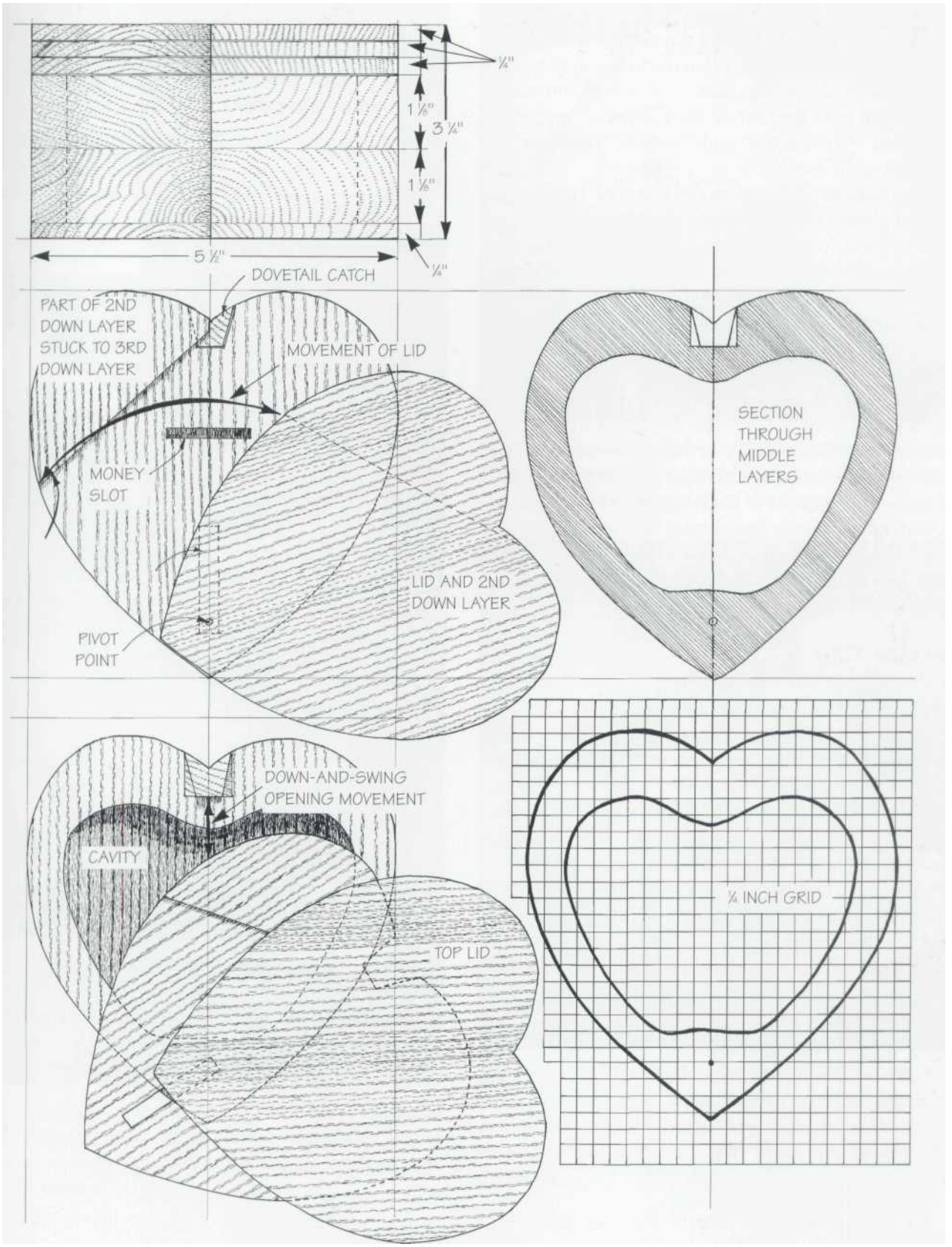
When I was a kid, an old woman left me a small wooden box in her will. The funny thing was that, although it appeared to be just an ordinary empty box with a small division to one side, when I shook it, it rattled. After variously pushing, pressing and sliding the sides and base of the box, I discovered that it had a secret compartment! It was very exciting. When I pressed down on one side of the bottom inside of the box, I was able to slide up one side of the little division to reveal a secret space. As for the rattling noise, it was a solid gold half sovereign!

This project draws its inspiration from that old wooden box. It has all the same elements: a secret area, a sliding lid, and a part that swivels open.

MAKING THE BOX

First things first, you must have a good long look at the working drawings and see how the box works. Of course, like all such boxes, it's pretty easy when you know how. To open the box, swivel the lid to the right to reveal the coin slot and the top of the dovetail key. Then, at the same time, slide and swivel the coin slot face of the box down and around to reveal the inside compartment.

When you have studied the design, draw out the heart shape. Make a tracing. Pencil press transfer the traced lines through to the layers of wood that go to make up the box. You need six layers in all: four at 1/4" thick and two at 1 1/8". Fret the shapes out on the scroll saw, so that they are all slightly oversize—meaning that the line of cut



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is about 1/8″ to the waste side of the drawn line. While you are at **it,** cut out the inside-box area.

Glue the two 1 1/8" layers together and use a gouge to pare the inside of the box to a clean finish. Next, use a fine saw and chisel to pare a channel from top to bottom of the box (at top-middle, where the two cheeks meet). Now, pencil label the four 1/4"-thick cutouts: "top," "second down," "third down" and "bottom." Then glue the "bottom" to the box.

Glue the rod of wood in the channel and cut the dovetail shape. This done, take the "third down" layer and cut the two slots and the dovetail location notch. When you are happy with the fit, take the "second down" layer, set the scroll saw cutting table at an angle, and run the wood through the saw to cut the miter across the top-left cheek.

When you have made all the component parts, then comes the not-so-easy part of putting the box together. The best procedure is to first fix the slotted layer and the bottom half of the mitered layer with a swivel screw. Then glue the two halves of the mitered layer together. Finish by gluing the lop layer to cover up the swivel screw.

Certainly it sounds complicated but, in fact, you will have it worked out in much less time than it lakes to tell. Finally, you rub it down with the graded sandpapers and seal with Danish oil.

SPECIAL TIP

The secret of getting this box right has to do with the standard of the finishing and fitting. All the surfaces must be rubbed down to a super-smooth finish, especially the mating faces that are to be glued and the laces that are to slide over each other. As to the final gluing, the best procedure is to start off using double-sided sticky tape, and then use the glue for real when you know how it all goes together. 1 say this because it is the easiest thing in the world to make a complete mess-up by gluing the wrong two parts together. Be warned!

MATERIALS LIST

A Board (6)	¼″×6″×7″—I used English yew throughout

HARDWARE AND EXTRAS

Swivel screw (1)	1¼″-long brass countersunk screw

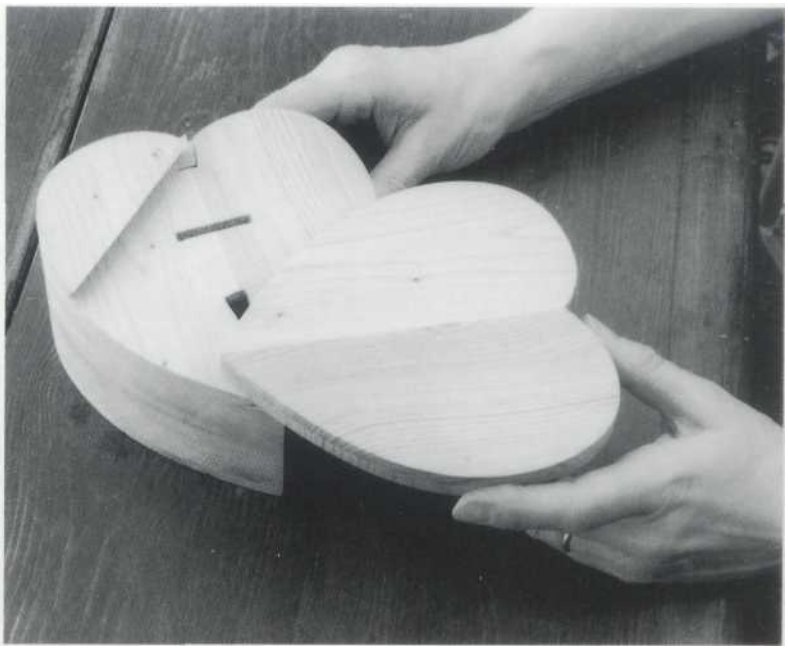
STEP-BY-STEP STAGES



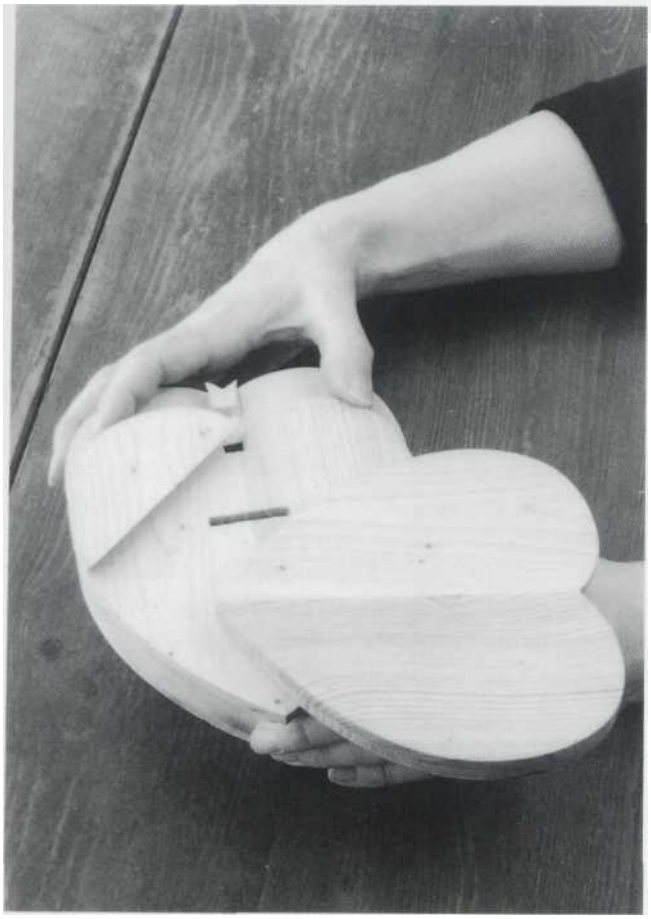
1 Detail showing how the square rod fits in the channel so that the dovetail at the top locates in the slotted layer. The procedure is to first glue and fit the rod, then cut the dovetail.

2 The miter cut on the second layer needs to be angled so that it looks toward the bottom of the heart. Be mindful that the finer the saw used to make the cut, the better the fit.

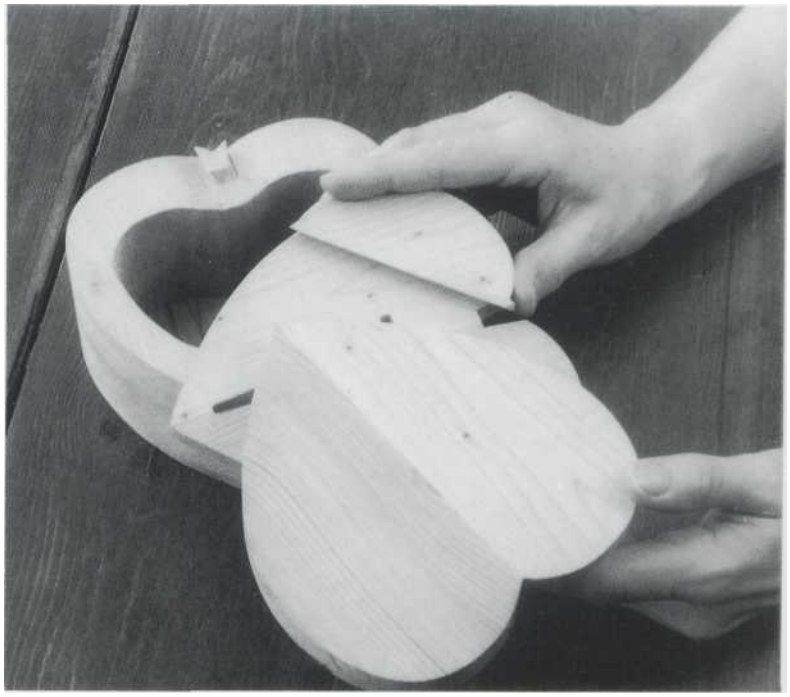




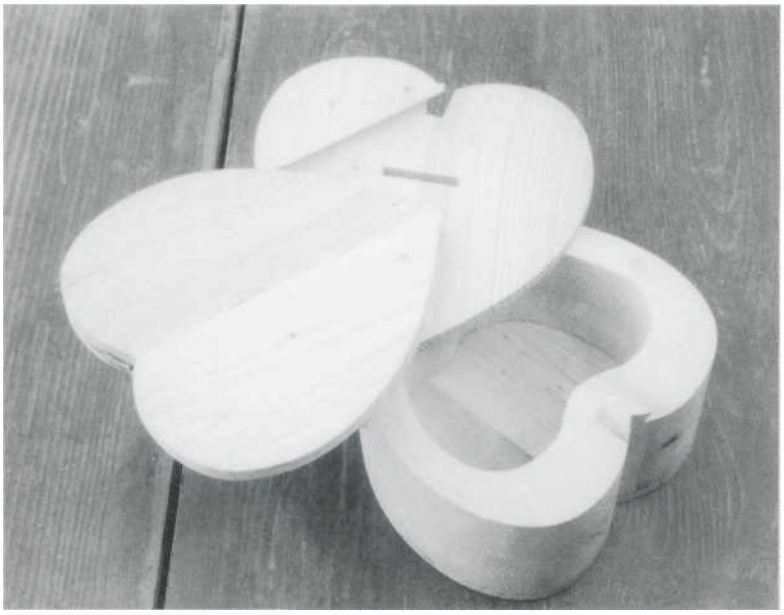
3 See how the top-left part of the mitered layer needs to be glued to the slotted layer, so that the topmost part of the miter hangs clear of the dovetail.



4 The pivot slot on the third layer needs to be adjusted so that the layer can be slid down and then swung over—so that the "cheeks" at the top of the heart just clear the dovetail.



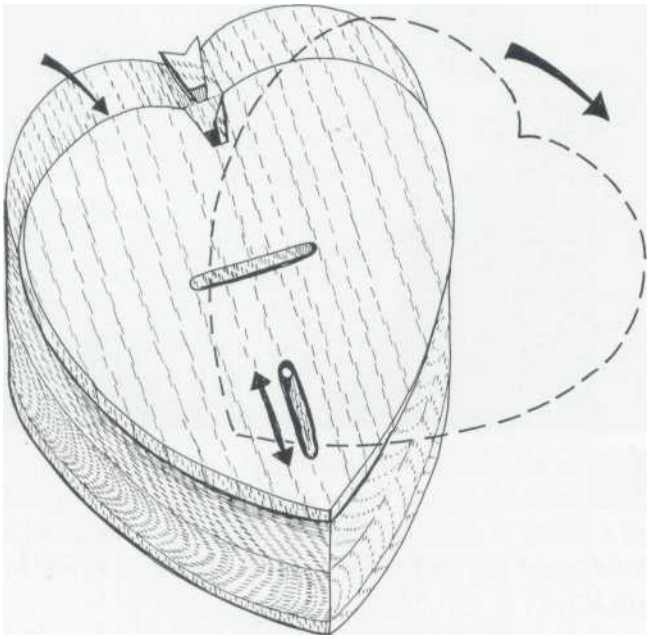
5 In my design, the slotted layer is able to swing to the left or right. If you want to make the box more of a puzzle, a good modification would be to build in a little "stop" peg so that the layer could only be swung to the left.



TWEAKING THE DESIGN

When you are fixing the swivel point and the slot, make sure that the slot is long enough for the cheeks to clear the underside of the dovetail.

6 Because I had quite a lot of trouble cutting out the center of the box—first with the drills and then with a gouge I think the next lime around 1 will redesign the dovetail post so that it cuts right through the wall of the box. Then 1 can more easily clear the inside-box waste on my fine-bladed band saw.



PROTOTYPES

A prototype is a full-size working model that is made prior to the project. The idea is to use inexpensive materials to work out all the problems before you start using your precious materials.

As you can imagine, this heart-shaped box didn't drop from the sky perfect and ready-made—no way! In **fact,** it was rather difficult to sort out. Although the various views and cross sections looked fine on paper, I just couldn't figure out how the three layers that make the top of the box fit great together. In the end, after a deal of swearing and messing about, 1 decided that the best way was to make a full-size prototype from three pieces of 1/4"-thick hardboard.

The working procedure went as follows: First I cut out the three heart shapes and pencil labelled them "1," "2" and "3." Then I drew the heart shape out on the bench. Next, I took cutout number 3 and played around on the drawn-out heart with various placings of the swivel point and the sliding slot.

The main difficulty I found was positioning the miter in such a way that there was enough room for the "cheeks" of the heart to slide open.

When I had established the precise position of the swivel point and the length of the slot, I then tried out board number 2 and fixed the position of the miter slot. And, of course, when it came to making the box for real, I had the hardboard cutouts to use as templates.

And just in case you are thinking that you are so skilled that you can go straight in and make the toy, the table or whatever, without making a working model, yes, you might well be lucky once or even twice. But sooner or later you are going to make a mistake with one or all parts getting incorrectly cut and/or glued.

For example: I once designed the most beautiful chair. It looked wonderful on paper; the drawn elevations were a work of art! But when it was built, it was unstable, it was grossly uncomfortable, and it started to pull apart. Another time, 1 made a moving toy that looked good on paper, but when 1 made it full size, the friction between the wheels and the floor was so great that it simply didn't work.

All this is to say that the only sure way of knowing that a design is going to work is to make a full-size working model.

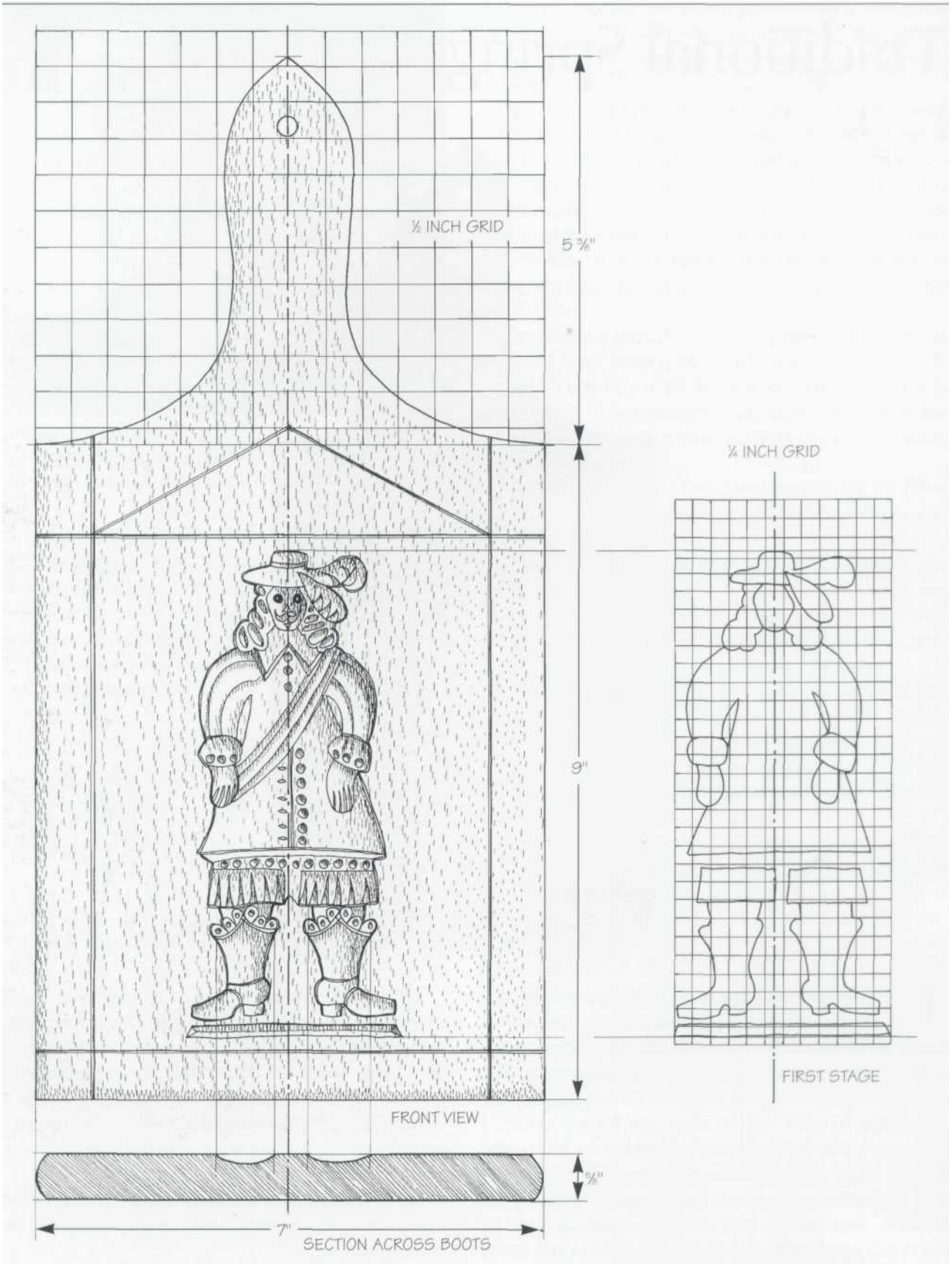
Traditional Springerle Board



The American Colonial kitchen or "keeping room" was an absolute treasury of fine woodwork. There were butter bowls and salt trays, boxes and knife racks, pipe-shelves, cutting boards, tables and chairs, all of them variously carved, pierced and detailed. Of course, they are all exciting in some way or other, but for my money, I particularly like the beautifully carved biscuit and cookie boards. There were shortcake molds made by the English and Scottish communities, breadboards made by the Swedish communities, little stamps and presses made by the Polish immigrants. Just about every Old World group had a unique style, form and tradition of carved boards.

Of all these "mother country" woodenwares, the German American Springerle cookie boards are perhaps the most delicate and fanciful. Every early Pennsylvania German home had them. The cookie dough was rolled thin and the carved hardwood board was pressed onto it to imprint the designs. When the cookies were baked, the resultant raised designs and motifs made an attractive table arrangement.

So if you like the notion of basic carving, and you know someone who enjoys baking, then this could be the project for you.


½ INCH GRID
5 ⅞"
9"
FRONT VIEW
⅝"
7"
SECTION ACROSS BOOTS
¼ INCH GRID
FIRST STAGE

MAKING THE SPRINGERLE BOARD

This is the perfect project for nervous beginners who are looking for an easy way into the craft of woodcarving. All you need is a flat board, a bench clamp or holdfast, a V-section gouge, a straight gouge, a small spoon gouge, a sharp knife and a steel safety ruler, and you are ready to begin.

Trace the design on a slab of well-prepared, close-grained hardwood. We have chosen beech, but you could just as well go for plum, pear, sycamore or maple. Then carefully pencil-press transfer the primary lines of the design through to the wood. Next, cut out the shape of the board on a scroll saw and rub the edges down to a good finish. This done, secure the workpiece flat-down with the clamps or holdfast and use the spoon bit tool to scoop out the primary elements of the design. Don't try for any great depth, just settle for nice round depressions. It's all pretty easy, as long as you are careful that the tool doesn't dig too deeply into the gram and/or skid across the wood. Continue working with a controlled action, holding and guiding the tool with one hand and pushing, scooping and maneuvering with the other until you have achieved what you consider is a good strong design. You need to dish out the hat, the hair, the face, the coat and cuffs, and the boots. Being mindful that the design is in reverse, try to judge the depth of the carving so that the fullest part of the design has the deepest hollows. Aim to scoop out the little dips and hollows to a depth of about 1/4". Don't dig the tool too deep or try to lever the tool, but rather work with a delicate scooping and paring action. Cut across the grain wherever possible. Remove only small curls of wood and try to keep the carving crisp and controlled. If you feel at any time that the tool is cutting roughly, then approach the grain from another angle or sharpen the tool with a few strokes on the stone and leather. Bear in mind that each and every hollow needs to be worked smoothly—no rough surfaces or undercuts. It's a good idea from time to time to test out your carving by taking a piece of Plasticine and pressing it into the cut shapes, just as if you were pressing dough on the board. Once you have considered the shape and detail of the pressing, you can adjust your work accordingly. Ask yourself as you are working, could the little dips be deeper? are the shapes nicely rounded? and so on.

With the basic pattern in place, take the very smallest spoon gouge and scoop out the little dips that go to make up the small dot and dash details of the buttons and eyes.

Next, use your knives to cut in the fine details. For example, you need to cut in the features, the sash and belt, the tassels around the top of the boots, and so on. And of course, if at any time along the way you want to cut in pockets or bigger plumes or other details, then follow your fancies. Finally, use the knife *or* V-tool to cut in the simple frame shape.

MATERIALS LIST

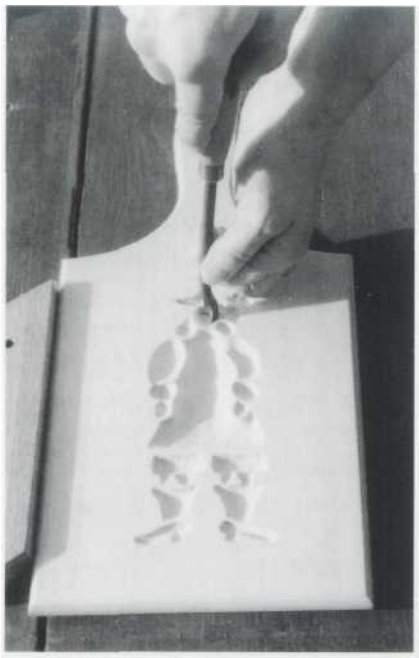
A Board (1)	5/8″×7″×15″—a piece of prepared wood like beech is best

Note that all measurements allow for a small amount of cutting waste.

STEP-BY-STEP STAGES



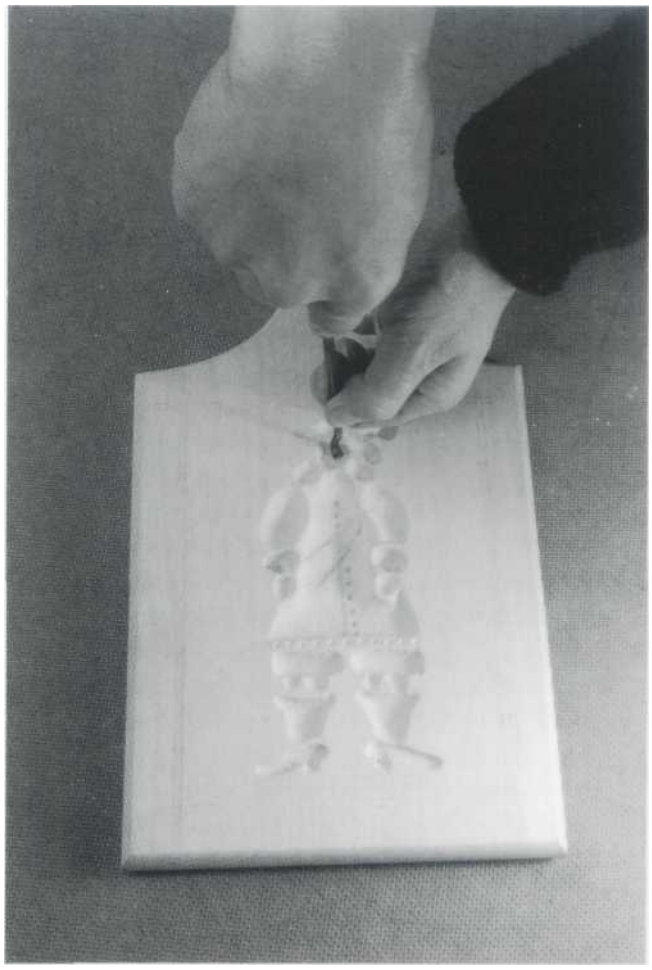
1 Go over the transferred lines with a soft pencil and then spray with pencil fixative to prevent



2 Use one of your spoon bent gouges to scoop out all the little hollows and depressions that will make up the design.



3 If the shape of the depression permits, cease with the spoon bit and change to using the straight gouge. You will find that the straight tool allows you to get a bit more weight behind the thrust.



4 Use the smallest spoon bit gouge to "winkle" out the small dot-and-dash details of the eyes and trim. Stab the tool down vertically and twist it on the spot so that it "drills" out a pocket of waste.

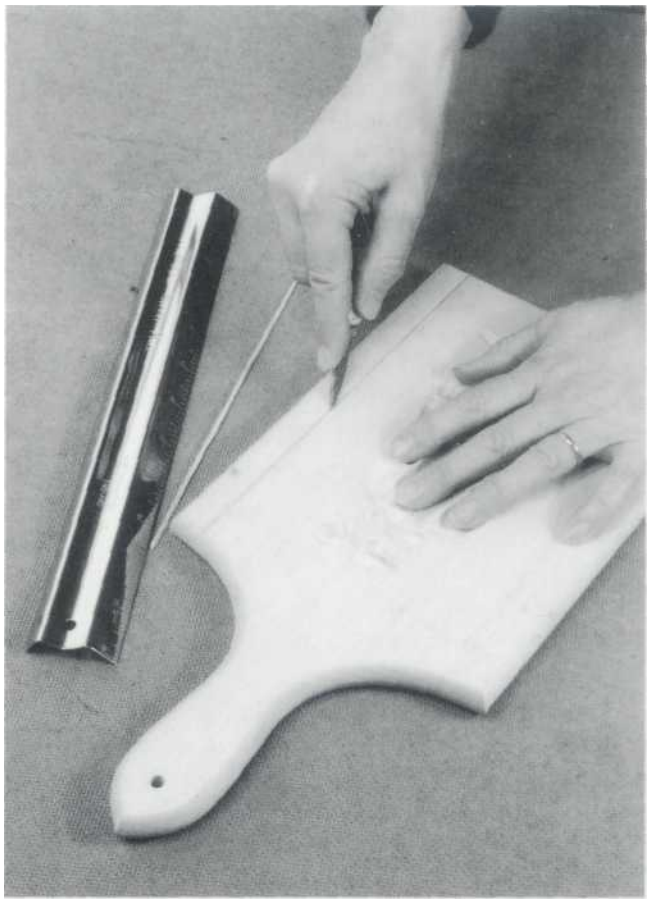
SPECIAL TIP

If you find that your tools are cutting roughly, the chances are that the wood is damp or unsuitable or the tools are blunt and need sharpening. The best way to work is to set yourself a rhythm. That is, spend a lew minutes carving and a few minutes standing back and assessing your progress, and then a few minutes rubbing the bevel of the knife or chisel on the fine stone, and so on. If you do this, the work will move along smoothly, with the carving being nicely considered and the tools kept at maximum sharpness.

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5 Use the knife to cut the tassel details. Make three cuts for each tassel—a deep stabbing horizontal stop-cut to define the width of the tassel, followed by two downstrokes to clear the waste from the triangular pocket.



6 Use the steel safety ruler and the knife to cut the V-section frame detail. Each line is made with three cuts—a single straight-down stop-cut to define the depth of the V, followed by two angled cuts to clear the waste.

CHOOSING AND USING WOODCARVING TOOLS

There are so many woodcarving tools on the market that beginners are often bewildered when it comes to buying gouges and chisels. For example, I have just looked through a handful of current catalogs and I see hundreds of slightly different tools to choose from. Maybe you aren't going to need more than a handful of tools, but the big problem is which ones to buy.

The first question you have to ask yourself is what do you have in mind to carve? Are you excited about the notion of carving huge sculptural pieces? Or do you fancy caning intricate little birds? Or do you just want to try your hand at traditional flatwork like chip or relief carving, the sort of carving that you see on furniture?

When you decide on your area of woodcarving—sculptural, relief designs, miniatures or whatever—it's best to buy a modest starter kit of, say, four tools. For example, you might get a couple of straight gouges, a V-tool and a bent gouge. Of course, once you actually start carving, the whole problem sorts itself out. You will soon discover that certain tricky details simply cannot be worked, or that you can't carve an undercut or some other detail with any one of your four tools. Then you have enough knowledge to buy a tool of a shape and size to suit. When I first started carving, my favorite tool was a medium-size, shallow-curve straight gouge—it still gets used more than any other tool. So you might start out with the four tools, and everything will be fine and dandy, until the time comes when you need to use a fishtail or a smaller spoon gouge, or yet another size straight gouge .. . and so the fun begins.

All that said, the single thing that bothers most beginners is that they are confused when it comes to the names and the numbers of woodcarving tools. If you don't know what I mean, look at various woodcarving tool catalogs.

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From one manufacturer to another, there are all manner of descriptions that relate to the same tool types. Some manufacturers use letters and numbers, some use their own prefix codes, and so forth.

If you are a beginner and still undecided as to the correct gouges for your starter kit, then try the following method—it may help. Start by determining the width of blade you need. Let's say that you have chosen a *V2"* width. Next, consider the hollow or sweep of the blade. Ask yourself, do you want a shallow sweep or do you want a deep U-section sweep for bowls and such? Finally, decide on the profile or shape of the blade along its length. For example, do you want a straight blade or a curved or spoon bent? Once you have sorted out the blade width, the shape of the sweep and the profile of the blade, then all you do is walk into the store and point a finger.

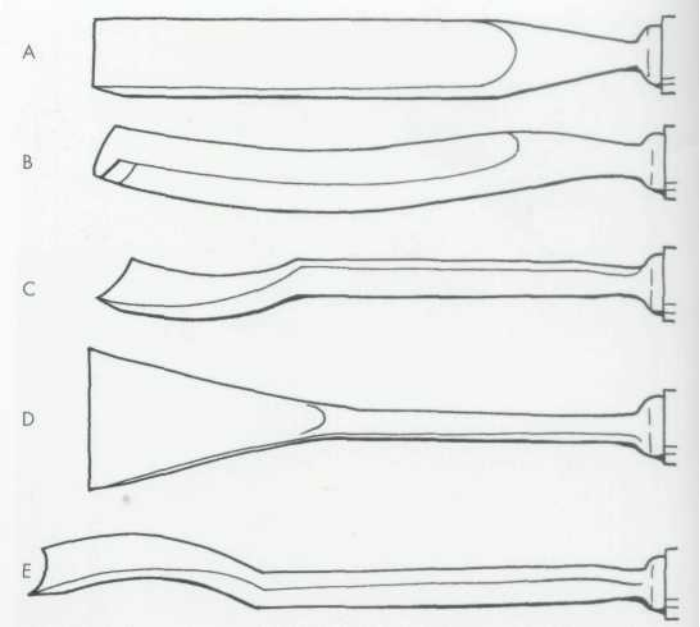
STRAIGHT CHISELS AND GOUGES

If you are still confused as to terms, the following glossary will show you the way.

Straight Chisel—A straight chisel is a flat-bladed tool that has a straight cutting edge. If you jab the cutting edge into the wood, it will leave a straight cut, like a dash. The term "straight" relates to the shape of the blade along its length. The size of the chisel is determined by the width of the cutting edge. In use, the chisel is held in one hand and then either pushed or struck with a mallet. ***Straight Gouge***—Though the straight gouge is straight along its length—just like the straight chisel—the blade is hollow-curved in cross section. If you stab a gouge into the wood, it makes a curved cut, like a C or U. The shape of the curve is termed the "sweep." So when you are ordering a gouge, you need to know the width of the blade and the shape of the sweep. In use, the straight gouge is either pushed by hand or struck with a mallet.

CURVED OR BENT CHISELS AND GOUGES

Having established that the term "straight" describes the shape of the blade along its length, it follows that the terms "curved" or "bent" also describe the blade along its length. For example, you might have two gouges that make identical cuts, the only difference being that one is straight along its length and the other curved or bent. They make the same cut, but the bent tool allows you to hook and scoop into hollows that the straight tool is unable to reach. Spoon bent, fishtail and back-bent tools are simply gouges that are more extremely shaped along their length. So, if you want the cutting edge of your gouge to be a certain width and sweep, you have to make a decision as to the shape of the blade along its length. Do you want a straight blade for heavy pushing or mallet work, a bent one for digging out a shallow bowl, a spoon shape for scooping out deep hollows, or a fishtail for cleaning out tight corners?



CURVED OR BENT CHISELS AND GOUGES

(A) *Straight chisel; (B) deep sweep curved gouge; (C)* shallow *sweep spoon bent gouge; (D) shallow sweep fishtail gouge; (E) shallow sweep backbent gouge.*

Handles—Once you have decided on the width of the blade, the size of the sweep—meaning the shape of the C section—and the shape of the blade along its length, then comes the choice of the handle. There are turned hardwood handles, plastic handles, handles with and without ferrules, and so on. I personally prefer the "London" pattern of turned and shaped octagonal boxwood handles on three counts. They are comfortable to hold, they look good, and best of all, the octagonal section prevents the tool rolling about or falling off the bench and doing damage.

Nautical Clock and Weather Station



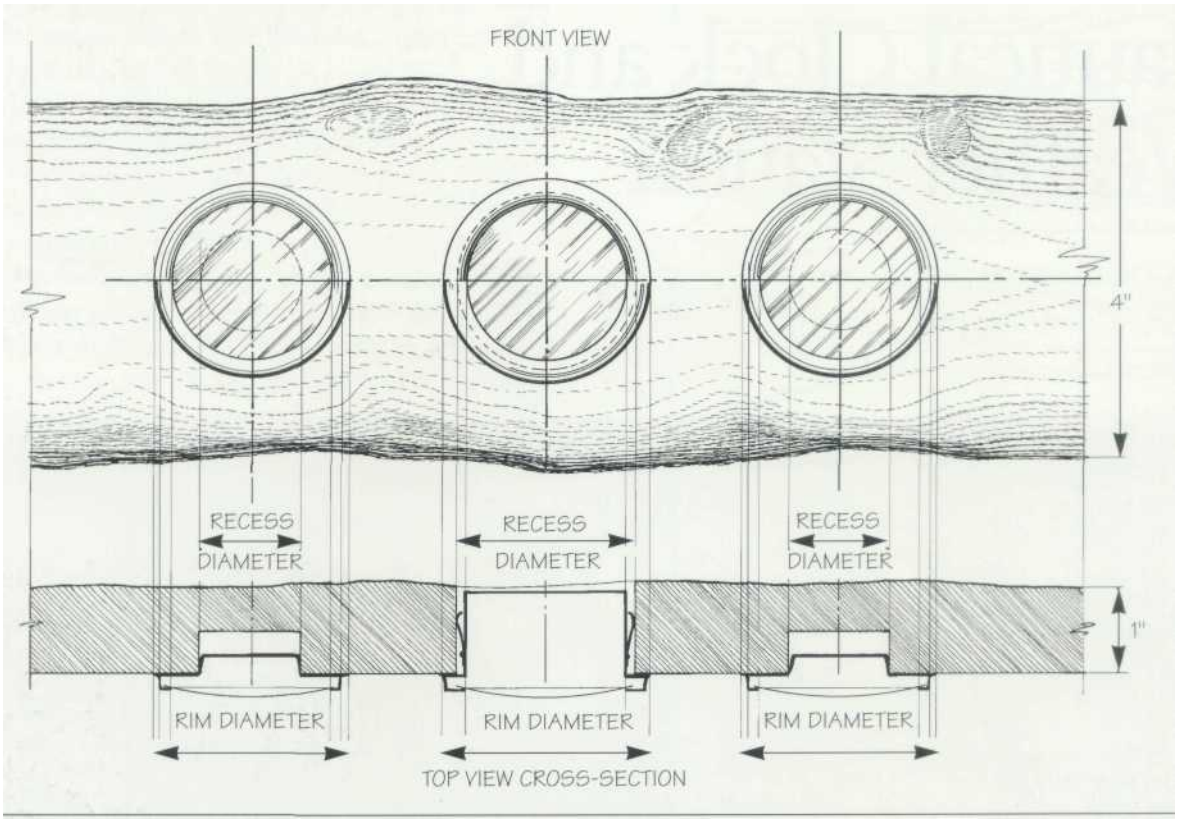
When we decided to move from a wild and windy part of the coast to a relatively mild hills-and-dales part of the country, we felt that we wanted to take a lasting memento with us. As we both love the sea, we felt that we wanted a reminder of our wonderful walks along the rugged cliffs, of the picnics on the lonely beaches, and of the exciting times we had with our many boats. After a great deal of thought that took in such notions as collecting sea shells and the like, it suddenly came to us. Why not take a piece of driftwood—perhaps part of an old boat—and turn it into a nautical clock and weather station? To our way of thinking, the whole project would be a lasting memento . . . of the beaches, the storms that smashed up the boats, and the constant need to keep one eye on the time, tide and weather.

So if you, too, want to make a memento gift that uses a piece of found wood, then this is a great project.

The wonderful thing about a design of this size, type and character is its flexibility. There are any number of amazingly exciting options. I say this because, as soon as I had made the sculpted and weathered board, Gill came up with the beautiful idea of using one of our old moulding planes to create a classic moulded board. Her thinking was that there must be thousands of woodworkers out there who own an old plane and are just looking for an excuse to tune it up and get started! She also had the bright idea that with a more formal board, the various instruments could be arranged so that the board could be mounted vertically or horizontally.

MAKING THE FOUND WOOD BOARD

This project is slightly unusual in that your found wood needs the minimum of preparation. Okay, it needs to be clean and the like, but that's about it—no jointing, no



extensive marking out, just three drilled holes and a small amount of planing and sanding. And, of course, there's no reason why your piece of found wood can't be a branch from a special tree, a part of an old house, a piece of wood found in the desert or mountains, or by a river, as long as it has some particular significance.

When you have found your piece of wood, set it down on the bench and consider how the instruments might best be placed. Are you going to settle for the clock, the thermometer and the hygrometer, (see page 73), or are you going to go for additional instruments like a tube barometer or maybe a special tide-time clock? Of course, much depends on the size of your piece of found wood.

Though I wanted three matching brass dials, with a clock having Arabic numerals, I found it impossible to get a good matchup. As you can see, I had to settle for a slightly nasty white-face clock with Roman numerals. Make sure that the instruments you choose are designed to fit into a shallow recess or hole, with the brass surround or rim overlapping the edge of the hole.

When you have decided where the instruments are going to be placed, use a wire brush to scour the grit and grime from the workpiece. If you see some part of the found wood that could be modified in some way, then so much the better. For example, 1 knocked out two rusty old nails and wire brushed the resultant iron-stained holes so that they were big enough to take a piece of found rigging cordage, so that the clock and weather station could be hung on the wall.

Use the wire brush to sculpt the form, to extend and exaggerate the actions of nature. You can make contours that are rounded and rippled, much the same way as the wind, rain, sand and sea scour out the soft part of the grain, so that the hard gram and knots are left standing in relief.

When you have achieved what you consider is a good form, use a plane and sandpaper to prepare a level seating big enough for the instruments. Aim for a flat smooth surface that is slightly bigger than the instruments. Make sure that there are no nails, grit or other matter in the areas that are going to be drilled.

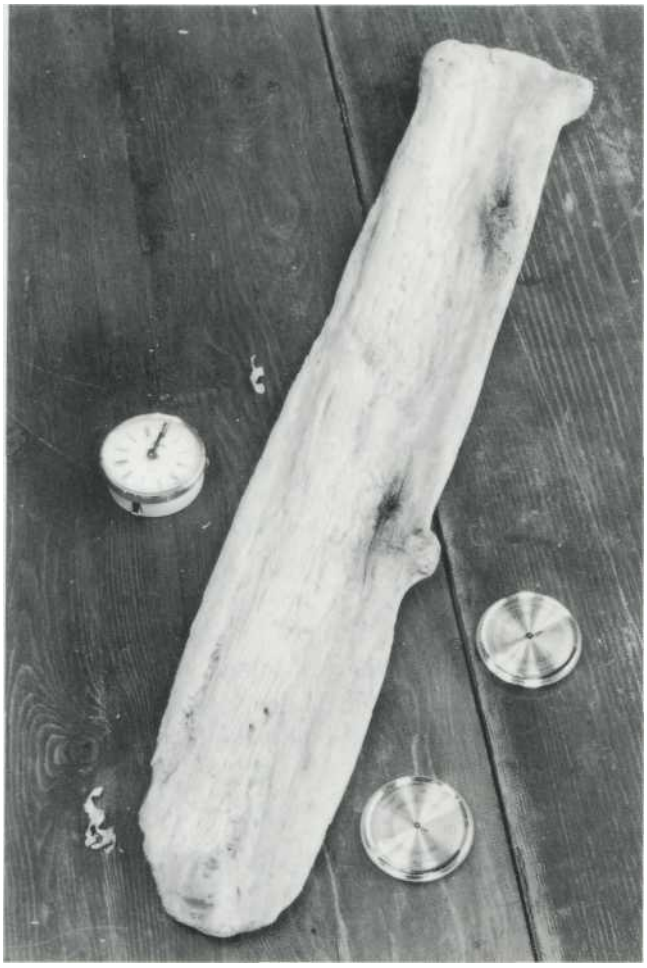
Having cleaned up the seating for the instruments so that it resembles a level plateau, bore the recess holes out with the Forstner bits. Then seal with a coat of varnish and use beeswax to burnish the whole works to a rich sheen finish. Finally, push fit the instruments in the holes, fit the rope or chain, and the project is finished and ready for hanging.

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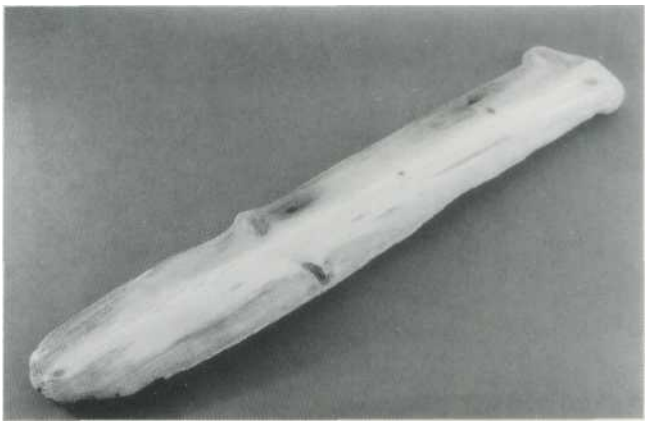
MATERIALS LIST

A Board (1)	A piece of found wood of a size and thickness to suit your instruments.

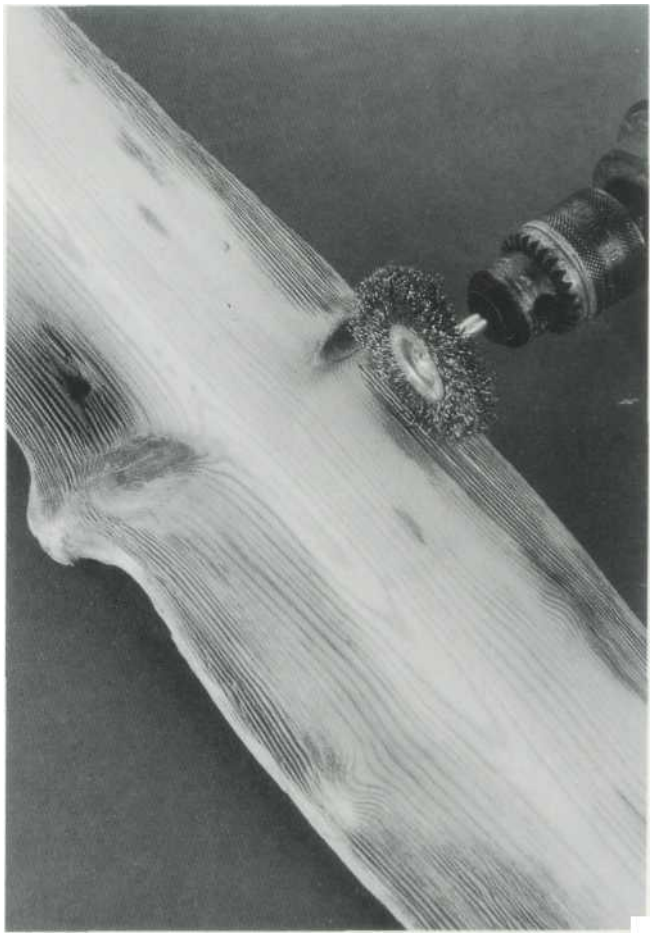
STEP-BY-STEP STAGES



1 Having found your piece of wood, select a set of instruments to fit.

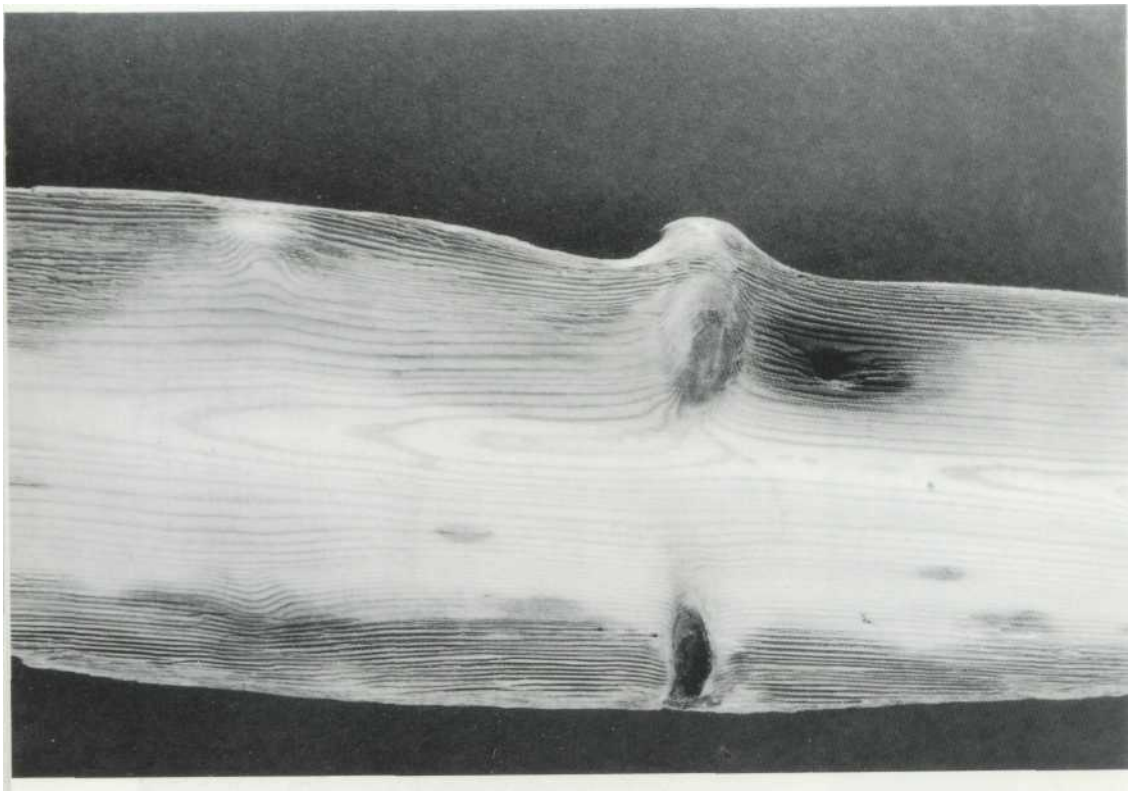


2 Remove the more obvious bits of rubbish—old nails, bits of tar, embedded grit and such. Wipe the wood with a damp cloth and leave it until it is good and dry.

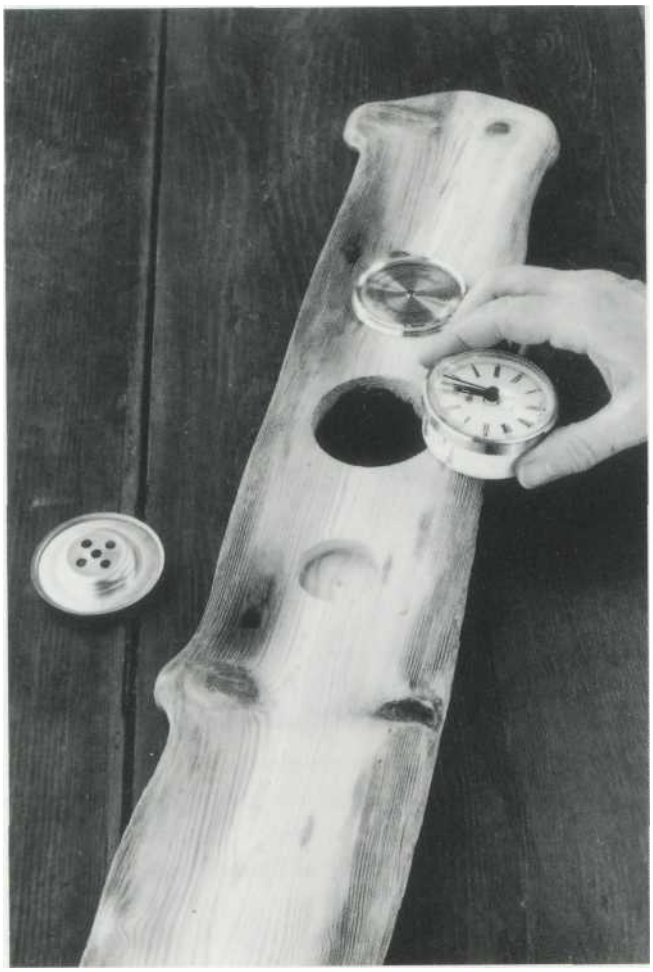


3 Not forgetting to wear gloves and goggles, use a power drill fitted with a wire brush attachment to scour out the loose grain. The safest procedure is to have the workpiece either screwed or clamped to the bench.

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4 A close-up showing how I have concentrated use of the wire brush along the edges and around the knots, so that there is a smooth, level central area.



5 If you have a drill bit size that fits the instrument, then so much the better; otherwise, you have to drill the nearest size hole. After drilling the hole, painstakingly file it to fit. I needed to remove an all-round strip about 1/8" wide.

Note—as I said earlier in the project, I don't much like the clock as shown. On consideration, I would much prefer the little watch-clock as shown in the miniature mantle clock case project.

MAKING A TRADITIONAL BEAD-MOULDED BOARD

Having measured and marked out the board and cut it to size, use the bench plane to bring it to a smooth finish. When you are happy that the board is square and true, secure it to the bench so that one long side is hanging over the edge.

Set your moulding plane up with 3/8"-wide beading iron. If like me, you are using a single-bead cutter to plane two beads side by side—a double reed—then adjust the fence to the position for the bead that is furthest in from the edge. The procedure is: First cut the bead that is furthest in from the edge. Then reset the fence and cut the bead nearest the edge. You repeat the procedure for the other edge of the board.

Finally, having used a block plane to chamfer the ends of the board, drill out the three large-diameter holes as already described in step 5.

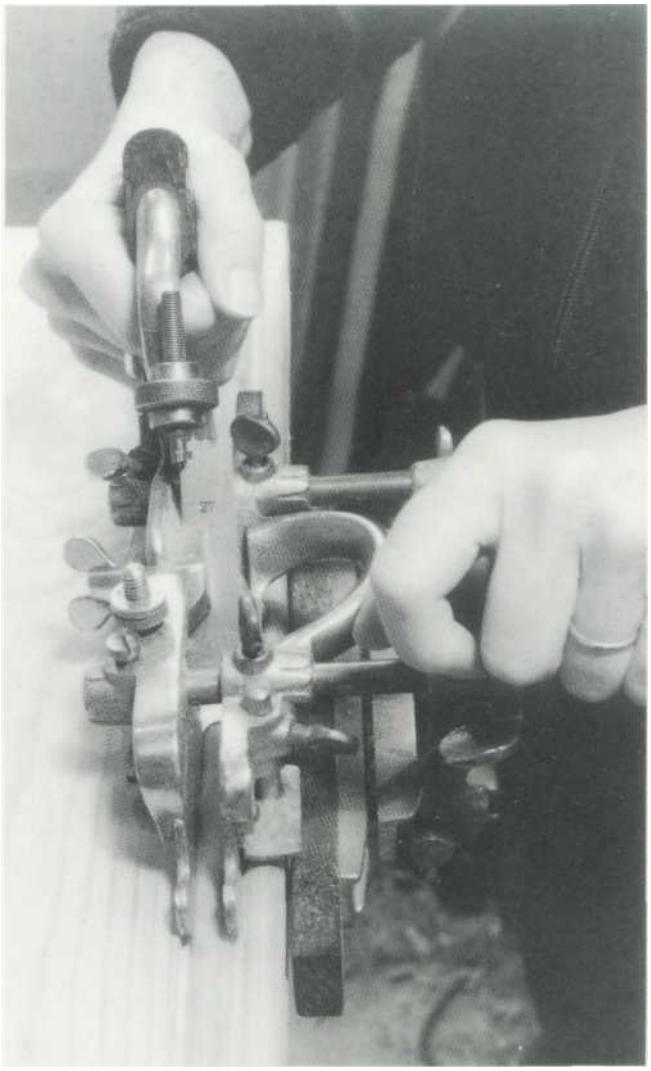
SPECIAL **TIP**

If you are looking to bore out clean-sided, flat-bottomed holes—relatively shallow holes as in this project—then you can't do better than using Forstner drill bits in conjunction with a drill press. We use a large Delta bench drill press. It doesn't wobble, or make odd noises, or require a great deal of attention. It just gets on with the job. As for the drill bits, we have a set of Forstner bits made by Freud. They do a beautiful job every single time. They bore down through end grain and hard knots, and just about anything we care to throw at them. Best of all, we like the fact that we can use them to bore out overlapping holes. Yes, they do cost about twice as much as most bits, but they last longer, stay sharp and are a pleasure to use.

MATERIALS LIST: OPTION

Board (1)	¾"×5¼"×15"—cherry

STEP-BY-STEP STAGES



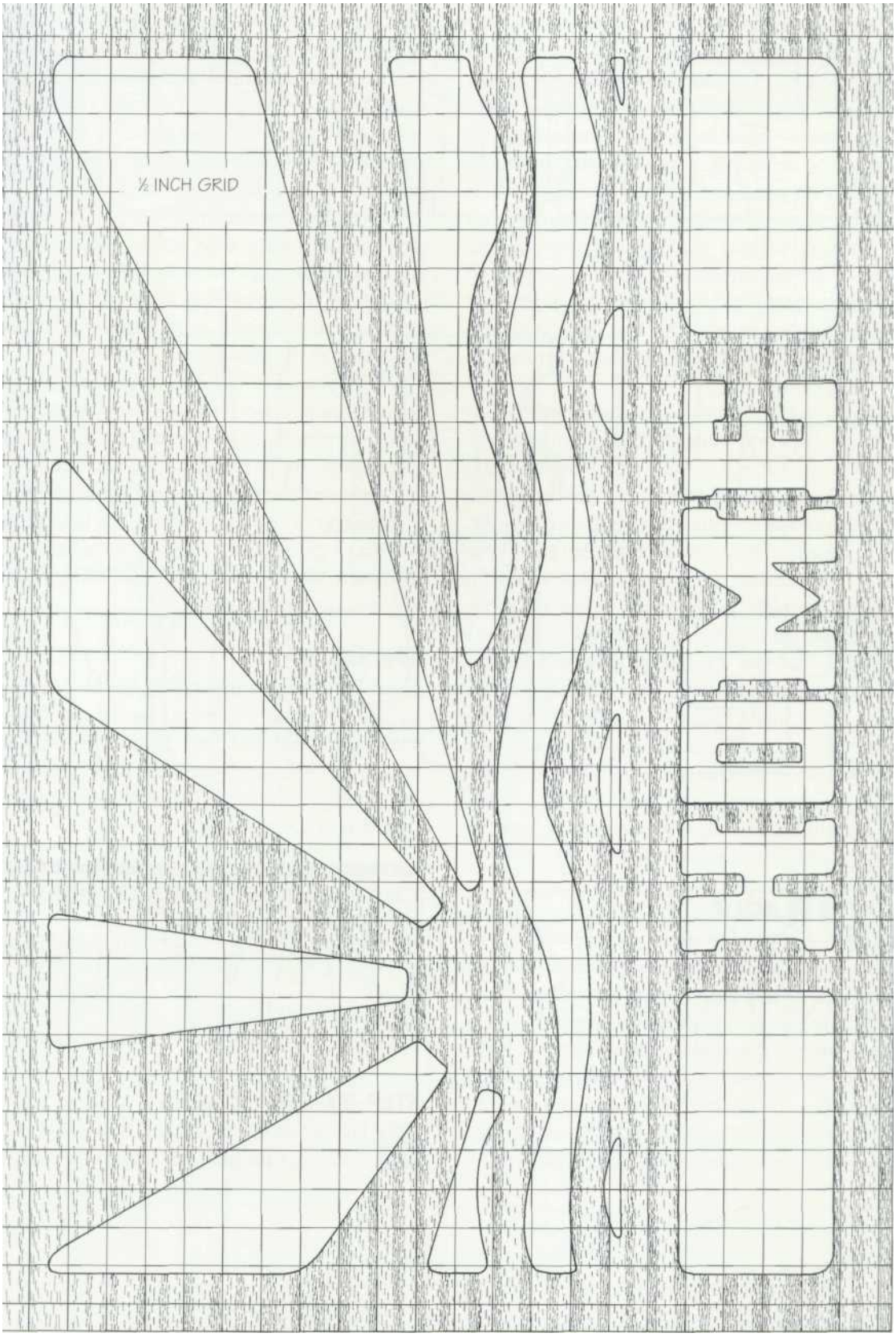
1 When you have used the plane to cut the two beads side by side, reset the blade to the very finest of skimming cuts and burnish the surface of the wood to a sheen finish. Be careful not to force the pace. Just let the weight of the plane do the work.

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Raised Letter Address Plaque



hen we first got married, one of the joys and pleasures was having our own home. Some of the first things we did when we moved into our infinitesimally minute cottage were to paint the front door bright red and design an address plaque. The red door didn't go down too well, but the plaque was a huge success! The neighbors admired it, the mailman said it added a touch of class—in fact the whole street made comments. So, if you want to make someone a unique gift, one that will beautify their home—be it ever so humble a house, cottage, bungalow, farm, ranch or riverboat—then a fretted address plaque is a great idea.


½ INCH GRID

THOUGHTS ON DESIGN

Of all the projects in the book, the name board is perhaps both the easiest and the most complex. I say this because, while the fretting techniques are truly easy—**just** about as simple and direct as can be—the design is something again. The problem is, of course, how to achieve a good visual effect—meaning a balance between the solid wood and the pierced areas—while at the same time getting the message across and achieving a structure that is sound. For example, it's no good at all having a design that is so complex that it needs to be viewed closeup with a magnifying glass, or a house name that is more an epic saga than one or two words. Also, the shape of the pierced areas needs to be carefully thought through so that the imagery is rounded and easy to cut. You don't want lots of spiky, sharp-angled imagery that is almost impossible to cut.

We are not suggesting that you necessarily use the sunburst image and the word "Home." After all, it would be more than a little bit strange if you, your neighbors and all our readers had identical boards. What we have in mind is that you use our imagery as an inspirational guide. In fact, you can use just about any imagery that takes your fancy—birds, horses, cattle, mountains, trees or whatever. The chief design problem is being able to link the name and the imagery so that the total message gets across. Let's say, for example, that you are giving this board to your grandmother who lives by the sea in a cottage called "Harbor View." You might well have a galleon riding the waves, or seashells, or a crab, or an anchor, or gulls, or a steamer, or whatever sea-salt-and-briny imagery that suits. And your great aunt—the one who lives in the mountains—could have a plaque with peaks, or bears, or **fir** trees. So let your imagination run wild!

MAKING THE PLAQUE

First things first, you need to decide on the wood. I say this because in many ways the choice of the wood is essential to the design. While the wood must withstand the wind and the rain and be relatively easy to work, it must also be fitting for the task. For example, while oak is a good choice for our plaque which is to remain unpainted and mounted on a cottage near the sea, if you live in a pine forest or you plan to have the board painted, then you might as well use an inexpensive wood like pine.

When you have chosen your wood, and once you have achieved what you consider is a good design—with the spelling of the name double-checked—trace off the design, press transfer the imagery through to the wood, and shade in the areas of waste that need to be cut away. This done, take your drill and run pilot holes through the shaded areas. How you fret out the waste areas depends on your particular tool kit. I used an electric scroll saw, but you could just as well use a coping saw, a bow saw or even a large fretsaw.

No matter your choice of tool, the procedure is much the same. Make the pilot holes. Unhitch the saw blade and enter it through the hole. Refit the blade and adjust the tension. Then variously move and maneuver both the workpiece and the saw, so as to run the line of cut to the waste side of the drawn line.

When you have fretted out the design and used the graded sandpapers to rub the rough edges to a smooth finish, cut out the base board and bring it to a good finish. Use waterproof glue to bond the two boards together.

Finally, having first protected the wood with oil, paint or whatever seems appropriate, it's time to present the board as a gift. And if you really want to make it special, you could offer to mount the board on the wall, gate, post or other appropriate place.

SPECIAL TIP

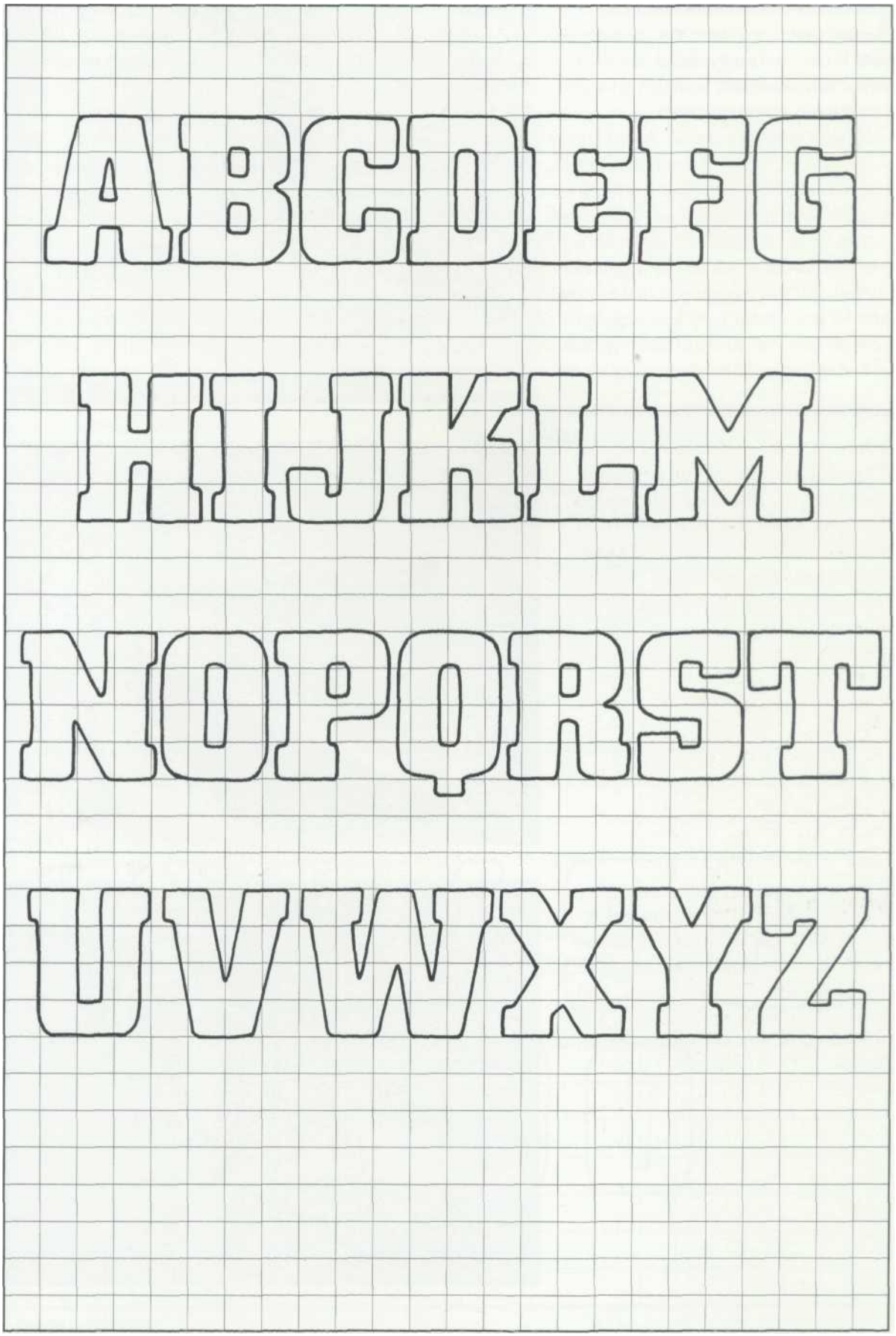
If you are going to mount the board directly on a wall, say beside the front door, it's best to use brass or bronze screws and have the board distanced from the wall by an inch or so. That way, when the ram runs down the wall and dribbles behind the board, there is space enough for a good flow of drying air.

MATERIALS LIST

A Front pierced board (1)	½″×11¾″×18″—we used oak
B Base board (1)	½″ to ¾″×11¾″×18″

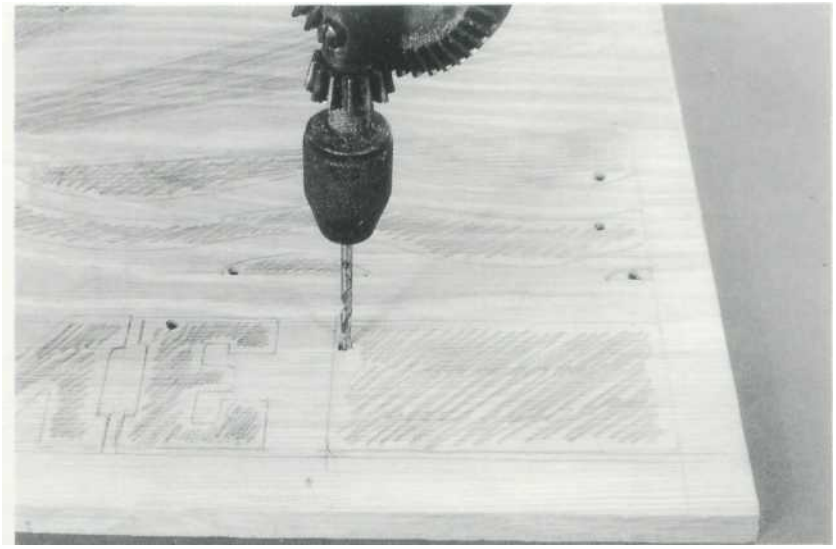
STEP-BY-STEP STAGES

1 Having settled on a good, easy-to-work style of lettering, spend time drawing the letters up to size.

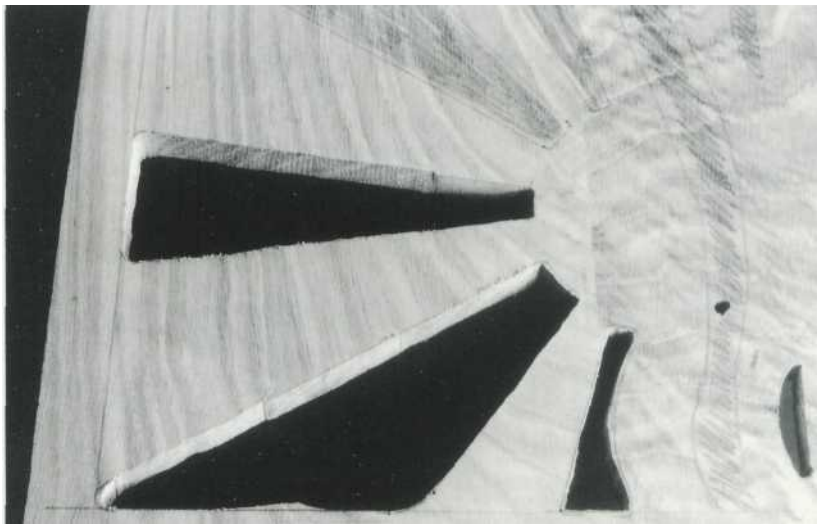


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2 Run small pilot holes through the areas that need to be cut away. Be mindful if you are using a hand saw, that as some blades have pin fixings, you will have to choose a larger bit size.



3 As you can see, I had a bit of trouble keeping the line of cut on course. The problem was that the blade needed changing, the wood was amazingly tough and stringy, and I needed a rest. The only good thing you can say is that the bad cuts occur well to the waste side of the drawn line.



4 If you find that the workpiece doesn't want to move smoothly, then it's a good idea to rub a wax candle over both the surface of the cutting table and the underside of the workpiece. And don't be stingy with the blades. If the blade looks saggy or burns the wood, then change it!



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FRETTED **LETTERS IN RELIEF**

If your workshop is anything like mine, you are forever wondering what you can do with the offcuts. Well, there we were fretting out the letter shapes when one of the kids next door, Michelle Edwards, asked me if she could have the "M" and "E" waste cutouts from the word "HOME," so that she could stick them on her bedroom door. And so it was that the idea came to us that we could design a house board that used the cutouts rather than the holes, if you see what I mean.

PROCEDURE

First, you need to draw the letter and/or number forms up to size—ours are 1 1/2″ high—and trace them off. Arrange the tracing on the 1/4" wood so that the grain runs from side to side through the letters. Pencil press transfer the traced lines through to the wood.

As for the fretting out procedure, it's much the same as already described (see page 80), only easier. If you think about it, you will see that you only have to run the pilot holes through the enclosed forms—like the O and A—and you don't have to worry about saving the ground around the letters. All you do is run the line of cut in from the edge of the wood, travel around the letter and then move on to the next form.

Once you have beveled off the edges of the ground board, then comes the tricky task of setting out the various guidelines. I use the word *tricky* advisedly, because if the spacing between the letters is wrong, or the baseline on which the letters sit is crooked, or whatever, then the whole thing will be messed-up. The best procedure is to work the spacing out on tracing paper, and then use a square and straight edge to very carefully mark the base board with all the guidelines.

When you are happy with the guidelines and the spacing, smear the back of the letters with the PVA glue and dab them down on a piece of scrap wood to remove the excess. Then position them on the board and press down firmly. With all the letters/numbers in place, stand back to check the alignment and then leave them be until the glue has set. Finally, drill the four fixing holes and give the whole works a generous coat of yacht/spar varnish.

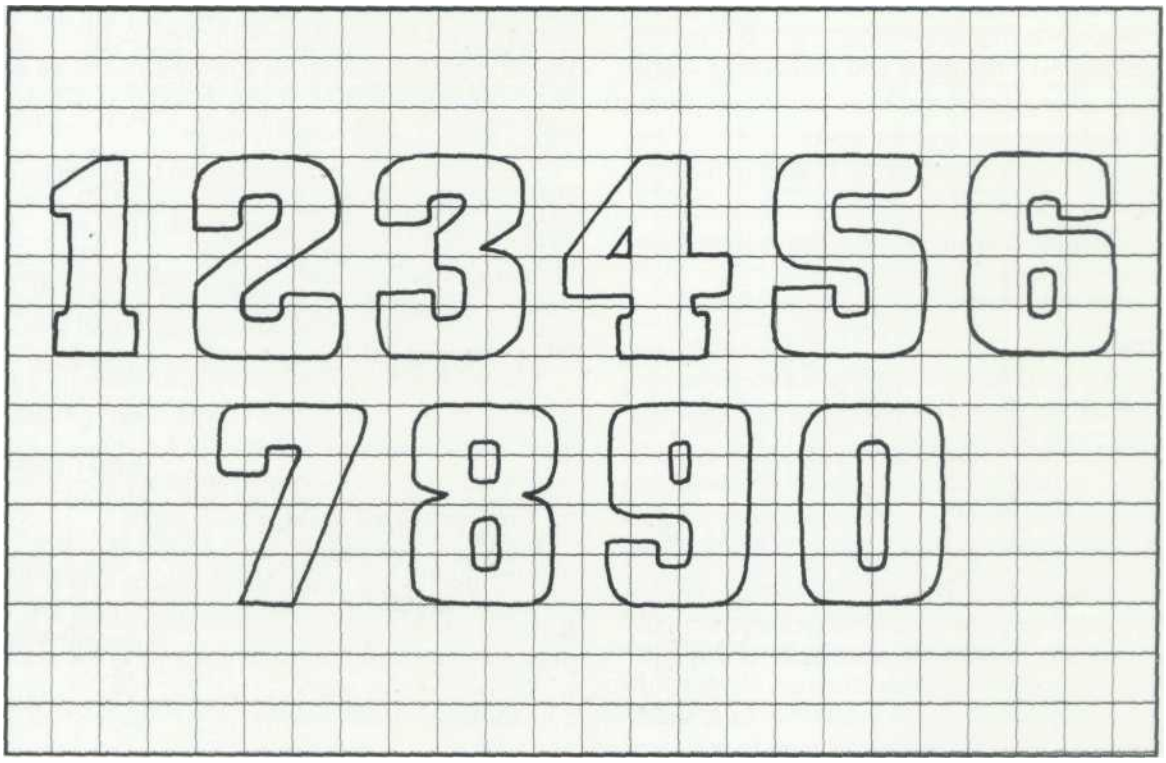
MATERIALS LIST: OPTION

A Board (1) prepared 7/8″×4″ piece of American oak at a length to suit the name of your house

B Board (1) 1/4″-thick piece of American oak—enough for all your letters

C Exterior PVA glue

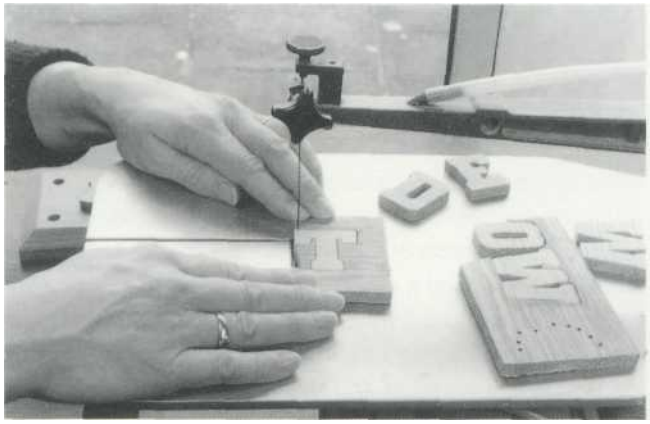
D Yacht varnish



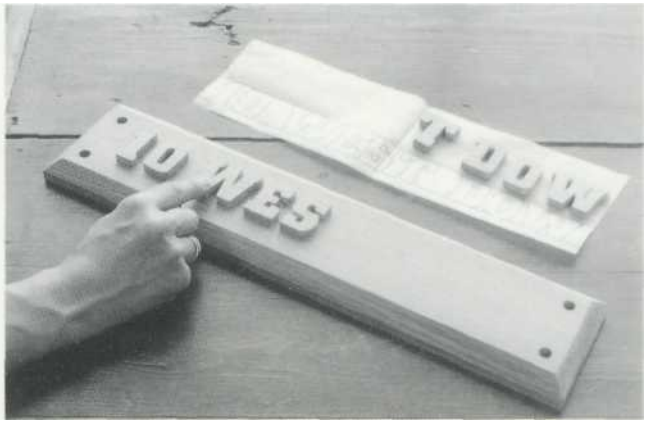
NUMBER PATTERNS

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STEP-BY-STEP STAGES



1 Press transfer the various letters and numbers through to the 1/4"-thick wood. Shade in the waste so that there is no doubting the line of cut. Then fret out the letters and numbers on the scroll saw. Work at a very steady, easy pace, all the while making sure that the line of cut is fractionally to the waste side of the drawn line.



2 Check and double-check the spacing. Label the back of each letter "glue side," and then very carefully glue them in place. Do your best **to** avoid using so much glue that it oozes out.

DESIGNING AND TRANSFERRING

One of the chief difficulties for many woodworking beginners is that they make mistakes when it comes to designing and transferring. They make the first mistake when they draw the designs up to size, and the second when they transfer the designs through to the wood. The pity of it is that, by the very nature of things, the designing and transferring mistakes occur in the early stages. What invariably happens is that the beginners get so frustrated with the techniques of designing and transferring—what with using the wrong paper and with pencil lead getting smeared all over the paper and the wood—that they give up on the project before they ever get around to the wondrously exciting woodwork.

If you are having difficulties, then the following tips will help you sort out your problems.

Designing

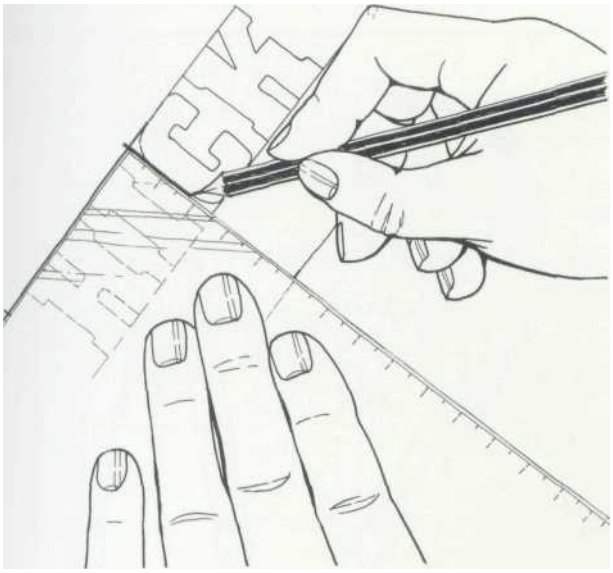
Designing is the procedure of working out the structure, pattern and form of a project by making various drawings, taking photographs and making models or prototypes. For example, with this address plaque the lettering needed a lot of thought. The problem was that while I personally prefer what might be described as classic Greek and Roman letter forms—with serifs and thick and thin strokes—it was pretty plain to see that such a style would be totally unsuitable in terms of wood and fretsaw work. So we searched around in books until we came up with a strong, bold letter style, one that looked as if it might lend itself to being fretted out with a scroll saw. Then we modified the style slightly so that all the little angles became curves. We used a ruler and square to draw the letters to size on thin layout paper, and then, using tracing paper with ruled guidelines and a square, we played around with the spacing of the letters until the word looked right. Be warned that you must always use a square **in** all lettering projects. If you don't, you will finish up with a badly spaced, wobbly mess!

We did much the same thing with the sunburst design. Having settled on the idea of the sunburst, we drew the elements of the design on scraps of layout paper. We fiddled around with the placing and the size and then drew up a master design on white illustration board. Then we took a final tracing.

It sounds a bit complicated, but the whole idea of working in this way is that all the many roughs, ideas, alternatives, variations, scribbles and sketches are worked out on the relatively inexpensive layout paper, before they are ever transferred to the quality paper.

We take a tracing from the master drawing so that we can use the tracing in the workshop—where it generally gets creased, damaged and used to destruction. The master drawings, however, are stored safely away for next time.

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DESIGN TOOLS

A set square *is an essential piece of drawing equipment. It's best to* ***gel*** *the see-through type so you can see what's going on under the square.*

Paper, Illustration Board, Layout and Tracing Paper

We use layout paper for the initial scribbles and sketches, good-quality glazed white illustration board for drawing out the master designs, and best-grade tracing paper for the transferring. It's not that we are fussy or faddish, and it's certainly not that we can afford to splash our money around. It's just that over the years we have learned that using the choice papers generally gets the job done faster and with fewer mistakes. Certainly you might think that we could use a flimsy-grade tracing paper for transferring, but again, experience has taught us that using a cheap-grade paper is a bad bet. It tears easily, it bleeds when used with ink and it doesn't take kindly to being scratched and scraped. And the same could be said about the pencils, the illustration board and all the other designing materials—the best is cheapest in the end! All that said, you can cut costs by visiting a printer and buying offcuts and ends of rolls/packs.

Masking Tape

We use an all-purpose paper, low-tack sticky tape to secure the card and tracing paper to the drawing board, and the tracing paper to the wood. We never use transparent tape simply because it is too sticky and damages both the paper and the wood.

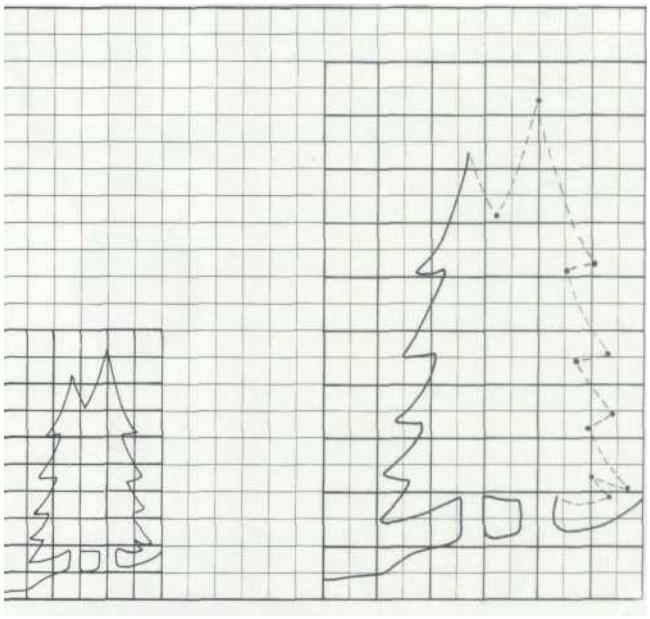
Gridded Working Drawings

A scaled square grid can be placed over a working drawing so that the object illustrated can be reduced or enlarged simply by changing the size of the grid. For example, if the grid is described as a "1" grid" or "one grid square to 1"" and the object is 6" long, and you want to finish up with an item 12" long, then all you do is double the scale and read each square off as being 2". And, of course, when you come to drawing the design up to size, you simply draw up a grid of the suggested size and transfer the contents of each square in the design through to your drawn grid.

Tracing and Pencil-Press Transferring

I usually describe the procedure of taking a tracing from the master design and then transferring the design through to the surface of the wood as "pencil-press transferring."

The procedure is: Work up the design on layout paper, make the master drawing with a hard pencil and take a tracing with a hard pencil. Next, pencil in the back of the tracing with a soft 2B pencil. Turn the tracing right side up, fix it to the wood with tabs of masking tape, and then rework the traced lines with a hard pencil or ball-point pen. This done, remove the tracing and rework the transferred lines on the wood. Finally, spray the surface of the wood with artist's fixative to prevent the pencil from smudging.



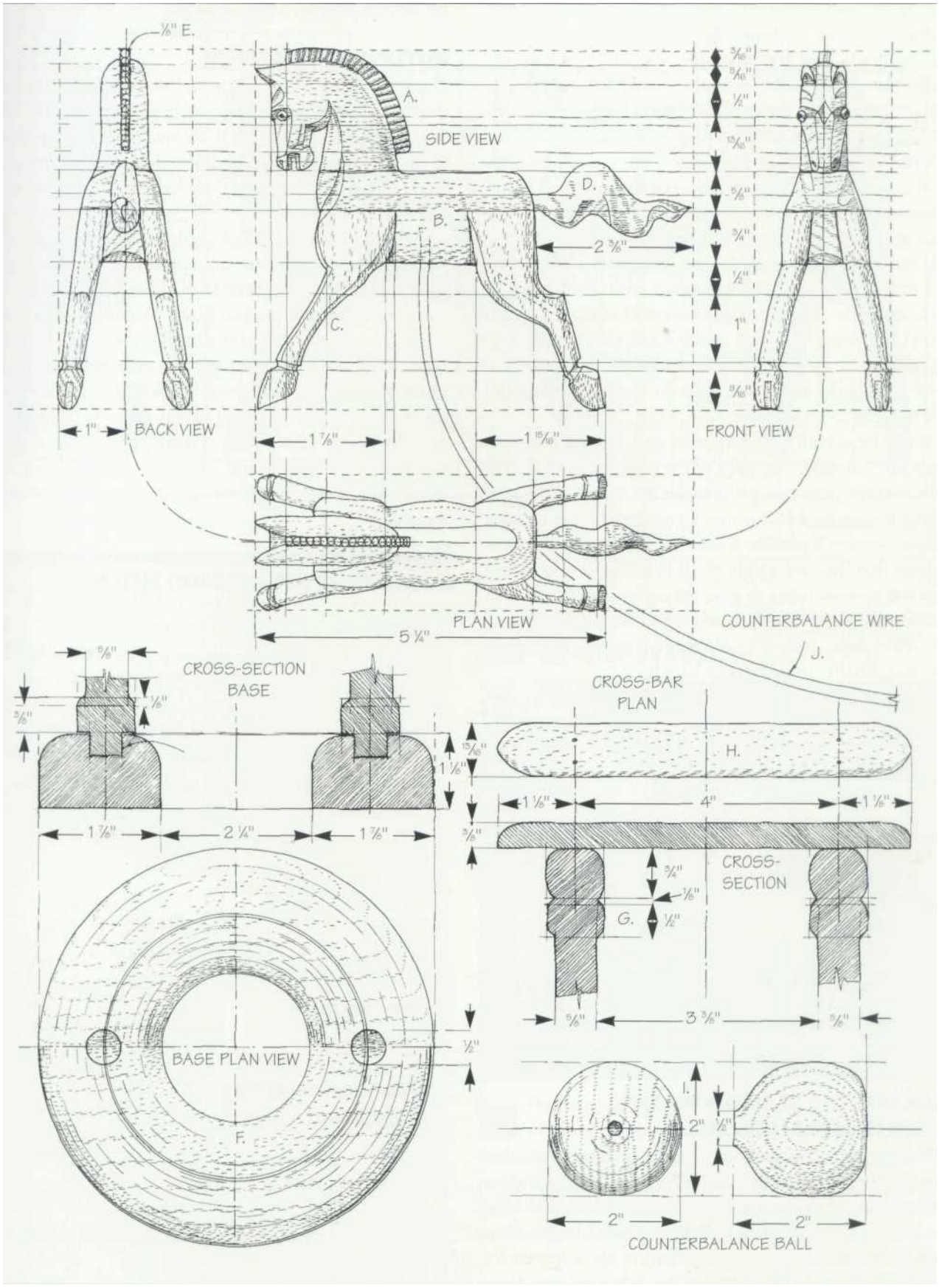
TRANSFERRING SCALED DRAWINGS

Having drawn a grid over the original design and another grid at a scale to suit—in this case 1 wanted to double up, so it is twice the size—then all you do is painstakingly transfer the contents of ***each*** *square.*

Counterbalance Horse Toy



One of the pleasures of making a traditional toy of this size, type and character is the fact that you can change the specifications, the working drawings, the imagery, and the techniques to suit your own needs and fancies. For example, you might prefer to go for an elephant or a tiger rather than the horse, or you might want a straight-sided slab rather than the turned base. Our advice is to have a good long look at the working drawings and the various photographs, and then either copy our design directly or go your own way and adjust the designs to suit.



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MAKING THE HORSE

Having roughly fretted out the shape of the head and the four legs, begin by taking the seven component parts—the head, the four legs and the two body pieces—and gluing them together to make the blank. The best procedure is to first glue the two body parts together, then fix the legs to the body and finish with the head.

Once you have made the blank, then comes the pleasurable task of whittling the horse to shape. It's all pretty straightforward. All you do is round over the back of the neck and body, swiftly model the face and the hooves, trim the legs and so on. Of course, the degree of modeling **will** to a great extent depend upon your knowledge of horse anatomy. But that said, I believe that in the context of toys, the imagery is best stylized and simplified. Or to put it another way, yes, the horse needs to look like a horse, but at the same time you do have to be mindful that it needs to be strong.

With the overall horse whittled and sanded to shape, run a saw cut down the back of the neck and glue fix the little wooden pegs that go to make the mane. After a lot of trial and error, 1 found that a good method is to cut a couple wooden barbecue sticks into 1" lengths, slice the ends so that they are a tight push fit in the saw kerf, and then use cyanoacrylate to glue the sticks one at a time in the slots. When you are pleased with the shape and placing of the pegs, dribble a tad more glue along the whole row and, finally, trim them to length.

When you come to the tail, whittle it to shape as seen in the side view, and then whittle the shape as seen in the top **view.** It is a little bit tricky because the pine is relatively hard and grainy, but you don't have to get too fussed about the precise shape. Lastly, drill two holes in the horse—one for the tail and one for the wire. Then glue the tail into place.

Making the horse is pretty easy, but if you look closely at the photographs, you will see that I needed to correct various mistakes. For example, I needed to inset strips to strengthen the hooves, and I had to glue and dowel-pin one of the legs so as to strengthen the short grain. All I am saying is don't get in a sweat if a leg splits off or something else breaks. Just make a glue-and-peg repair and start over.

MAKING THE STAND AND THE COUNTERBALANCE BALL

The stand can be as plain or as fancy as the mood takes you. As long as the height and placing of the posts allow lor the swing of the wire and the counterbalance ball, and the horizontal crossbar is level and parallel to the base, then the actual shape and construction are a matter for personal choice. I decided to go for a turned ring base, and whittled posts, crossbar and ball, but you could go for turned posts or other changes.

PUTTING IT TOGETHER

Once you have made the horse, the stand and the ball, then comes the frustrating and finger-twistmg, but very enjoyable, task of putting it all together. Start by gluing the posts in the base and gluing and pinning the crossbar. Don't forget that the posts must be parallel and the crossbar level.

Now, having first drilled a hole in the horse's belly and flattened one end of the counterbalance wire, dribble glue in the hole on the underside of the horse and push the flattened end of the wire in place. This done, drill a hole right through the ball and thread the ball on the wire. Next, bend the wire into a gentle curve and position the horse on the crossbar. Try out various curves of wire until the horse is nicely balanced. Then glue the ball in place and clip off the excess wire. Finally, give all the **surfaces** a thin coat of varnish and let it dry. Burnish the whole thing with beeswax, and the horse is finished and ready for action.

MATERIALS LIST–

HORSE

A Head (1)	1″×2″×2¼″
B Body (2)	1½″×¾″×3½″
C Legs (4)	½″×2″×3″
D Tail (1)	⅝″×1″×3″
E Wooden barbecue sticks (2)	⅛″ diameter

STAND

F Base (1)	1½″×6″×6″
G Posts (2)	1″×1″×14″
H Crossbar (1)	½″×⅞″×6½″

COUNTERBALANCE

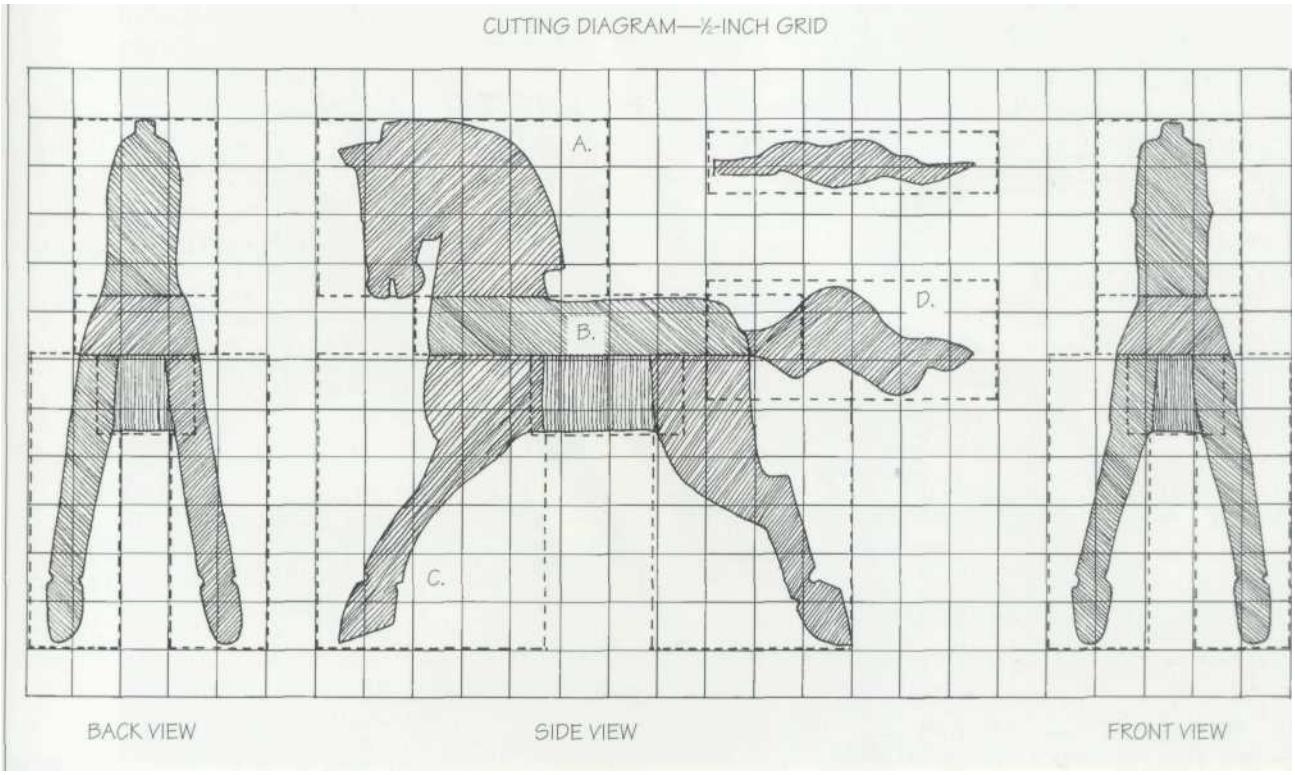
I Ball (1)	2″×2″×2″ cube

HARDWARE AND EXTRAS

J Wire coathanger (1)	16″
K Screws and nails	various
L Cyanoacrylate	

Note that all measurements allow for a small amount of cutting waste.

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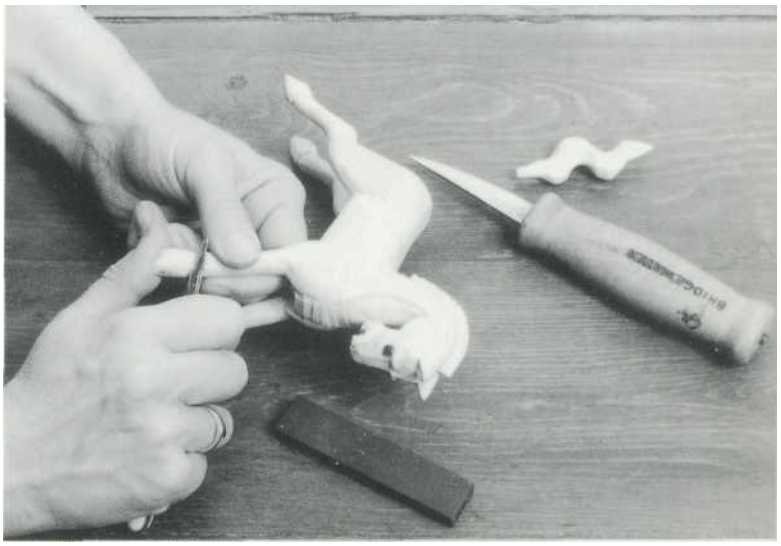


WORKING DRAWING B

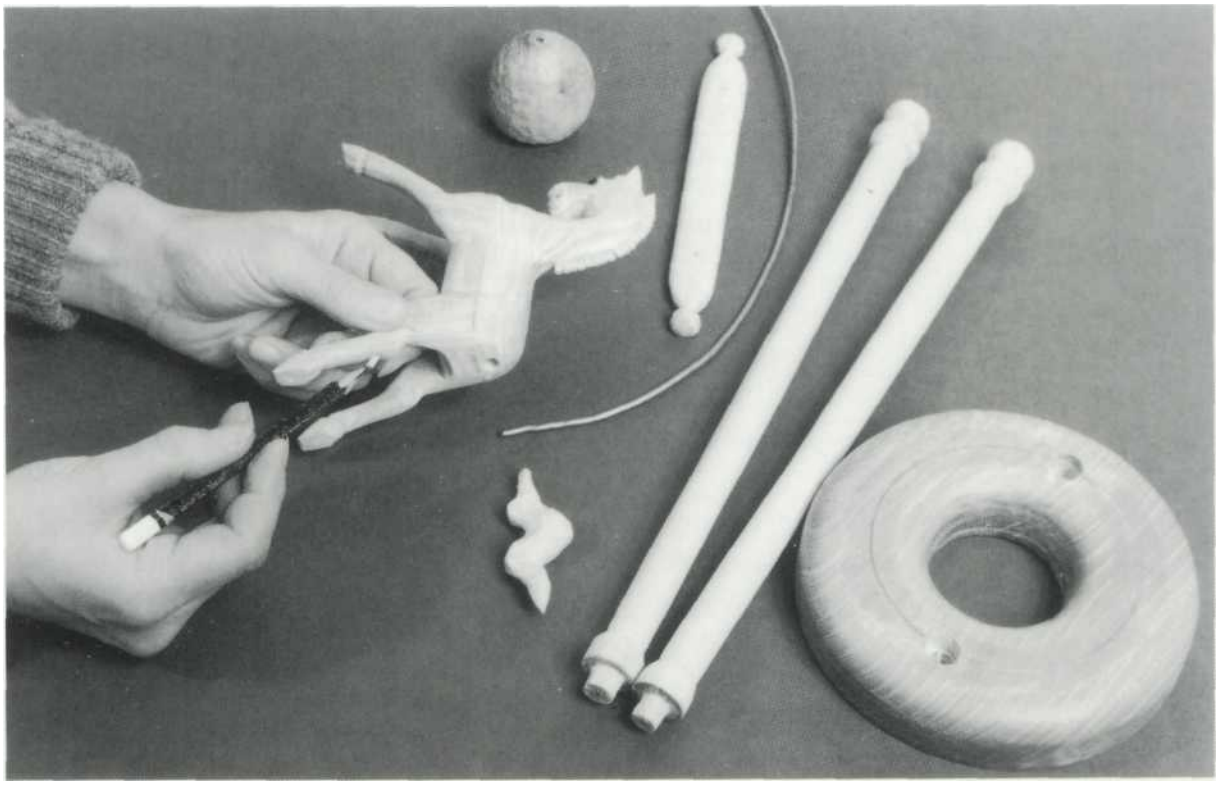
SPECIAL TIP

Gill—my wife and better half—has just pointed out that there are toys for babies, toys for toddlers and toys for adults. She says that while the balancing horse is the perfect toy for an adult—you know the sort of thing, a toy that can be played with at the dinner table when kids, friends and family are looking on—it's not the sort of toy that you give to a boisterous five-year-old!

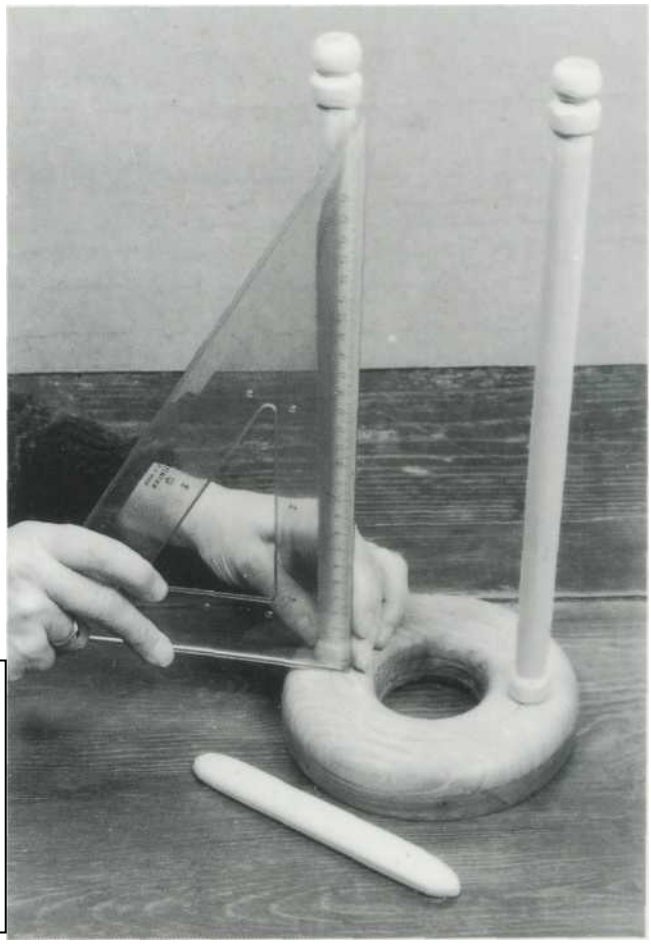
STEP-BY-STEP STAGES



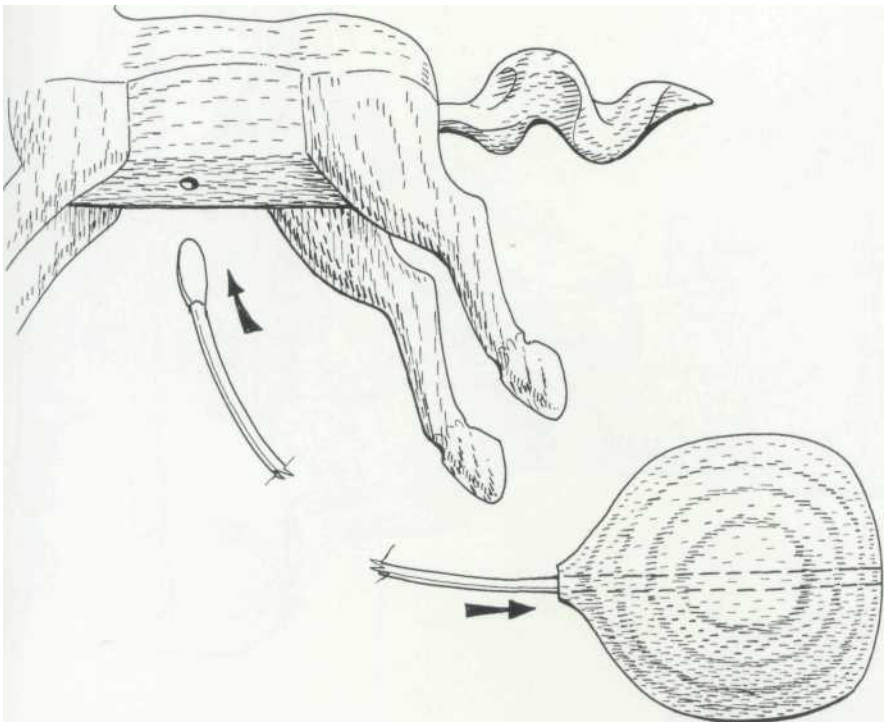
1 Having glued up the blank, use your knives to model the details. Use tightly controlled paring cuts, all the while being careful not to damage the relatively fragile short-grain areas like the ears. Note that I had a trial fitting of the eyes at this stage—I was eager to see how the overall image looked.



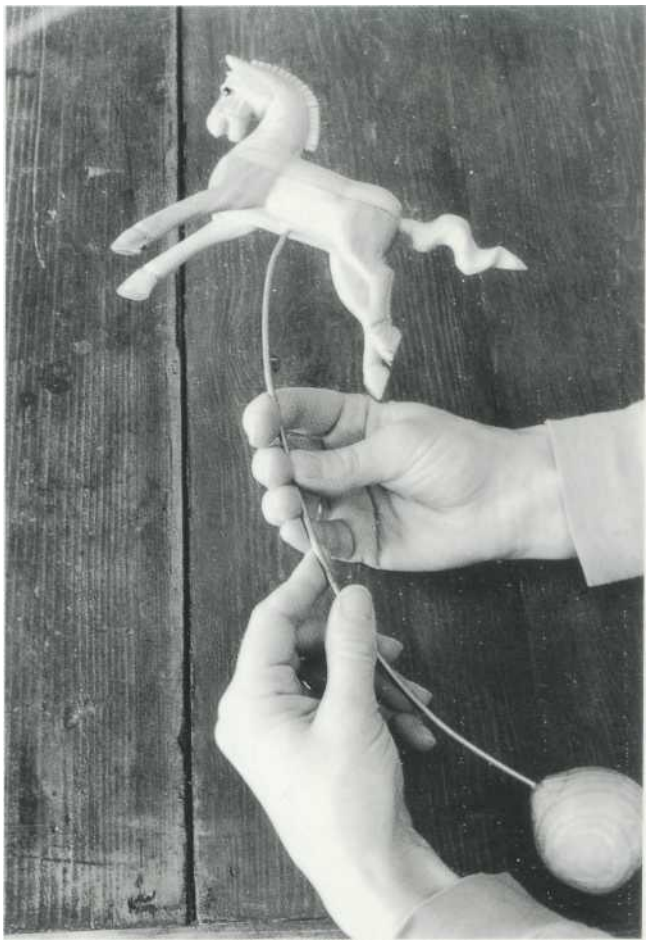
2 I had a bit of trouble when it came to the short grain on the back legs, so much so that I needed to reinforce one of them with a glued dowel. All I did was drill a hole across the run of the gram, dip a cocktail stick in glue and run it in the hole.



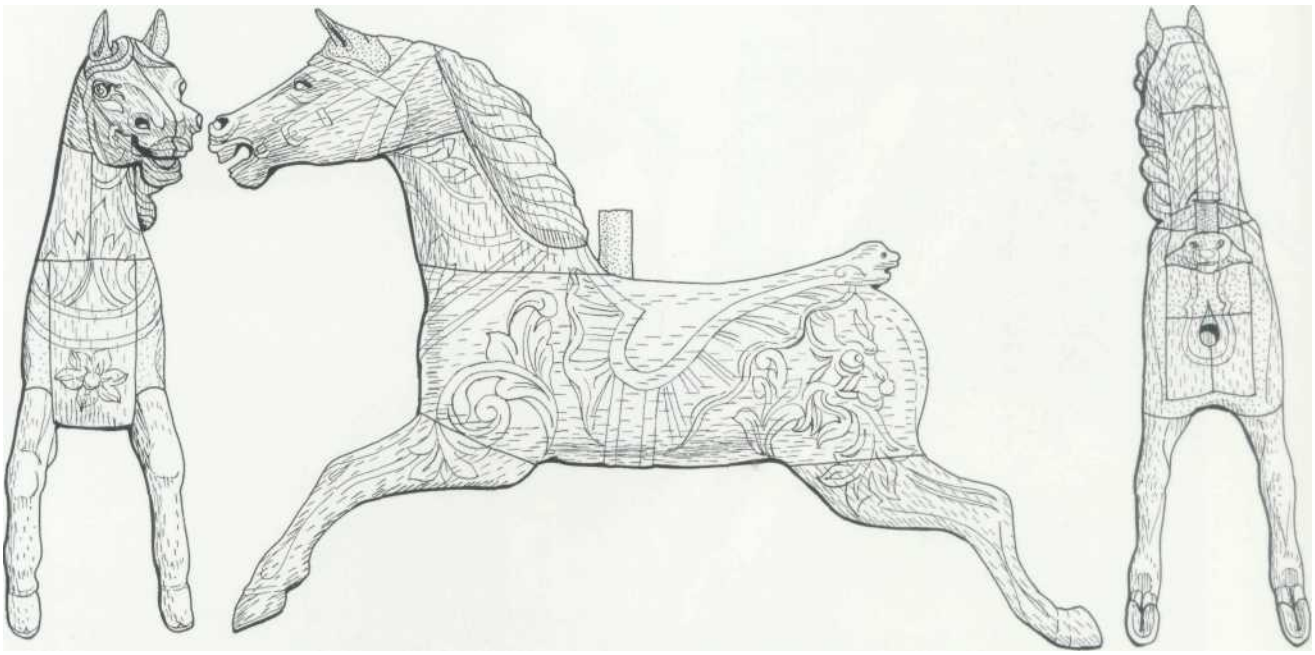
3 When you are gluing up, make sure that the posts are square to the base and parallel to each other. The good thing about using the PVA glue is that the long setting period allows you plenty of time to fiddle and fuss to get it right.



Flatten the end of the wire, smear it with glue, and then force it into the drilled hole (top). Having played around until the horse is more or less balanced, thread, glue and wedge the ball in place (bottom).



Finally, tweak the curve of the wire until the horse is perfectly posed.



DESIGN OPTION

Design for *a single-seater galloper, circa 1895-1905, by J.R. Anderson. We drew a good part of our inspiration for this project from this design.*



DESIGN OPTION

Here's *a head detail from a carousel horse circa 1926, Circus World, Orlando, Florida (lop), and a horse from the Crescent Park carousel, circa 1895, Riverside, East Providence (bottom).*

Old-Fashioned Push-Along Toys



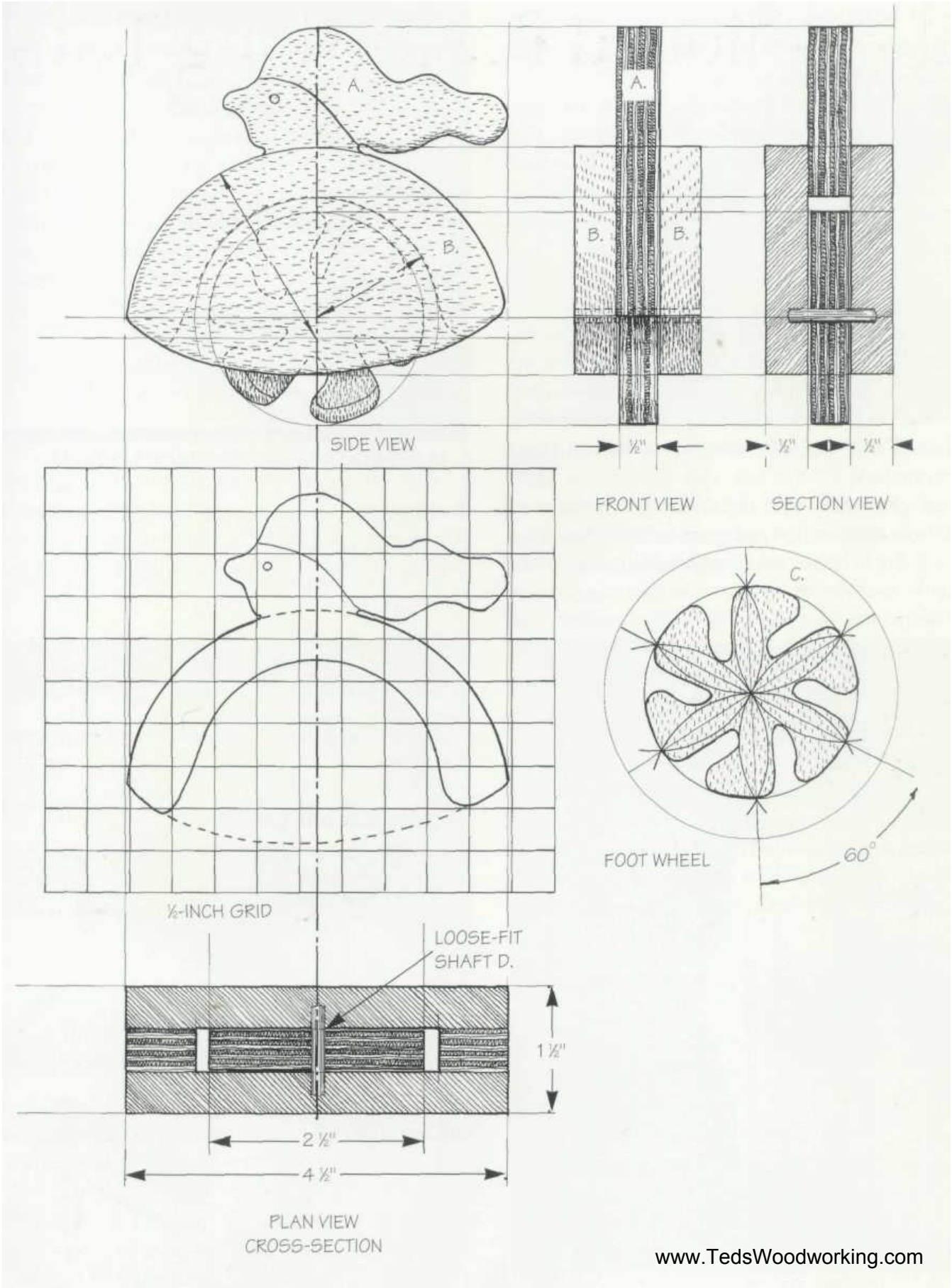


RUNNING ROSY

A doll to kiss, a doll to cuddle—at some time or other, most of us have sought the cozy, clinging comfort of a toy doll. Running Rosy is something more than a doll. She's a sort of doll in a hurry, the perfect push-along-the-carpet plaything for younger kids. This is a beautiful plaything, a real delight for kids and adults alike. She's strong, easy to make, nicely rounded for "learning" hands, but best of all, her wheel-turning movement is just right for active toddlers who like to push toys along the floor. If you are looking to make a unique toy for a unique kid, then this is the one.

MAKING THE TOY

When you have carefully studied the working drawings, take the tracing paper, a pencil, ruler and compass, and carefully set out the design on the wood. If you are going to stay with my choice of materials—plywood sandwiched between solid wood—then you need six cutouts in all: two solid wood outside body parts, two plywood head and body spacers, and two plywood foot-wheels. If you are wondering about my choice of materials, it's pretty straightforward and logical. While the head-and-body spacer and the wheel need to be strong in all directions across the grain, they also need to be safe for kids,



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as well as relatively easy to work with a coping saw. All things considered, we thought that best-quality 1/4"-thick multi-layer plywood was a winner on many counts. It's strong, it's stable, it's easy to cut, and it's easy to bond layers together to give extra strength.

When you have made all the cutouts, rub the two foot-wheels down to a smooth, round-edged finish—so that they are smooth to the touch and the total two-wheel thickness is something less than 1/2″. Next, establish the position of the pivotal dowel holes through the wheel and into the inside face of each solid wood body part. Then drill them out with a bit size that gives you a slightly loose fit for your chosen dowel.

To assemble: Glue one body part to one side of the central head-body spacer. Set the two foot-wheels in the cavity so that the feet are facing in the correct direction. Slide the dowel in place, and, lastly, glue the other body part in place so that the foot-wheels and pivotal dowel are nicely contained.

When the glue is dry, rub the whole works down so that the corners are rounded and good to hold. Aim for a form that is going to be safe and comfortable in a toddler's hands. Finally, use watercolors to tint in the imagery, give the whole works one or more coats of clear varnish, and the toy is finished.

SPECIAL TIP

Wooden toys must be childproof! Being mindful that toddlers are, at the very least, going to stick the toy in their mouths, it's most important that all the fixtures, fittings and materials be totally secure and nontoxic. Perhaps most important of all, the wood must be splinter resistant. With all this in mind, we chose to use multi-ply for the central layer and for the wheels, for the simple reason that it's easy to work, good to touch, strong across short grain "necks," and it glues and finishes well.

Don't think you can cut costs by using the coarse-centered plywood that goes by such names as "block ply," "stout heart" and "Malaysian." I say this because plywood of this type and character tends to be difficult to work, soft, almost impossible to sand to a good finish, and prone to splintering. No, when we say "multi-ply," we are specifically referring to the type of plywood that is built up in thin 1/16" layers or veneers. A plywood of this character has a smooth, white, close-grained face, it's tremendously strong and it's great to work. Ask for "best-quality, multi-ply, multilayer or multi-core plywood," and don't be talked into anything else.

Note, a sheet of 1/4"-thick multilayer plywood should be made up of four or five thin veneer layers.

MATERIALS LIST

A Head-body spacer (2)	¼″×5″×5″ plywood
B Outside body parts (2)	½″×3″×5″ solid wood
C Foot-wheels (2)	¼″×3″×3″ plywood
D Pivotal dowel (1)	¼″ dowel × 1¼″ long

Note that all measurements allow for a small amount of cutting waste.

HARDWARE AND EXTRAS

E Artist's watercolor paints—colors to suit
F Clear varnish



USING PLYWOOD

Best quality multi-ply is a first choice material for small cutout type toys. It is *amazingly strong and it rubs down to a good smooth-to- touch finish.*

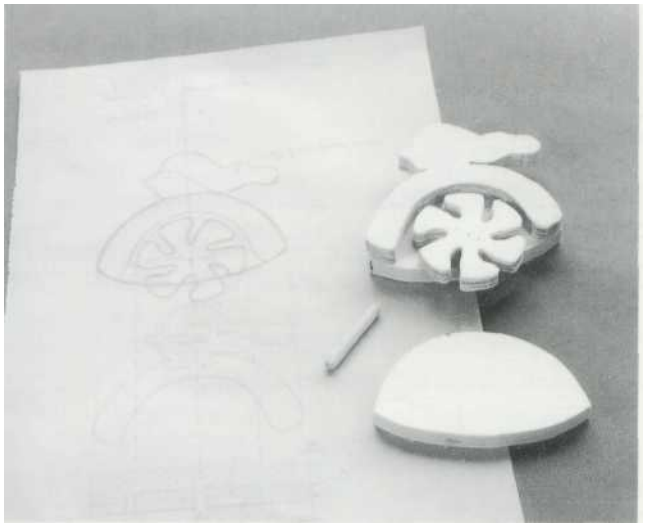
STEP-BY-STEP STAGES



1 Check the component parts against the working draw ings. And just in case you are wondering why I opted to use two 1/4"" thicknesses to make up the 1/2"-thick spacer—rather than a single 1/2" thickness—the simple answer is that I had lots of pieces of 1/4" ply that needed to be used up.



2 Fix the two wheels together with a piece of double-sided sticky tape and rub them down so that they are slightly less than 1/2" in total thickness. The use of the tape not only ensures that both wheels are identical, it also makes them easier to handle.



3 Test the wheels in the body cavity. They need to be an easy loose-turning fit. Note that in this test run I have the feet running in the wrong direction!



4 Rub the whole works down to a smooth finish. Close your eyes to test the finish—it's vital that every surface, edge and angle be supersmooth to the touch.

RUNNING REG IN HARDWOOD

Kids are so perceptive! When our Rosy toy was finished and up and running, I took it around to the 5-year-old girl next door for a bit of no-nonsense, in-depth criticism. Of course 1 was expecting a little bit of praise, but, oh no. All she said was, "But. . . where is running Reg?" So there you go, we had no other option but to make a Running Reg toy.

COUNTERCHANGE CUTTING

The clever thing about this project is not so much the design, but rather the way the two contrasting thicknesses of wood are cut and then counterchanged. It's an amazingly simple but subtle technique. All you do is sandwich two contrasting sheets of wood together, fret the design through both layers, and then swap the cutouts around so that the cutouts are contrasting.

PROCEDURE

Take the four pieces of wood—the sycamore, the mahogany, and the two pieces of plywood—and use the double-sided sticky tape to make a sandwich that has the plywood as the filling. When you are happy with the arrangement, carefully press transfer the traced imagery through to the sycamore side of the sandwich. Use the scroll saw to fret out the outside profile. This done, ease off the outside layers—the sycamore and the mahogany—and stick them together.

Cut out the **plywood** inner shape and the wheels. Then comes the very clever procedure of counterchange cutting. The method is beautifully simple. All you do is take the two profiles— the sycamore and the mahogany, all nicely stuck together with the double-sided tape—and saw them down into all the little parts that go to make up the design. For example, with this design I ran cuts through at either side of the hat band and under the chin. All you then do is swap the cutouts around and put the toy together in much the same way as already described.

MATERIALS LIST: OPTION

A (1) Prepared sycamore or maple wood—½″×5″×6″

B (1) Prepared thick dark wood—I used a piece of salvaged mahogany—½″×5″×6″

C (2) Pieces of plywood—¼″×5″×5″

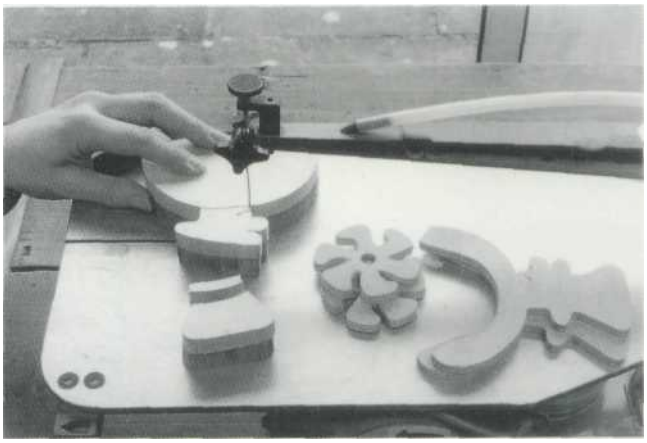
HARDWARE AND EXTRAS

D PVA glue

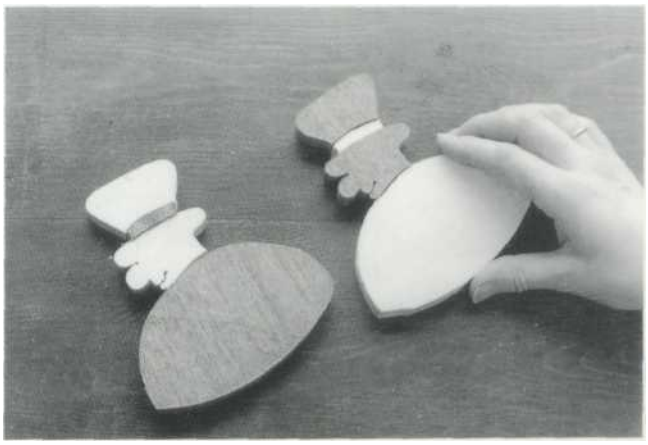
E Yacht varnish

F Double-sided sticky tape

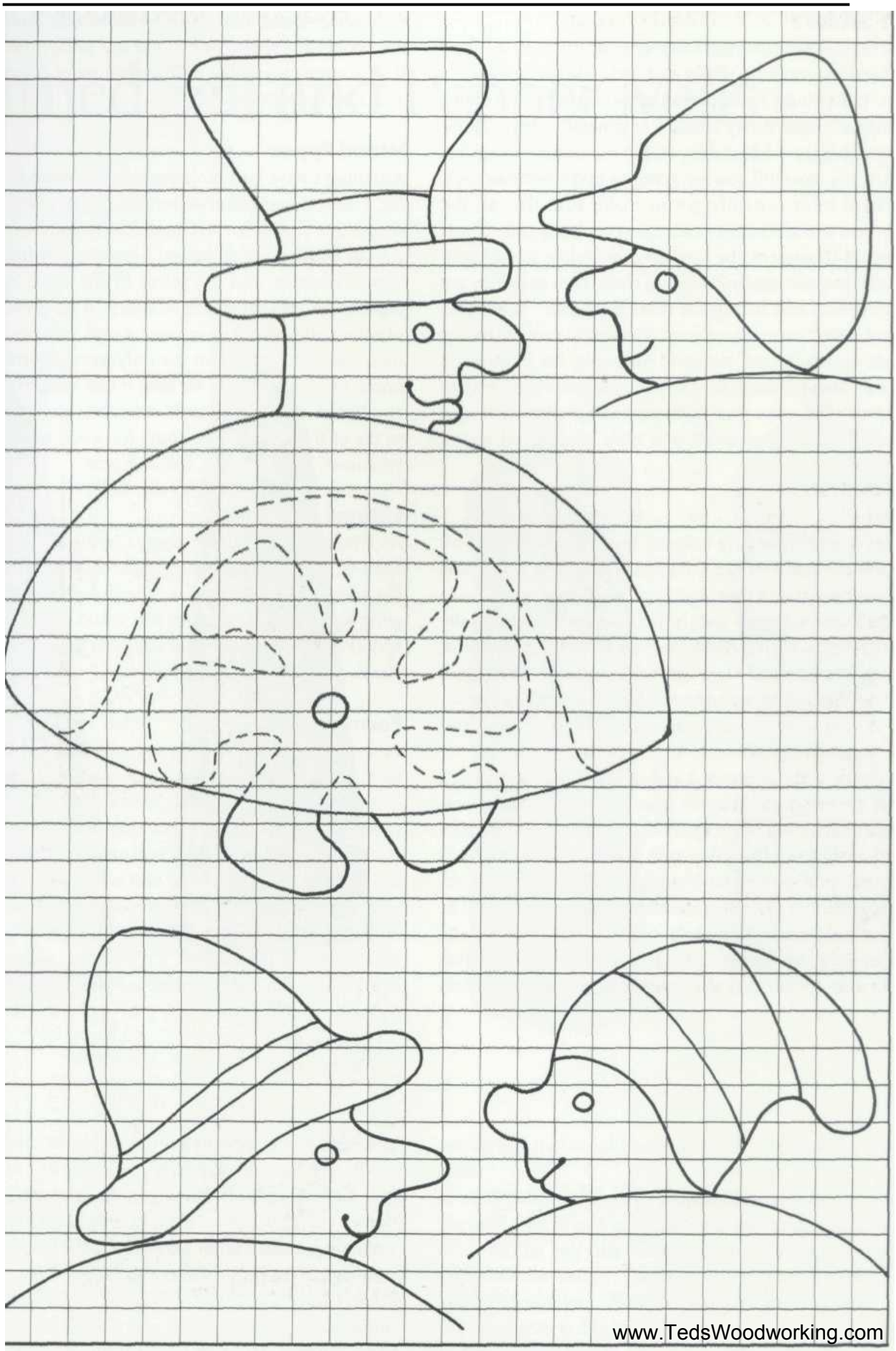
STEP-BY-STEP STAGES



1 Having fitted the very finest blade in the scroll saw, very carefully cut the design down into its component parts. It's important that you use a new, well-tensioned blade and go at it slowly, so that each and every cut is well placed and square to the wood.



2 Ease the layers apart, remove the double-sided tape and counter-change the parts. Note the little cut that goes to make the design of the mouth.


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TOY SAFETY

Traditional wooden toys are enormous fun! Woodworkers like making them and kids like playing with them. But you do have to bear in mind that the average, intelligent finger-sticky toddler is generally going to do his level best to push the toy in his mouth and/or up his nose, if not worse! If you are going to make wooden toys, you have most certainly got to make sure that all the structures and all the materials are completely safe. If you are going to present the toys as gifts and/or make them for sale, you are legally bound to make sure that they are "safe, sound and fitting for their purpose." What this means is that you must ensure that every part of the toy is safe—no splinters, no toxic materials, no loose parts that can be swallowed. Be warned, ignorance is no excuse under the law—*you must make sure that everything is safe!* The following will provide you with some good sound guidelines.

Paint

Since kids like brightly colored toys, it's vital that you make sure that you use paints that are completely safe and nontoxic. Yes, your dad's old paint might still be in good condition, and, yes, it would give a wonderfully glossy, hard-wearing finish, but then again, it is almost certainly poisonous! Most old paints contain all manner of toxic mixes, everything from lead and antimony to arsenic. You must set out on the assumption that all old paints are dangerous.

When 1 asked around, I was assured that all modern paints are required by law to meet certain nontoxic, lead-free standards. But when I took it a bit further and phoned a paint manufacturer, they said that though their paints do most certainly come within safe standards, they don't necessarily come up to the standards required by the "Toy Safety" laws. As you can see, the whole area of paints and toy safety is somewhat difficult. I personally think that the best advice is either to use water stains and cover them with water-based varnish or to use acrylic paints. If you are concerned about paints and toy safety, then it's best if you write to various well-known paint manufacturers and ask their advice.

Wood Types

Although I have had no personal experience in this matter, I do understand that certain exotic wood types are dangerous if they are chewed. For example, I read of a case in which a child chewed a wooden toy from a Third World country, and the juices in the wood caused the child to go into some sort of shock. II we err on the side of safety and take it that some wood varieties are toxic, then the best advice is to use only wood varieties that we know to be safe. So, if we take it that modern American and British toymakers know what they are doing, it looks to me as if we should be going for wood types like lime, sycamore, beech, birch, oak and pine.

Fittings

As I remember, kids are always trying to pry their toys apart **in** an effort to find out how they work. This being the case, it's a good idea to avoid nails, small pieces of wire, and component parts that could in any way crack, splinter or shatter. The best advice is to use brass screws, glued dowels and glued layers.

Form

In many ways, the form a toy takes is as important as its substance and structure. For example, if a toy has a component part that is long, thin and spiky, or a part that could be swallowed, or a part that could be inserted into the ear or nose, then it follows that the toy in question has been badly designed. If and when you are designing your toys, or if you decide to modify this one, you must make sure that it's safe. For example, it might be a good idea to extend the walking girl's hair so as to make more of a handle, but the question is—would it be safe?

Turned Salt and Pepper Mills

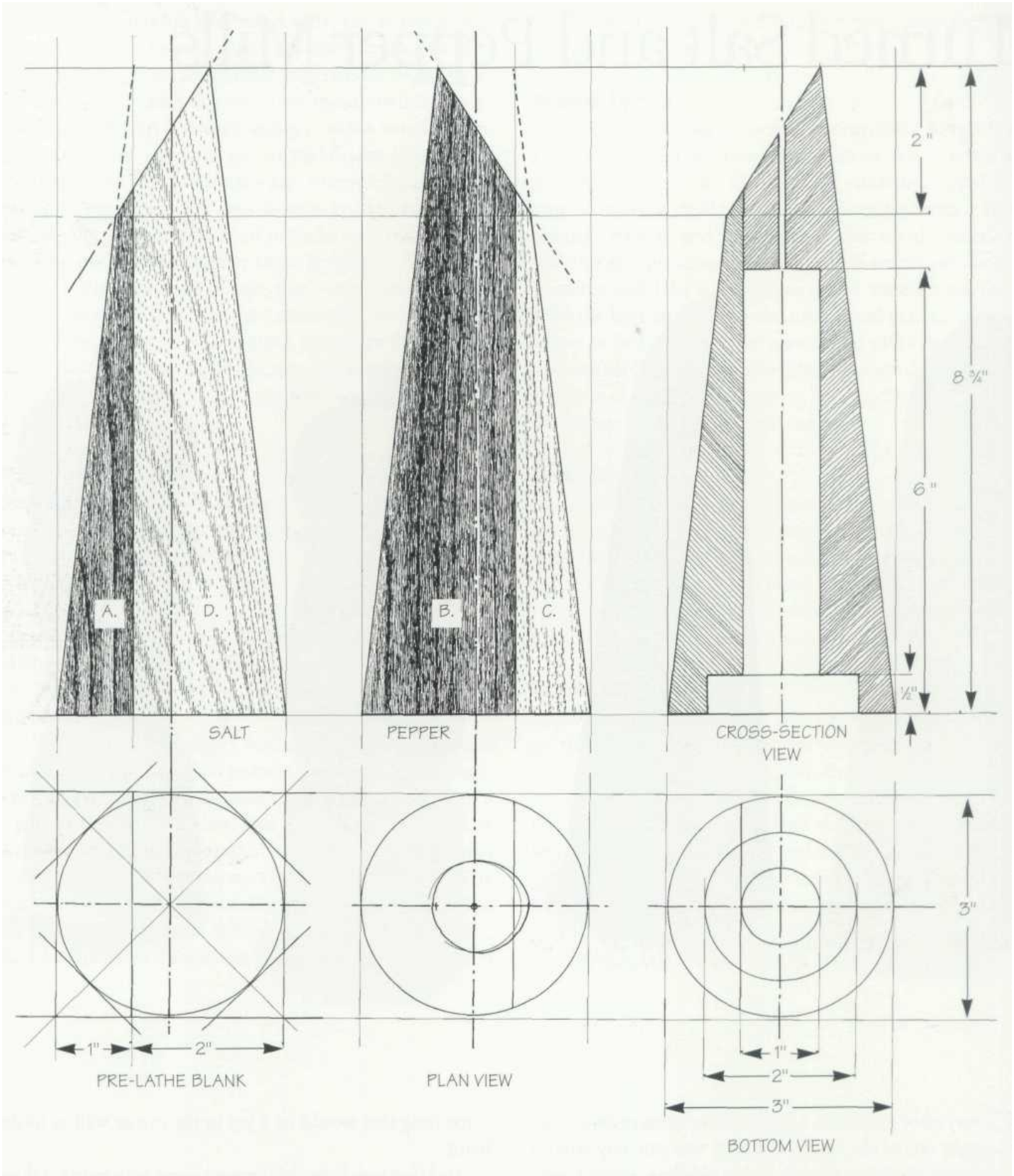






Every once in awhile, a good project idea comes to me right out of the blue. And so it was one day when I was sitting down to dinner. I was fiddling around with our horrible diminutive, pressed plastic, difficult-to-hold salt and pepper mills, and trying to fill them for the umpteenth time, when the idea suddenly came to me—Eureka! I could make a couple of cone-shaped mills on the lathe—something really big, bold and sculptural, something that wouldn't need filling every ten minutes or so, something that would be a joy to the eye as well as to the hand.

And that was how this project came into being. Okay, perhaps they aren't to everyone's taste and, yes, they are a bit on the big side—but they are certainly a unique conversation piece. The over-coffee chat usually goes something like, "Where did you get those er . . . big/strange/terrible/unusual/beautiful salt and pepper mills?"—ha!



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MAKING THE SALT AND PEPPER MILLS

When you have studied the project and generally brought your lathe and tools to order, take your chosen wood and cut it to size. You need four 10" lengths in all: one dark and one light 1 1/4" X 3", and one dark and one light 2 1/4" X 3".

Plane the mating faces and glue and clamp them together so that you have two 3" X 3"-square sections. If you have done it right, the two blocks will be color counterchanged, so that one is predominantly dark with a light strip and the other visa versa. You can, of course, glue the wood up from larger section material—so that you have a single large lump—and then slice it down to size.

First establish the end centers of the blocks. Scribe out 3"-diameter circles and clear the bulk of the waste so that you more or less have octagonal sections. Then mount the wood on the lathe and swiftly turn it down to a 3"-diameter smooth, round section. With the workpiece held securely in the four-jaw chuck and pivoted on the tailstock center, take the dividers and mark off the total 8 3/4" length. Take the parting tool and sink a tool-width channel at each end. Run the tool in to a depth of 1" so that you are left with a 1 "-diameter core at each end of the turning. Now, with the narrow end of the cone nearest the chuck, take the gouge and make repeated passes from right through to left.

When you have made the cone shape, carefully part the waste off at the tailstock end. With the drill chuck mounted in the tailstock, run two holes into the wide end of the cone—first a 2"-diameter hole at about 1/2" deep, followed up by a l"-diameter hole at about 5″ to 6" deep.

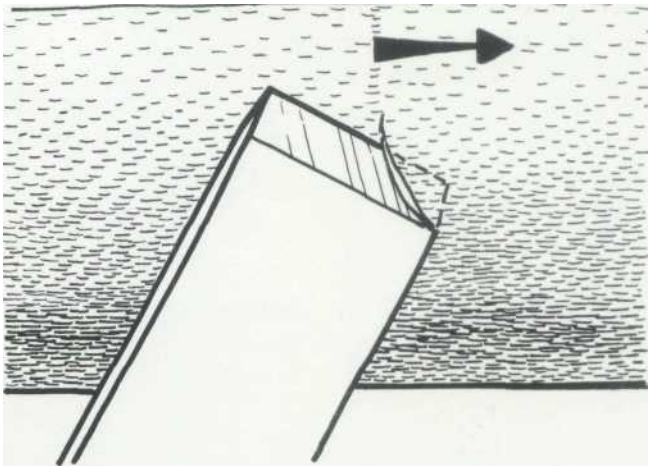
Finally, part the cone off from the lathe, run a ¥52"-diameter hole down into the top of the cone at top center, and saw off the top of the cone so that it is truncated at an angle. Rub down to a smooth finish and then burnish with a small amount of vegetable oil.

MATERIALS LIST

A Dark wood (1)	1¼″×3″×10″—we used American Walnut
B Dark wood (1)	2¼″×3″×10″
C Light wood (1)	1¼″×3″×10″—we used English Hornbeam
D Light wood (1)	2¼″×3″×10″

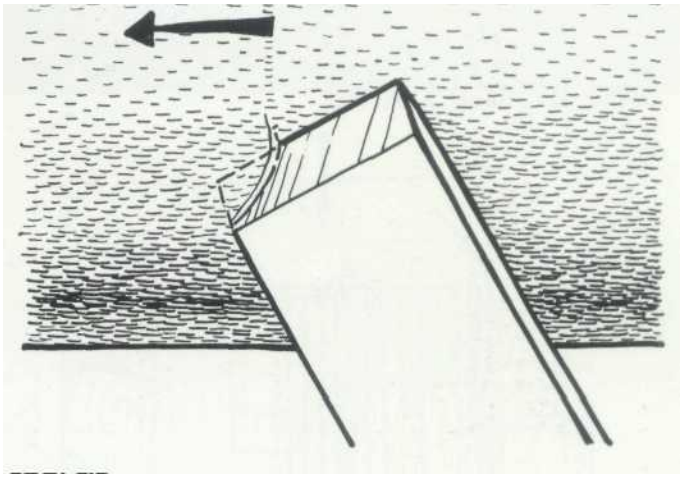
HARDWARE AND EXTRAS

E Corks or plastic stoppers to fit the 1″-diameter holes



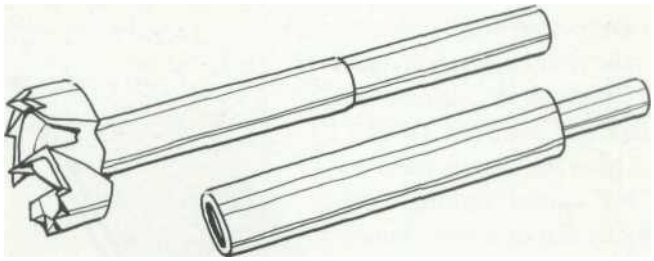
TOOL TIP

When you are using a turning chisel, the procedure is to lift the handle up until the lower end of the cutting edge begins to bite, then advance the cut in the direction of the blade. If you work in this way, you will find that the skewed approach greatly minimizes tool pressure and consequent flexing of the workpiece.



SPECIAL TIP

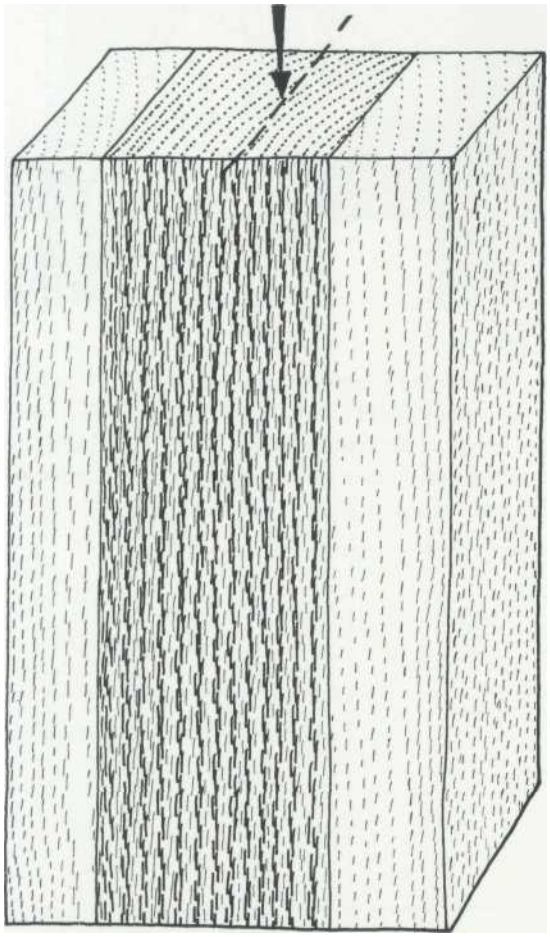
Because the gist of this project has to do with being able to drill deep, accurate, smooth-sided holes, I would always advise using either a Forstner bit or a saw tooth multi-spur-type bit. As to the actual drilling procedure, if you have to do it off the lathe—say on a drill press—then be warned, if you go off center, there is a big chance that you might break through the walls of the cone.



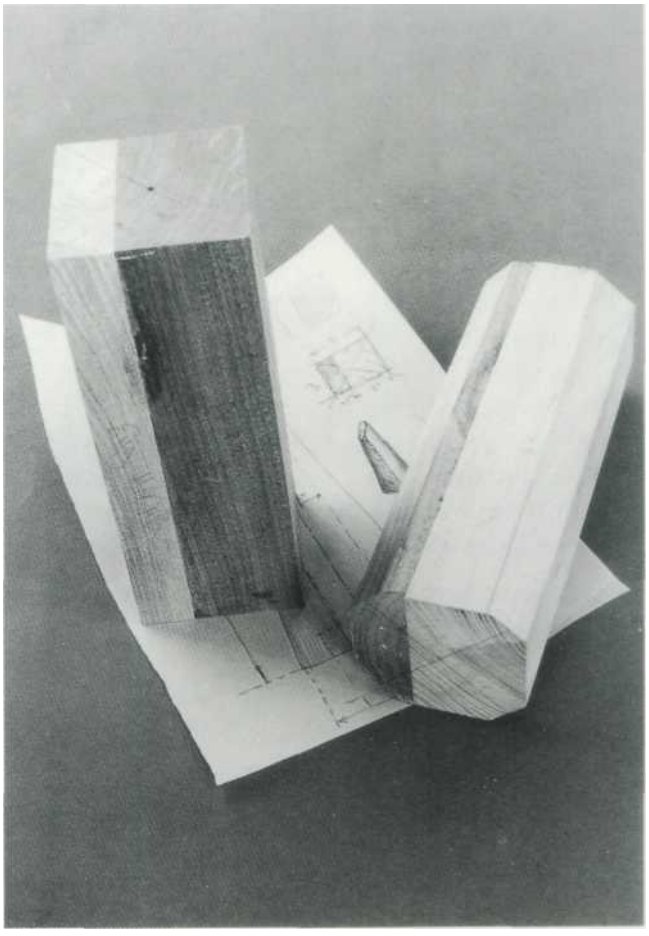
DRILLING HOLES ON THE LATHE

If you need to drill holes on the lathe, then it's best to get a Forstner or multispur bit with an extension bar.

STEP-BY-STEP STAGES



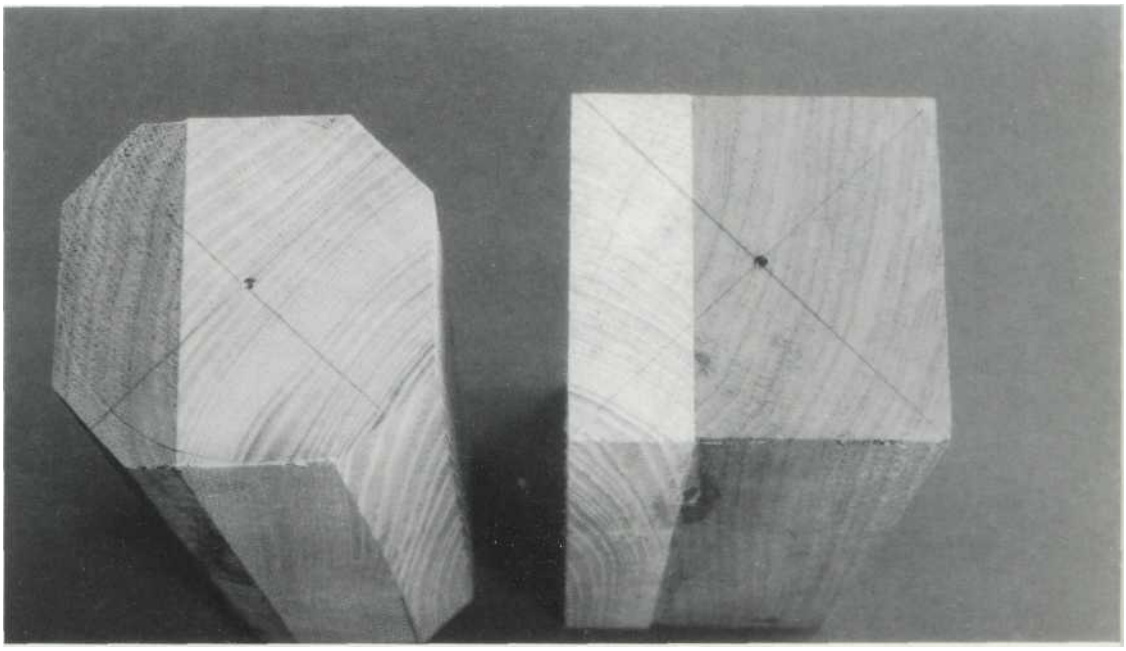
1 If you don't like the notion of gluing up small individual strips of wood or you are working with bigger pieces, a very economical method is to glue up the three blocks as shown, and then saw the resultant piece through from end to end.

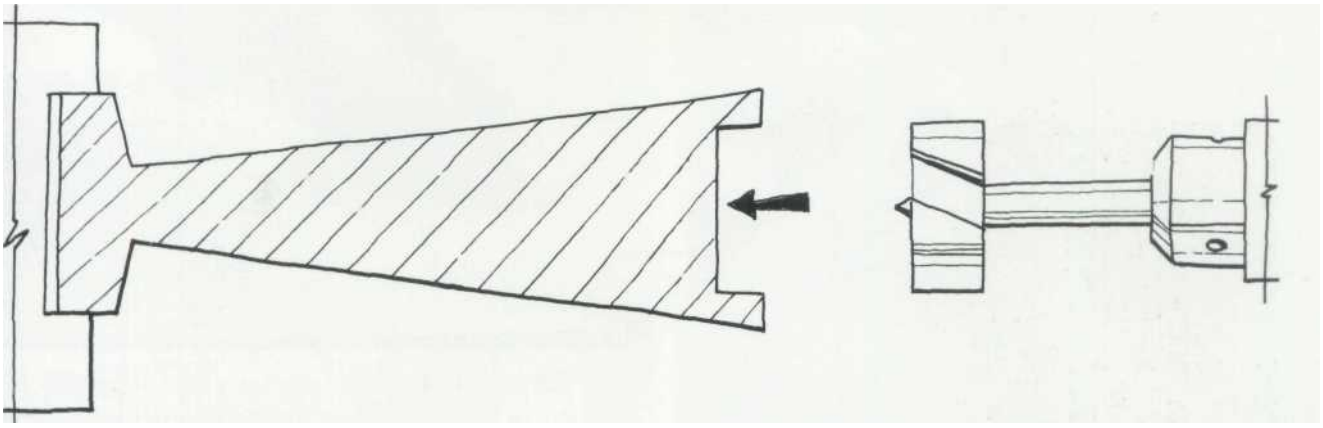


2 If you are working on a small lathe, it's always a good idea to clear the bulk of the waste by planing the wood to an octagonal section. You need to finish up with two blanks, one predominantly light and the other predominantly dark.

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3 In the interest of safety, you must make absolutely sure that the laminations are sound and well glued. If you have any doubts at all, it's best to start over. Be warned, if ever you should decide to modify this project and go for different light-dark proportions—meaning a different gluing-up arrangement—you must make sure that the lamination line occurs well clear of the center of spin. If you don't, there is a danger that the tailstock point will force the wood apart.

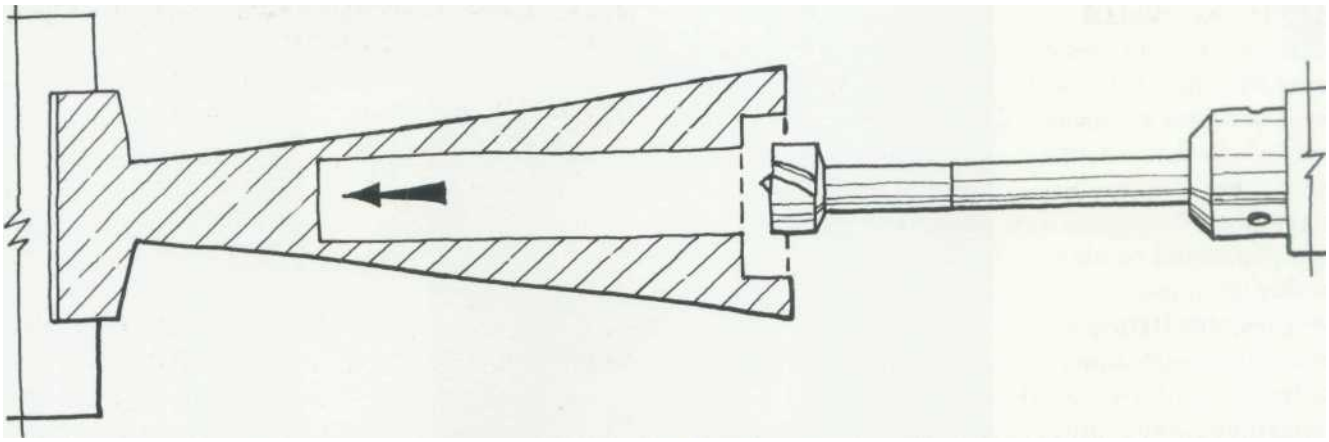




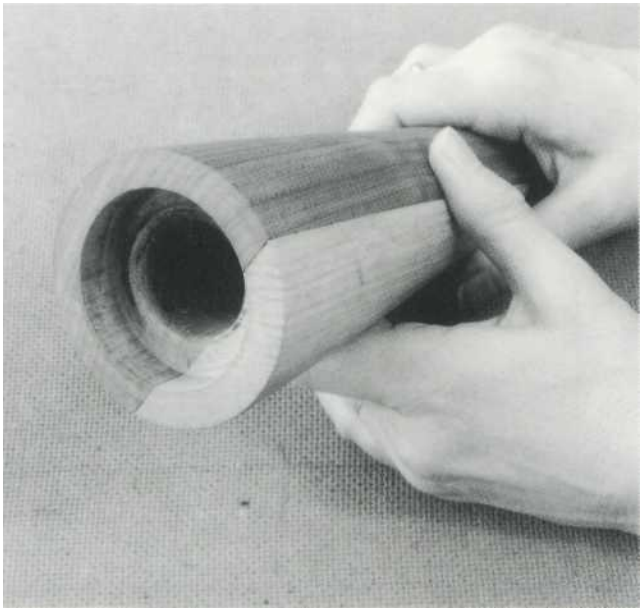
THE FACE PLATE

Using a faceplate is a good, sound means of securing a large blank. ***Notice*** *the use of short, fat screws for maximum holding efficiency.*

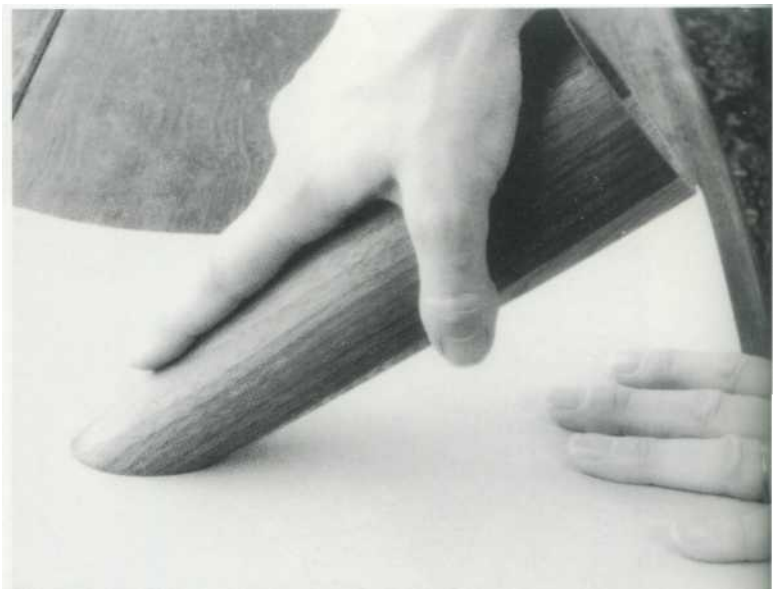
4 With the workpiece held secure in the jaws of the chuck, lit a 2"-diameter Forstner bit in the tailstock chuck and run a 1/2"-deep hole into the end of the cone.



5 Having made the 2"-diameter hole, follow up with a 1" bit and sink a hole to a depth of about 5", 1/2″ at a time. The procedure is, run the bit in 1/2" and then back out, and then back in another V2", and so on, so that you remove the waste little by little and give the bit a chance to cool off.



6 The drilled and recessed base allows you to fit all manner of corks and plugs. If you like the idea of the project but want to go for something a little more sophisticated, then many specialist suppliers stock small brass screw-stopper-and-collar units that can easily be fitted into the recess.



7 Having drilled the 3/32"-diameter hole down into the top of the cone—right through to the cavity—and used a fine-tooth backsaw to truncate the cone, use the graded sandpapers to achieve a smooth finish.

GRINDING MILLS

Traditional Colonial-style salt and pepper mills are fascinating! It's not so much the way they fit together and operate—although this is very interesting in itself—but the way they are made. There is something really exciting about the procedure. One moment you have a couple of lumps of wood and the next you have two little machines. Really good fun!

MATERIALS LIST: OPTION

A (2) 2½″×2½″×12″ pieces of beech

B (2) 7½″-long mechanisms—one for salt and the other for pepper

THE PROCEDURE

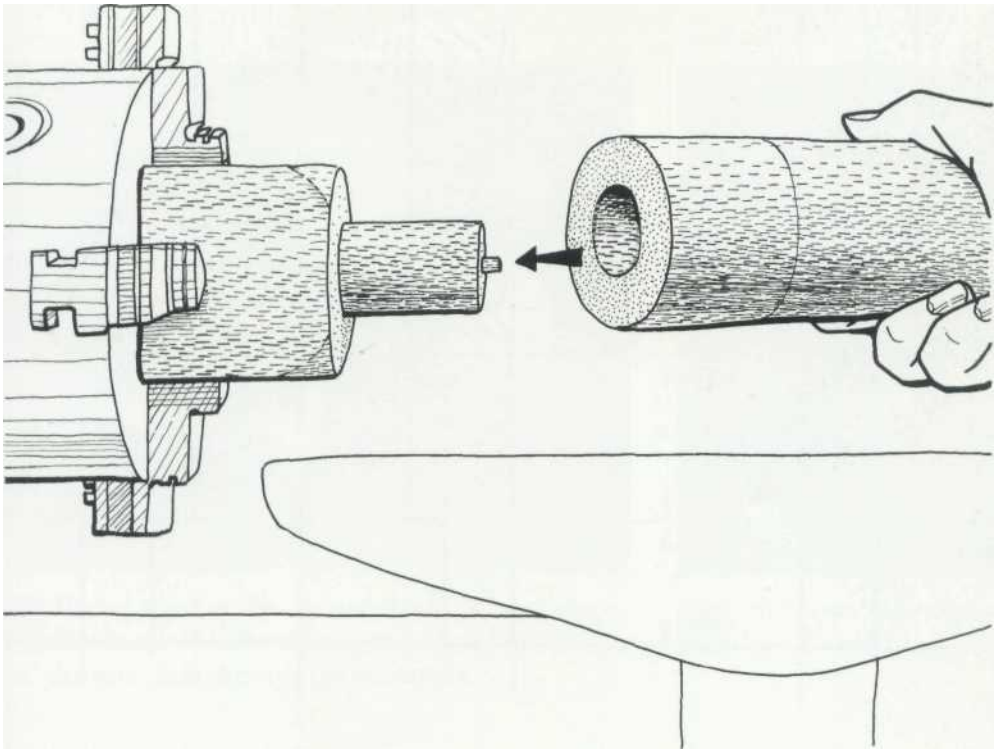
Having first made sure that the wood is free from splits and cavities, mount it on the lathe and swiftly turn the greater part of the length down to a 2 1/4"-diameter cylinder. Run guidelines around the cylinder so that the top part of the mill is nearest to the tailstock end of the lathe.

Turn the top of the mill—called a capstan—to shape and very carefully part off. Fit the tailstock drill chuck, set the l 1/8"-diameter Forstner bit in the chuck, and run a hole into the end of the cylinder. Sink the hole in to a depth of about 3". Part off the 5 1/5"-long cylinder.

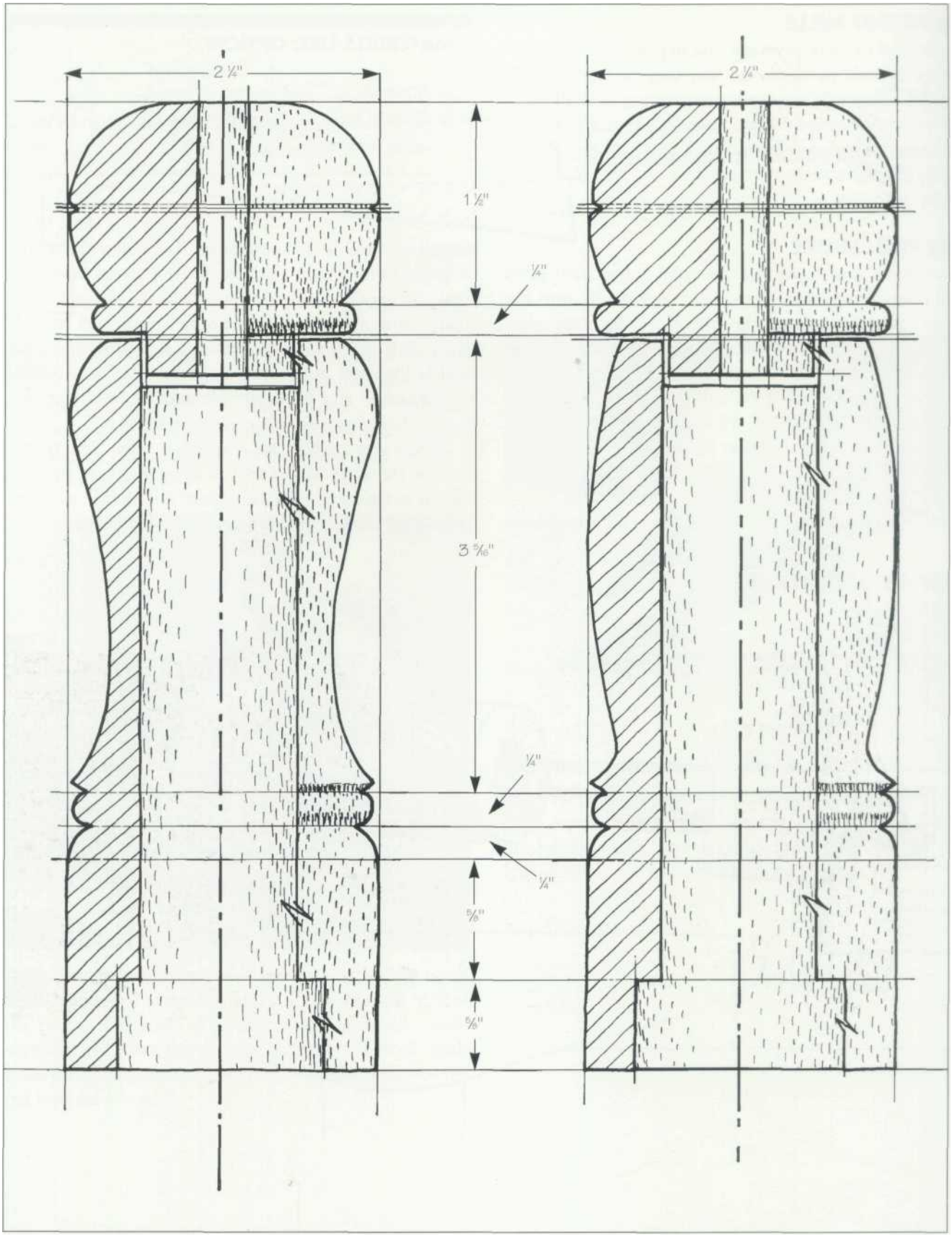
Wind the tailstock up so that the remaining short length of wood is well supported. Turn off a spigot that is going to be a tight push fit in the l 1/8"-diameter hole that you have drilled into what will be the top end of the body. Now, slide the body onto the spigot, refit the tailstock drill chuck and bore different size holes into what will be the base of the mill body. Bore the first hole at 1 1/2"-diameter and 1/2″ deep, followed up by the second hole at 1 1/8"-diameter and as deep as it will go.

When you are this far, the rest is easy. You simply reverse the body of the mill in the chuck—so that the base is in the chuck—fit the capstan on the mill, and then wind up the tailstock and turn the mill to shape.

STEP-BY-STEP STAGES

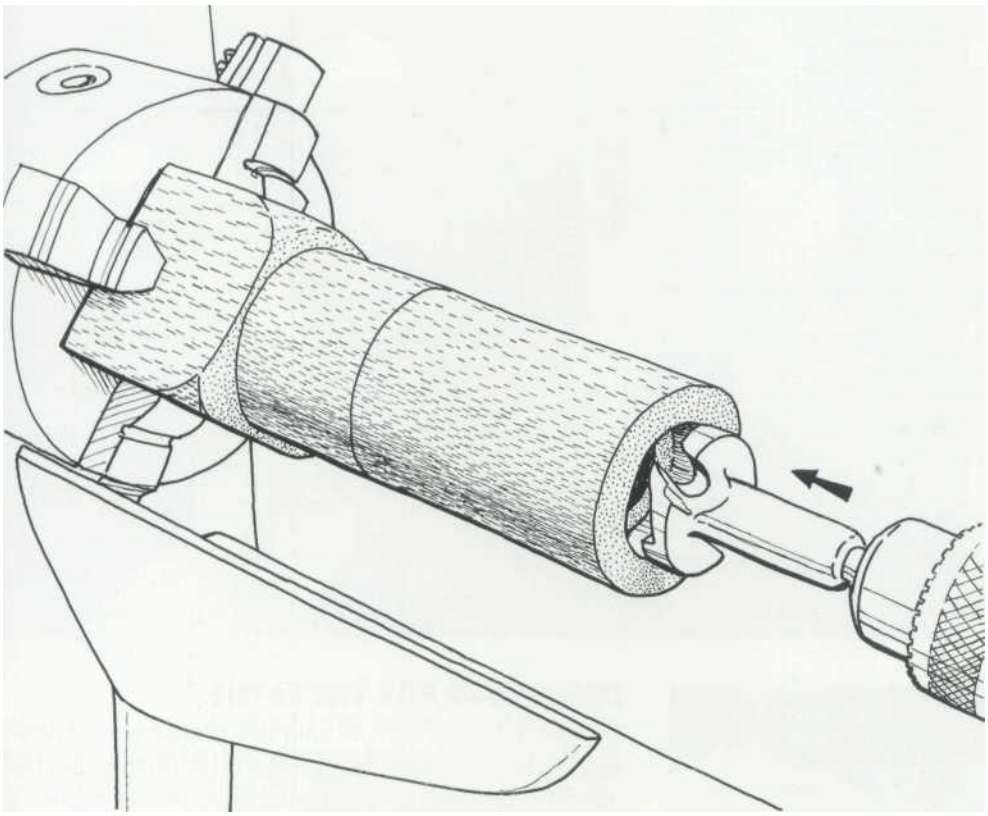


1 Having turned the capstan to shape and parted off, drill a 1 1/8"-diameter hole into what will be the top of the body. Then push the cylinder onto the spigot.



WORKING DRAWING B

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2 Bore two holes into the bottom of the mill—the first hole at 1/2″ in diameter and 1/2" deep, followed by the second hole at 1 1/8" in diameter and as deep as it goes.

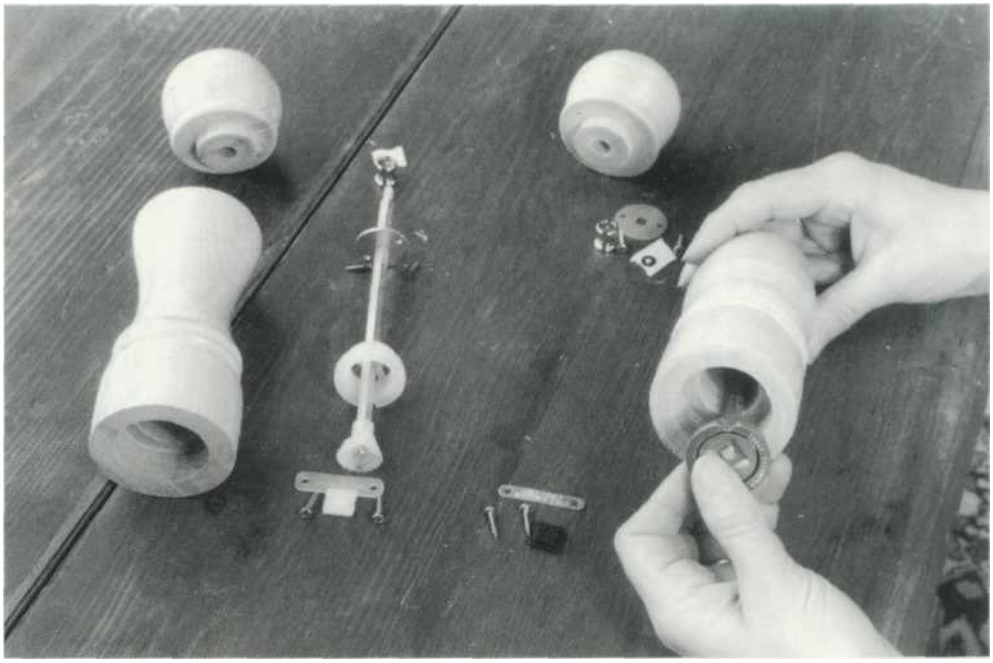


3 Having more or less turned the capstan to shape, fit it in the chuck and bring it to a good finish. Run a 3/8"-diameter hole through the workpiece.



4 Fit the whole works back on the lathe and sand and burnish to a good smooth finish.

5 Slide the mill mechanism up through the body and fix with the little bar and a couple of screws.





6 Having screwed the ring washer on the capstan spigot, slide the capstan on the threaded rod and fit with the fancy head screw.

DESIGNING FOR THE LATHE

Designing for the lathe is uniquely problematic. The success of the design not only hinges on aesthetics and function but also on the turning techniques. Of course, the same goes when you are designing a chair or whatever—you still have to make decisions about the tools and the techniques—but with turning, the tools and the techniques are paramount. Also, the design solution is very closely related to method. In chairmaking, the balance of concern is perhaps equally distributed between aesthetics, function and technique; with wood turning, the technique concerns far outweigh all others. In fact, when I'm designing for the lathe, my big worry is not whether it looks good or if it functions. Rather, I'm concerned with how I will hold, secure and approach the workpiece while it is being turned, and whether it is safe.

When I'm designing for wood turning, I always run through the following little how-will-I-do-it checklist:

■ Is the lathe powerful enough? Will the motor size hap pily shift the weight of the wood?

■ Is the distance between centers long enough to accom modate the design?

■ Is the radius of swing big enough? (Meaning, is the distance between the center of spin and the top of the bed great enough?)

■ How am I going to hold the wood? Am I going to use the four-jaw chuck, the face plate, the screw chuck, the pronged center, or what?

■ Will I turn multiples in one piece to be cut apart or as individual units?

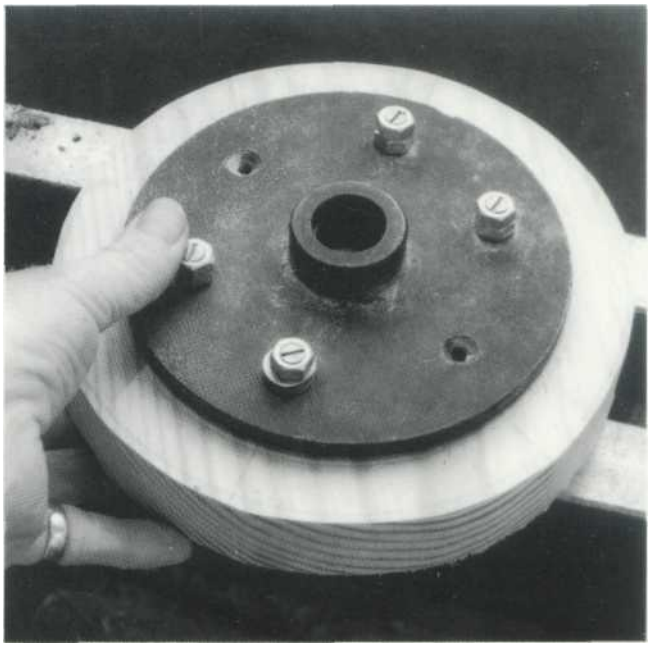
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■ Will 1 need to use a drill chuck in the tailstock mandrel?
■ Will I need to use special drill bits with extension pieces?
■ Will I turn the item over the bed of the lathe? Or will I use the outboard bowl-turning option on the back of the lathe?
■ Is the chosen wood type available in the size and quality I need? Will I need to laminate up?
■ Is the wood the traditional choice for a turning of this size and character?
■ Will 1 need to use special tools other than the usual scrapers, chisels and gouges?

As you can see, at least half of the design procedure has to do with the lathe and related tooling. Of course, just about all your questions are answered if you want to turn something like a baseball bat—your only worry is length—but if the turning is more complex with maybe two component parts that fit together, then it's not so easy and needs thinking about.

Let's say, for example, that you have set yourself the design problem of turning a large lidded container—the biggest diameter possible on your lathe—a form about as high as it is round. The first thing you do is measure the radius of swing and double it. If your lathe measures 3" from the center of the headstock down to the top face of the bed, you can reckon on a diameter of no more than 6". So, you are turning a container about 6" in diameter and 6" high.

Next, you have to decide how the block of wood is to be held and the order of work. Though there are many



ways of proceeding, I usually turn the wood down between centers—meaning the outside profile—then hold the wood in the four-jaw chuck while I hollow-turn the center. When I have cleared the waste from inside the container and maybe turned the rim, I then change the container around on the chuck—so that it is held by its rim—and finish up by turning the base.

What else to say, except that you must always think well ahead before you put tools to wood. And of course, as with all potentially dangerous machinery, you must always be wide awake and ready for the unexpected.

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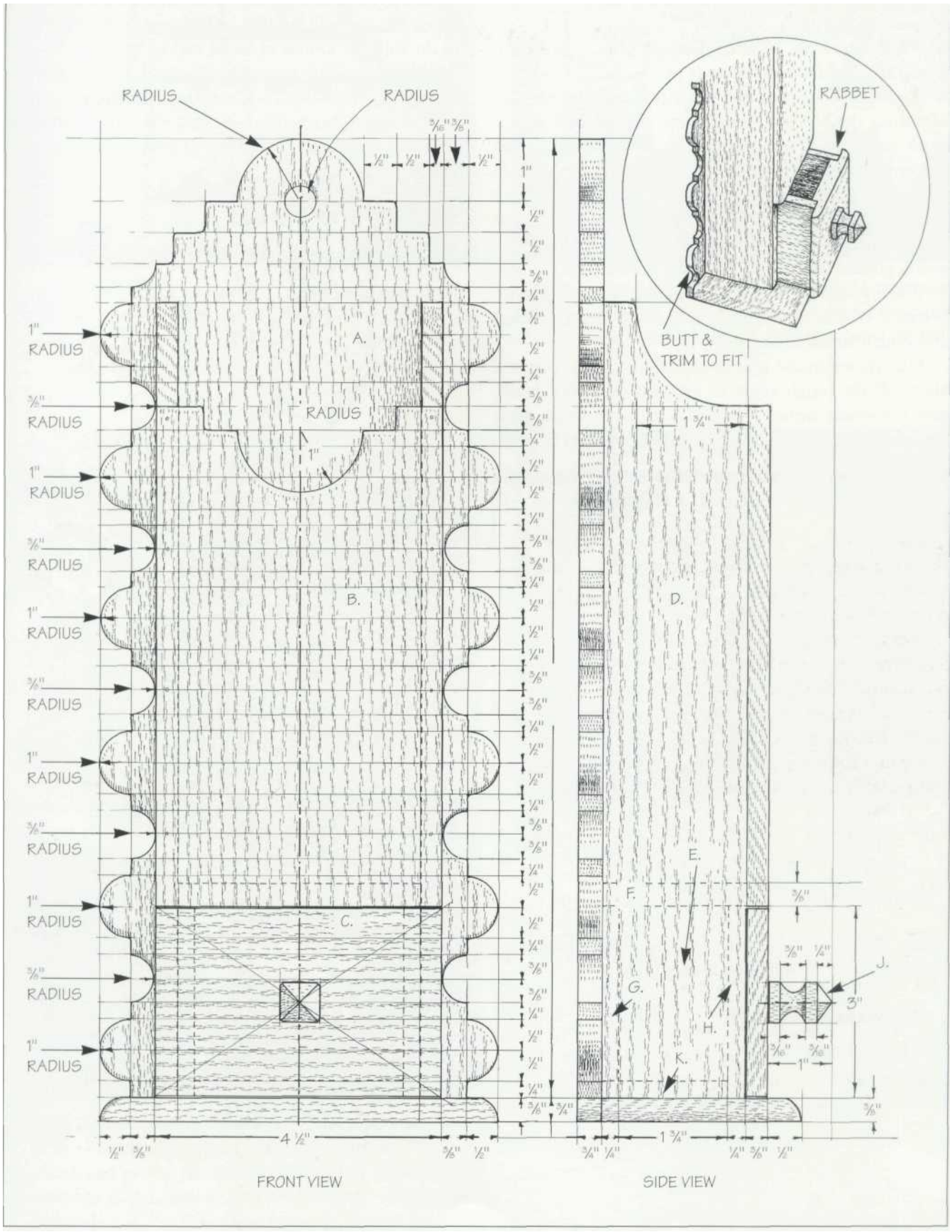
Folk Art Pipe Box



I wonder why our great-great-great-grandparents put such a huge amount of energy and enthusiasm into making pieces of woodwork that were used for everyday chores. Okay, so they had to have such functional items as dough troughs, candle boxes and flour bins. But remembering that every stick of wood had to be laboriously cut, planed, fretted and finished by hand, why did they put extra time and trouble into decorating their woodwork with so many fancy curlicues?

If you want to try your hand at a piece of woodwork that perfectly illustrates this point, then this pipe box is for you. Inspired by an English eighteenth-century folk art original, boxes of a similar type, design and construction can be found all over—in England, in Wales, in Scotland, in America—in fact, just about anyplace people smoked long-stemmed clay pipes. The design of the box is beautifully fitting for its task. The pipes fit in the top half of the box, the "makings" fit in the little drawer, and the whole works hangs on the wall alongside the fireplace.

As to the fancy compass-worked edge design, it can be found on all kinds of eighteenth- and nineteenth-century woodwork—on everything from overmantel and cupboard shelves to bench trim, door surrounds and plate racks.



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MAKING THE PIPE BOX

Having set the wood out with all the dip-and-arch curves, fret out the design.

When you have made all the component parts and pencil labelled them so there is no doubting what goes where and how, then comes the tricky, sticky-finger task of putting the box together. I found that the best way to work was to drill, pin and glue the components in the following order: (1) the main backing board to the main baseboard; (2) the side boards to the backing board; (3) the inside-box piece that forms the bottom to the pipe part of the box; (4) the front to the box. And lastly, I glued, pinned and adjusted the little drawer to fit the box.

When you come to the little drawer knob, all you do is trim a 3/4" X 3/4"-square section of wood down to shape and plug it into a drilled hole.

Finally, when the glue is completely dry, trim and shape all the rough edges to a slightly rounded finish, give the whole works a rubdown with the finest-grade sandpaper, and then lay on a thin coat of wax or varnish.

MATERIALS LIST

BOX

A Back board (1)	⅜"×6¼"×15½"—we used English oak throughout
B Front board (1)	⅜"×4½"×7⅞"
C Side boards (2)	⅜"×2¼"×12½"
D Drawer sides (2)	¼"×3"×2¼"
E Inside-box bottom (1)	⅜"×2¼"×3¾"
F Drawer back (1)	¼"×3"×3¼"
G Drawer front (1)	⅝"×3"×4½"
H Box base (1)	⅜"×3⅛"×6¼"
I Knob (1)	⅝"×⅜"×1⅜"
J Drawer base (1)	¼"×2"×3¼"

Note that all measurements are to the mark—meaning they make no allowance for cutting waste.

HARDWARE AND EXTRAS

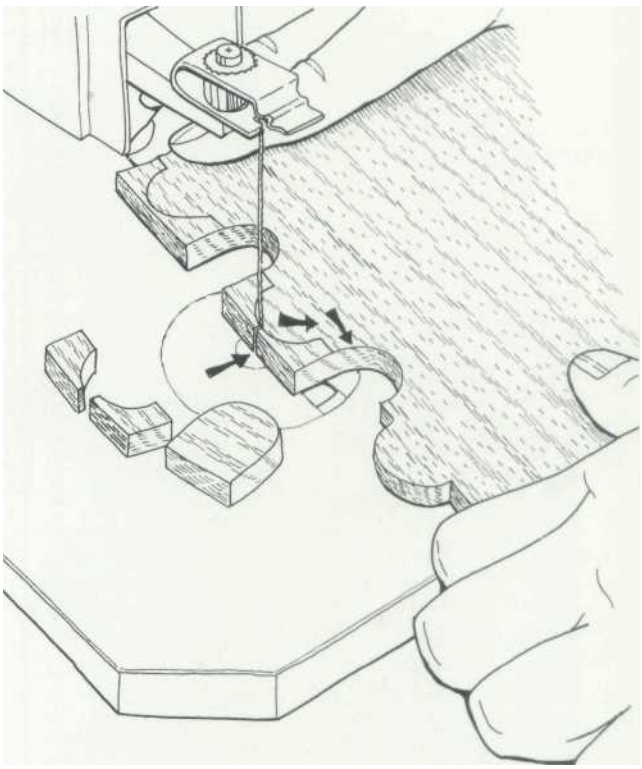
K Copper panel pins

L PVA glue

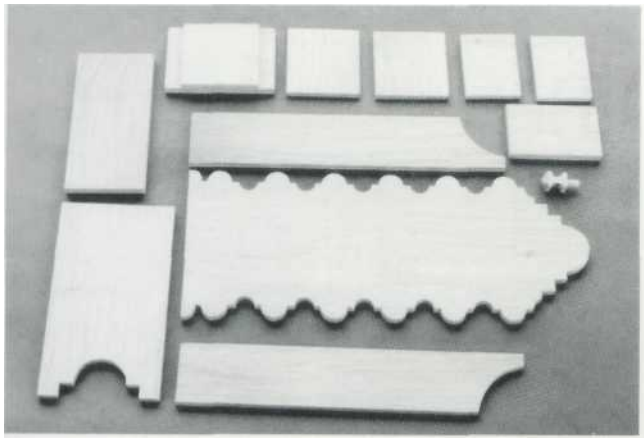
SPECIAL TIP

If you have a good close-up look at museum boxes of this character, you will see that a good part of the charm has to do with the choice of wood and the degree of finish. For example, while a good native wood looks beautifully fresh and understated—something like cherry, maple, pine or oak is just perfect—a fancy wood like mahogany or one of the exotic African woods tends to look too precious or "overdressed."

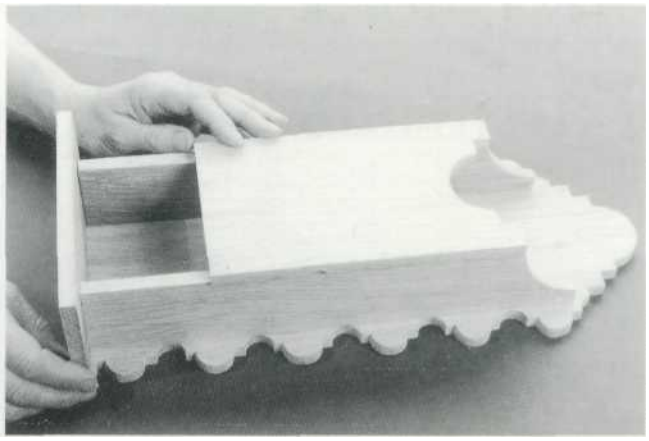
STEP-BY-STEP STAGES



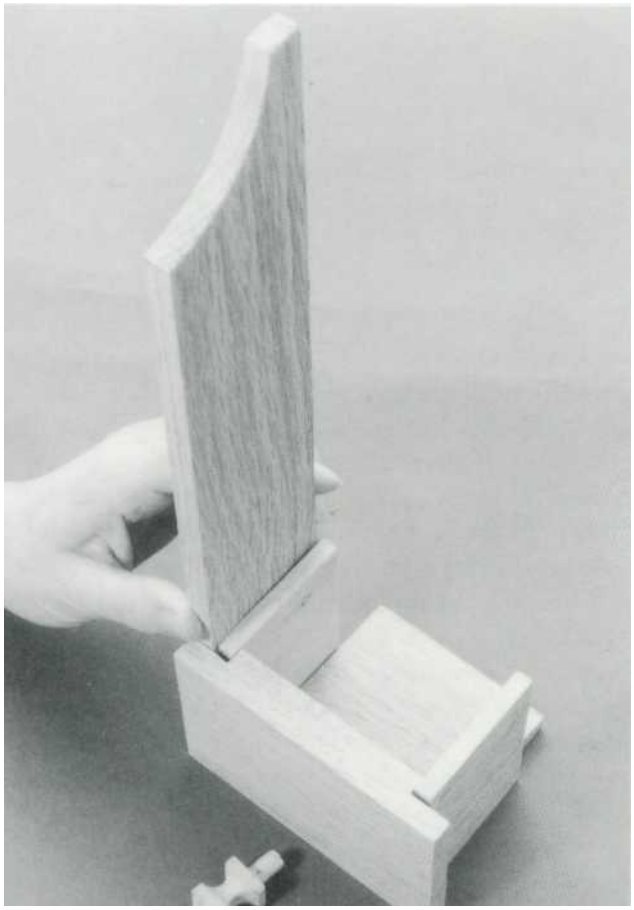
To work the fancy edge, start by cutting out all the deep concave U shapes—along the whole length of the wood—and then fret out the remaining convex forms. If you look at the arrows, you will notice that I always work in the direction of the grain—that is, two cuts that run down-and-out from the peak of the little bridge shape.



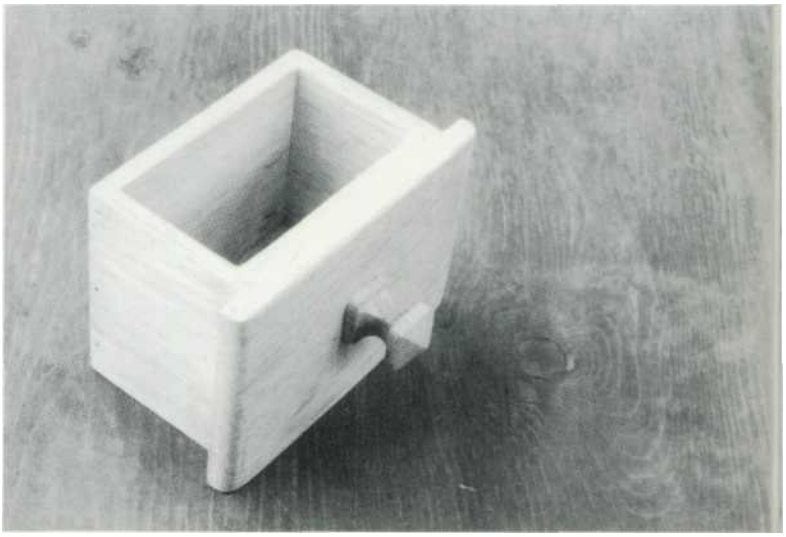
2 Having made all the component parts, pencil label them so that you know precisely how they fit one to another. If one side of a part is more attractive, or damaged, then now is the time to make decisions as to its placing.



3 Do a trial fitting to make sure that you haven't made any mistakes. Test for the squareness of the butting edges and mark in the position of the nail/panel pin holes.



4 Do a trial fitting of the sides of the box and the sides of the drawer. If necessary, you can trim back the rabbet and/or the thickness of the wood. Establish the position of the drawer pull by marking with crossed



5 Here's the finished drawer—all glued, pinned and rubbed down. Putting the drawer together is a little bit tricky, not because any single cut is complicated, but because the total form needs to be true, square and a good fit.

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Laminated Jewelry Box



This project draws its inspiration from the English decorative woodworking technique known as Tunbridgeware. This ware is characterized by small items that give the appearance of being worked with delicate tessera inlay. The technique involves gluing colored sticks of wood together in bundles and then repeatedly slicing, repositioning and re-gluing.

With this little box, the slicing and laminating technique is used in conjunction with what has come to be called "band saw joinery."

MAKING THE LAMINATED BOX

First and foremost, you have to understand that with this project there are several steps along the way where there is a high risk of the whole thing falling to pieces. This being so, we decided at the outset to work on two boxes at the same time, just in case of mistakes. Well, as you can see in the photographs, we got so far with one box and—Splap!—it came to grief.

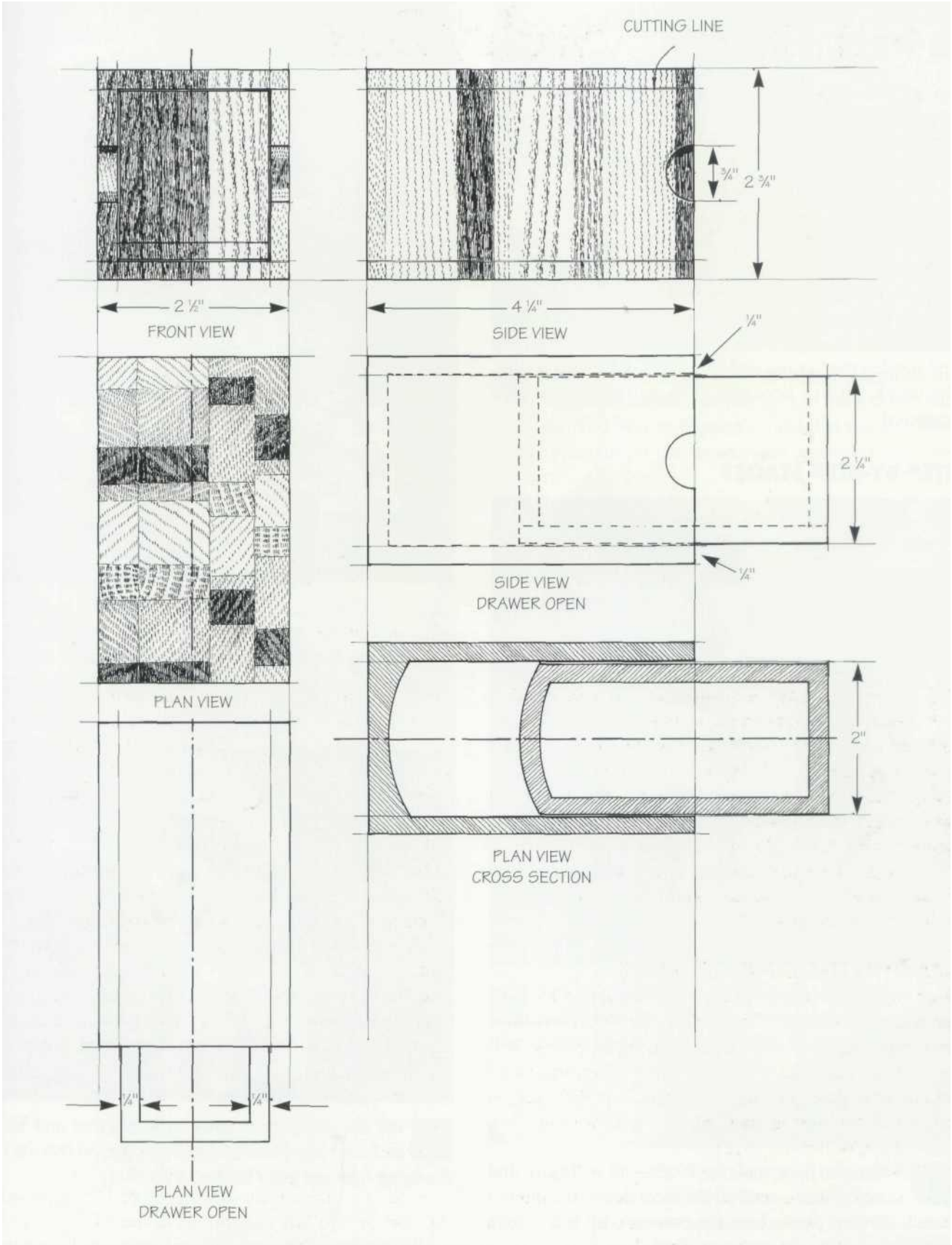
When you have studied the working drawings, gather your chosen offcuts, and plane them down to smooth-sided sections. Stick them together side by side, like a long fence. When the glue is dry, plane both sides of the fence, cut it into short lengths, and then re-glue the resultant lengths into a layered sandwich. Continue slicing, planing, gluing and laminating, until you have what you consider an interesting multicolored brick. And of course, the more you slice and laminate, the smaller the design and the greater the complexity of the pattern.

Plane your brick to size so that it is *2 1/2"* X 2 3/4*"* in section and 4" long, with all six sides being smooth and at right angles to each other. Pencil label the various sides "top," "bottom," "back," "front," "left side" and "right side."

Use the band saw to cut a 1/4" slice from the "top" and "bottom," label the slices and put them carefully to one side. This done, set the shape of the drawer out on the rough face of the block, and use either a fine-bladed band saw or a scroll saw to cut it out. Next, slice the bottom off the drawer, label it and put it to one side. Then use the scroll saw to clear away the waste from what will be the inside of the drawer. While the saw is handy, cut away the two finger holes and run a cut straight down back-center of the shell-like piece that wraps around the drawer.

When you have made all six component parts—the top and bottom slabs of the brick, the all-in-one-piece back and sides that has been cut into two halves, the

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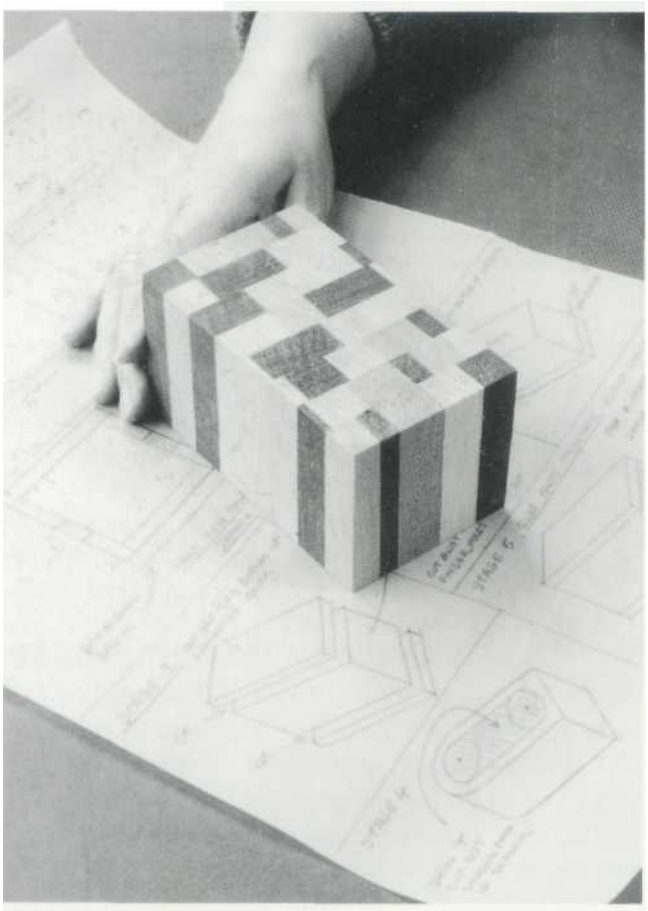
drawer with the inside cut away, and the bottom to the drawer—take the finest-grade sandpaper and rub all the sides and faces down to a smooth finish. Be careful that you don't blur the corners.

To put the little box together, start by gluing the base onto the drawer. Then smear glue on mating faces and reconstruct the block so that the drawer is nicely and closely contained. Finally, when the glue is dry, sand and finish the box.

SPECIAL TIP

If **you** like the idea of this project and want to try something a little more complex, you could experiment with cross-laminating. For example, you could turn the slices around at the sandwiching steps so that all faces of the brick show end grain. Then again, you could try swapping and turning the bottom and side slices of the box so that the block pattern becomes even more complex and staggered.

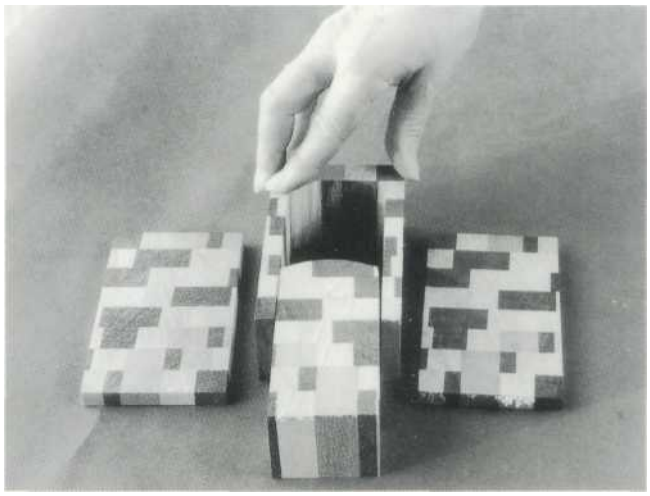
STEP-BY-STEP STAGES



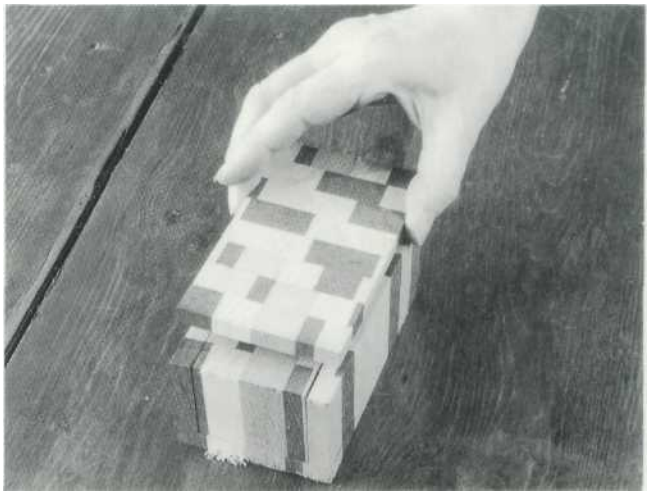
1 When you have made the block—all well glued and sawed to size—sand all the faces down to a smooth finish. Do your best to keep the corners crisp and at right angles.

MATERIALS LIST

Box	A selection of contrasting offcuts all sawed and planed—we used American walnut, oak, cherry and tulipwood—at about ½" thick and at various widths.

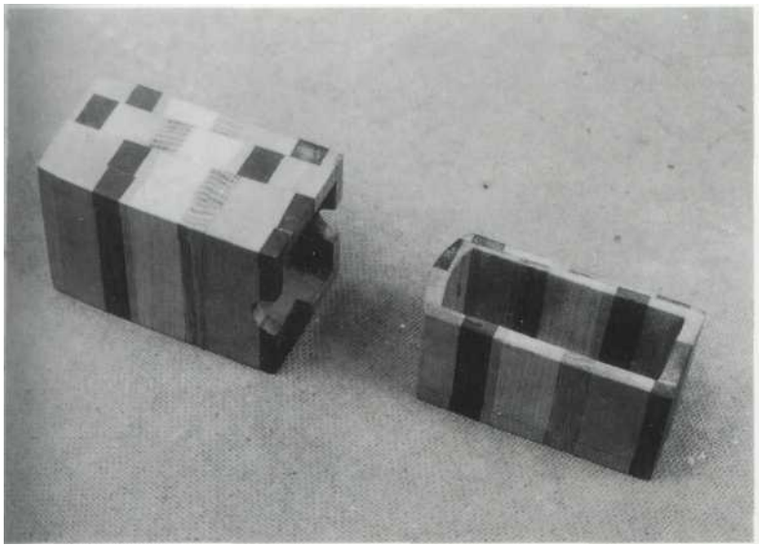


2 Saw slices off the top and bottom of the block and cut out the shape that goes to make the drawer. Be mindful that the drawer surround—meaning the piece that you see me holding—is very fragile at this stage and liable to break apart at the corners.

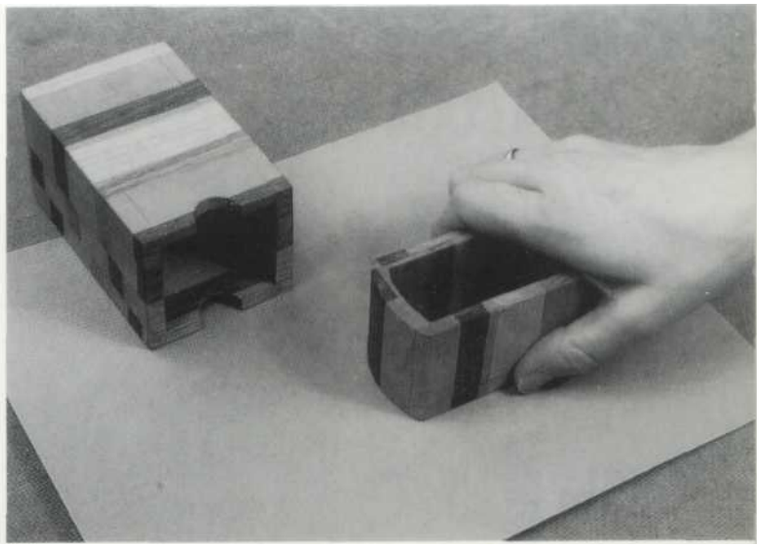


3 Put the component parts back together and label each and every face and mating edge, so there is no doubting how the parts fit one to another.

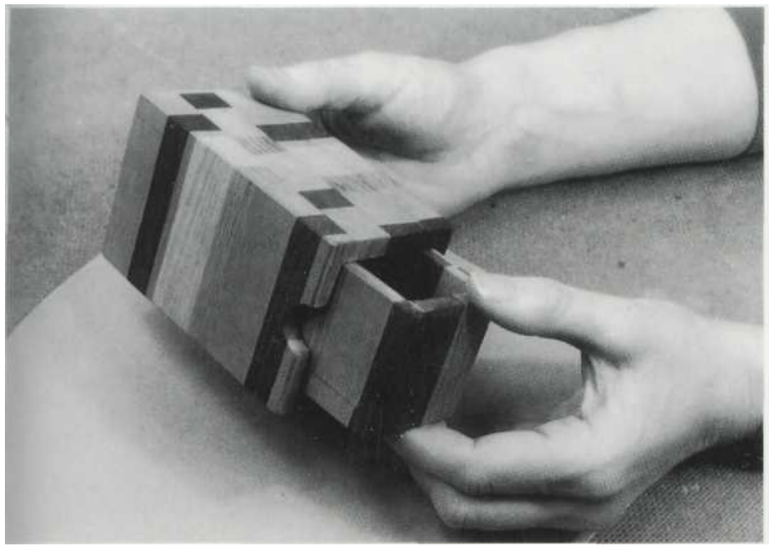
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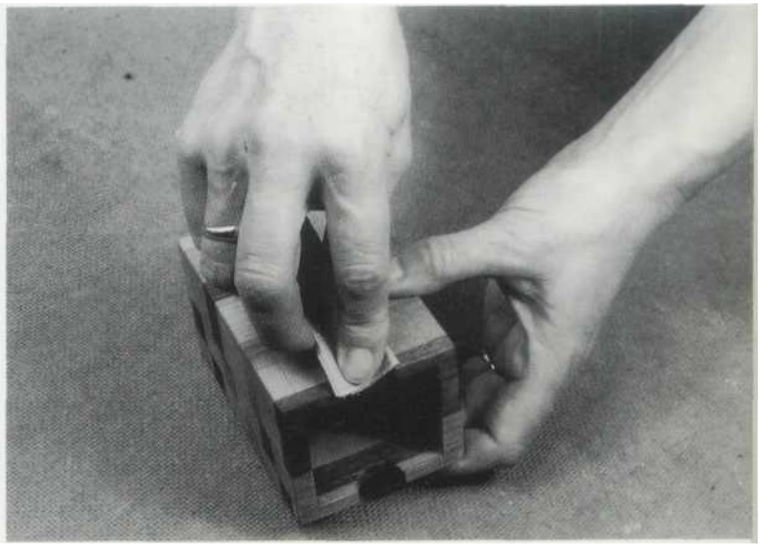
4 Having sliced off the bottom of the drawer block, saw out the inside-drawer waste and then glue the base back on the drawer. And just in case you have noticed that this photograph shows another block, the sad truth is the original block fell to bits when 1 was cutting the drawer. I think the problem was that I was a bit anxious and heavy-handed, and the glue hadn't quite cured.



Sanding the various faces is a very slow business for the simple reason that you have to work slowly and with care. You have to be most careful that you don't put undue pressure on the drawer—no squeezing the sides together.



6 If you find that the drawer is a somewhat loose fit, it's a good idea to give the inside of the box a couple of coats of sealer and then sand back to a nice push fit. The best procedure is to sand a little and test the fit, then sand some more, and so on until you are satisfied.



Sand the finger holes to a rounded finish. You have a choice at this stage . . . do you want to round and blur all the corners, or do you want to keep them sharp?

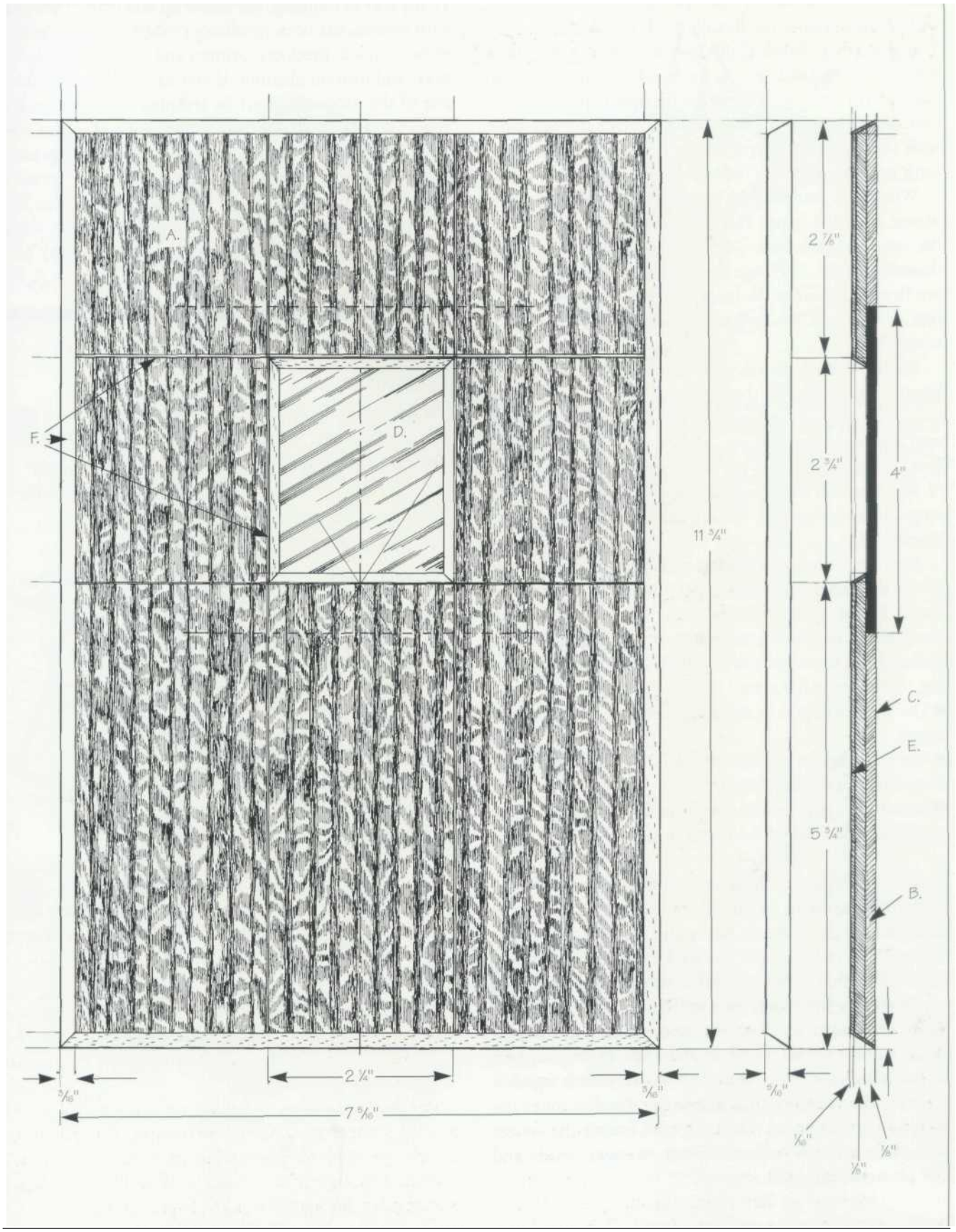
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Marquetry Mirror



About five years ago, my son Glyn made a marquetry mirror for an English magazine called the *Woodworker*. It was a real success and there was lots of interest. This mirror draws its inspiration from that project. At first glance, this mirror appears to involve an incredibly complex and fine marquetry technique—very fine hairline inlays and a multitude of cuts. Certainly it is a most delicate and exquisite item, but appearances are not always what they seem! The marquetry surface is, in fact, made up from a sheet of specially printed and pressed flexible veneer, while the hairline inlay is made from strips of sycamore veneer glued to the kerf face. As to the technique, it's no more than a few saw cuts and a bit of ironing.

For the actual shape and character of the mirror, there are any number of exciting possibilities. You can chop and change the veneer around to create different effects; you can rearrange the saw cuts so that the little "window" is triangular, hexagonal or star-shaped. In fact, you can go for just about any shape that takes your fancy.


A.
D.
F.
11 3/4"
2 1/8"
2 3/4"
4"
C.
E.
5 3/4"
B.
2 1/4"
3/16"
3/16"
7 5/16"
3/16"
1/8"
1/8"
1/8"

MAKING THE MIRROR

Before you do anything else, you need to play around with the materials—the flexible veneer and the gluefilm. The gluefilm is wonderfully easy to use. All you do is position it paper-side up on the baseboard and iron it in place with a hot iron; remove the backing paper and position the marquetry on the gluefilm; cover the assembly with the backing paper and run the hot iron back and forth until the glue has melted.

When you understand how the gluefilm technique works, clear the bench ready for action. Start by cutting the two boards to size—the top board and the mirror thickness board. Then use the gluefilm to bond your chosen flexible veneer to the front face of the top board. And just in case you are wondering, yes, it is as easy as it sounds!

Having used a pencil, ruler and square to draw the lines of the design on the veneered surface so that they run off the edge of the board, sit awhile and consider your next move. As you can see, all you need to do is make four cuts straight across the board and at a mitered angle of 30°. Then fill the resultant saw-cut kerfs with a glued strip of veneer so that the angled veneer becomes the beveled edge.

Now there are two ways forward. You can either do as we do and make one cut straight down the length of the board, fill the cut up with the veneer strip and move onto the next cut, or you can make all four cuts and then fiddle about gluing up the whole assembly. Either way, the gluing procedure is the same.

- Use the scroll saw to make the beveled cut across the board.
- Use the gluefilm to bond the strip of sycamore veneer to one face of the kerf bevel.
- Smear PVA glue on the face of the sycamore strip and push the other side of the board in place.

Then continue making beveled cuts with the scroll saw, sticking veneer strip to one side of the bevel, sticking the other side of the board in place, and then on to the next cut until the task is done. The trick is to finish up with a mirror hole that is nicely beveled on all four edges.

When the glue is dry, use a small plane and the finest-grade sandpaper to clean the whole works down to a smooth finish so that the edges of the veneer strips appear as fine inlay lines. This done, glue the two boards together to make the recess for the mirror tile. Finally, miter the edge of the two-board thickness, trim it with the veneer strip, burnish the whole works with beeswax polish, and the project is finished.

SPECIAL TIP

To my way of thinking, the whole art and craft of working with veneers has been revolutionized by the introduction of two miracle products: printed and pressed flexible veneer, and iron-on gluefilm. If you have trouble obtaining one of the products, don't be tempted to use traditional veneer and hot-melt glue, but rather visit a specialist supplier and ask specifically for the products by generic name. You need "thermoplastic gluefilm," and "pressed and printed flexible veneer." Flexible veneers come in a whole range of designs and colors, everything from imitations of exotic veneers to designs that look as if they have been woven.

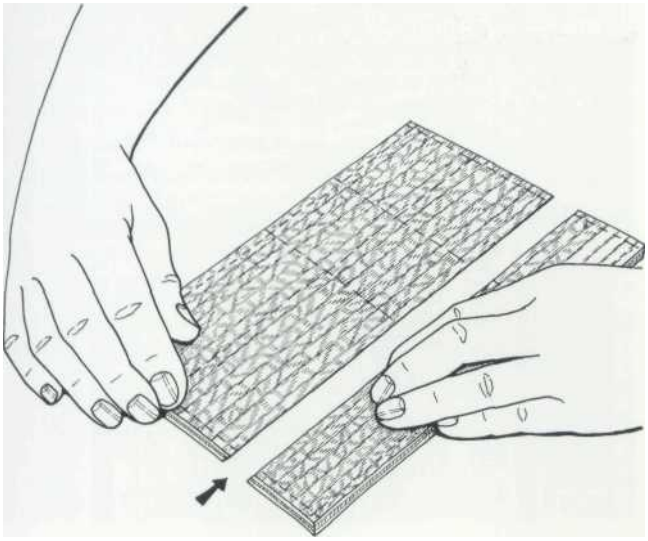
MATERIALS LIST

A Front board (1)	⅛″ ply × 7 5/16″ × 11¾″
B Mirror thickness board (1)	⅛″ ply (same thickness as the mirror tile) × 7 5/16″ × 11¾″
C Backing paper (1)	6″ × 6″—sticky-back paper or plastic to hold the mirror secure
D Mirror tile (1)	4″ × 4″-square tile
E Veneer (1)	printed and pressed flexible veneer 12″ × 12″—this allows for cutting waste
F Inlay (1)	sycamore veneer 14″ × 10″—this allows for a good amount of cutting waste

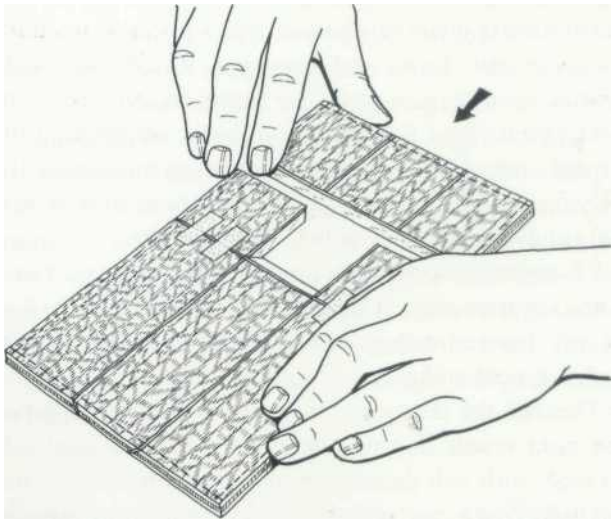
HARDWARE AND EXTRAS

G Thermoplastic gluefilm (1)	18″ × 18″
H PVA glue	

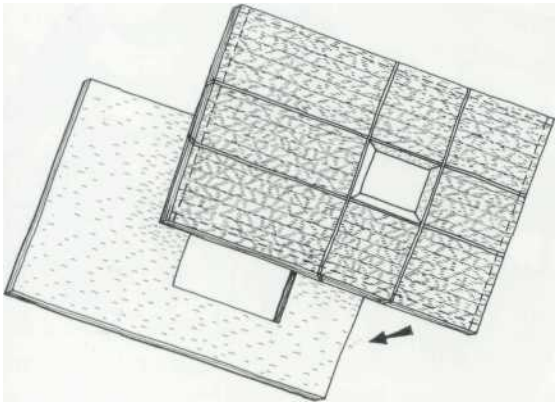
STEP-BY-STEP STAGES



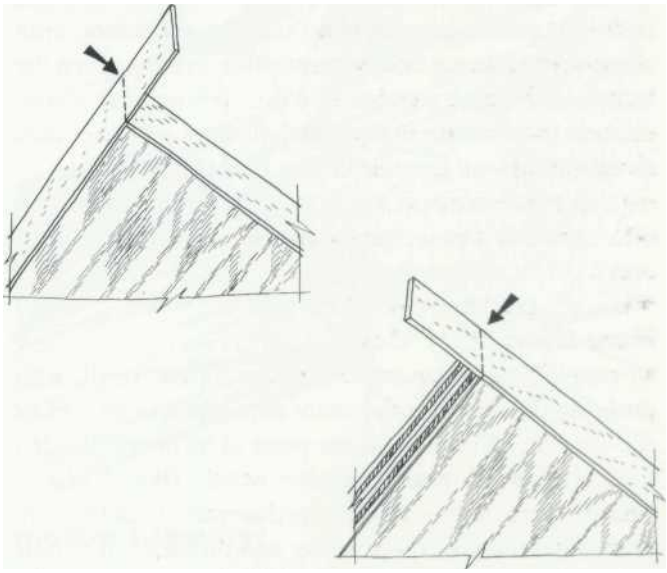
1 Set the saw table to a tilt angle of 30° and run a saw cut right across the length of the board. Then, glue a strip of veneer on the sawed edge and glue the two parts of the board back together.



2 Continue running straight saw cuts across the board and filling the kerf with veneer until the design is complete. If you do it right, the procedure will automatically result in the mitered edges of the mirror hole or window being veneered with the strip.



3 Glue the backing board in place so that you have the thickness of two boards. Then run a beveled cut around all four sides of the frame.



4 Glue the strips around the mitered edges and trim and sand the corners to a crisp finish.

MORE ABOUT THE CRAFT OF MARQUETRY AND INLAY

If you have enjoyed this project and want to know more about the craft of inlay and marquetry, then the following brief history will give you some useful leads.

Marquetry and inlay were originally inspired by the ancient craft of "intarsia"—the making of mosaics by the inlaying of precious and exotic materials into and/or onto a groundwork of solid wood. The Egyptians decorated much of their woodwork with inlay. In fact, in the tomb of the Egyptian king Tutankhamen, just about all the furniture is covered with an inlay made up of little briquettes of wood, gold and ivory.

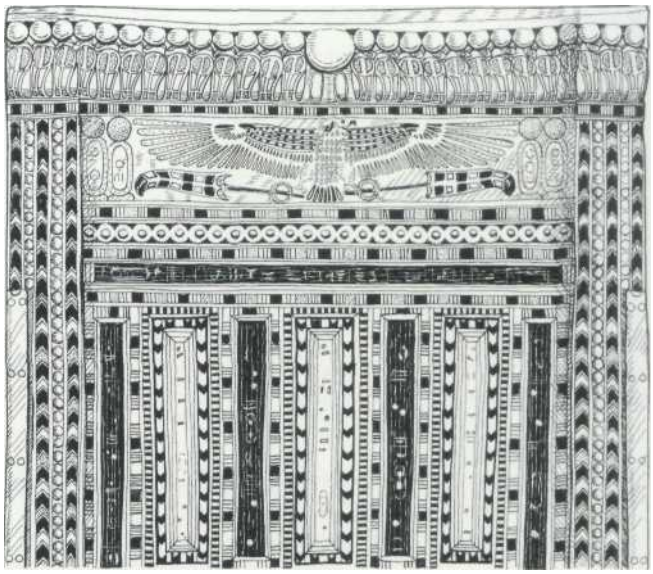
Through the centuries, in Egypt, Rome, Persia, Japan and right across Europe, the craft of inlaying gradually evolved, with rich patrons employing craftsmen to painstakingly cover base woods with rare and exotic woods. The craft involved importing rare woods, slicing the wood into little chunks, and then setting the chunks or briquettes one at a time into the base wood. The process of inlay was massively expensive in time and materials.

And so it might have continued had not some tired and weary woodworker—sometime toward the end of the sixteenth century—invented the jigsaw. From then on, 1 he whole process became swifter and more efficient, until about the beginning of the seventeenth century, when the technique became so improved and refined that woodworkers were using thin sheets of wood—by this time called veneer—to glue directly to the base wood.

The craft as we now know it can be divided into four areas of study—veneering, parquetry, boulle marquetry and window marquetry.

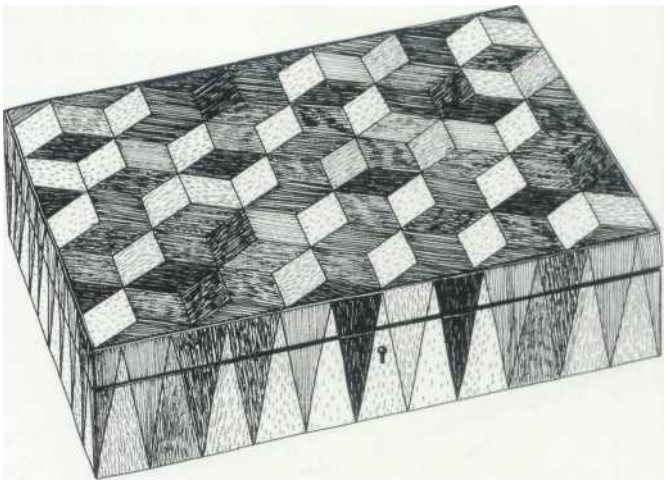
Veneering

In simple terms, the craft of veneering has to do with covering base wood with a more attractive species, to fool the eye into believing that the piece of furniture or other Hem is made of more expensive wood. Though at one time this area of the craft fell into disrepute, with the term "veneer" coming to mean tricky and/or cheap, it is now seeing a revival. Current thinking is that one way of saving rare and precious tree species is to make a little go a long way. For example, it is now possible to build a whole piece of furniture from a man-made sheet-wood material like MDF (medium density fiberboard), and then cover it with a pressed-and-pnnted flexible veneer—as in this project—or with plastic veneers or thin sheets of rare wood. One look through a batch of current woodworking magazines will bear out the fact that the time is fast coming when some woods will be so rare and costly that woodworkers will have no choice but to use thin decorative veneers on base-wood grounds. Interesting isn't it!



EGYPTIAN INLAY

Detail from the back of Tutankhamen's ceremonial chair—inlayed with exotic woods and precious stones.



NINETEENTH-CENTURY PARQUETRY

A classic *example of a parquetry box—made in* ***Tunbridge*** *Wells, England, in the middle of the nineteenth* ***century.***

Parquetry

Squares, checkerboards, counterchanges, triangles, diamonds and zigzags—parquetry is the art and craft of math, geometry and the straight line. While marquetry involves pictures, patterns and all manner of wavy-line imagery, parquetry concentrates on straight lines and geometrical patterns.

Many American marquetry craftsmen think of parquetry as being similar to fabric patchwork. It's a good comparison. If you think of the geometrical patterns that make up a quilt, and if you go on to think of this same pattern in terms of tiles of veneer spread out over a piece of furniture, or maybe over a floor, then you have a parquetry. If you enjoy playing around with rulers and set squares, and if you enjoy logic, order and straight, crisp lines, then you will enjoy parquetry.

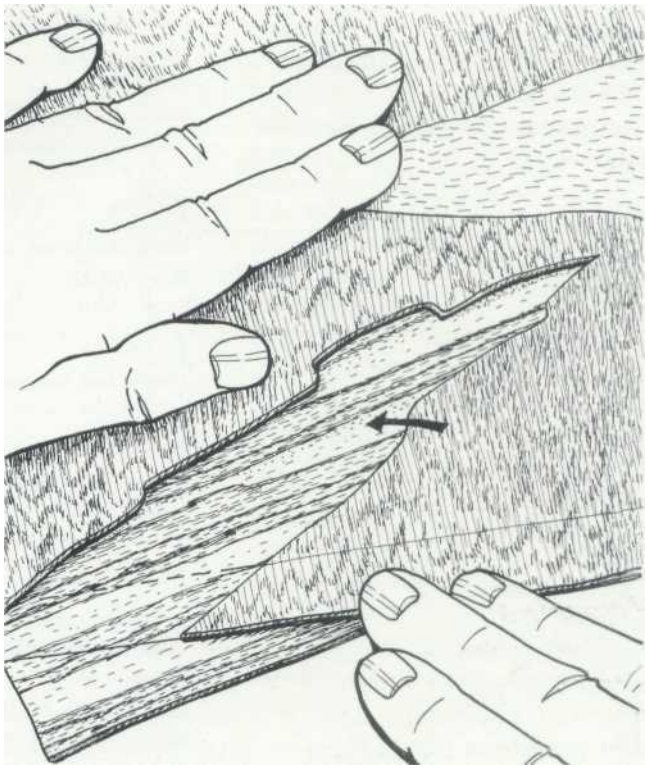
Boulle Marquetry

Boulle is a type of marquetry that was popular in France in the seventeenth and eighteenth centuries. The technique was named after Andre Charles Boulle, a French marquetry craftsman under King Louis XIV. Now known as boulle, boule, or even, buhl, the technique might best be described as getting two designs for the price of one. Traditionally, the boulle technique involves setting two thin sheets of contrasting material together—usually brass and an exotic wood—and then cutting through both sheets at the same time to create a number of pairs of identical cutouts. For example, if you have two sheets of veneer sandwiched together—one black and the other white—and you cut a circle shape through both sheets and then swap the cutouts around, you will have a black sheet with a white circle at its center and a white sheet with a black circle. If you were to continue cutting out more complex shapes and swapping them around, you would finish up with two identical counterchanged designs—one white on black and the other black on white. If you sandwich four sheets of veneer together, then the technique really begins to lift off. If you enjoy intricate sawing, and exquisite pattern work—say on small boxes and the like—and if you like the notion of using up every last piece of veneer, then perhaps this is a technique that you need to explore.

Window Marquetry

Window marquetry, sometimes called picture marquetry, involves pencil-press, transferring the design through to a sheet of scrap veneer, then cutting out the elements of the design one step at a time and replacing them with more decorative veneers.

For example, if you draw a picture of an old sailing ship on the scrap veneer and cut out, say, one of the sails so that you have a hole, then you can slide the hole over your choice veneer and try out various grain patterns. When you have selected the veneer, you cut a piece to fill the hole. Then, you repeat the procedure with all the other elements that go to make the design—the sails, the masts, the hull, the clouds, and so on. Of course, if you continue in this manner, you will eventually finish up with a situation where just about all the base veneer has been replaced by little cutouts of contrasting veneer. When this point is reached, the resultant design can be mounted like a picture or built into something like a coffee table. Great fun!

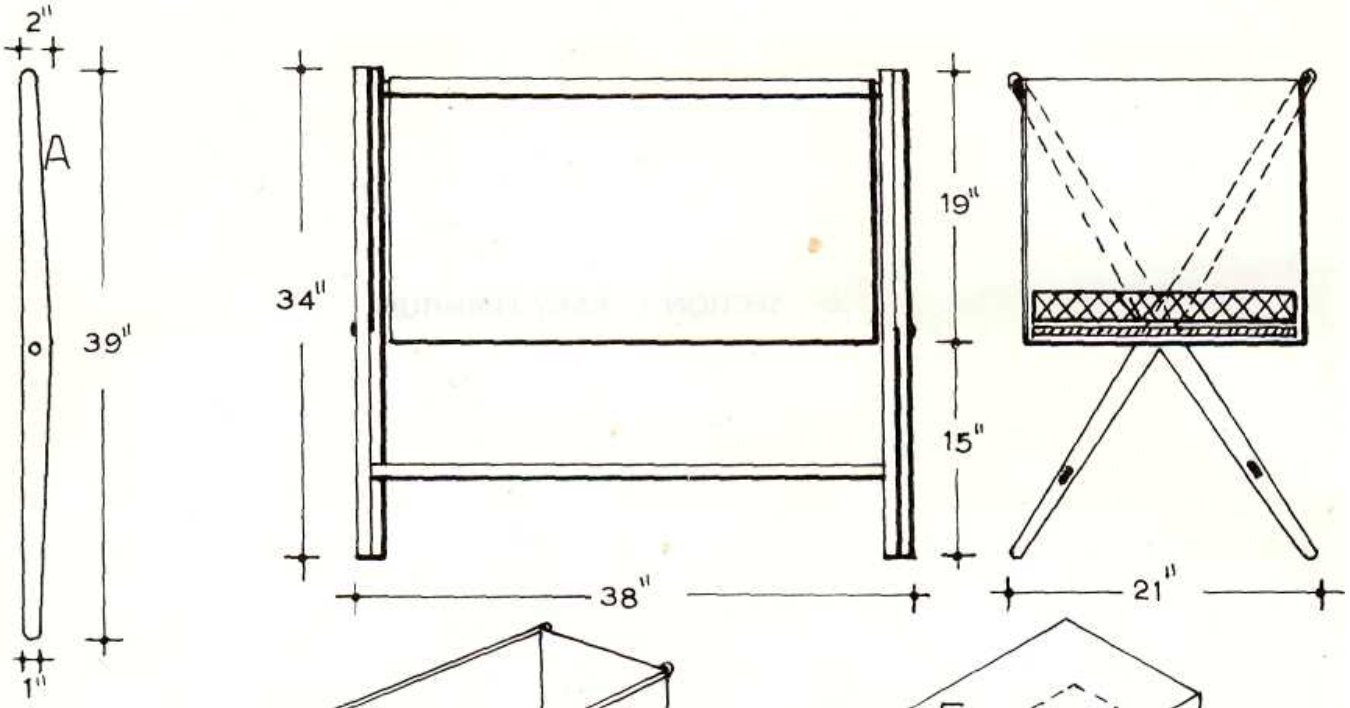


WINDOW MARQUETRY

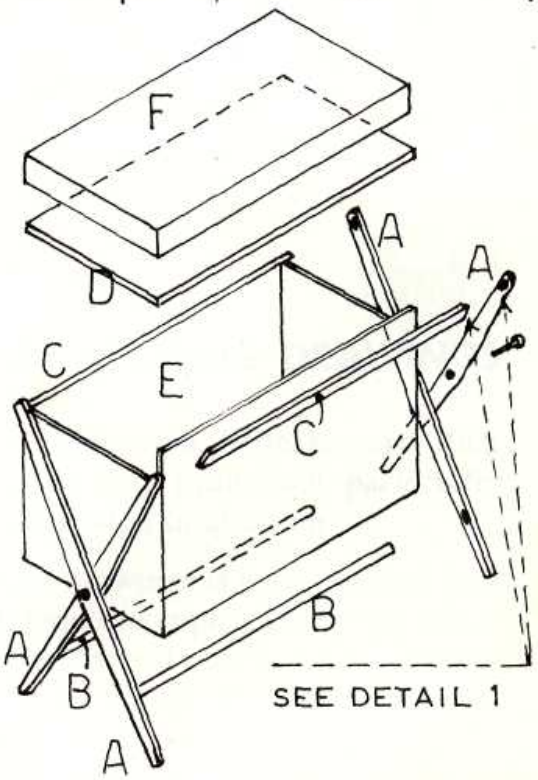
The technique is beautifully simple and direct. All you do is cut out an element of the design and then [ill it with choice veneer.

1.1 BASSINET

This basket-bed for infants is easy to make, and easily moved from room to room. The crossed wooden legs fold to permit storage; the mattress, too, can be folded for storage or transport.



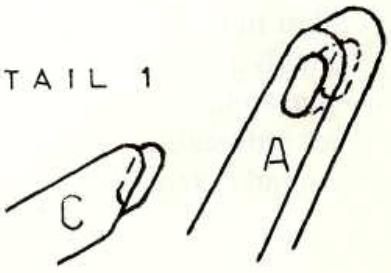




List of Materials

PART	NO.	FUNCTION	DIMENSION IN INCHES thickness × width × length		
A	4	legs	1	2	39
B	2	stretchers	¾	1¼	37
C	2	rails	¾	1¾	37
D	1	plywood panel	⅜	18	33
E	1	plastic sheet		36	80
F	1	foam rubber mattress	3	18	33

DETAIL 1



Instructions for Assembly

1. Join legs (A) with bolts at center.
2. Fasten stretchers (B) and rails (C) with legs (A).
3. Apply finish.
4. Saw the plastic sheet to indicated shape and attach to rails (C).

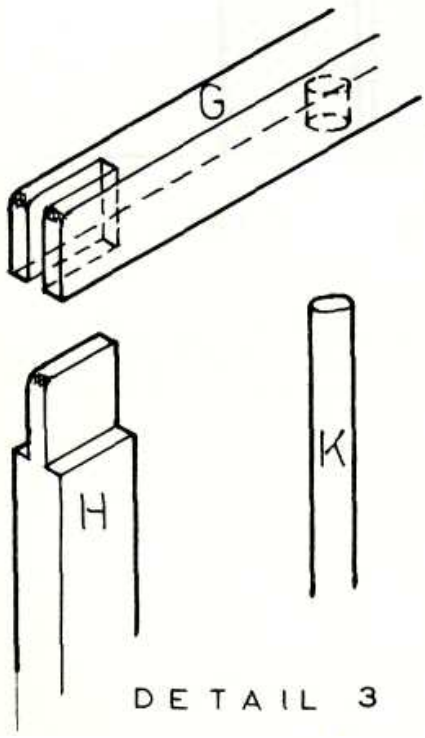
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1.2 CRIB

The fixed side is placed against the wall, while the folding side facilitates making the child's bed or removing the mattress. Double-spring catches make it impossible for inquisitive fingers to unlatch the folding side. Because of the large number of parts that have to be joined, care and accuracy are required in this project.

List of Materials

PART	NO.	FUNCTION	DIMENSION IN INCHES thickness	×	width	×	length
A	4	legs	1		1½		37½
B	2	rails	1		1½		26
C	2	panels	¾		23		28½
D	2	rails	¾		5½		46
E	2	cleats	¾		1		44
F	4	cleats	¾		1		24
G	6	rails	¾		1¼		46
H	2	rails	¾		1¼		24
J	4	rails	¾		1¼		12
K	9	dowels	⅜ diam.				23
L	18	dowels	⅜ diam.				11
M	2	rails	¾		1½		46
O	2	rails	¾		1½		21
P	6	strips	¼		1½		23
Q	1	foam rubber mattress	2		23		45



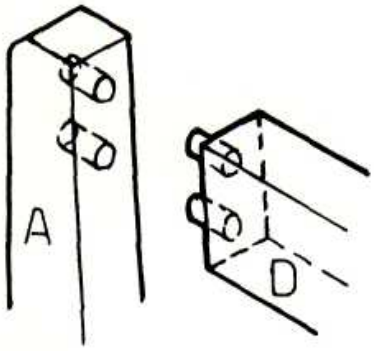
DETAIL 3



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1.3 PORTABLE CRIB

Taking little room space and small enough to be wheeled through a doorway, this crib allows the very young baby to have company while Mother tends to chores in kitchen or utility room.



DETAIL 1



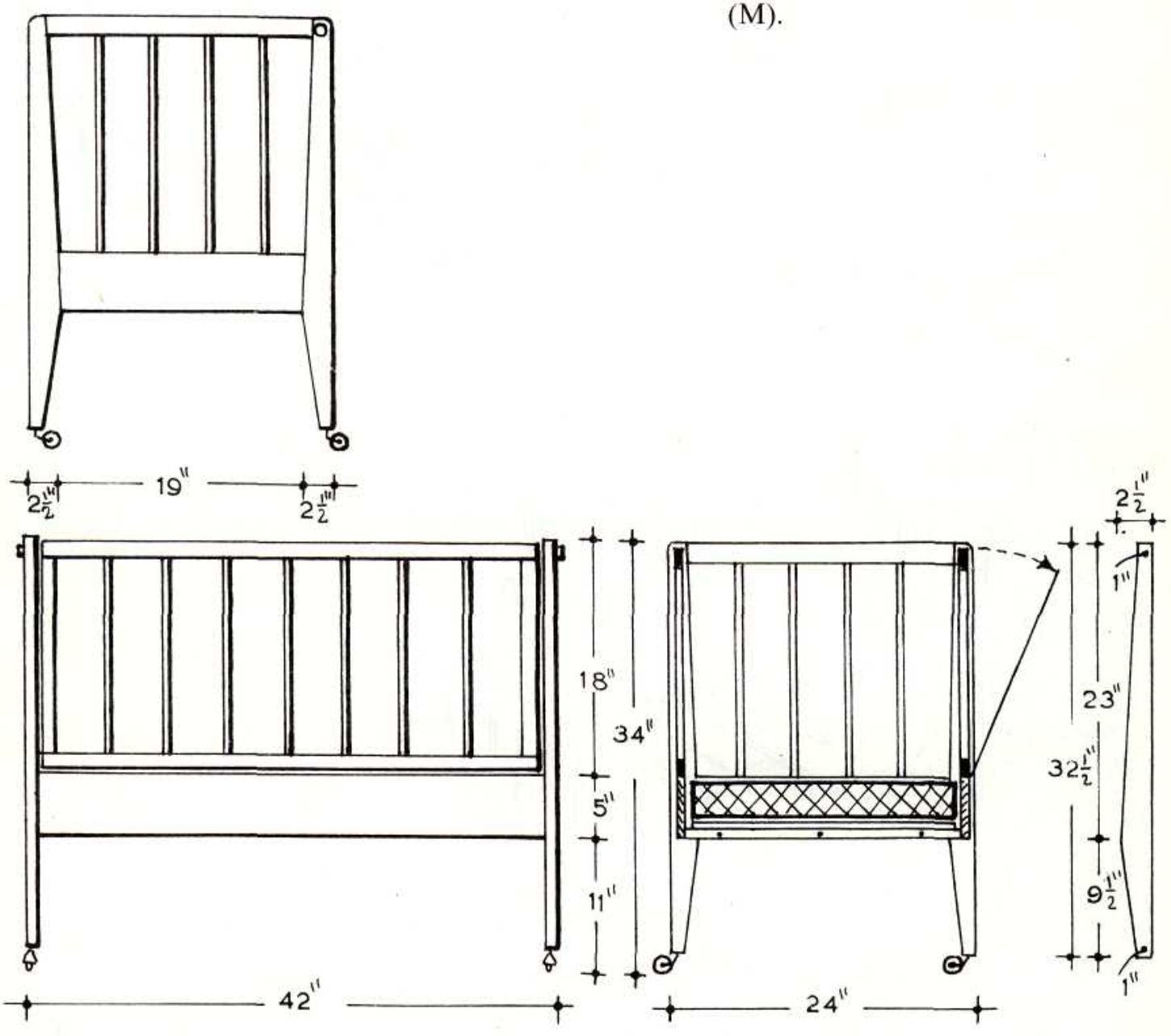
List of Materials

PART	NO.	FUNCTION	DIMENSION IN INCHES thickness	×	width	×	length
A	4	legs	1		2½		32½
B	2	rails	¾		5		40
C	2	rails	¾		5		20½
D	2	rails	1		1¼		22
E	8	dowels	⅜ diam.				18
F	4	rails	¾		1¼		17½
G	4	rails	¾		1¼		40
H	14	dowels	⅜ diam.				16½
J	2	cleats	¾		1		40
K	2	cleats	¾		1		20
L	1	plywood panel	⅜		22		40
M	1	foam rubber mattress	3		21		39

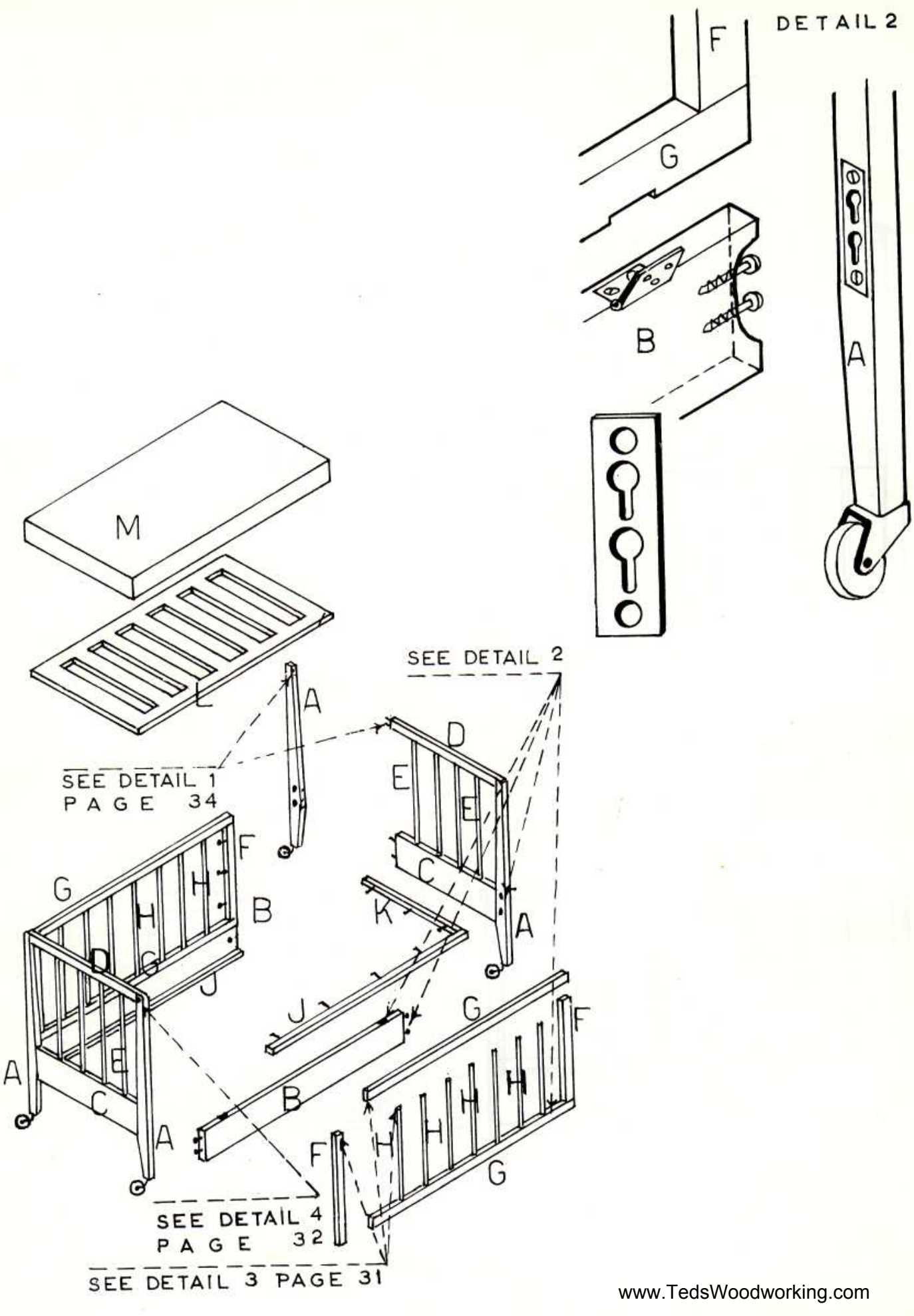
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Instructions for Assembly

1. Install dowels (E) in the rails (C, D) and join rails (C) and (D) with legs (A).
2. Fasten cleats (J) and (K) to rails (B) and (C).
3. Fasten rails (F) and dowels (J) to rails (G) and attach latter to rails (B) with hinge.
4. Fasten rails (B) to legs (A).
5. Apply finish.
6. Insert bottom (L) and mattress (M).



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1.4 HIGH CHAIR

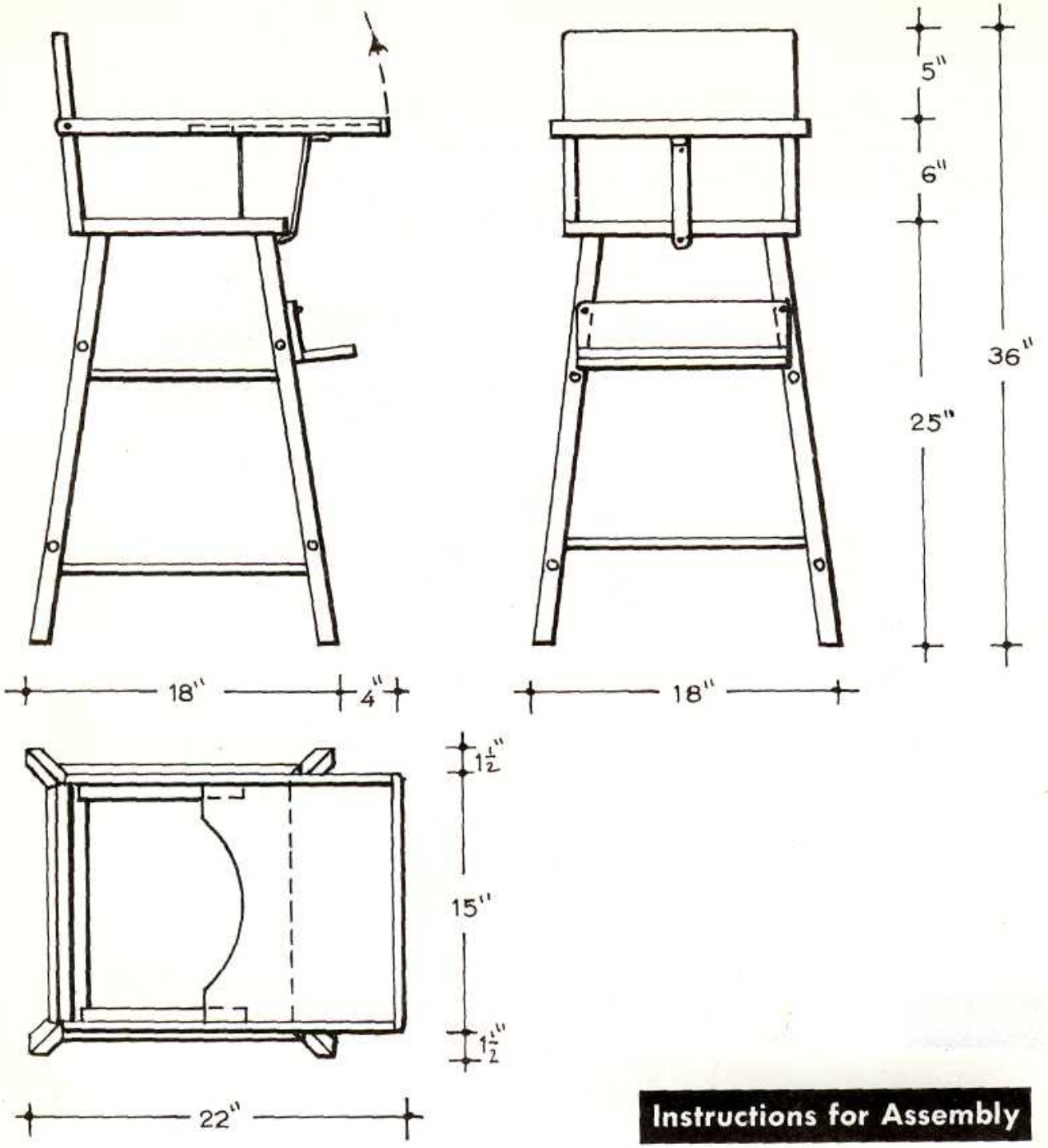
A broad base and sturdy construction make this model relatively tip-proof. Any kind of finish will do for the chair, but the tray should be enameled to take repeated washing and scrubbing. The time-honored high chair makes junior a joiner at the family table.



List of Materials

PART	NO.	FUNCTION	DIMENSION IN INCHES thickness	×	width	×	length
A	1	back	½		12		13½
B	1	seat	¾		12		13½
C	2	sides	½		5		10
D	4	legs	1¼		1¼		25
E	4	stretchers	⅝ diam.				16
F	4	stretchers	⅝ diam.				13
G	2	braces	½		1		19
H	1	strip	½		1		14½
J	1	panel	½		13½		12
K	1	support	½		4		13
L	1	support	¾		3		13
M	1	strip of leather					9

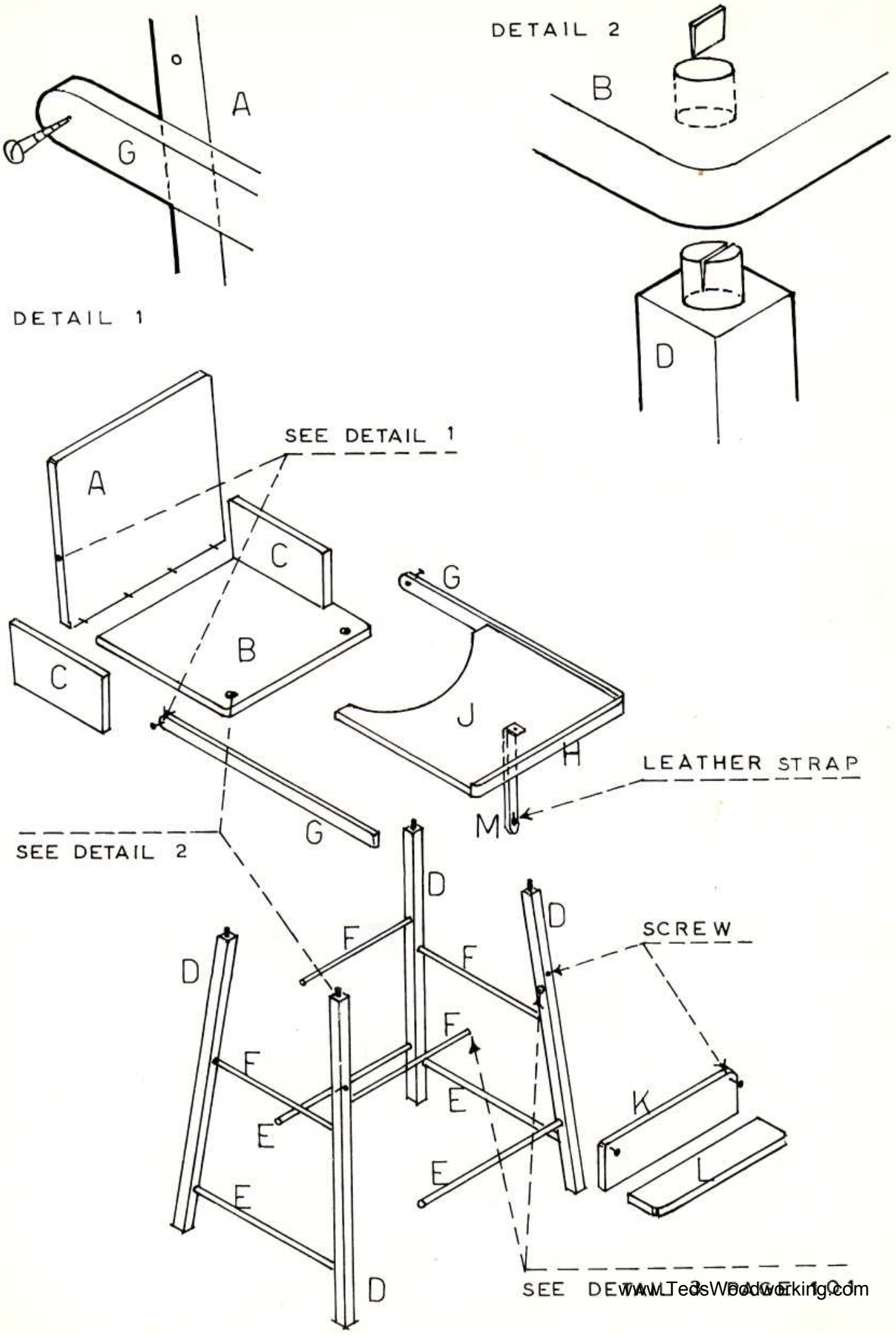
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Instructions for Assembly

1. Attach back (A) to seat (B) and to sides (C).
2. Join legs (D) to stretchers (E) and (F).
3. Fasten legs (D) to seat (B).
4. Join strips (G) and (H) to panel (J) and fasten braces (G) to back (A).
5. Join supports (K) and (L) together and fasten to legs (D) with screws.
6. Fasten wheels (M).
7. Apply finish.

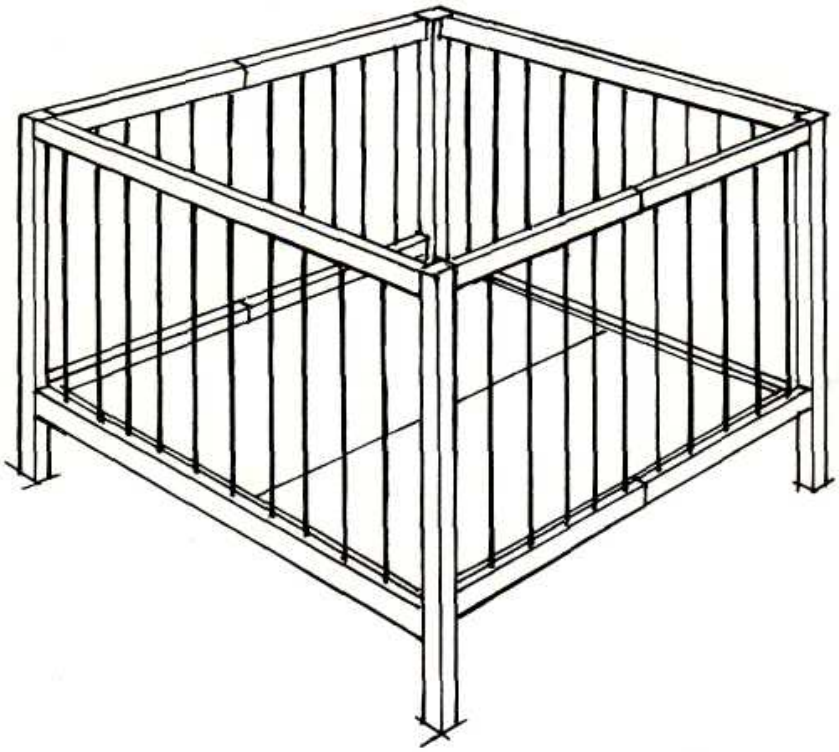
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1.5 PLAY PEN

This model folds flat for ready portability or storage. Correct placement of the hinges is important for proper folding, as indicated in the plan view. A very useful item if it is not too confining for an active child.



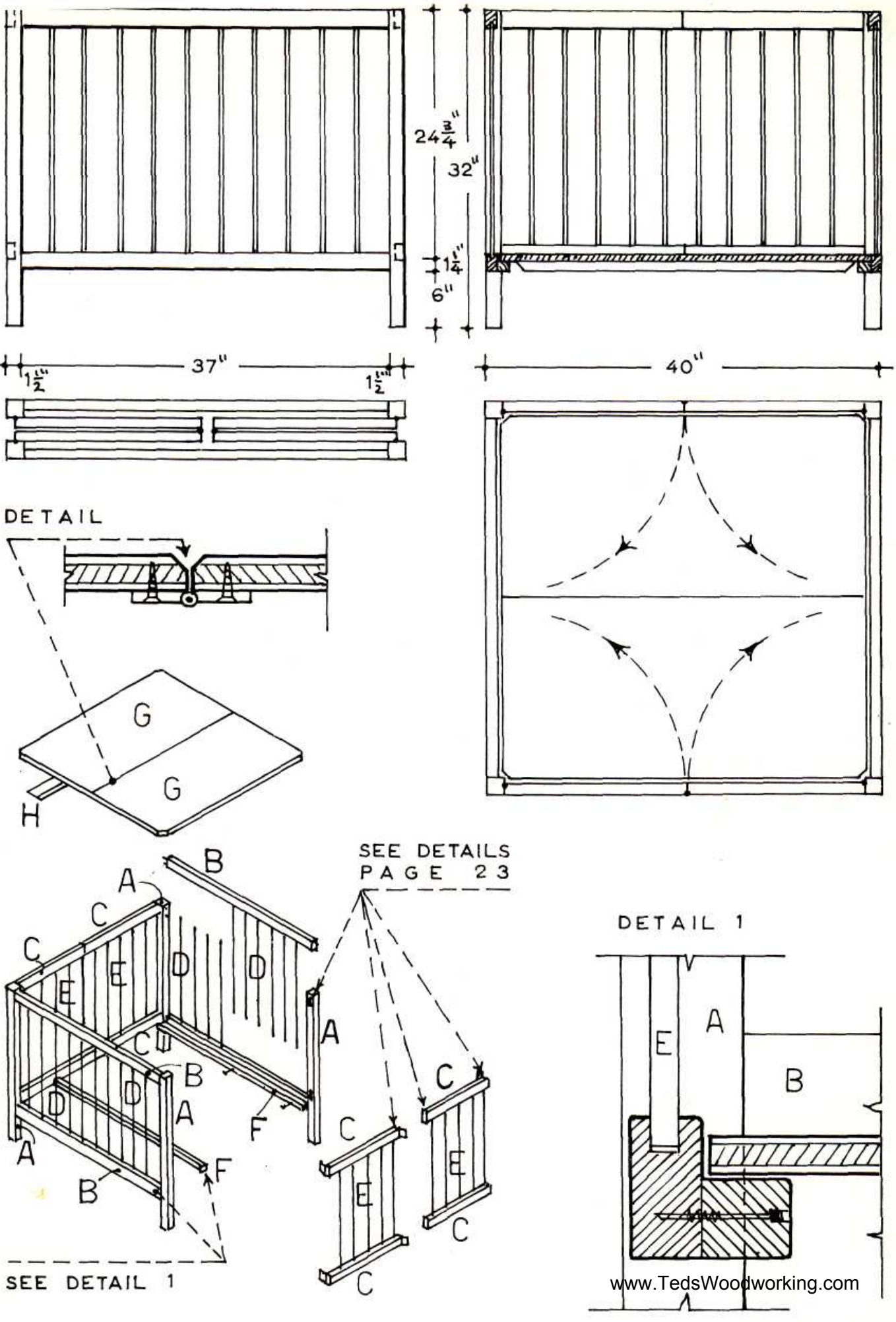
List of Materials

PART	NO.	FUNCTION	DIMENSION IN INCHES thickness × width × length		
A	4	legs	1½	1½	32
B	4	rails	1	1½	37
C	8	rails	1	1½	18½
D	20	dowels	½ diam.		25
E	20	dowels	½ diam.		24
F	2	cleats	⅞	1¼	37
G	2	plywood panels	⅜	19	38
H	2	cleats	¾	2	36

Instructions for Assembly

1. Insert dowels (D) in rails (B) and join rails with legs (A).
2. Fasten cleats (F) to rails (B).
3. Insert dowels (E) in rails (C).
4. Join rails (C) together and with legs (A), using hinges.
5. Join panels (G) together with hinge and attach cleats (H).
6. Apply finish.

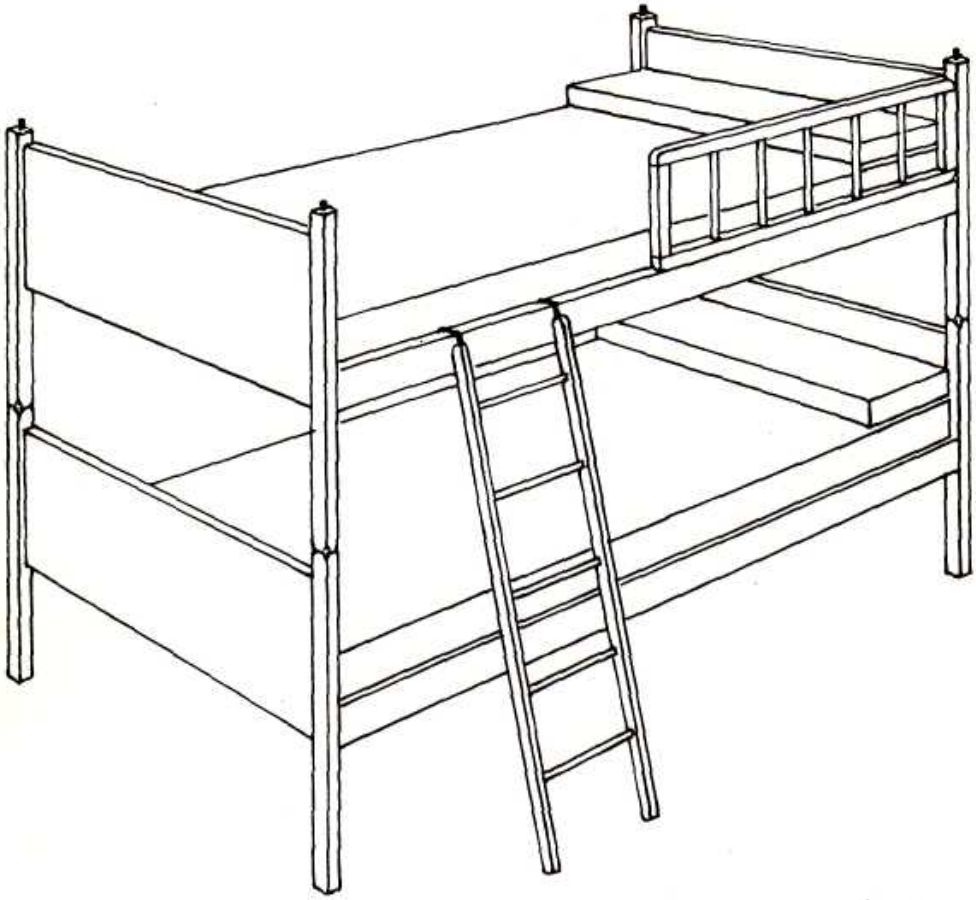
www.TedsWoodworking.com

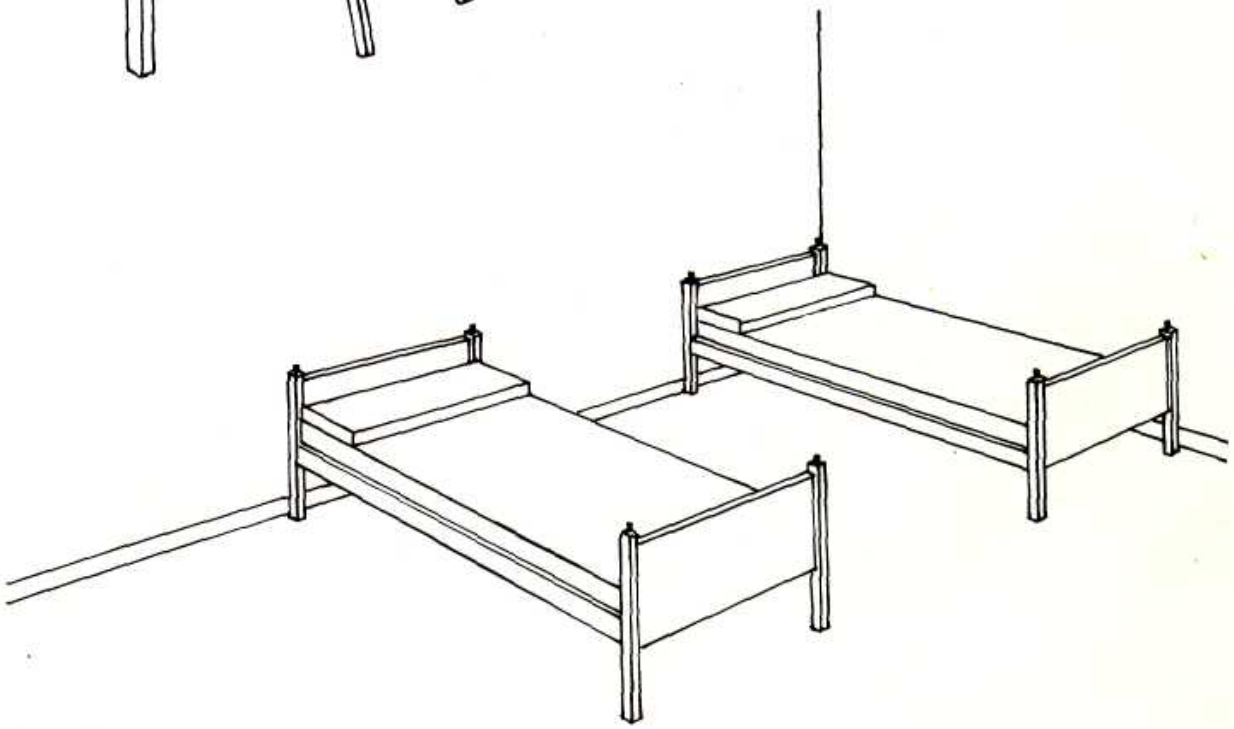


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2.1 STACKING BEDS

Also called "double-decker" beds or bunks, these can be stacked when the bedroom is small, or used as separate beds when the room is large. The projecting dowels in the bedposts should be rounded so that they can be exposed with safety. The guard rail should be placed at the head of the top bed, permitting a sense of adventure without undue danger.





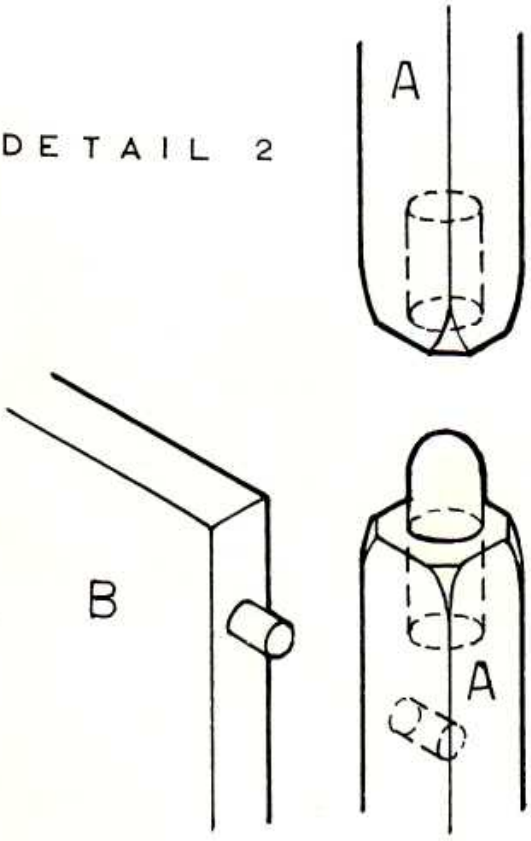
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List of Materials

PART	NO.	FUNCTION	DIMENSION IN INCHES thickness	×	width	×	length
A	4	legs	1¾		1¾		32
B	2	panels	¾		18		34½
C	2	side rails	1		5		75
D	2	cleats	1¼		1¼		75
E	2	cleats	1¼		1¼		34½
F	1	plywood panel	½		35½		76½
G	2	rails	¾		1¼		13
H	2	rails	¾		1¼		36
J	5	dowels	⅜ diam.				12
K	5	dowels	¾ diam.				12
L	2	ladder supports	1		1¼		51
M	2	metal catch for ladder					
O	2	rails	¾		2		36½

(for ladder storage in bottom bed)

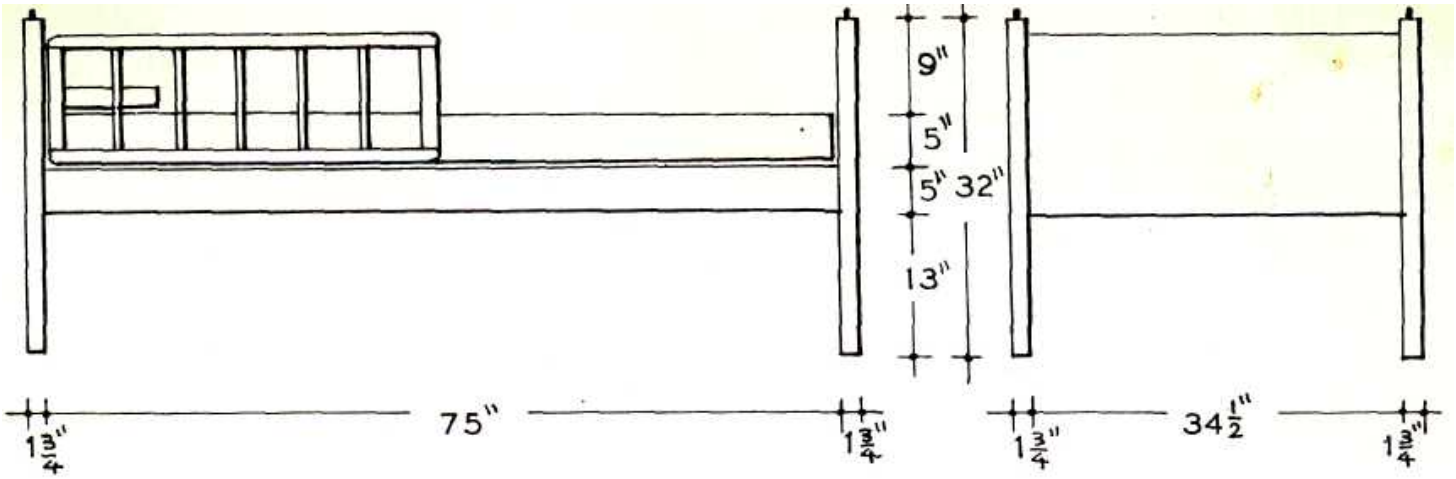
DETAIL 2



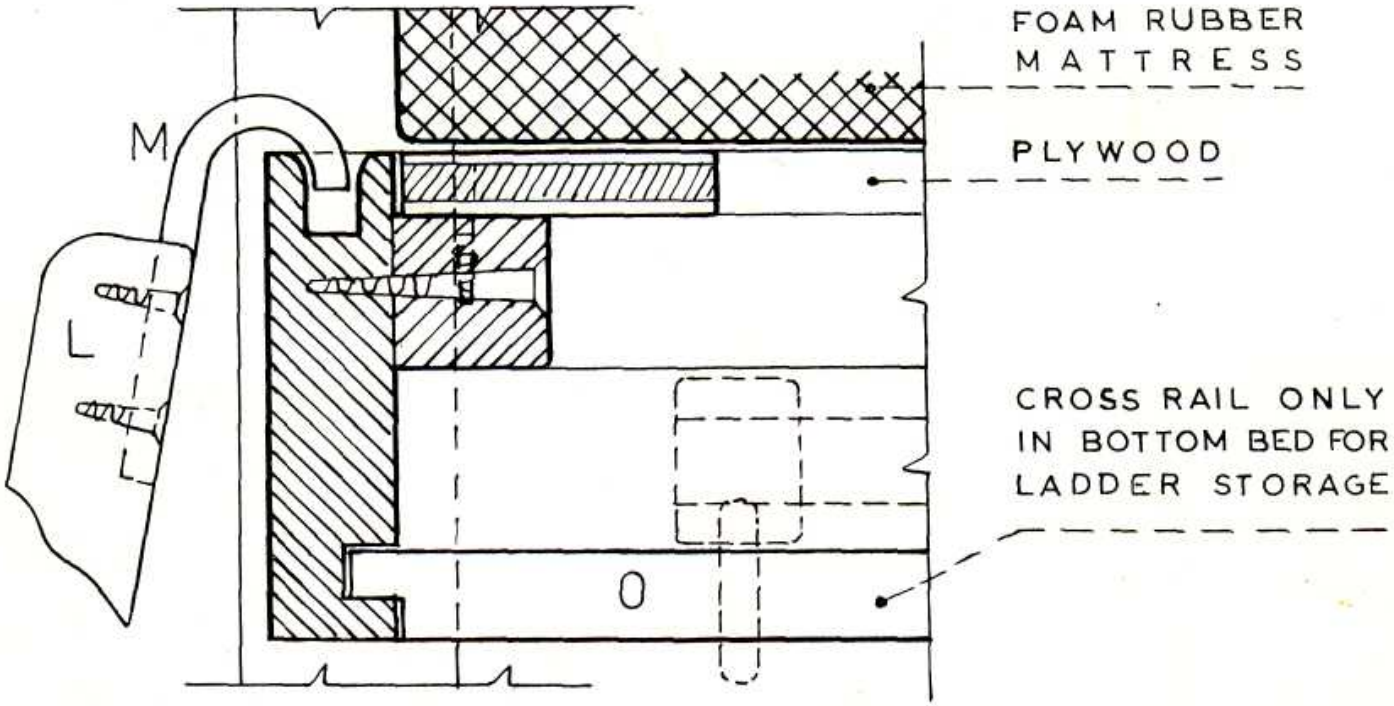
Instructions for Assembly

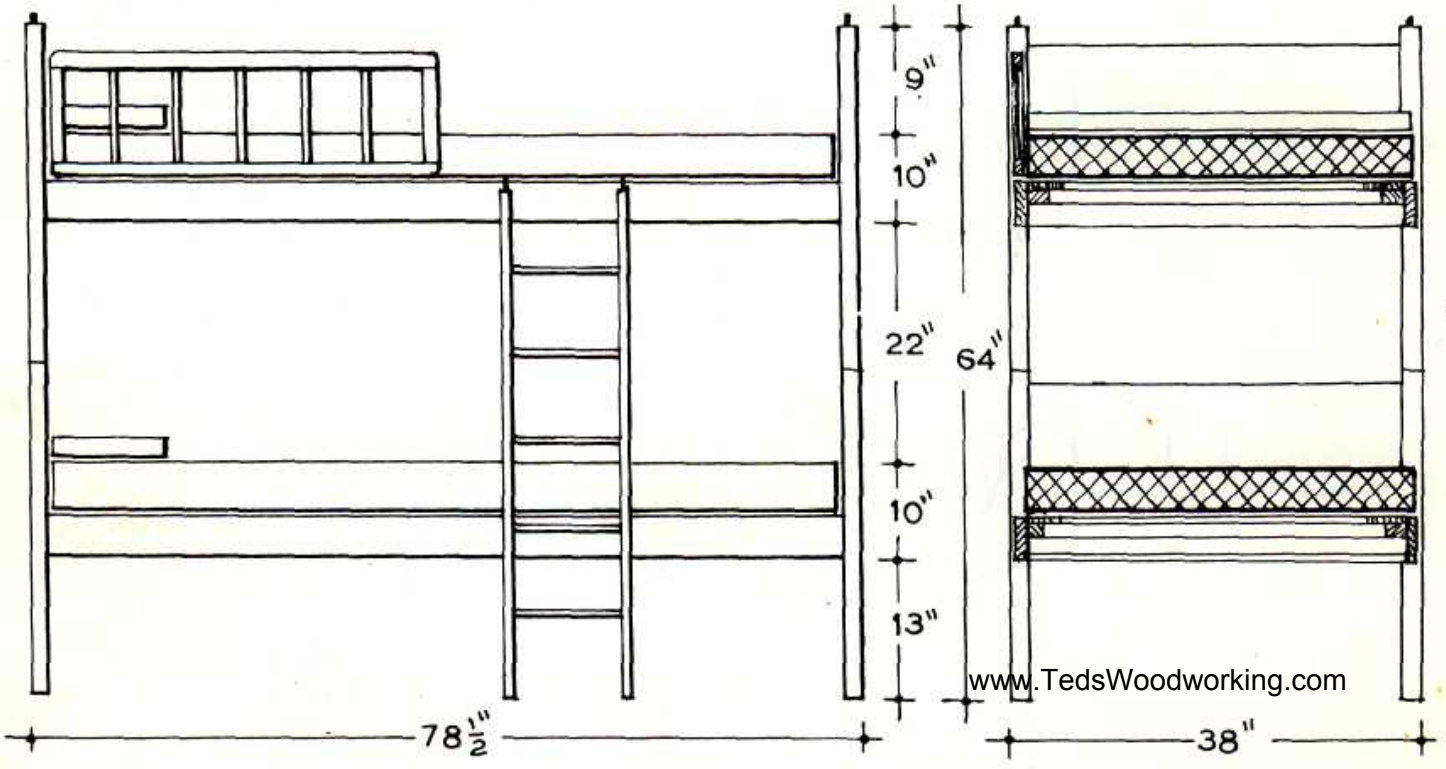
1. Join legs (A) with panel (B).
2. Attach cleats (D) and (E) to rail (C) and panel (B).
3. Insert side (C) in leg (A) and add rail (O) on bottom bed.
4. Insert dowels (J) in rail (H) and attach rails (G).
5. Join dowels (K) to ladder supports (L) and attach metal catch (M).
6. Apply finish.
7. Insert panel (F) and mattress.
8. Place top bed over lower bed and see that dowels on bedposts fit properly.

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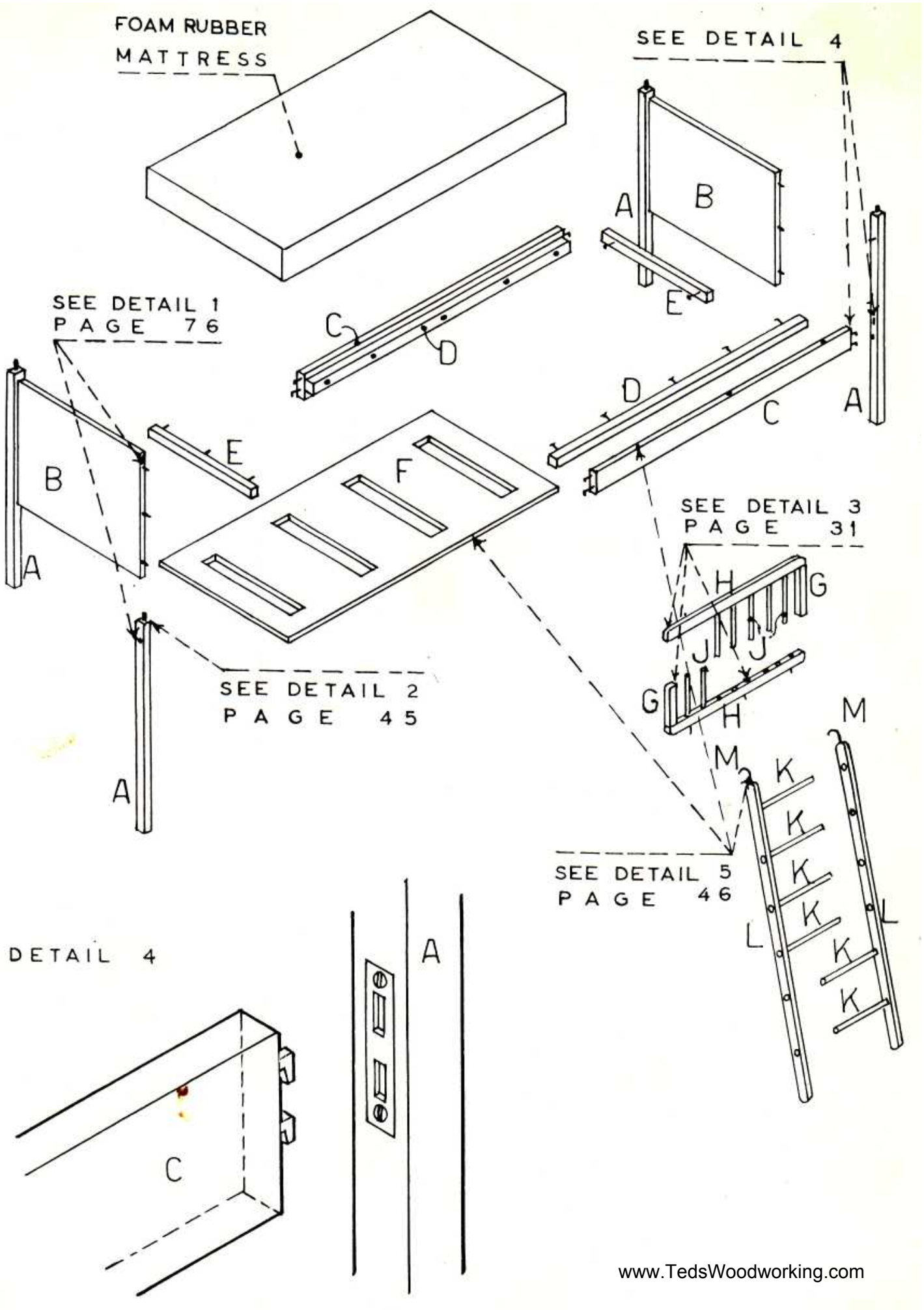


DETAIL 5





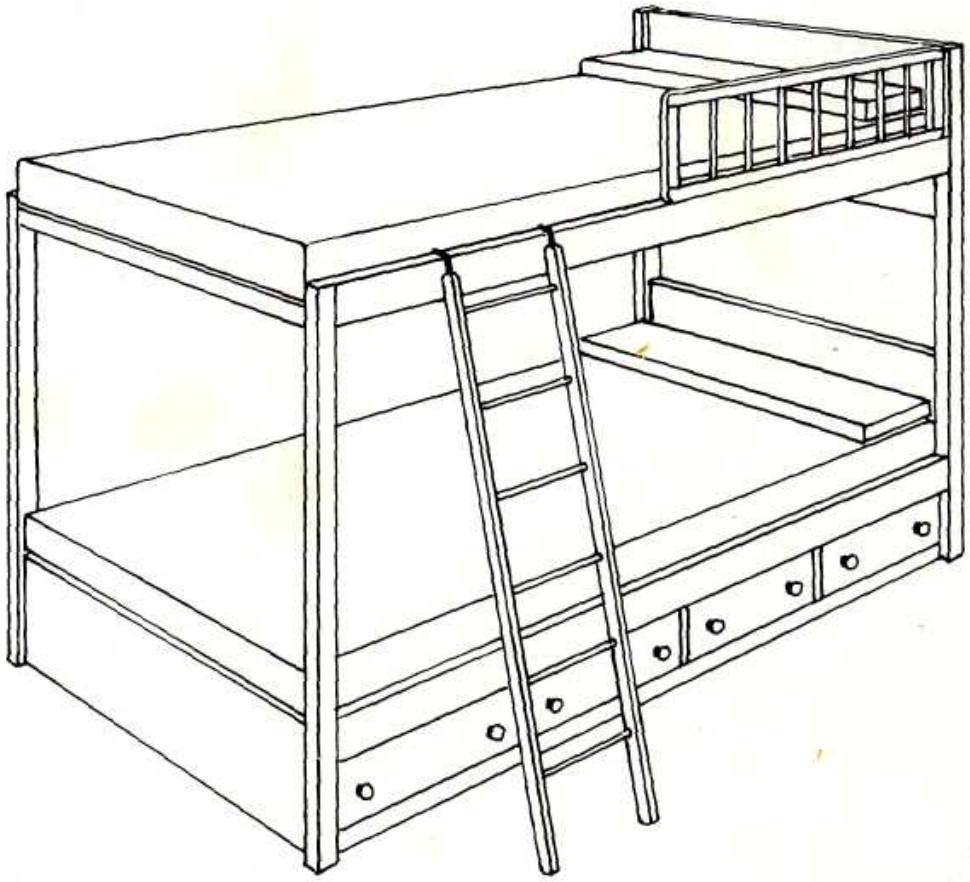
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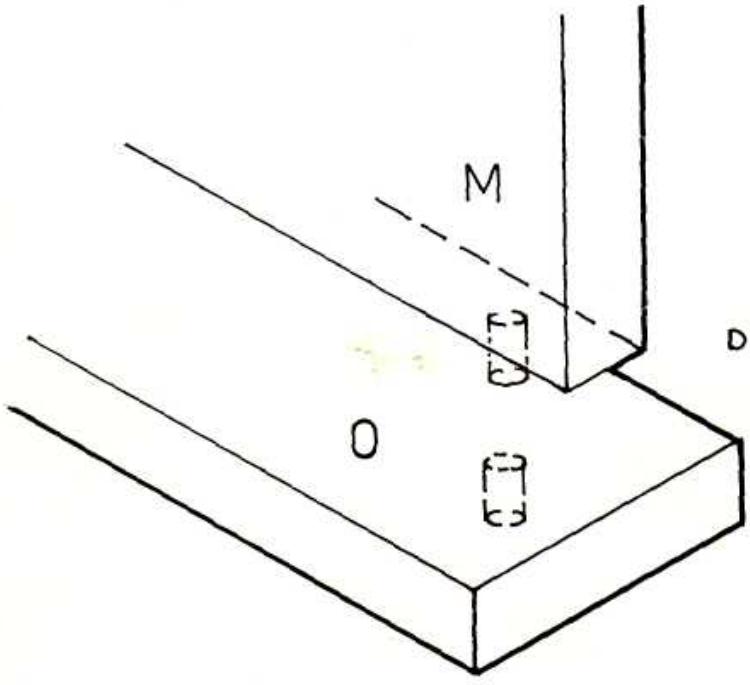


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2.2 BUILT-IN DOUBLE DECKER with storage units

No dust under the beds with this neat, space-saving arrangement, and the four drawers provide ample stowage for toys, spare blankets or pajamas. This project requires some degree of craftsmanship and patience, but will provide enormous satisfaction for the whole family. As in Project 2.1, the guard rail should be at the pillow end of the top bed.





DETAIL 1

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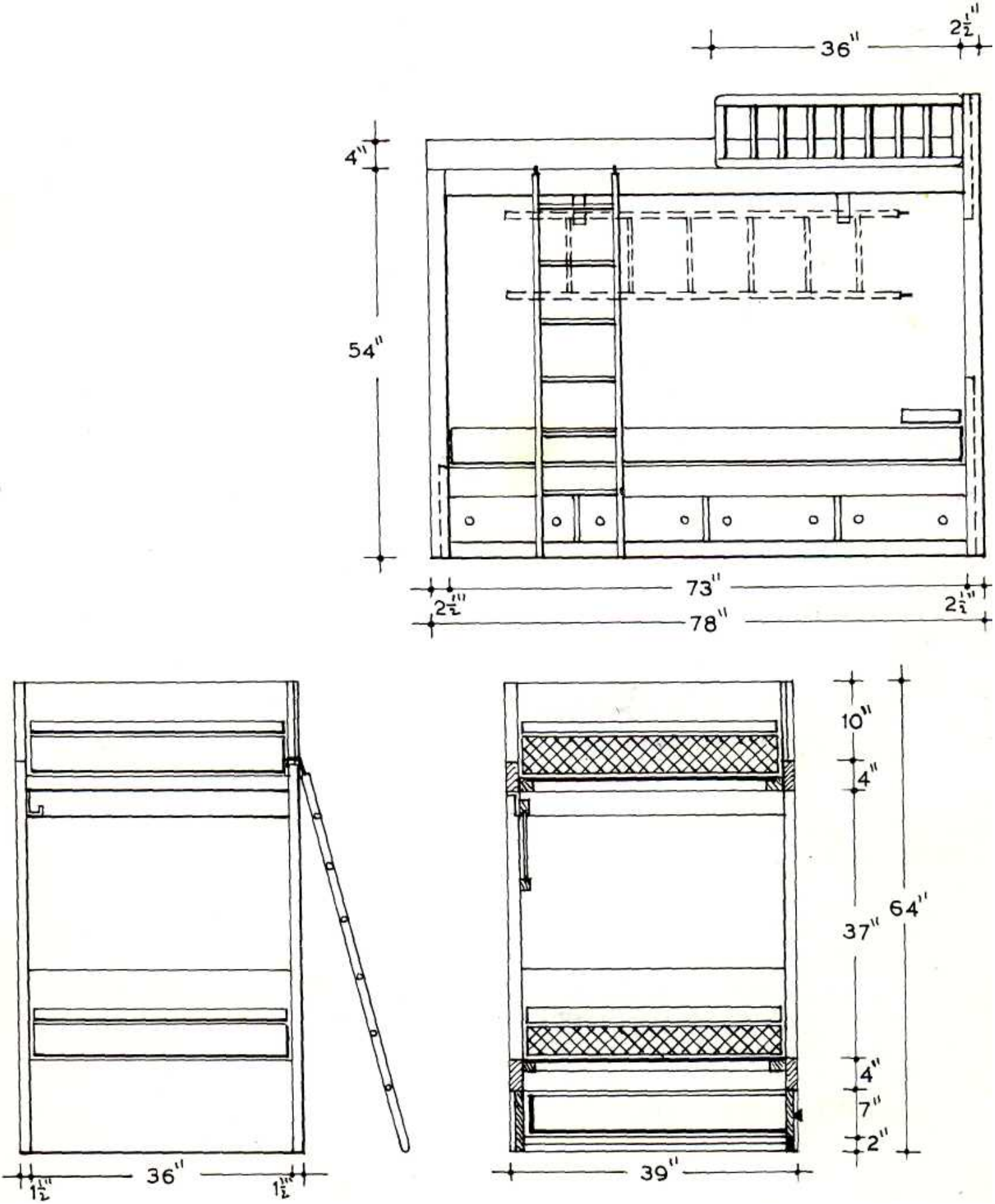
List of Materials

PART	NO.	FUNCTION	DIMENSION IN INCHES thickness	×	width	×	length
A	2	supports	1½		2½		64
B	2	supports	1½		2½		54
C	4	rails	1½		4		73
D	1	headboard	¾		17		36
E	1	headboard	¾		24		36
F	1	rail	1½		2½		36
G	1	panel	¾		13		36
H	4	cleats	1¼		1½		75
J	3	cleats	1¼		1½		33½
K	1	back	¾		9		73
L	1	plywood panel	⅜		36		73
M	3	partitions	1		8		37
O	5	drawer slides	¾		3		36½
P	1	toeplate	1		2		73
Q	2	rails	¾		1¼		36
R	2	rails	¾		1¼		9½
S	7	dowels	⅜ diam.				8½
T	2	rails	1		1½		55
U	6	dowels	⅞ diam.				12
V	4	drawer fronts	¾		7		17½
W	8	drawer sides	½		7		36¾
X	4	drawer backs	½		6½		16½
Y	4	drawer bottoms	¼		17		36½
Z	50 ft	rubber straps	2″ wide				

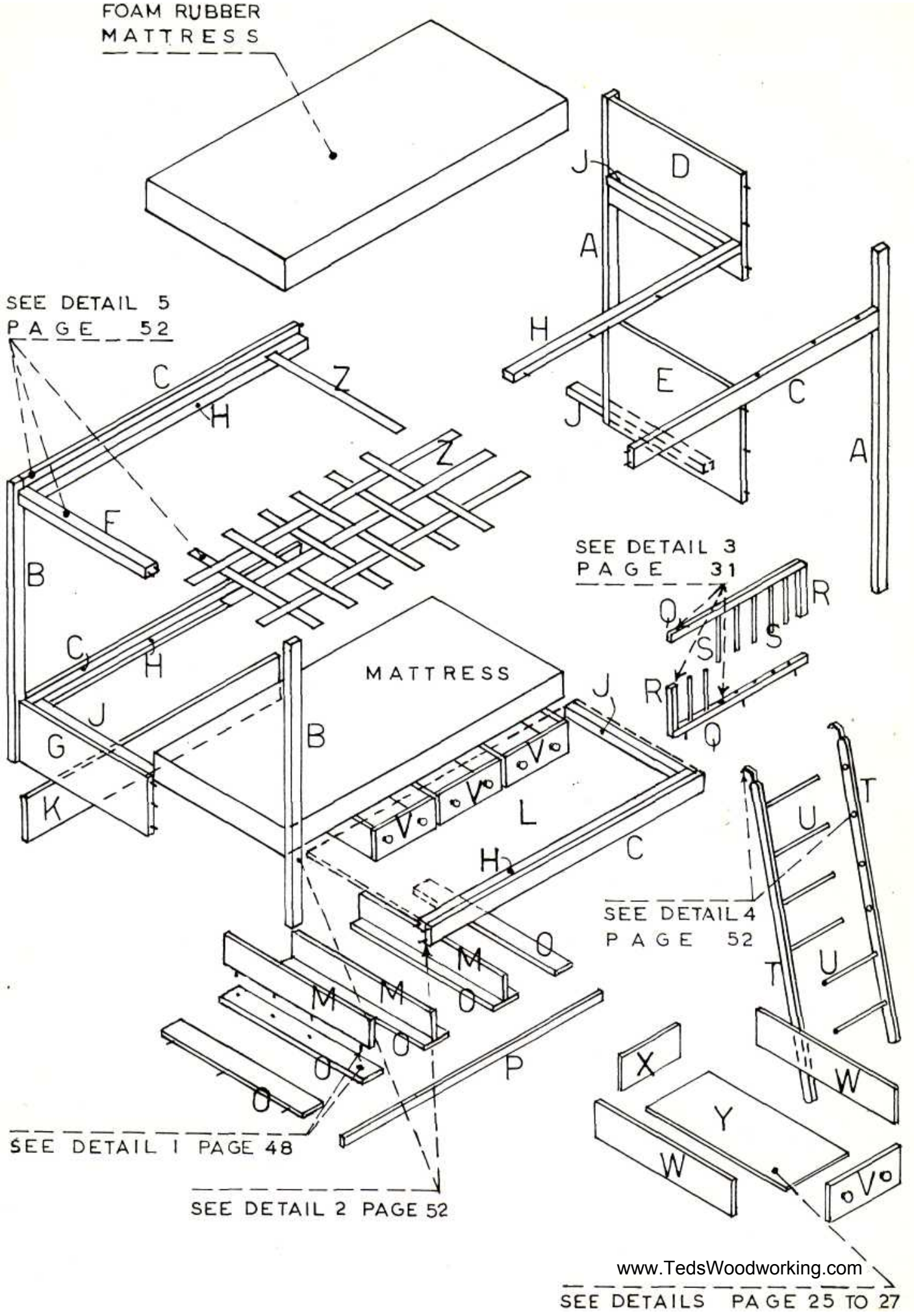
Instructions for Assembly

1. Join supports (A) with headboards (D) and (E) and supports (B) with rail (F) and panel (G).
2. Fasten supports (A) and (B) with rails (C), back (K) and toeplate (P).
3. Attach partition (M) to drawer slides (O) and fasten to rails (C), back (K) and toeplate (P).
4. Attach cleats (H) to rail (C) and cleats (J) to headboards (D) and (E) and to panel (G).
5. Install plywood panel (L) and rubber strap (Z) as shown in detail drawing.
6. Insert dowels (S) in rails (Q) and attach rails (R).
7. Join sides of drawers (W) to front (V) and back (X); install bottoms (Y).
8. Join dowels (U) with ladder supports (T).
9. Apply finish.

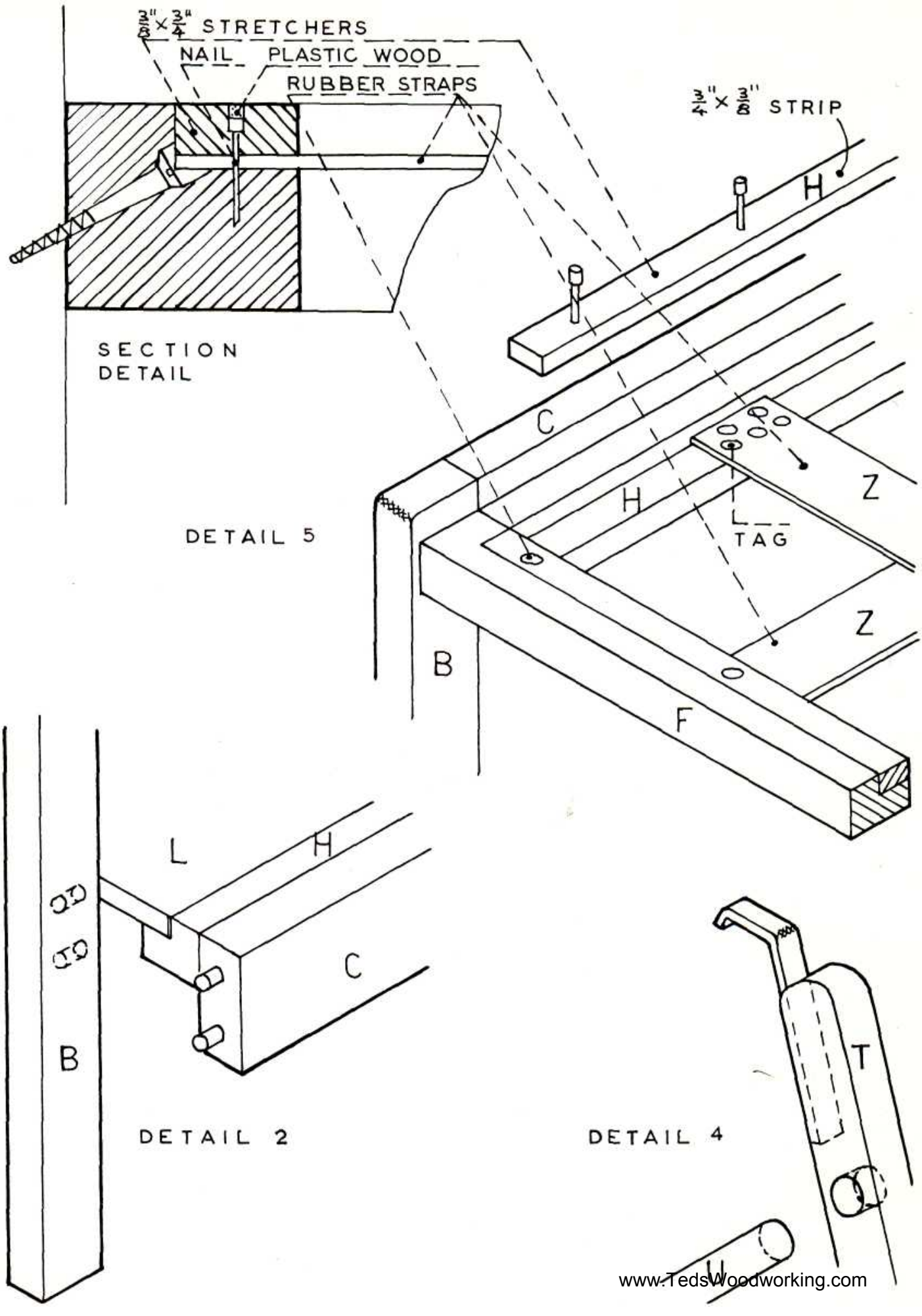
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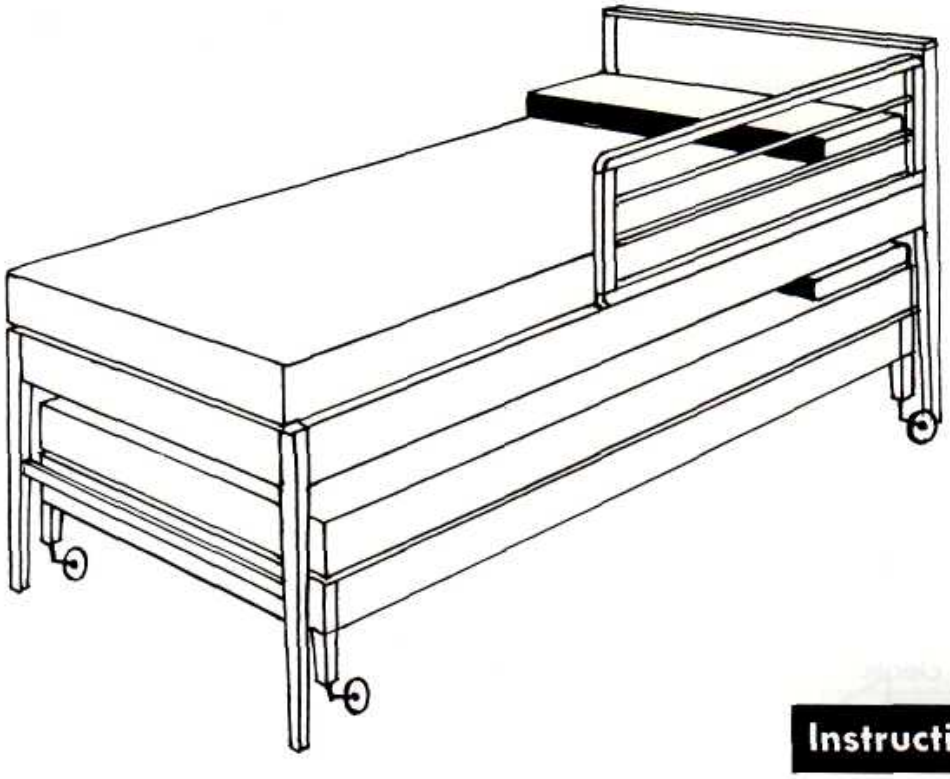
www.TedsWoodworking.com

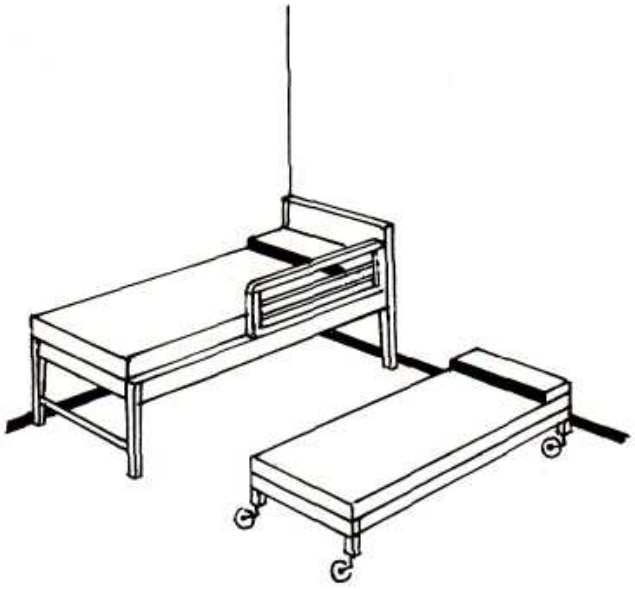


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2.3 TRUNDLE BED

A modern version of the classic bedroom space-saver. The legs of the main or upper bed can be made shorter if desired, provided the trundle bed is not made up with pillow. This is a highly practical solution when the bedroom is small and play space is scarce.





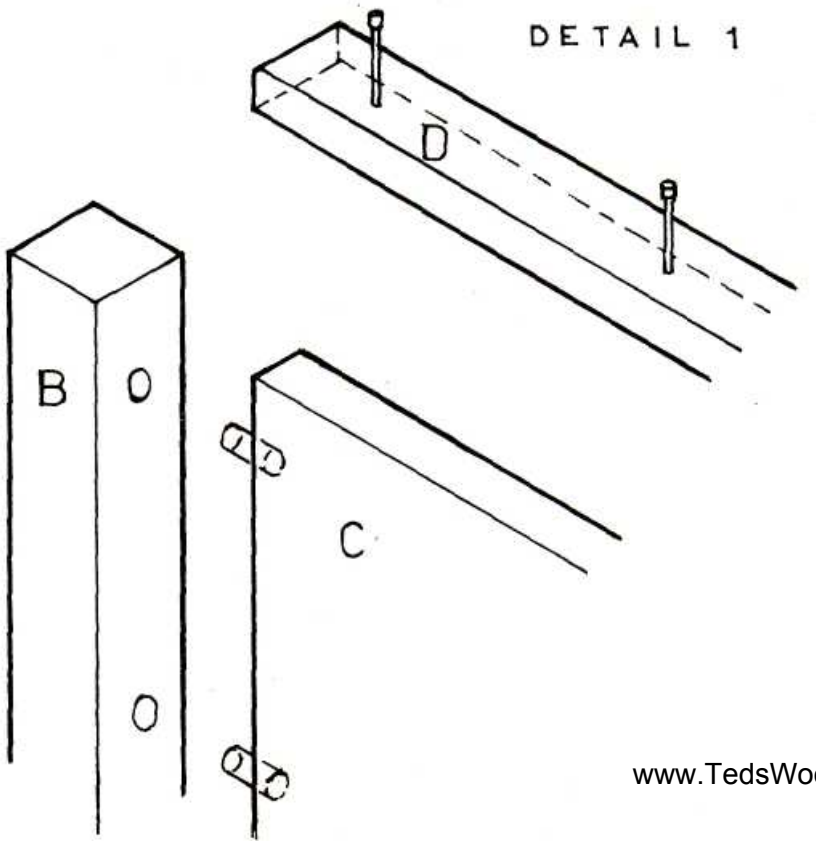
Instructions for Assembly

1. Join legs (A) with rails (E) and (F), and legs (B) with headboard (C).
2. Fasten side rails (G) to legs (A) and (B).
3. Attach strip (D) and cleats (H, J) to headboard (C) and rails (E) and (G).
4. Proceed in same manner for lower bed.
5. Fasten rubber straps to cleats (H, J and R) with tags and cover the straps with strips (K, L and S) as indicated in detail drawing.
6. Insert stretchers (N) in rails (O) and attach rails (M).
7. Apply finish and insert casters in trundle bed.

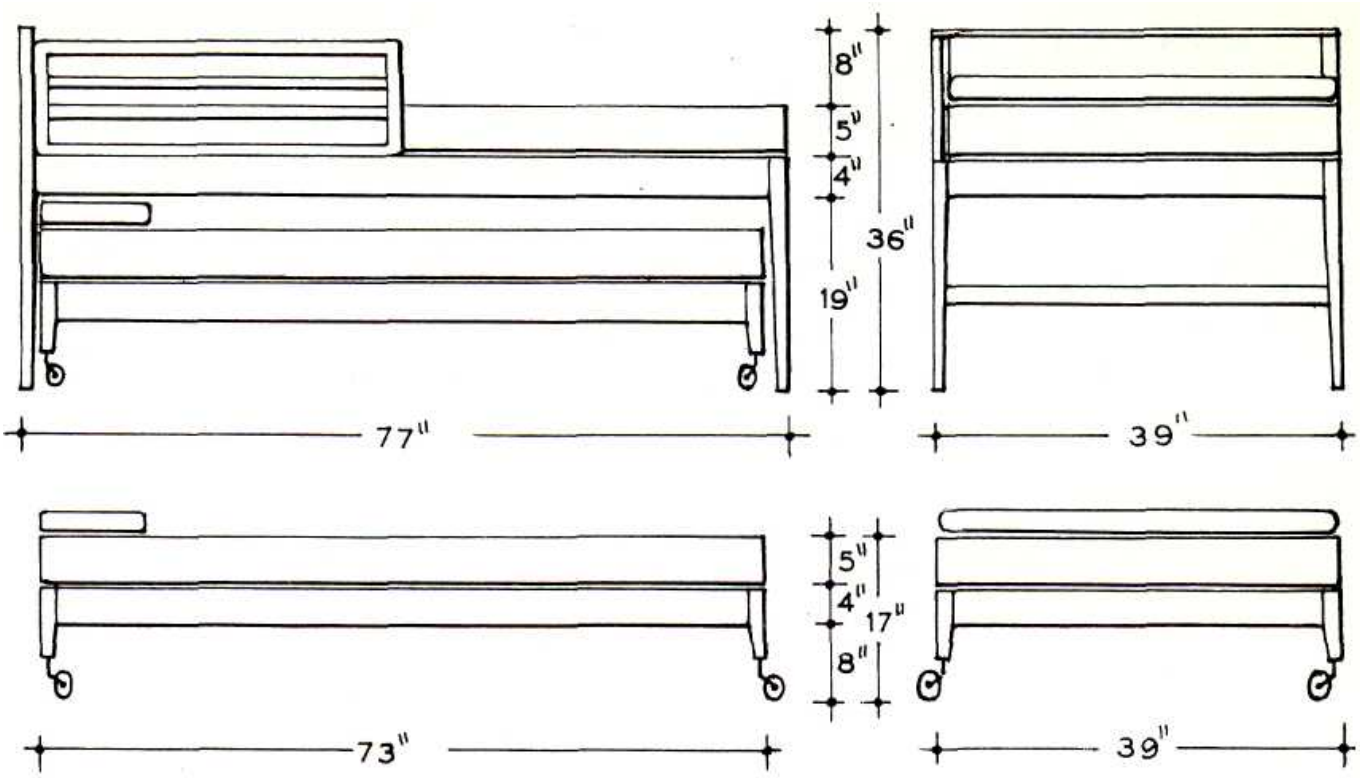
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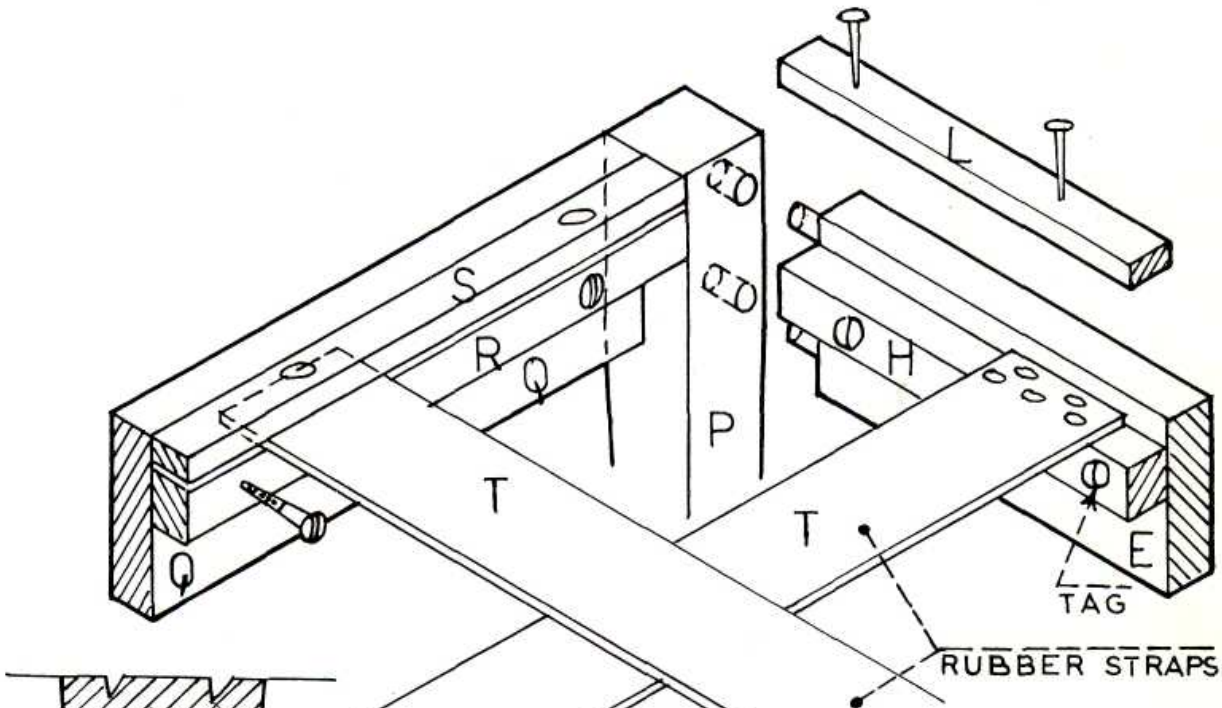
List of Materials

PART	NO.	FUNCTION	DIMENSION IN INCHES thickness	×	width	×	length
A	2	legs	1½		1½		23
B	2	legs	1½		1½		36
C	1	headboard	¾		16½		36
D	1	strip	½		1½		39
E	3	rails	1		4		36
F	2	rails	¾		1¼		38
G	2	side rails	1		4		74
H	4	cleats	¾		¾		37
J	2	cleats	¾		¾		75
K	2	strips	⅜		¾		75
L	4	strips	⅜		¾		37
M	2	rails	¾		1¼		36
N	2	stretchers	⅜		1		35
O	2	rails	¾		1¼		12½
P	4	legs	1½		1½		10
Q	2	side rails	1		4		70
R	2	cleats	¾		¾		71
S	2	strips	⅜		¾		71
T	100 ft	rubber straps	2″ wide				

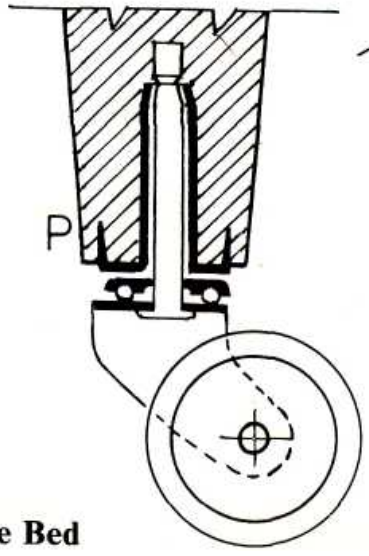


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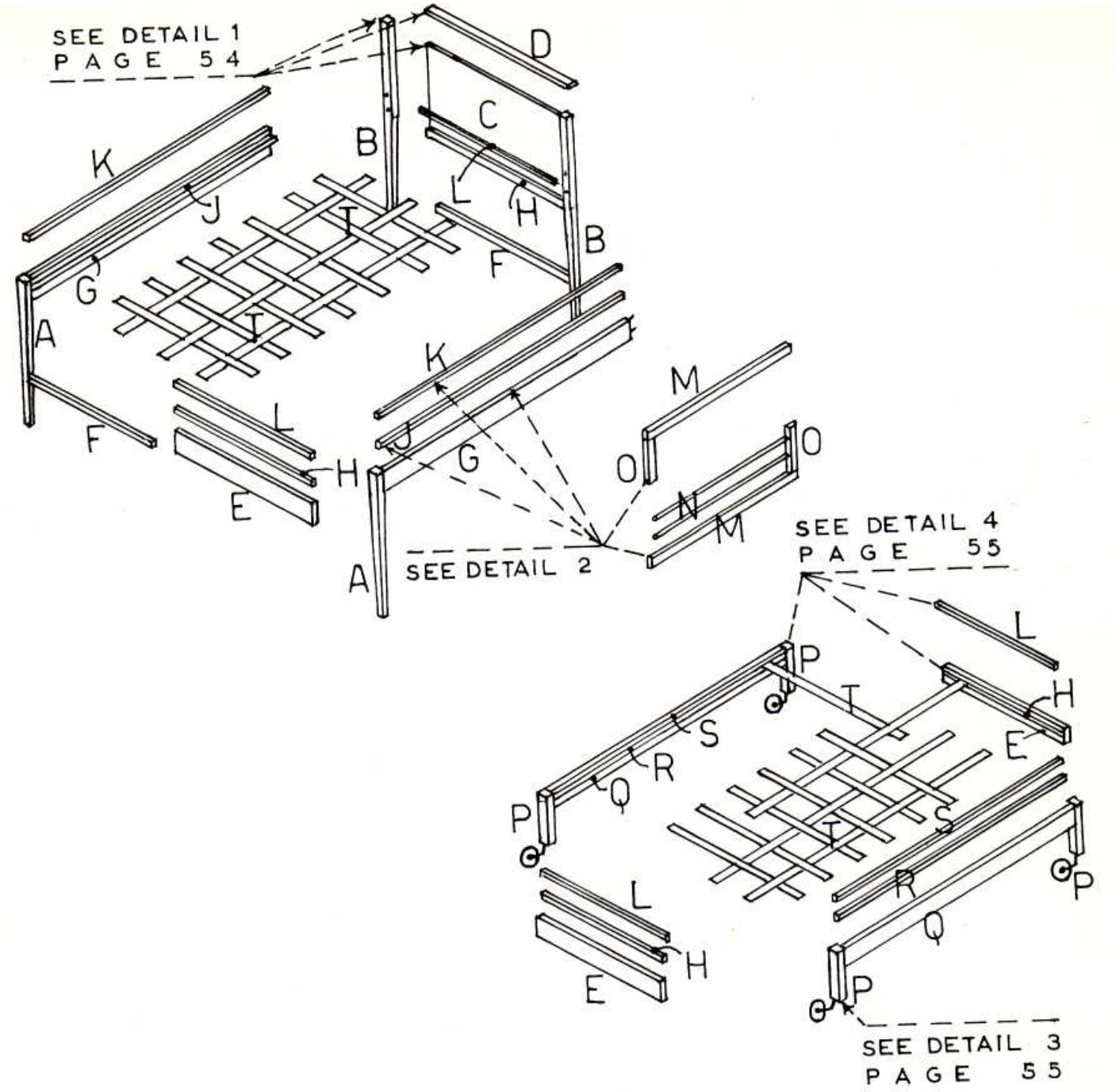


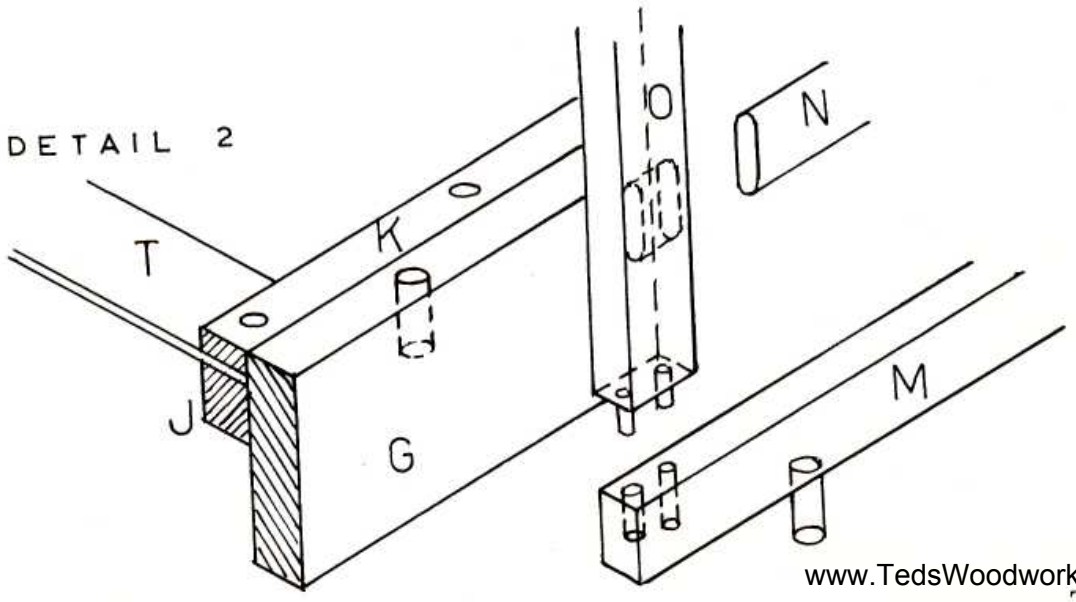
DETAIL 4



DETAIL 3

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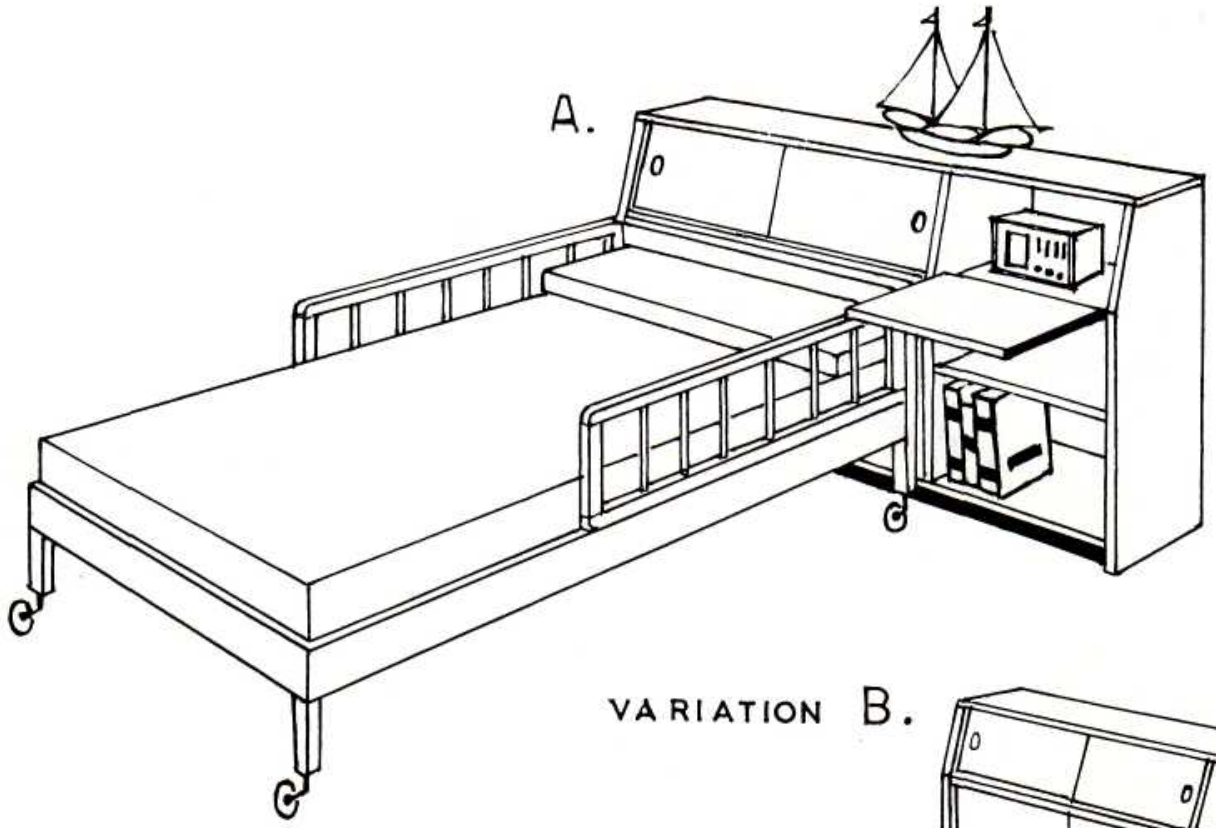


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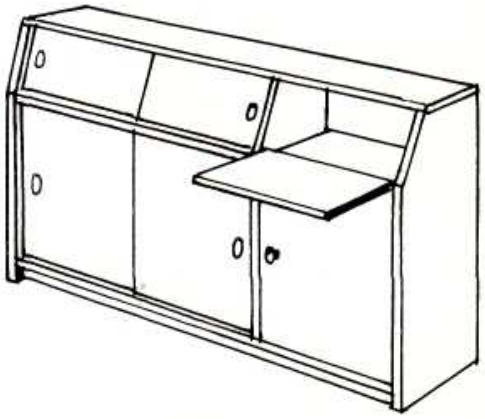
Trundle Bed

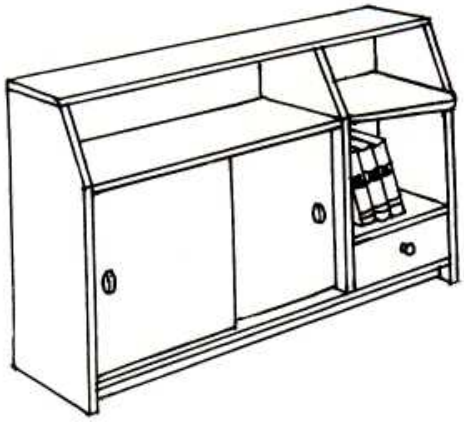
2.4 JUNIOR BED WITH HEADBOARD

An interesting and practical piece that provides desk and storage space without being cumbersome. The bed matches any one of the four designs of headboard. In variations A and B the angle of the sliding doors permits a shut-in to be supported by pillows while reading or drawing.



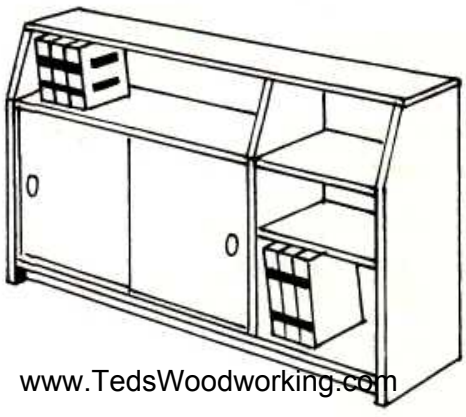
VARIATION B.



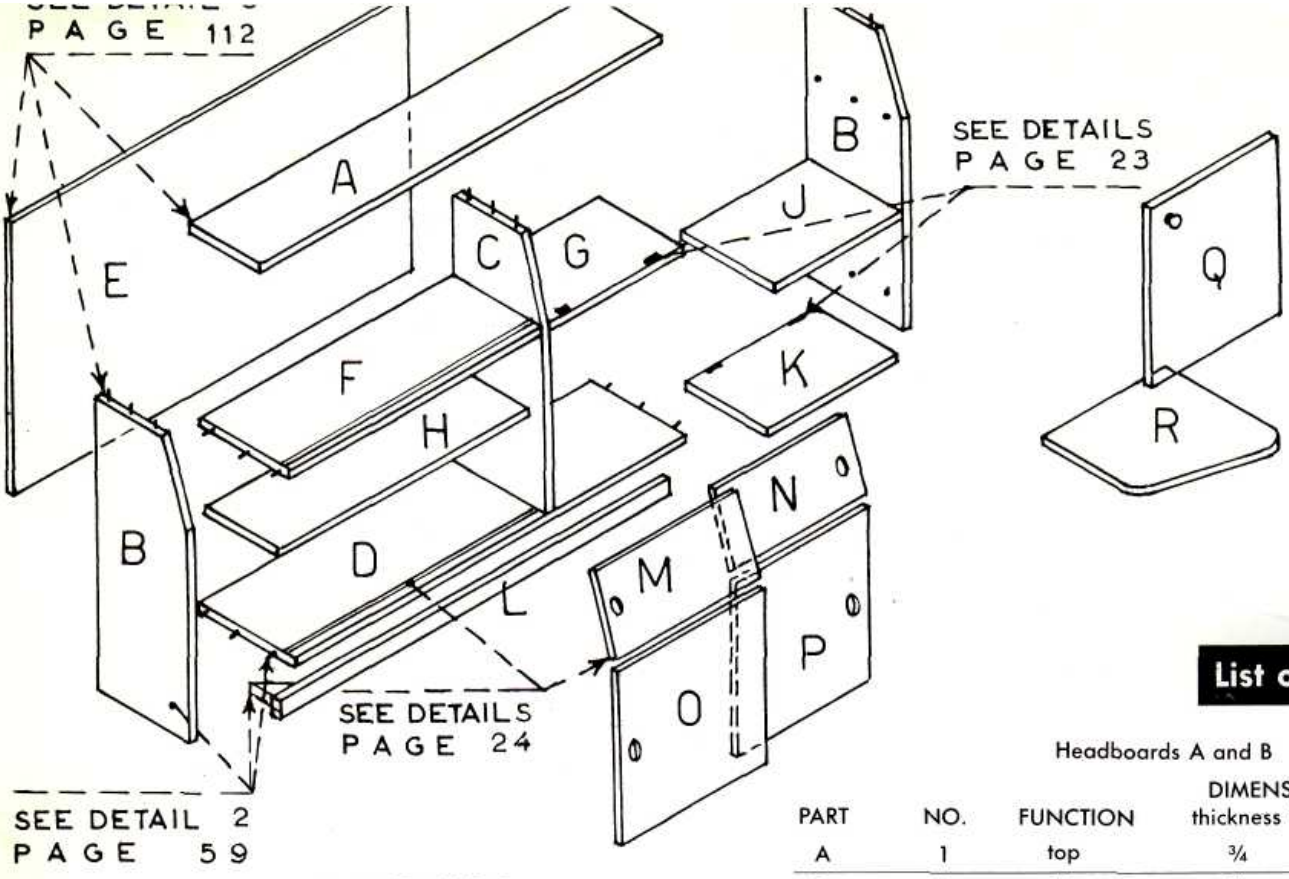


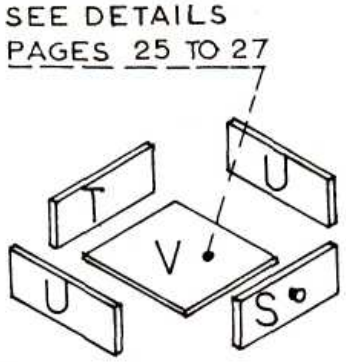
VARIATION C.

VARIATION D.



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List of Materials

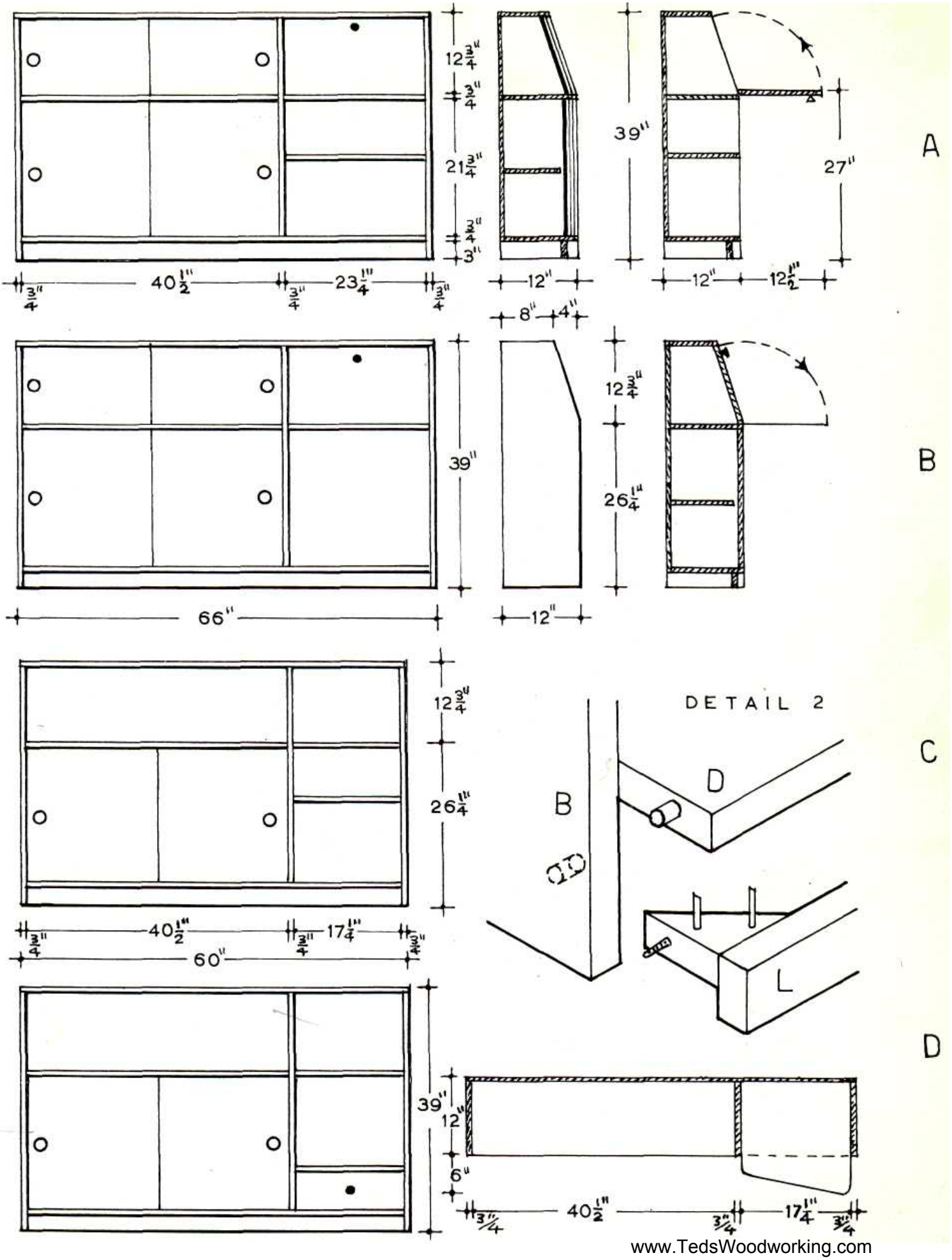
Headboards A and B

PART	NO.	FUNCTION	DIMENSION IN INCHES thickness × width × length		
A	1	top	¾	8¼	66
B	2	sides	¾	12	38¼
C	1	partition	¾	11¾	34½
D	1	bottom	¾	12	64½
E	1	back	¼	35½	65½
F	1	shelf	¾	11¾	40½
G	1	shelf	¾	11¾	23¼
H	1	shelf	¾	10	40½
J	1	shelf	½	11¾	23¼
K	1	door	¾	13	23¼
L	1	toeplate	¾	3	64½
M	1	door	¼	13¼	20¼
N	1	door	¼	13¼	21¼
O	1	door	¼	22¼	20¼
P	1	door	¼	22¼	21¼
Variation for Headboard B					
Q	1	door	¾	23¼	21¾
Also reduce shelf (J) above to 10 in. width.					
Headboards C and D					
Reduce length by 6 in.; eliminate all top doors. Shelves G and J are 17¼ in. in length.					
Variation for Headboard C					
R	1	shelf	¾	17¼	18
S	1	drawer front	¾	6	17¼
T	1	drawer back	½	5½	16¼
U	2	drawer sides	½	6	11⅜
V	1	drawer bottom	¼	16¾	11¼

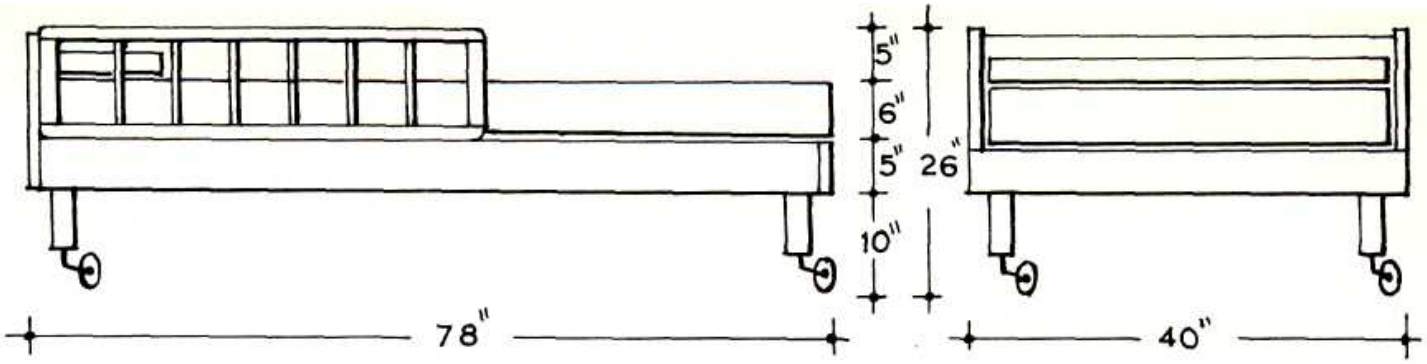
Instructions for Assembly

1. Join bottom (D) and shelves (F) and (G) with partition (C) and side (B).
2. Attach top (A) and back (E).
3. Fasten toeplate (L) and door (K).
4. Install shelves (H) and (J) and add doors (M, N, O and P).
5. Apply finish.
6. If variations are used, add door (Q); build drawer and join side (U) with front and backs (S) and (T), and install drawer bottom (V).

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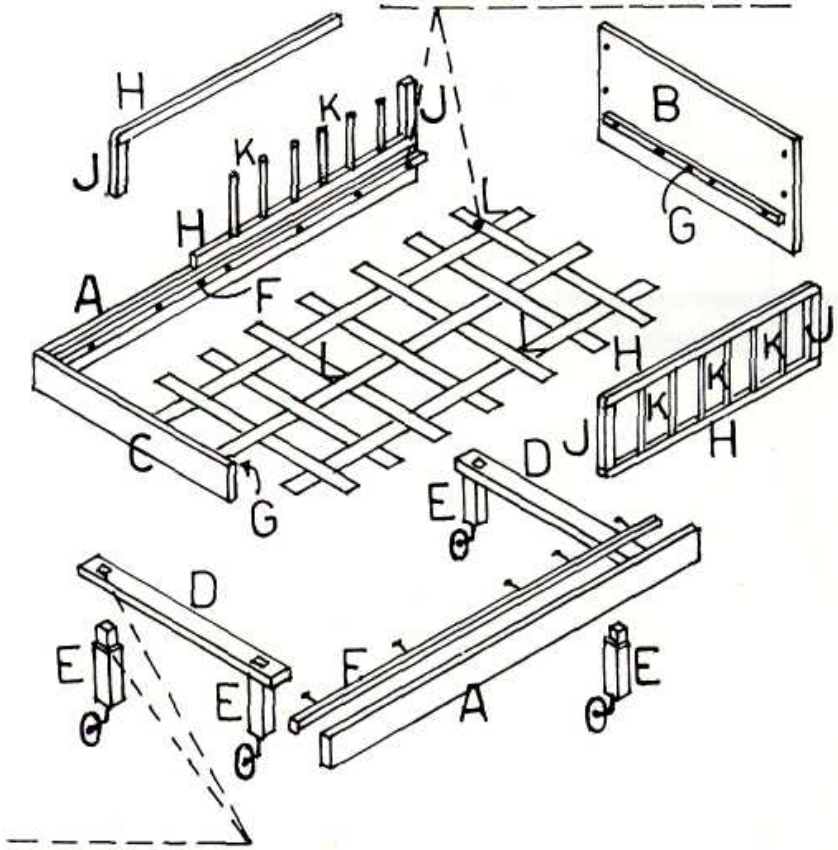
www.TedsWoodworking.com



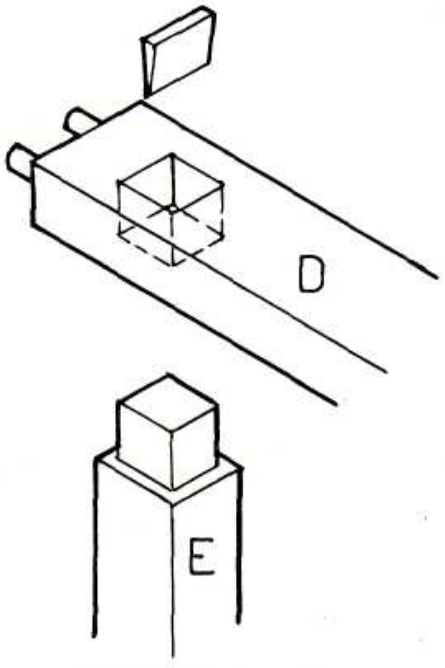
SEE DETAIL 4 PAGE 55

Instructions for Assembly

1. Join crossrails (D) with legs (E).
2. Fasten side rail (A) to rails (D) and (C) and headboard (B).
3. Attach strips (F) and (G) to rails (A) and (C) and headboard (B).
4. Insert dowels in rails (H) and attach rails (J).
5. Fasten rubber strip (L) to strips (F) and (G).
6. Apply finish.
7. Insert casters, install mattress and side protection.



SEE DETAIL 1



DETAIL 1

List of Materials

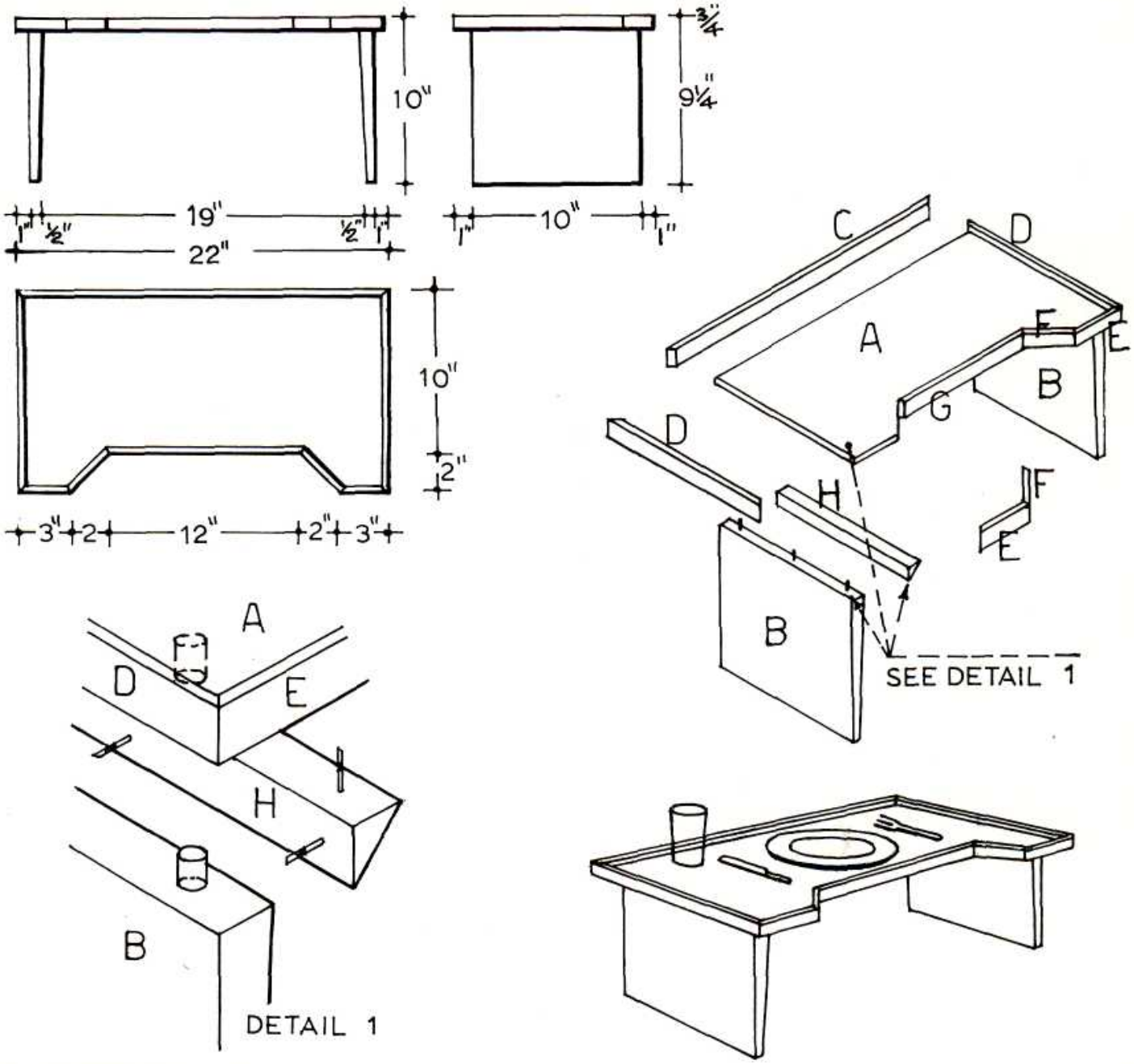
BED

PART	NO.	FUNCTION	DIMENSION IN INCHES thickness × width × length		
A	2	side rails	1	5	76
B	1	board	¾	15	40
C	1	rail	1	5	40
D	2	rails	1	2	38
E	4	legs	1⅜	1⅜	8
F	2	strips	¾	1	76
G	2	strips	¾	1¼	36
H	4	rails	¾	1¼	42
J	4	rails	¾	1¼	11
K	12	dowels	⅜ diam.		10
L	50	rubber strips	2″ wide		

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2.5 TRAY

This is more than just an ordinary tray; it can be placed on the floor, thus eliminating the need for a table, and it is particularly adaptable for outdoor use.



List of Materials

A	1	top	½	11½	21½
B	2	supports	1	9¼	10
C	1	strip	¼	¾	22
D	2	strips	¼	¾	12
E	2	strips	¼	¾	3
F	2	strips	¼	¾	3½
G	1	strip	¼	¾	12½
H	2	corner strips	1	1	9

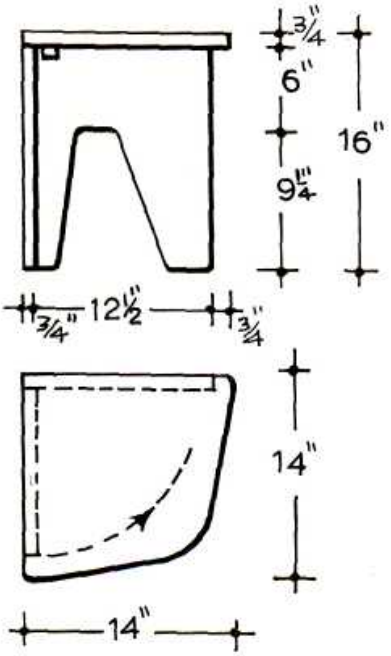
Instructions for Assembly

1. Join top (A) with strips (C, D, E, F, G).
2. Attach supports (B) to top (A) and [illegible] strips (H).
3. Apply finish.

www.FreeWoodworkingPlans.com

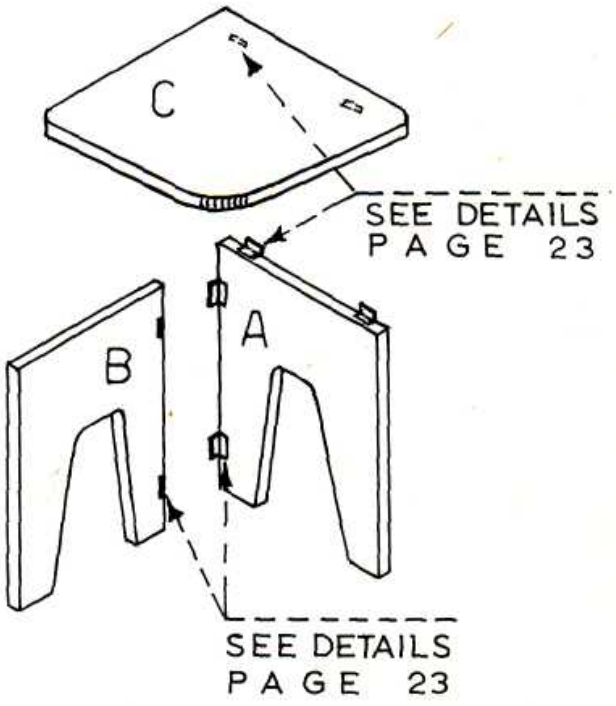
2.6 FOLDING STOOL

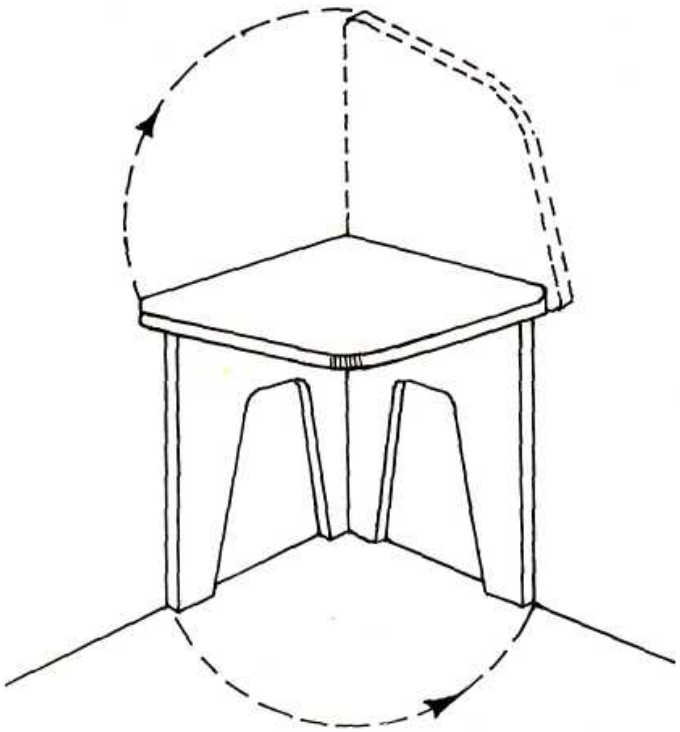
Designed for use by young children, this stool is not only very practical, but it may prevent accidents in the bath as well.



List of Materials

A	1	side	¾	13¼	15¼
B	1	side	¾	12½	15¼
C	1	top	¾	14	14





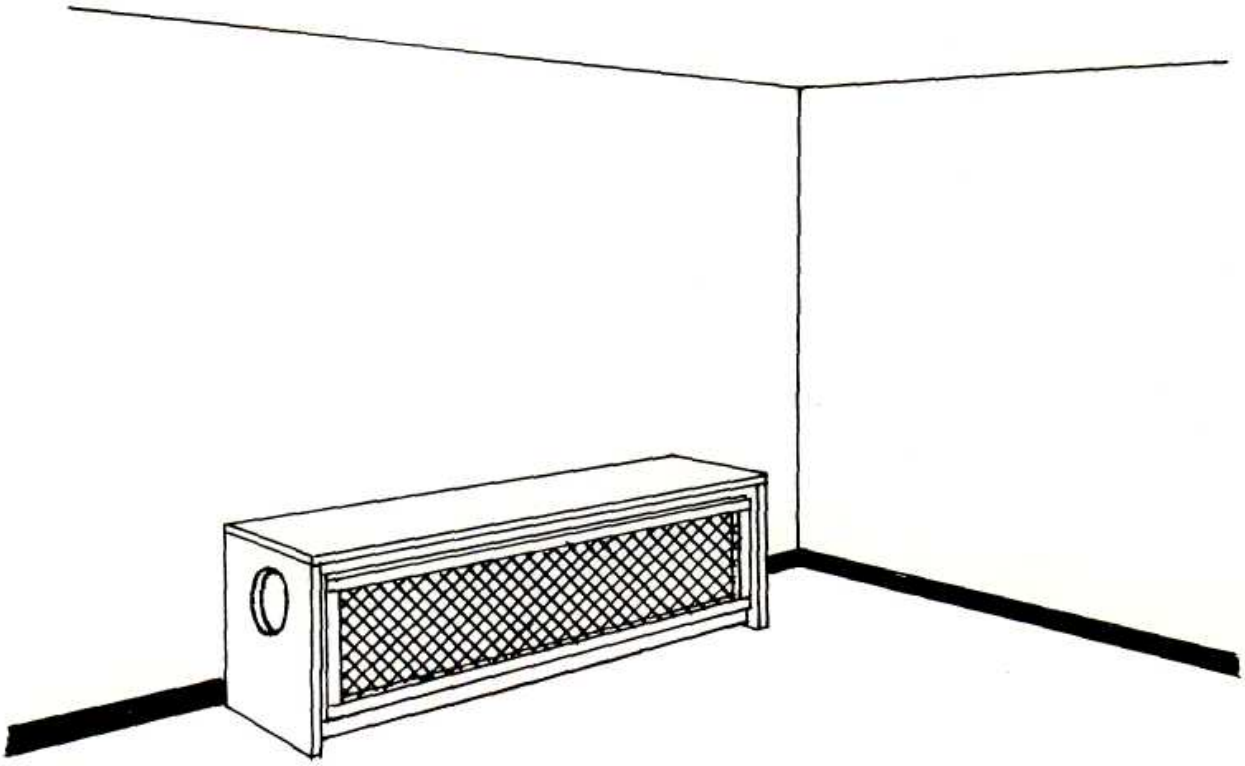
Instructions for Assembly

1. Join side (B) to side (A) and top (C) to side (A) with hinges.
2. Apply finish.

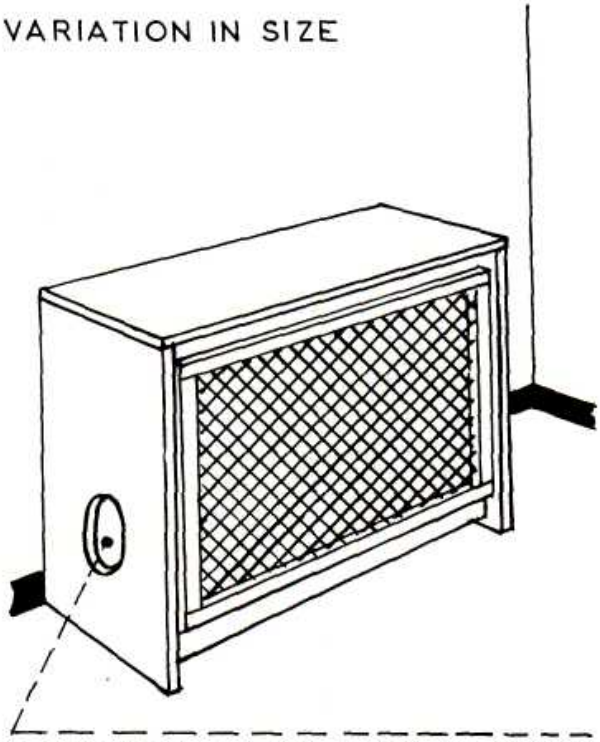
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3.1 RADIATOR ENCLOSURE

Besides its aesthetic value, this radiator cover protects young children from bruises and burns, and the bottom rail prevents marbles and other small objects from rolling under the radiator. Dimensions are adaptable to size of radiator.



VARIATION IN SIZE



HANDHOLE IN RELATION TO VALVE

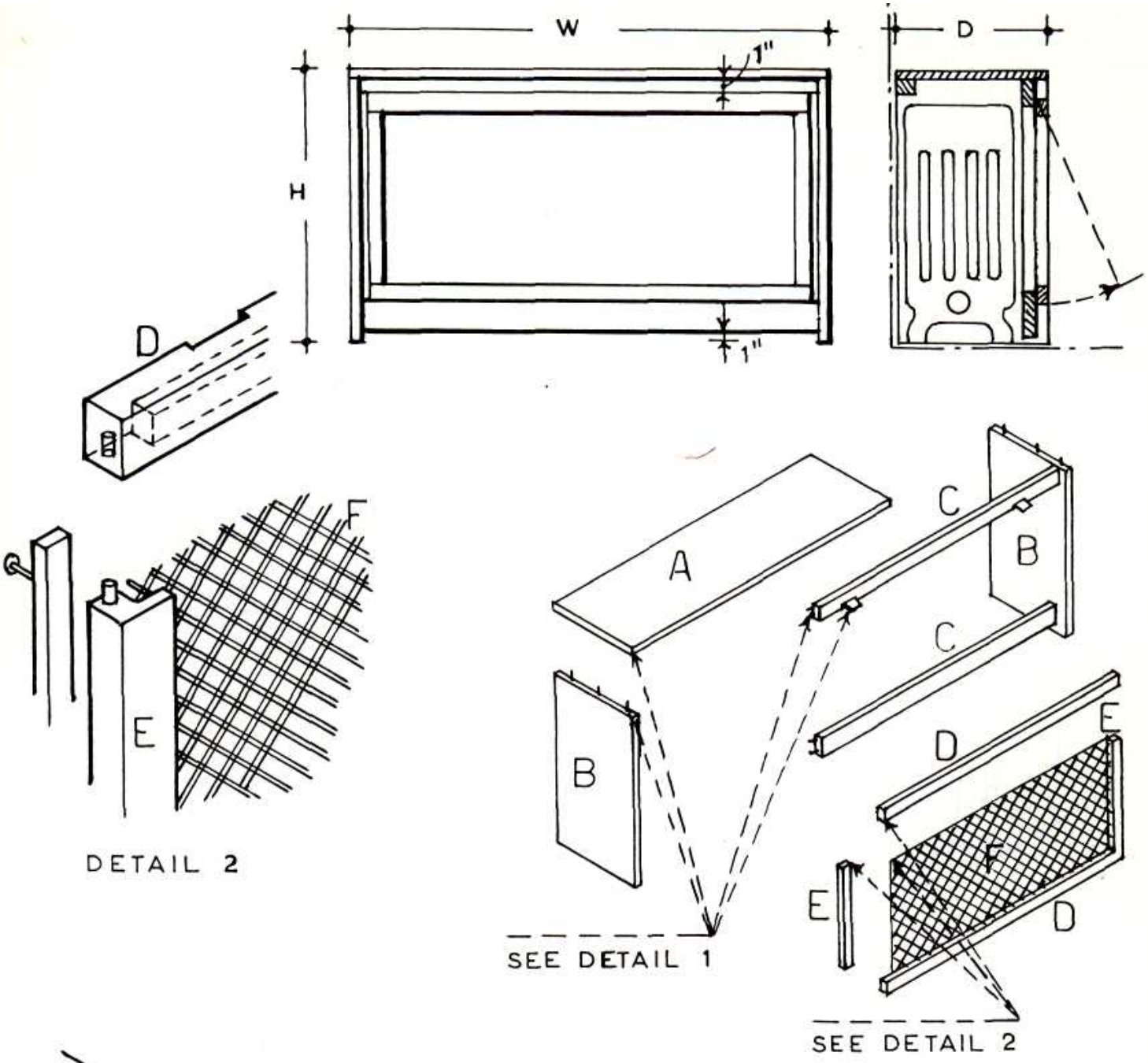
List of Materials

PART	NO.	FUNCTION	DIMENSION IN INCHES thickness × width × length		
A	1	top	¾	*W*	*D*
B	2	sides	¾	*H*	*D*
C	2	rails	1	2	*W* less 1½
D	2	rails	¾	1¼	*W* less 2½
E	2	rails	¾	1¼	*H* less 6½
F	1	sheet of expanded metal	*H* less 6 in.		*W* less 3 in.

Instructions for Assembly

1. Join side (B) with rail (C) and attach top (A).
2. Fasten rails (D) to (E) and attach metal sheet (F).
3. Join rail (D) to rail (C) and apply finish.
4. Install enclosure over radiator.

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H = HEIGHT OF RADIATOR + 2"

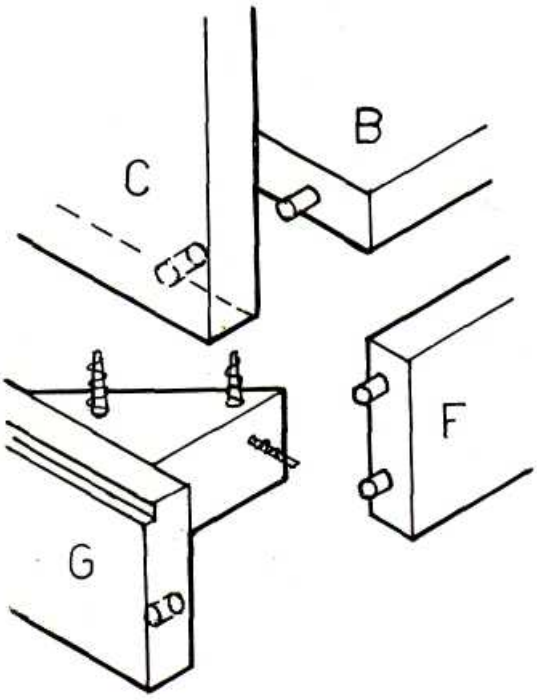
W = WIDTH OF RADIATOR + 4"

D = DEPTH OF RADIATOR + 2"

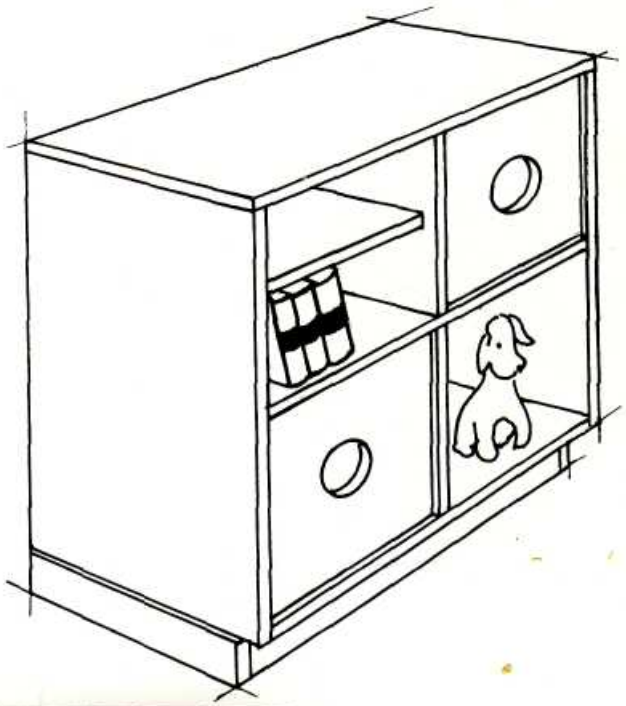
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3.2 MODULAR BOOKCASE

An original and practical unit that adds a note of vivacity to any room. Groups can be built up as desired, with or without the central shelf. You can add as many modules as you wish, either vertically or horizontally.

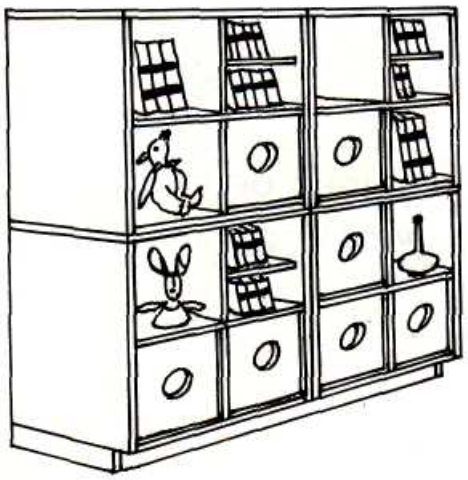


DETAIL I



List of Materials

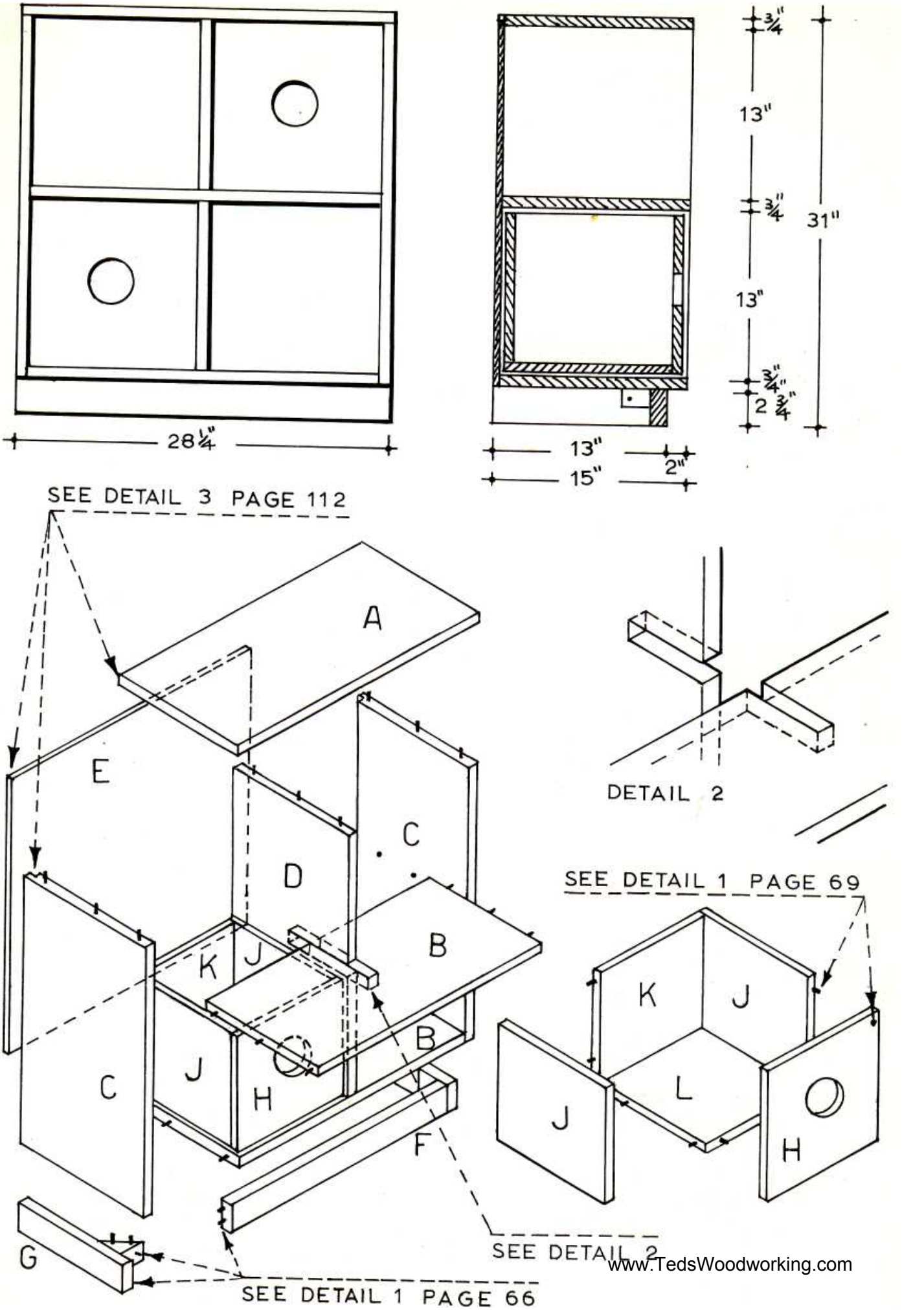
A	1	top	¾	15	28¼
B	2	bottom & shelf	¾	14¾	26¾
C	2	sides	¾	15	27½
D	1	partition	¾	14¾	26¾
E	1	back	¼	27¾	28
F	1	toeplate	¾	2¾	26¾
G	2	toeplates	¾	2¾	15
H	1	front	½	13	13
J	2	sides	½	12½	13
K	1	back	½	12	13
L	1	bottom	½	12	12



Instructions for Assembly

1. Join shelf and bottom (B) to partition (D); then sides (C) and top (A).
2. Attach back (E) and toeplates (F, G) to cabinet bottom (B).
3. Join bottom (L) to back (K); then sides (J) and front (H).
4. Apply finish.

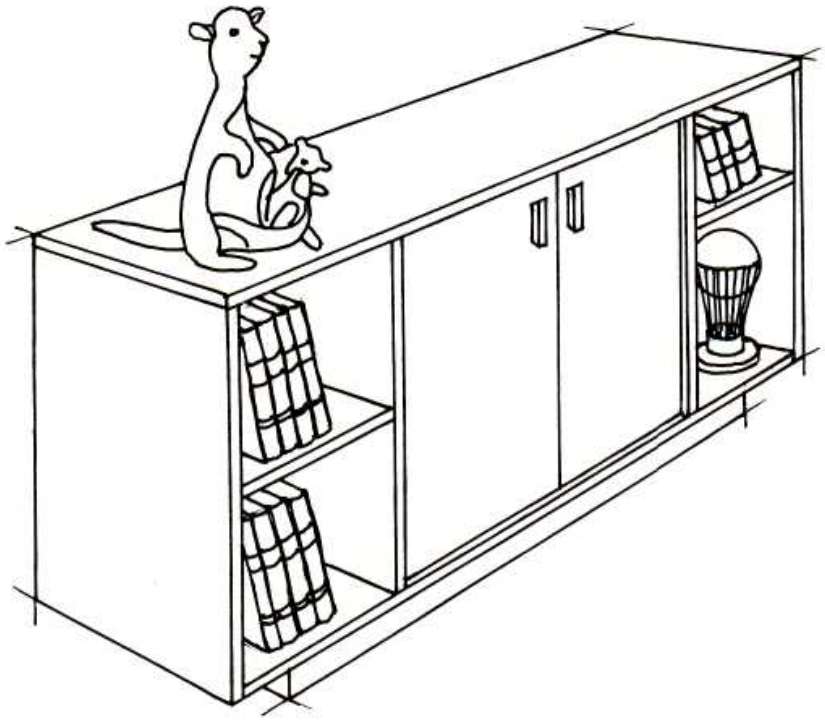
www.TedsWoodworking.com

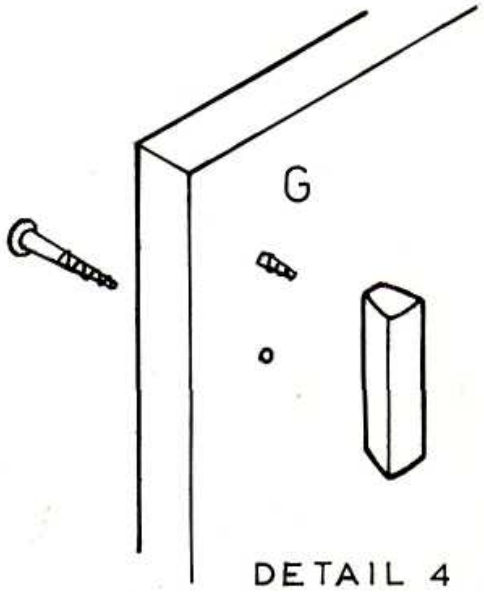


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3.3 BOOKCASE CABINET

A piece of furniture of this type is always expensive to buy. This project is easy to make, and its cost is relatively low. We suggest plywood as the construction material.





DETAIL 4

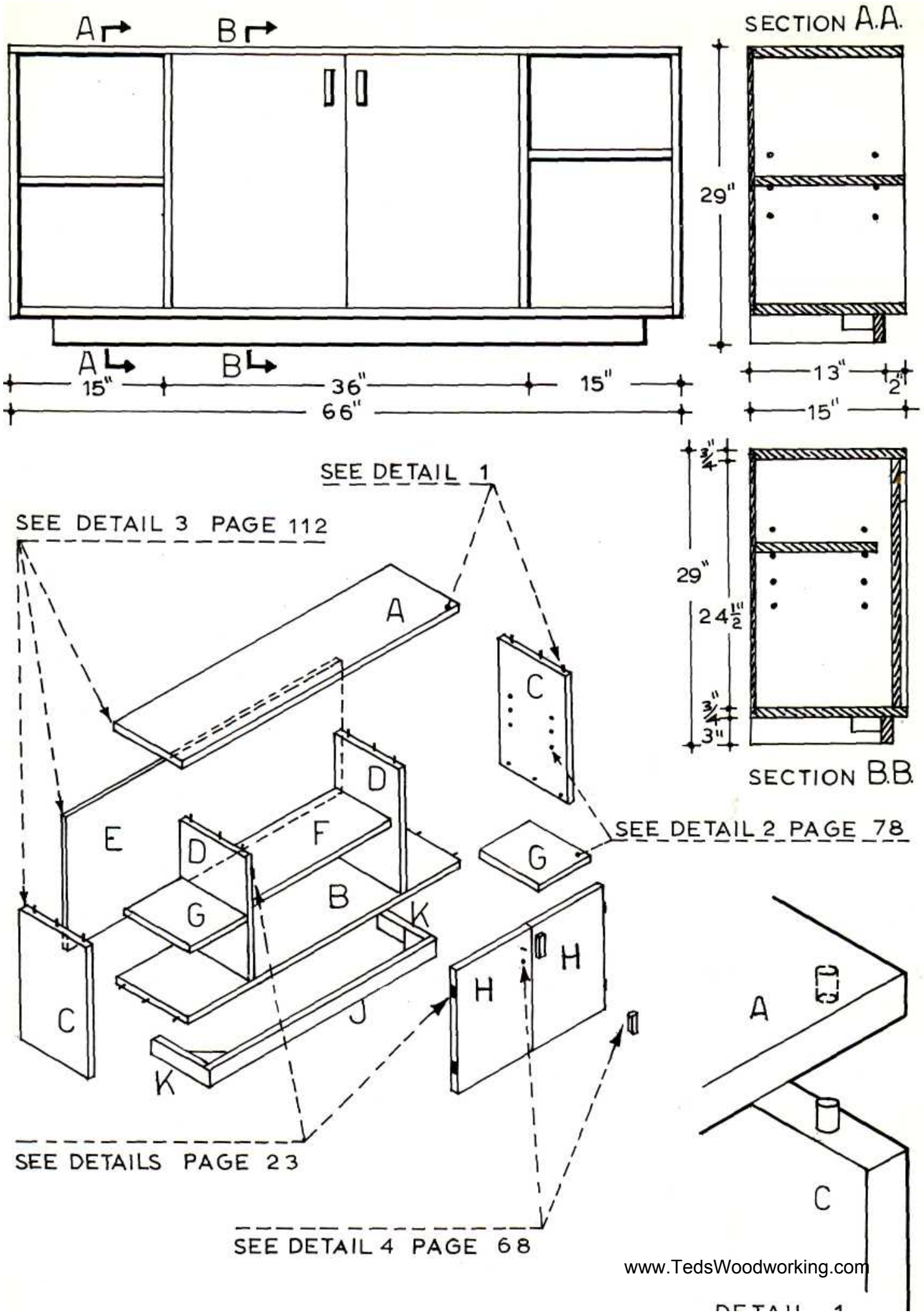
Instructions for Assembly

A	1	top	¾	15	66
B	1	bottom	¾	14¾	64½
C	2	sides	¾	15	25¼
D	2	partitions	¾	14¾	24½
E	1	back	¼	25½	65½
F	1	shelf	¾	14¾	34½
G	2	shelves	¾	14¾	14¼
H	2	doors	¾	17¼	24½
J	1	toeplate	¾	3	58
K	2	toeplates	¾	3	13

List of Materials

1. Fasten shelf (F) and bottom (B) to partitions (D) and sides (C); then attach top (A).
2. Install back (E).
3. Join toeplates (J, K) to corner blocks, and fasten to bottom (B).
4. Apply finish and set cabinet in place.

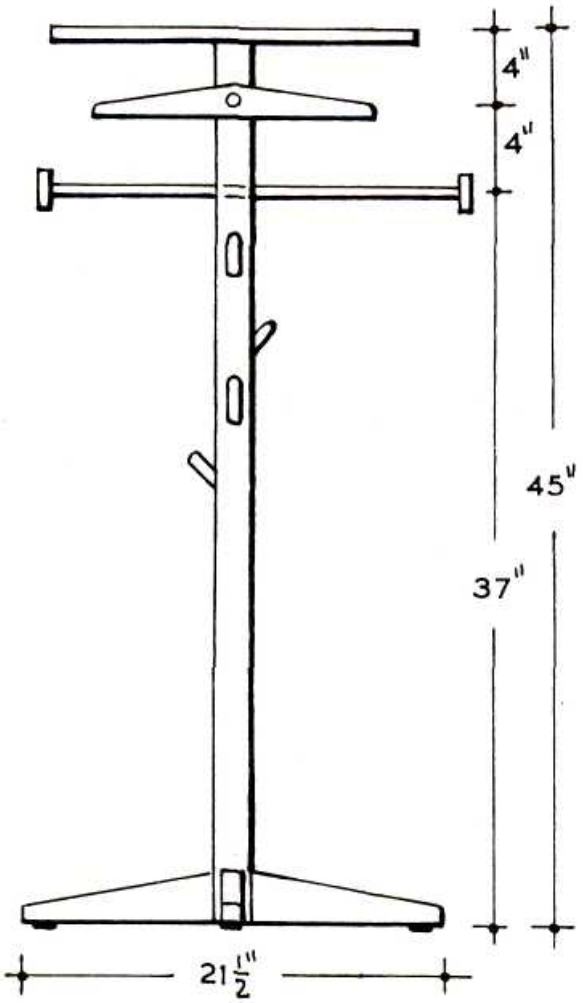
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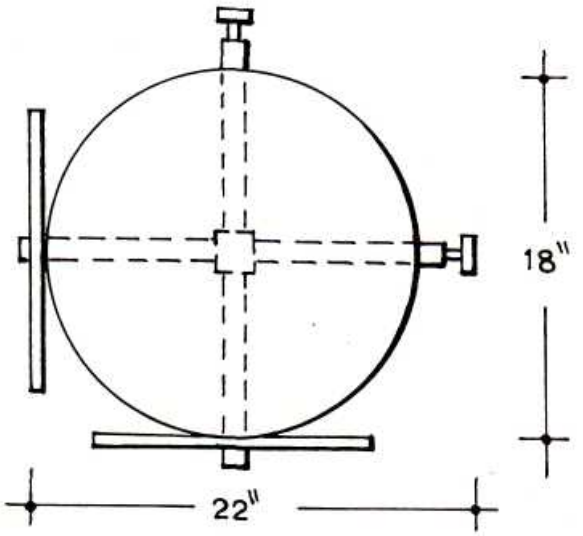


www.TedsWoodworking.com

3.4 CLOTHES TREE

How can we train young ones to hang up their clothes if they can't reach the closet rack? This child-size clothes tree makes it fun to hang things up—and take them down. The top shelf holds school books, games or assorted pieces of play equipment.



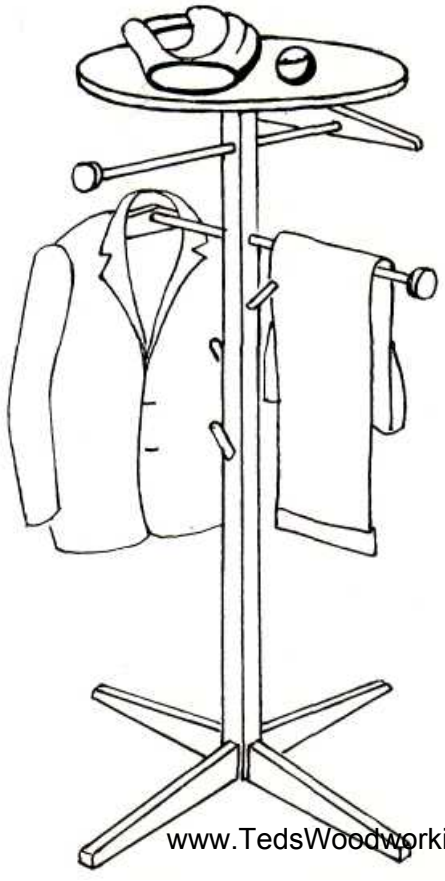


List of Materials

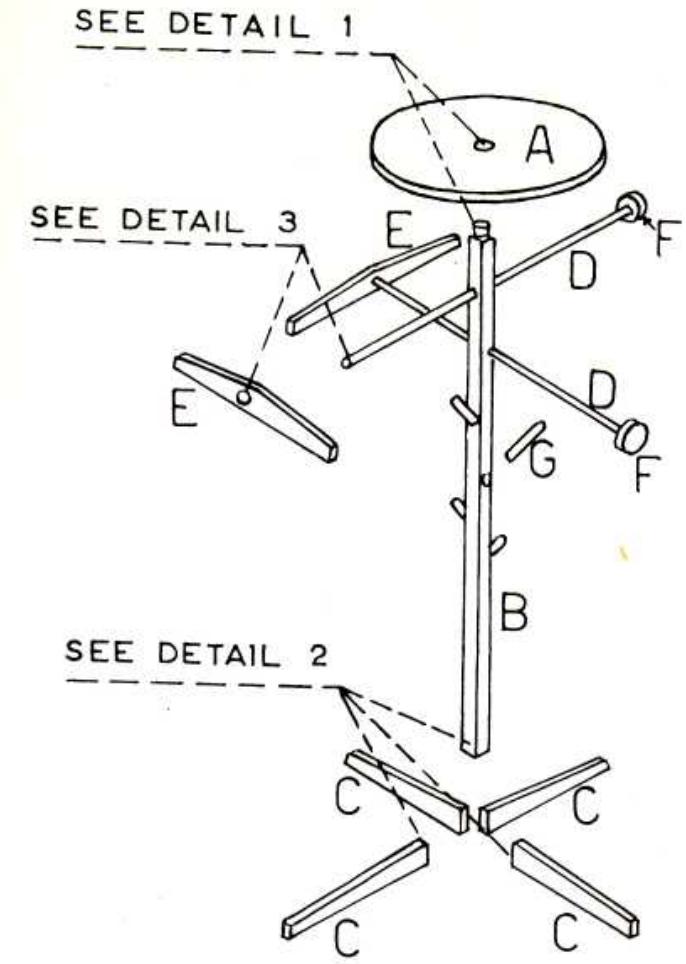
PART	NO.	FUNCTION	DIMENSION IN INCHES thickness × width × length
A	1	top	¾ × 18 in. diam.
B	1	support	1½ × 1½ × 45
C	4	legs	1 × 2½ × 10
D	2	dowels	¾ diam. × 22
E	2	hangers	¾ × 1½ × 14
F	2	hangers	¾ × 2 in. diam.
G	4	hook	½ diam. × 5

Instructions for Assembly

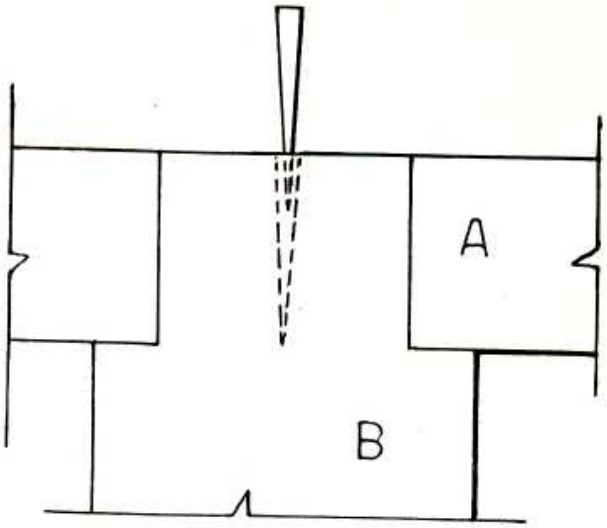
1. Join support (B) with legs (C).
2. Insert dowels (D) in support (B) and attach hangers (E) and (F) to dowels (D).
3. Install top (A) and hook (G) to support (B).
4. Apply finish.



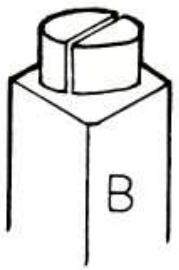
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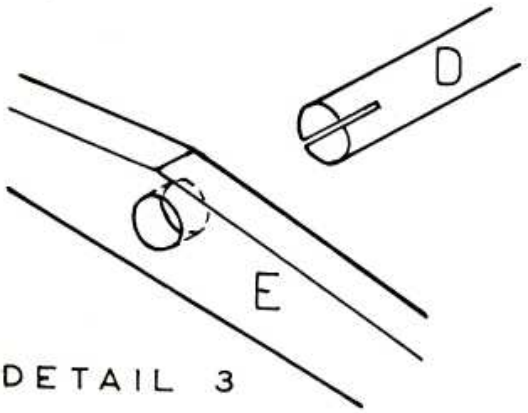


DETAIL 1 FULL SIZE



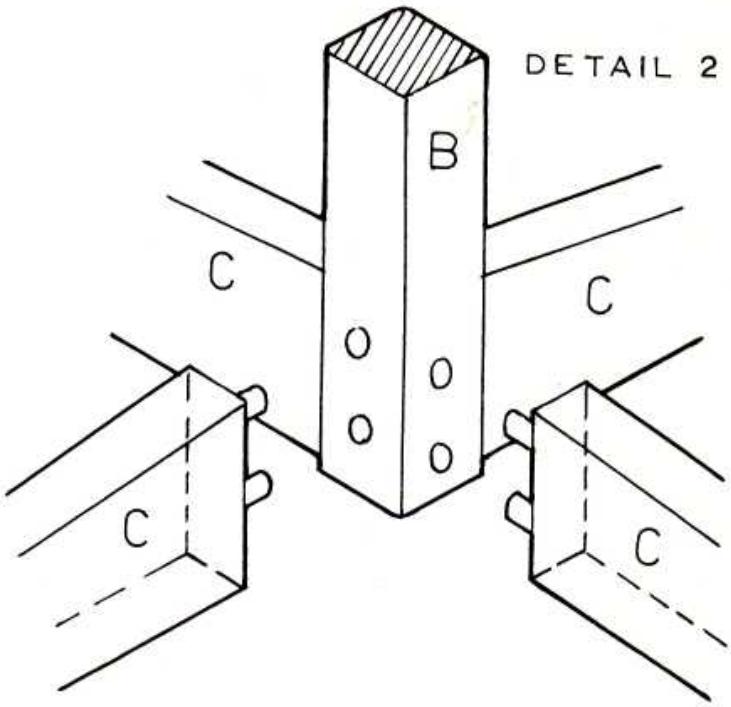
DETAIL 1

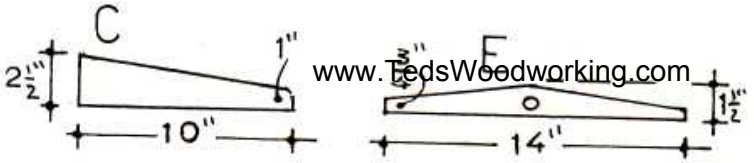




DETAIL 3

DETAIL 2

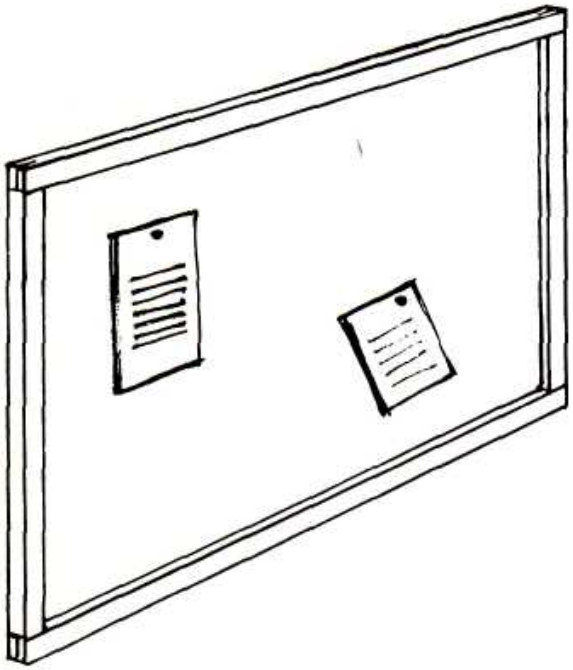


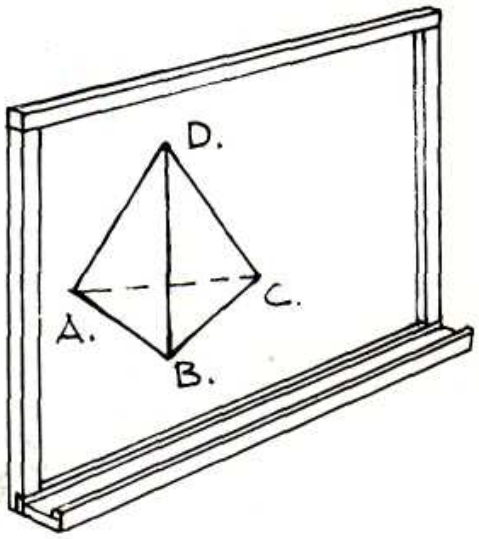


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3.5 BULLETIN BOARD OR CHALKBOARD

Both are useful all the way from preschool to high school. For a bulletin board, use soft wallboard to take thumbtacks. For a chalkboard, add the lower ledge and use hard-surfaced Masonite covered by green chalkboard paint.





List of Materials

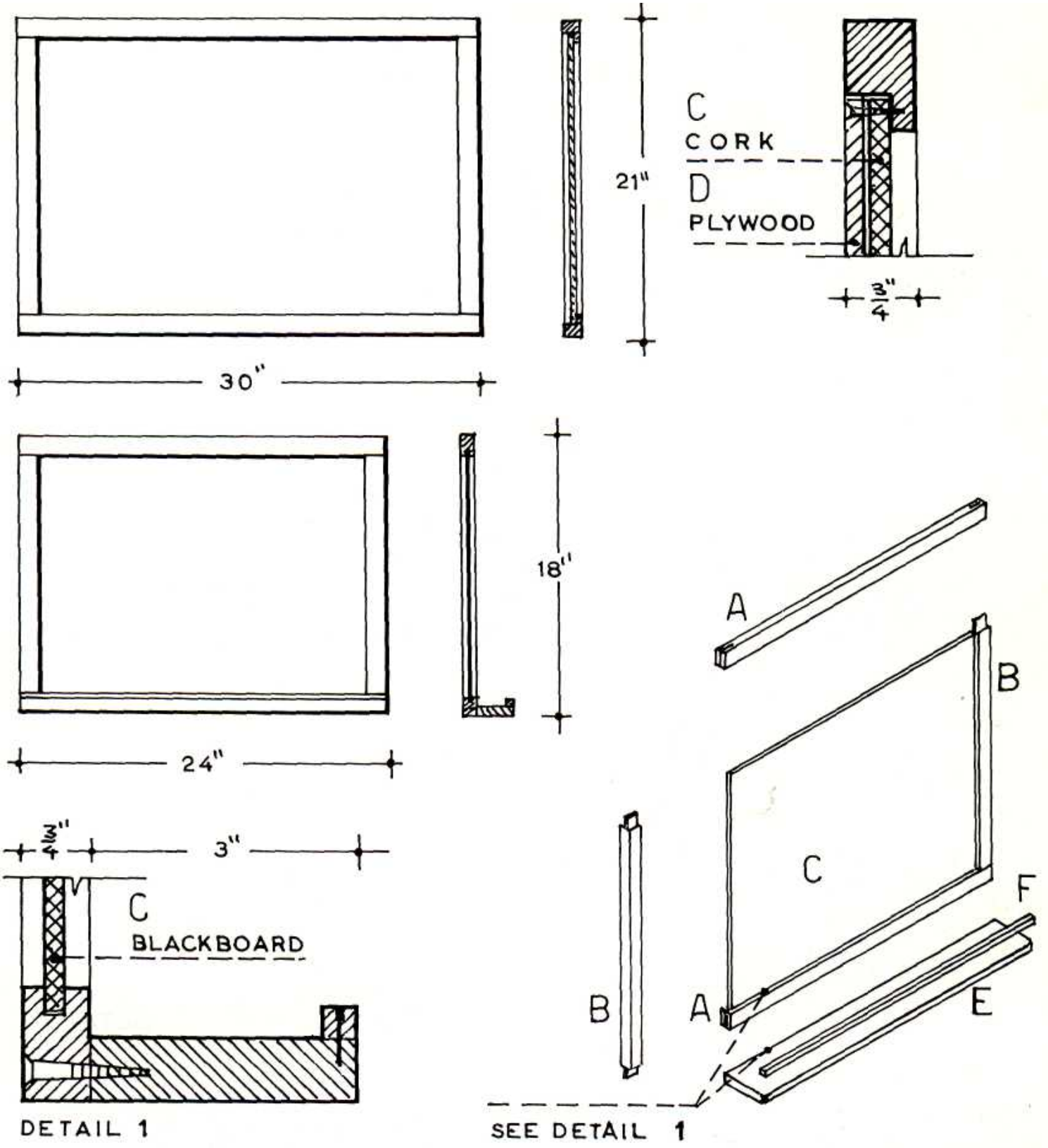
Bulletin Board

PART	NO.	FUNCTION	DIMENSION IN INCHES thickness × width × length		
A	2	rails	¾	1¼	30
B	2	rails	¾	1¼	21
C	1	wallboard or cork panel	3/16	19½	28½
D	1	plywood panel	¼	19½	28½
		Chalkboard			
A	2	rails	¾	1¼	24
B	2	rails	¼	1¼	18
C	1	Masonite panel	¼	16½	22½
E	1	board	¾	⅜	24

Instructions for Assembly

1. Join rails (A) with rails (B).
2. Install wallboard or cork (C) with plywood back (D) for bulletin board.
3. Apply finish.
4. For chalkboard, install the Masonite in place of the wallboard or cork, and paint with green chalkboard paint.

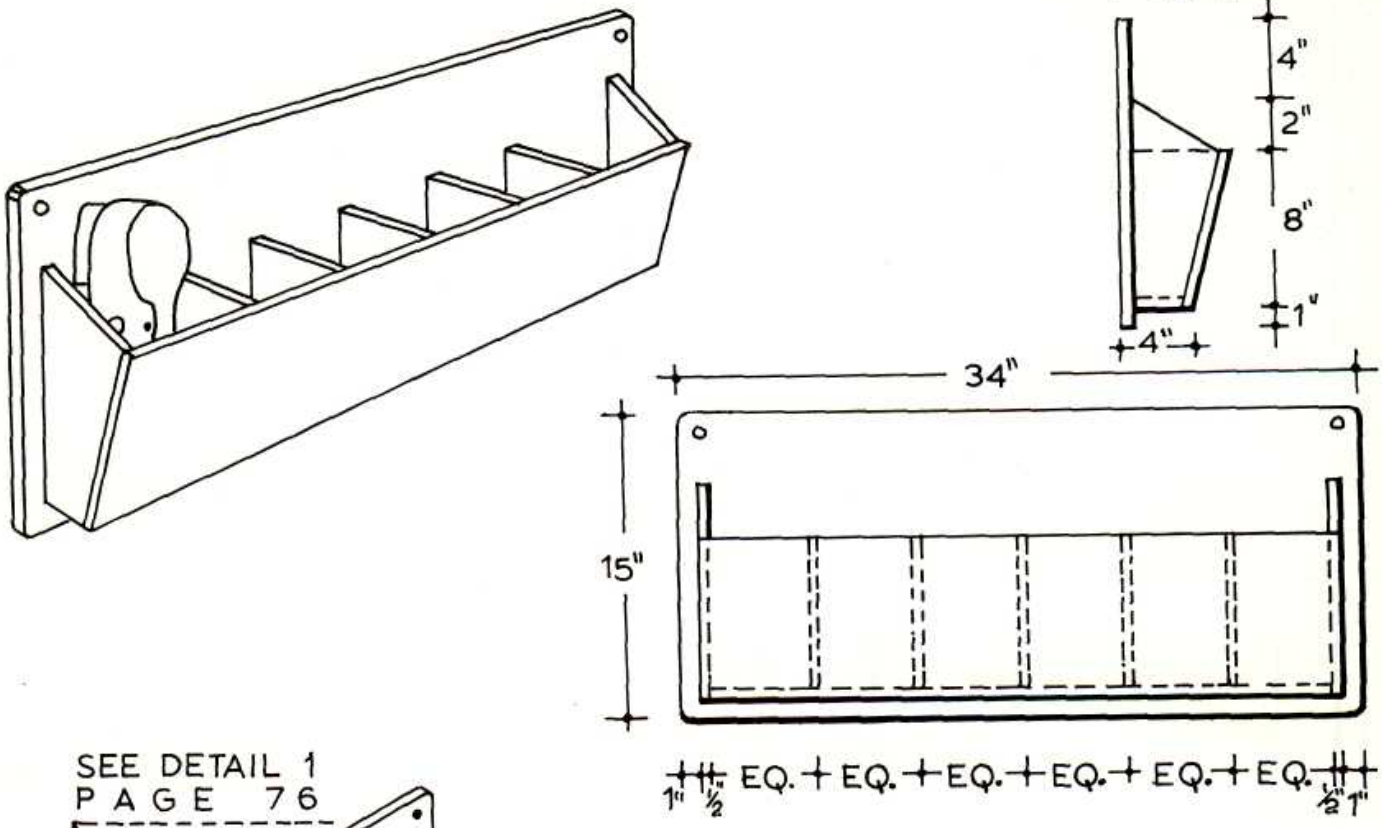
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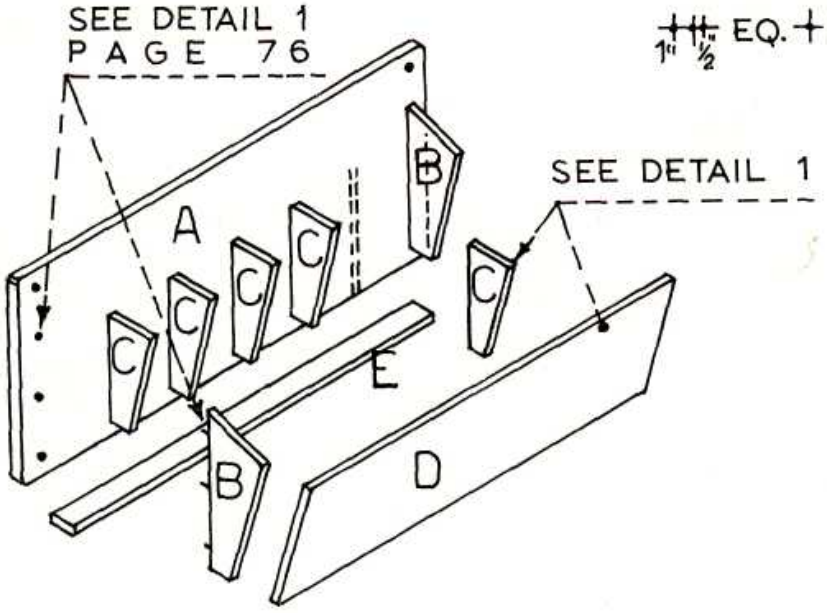


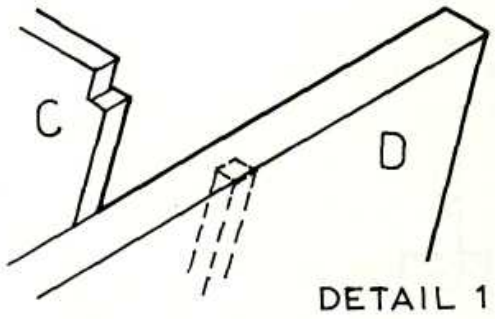
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3.6 SHOE RACK

To avoid having children's shoes scattered on the closet floor, build one or more of these easy-to-make shoe racks. The rack can be attached inside the closet door, and its length







List of Materials

A	1	back	½	15	34
B	2	sides	½	4½	10
C	5	partitions	¼	4½	8
D	1	front	½	8½	32
E	1	bottom	½	3	32

Instructions for Assembly

1. Join back (A) with sides (B) and bottom (E).
2. Insert partitions (C) in back (A) and fasten front (D).
3. Apply finish.

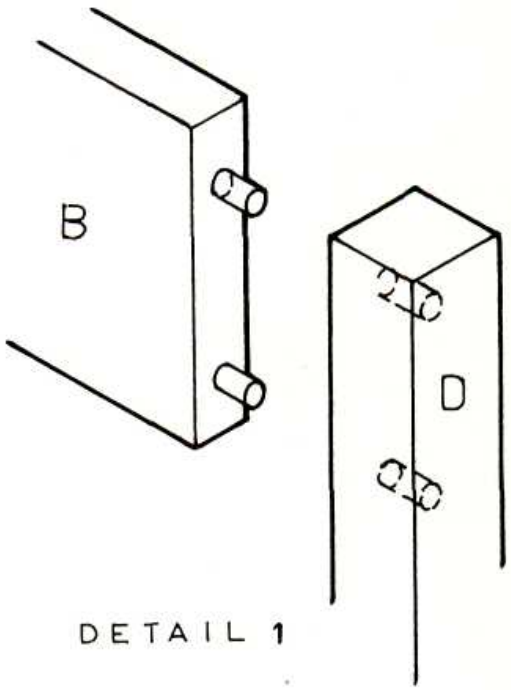
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4.1 KNEEHOLE DESK

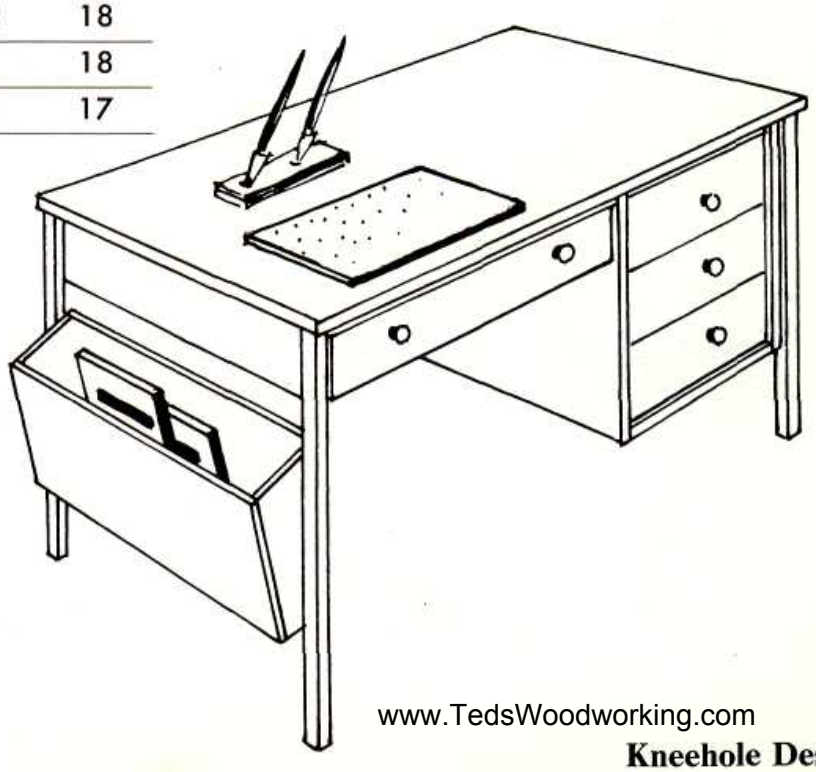
Not too difficult to make yet good-looking, sturdy and practical for any room in the house. Note the left-hand well for magazines and outsize books. Instead of paint or lacquer many do-it-yourselfers use "contact" plastic covering, which can be had in a variety of wood grains and colors.

List of Materials

PART	NO.	FUNCTION	DIMENSION IN INCHES thickness	× width	× length
A	1	top	¾	22	42
B	1	rail	¾	4	18
C	1	rail	¾	4	23
D	4	legs	1¼	1½	27¼
E	2	sides	¾	19¾	19½
F	2	pieces	¾	19	14½
G	1	back	¾	14½	19½
H	8	cleats	⅜	½	19
J	1	rail	¾	2	23
K	3	drawer fronts	¾	6	14½
L	6	drawer sides	½	6	18⅝
M	3	drawer backs	½	5½	13½
O	3	drawer bottoms	¼	14	18½
P	1	drawer front	¾	3¼	23
Q	1	drawer back	½	2¾	22
R	2	drawer sides	½	3¼	18⅝
S	1	drawer bottom	¼	22½	18½
T	2	sides	½	5½	12
U	1	back	½	12	18
V	1	front	½	11	18
W	1	bottom	½	2	17



DETAIL 1

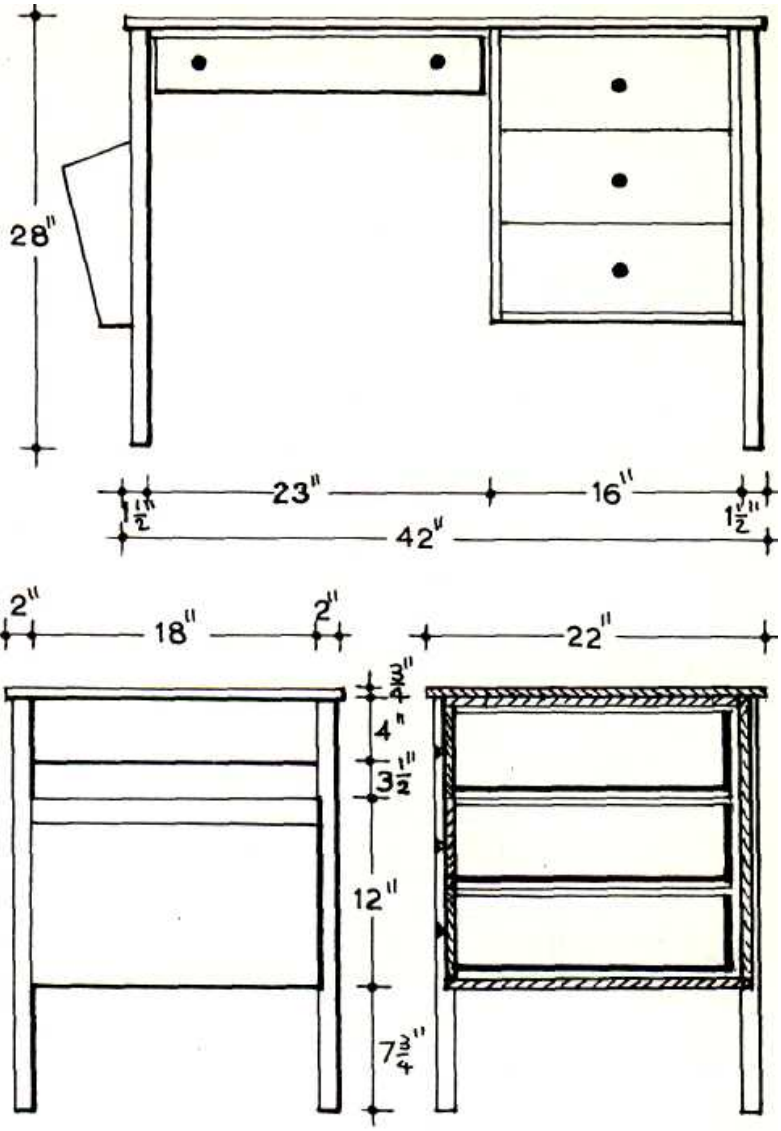


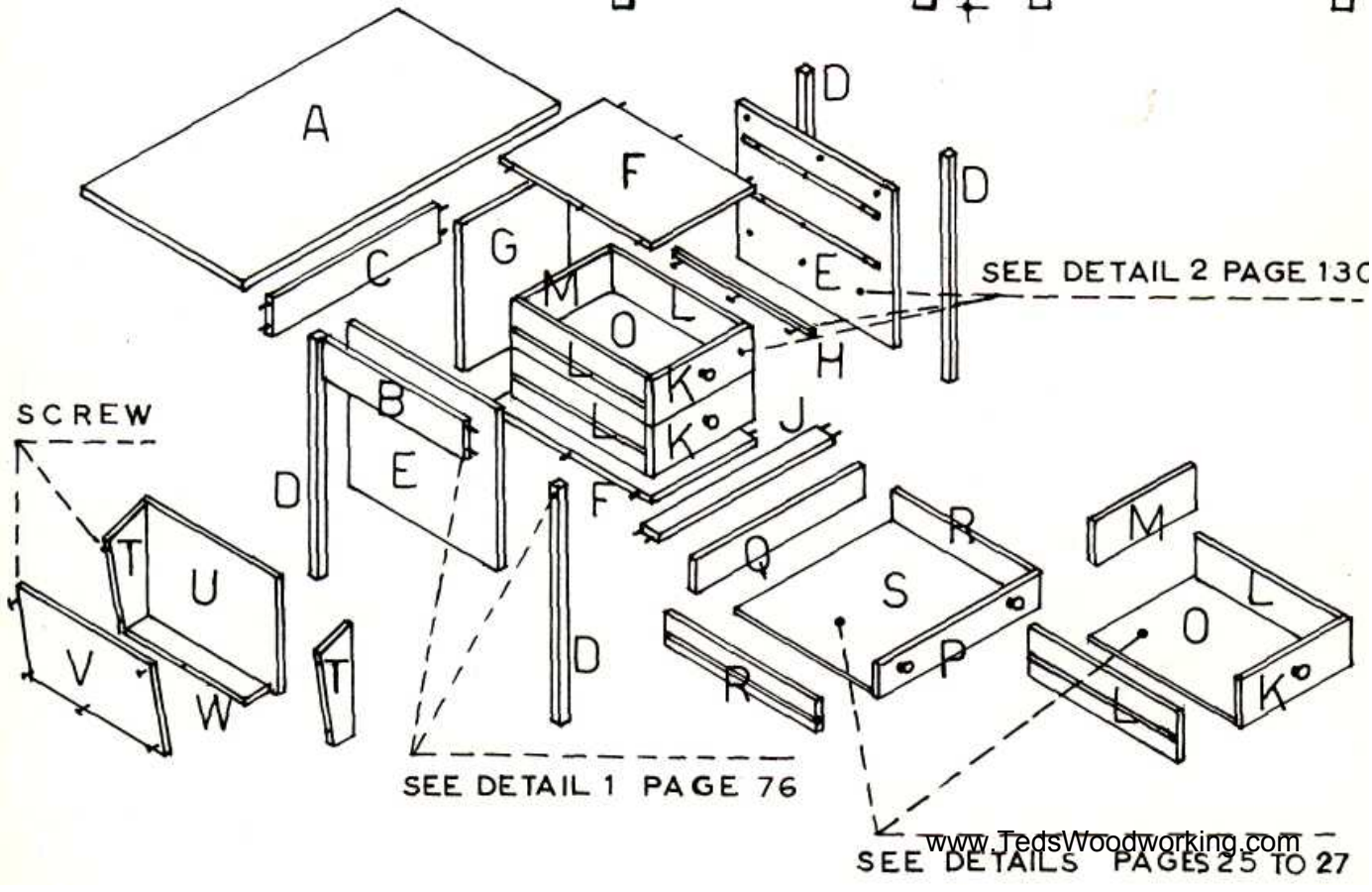
www.TedsWoodworking.com

Kneehole Desk

Instructions for Assembly

1. Fasten pieces (F) with sides (E) and back (G).
2. Join legs (D) with rails (B) and (C) and with sides (E) and rails (J).
3. Fasten top (A) to frame thus formed.
4. Attach cleats (H) to rail (B) and sides (E).
5. Join drawer side (L) with drawer front (K) and back (M), and install drawer bottom (O).
6. Join drawer sides (R) with fronts (P) and back (Q) and install bottom (S).
7. Fasten back (U) to bottom (W), sides (T), front (V) and attach to legs (D).
8. Apply finish.

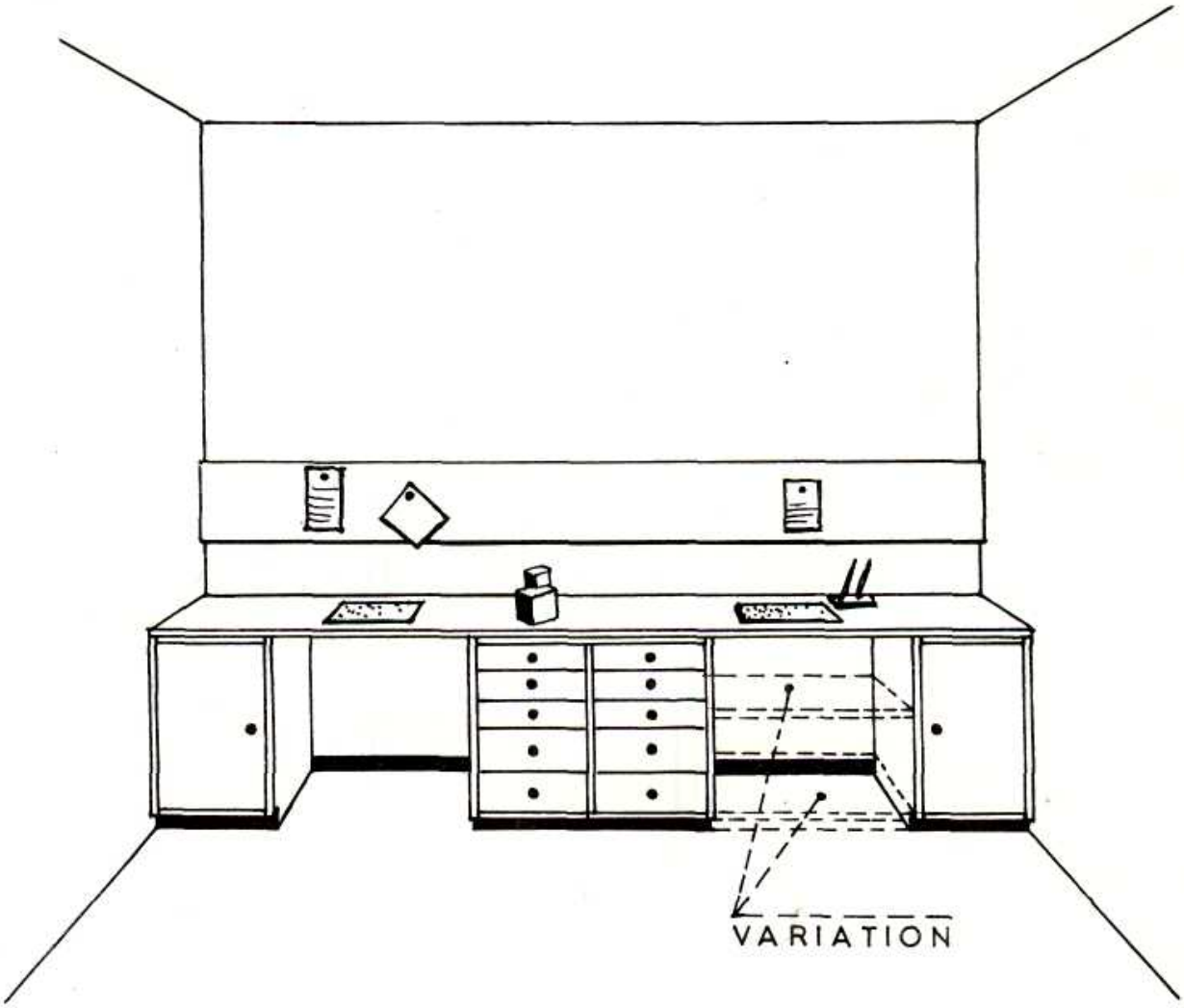


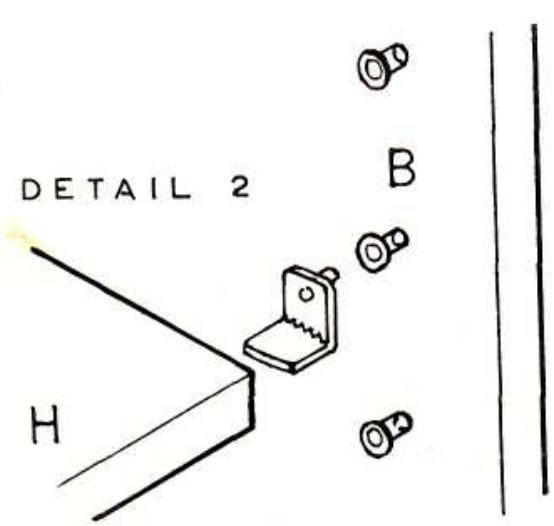


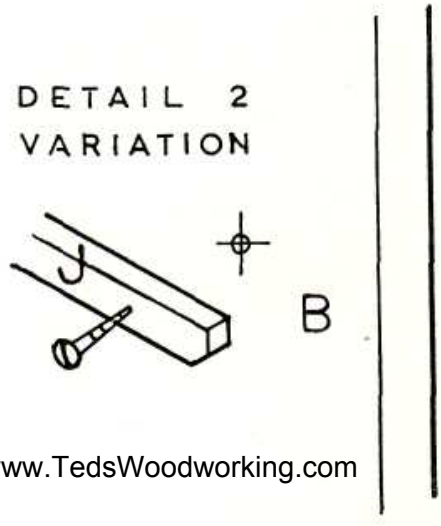
www.TedsWoodworking.com

4.2 BUILT-IN DESK

Besides making full use of the space between two closets, this design provides extra work space for drawing—or play space for games. Teen-agers with lots of books and papers for "research" assignments will appreciate the larger working surface. A wall-to-wall bulletin board over the desk or a large map will be both esthetic and functional.







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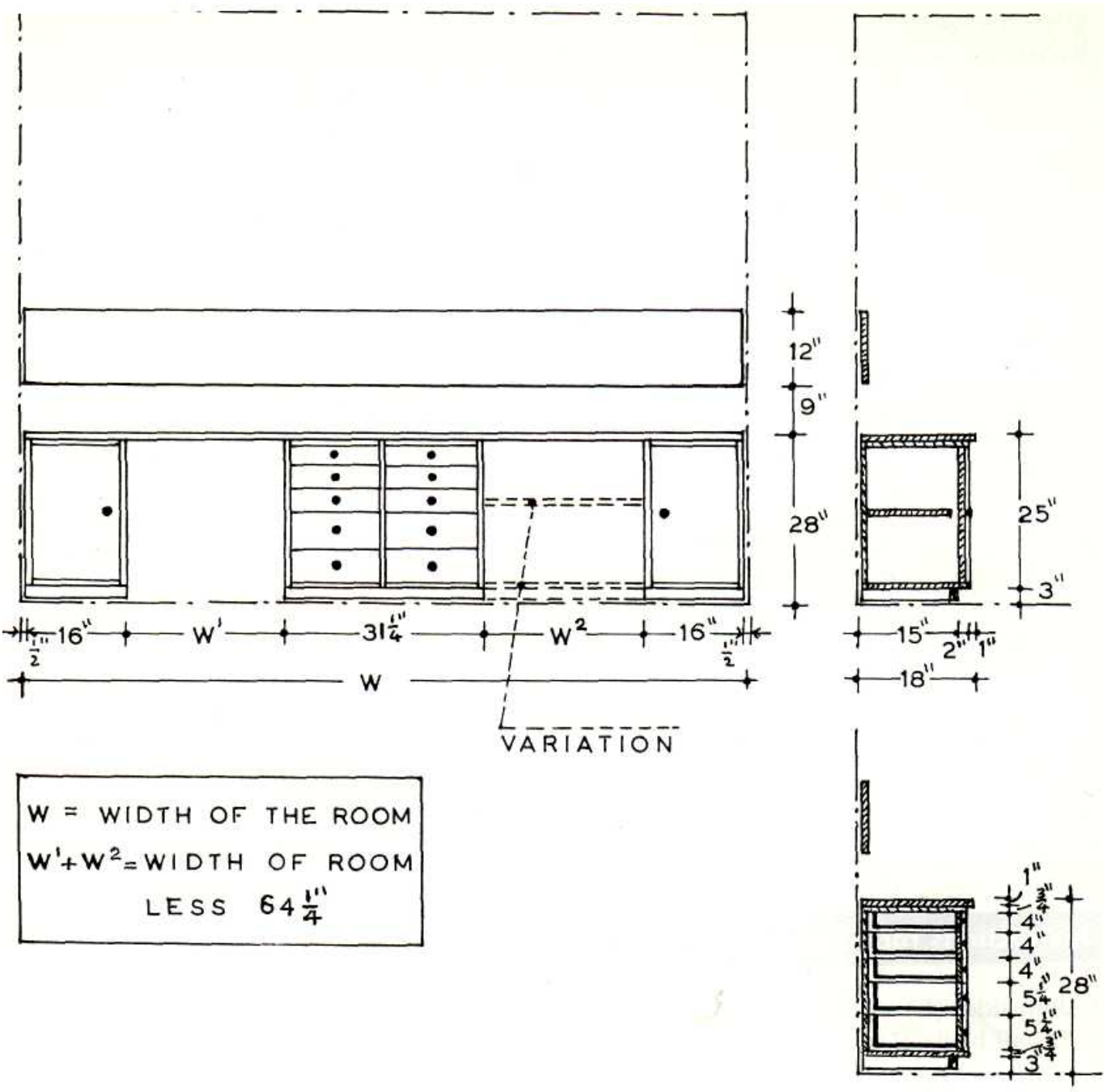
List of Materials

PART	NO.	FUNCTION	DIMENSION IN INCHES thickness	×	width	×	length
A	1	top	1		18		W
B	6	sides	3/4		17		27
B	1	partition	3/4		16 3/4		24
C	8	tops and bottoms	3/4		14 1/2		17
D	4	backs	1/4		15 1/2		23 1/2
E	2	doors	3/4		14 1/2		22 1/2
F	2	bases	3/4		3		14 1/2
G	1	base	3/4		3		29 3/4
H	2	shelves	3/4		14 1/2		15
J	20	cleats	3/8		3/4		14
K	6	drawer fronts	3/4		3 1/2		14 1/2
L	6	drawer backs	1/2		3		13 1/2
M	12	drawer sides	1/2		3 1/2		16 3/8
O	10	drawer bottoms	1/4		14		16 1/4
P	4	drawer fronts	3/4		6		14 1/2
Q	4	drawer backs	1/2		5 1/2		13 1/2
R	8	drawer sides	1/2		6		16 3/8
T	2	add'l shelves	3/4		16 3/4		W 2
U	1	toe plate	3/4		3		W 2

Instructions for Assembly

1. Join sides (B) with tops and bottoms (C).
2. Install backs (D).
3. Fasten toeplate or bases (F) and (G) to sides (B) and bottoms (C).
4. Attach cleats (J) to sides (B) and install doors (E) and shelves (H).
5. Join drawer sides (M) to drawer fronts (K) and backs (L) and install drawer bottoms (O).
6. Join drawer sides (R) to drawer fronts (P) and backs (Q) and install drawer bottoms (O).
7. Apply finish.
8. Set cabinet in place and fasten top (A).
9. Add shelves (T) and toeplate (U) if variation is desired.

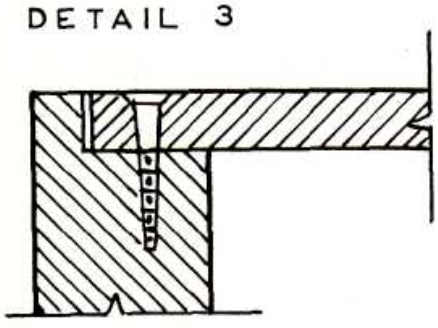
www.TedsWoodworking.com

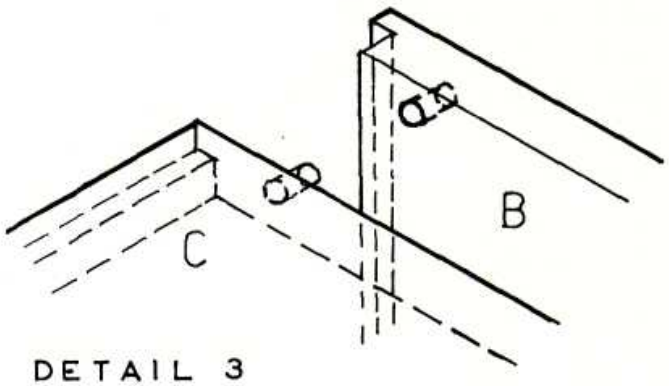


W = WIDTH OF THE ROOM

W'+W²=WIDTH OF ROOM LESS 64 1/4"

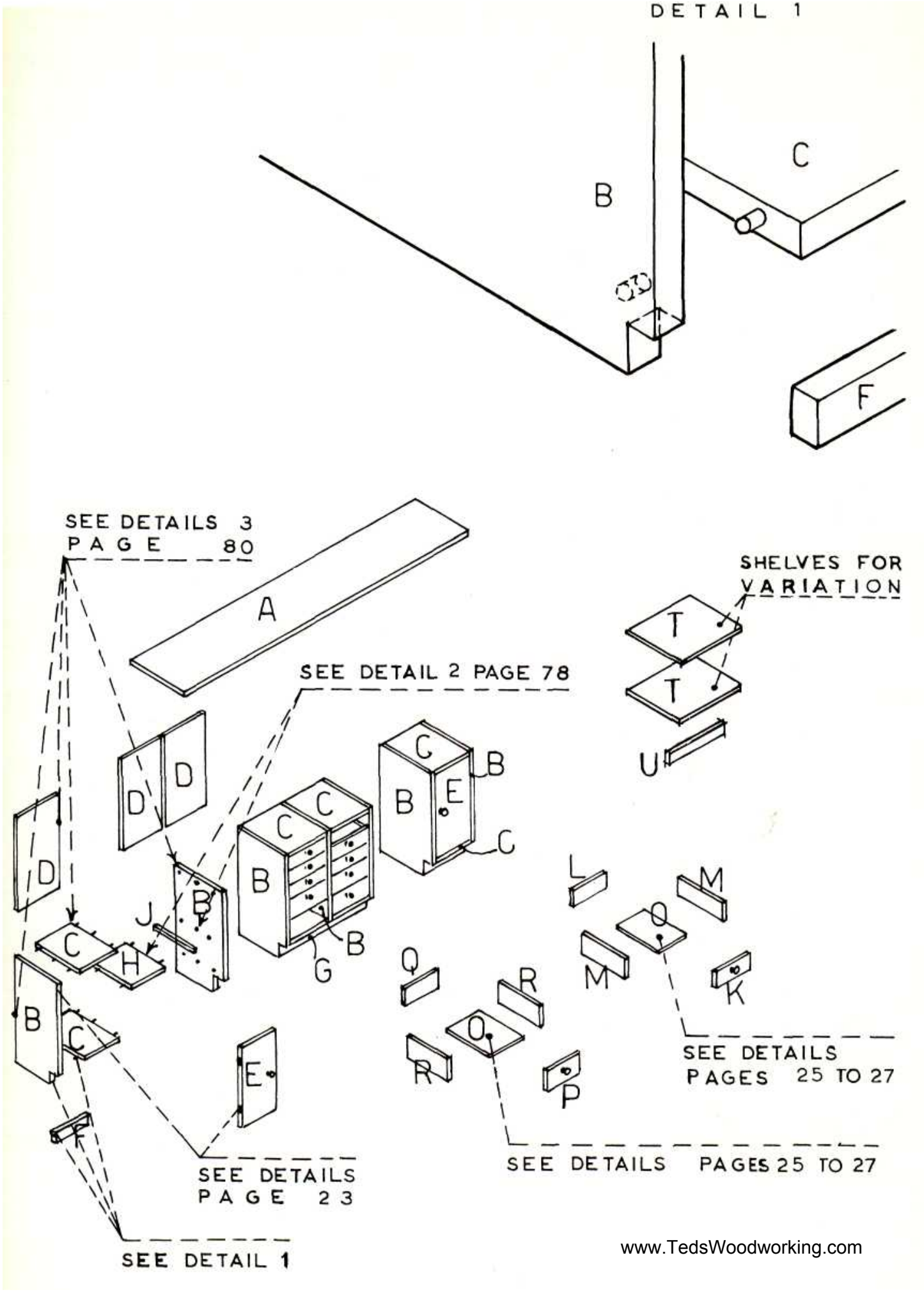
DETAIL 3





DETAIL 3

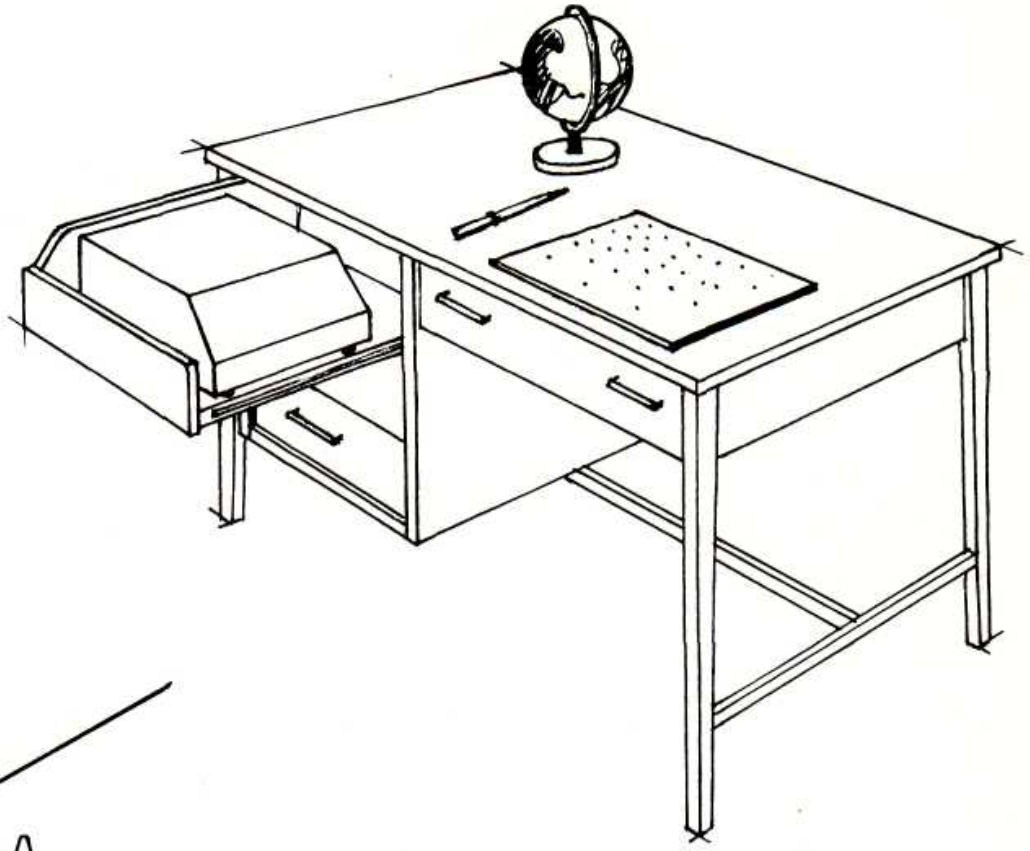
www.TedsWoodworking.com



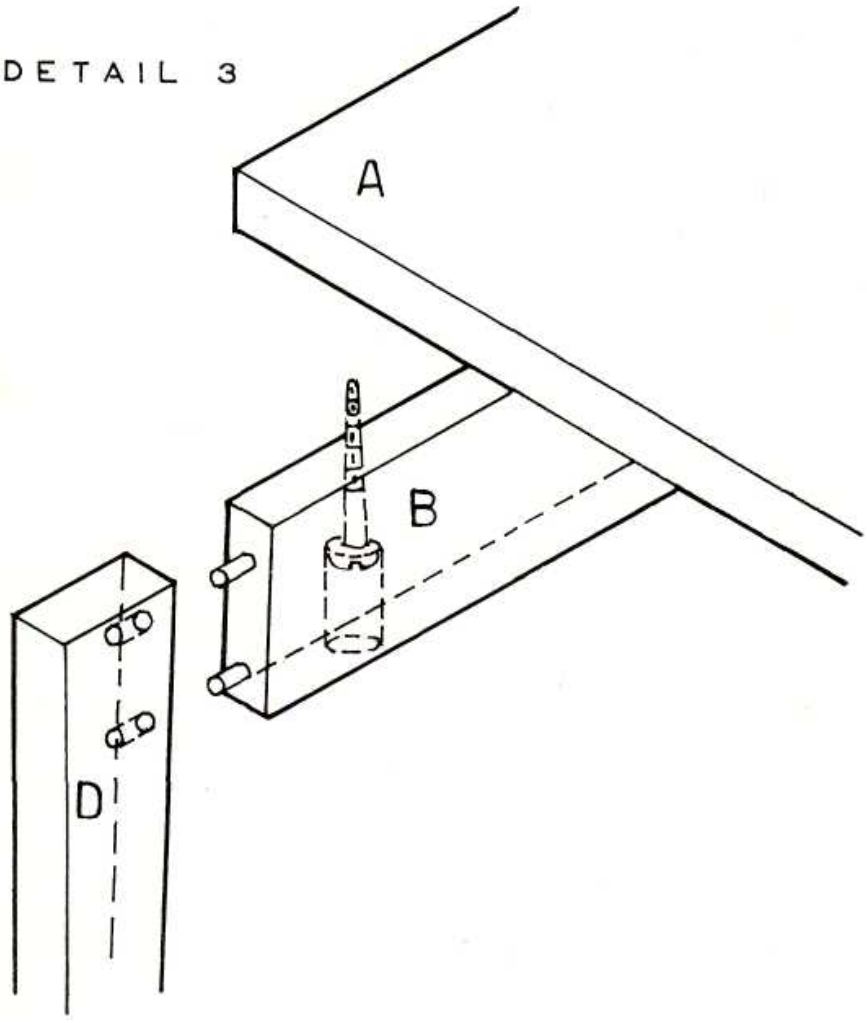
www.TedsWoodworking.com

4.3 TYPEWRITER DESK

Building this "portable typewriter" desk requires a little more skill and accuracy than the desk of Project 4.1, but your efforts will be amply rewarded. The top drawer front is made half height to permit free travel of the typewriter carriage. Commercial drawer slides may be substituted if desired.



DETAIL 3



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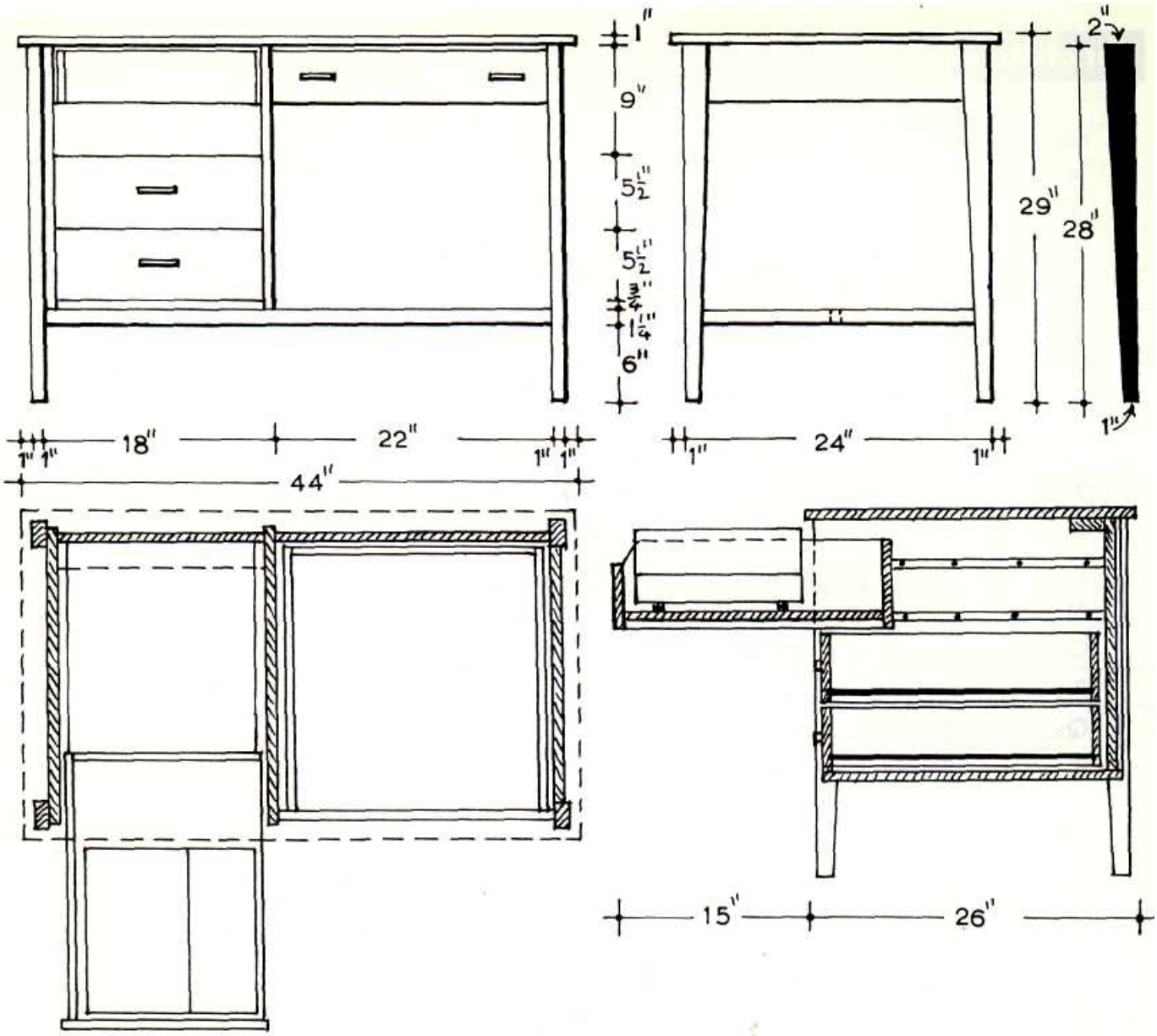
List of Materials

PART	NO.	FUNCTION	DIMENSION IN INCHES thickness	×	width	×	length
A	1	top	1		26		44
B	2	rails	¾		4½		20½
C	1	rail	¾		4		22
D	4	legs	1		2		28
E	2	stretchers	1		1¼		23
F	1	stretcher	1		1¼		42
G	2	sides	¾		23		20¾
H	1	back	¾		16½		20
J	1	bottom	¾		16½		23
K	2	pieces	¾		2		18
L	9	cleats	⅜		¾		21
M	1	drawer front	¾		4½		16½
O	1	bottom	¾		15		20½
P	1	side	¾		9		21¼
Q	1	back	¾		9		15¾
R	1	piece	¾		1¼		21¼
S	2	drawer fronts	¾		5½		16½
T	4	drawer sides	½		5½		21¾
U	2	drawer backs	½		5½		15½
V	2	drawer bottoms	¼		16		21½
W	1	drawer front	¾		4½		22
X	2	drawer sides	½		4½		21¾
Y	1	drawer back	½		4		21
Z	1	drawer bottom	¼		21		21½

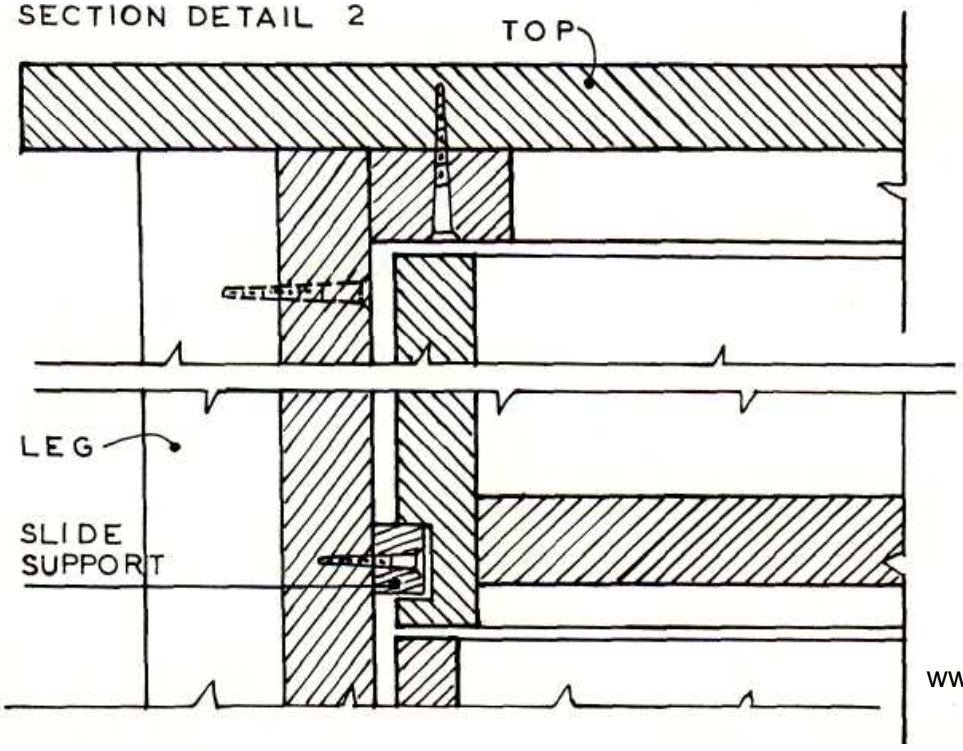
Instructions for Assembly

1. Join rails (B) and stretchers (E) with legs (D).
2. Fasten sides (G) with back (H), bottom (J) and pieces (K).
3. Join rail (C), sides (G), stretcher (F) with legs (D) and stretcher (E).
4. Attach cleats (L) to sides (B) and (G) and fasten top to rails (B), (C) and (K) with screws.
5. Join drawer sides (P) and (R) with bottom (O), front (M) and back (Q).
6. Join drawer sides (T) with drawer fronts (S), backs (U) and install bottoms (V).
7. Join drawer sides (X) with drawer front (W) and back (Y) and install bottom (Z).
8. Apply finish.

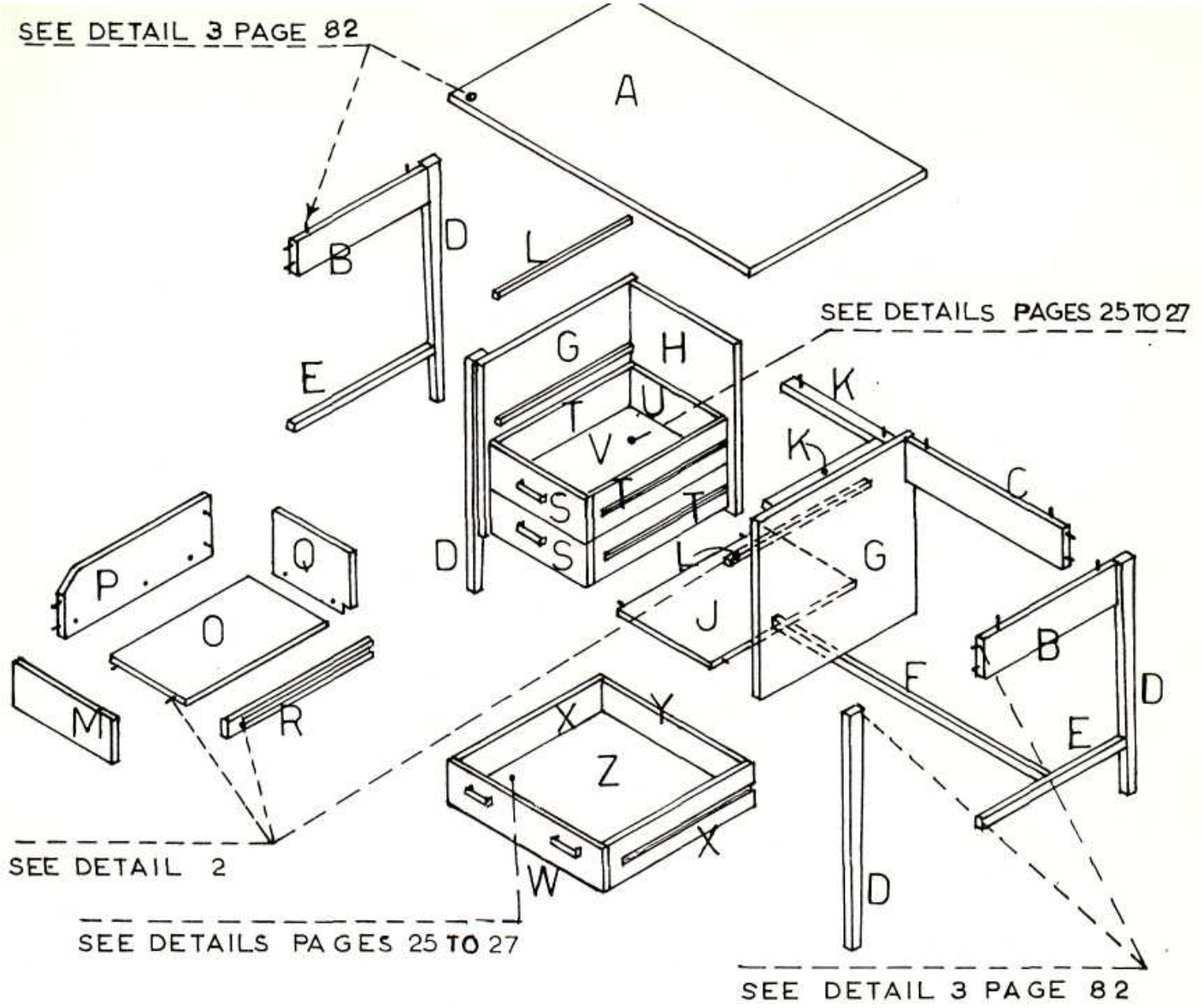
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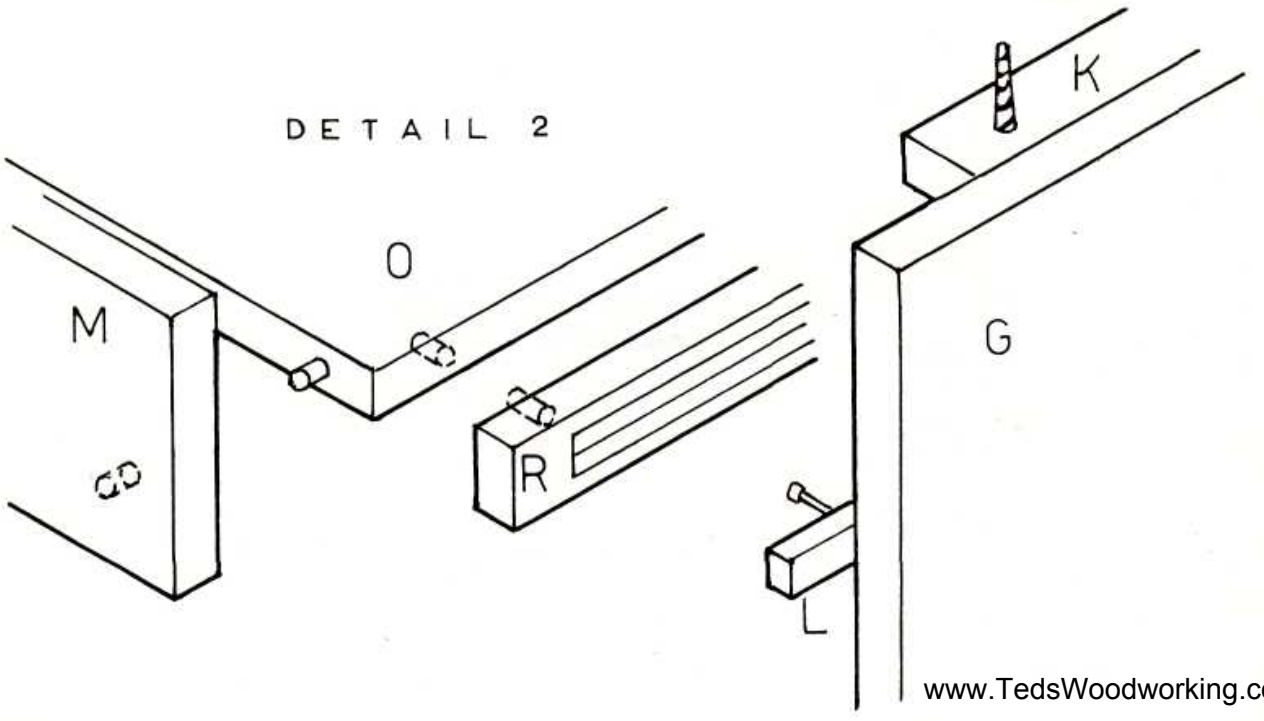
SECTION DETAIL 2



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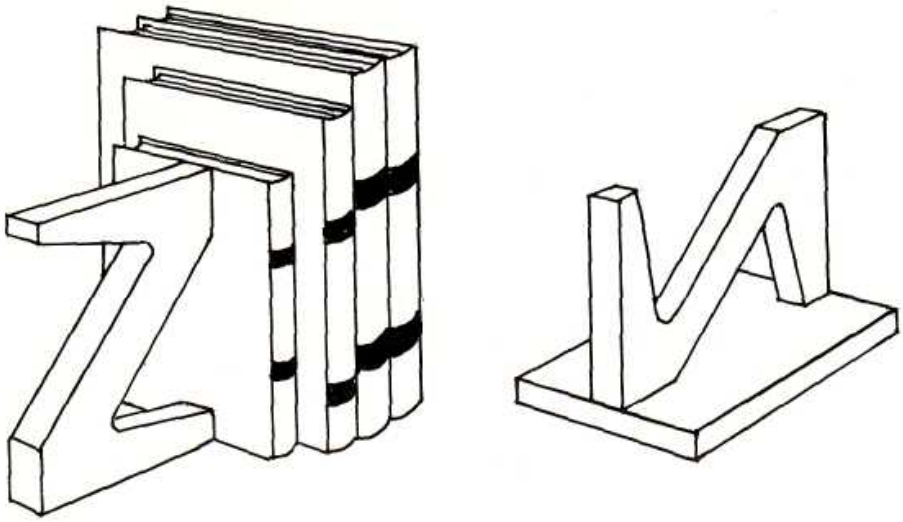
DETAIL 2

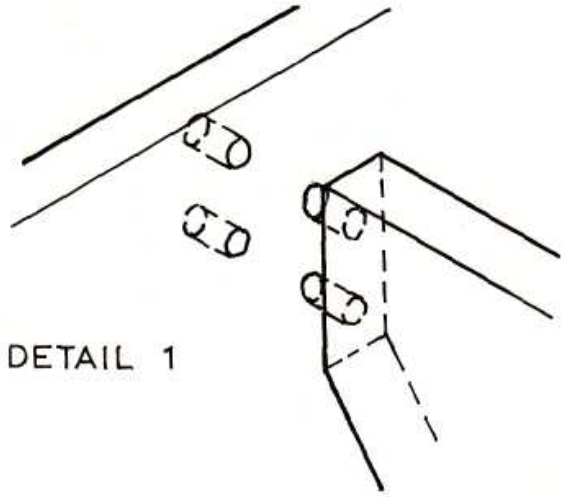


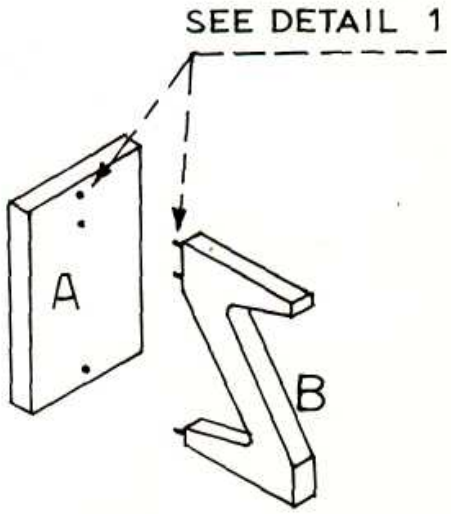
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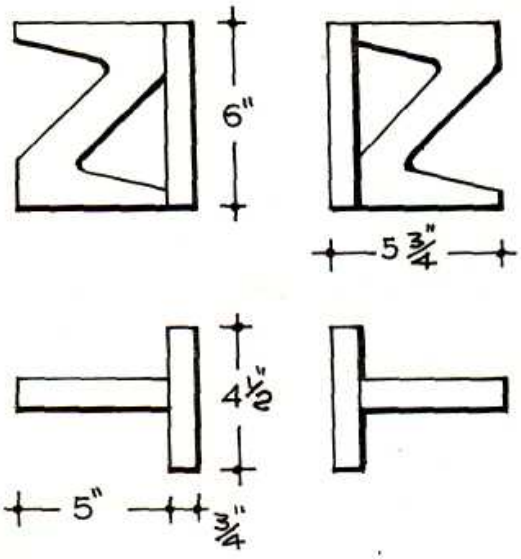
4.4 BOOKENDS

An interesting idea for book ends can be to fashion them in the form of your initials. Any combination of letters will do for this project.









List of Materials

A	2	boards	¾	4½	6
B	2	boards	¾	5	6

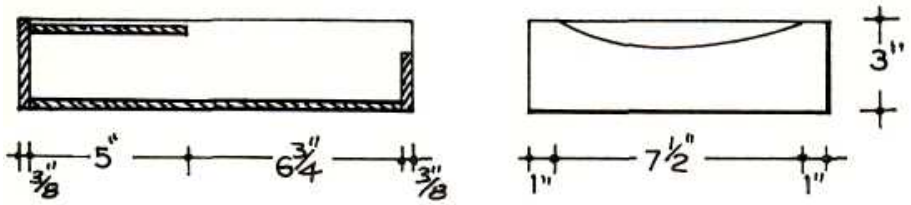
Instructions for Assembly

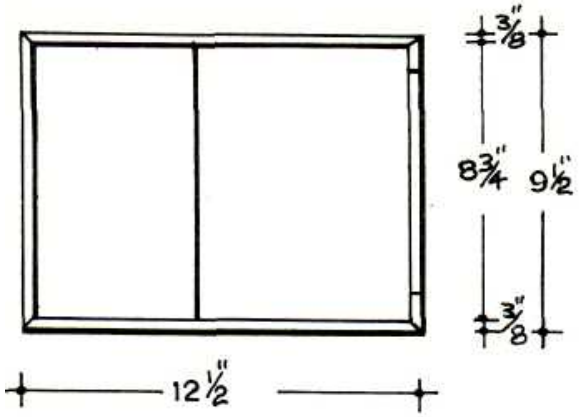
1. Join boards (A) with (B).
2. Apply finish.

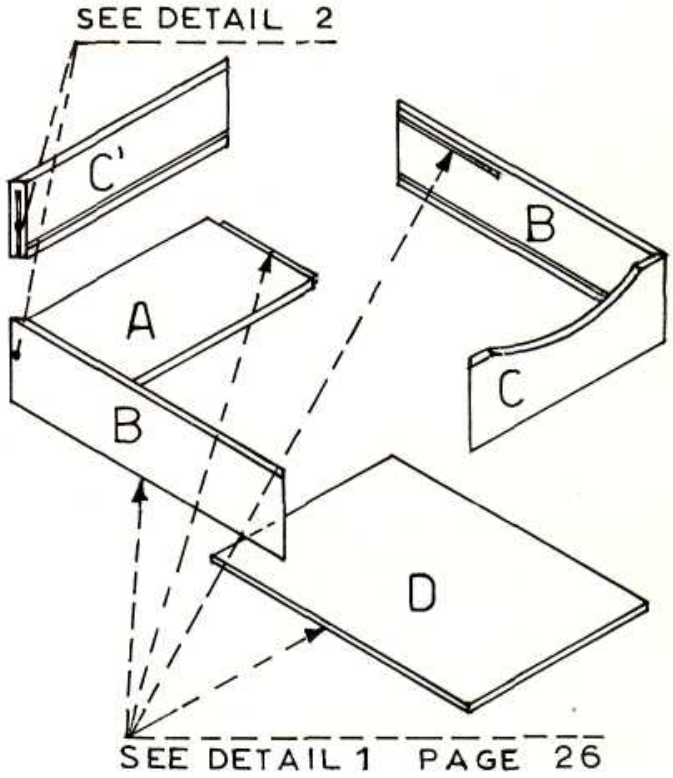
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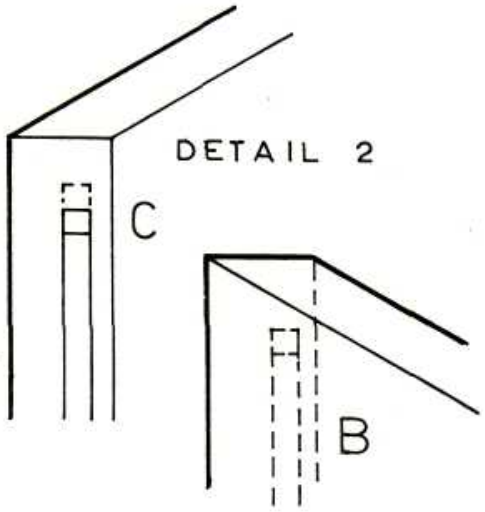
4.5 LETTER TRAY

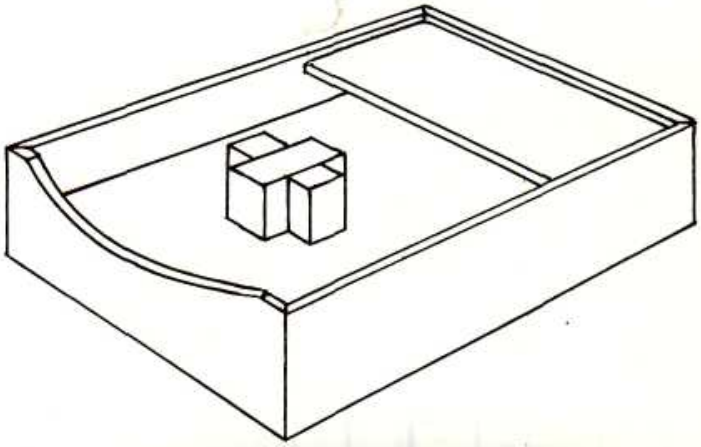
This rectangular-shaped letter tray is very simple to make, but careful construction will give a feeling of achievement.











List of Materials

A	1	top	3/8	5 1/8	9 1/8
B	2	sides	3/8	3	12 1/2
C,C'	2	front & back	3/8	3	9 1/2
D	1	bottom	3/8	9 1/8	12 1/8

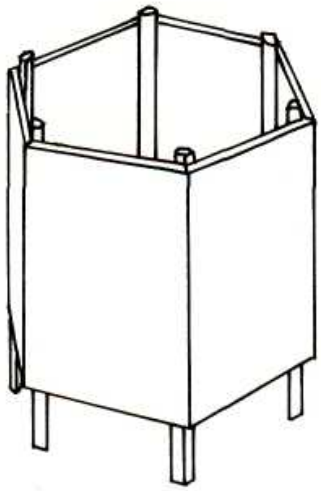
Instructions for Assembly

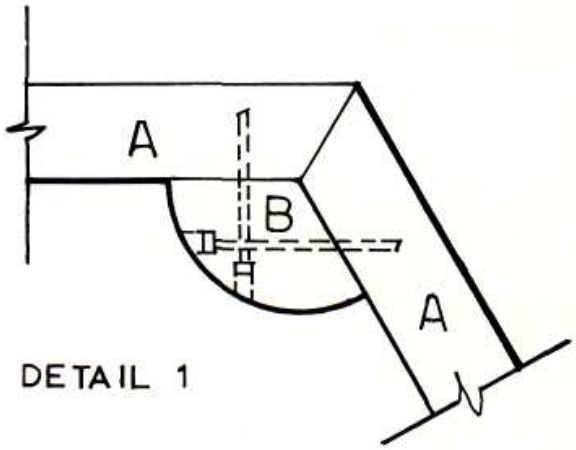
1. Join top (A) and bottom (D) with front (C) and back (C') and sides (B).
2. Apply finish.

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4.6 WASTEBASKET

One of the accessories to which designers very seldom give any attention is the humble wastebasket. The hexagonal type shown here will fit in with the furniture of any family room.



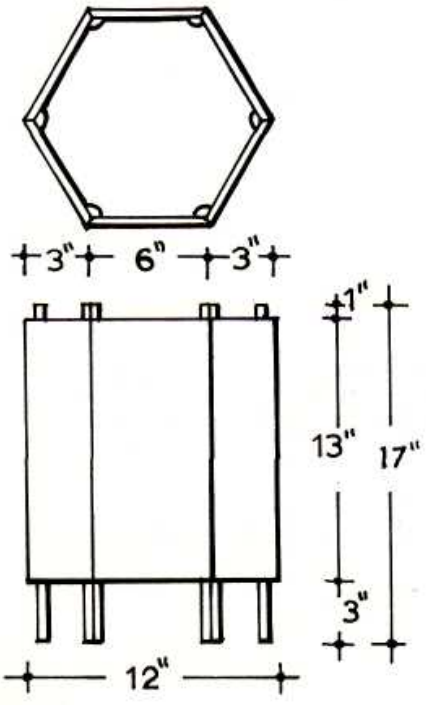


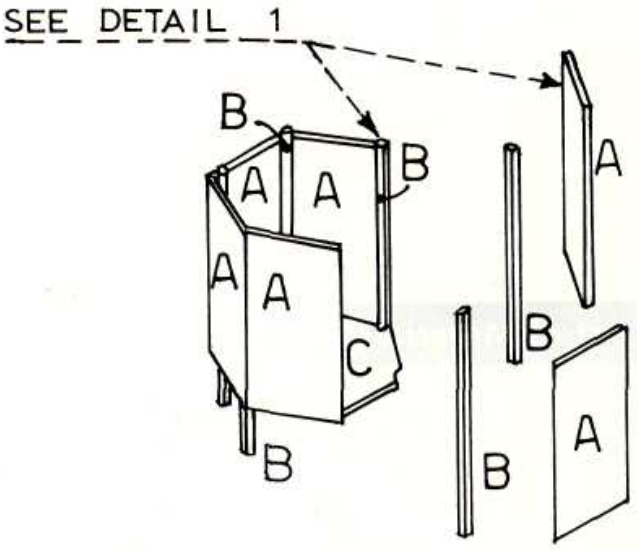
Instructions for Assembly

A	6	sides	⅝ diam.		14
B	6	supports	⅝	1	17
C	1	bottom	½	6	13

List of Materials

1. Join bottom (C) with supports (B) and sides (A).
2. Apply finish.





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4.7 MAGAZINE RACK

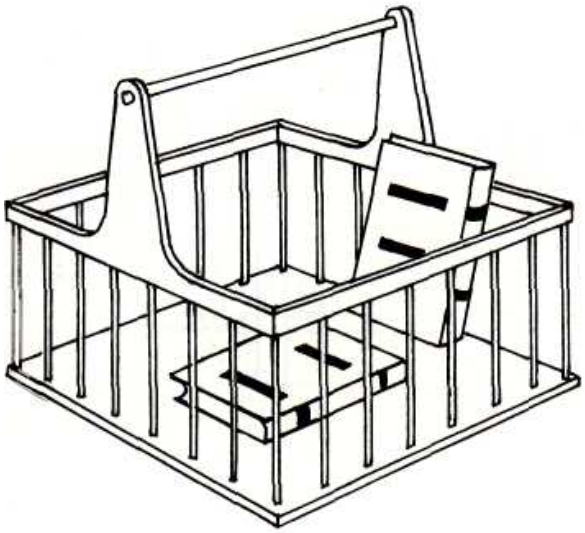
A magazine rack can be a very decorative addition in any home. Here is a good example that can be built easily and inexpensively.

List of Materials

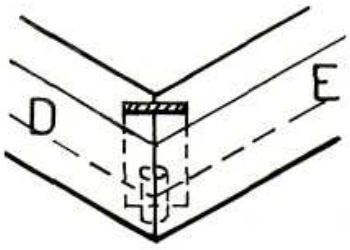
A	1	bottom	½	14	14
B	1	dowel	⅝ diam.		14
C	28	dowels	⅜ diam.		8½
D	2	sides	⅝	6½	14
E	2	sides	⅝	1	14

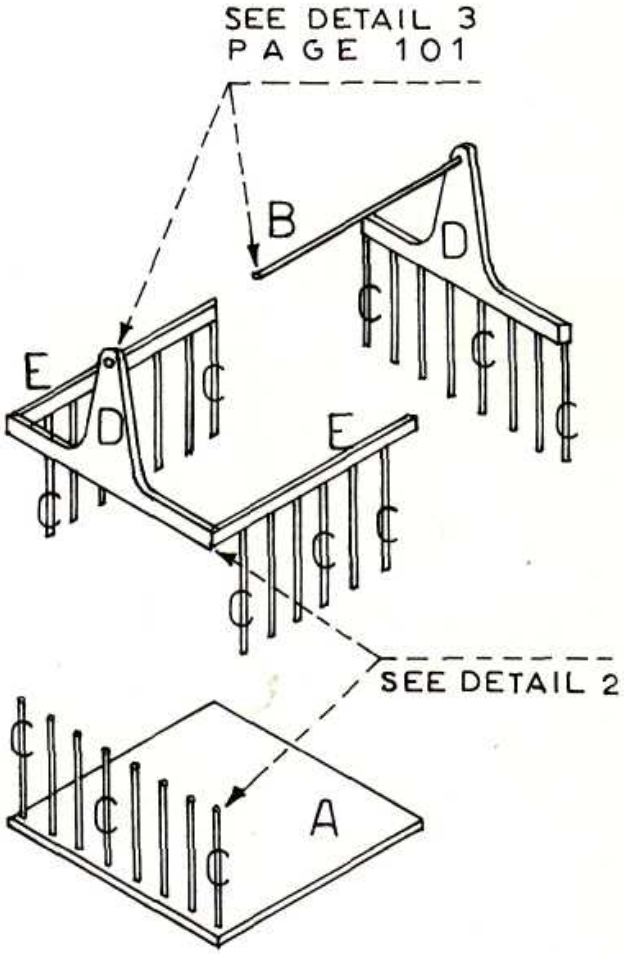
Instructions for Assembly

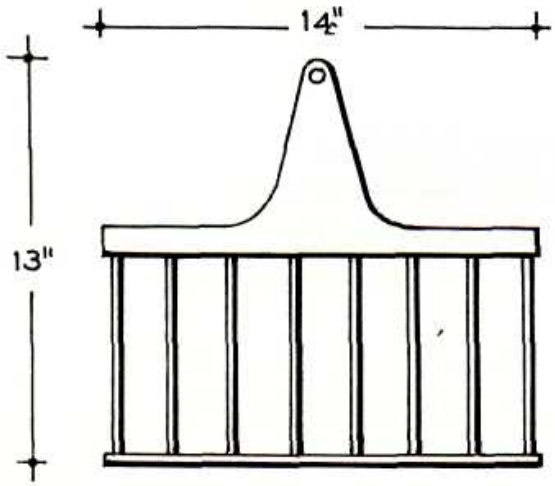
1. Join sides (D) with dowel (B) and sides (E).
2. Insert dowels (C) in bottom (A) and sides (D, E).
3. Apply finish.

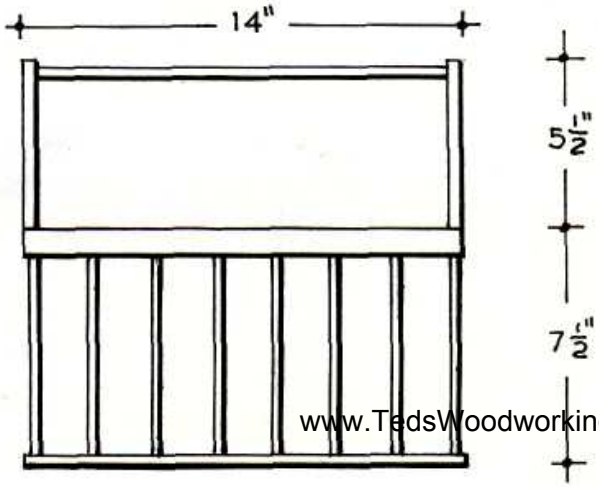


DETAIL 2





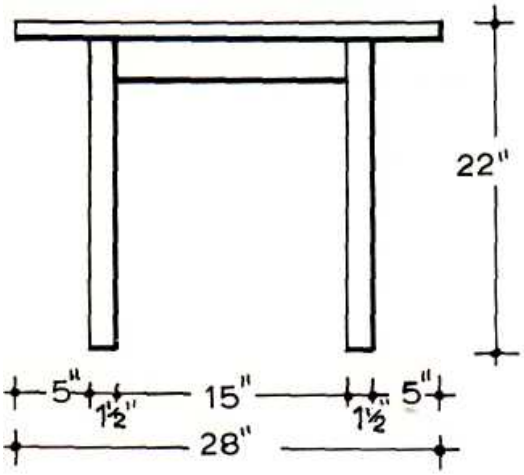


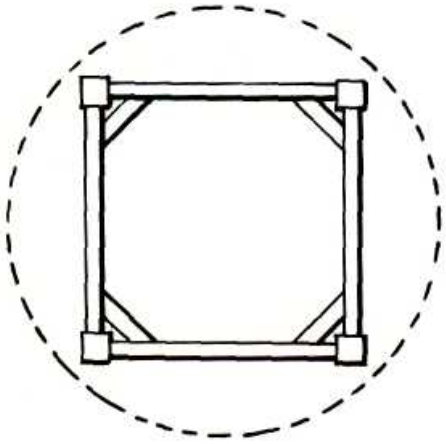


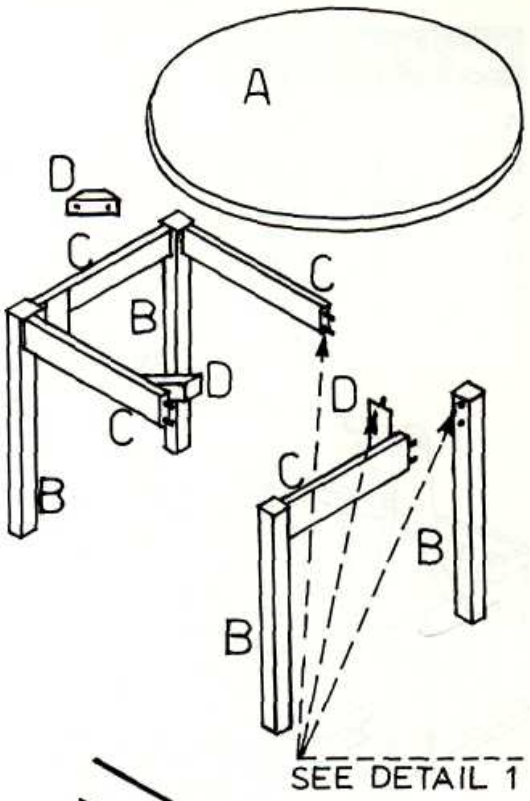
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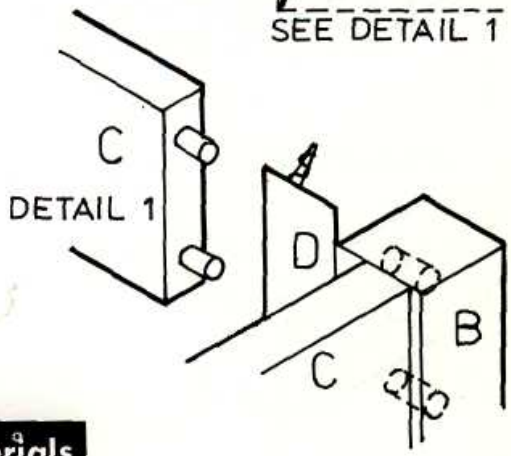
4.8 SMALL ROUND TABLE

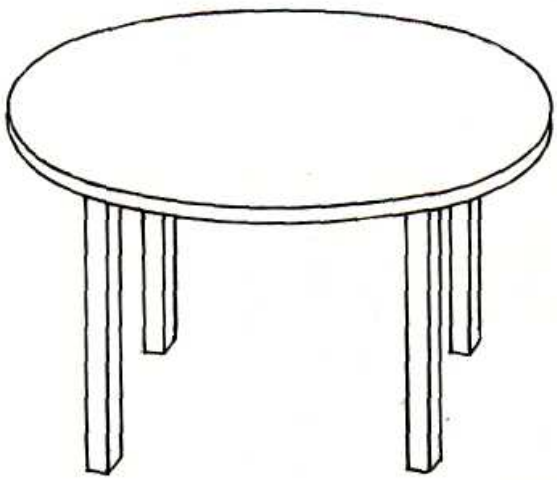
Ideal for cozy tea parties (simulated) and board games of the younger set. Can be combined with the plywood chair of page 97 to make a complete two-piece unit.











List of Materials

A	1	top	1	28 diam.	
B	4	legs	1½	1½	21
C	4	rails	1	2	15
D	4	corner blocks	1	2	4

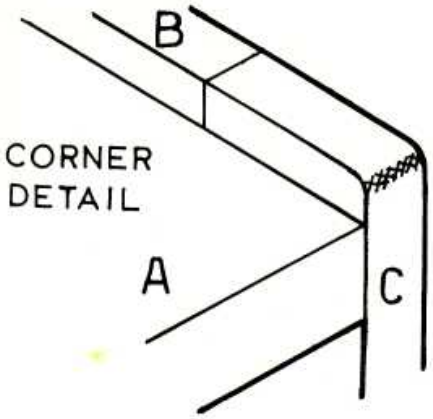
Instructions for Assembly

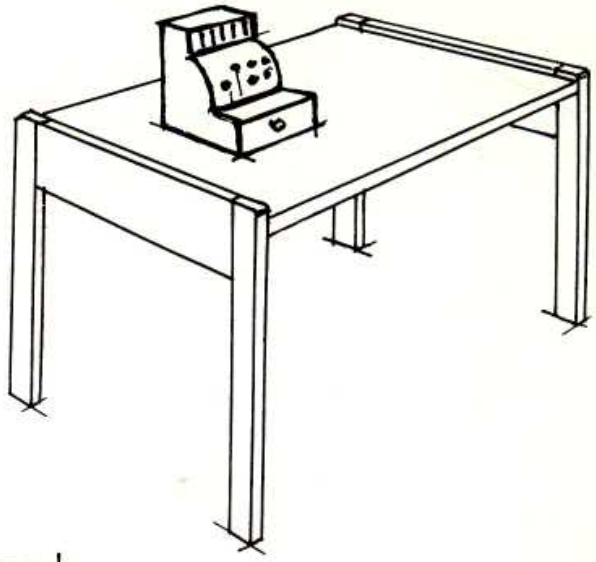
1. Fasten legs (B) to rails (C).
2. Attach corner blocks (D) to rails (C).
3. Prepare round top and fasten with screws to corner blocks (D).
4. Apply finish.

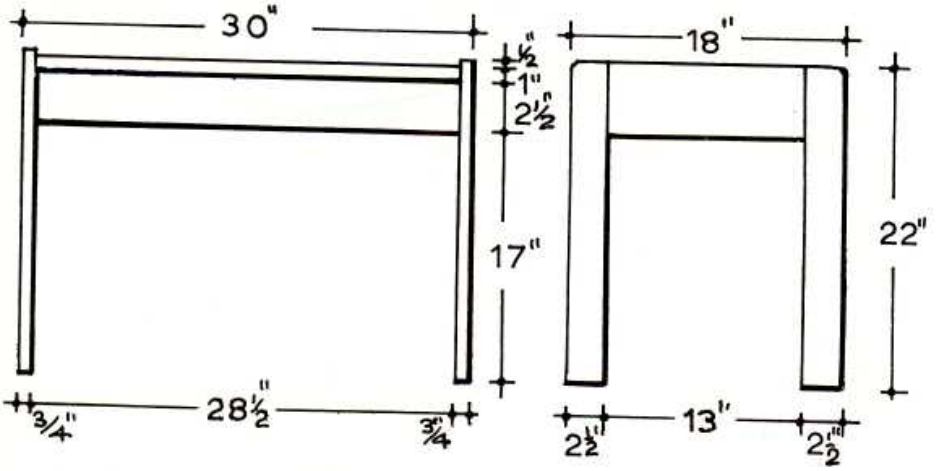
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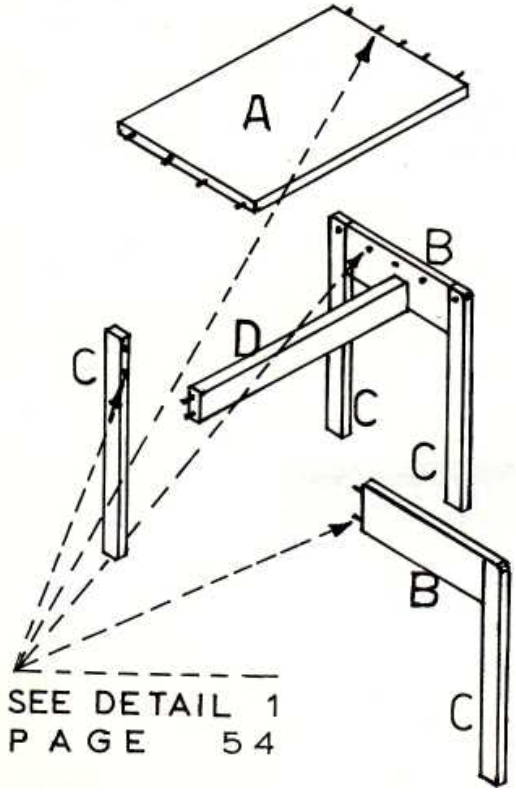
4.9 PLAY AND WORK TABLE

Because of its purpose, this table should have sturdy legs for steadiness and durability. Plywood top can be covered with plastic material, and a raised edge will keep pencils and crayons from falling on the floor.









List of Materials

A	1	top	¾	18	28½
B	2	traverse	¾	4	13
C	4	legs	¾	2½	22
D	1	rail	¾	2½	28½

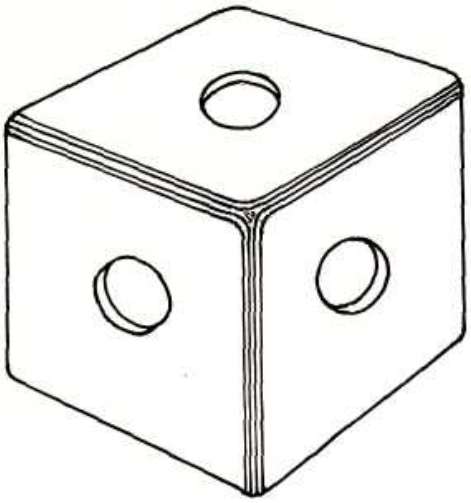
Instructions for Assembly

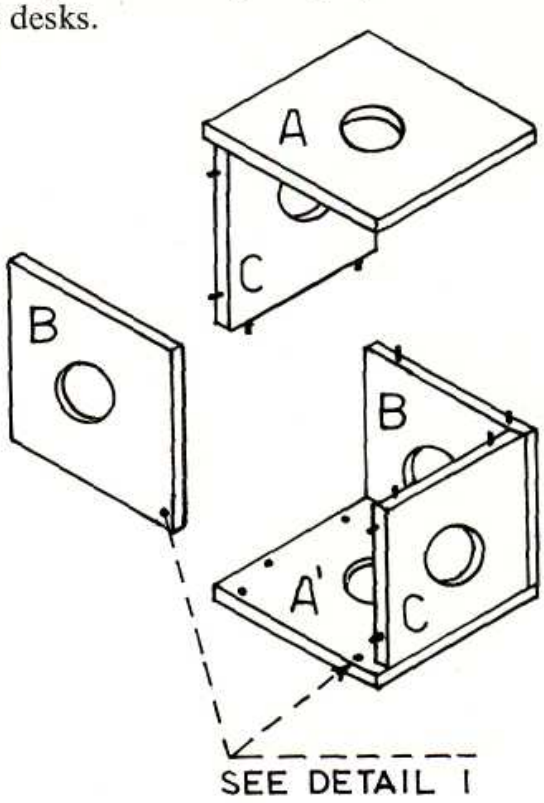
1. Fasten traverse rails (B) to legs (C).
2. Join top (A) and cross rail (D) to traverse rails (B) and legs (C).
3. Apply finish.

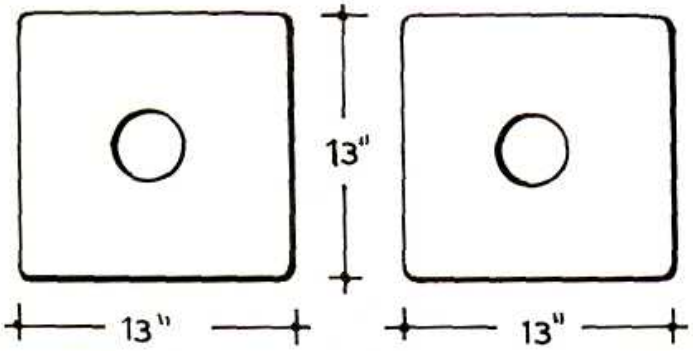
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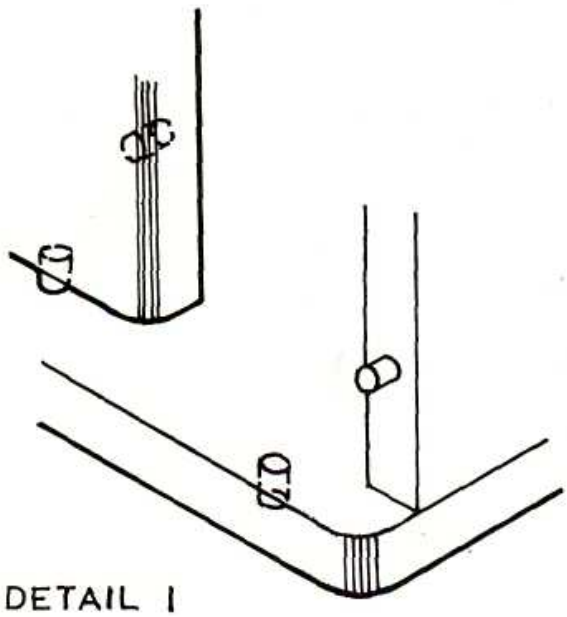
4.10 STOOL

Tip-proof and sturdy, this stool can serve equally well as a seat, a stand for gadgets such as radios and hamster cages, or occasionally as a night table. A good project to start on before undertaking more complicated items such as desks.









List of Materials

A	1	top	¾	13	13
A′	1	bottom	¾	13	13
B	2	sides	¾	11½	13
C	2	sides	¾	11½	11½

Instructions for Assembly

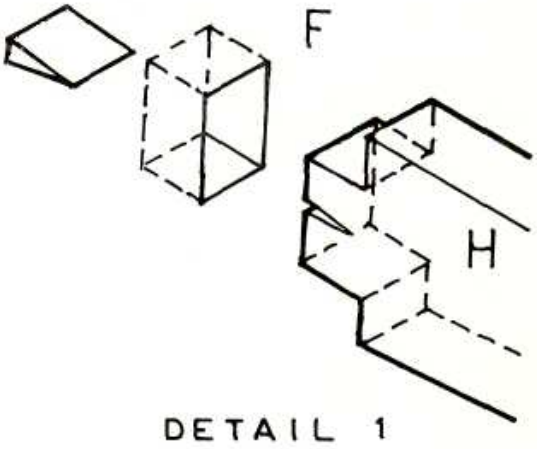
1. Join sides (B) with sides (C).
2. Fasten top (A) and bottom (A') to sides (B) and (C).
3. Apply finish.

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4.11 WORK TABLE

This is one of the most useful, all-purpose items for play, work and storage. The raised rim prevents small objects from falling off. Material used is plywood throughout, except for the cross-rail support, which is solid wood. A laminated plastic surface such as Formica is ideal for clay, finger paints, potted plants, aquariums, and even occasional between-meal snacks!





DETAIL 1

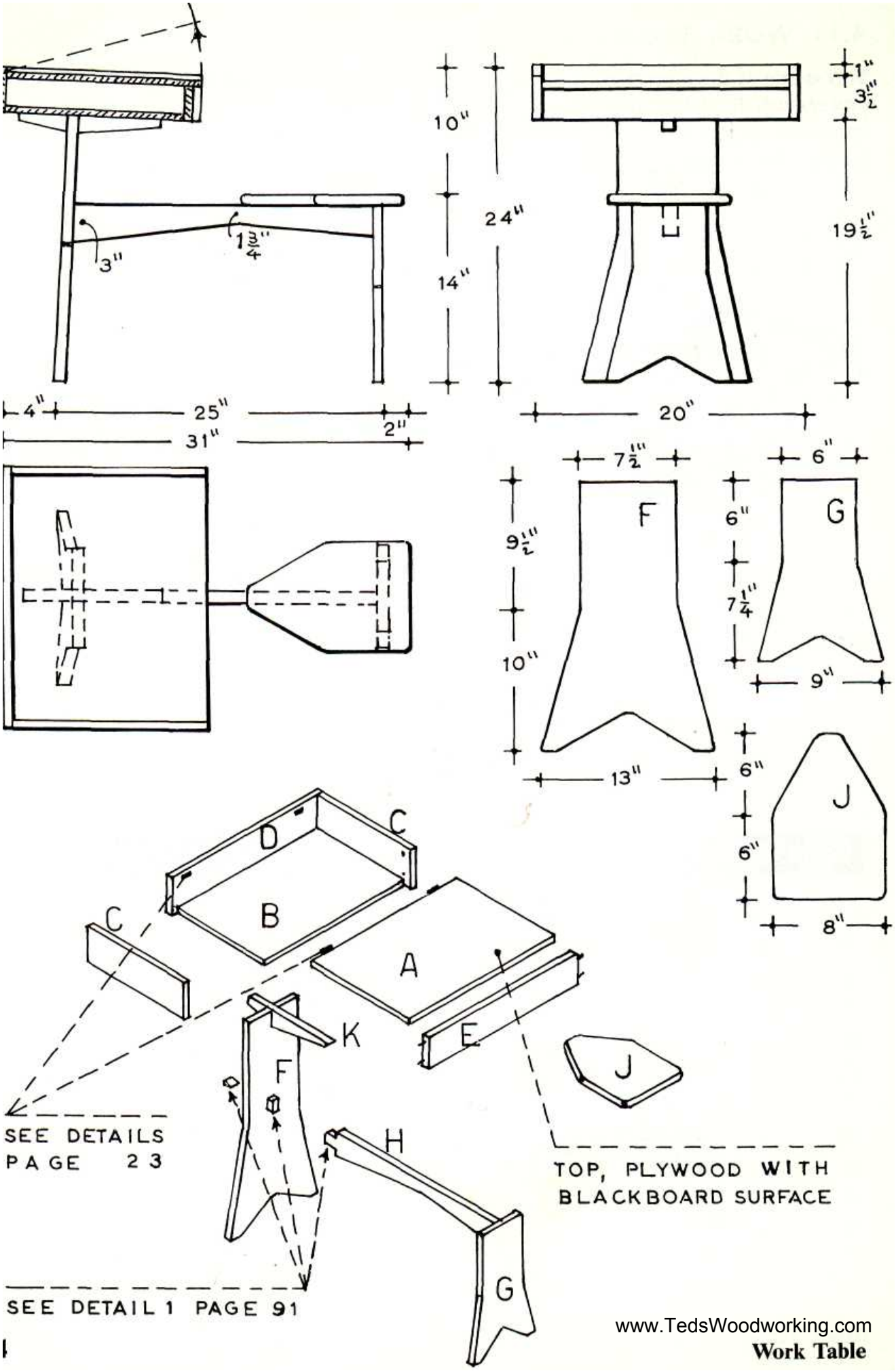
List of Materials

PART	NO.	FUNCTION	DIMENSION IN INCHES thickness × width × length		
A	1	top	½	14½	19
B	1	bottom	½	13½	19
C	2	sides	½	3½	14½
D	1	front	½	3½	20
E	1	back	½	2¾	19
F	1	support	¾	13	19½
G	1	support	¾	9	13½
H	1	rail	1¼	3	24
J	1	seat	¾	8	12
K	1	brace	1½	1½	11

Instructions for Assembly

1. Attach sides (C) to front (D) and back (E) and to bottom (B).
2. Install top (A) on front (D).
3. Join rails (H) to supports (F) and (G).
4. Fasten seat (J) to rails (H) and supports (G).
5. Join brace (K) to support (F) and fasten to bottom (B).
6. Apply finish.

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Work Table

4.12 STANDARD CHAIR

Why build a "standard" chair when they can be bought so easily? Answer: it's more fun. Then, too, you can "tailor" it to match the other furniture in your child's room. Besides, think of the heirloom value!

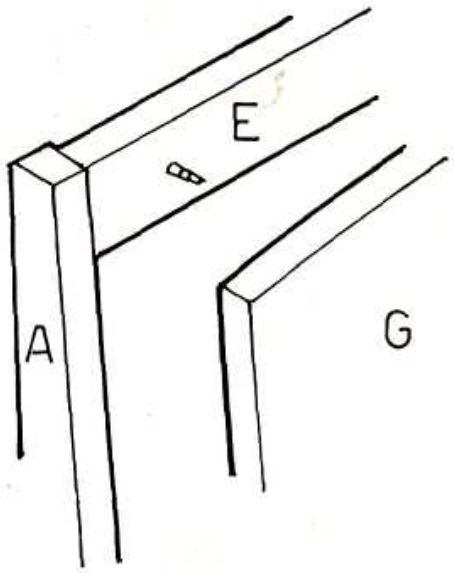
List of Materials

PART	NO.	FUNCTION	DIMENSION IN INCHES thickness × width × length		
A	2	legs	1	3	31
B	2	legs	1	1¾	16¾
C	2	rails	¾	1¾	13½
D	2	rails	¾	1¾	13
E	1	rail	¾	1¼	13
F	1	seat	¾	17	18
G	1	back	½	6	16
H	2	stretchers	⅝ diam.		14
J	2	stretchers	⅝ diam.		16
K	4	corner blocks	1	2	2

Instructions for Assembly

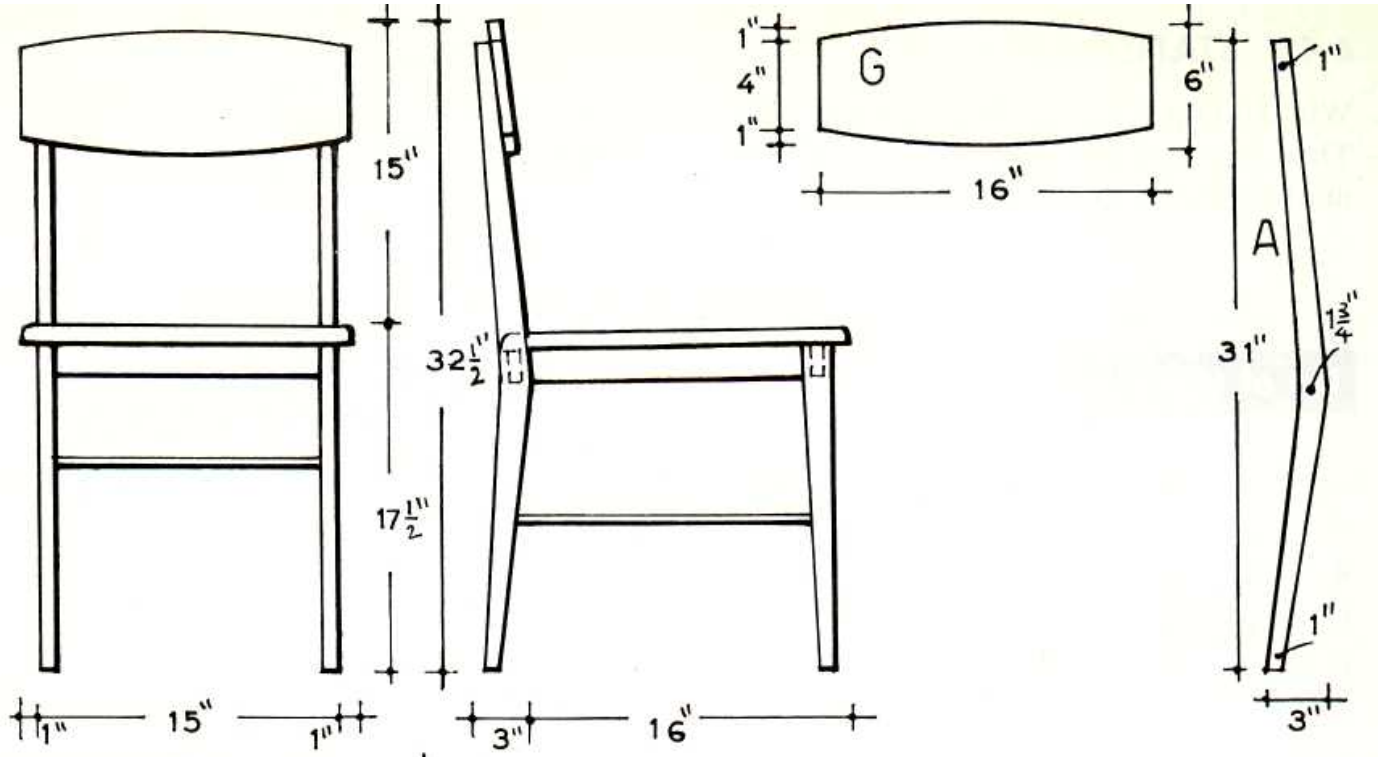
1. Attach legs (A) and (B) to rails (C) and stretcher (J).
2. Join legs (A) and (B) to rails (E) and (D) and to stretchers (H).
3. Fasten corner blocks (K) and attach seat (F) with screws.
4. Fasten back (G) to rail (E) and legs (A) with screws.
5. Apply finish. *Note:* Seat can be upholstered with half-inch foam rubber, covered with either fabric or plastic.

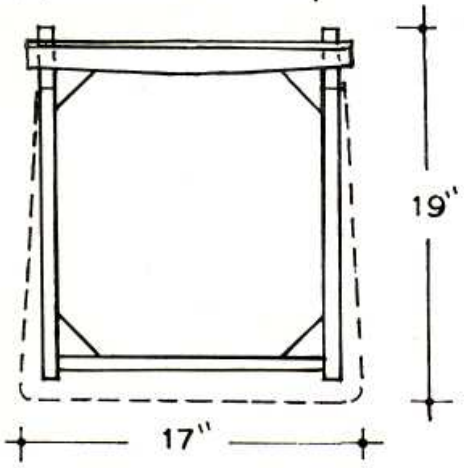


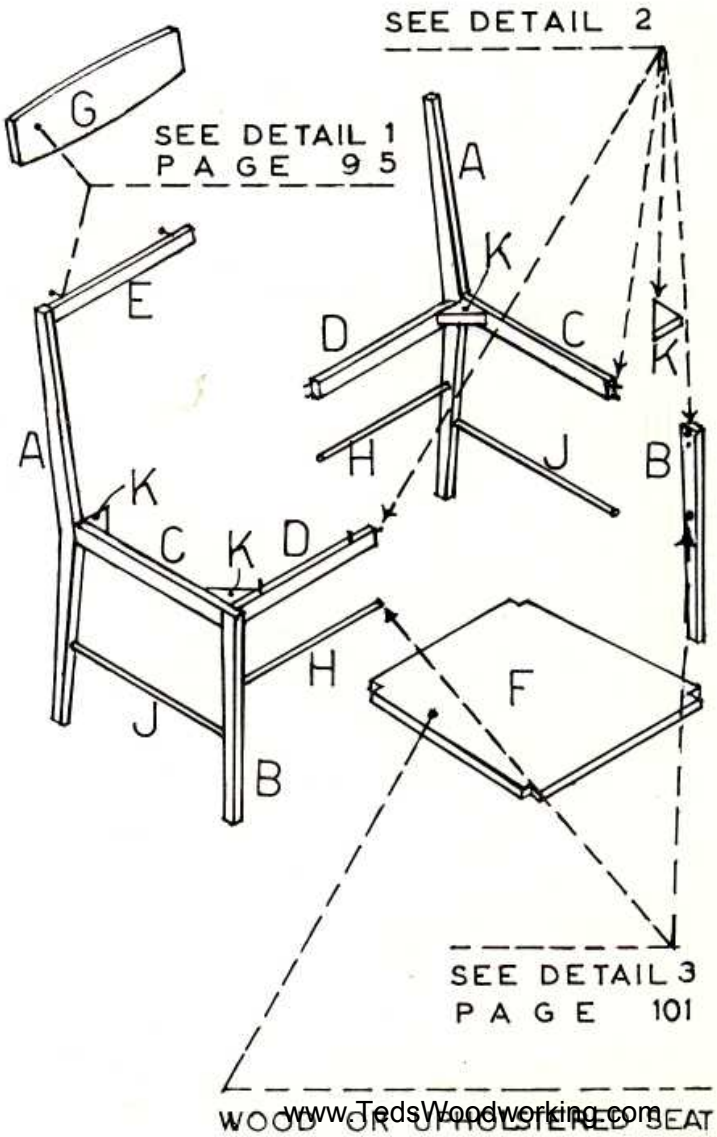


DETAIL 1

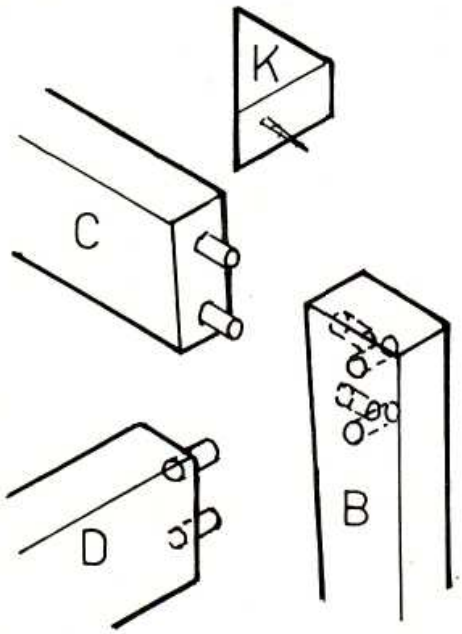
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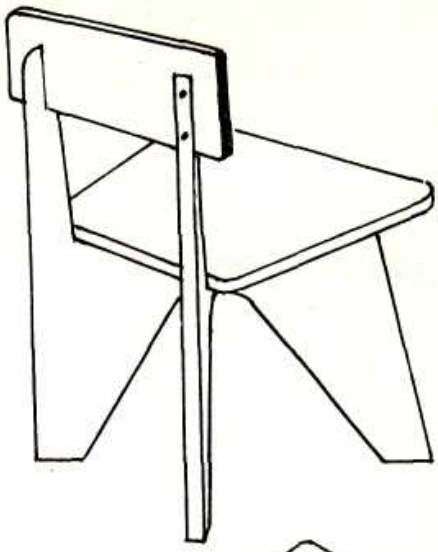
DETAIL 2



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4.13 PLYWOOD CHAIR

Simple in construction and designed for hard use, this practical chair has the shortest list of materials in the book. Makes an attractive companionpiece to the table of Project 4.9.

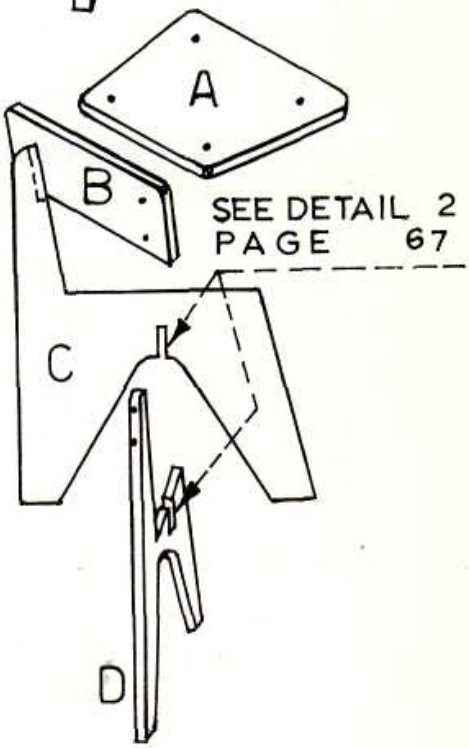


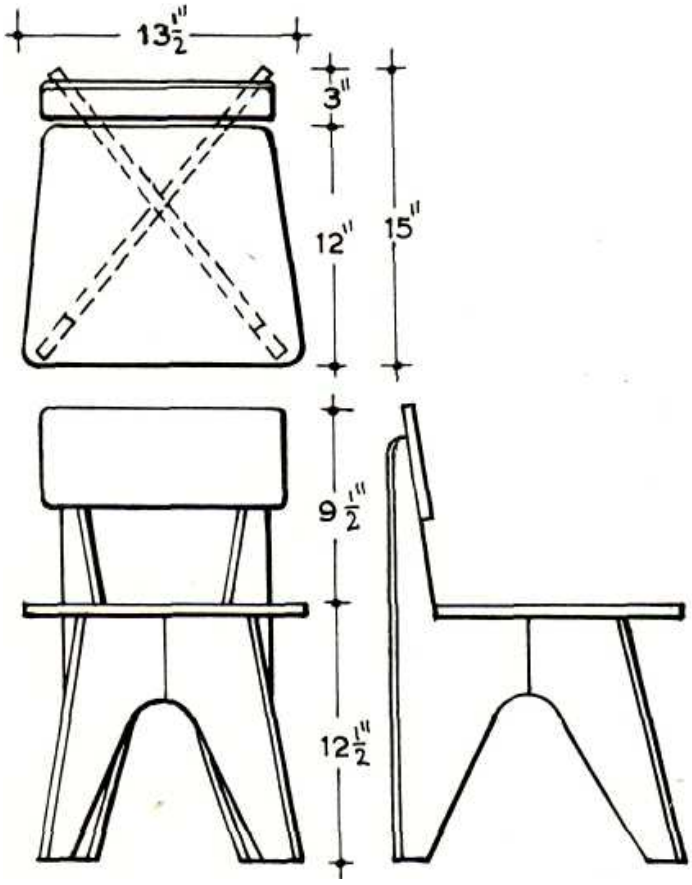
List of Materials

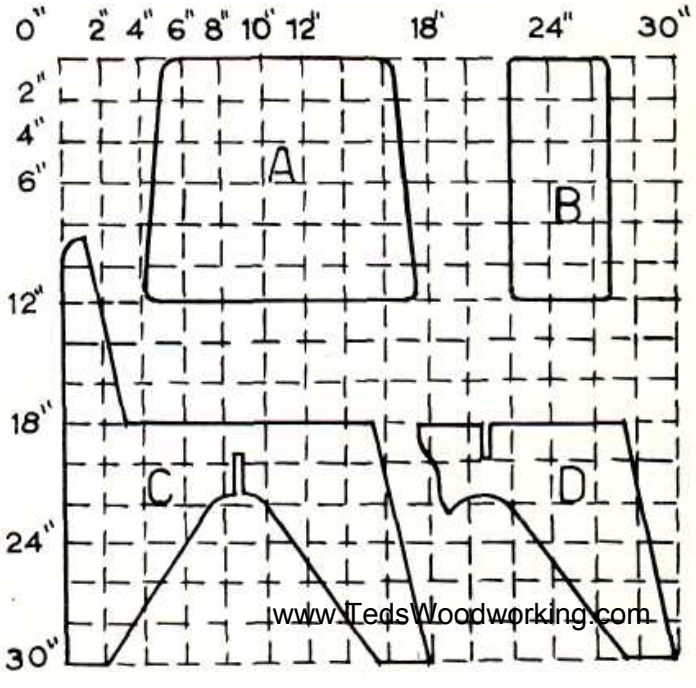
PART	NO.	FUNCTION	DIMENSION IN INCHES thickness × width × length		
A	1	plywood panel (finished both sides)	½	30	30

Instructions for Assembly

1. Enlarge drawing of parts to full scale and trace on plywood as indicated. Do not buy plywood with "rough finish" (knots in veneer) on one side; both sides must be "smooth finish."
2. Join together cross supports (C) and (D).
3. Attach seat (A) to cross supports (C) and (D) with screws.
4. Fasten back (B) to cross supports (C) and (D).
5. Apply finish.







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4.14 STEP STOOL

Secondary but eminently useful—for climbing, reaching, sitting, and as a footrest in the bathroom. Easy and inexpensive to make.

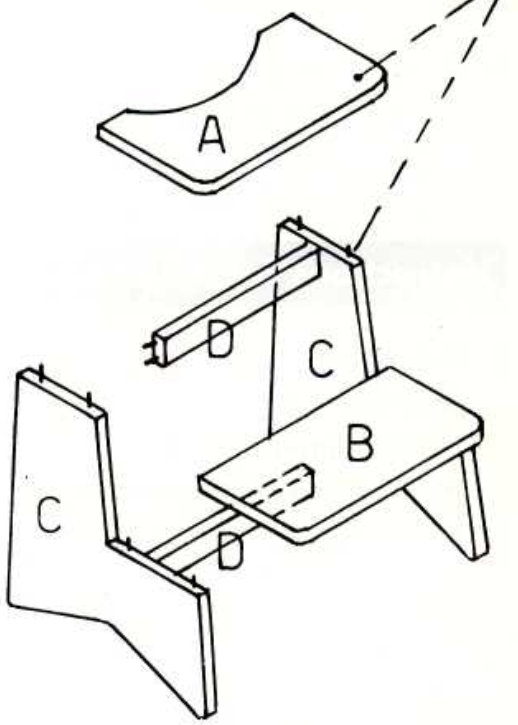
List of Materials

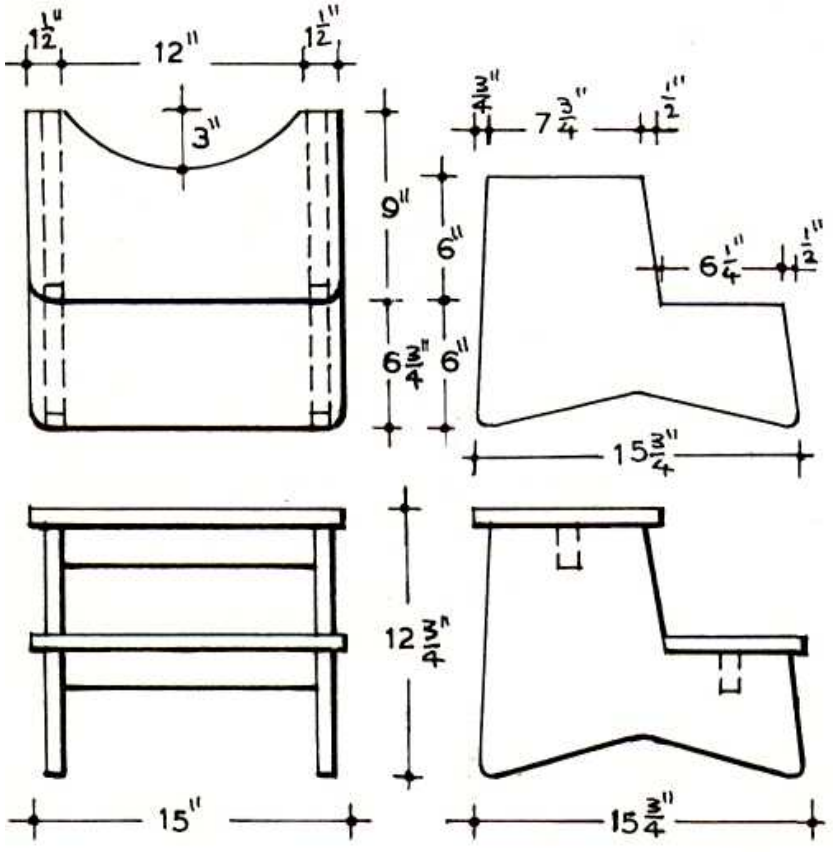
PART	NO.	FUNCTION	DIMENSION IN INCHES thickness × width × length		
A	1	step	¾	9	15
B	1	step	¾	6¾	15
C	2	sides	¾	12	15¾
D	2	rails	1	2	12

Instructions for Assembly

1. Join sides (C) with rails (D).
2. Fasten steps (A) and (B) to sides (C) and rails (D).
3. Apply finish.

SEE DETAIL 1 PAGE 123



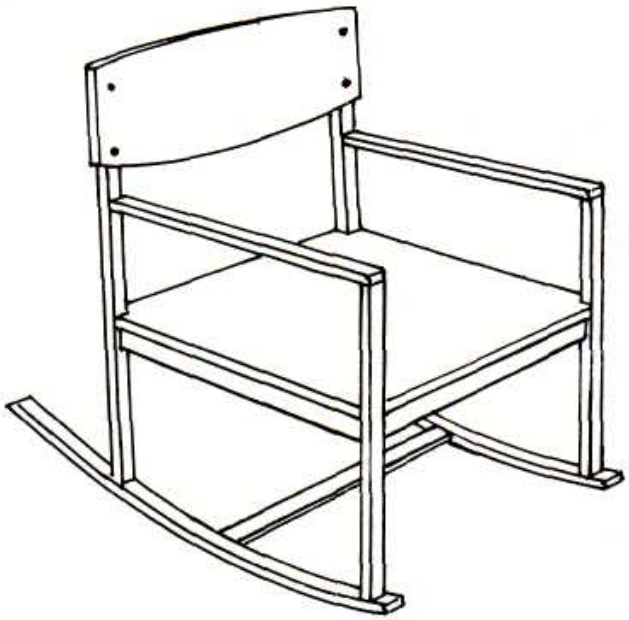


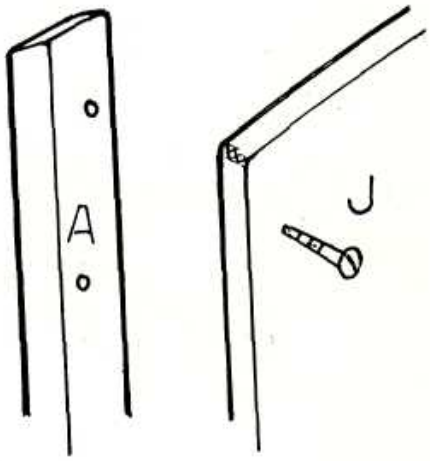


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4.15 ROCKING CHAIR

Children love to "cruise" in a rocking chair, and it's good exercise. This simple design with solid wood frame and plywood seat and back is just right size, too.





DETAIL 2

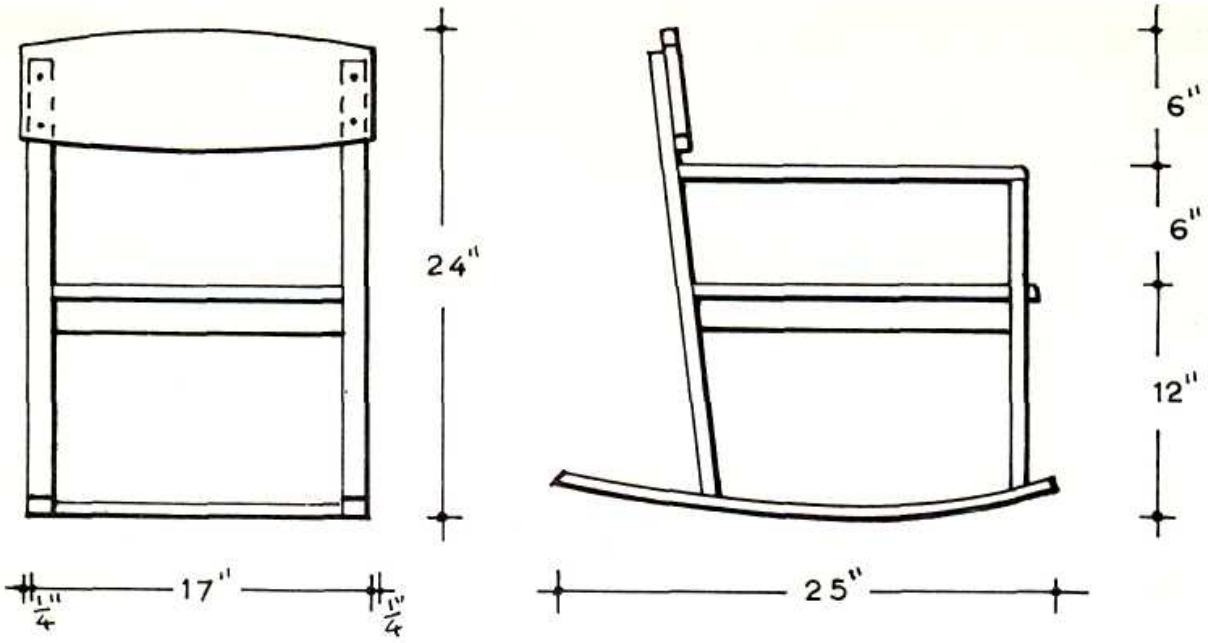
List of Materials

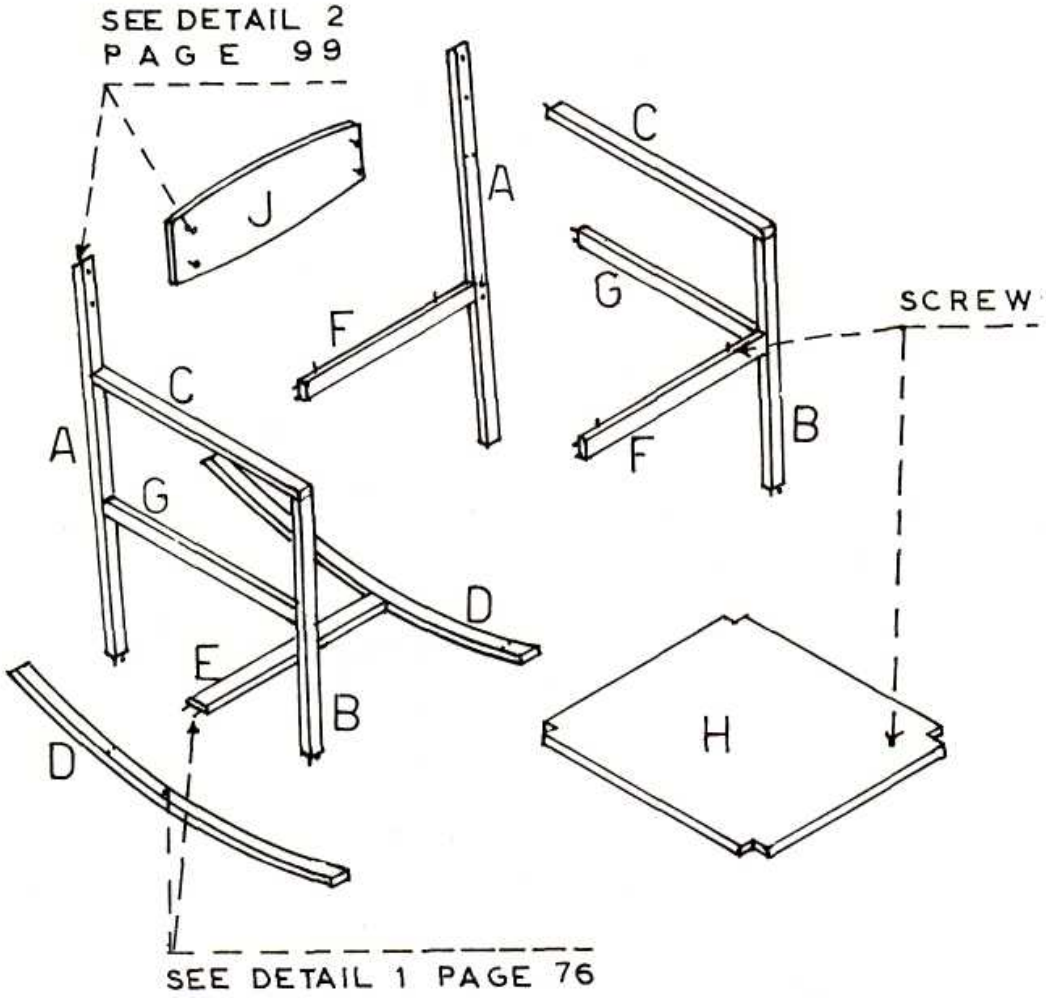
PART	NO.	FUNCTION	DIMENSION IN INCHES thickness × width × length		
A	2	legs	1	1½	22
B	2	legs	1	1½	15
C	2	arms	1	1½	17½
D	2	bases	2½	1½	25
E	1	rail	½	1½	14
F	2	rails	¾	1½	14
G	2	rails	¾	1½	16
H	1	seat	½	17	18
J	1	back	½	6	17½

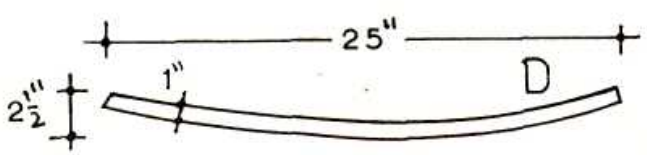
Instructions for Assembly

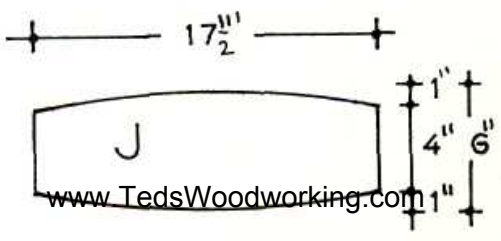
1. Attach arms (C), rails (G) and bases (D) to legs (A) and (B).
2. Join rails (E) and (F) to legs (A) and (B) and to base (D).
3. Attach seat (H) to rails (F) and (G) with screws.
4. Fasten back (J) to legs (A).
5. Apply finish.

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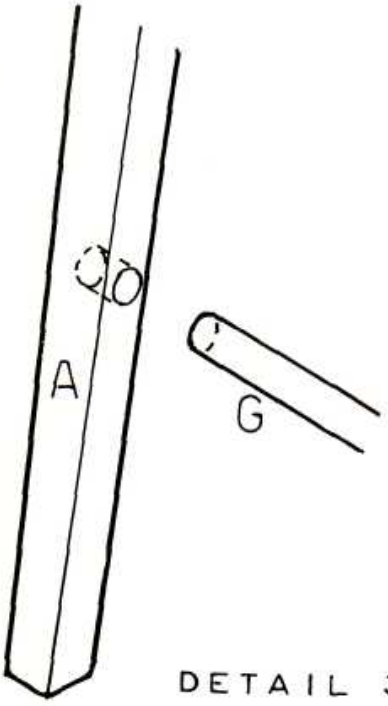




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4.16 JUNIOR CHAIR OR HIGH STOOL

More grown-up and dignified than the high chair of Project 1.4, this easy-to-make item allows junior to eat right off the dining-room table. The foot rest is strictly for comfort.



DETAIL 3



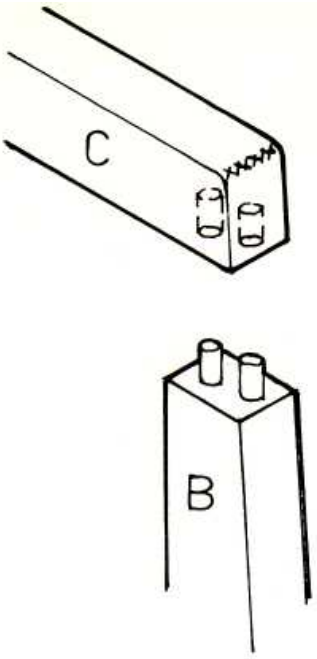
List of Materials

PART	NO.	FUNCTION	DIMENSION IN INCHES thickness × width × length		
A	2	legs	1	2½	36
B	2	legs	1	1¾	27¾
C	2	arms	1	1¼	15
D	1	back	½	7	14
E	1	seat	¾	16	16
F	2	rails	¾	1¾	14
G	4	stretchers	⅝ diam.		17
H	2	stretchers	⅝		15
J	2	supports	½	4	5
K	1	support	½	5	13

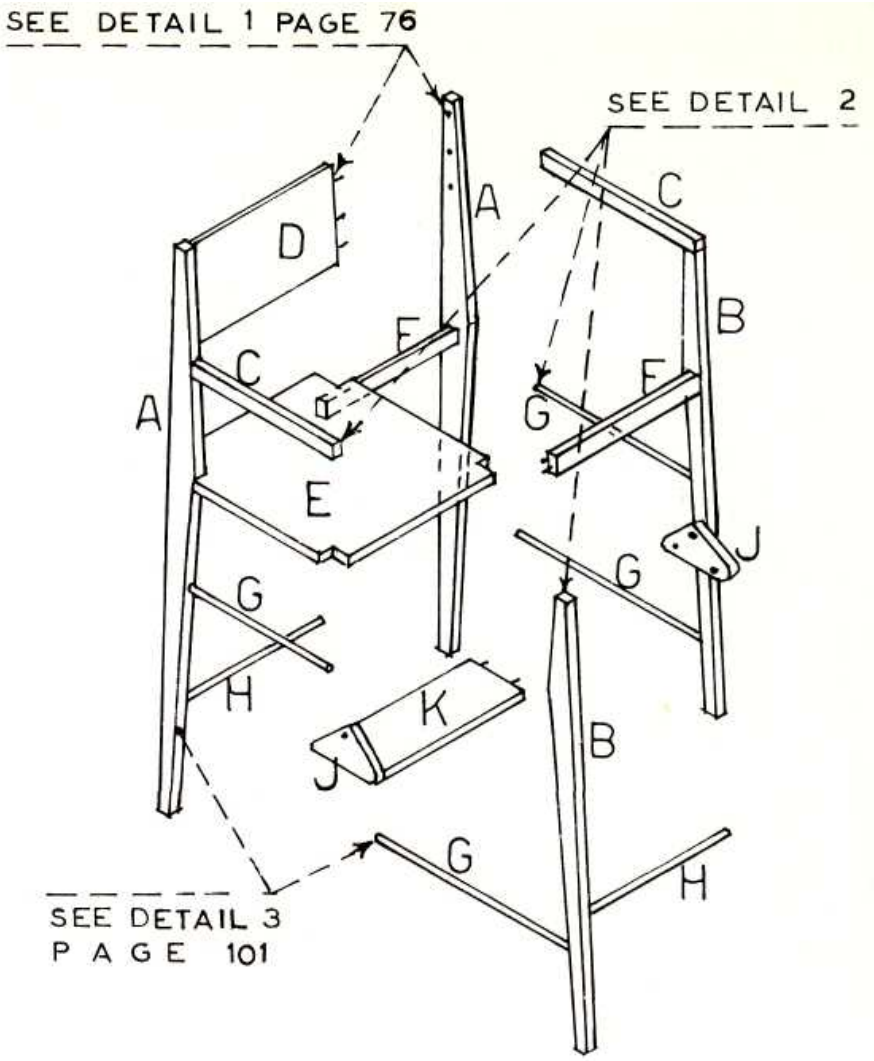
Instructions for Assembly

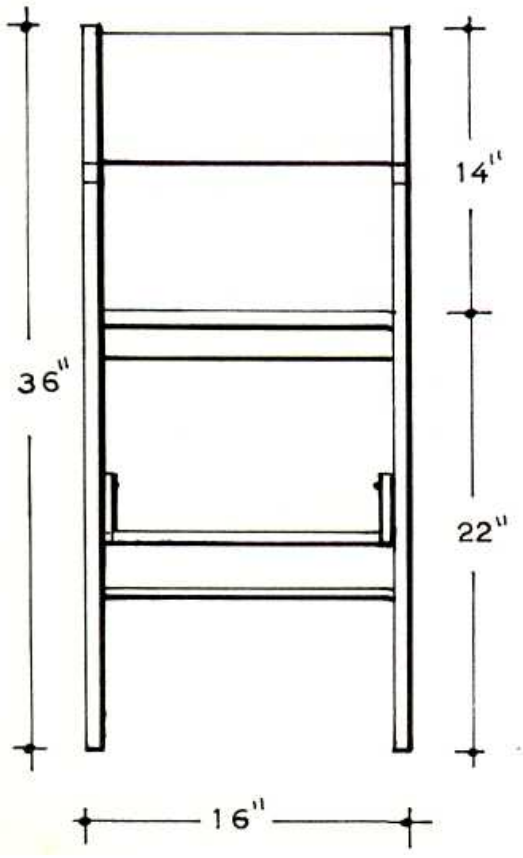
1. Attach legs (A) and (B) to arms (C) and stretchers (G).
2. Join legs (A) and (B) to back (D) and rails (F) and stretchers (H).
3. Fasten seat (E) to rails (F) with screws.
4. Join supports (J) and (K) together and fasten to legs (B) with screws.
5. Apply finish.

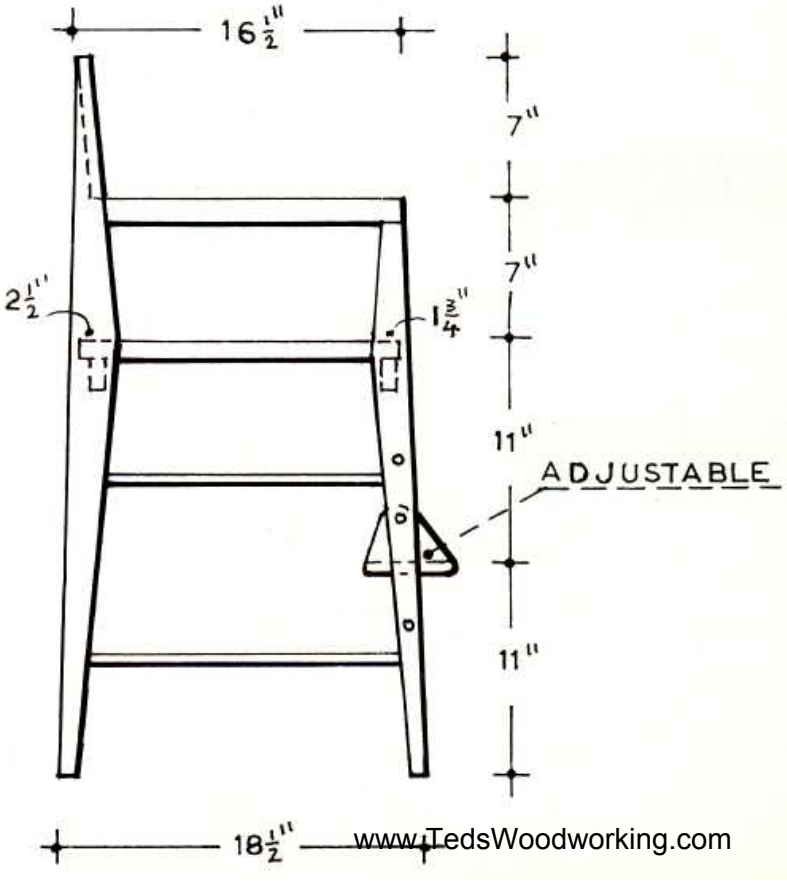
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DETAIL 2



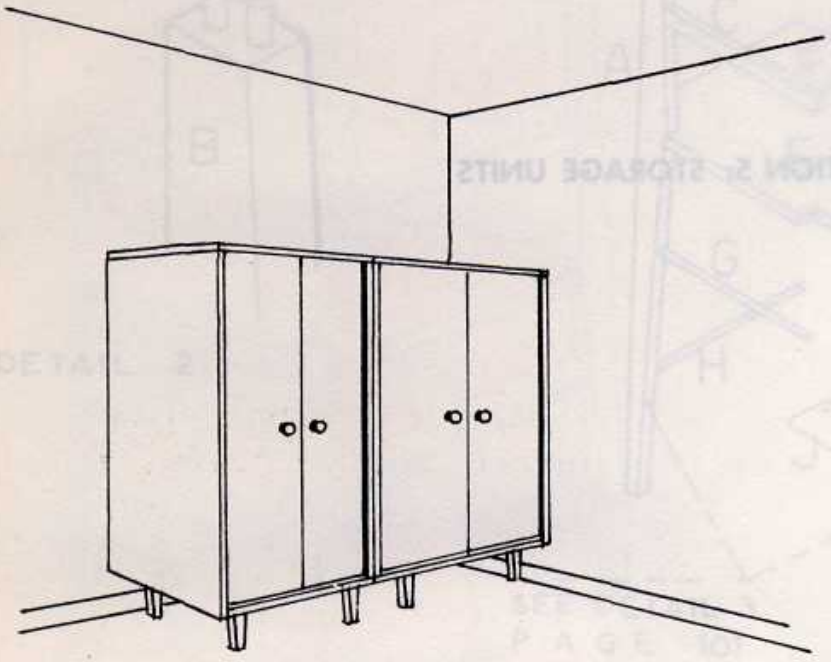


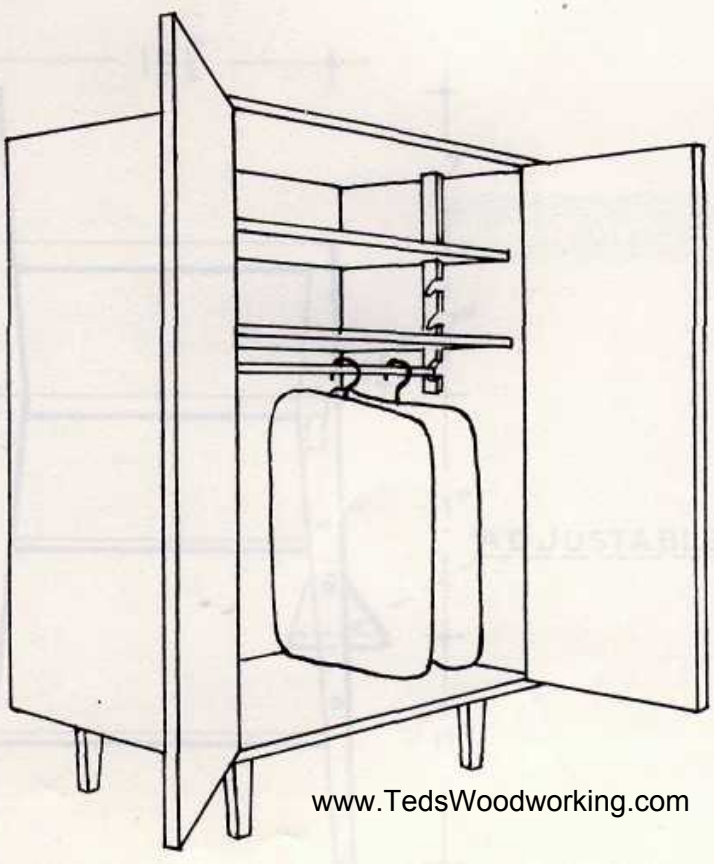


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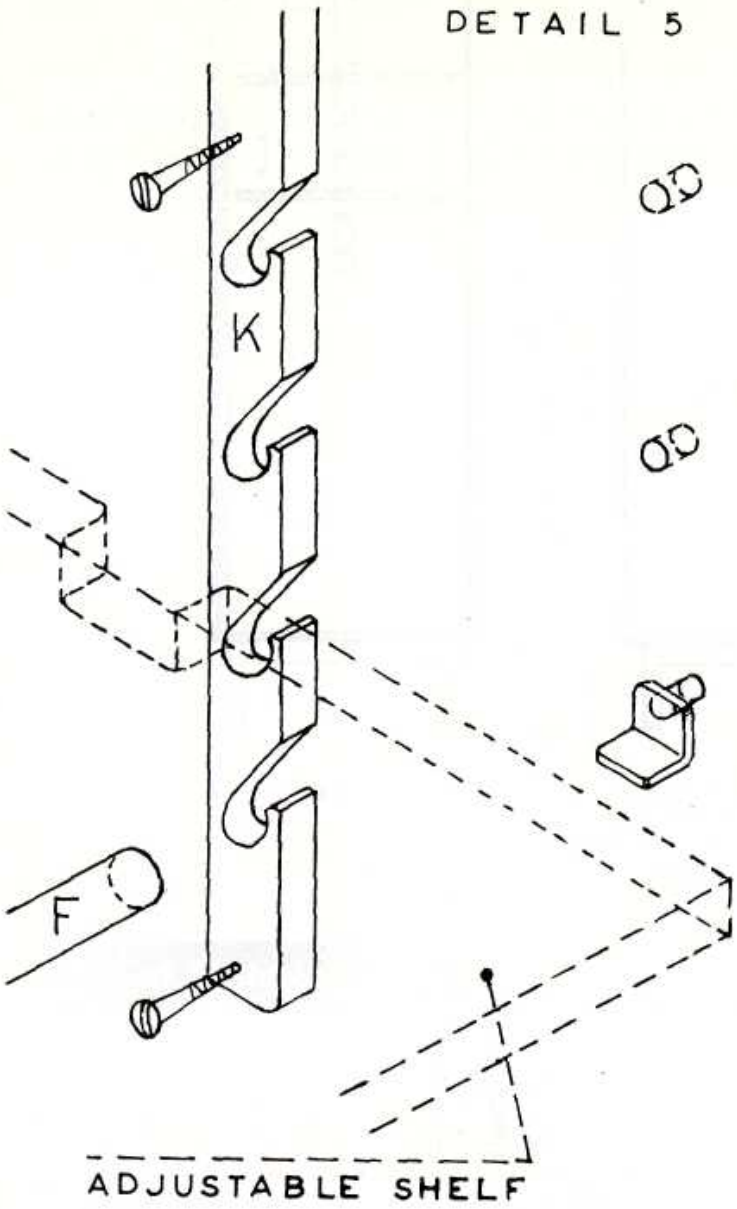
5.1 WARDROBE

Here's a piece of furniture that grows with the child! Both shelves and clothespole may be raised as the little man (or lady) gets taller. Standing a full six feet from the floor, the wardrobe can even be used by adults if one shelf is removed.





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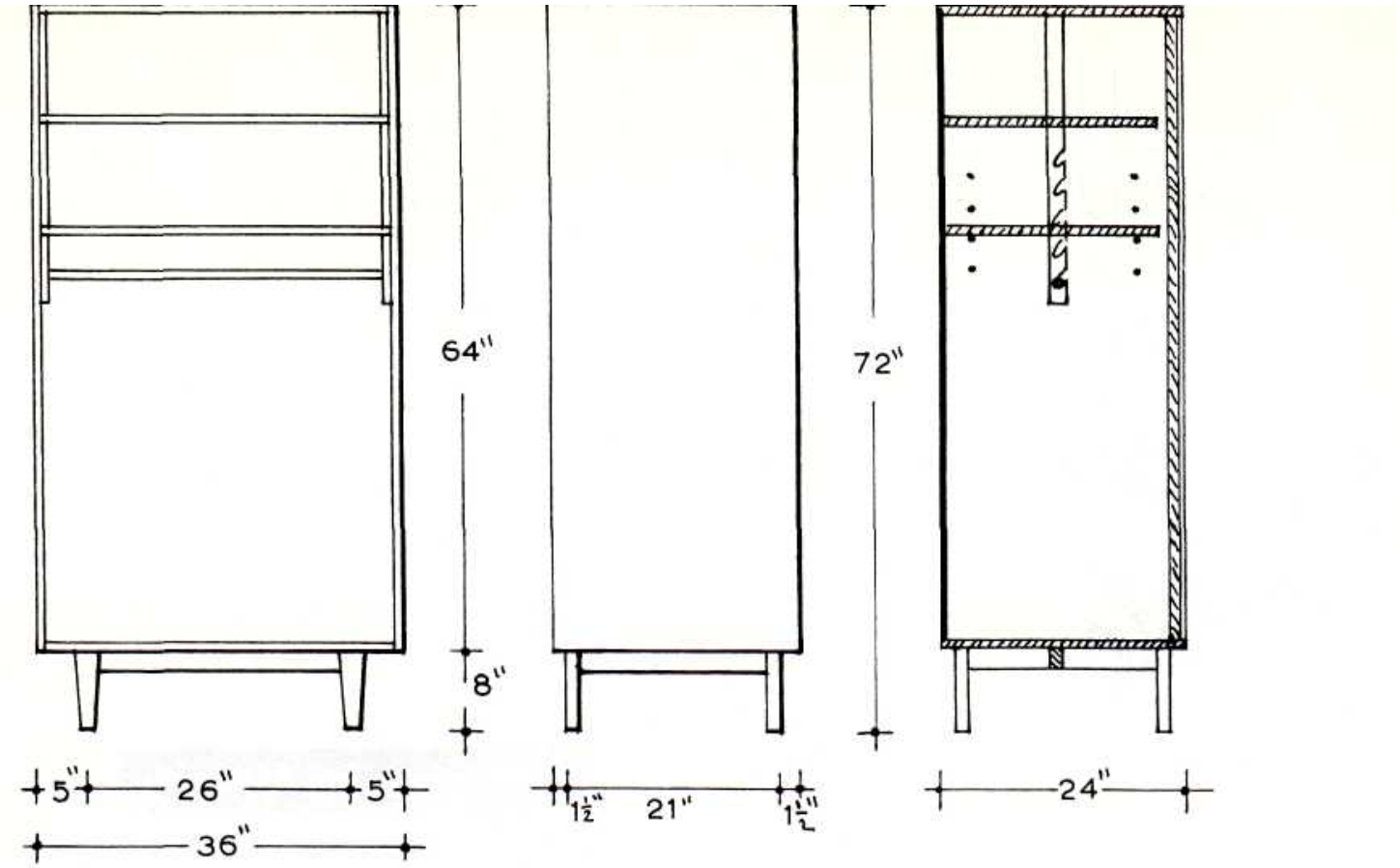
Instructions for Assembly

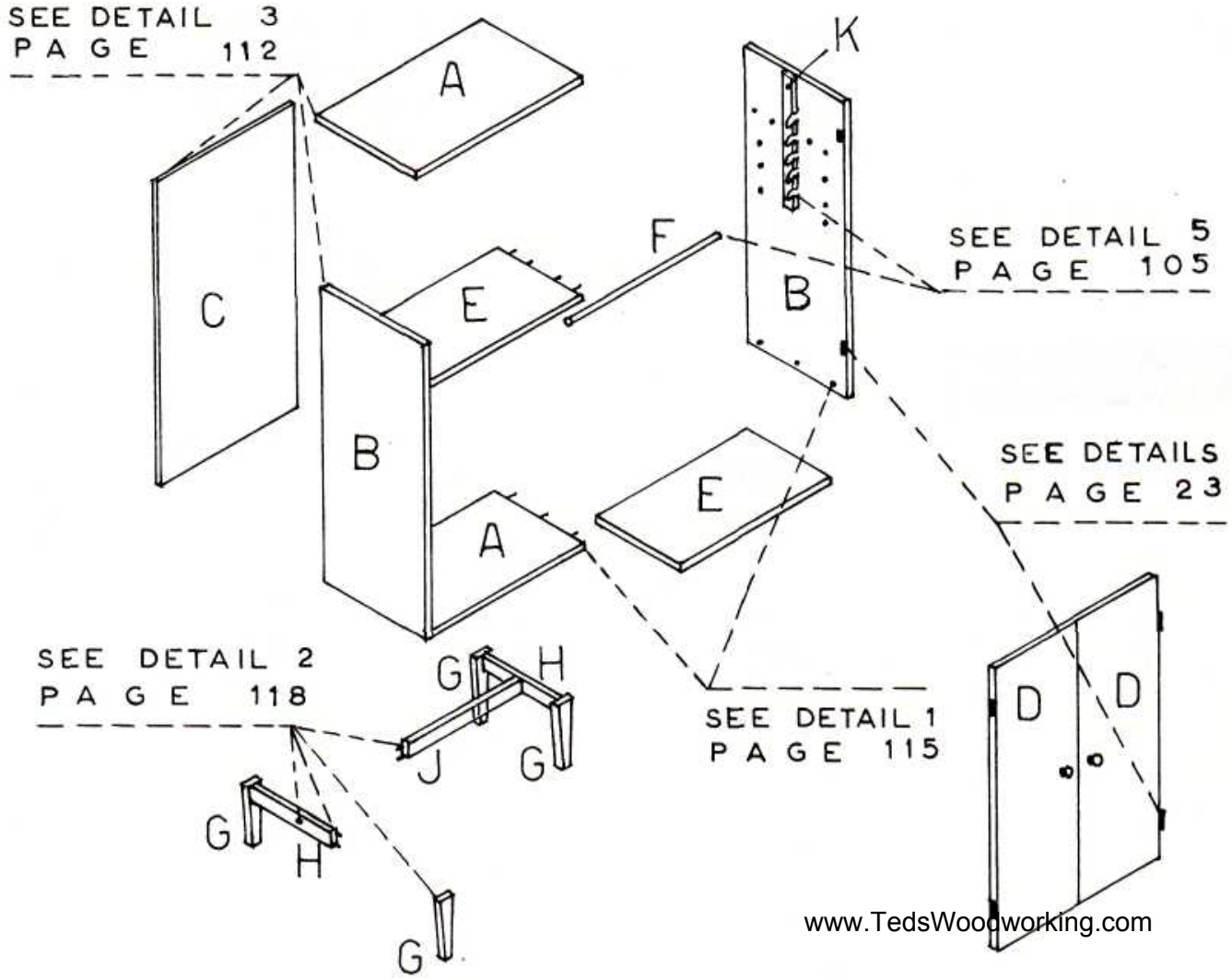
1. Join top and bottom (A) with sides (B).
2. Install back (C).
3. Fasten strips (K).
4. Join rails (H) and (J) to legs (G) and attach base to bottom (A) with screws.
5. Attach doors (D) to sides (B) and install pipe (F) and shelf (E).
6. Apply finish.

List of Materials

PART	NO.	FUNCTION	DIMENSION IN INCHES thickness	×	width	×	length
A	2	pieces	¾		24		34½
B	2	sides	¾		24		64
C	1	back	¼		35½		63½
D	2	doors	¾		17¼		62½
E	2	shelves	¾		22		34½
F	1	pipe	1 diam.				34½
G	4	legs	1		1¾		8
H	2	rails	1		1¾		19
J	1	rail	1		1¾		25½
K	2	strips	½		2		30

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5.2 LOW CHEST

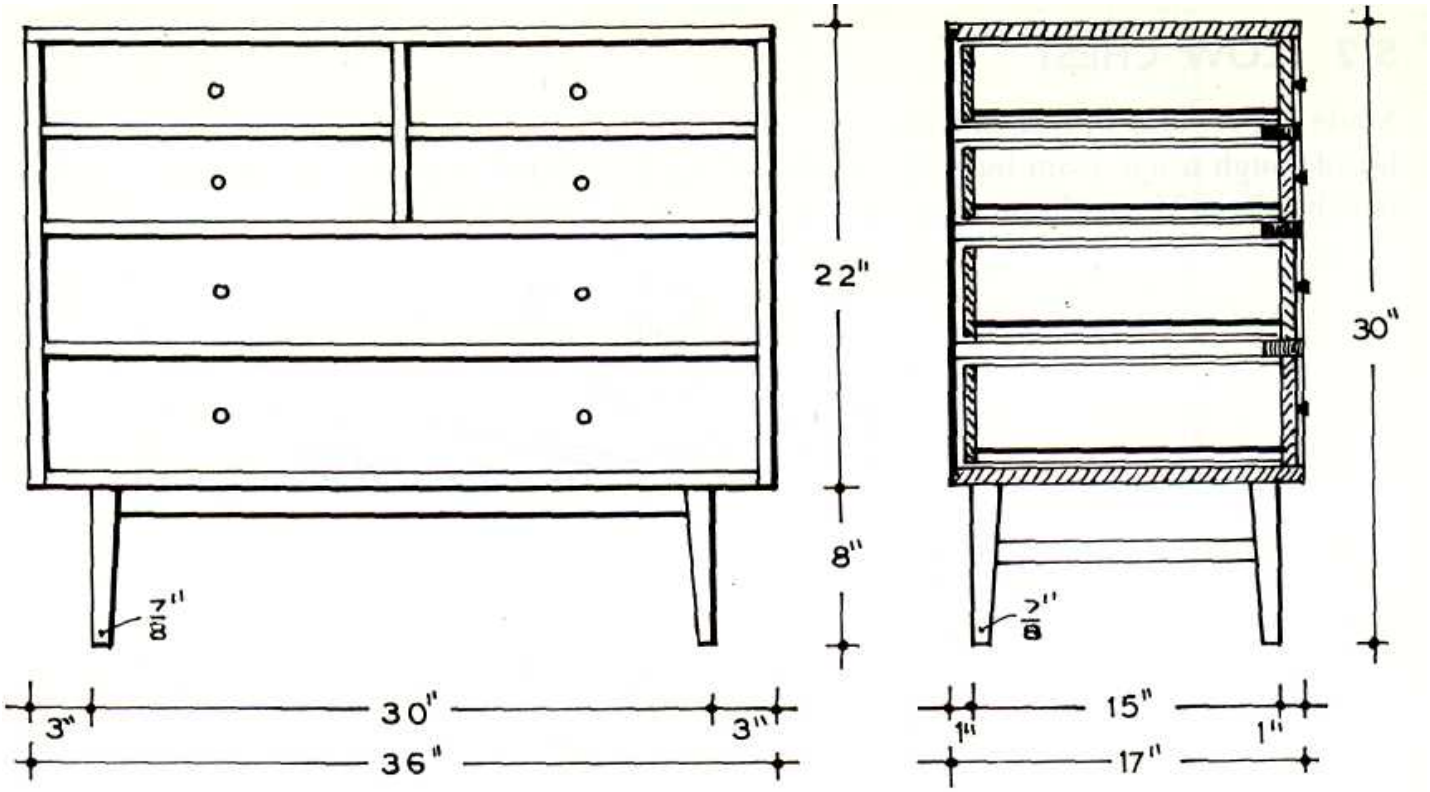
Made of plywood with solid wood base, this is attractive and serviceable—and will stand a lot of rough usage from busy teen-agers, which might not be true of an expensive store-bought piece. The addition of a wall mirror converts it into a dresser.

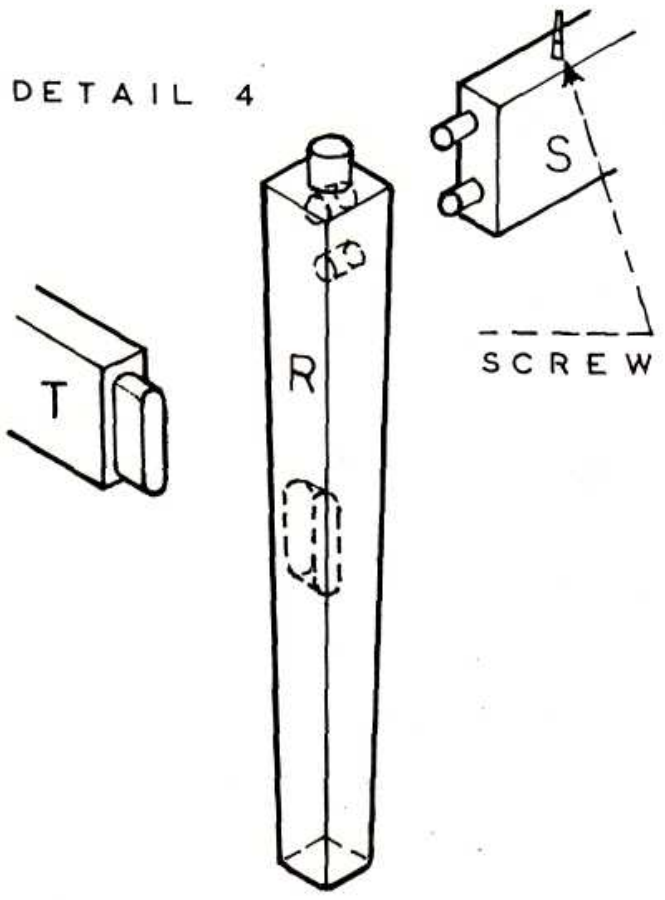


List of Materials

PART	NO.	FUNCTION	DIMENSION IN INCHES thickness	×	width	×	length
A	1	top	¾		17		36
B	1	bottom	¾		17		34½
C	2	sides	¾		17		21¼
D	1	back	¼		21½		35½
E	1	partition	¾		9½		16¾
F	2	rails	¾		2		16⅞
G	2	rails	¾		2		34½
H	10	cleats	¾		1		14¾
J	4	drawer fronts	¾		4		16⅞
K	8	drawer sides	½		4		16⅜
L	4	drawer backs	½		3½		15⅞
M	4	drawer bottoms	¼		16⅜		16¼
N	4	drawer sides	½		5⅛		16⅜
O	2	drawer fronts	¾		5⅛		34½
P	2	drawer backs	½		4⅝		33½
Q	2	drawer bottoms	¼		34		16¼
R	4	legs	1½		1½		8
S	2	rails	¾		1½		27
T	2	rails	¾		1½		12½

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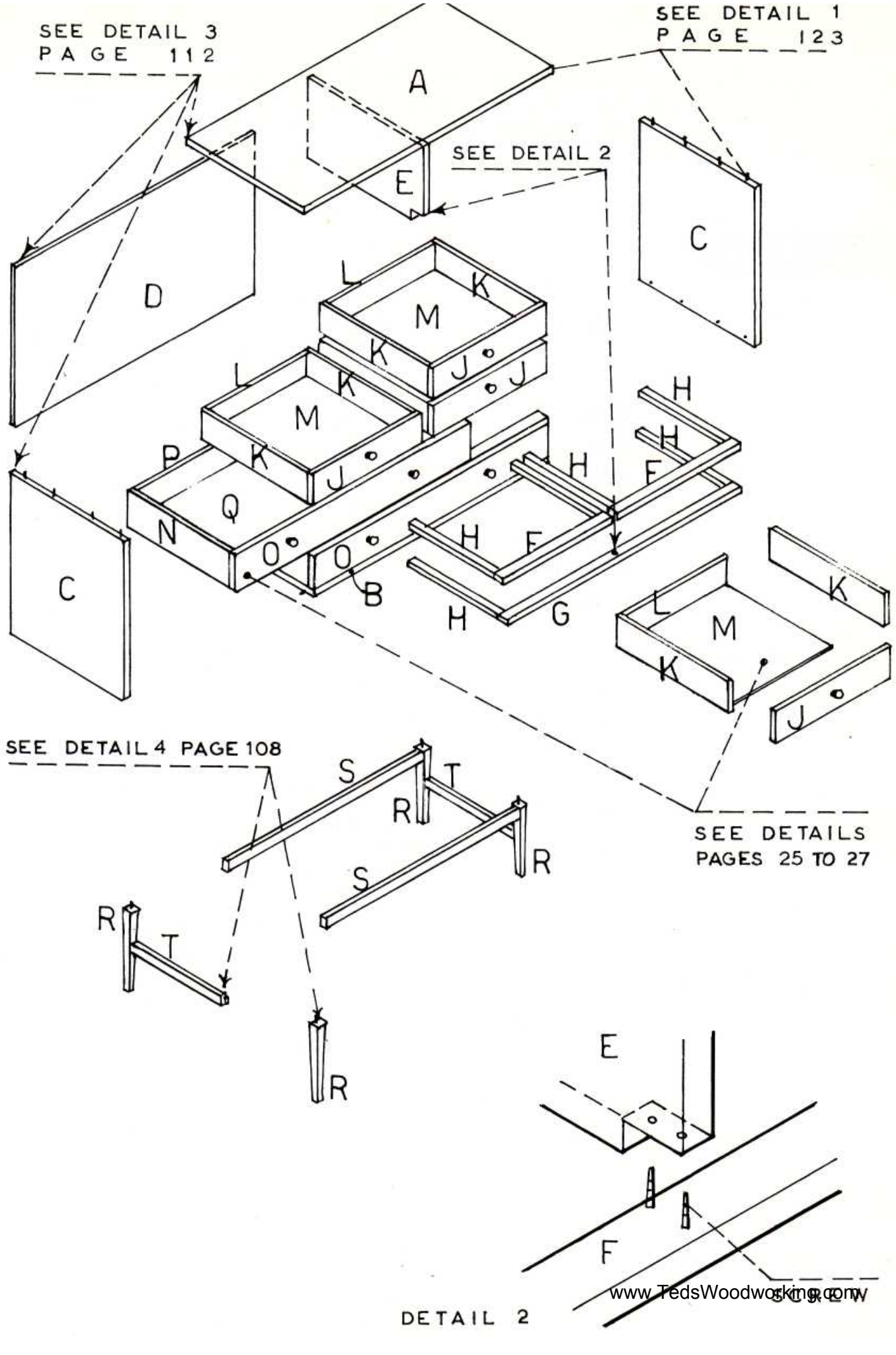




Instructions for Assembly

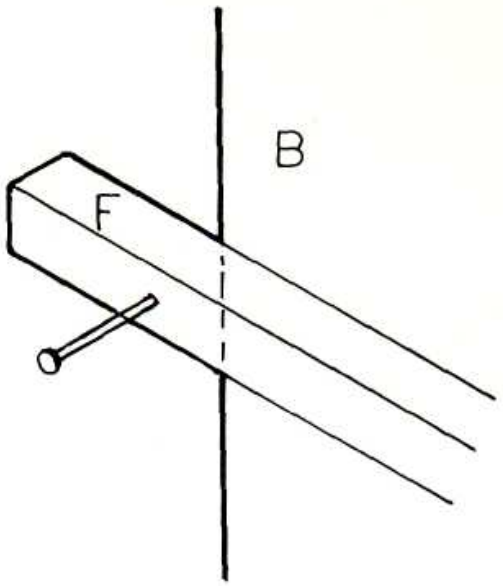
1. Join bottom (B), partition (E), rails (F, G) to side (C).
2. Attach top (A) and back (D).
3. Fasten cleats (H) to side (C) and partition (E).
4. Join drawer sides (K) to drawer fronts (J) and backs (L), and install bottoms (M).
5. Join drawer sides (N) to drawer fronts (O) and backs (P), and install bottoms (Q).
6. Fasten rails (S) and (T) to legs (R).
7. Attach rails (S) to bottom (C) with screws.
8. Apply finish.

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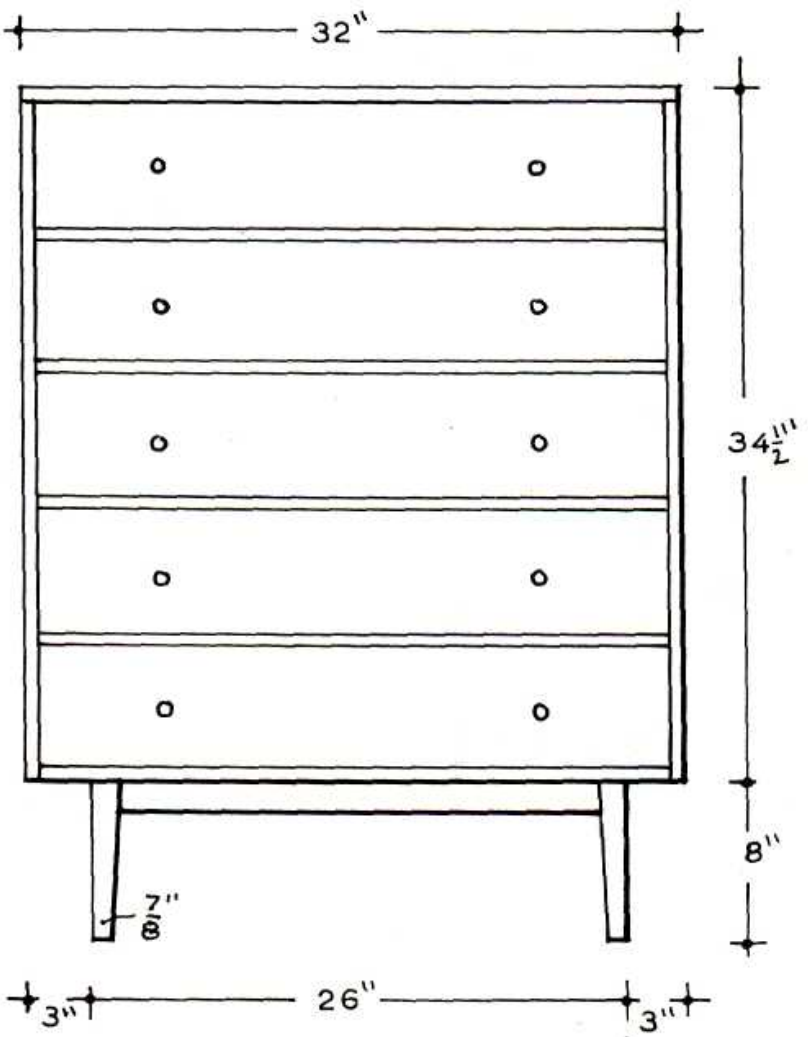
www.TedsWoodworking.com

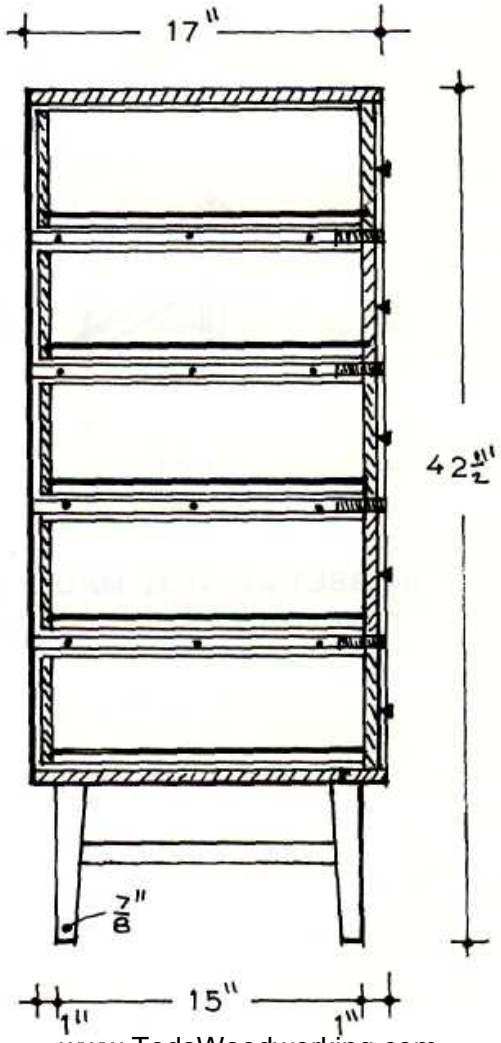
DETAIL 2



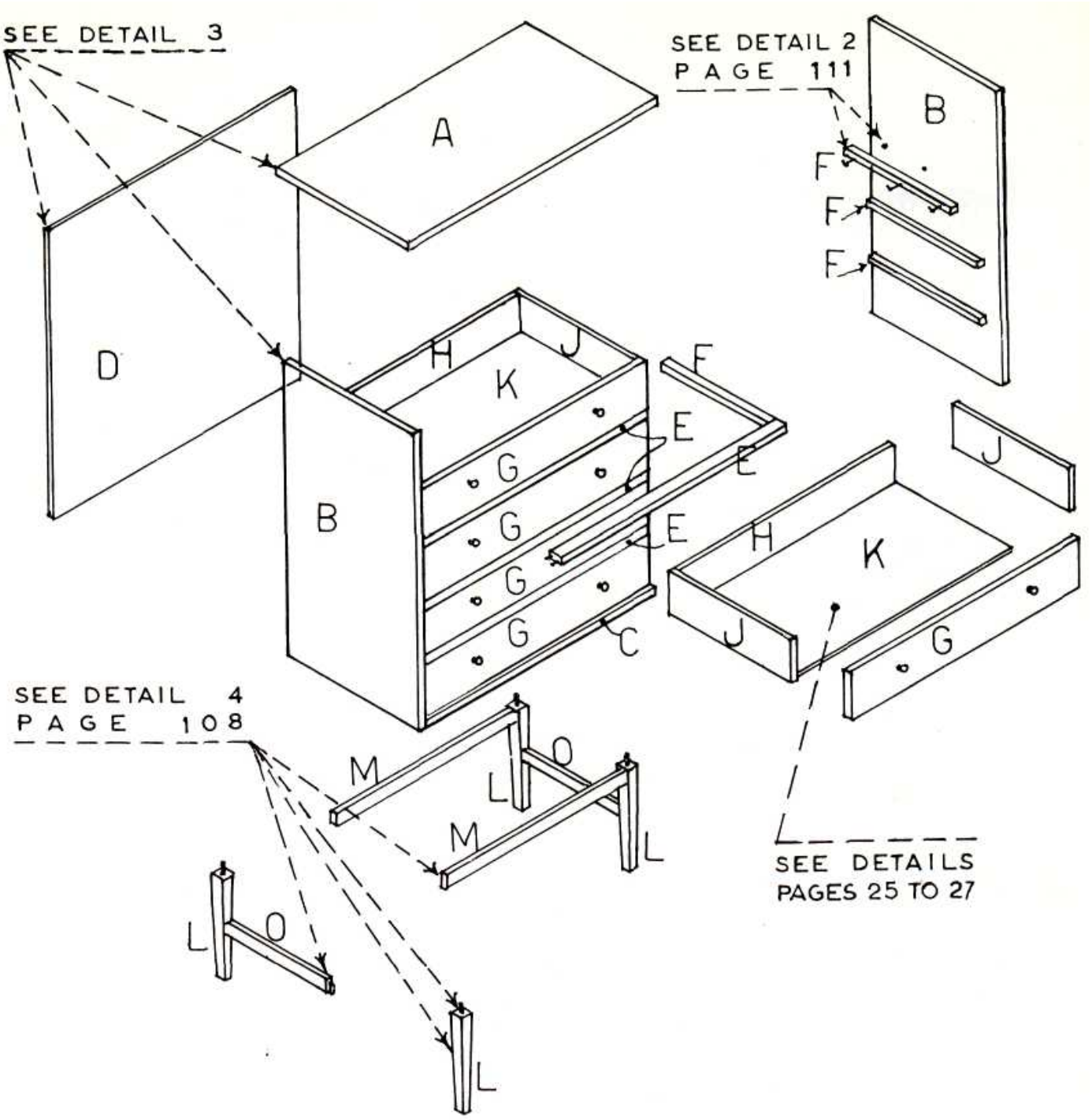
Instructions for Assembly

1. Join bottom (C) and rails (E) with side (B).
2. Install top (A) and back (D).
3. Attach cleats (F).
4. Join drawer sides (J) with drawer fronts (G) and backs (H) and install bottoms (K).
5. Fasten legs (L) to rails (M) and (O) and attach rails (M) to bottom (C) with screws.
6. Apply finish.



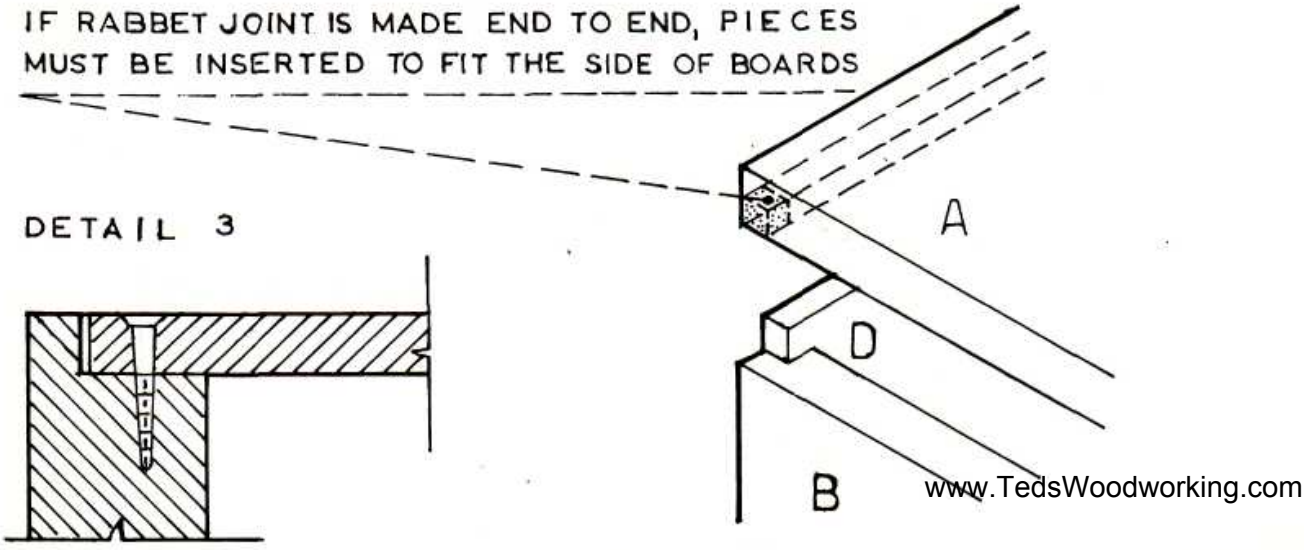


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IF RABBET JOINT IS MADE END TO END, PIECES MUST BE INSERTED TO FIT THE SIDE OF BOARDS

DETAIL 3



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5.4 CHIFFOROBE

Like the wardrobe of Project 5.1, this practical piece "grows" with the user; when the dress compartment becomes too small it can be used as a cabinet by adding shelves. The chiffo-robe matches the chests of Projects 5.2 and 5.3, making a bedroom set of two or three pieces.



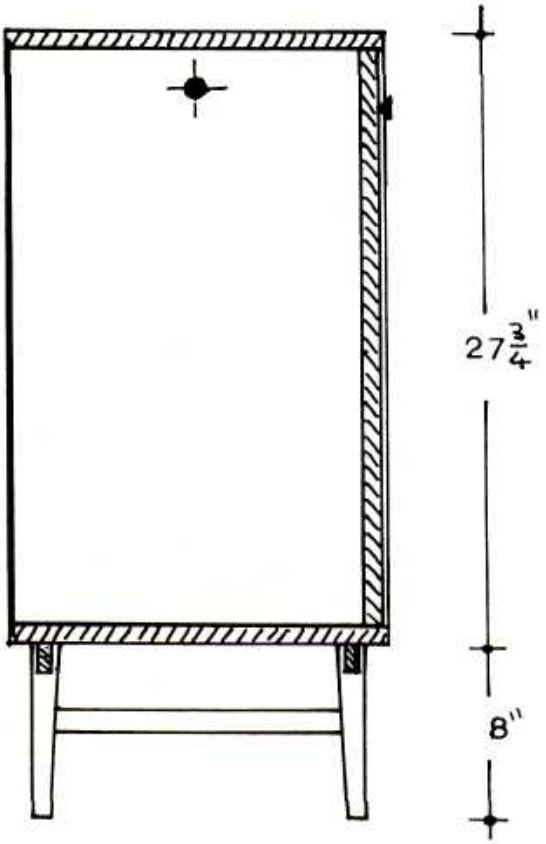
List of Materials

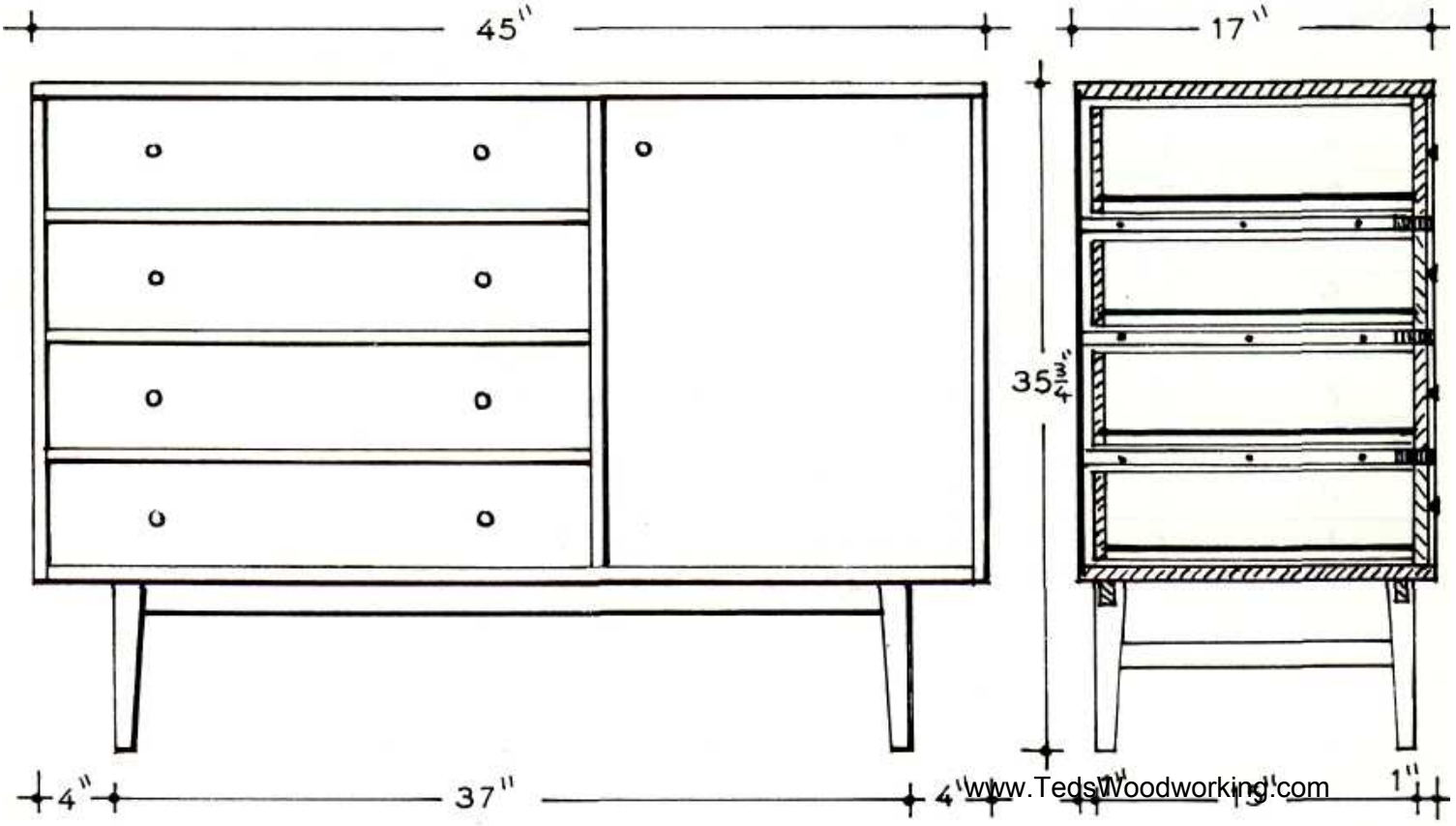
PART	NO.	FUNCTION	DIMENSION IN INCHES thickness	×	width	×	length
A	1	top	¾		17		45
B	2	sides	¾		17		27
C	1	partition	¾		16¾		26¼
D	1	bottom	¾		17		43½
E	1	back	¼		27¼		44½
F	3	rails	¾		2		25
G	6	cleats	¾		1		14¾
H	4	drawer fronts	¾		6		25
J	4	drawer backs	¾		5½		24
K	8	drawer sides	½		6		16⅜
L	4	drawer bottoms	¼		16¼		24½
M	4	legs	1½		1½		8
O	2	rails	¾		1½		34
P	2	rails	¾		1½		14½
Q	1	door	¾		26¼		17¾
R	1	dowel or pipe	1 diam.				17¾

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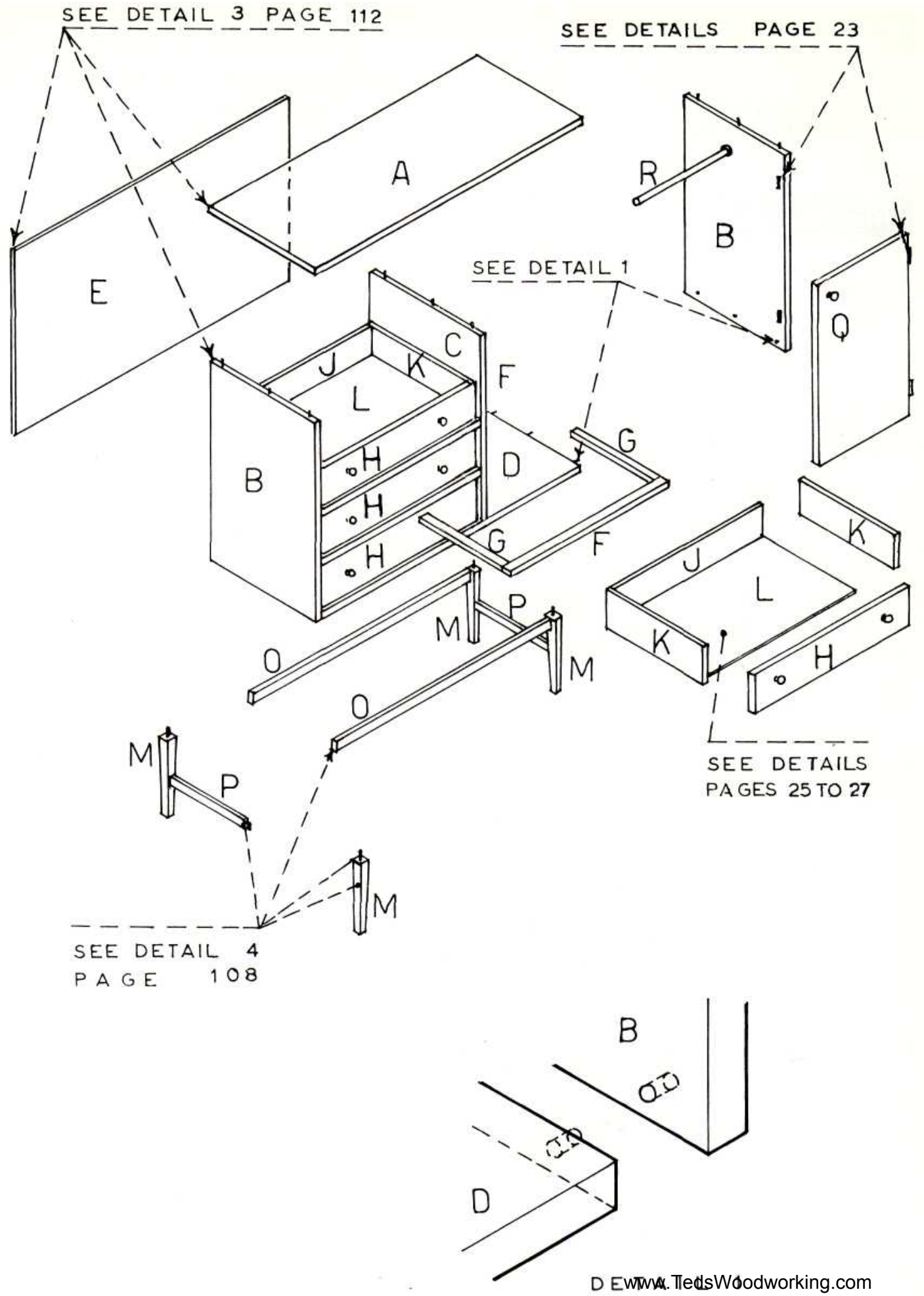
Instructions for Assembly

1. Join bottom (D), partition (C), rails (F) to sides (B).
2. Attach top (A) and back (E).
3. Fasten cleats (G) and pipe (R) to sides (B) and partition (C).
4. Join drawer sides (K) to fronts (H) and backs (J) and install bottoms (L).
5. Fasten legs (M) to rails (O) and (P) and attach base to bottom (C) with screws.
6. Apply finish.





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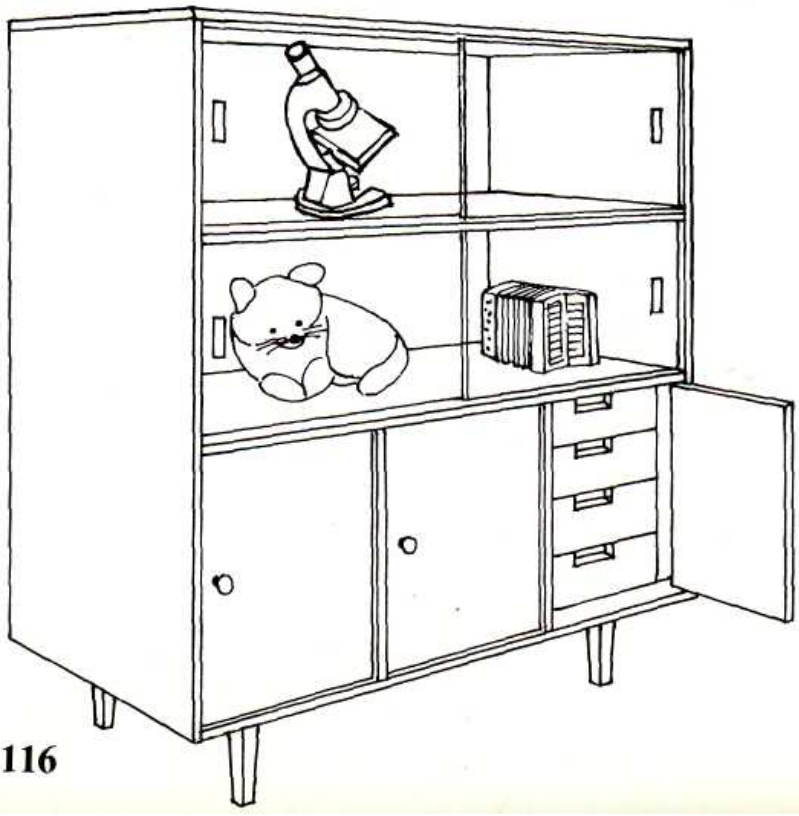
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5.5 DISPLAY CABINET

This professional-looking piece lends an air of neatness to a room and protects fragile models, sculpture, trophies and souvenirs from dust and damage. The shallow drawers behind doors are ideal for collections of rocks, shells, microscope slides, butterflies, leaves and the like.

List of Materials

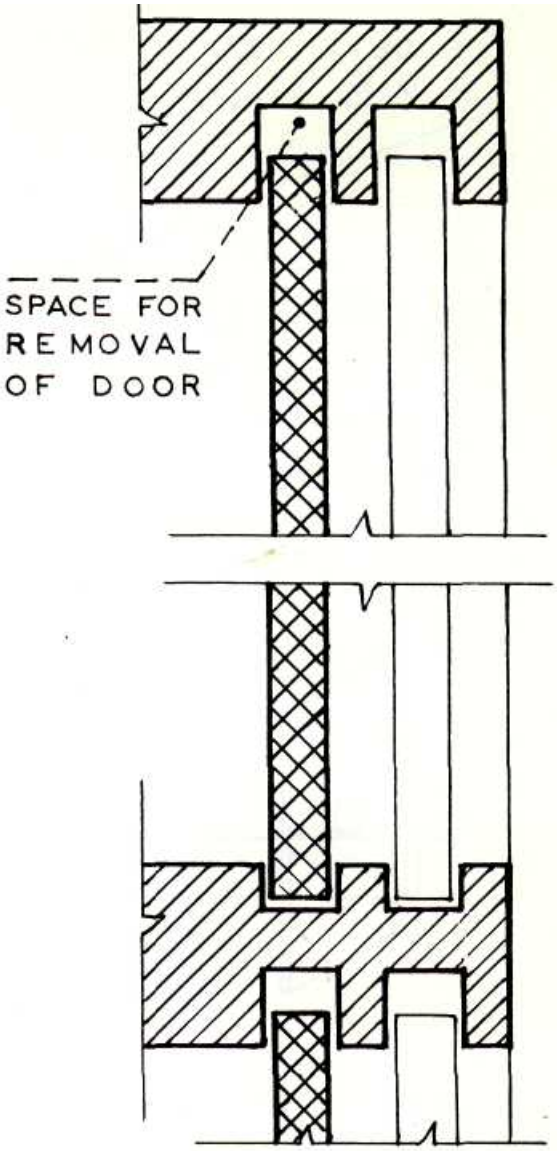
PART	NO.	FUNCTION	DIMENSION IN INCHES thickness	×	width	×	length
A	1	top	¾		15		54
B	2	shelves	¾		14¾		52½
C	1	bottom	¾		15		52½
D	2	sides	¾		15		45¼
E	1	back	¼		45½		53½
F	2	partitions	¾		14¾		17
G	4	plate glass doors	¼		13½		26¾
H	3	doors	¾		17		17
J	4	tray fronts	¾		4¼		16
K	4	backs	½		3¾		15
L	8	sides	½		4¼		13¼
M	4	bottoms	¼		15½		13
O	4	legs	1½		1½		7
P	2	rails	1		1¾		10¼
Q	1	rail	1		1¾		41¼
R	8	cleats	⅜		¾		12½
S	1	filler	1		13½		17



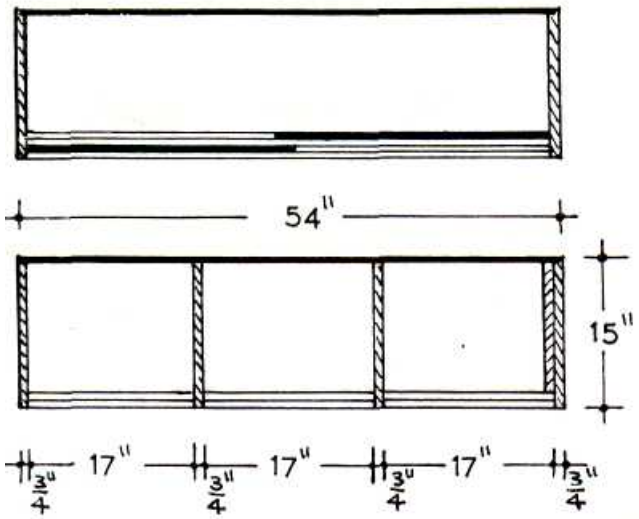
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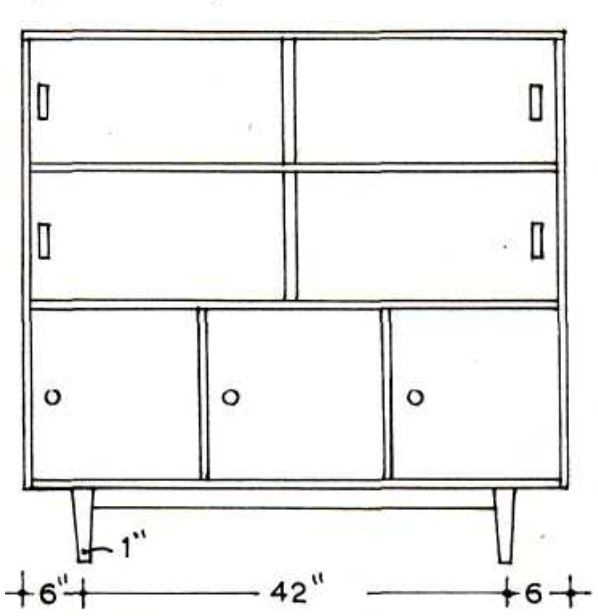
Instructions for Assembly

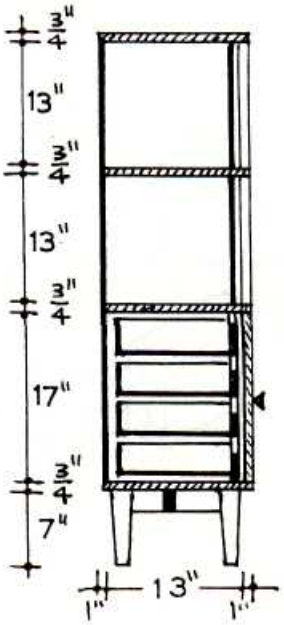
1. Join top (A), shelves (B), partition (F) and bottom (C) to sides (D).
2. Install back (E).
3. Attach filler (S) to side (D) and fasten cleats (R) to partition (F) and filler (S).
4. Join tray sides (L) to fronts and backs (J, K) and install bottom (M).
5. Fasten rails (P) to legs (O).
6. Join rail (Q) to rails (P) and attach base to bottom (C).
7. Attach door (H) to side (D) and partition (F).
8. Apply finish.
9. Install plate glass doors (G).

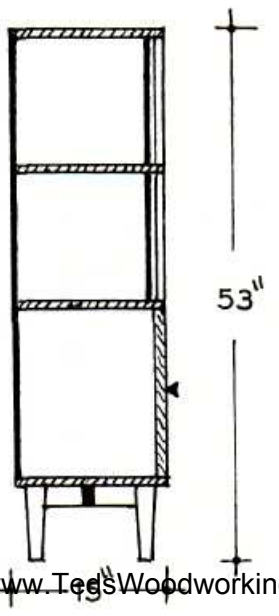


DETAIL 4
FULL SIZE

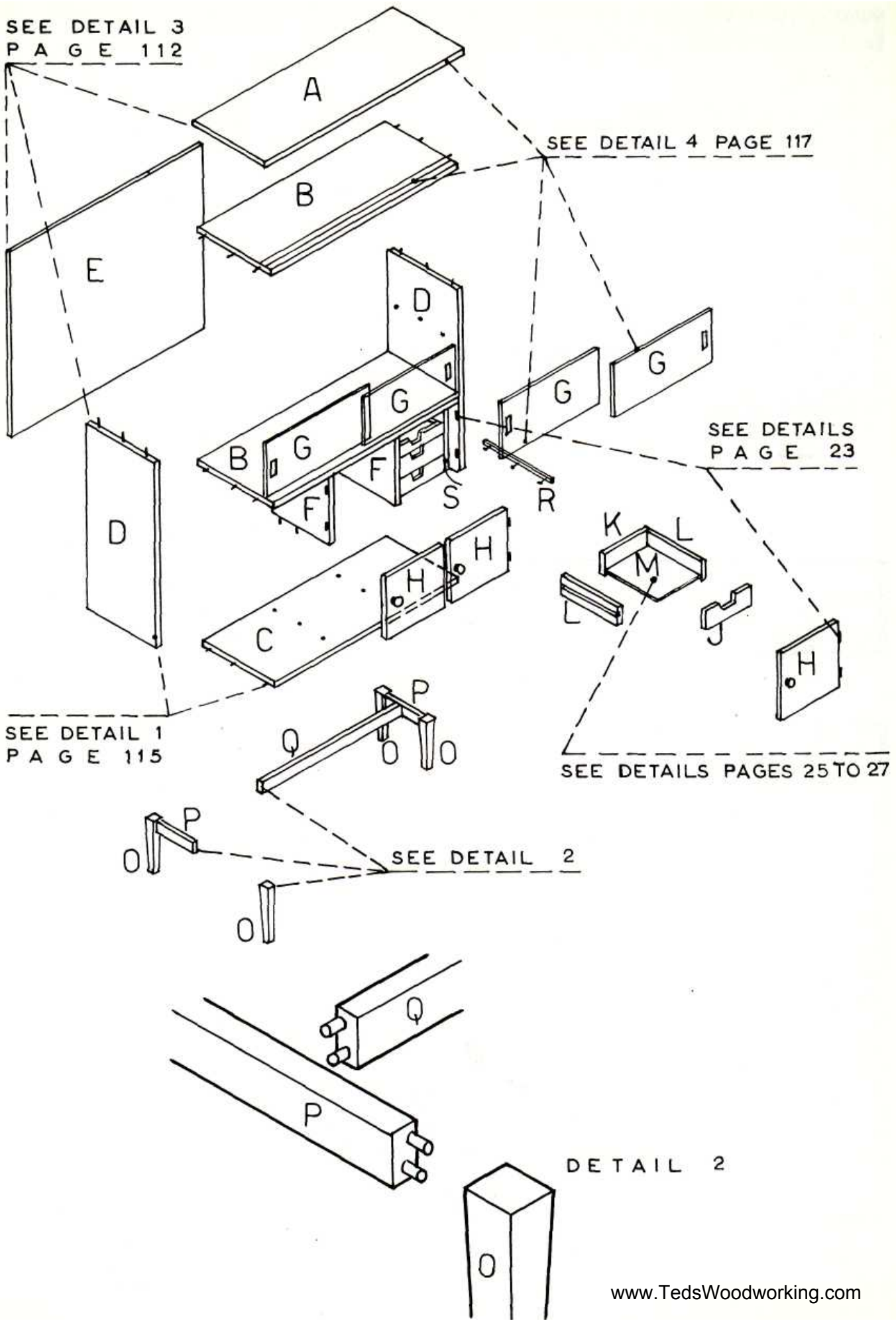








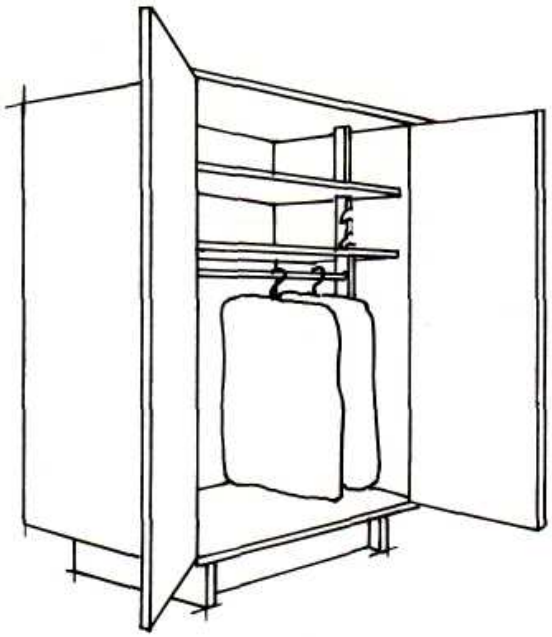
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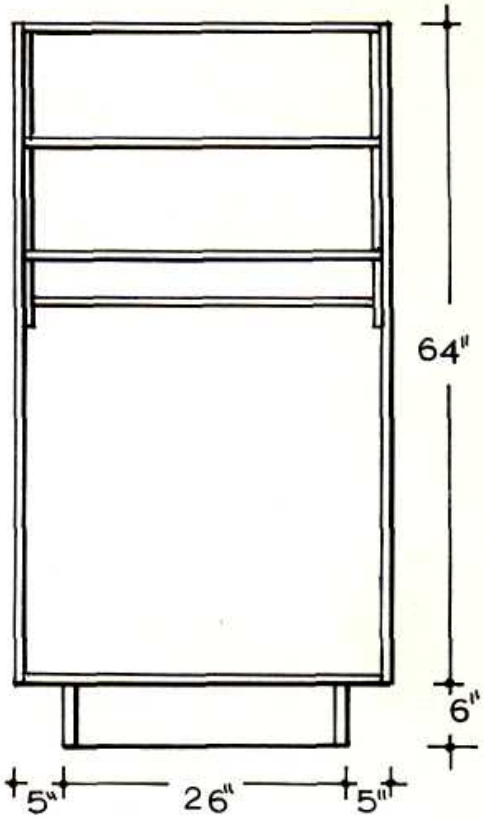


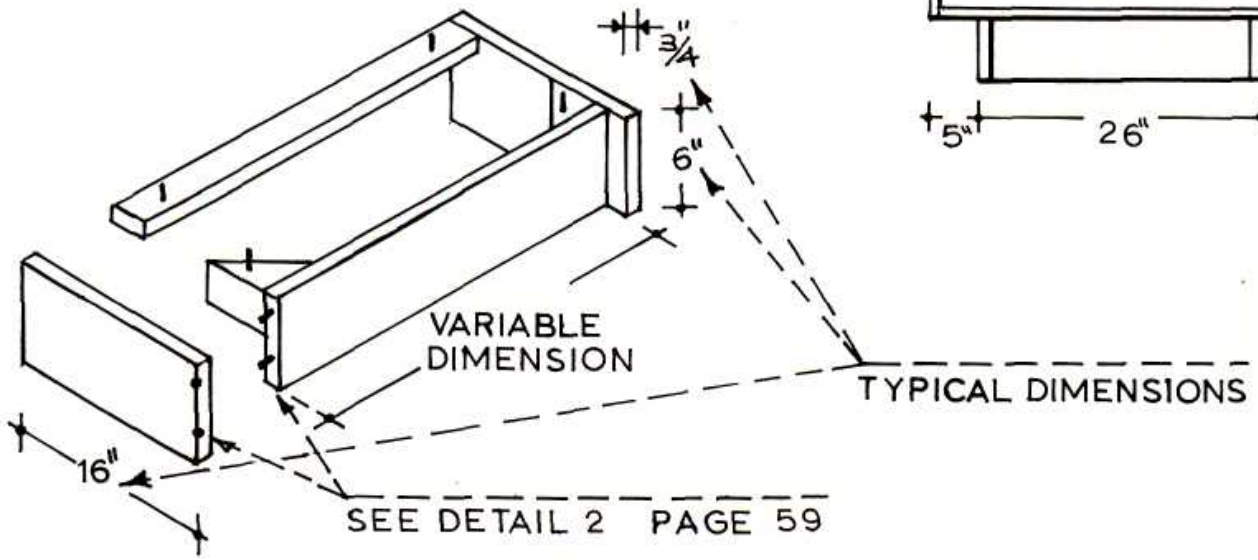
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5.6 BASE VARIATIONS FOR WARDROBES, CHESTS, ETC.

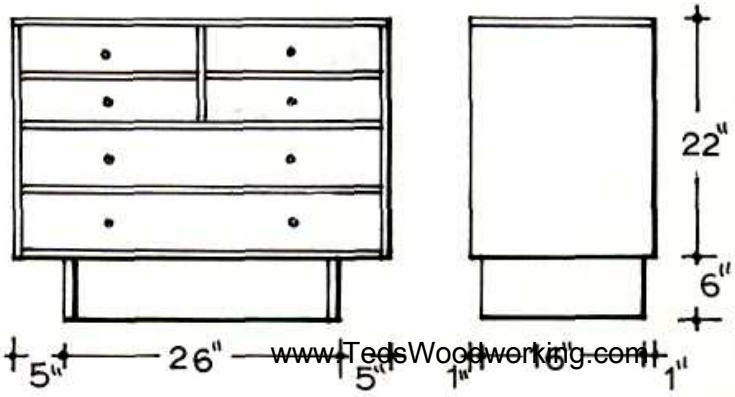
To satisfy the particular needs of different people, here are some variations affecting the base supports of these useful pieces of furniture.





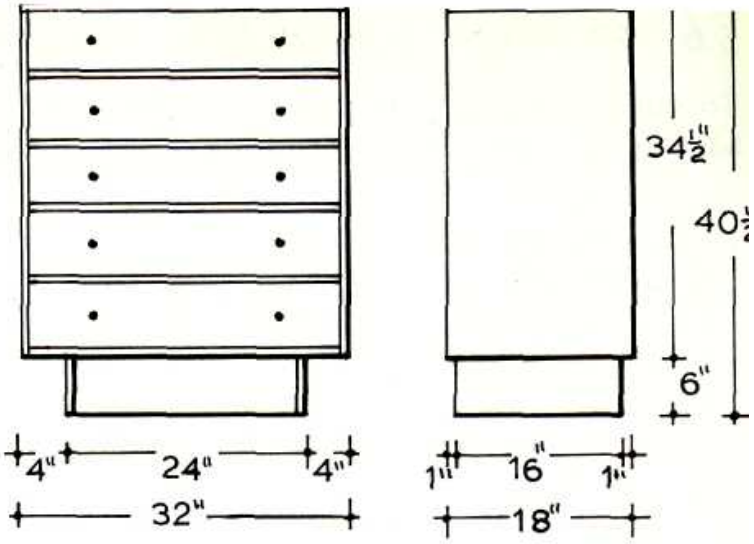


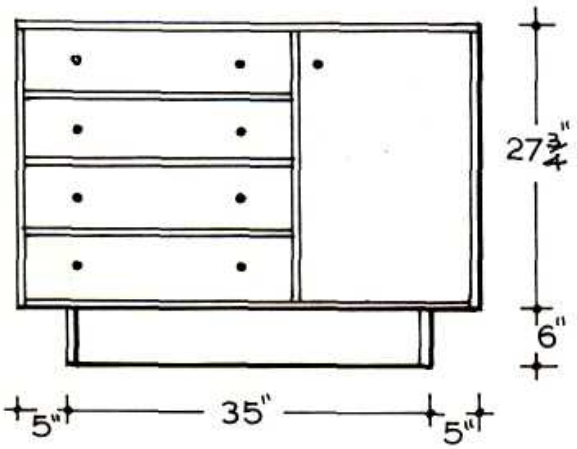




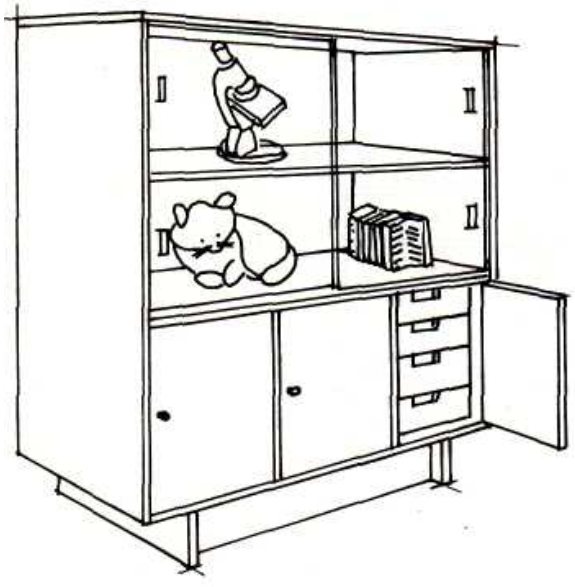
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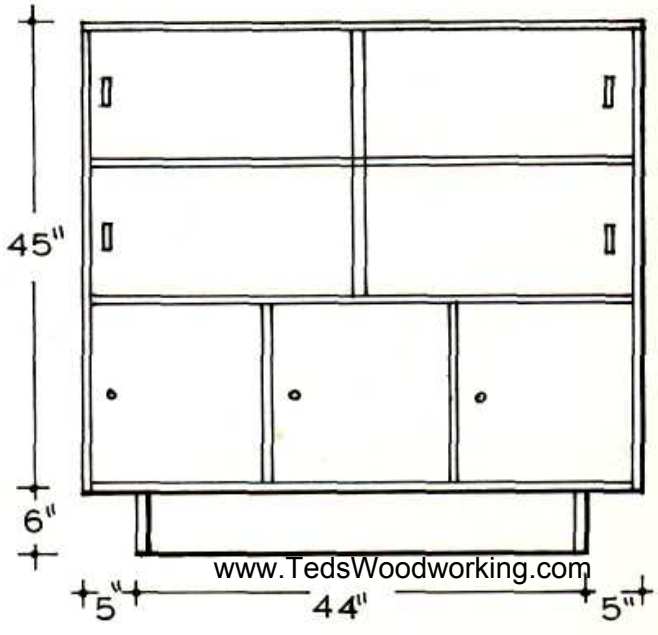












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5.7 STORAGE CABINET

No child ever has enough space for storing things, but this cabinet will be a step in the right direction. Designed to serve from toddlerhood to adulthood. Best of all, it's easy to put together.

List of Materials

PART	NO.	FUNCTION	DIMENSION IN INCHES thickness	×	width	×	length
A	1	top	¾		15		W
B	1	shelf	¾		14¾		× W less 1½
C	1	bottom	¾		15		× W less 1½
D	2	sides	¾		15		32¼
E	1	back	¼		32½		× W less ½
F	6	partitions	¾		14¾		15⅜
G	2	doors	¾		15⅜		16½
H	1	toeplate	¾		3		W
J	2	toeplates	¾		3		12
K	2	corner blocks	¾		3		3

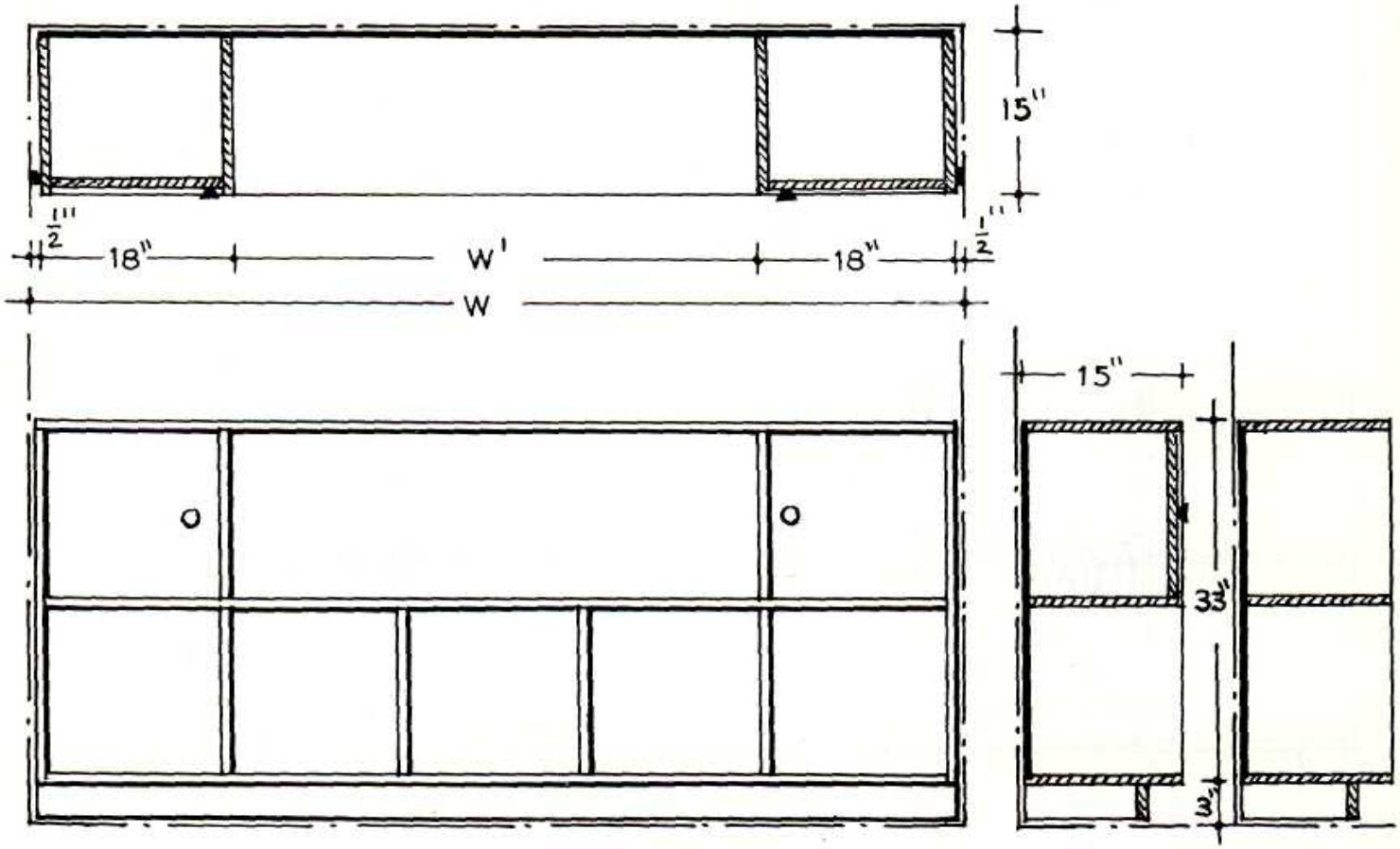


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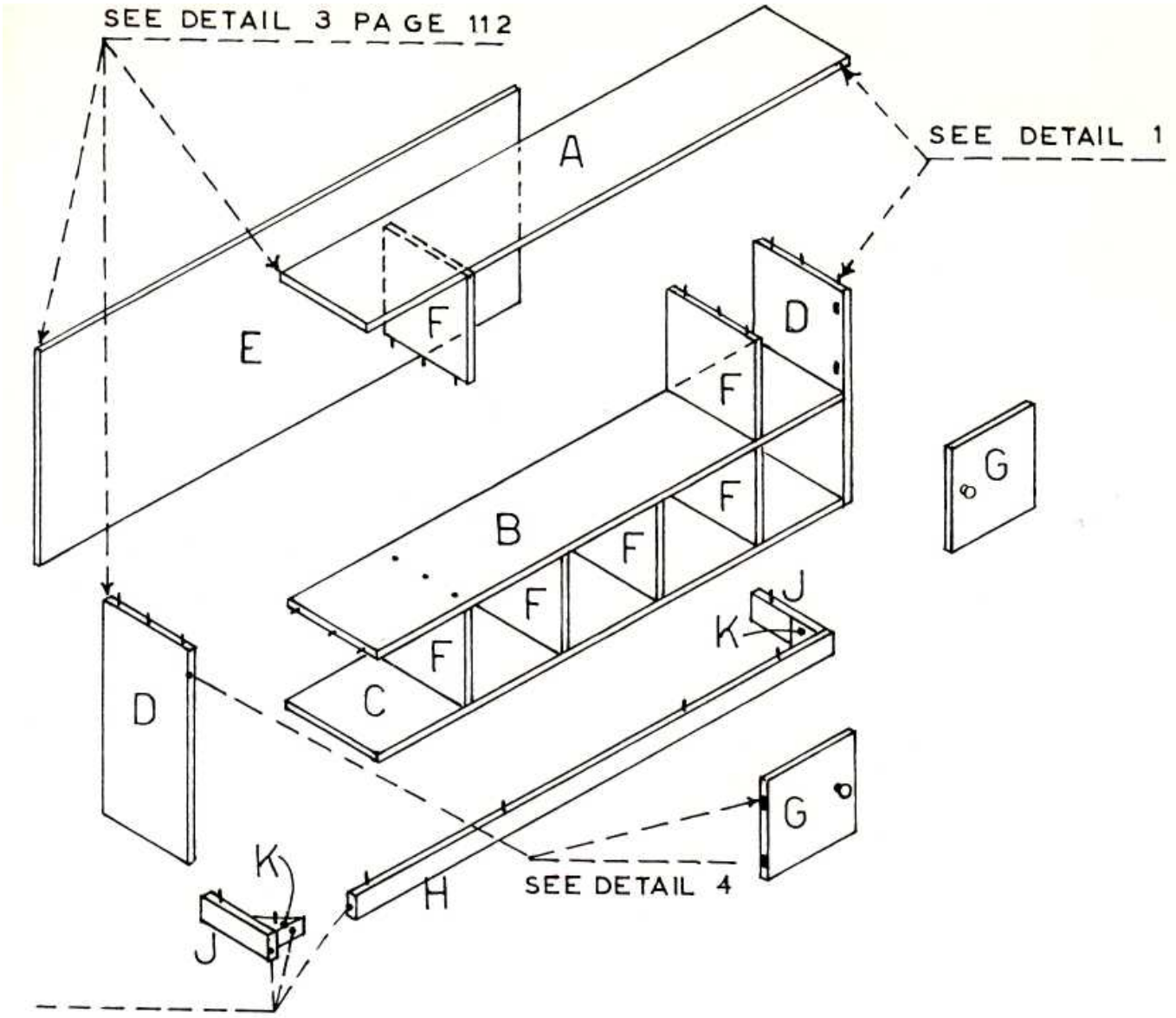
Instructions for Assembly

1. Fasten shelf (B) and bottom (C) to partitions (F) and sides (D).
2. Attach top (A) and install back (E).
3. Join toeplates (H) and (J) to corner blocks (K) and fasten to bottom (C).
4. Install doors (G) on side (D).
5. Apply finish and set cabinet in place.

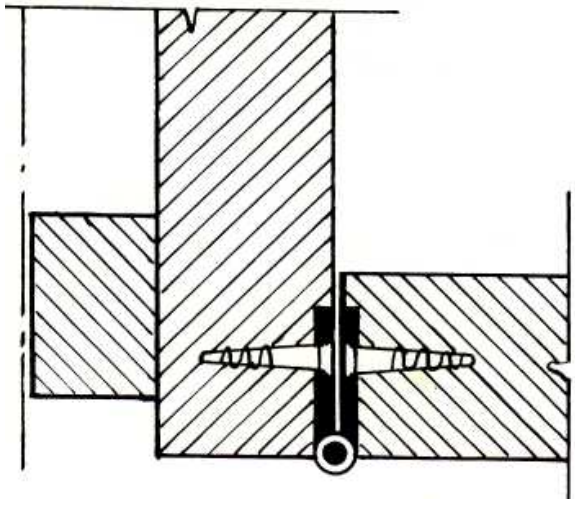
W = WIDTH OF THE ROOM
W' = WIDTH OF THE ROOM LESS 37"

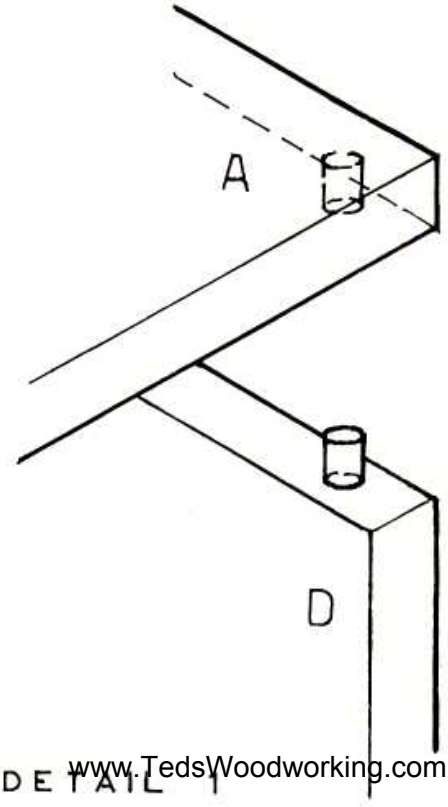


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DETAIL 4 FULL SIZE





DETAIL 1

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5.8 TOY CHEST AND BENCH

The addition of the graceful back and sides takes this practical storage bin out of the foot-locker category; its very appearance encourages neatness. A word of advice: don't use it to store broken, discarded toys and "junk," so that it loses half its utility.

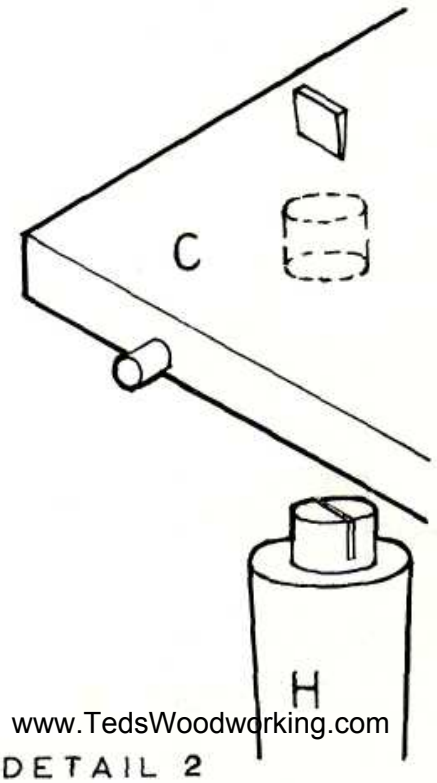
List of Materials

PART	NO.	FUNCTION	DIMENSION IN INCHES thickness × width × length		
A	2	sides	¾	15½	16
B	2	panels	¾	7½	28½
C	1	bottom	¾	13½	28½
D	1	top	¾	13½	28½
E	1	board	¾	2	28½
F	1	back	¾	3	28½
G	8	dowels	⅜ diam.		7
H	4	legs	1¼ top diam.		4

Instructions for Assembly

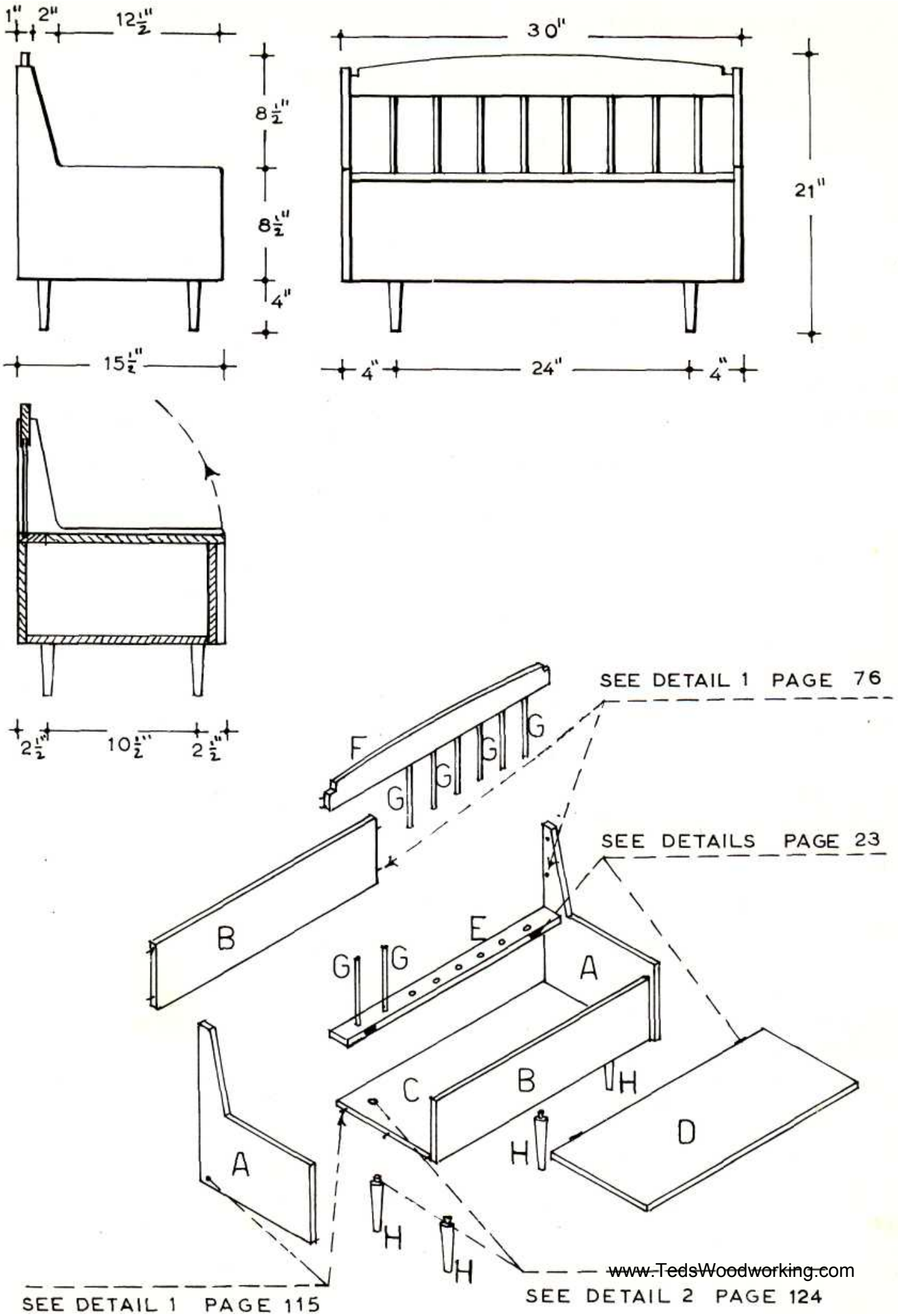
1. Join panels (B) to bottom (C).
2. Insert dowels (G) in rails (E, F).
3. Fasten side (A) to (B), (C), (E) and (F).
4. Install top (D) on board (E) with two hinges.
5. Attach legs (H) to bottom (C).
6. Apply finish.





DETAIL 2

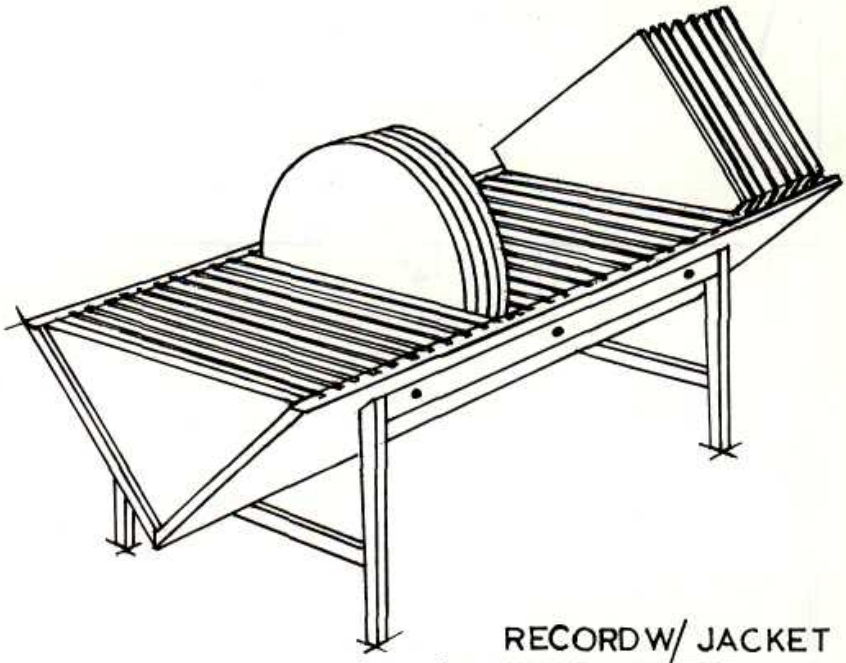
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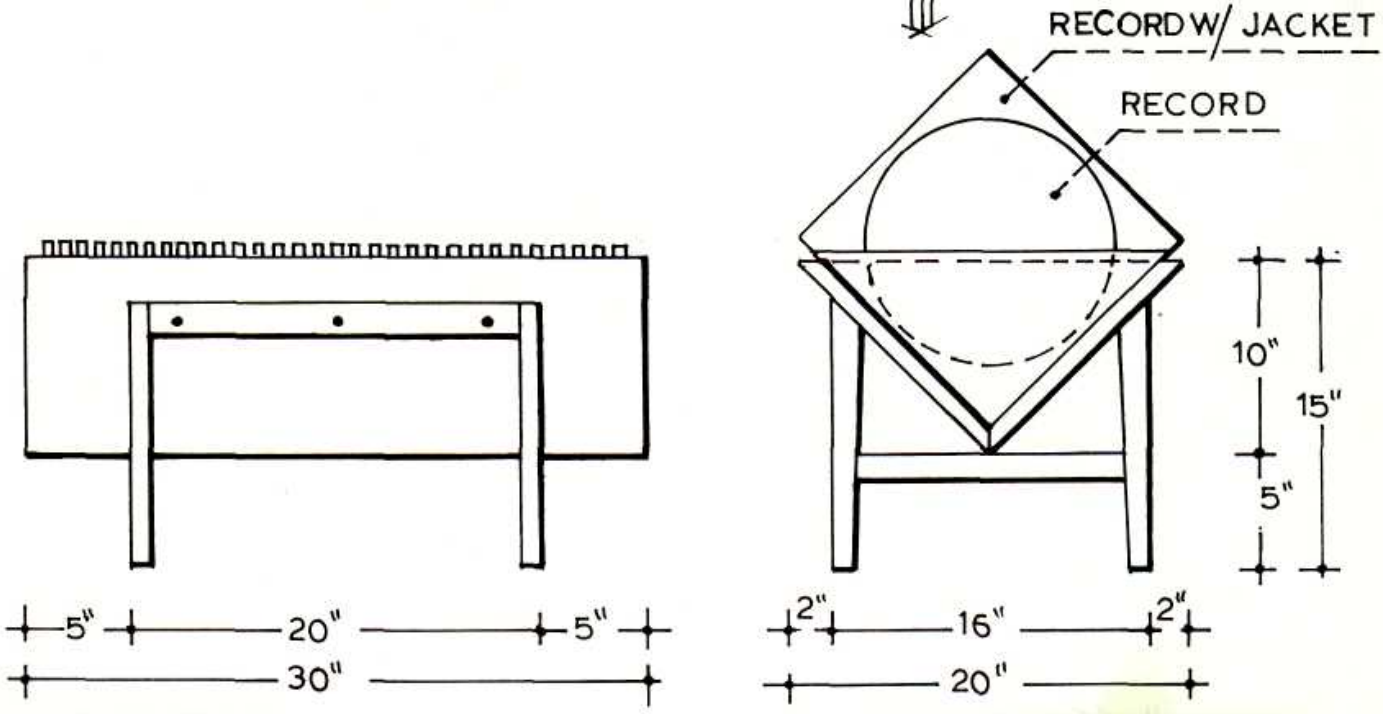


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5.9 RECORD STORAGE

This is an easy piece to make, and a practical one for the teenage record collector. The use of plywood is advised for the v-shaped box and solid wood for the support.





List of Materials

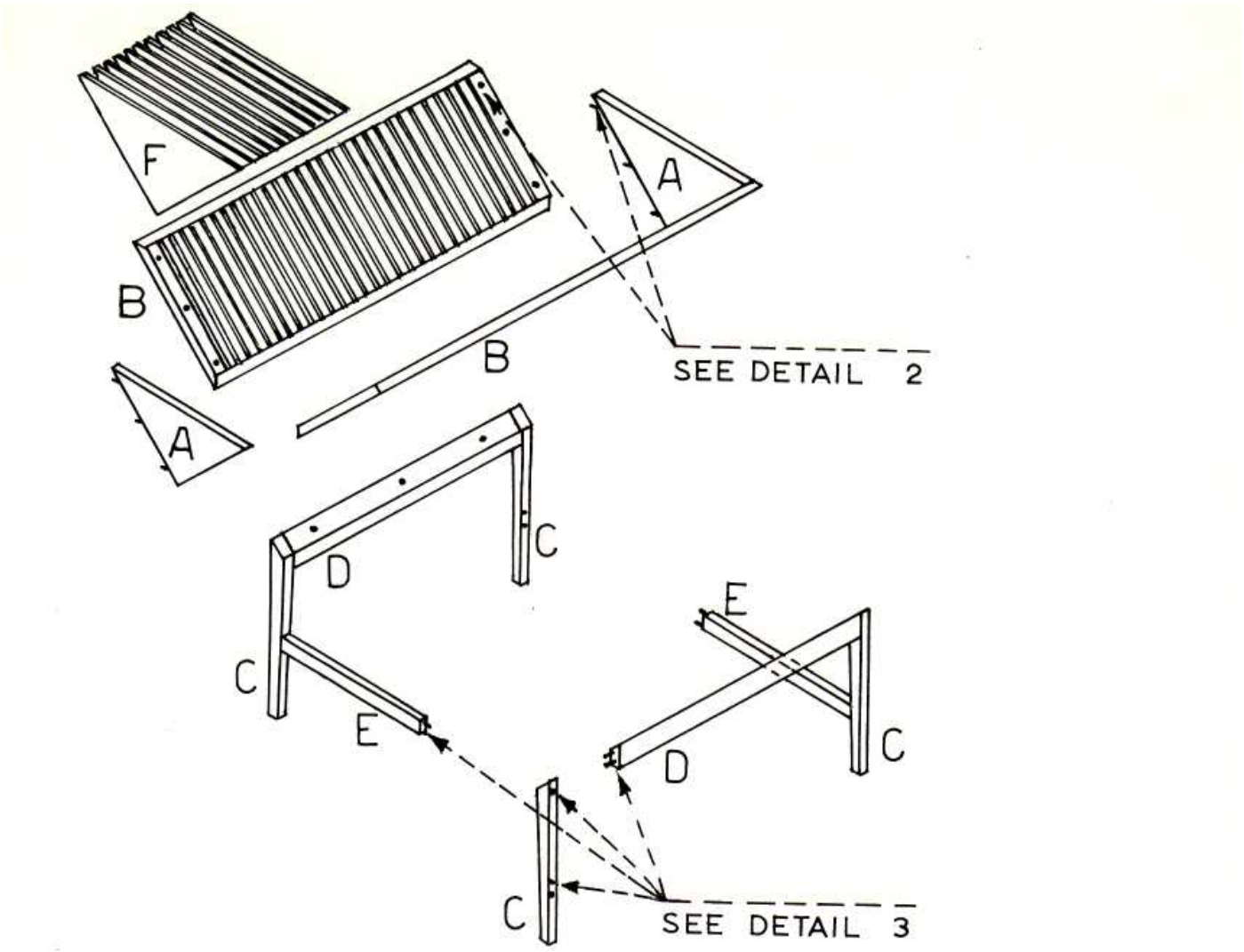
A	2	sides	¾	8½	17
B	2	fronts	¾	14	30
C	4	legs	1	1¼	13½
D	2	rails	1	1½	18
E	2	rails	⅝	1	14
F	20	partitions	3/16	13	13

Instructions for Assembly

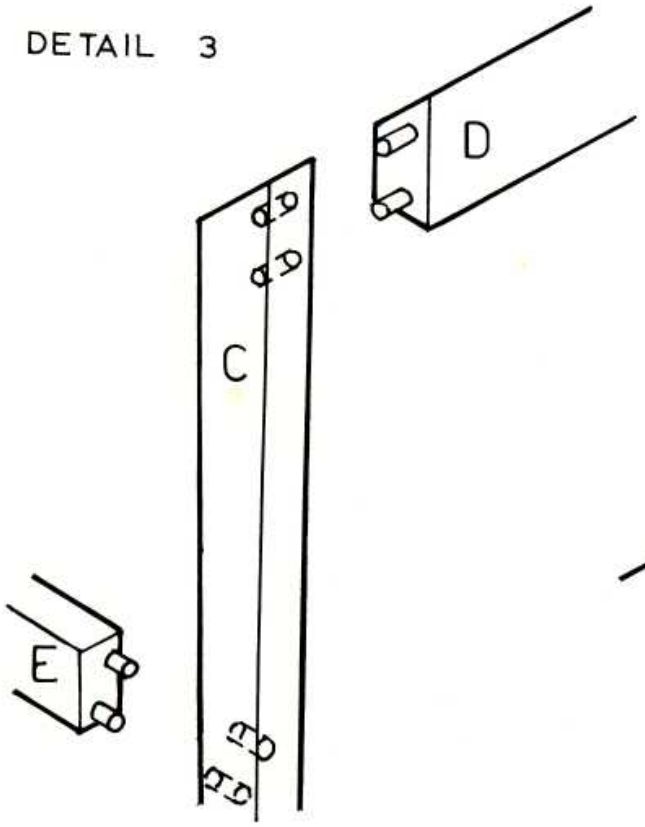
1. Join sides (A) with fronts (B).
2. Fasten rails (E) to legs (C), and rails (D) also to legs (C).
3. Attach rails (D) to fronts (B).
4. Apply finish.

Note. Cut partitions (F) on the diagonal to obtain 40 triangular partitions.

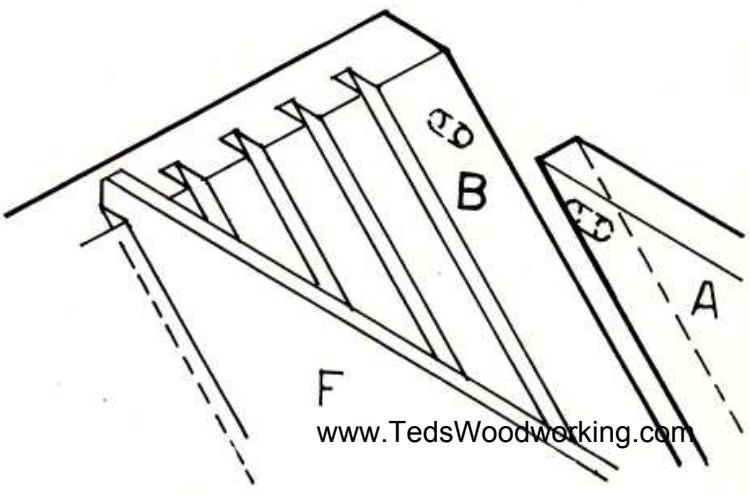
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DETAIL 3



DETAIL 2



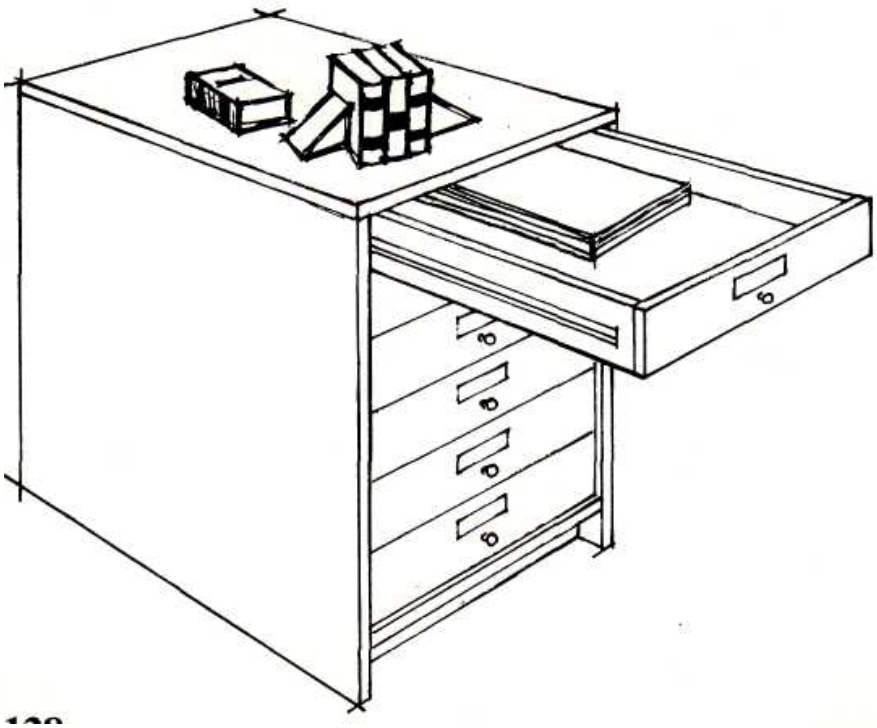
www.TedsWoodworking.com

5.10 CHEST for stationery or art materials

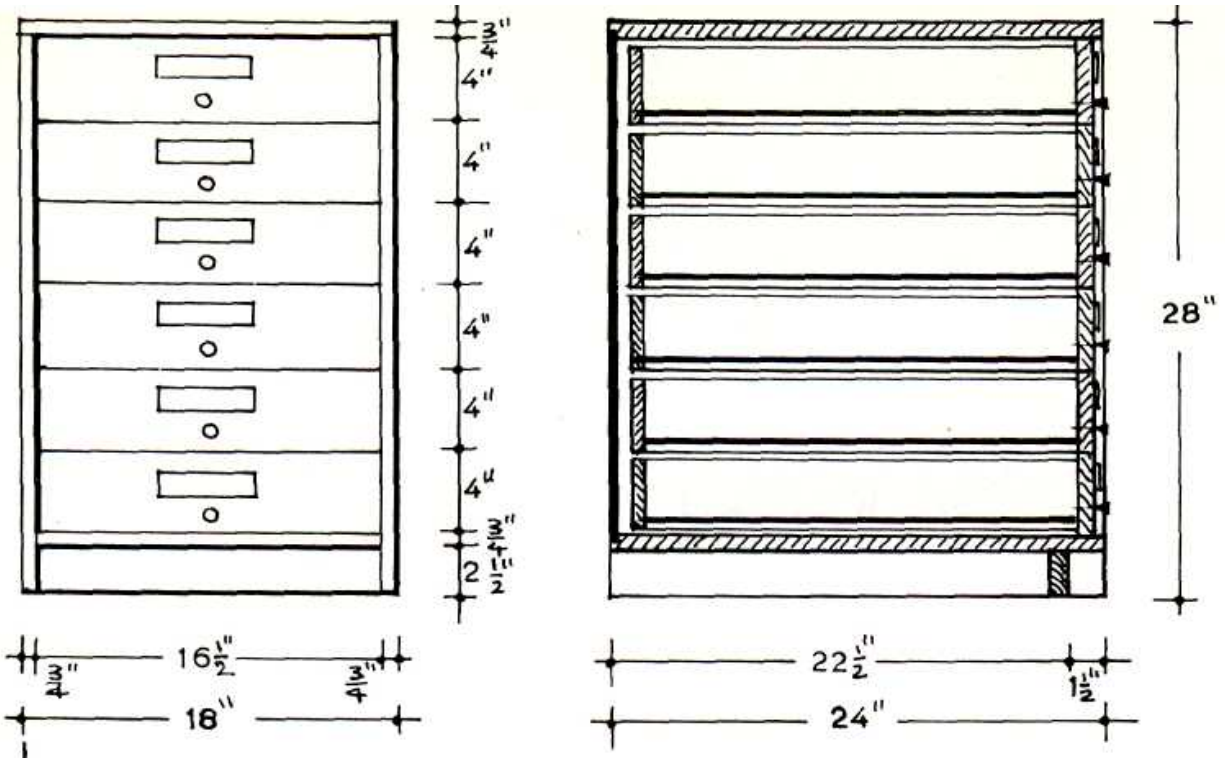
We all know how a pad of expensive drawing or tracing paper can get dog-eared and shredded just "lying around." Here is a businesslike cabinet for storing all sorts and sizes of stationery, construction paper, crepe paper, water-color paper, pastel pencils, oil tubes, rulers and triangles. Plywood frame, with drawers of either plywood or solid wood. Drawer plates help keep things orderly.

List of Materials

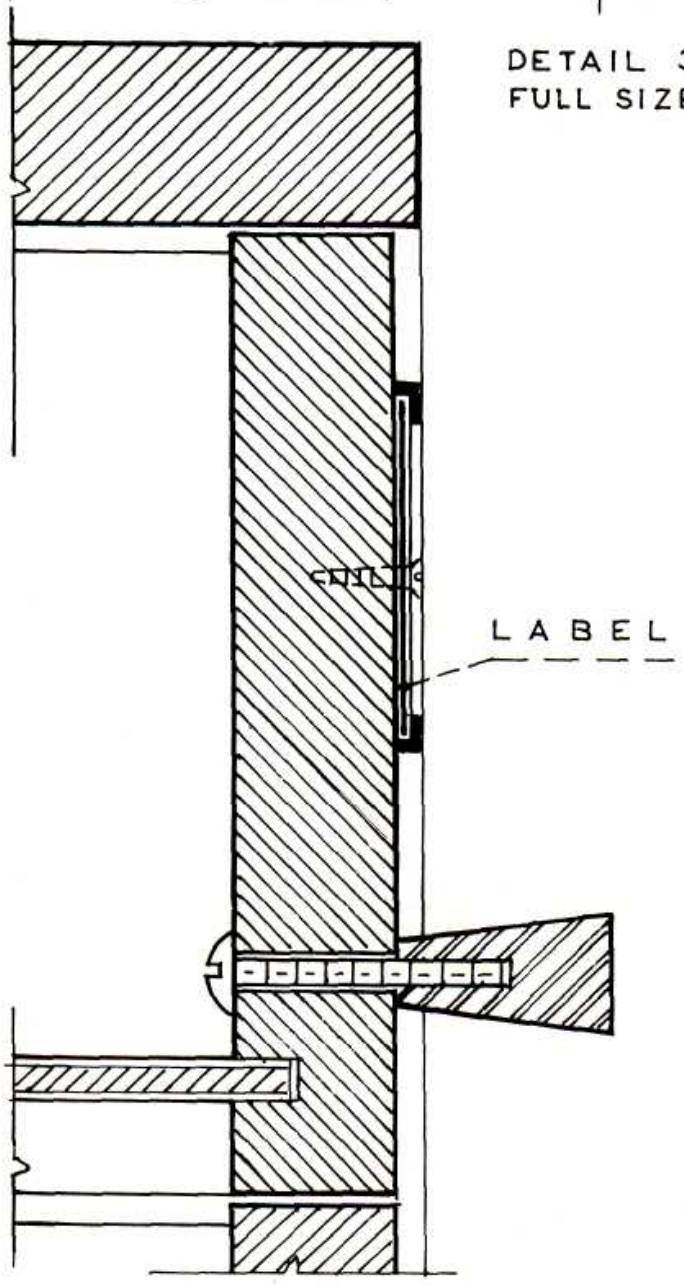
PART	NO.	FUNCTION	DIMENSION IN INCHES thickness	×	width	×	length
A	1	top	¾		18		24
B	2	sides	¾		24		27¼
C	1	bottom	¾		16½		24
D	1	back	¼		17½		25
E	1	toeplate	¾		2½		16½
F	12	cleats	⅜		¾		22½
G	6	drawer fronts	¾		4		16½
H	6	drawer backs	½		3½		15½
J	12	drawer sides	½		4		23¼
K	6	drawer bottoms	¼		16		23



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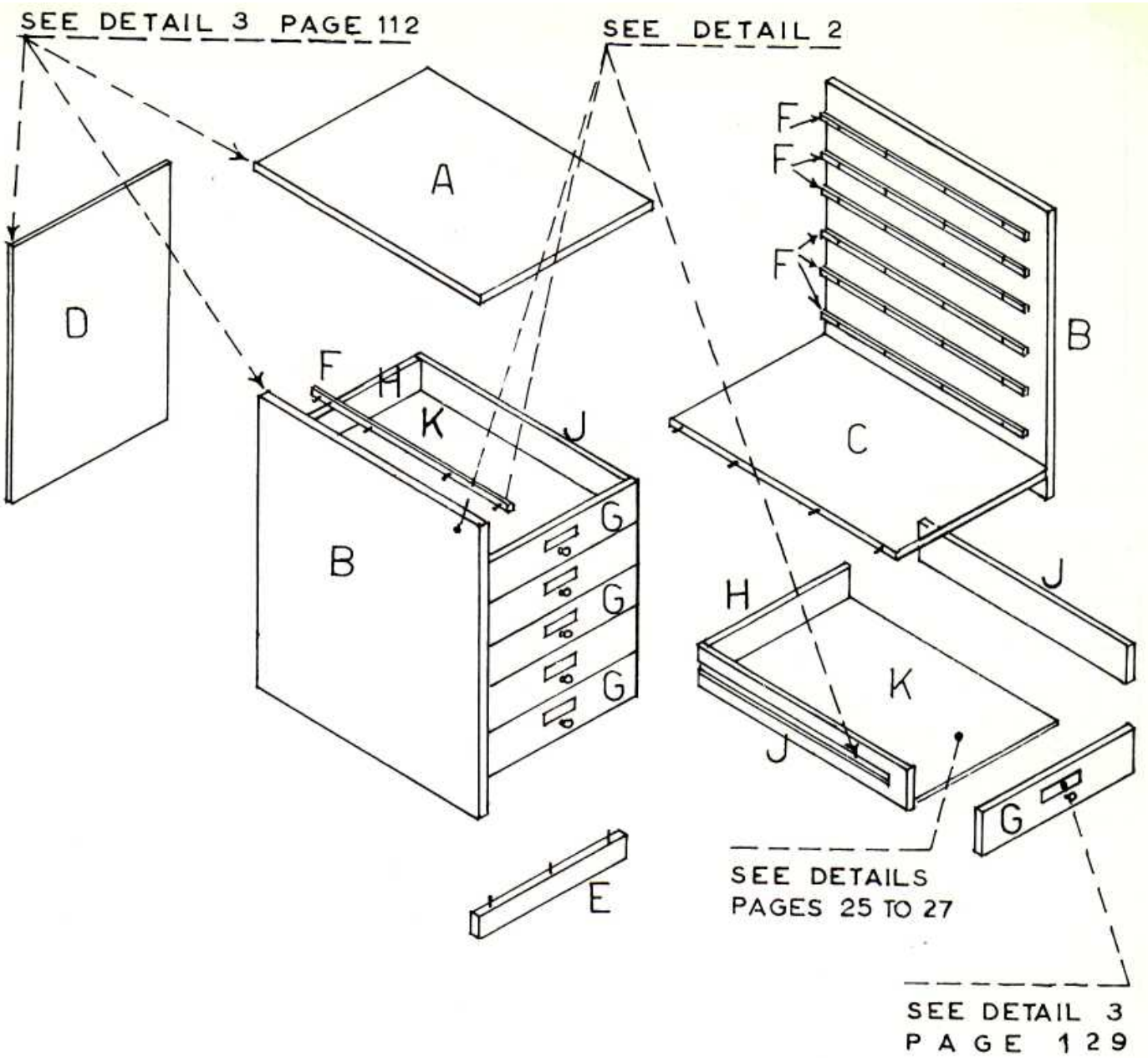
DETAIL 3
FULL SIZE



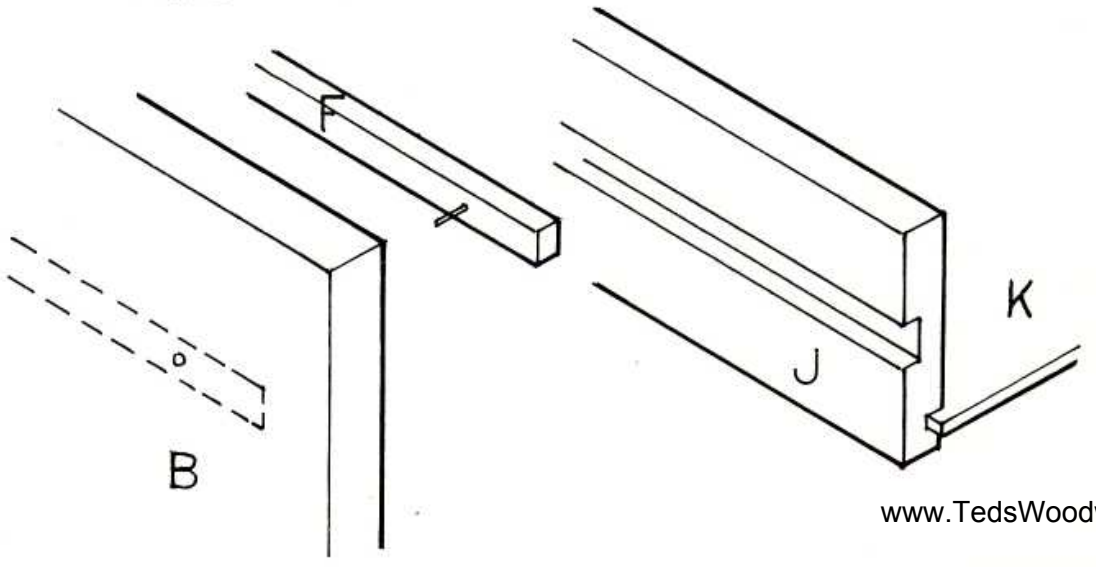
Instructions for Assembly

1. Join top (A) and bottom (C) to sides (B).
2. Install back (D).
3. Attach cleats (F) to side (B) and toeplate (E) to side (B) and bottom (C).
4. Join drawer sides (J) to drawer fronts (G) and backs (H) and install bottoms (K).
5. Apply finish.

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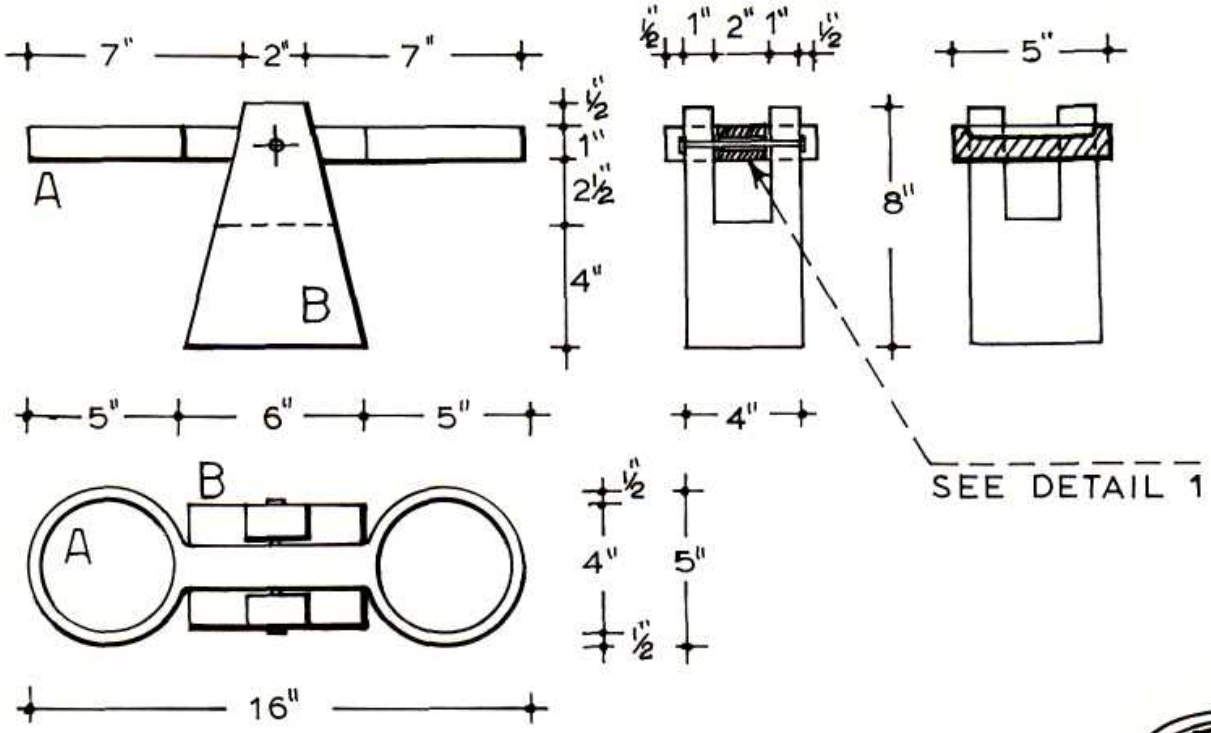
DETAIL 2

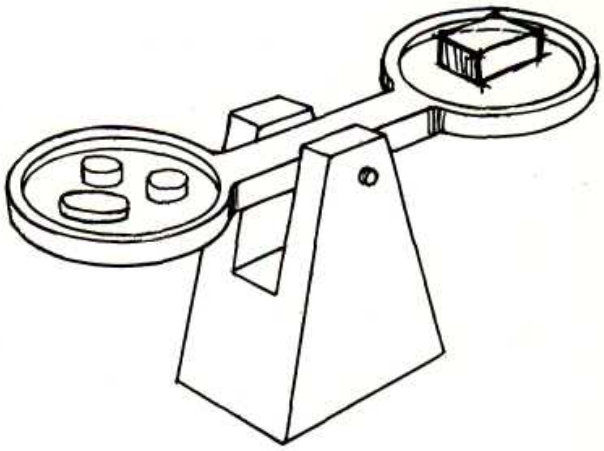


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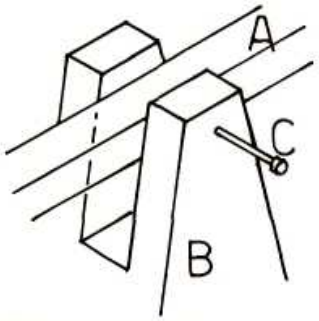
6.1 MOTION AND BALANCE TOY

This toy can be entertaining and educational as well, for it will give pleasure to your child while giving the child the opportunity to discover how mass and volume relate to each other when different materials, such as metal and wood, are involved.





DETAIL 1



List of Materials

A	1	top	1	5	16
B	1	block	4	6	8

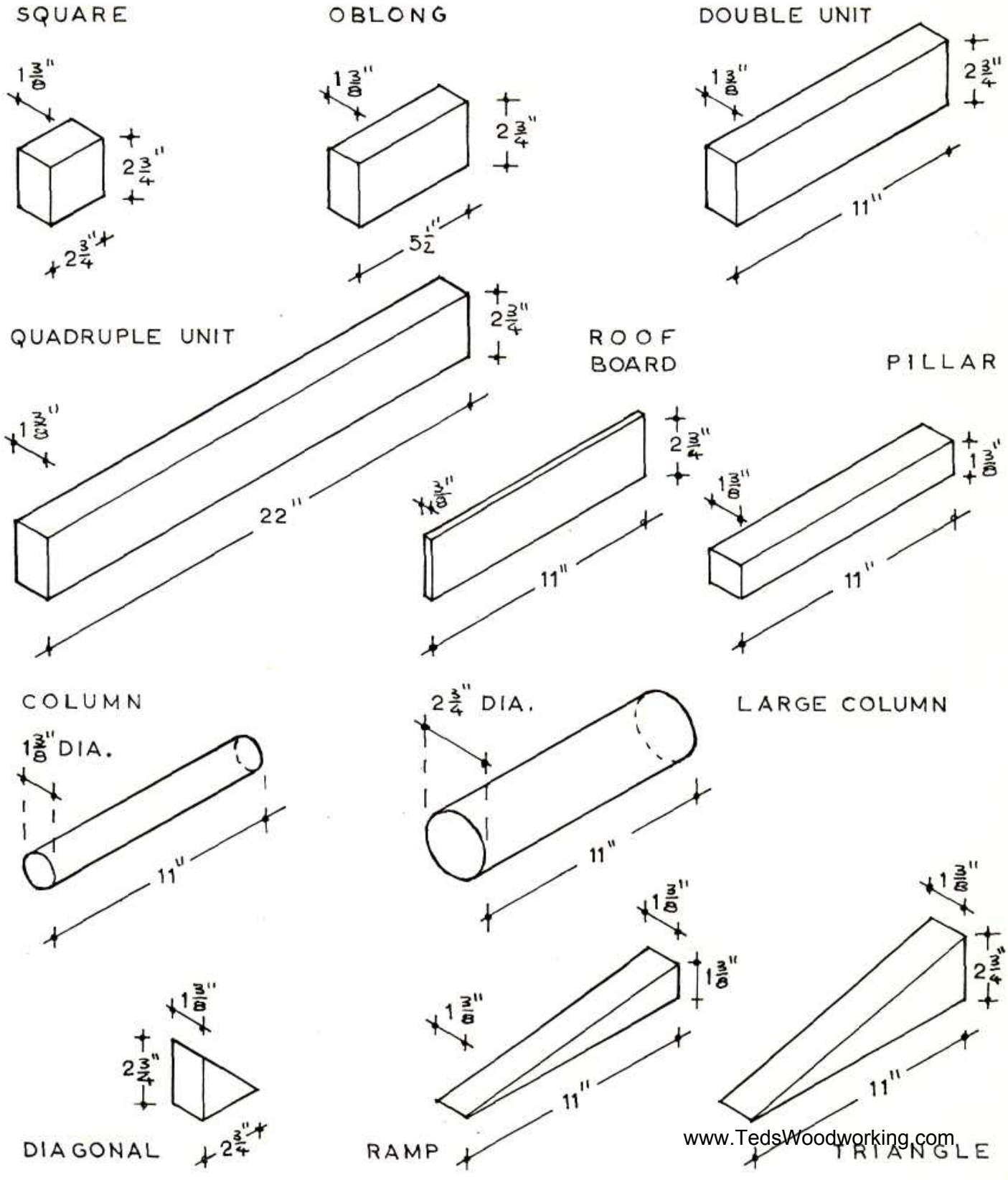
Instructions for Assembly

1. Shape top (A) as indicated in the drawing.
2. Prepare block (B).
3. Apply finish.
4. Join together top (A) and block (B) with bolt (C).

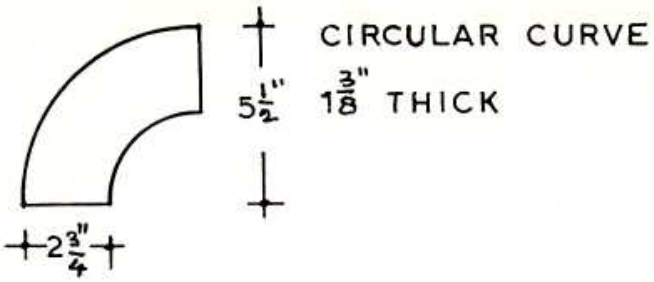
www.TedsWoodworking.com

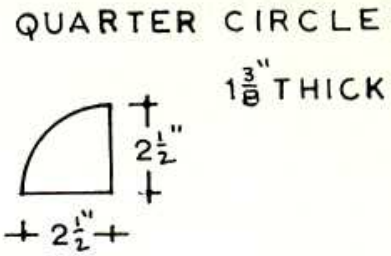
6.2 STANDARD CONSTRUCTION BLOCKS

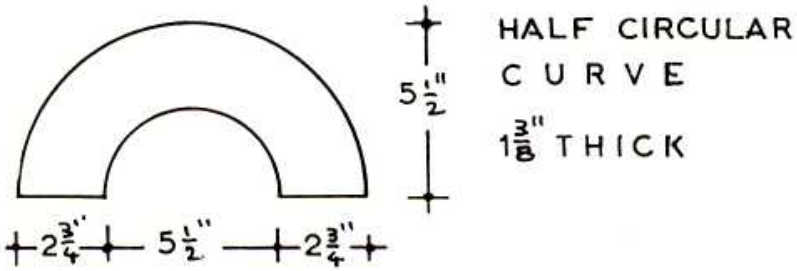
The variety of imaginative structures that can be built with these blocks is almost endless. All you need is a power saw, a ruler and enough wood to make several dozen copies of each of the indicated pieces—more of the oblongs or "bricks," fewer of the circular pieces and columns. The big problem, of course, is to see that all pieces are stowed away when play is over! Avoid using soft wood, which has a tendency to split or splinter—try maple or birch for best results.

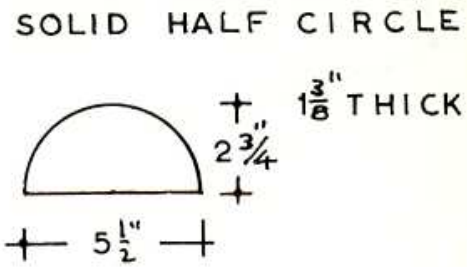


www.TedsWoodworking.com

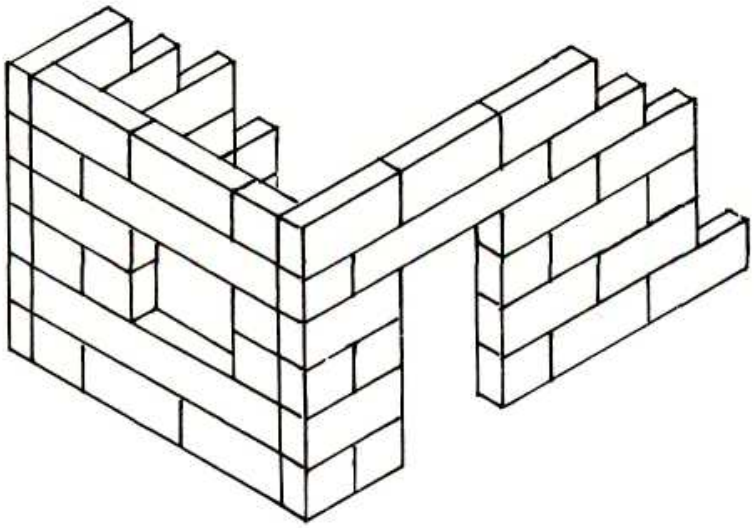




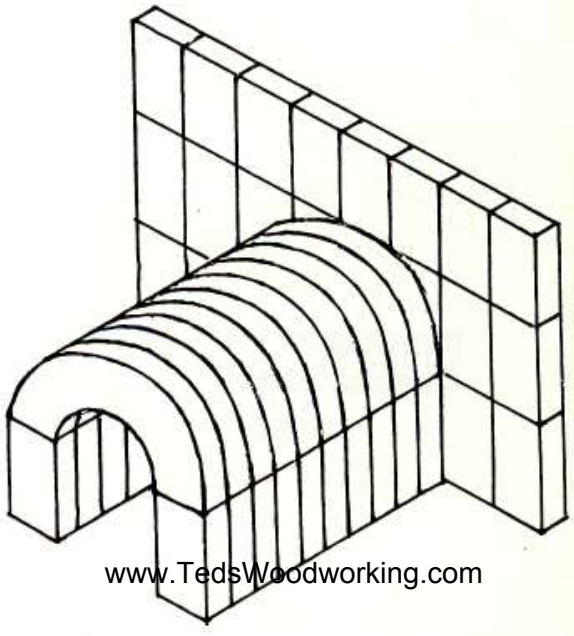




BUILDING



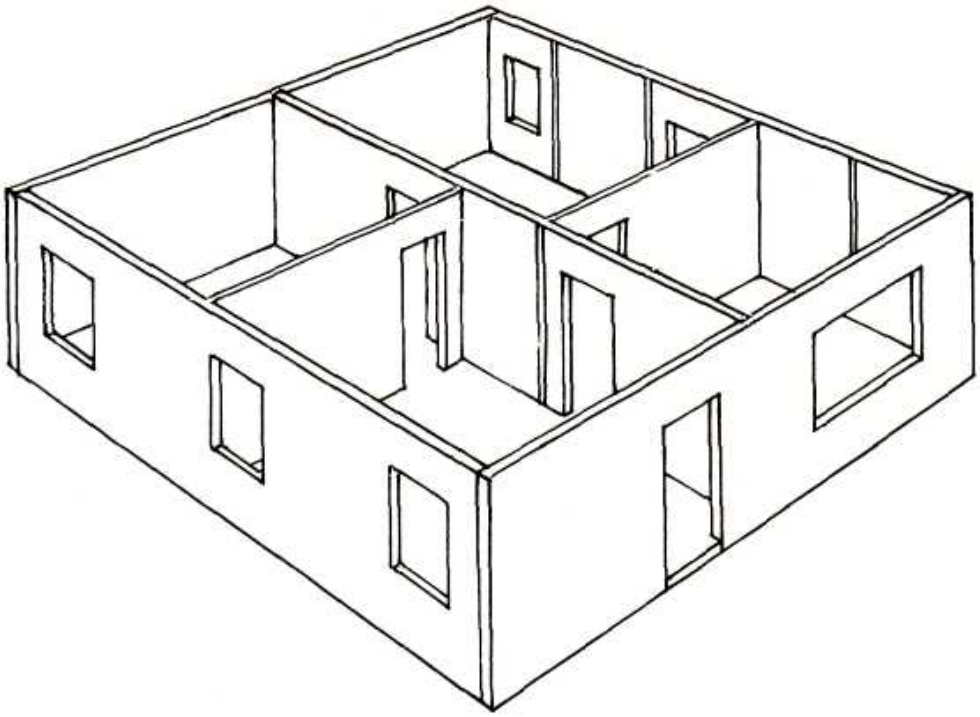
TUNNEL



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6.3 DOLL HOUSE

This is the Number One project on the list of any child who loves tiny places with secret corners—and what child doesn't! This design, though not as architecturally elaborate as some, will provide an endless amount of fun and fascination for children. Scaled for use of plastic furniture readily available in dime stores.



List of Materials

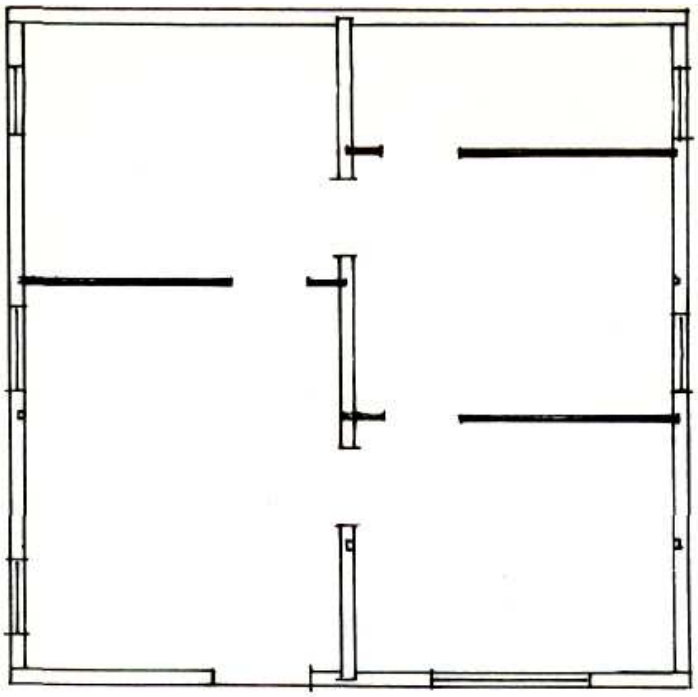
PART	NO.	FUNCTION	DIMENSION IN INCHES thickness × width × length		
A	1	front	½	8½	22
B	1	side	½	8½	21½
C	1	back	½	8½	22
D	1	side	½	8½	21½
E	1	bottom	½	21½	21½
F	1	partition	½	8	21½
G	2	partitions	¼	8	10½

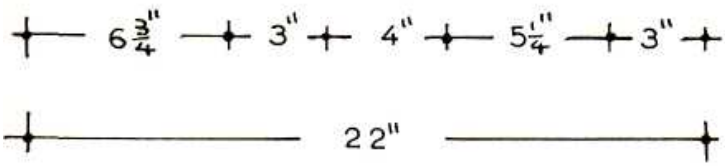
Instructions for Assembly

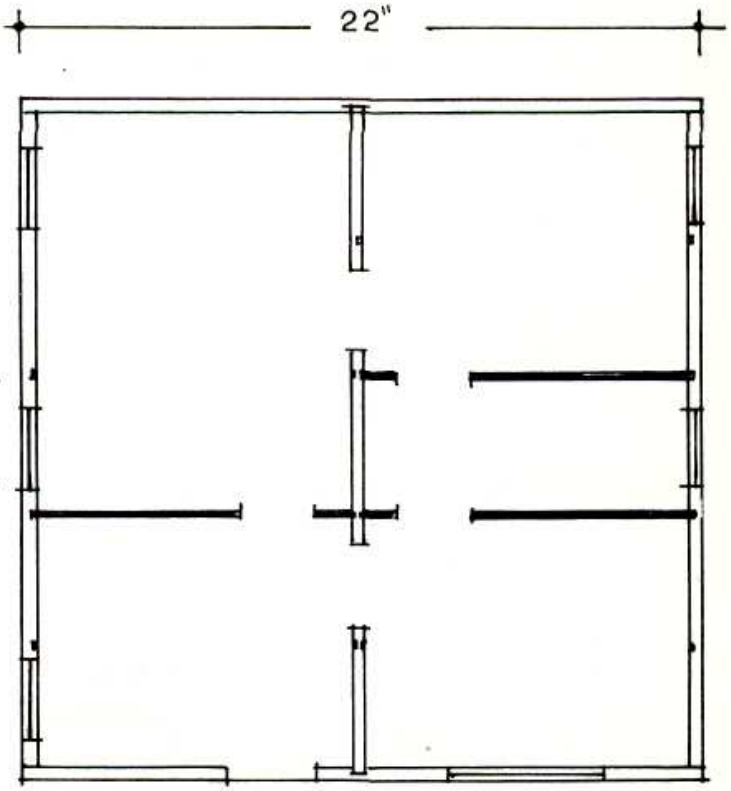
1. Join bottom (E) to side (B) and side (D).
2. Fasten front (A) and back (C).
3. Install partitions (F) and (G).
4. Apply finish.

www.TedsWoodworking.com

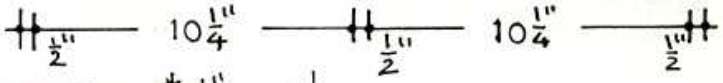
SOLUTION 1

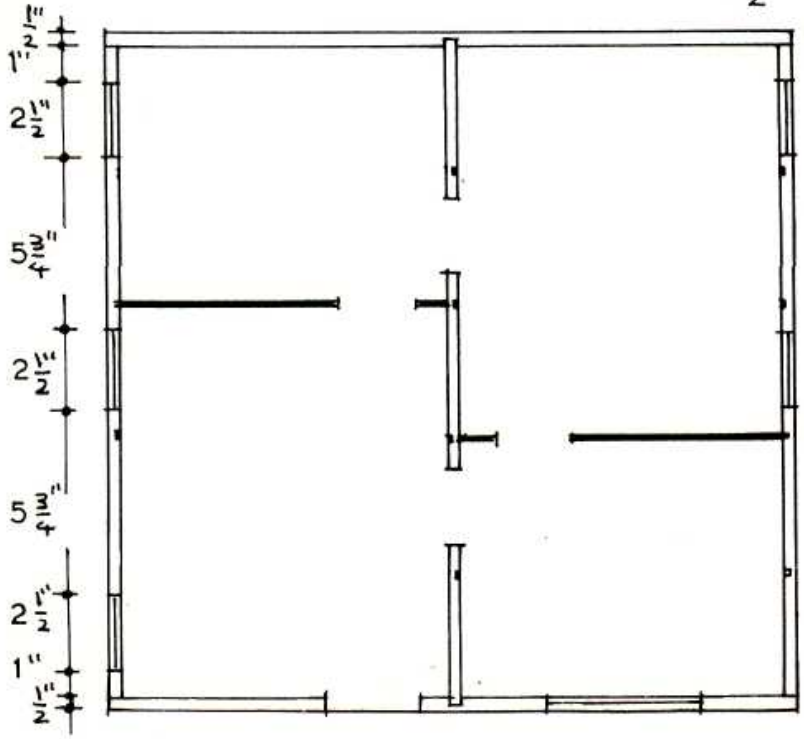


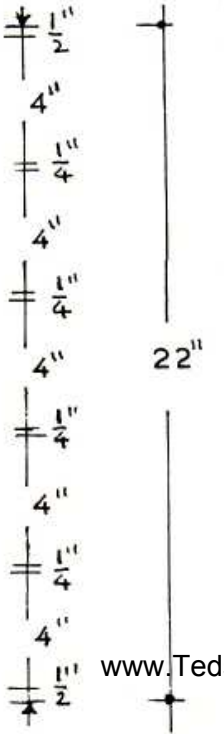




SOLUTION 2

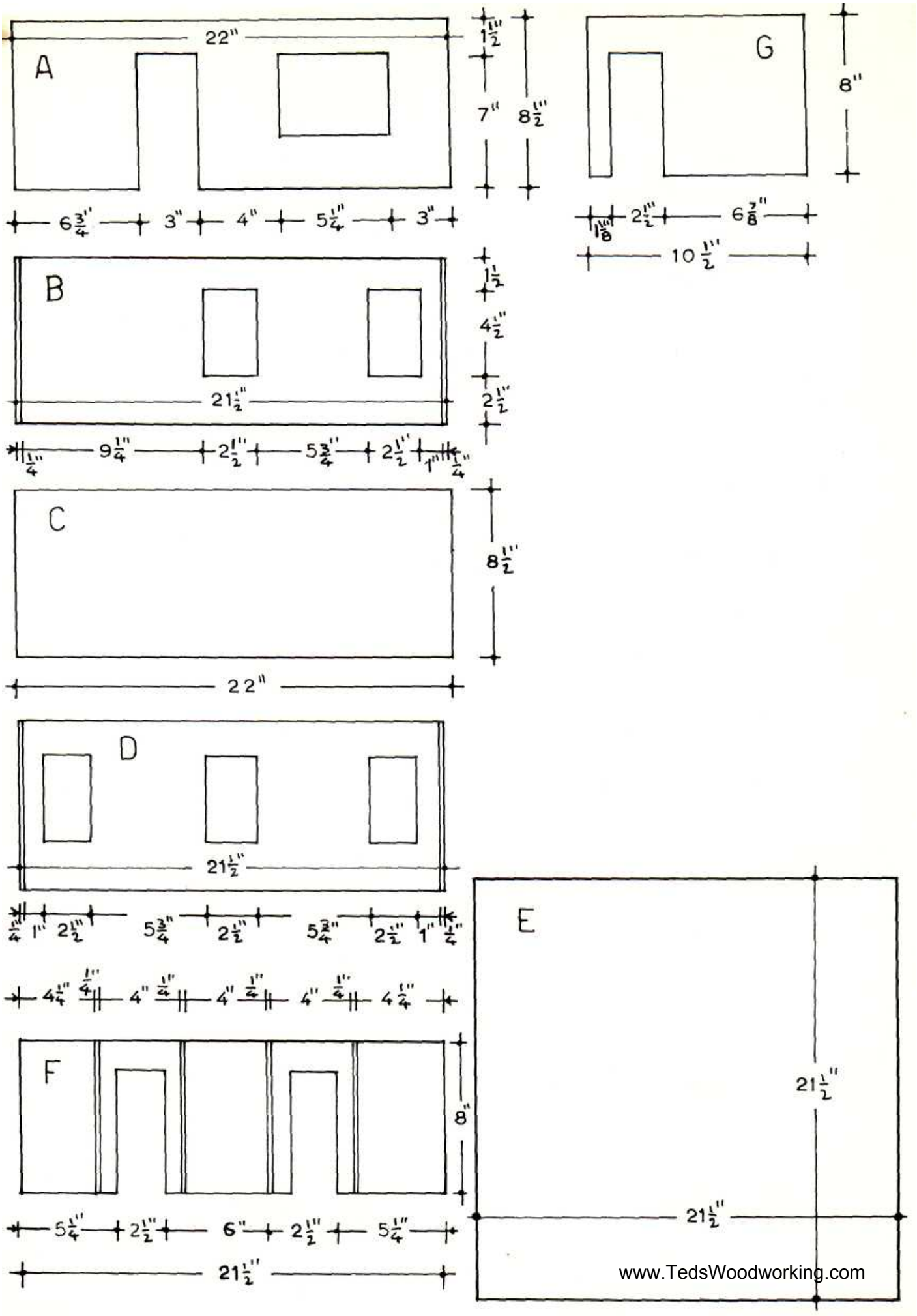




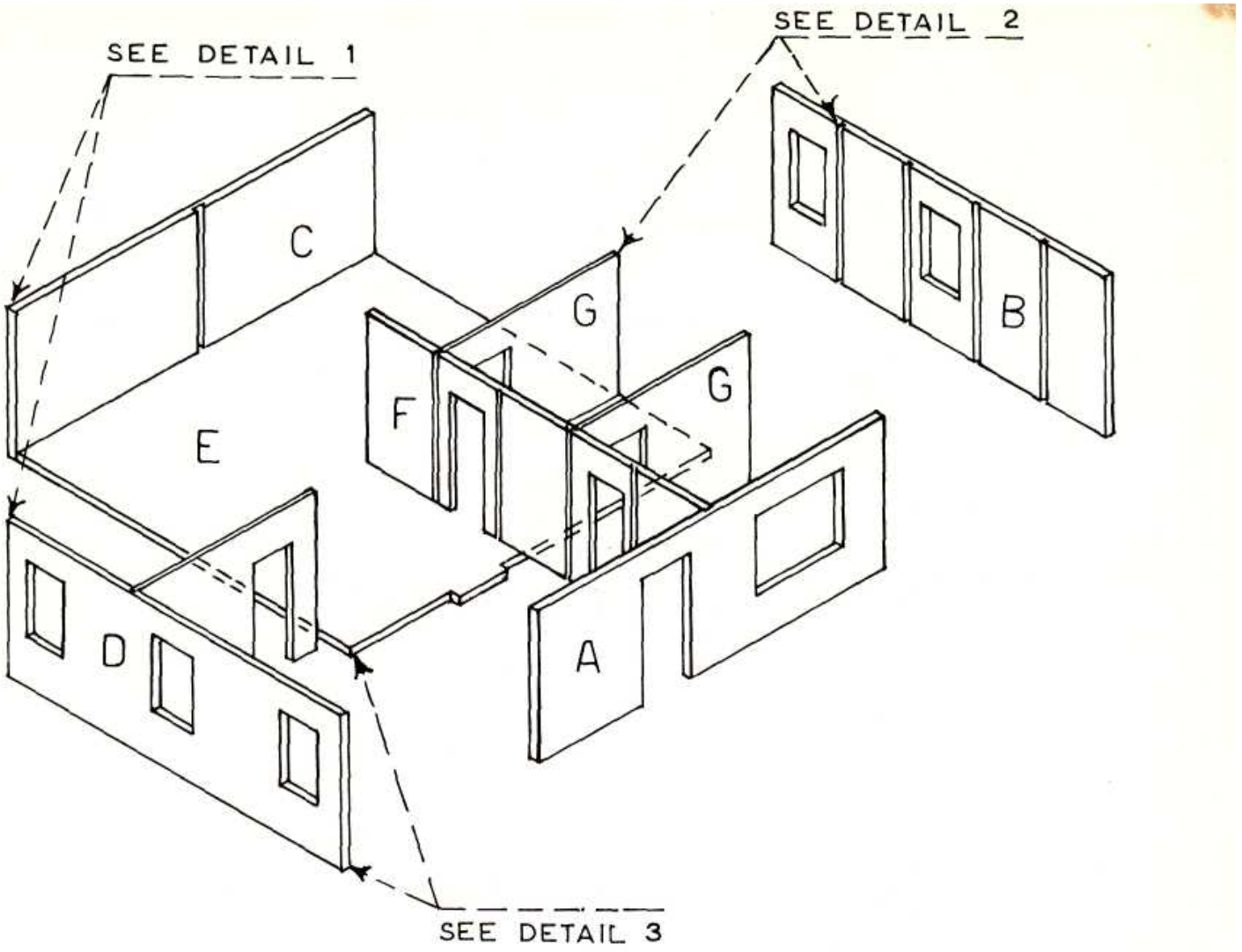


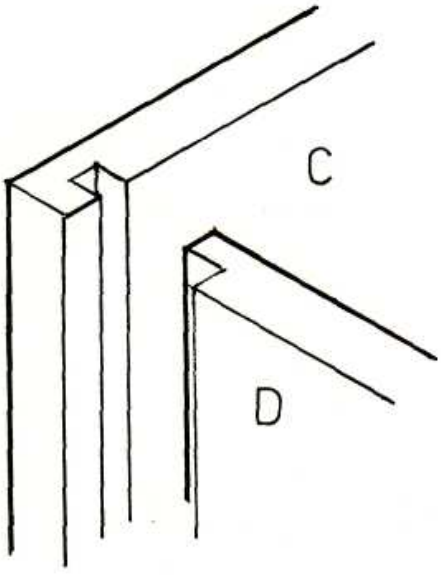
www.TedsWoodworking.com

SOLUTION 3

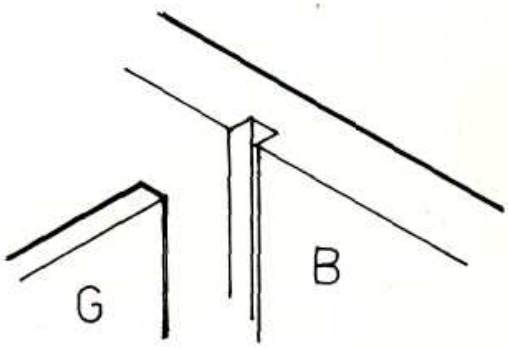


www.TedsWoodworking.com

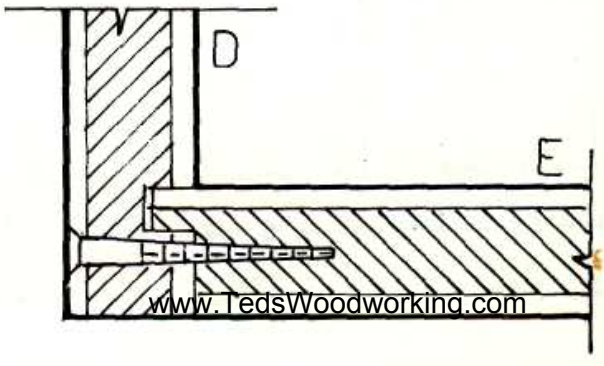




DETAIL 1



DETAIL 2

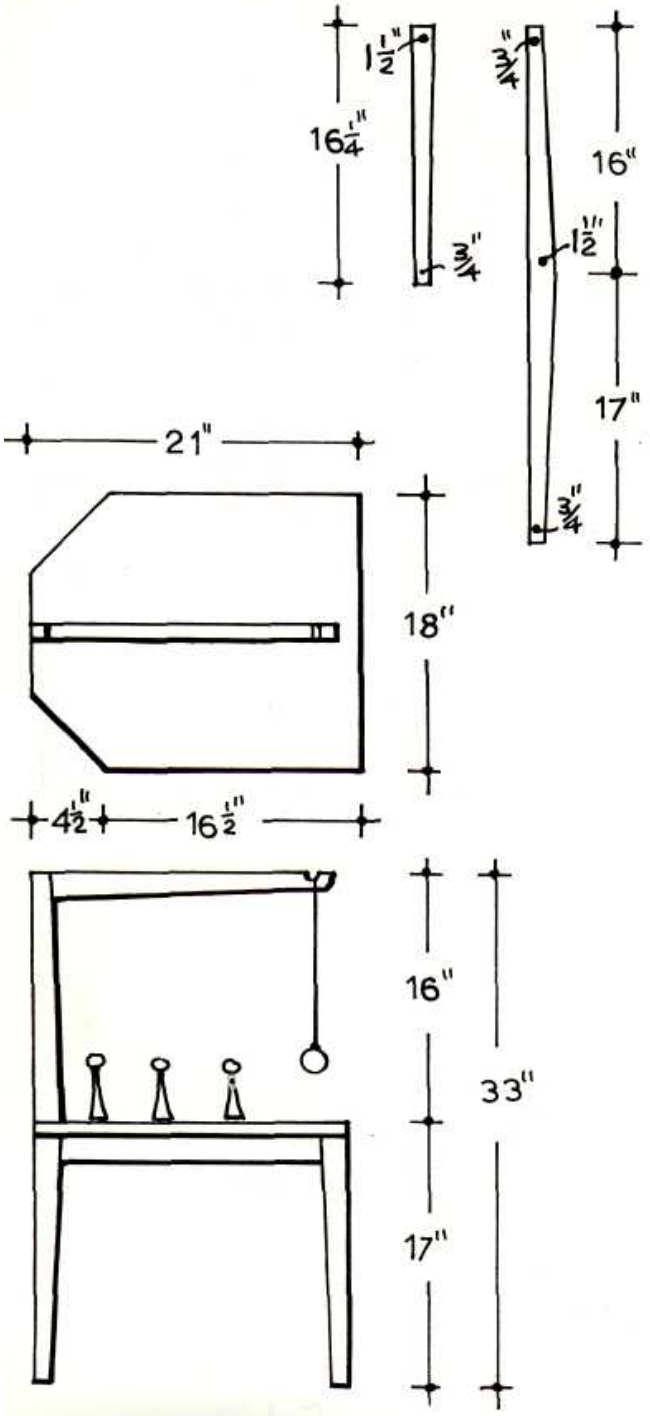


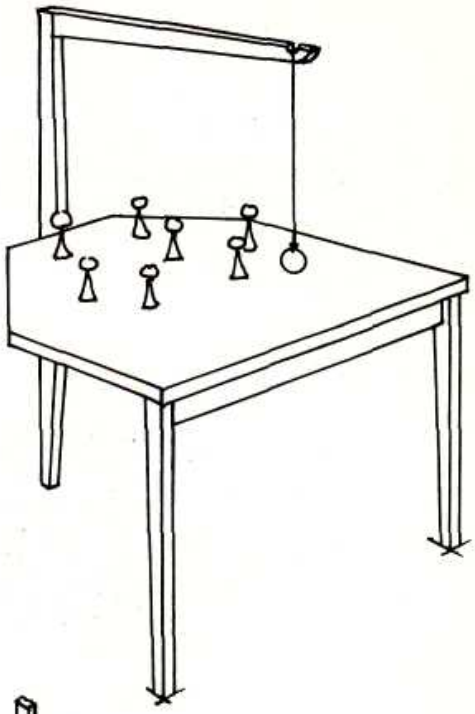
DETAIL 3

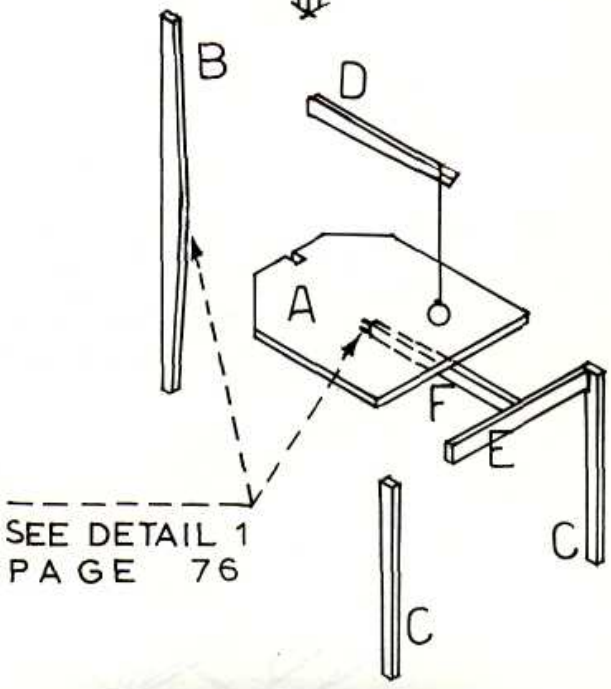
www.TedsWoodworking.com

6.4 PLAY TABLE

A practical and enjoyable present for your child, and especially useful when the weather is bad and the child has to play inside.







List of Materials

A	1	top	¾	18	21
B	1	leg	1	1½	33
C	2	legs	1	1½	16¼
D	1	rail	1	1½	18
E	1	rail	1	1½	15½
F	1	rail	1	1½	18

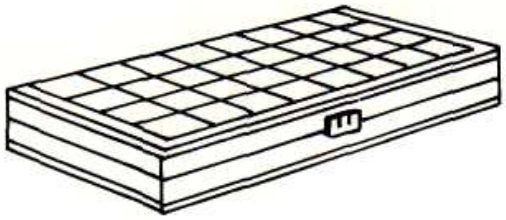
Instructions for Assembly

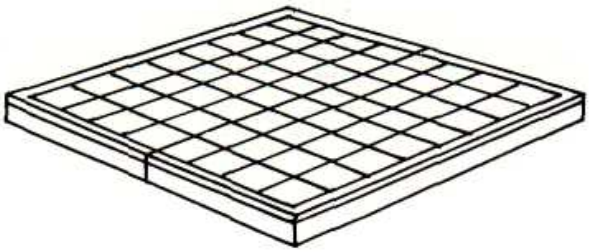
1. Join rail (E) to legs (C), and rail (F) to rail (E) and leg (B).
2. Fasten rail (D) to leg (B), and attach top (A) to rails (E, F).
3. Apply finish.

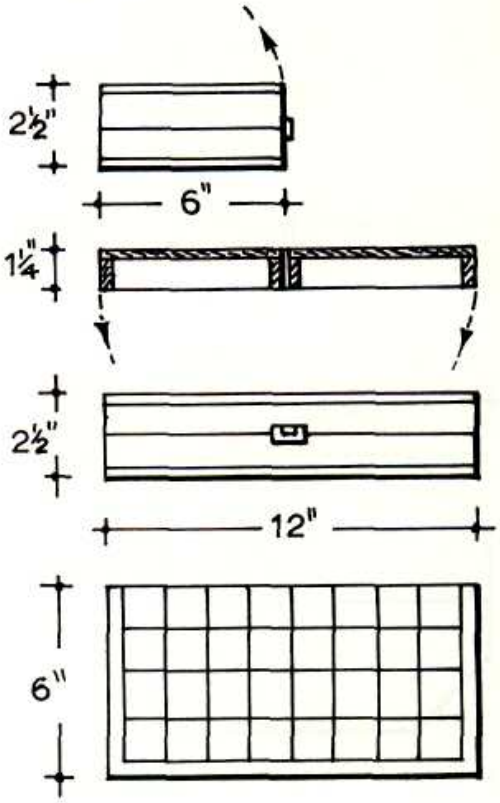
www.TedsWoodworking.com

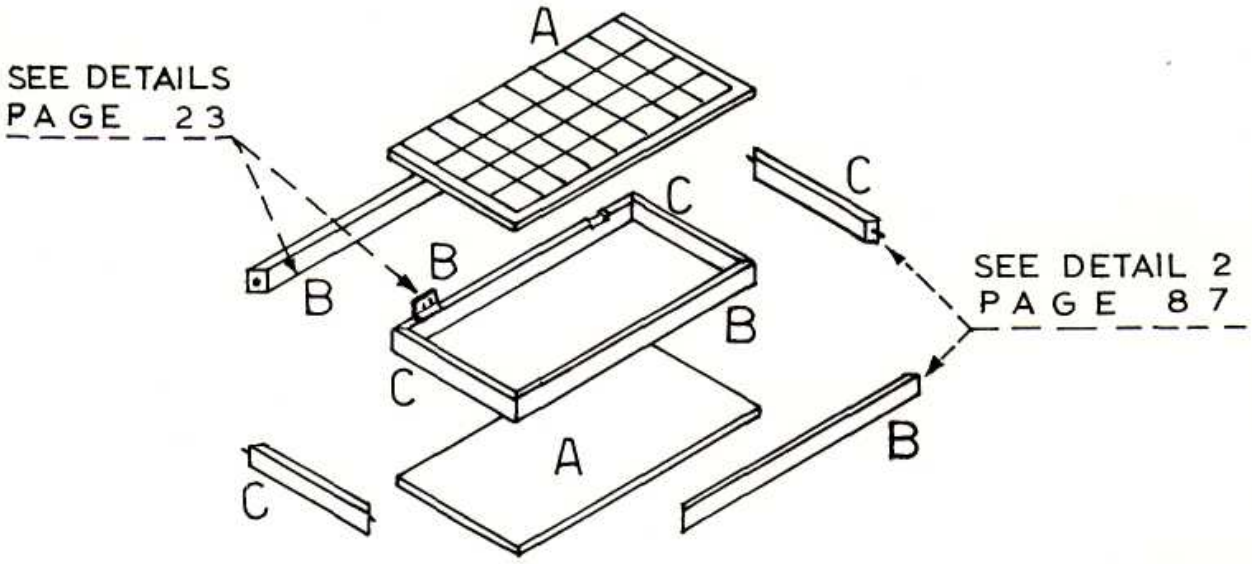
6.5 CHECKER BOX

The hobbyist will enjoy playing a favorite game on a checker box that is personally made.









List of Materials

A	2	tops	¼	6	12
B	4	rails	½	1	12
C	4	rails	½	1	6

Instructions for Assembly

1. Join rails (B) with rails (C).
2. Attach tops (A), and install hinges on rails (B).
3. Apply finish.

www.FreeWoodworking.com

6.6 LEG EXERCISER

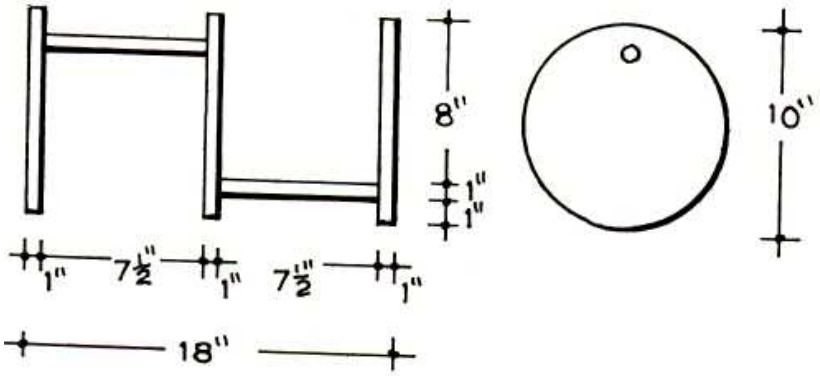
Your children can have fun and at the same time strengthen their leg muscles with this clever device. Easy to make, it requires very little time as well.

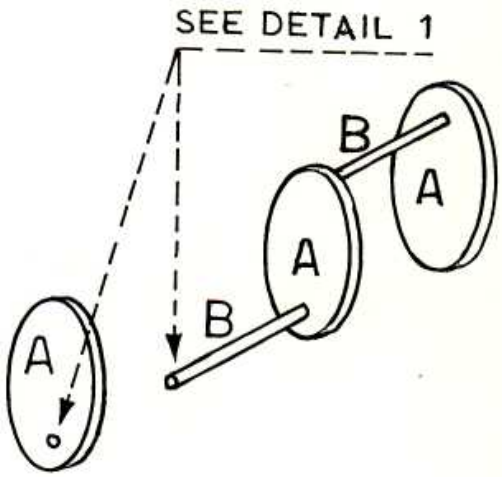
List of Materials

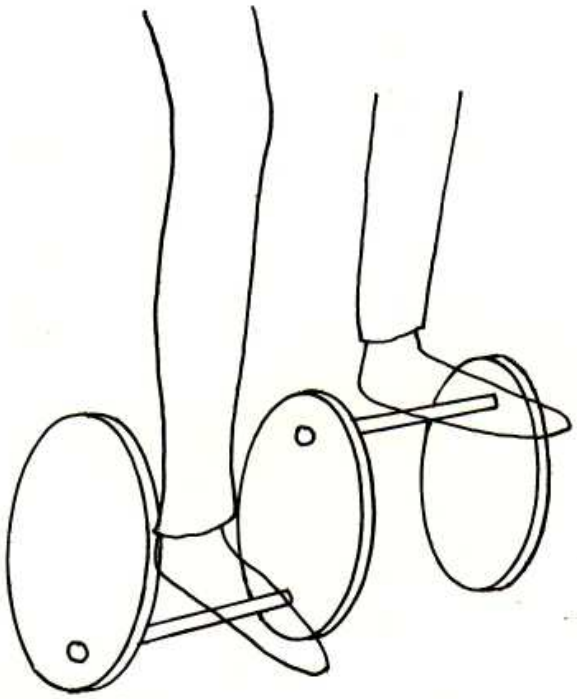
A	3	boards	¾	10 diam.
B	2	dowels	1 diam.	8½

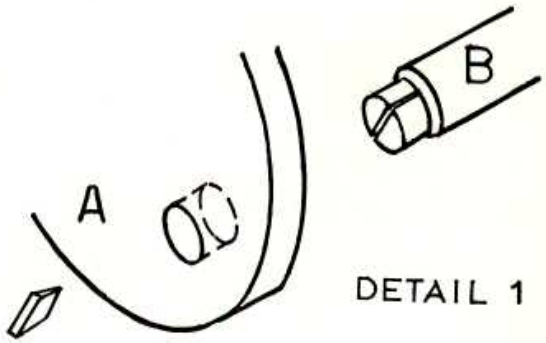
Instructions for Assembly

1. Join (A) with (B).
2. Apply finish.







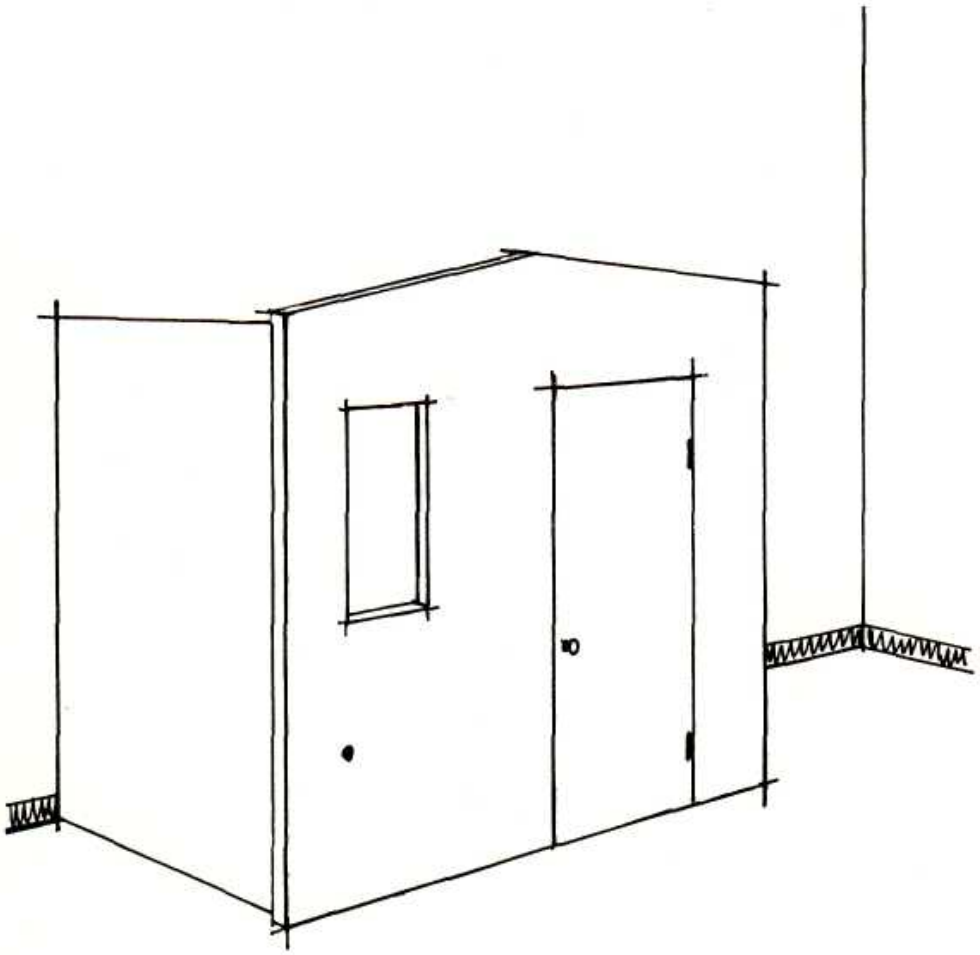


DETAIL 1

www.TedsWoodworking.com

6.7 FOLDING PLAYHOUSE

This three-sided, folding, roofless structure may not look like a castle, a firehouse, or a general store, but that's because we left out the principal ingredient—the child's gift of imagination. If used outdoors (against the side of the house) it should be painted.



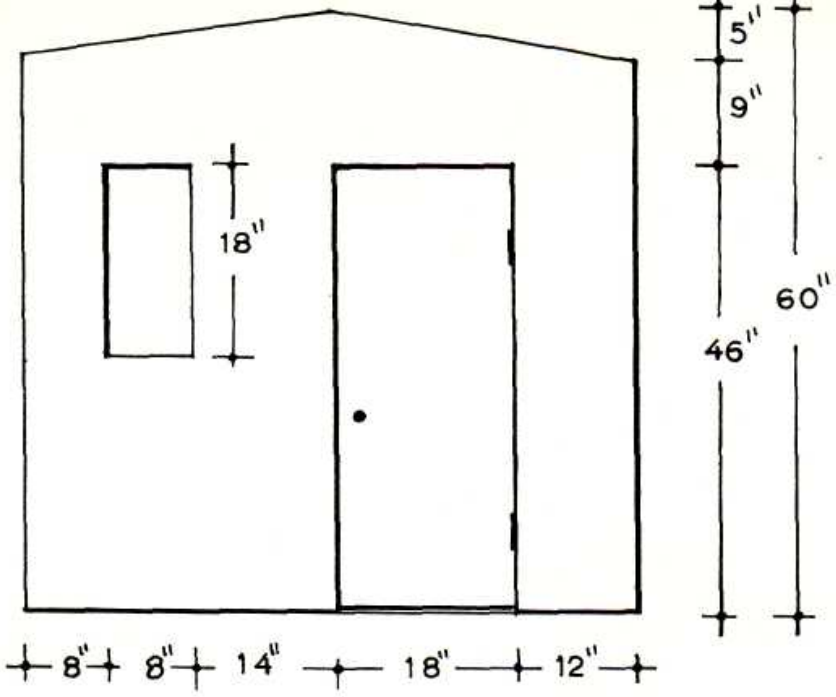
List of Materials

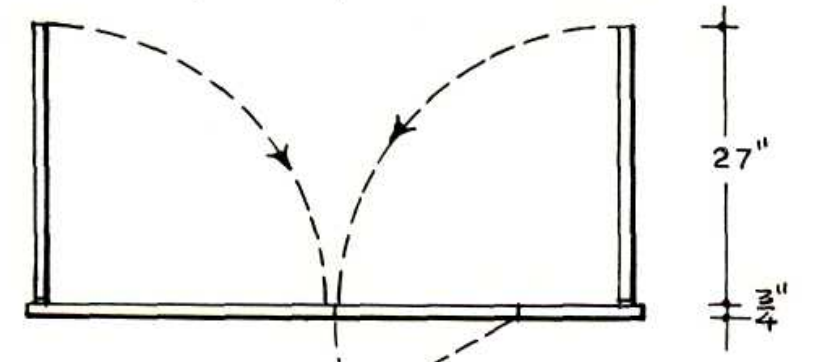
PART	NO.	FUNCTION	DIMENSION IN INCHES thickness ×	width ×	length
A	1	front panel	¾	60	60
B	2	sides	¾	27	55
C	1	door	¾	18	46
D	1	strip	½	1¼	60

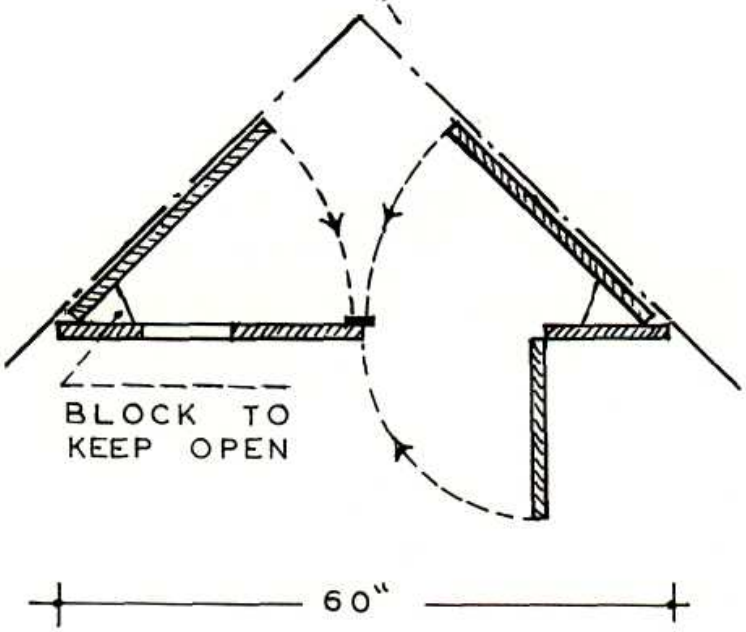
Instructions for Assembly

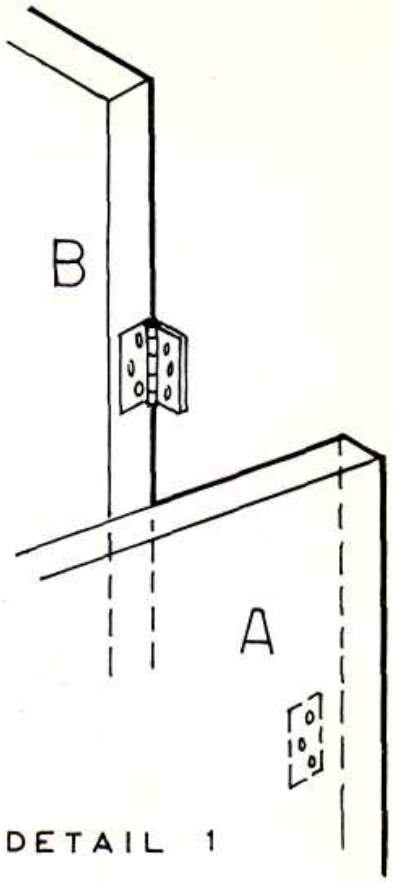
1. Join sides (B) to front (A).
2. Fasten strip (D) to front (A).
3. Install door.
4. Apply finish.

www.TedsWoodworking.com

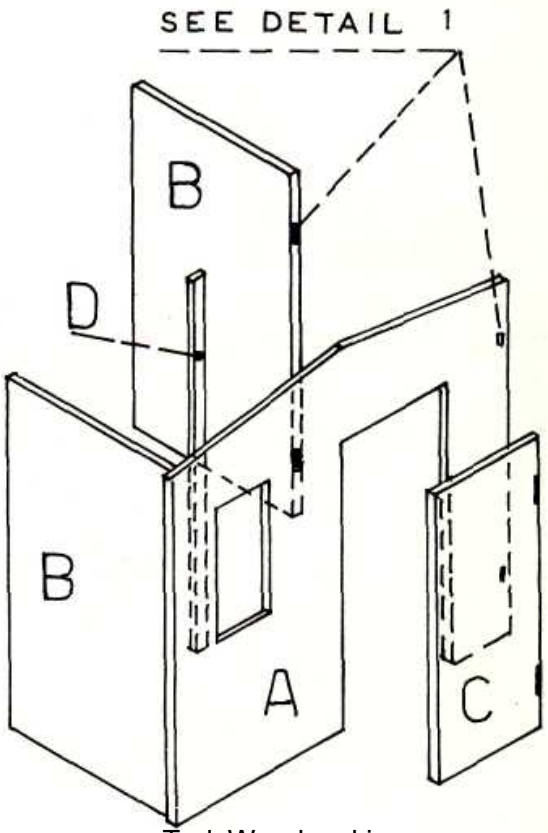








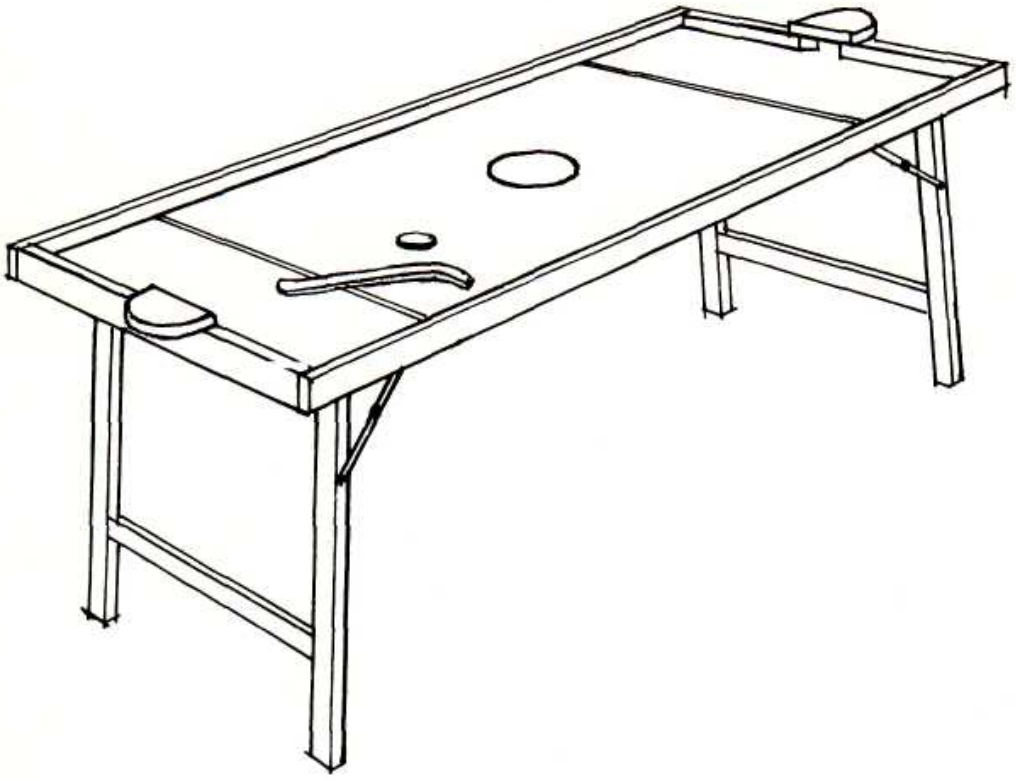
DETAIL 1



www.TedsWoodworking.com

6.8 HOCKEY TABLE

Hours of fun—and training in eye-hand coordination—are afforded by this simple table-top version of hockey. A children's game that can be shared by adults. A manufactured table, if at all available, would be pretty expensive, but this one takes only a little plywood and a few hours of your spare time.



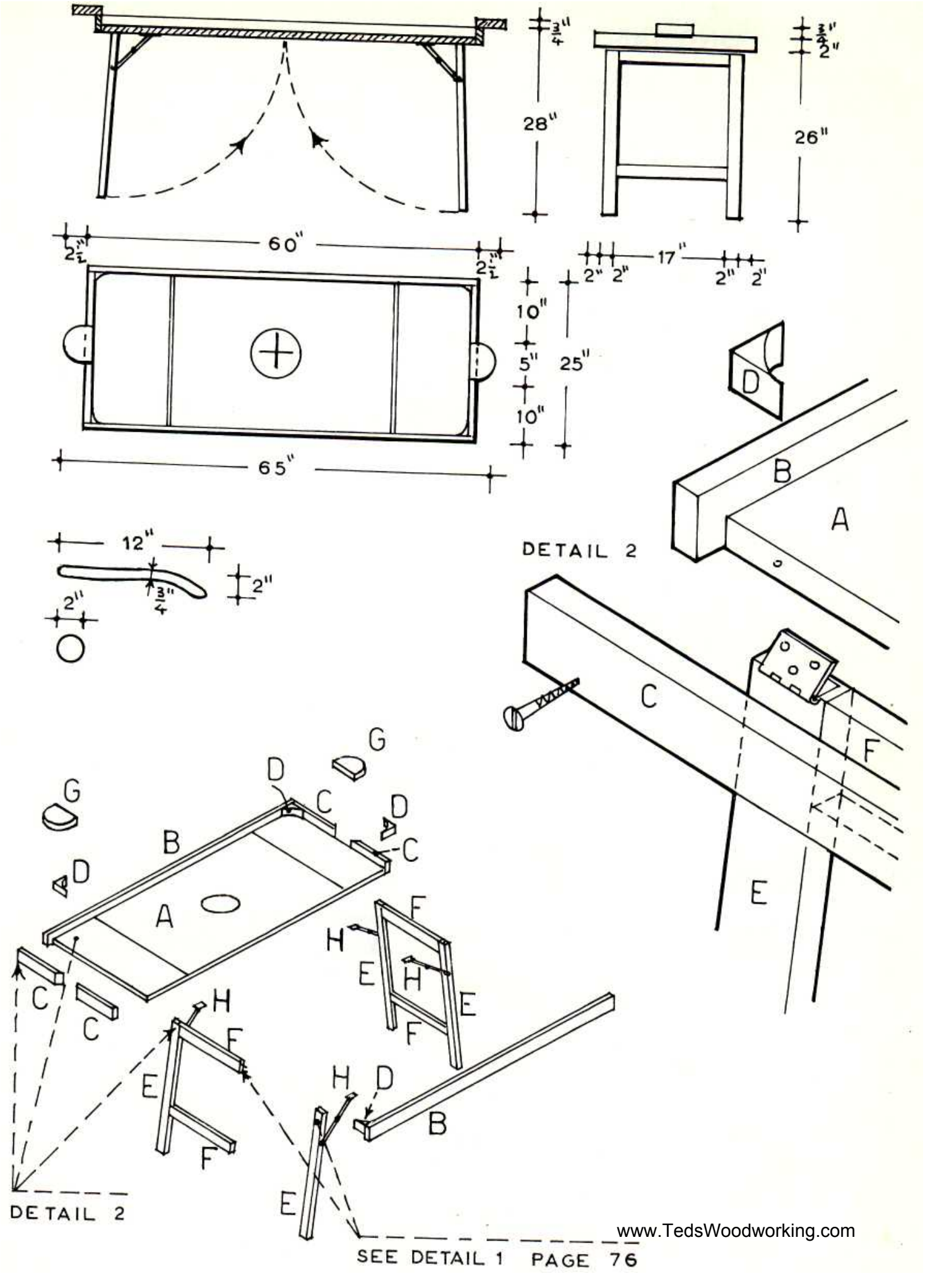
List of Materials

PART	NO.	FUNCTION	DIMENSION IN INCHES thickness × width × length		
A	1	top	¾	23½	58½
B	2	strips	¾	1½	60
C	4	strips	¾	1½	10¾
D	4	corner blocks	¾	2	2
E	4	legs	¾	2	26
F	4	rails	¾	2	17
G	2	covers	¾	5	3½
H	4	folding metal supports			

Instructions for Assembly

1. Attach strips (B) and (C) to top (A) and install corner block (D).
2. Fasten covers (G) on strips (C).
3. Join legs (E) to rails (F).
4. Fasten legs (E) to top (A) and install metal supports (H).
5. Apply finish.

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6.9 PING PONG TABLE

"Ping Pong" is actually a trademark or trade name for a special make of tennis table, but it has become so much of a household word that our use of it here can be excused. This is another family item which Dad and Mom will enjoy as much as the children. Construction is no problem—top of plywood, legs of solid wood, and a net-and-clamp set (from the local sports store), presto! You're ready for the first serve.



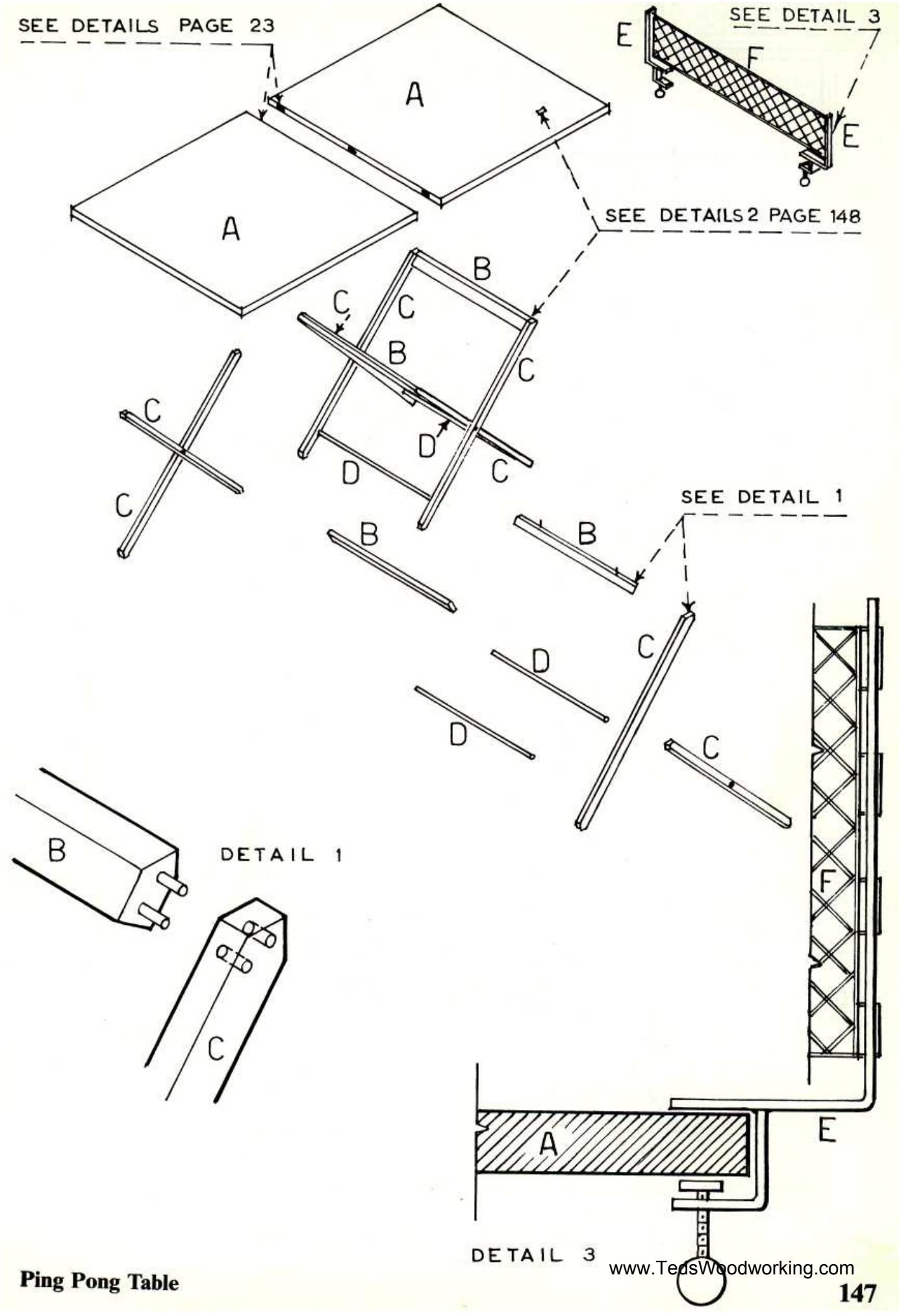
List of Materials

PART	NO.	FUNCTION	DIMENSION IN INCHES thickness × width × length		
A	2	tops	¾	48	48
B	4	rails	1	2	29
C	8	legs	1	1¼	43
D	4	stretchers	¾ diam.		32 (approx.)
E	2	metal clamps			
F	1	net (5 in. high)			

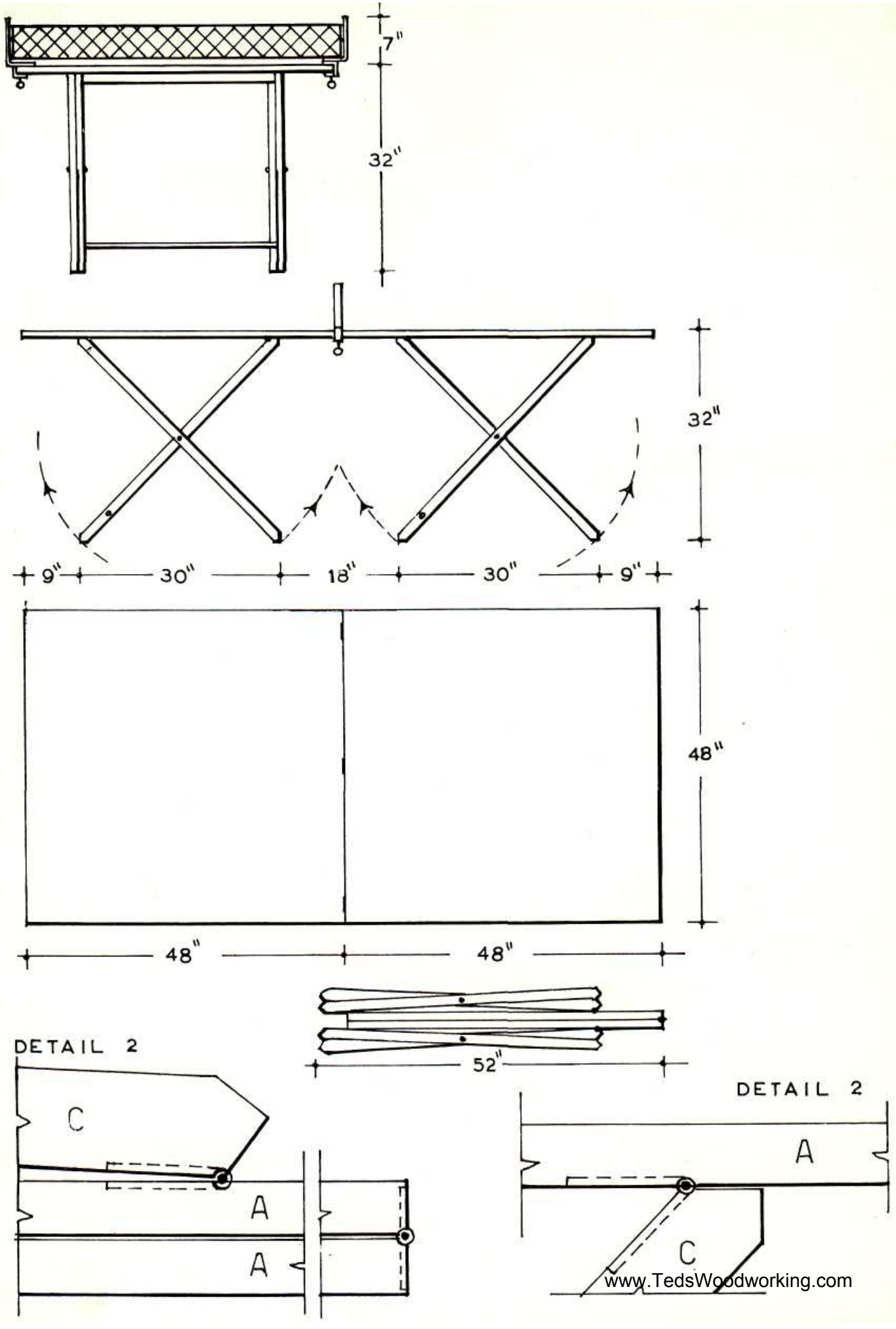
Instructions for Assembly

1. Join tops (A) with hinges at center.
2. Attach legs (C) with bolts at center.
3. Fasten rail (B) with stretchers (D) to legs (C).
4. Join legs (C) to top (A).
5. Install clamps (E) on top (A), and string net taut.
6. Apply finish.

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6.10 PUPPET THEATER

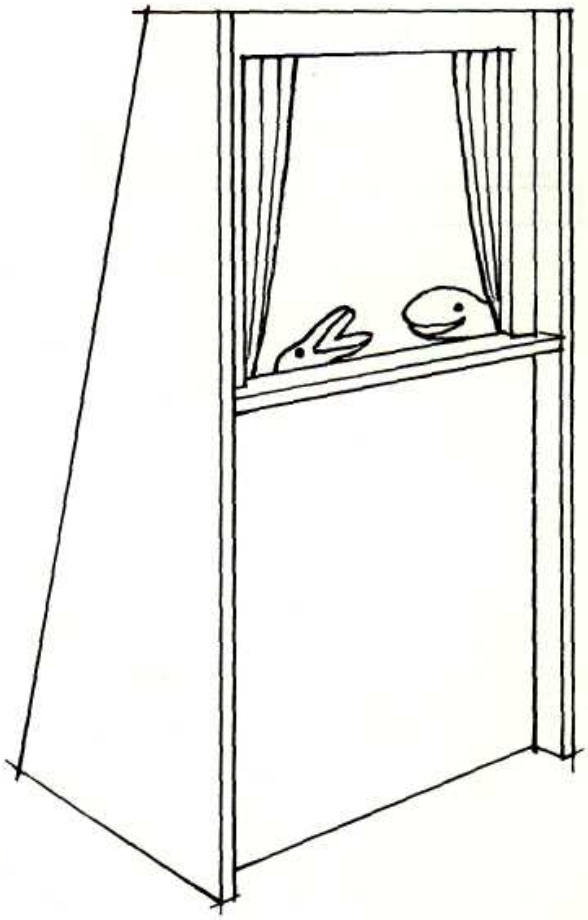
Punch and Judy, Kukla and Ollie, Lambchops and Charlie Horse will come to life in this child-size puppet theater, a training ground for the Burr Tillstroms and Shari Lewises of tomorrow. It just isn't fair to children *not* to build this plywood proscenium.

List of Materials

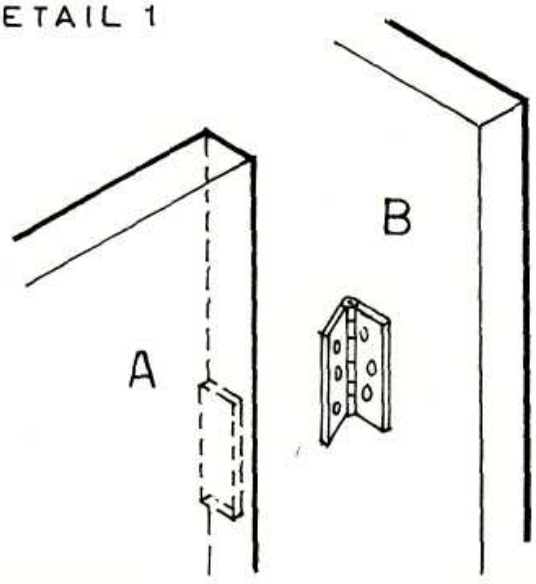
PART	NO.	FUNCTION	DIMENSION IN INCHES thickness × width × length		
A	1	front panel	¾	28½	53
B	2	sides	¾	17	53
C	1	board	¾	2¾	28½

Instructions for Assembly

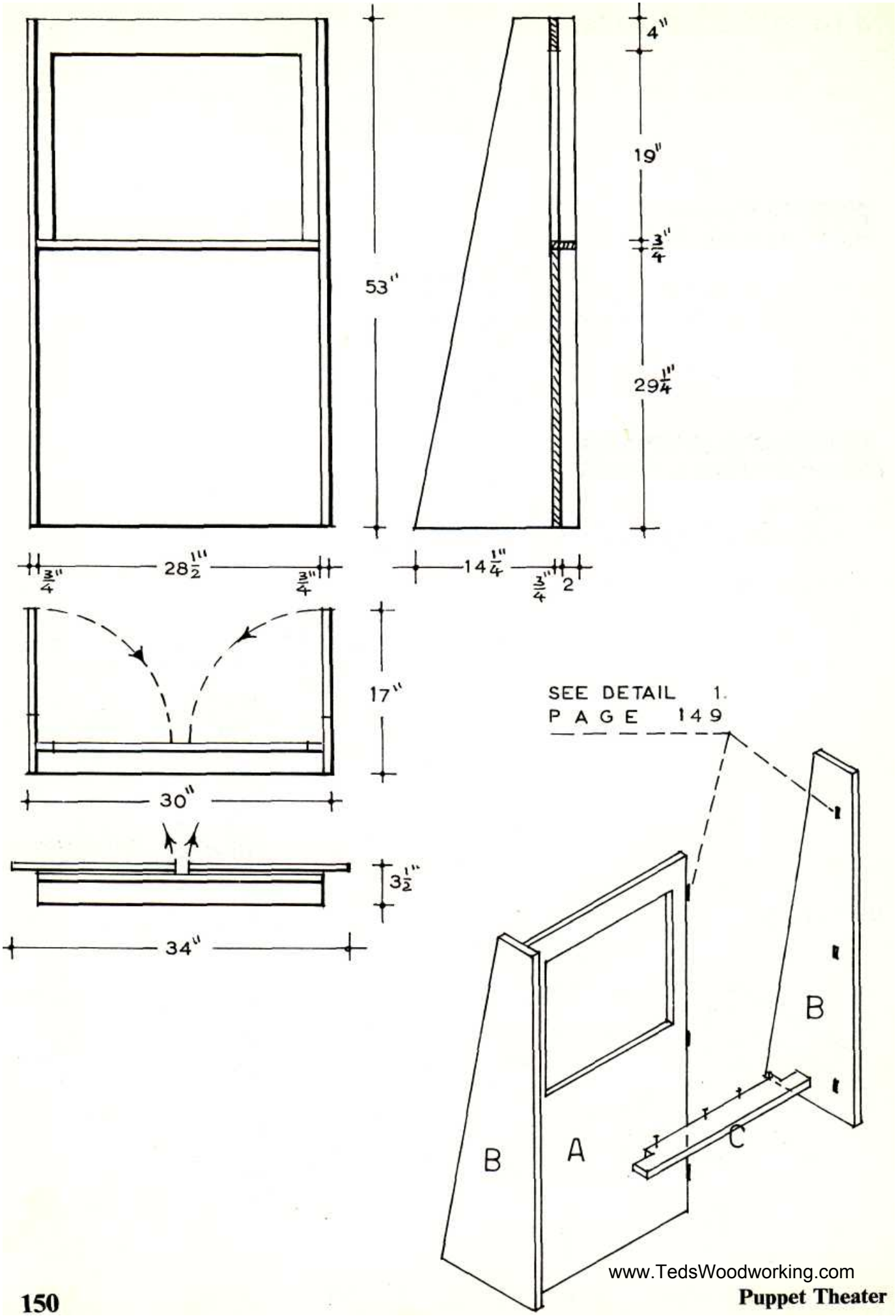
1. Join board (C) with front panel (A).
2. Install sides (B) by joining to front (A) with hinges.
3. Apply finish.



DETAIL 1



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6.11 INDOOR-OUTDOOR SLIDE

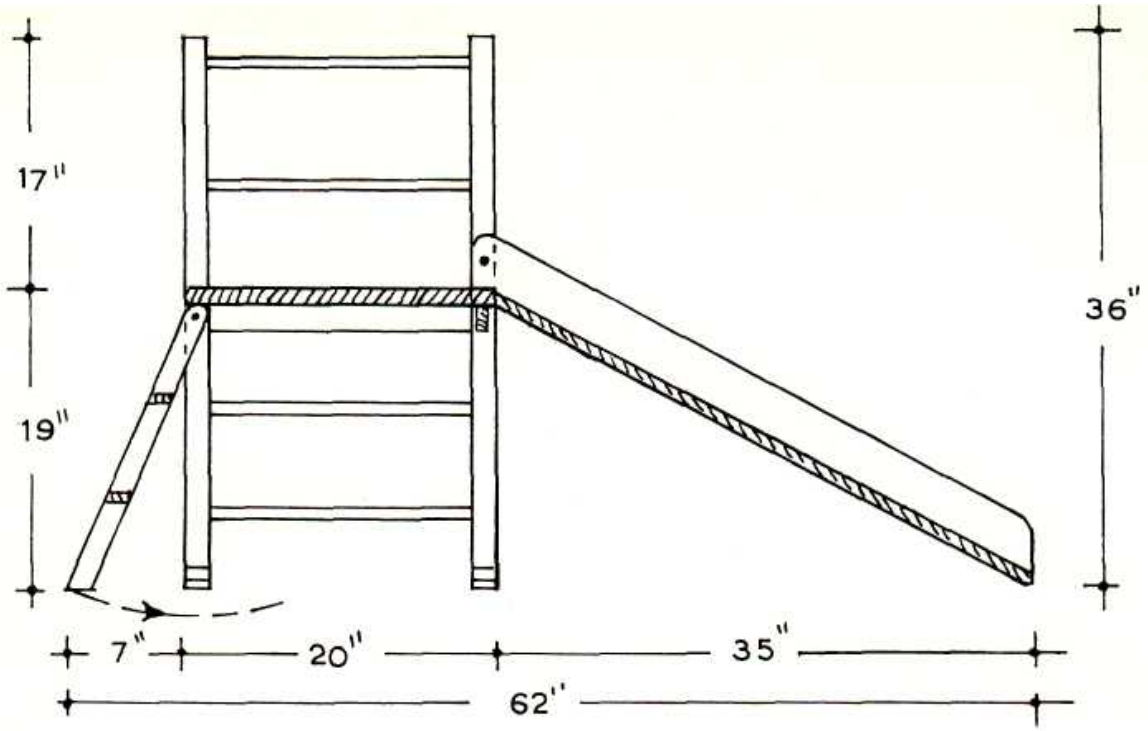
Sturdy, exciting but safe for the toddler; the drop is only a foot and a half but the three-year-old will be thrilled. The slide is removable for easy carrying in and out of the house. Plenty of muscle-building activity indoors on rainy days with this low-cost equipment.

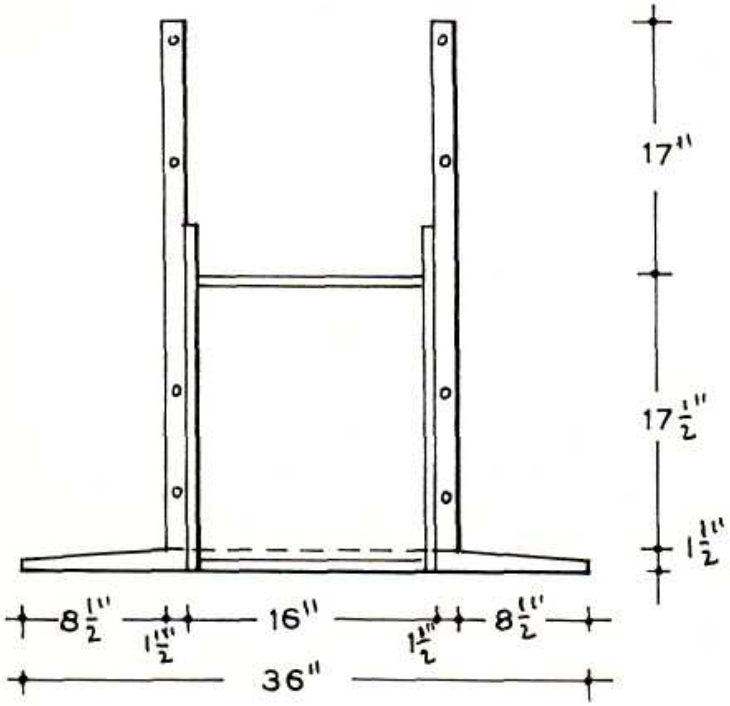


List of Materials

PART	NO.	FUNCTION	DIMENSION IN INCHES thickness	×	width	×	length
A	4	supports	1½		1½		36
B	2	rails	1¼		1¾		17
C	4	dowels	1 diam.				20
D	1	rail	1¼		1¾		16
E	2	bottoms	1½		1½		36
F	2	sides	¾		3½		42
G	1	plank	¾		14½		42
H	2	side rails	1		1½		20
J	2	cross rails	1		1½		14¾
K	1	panel	¾		18½		20

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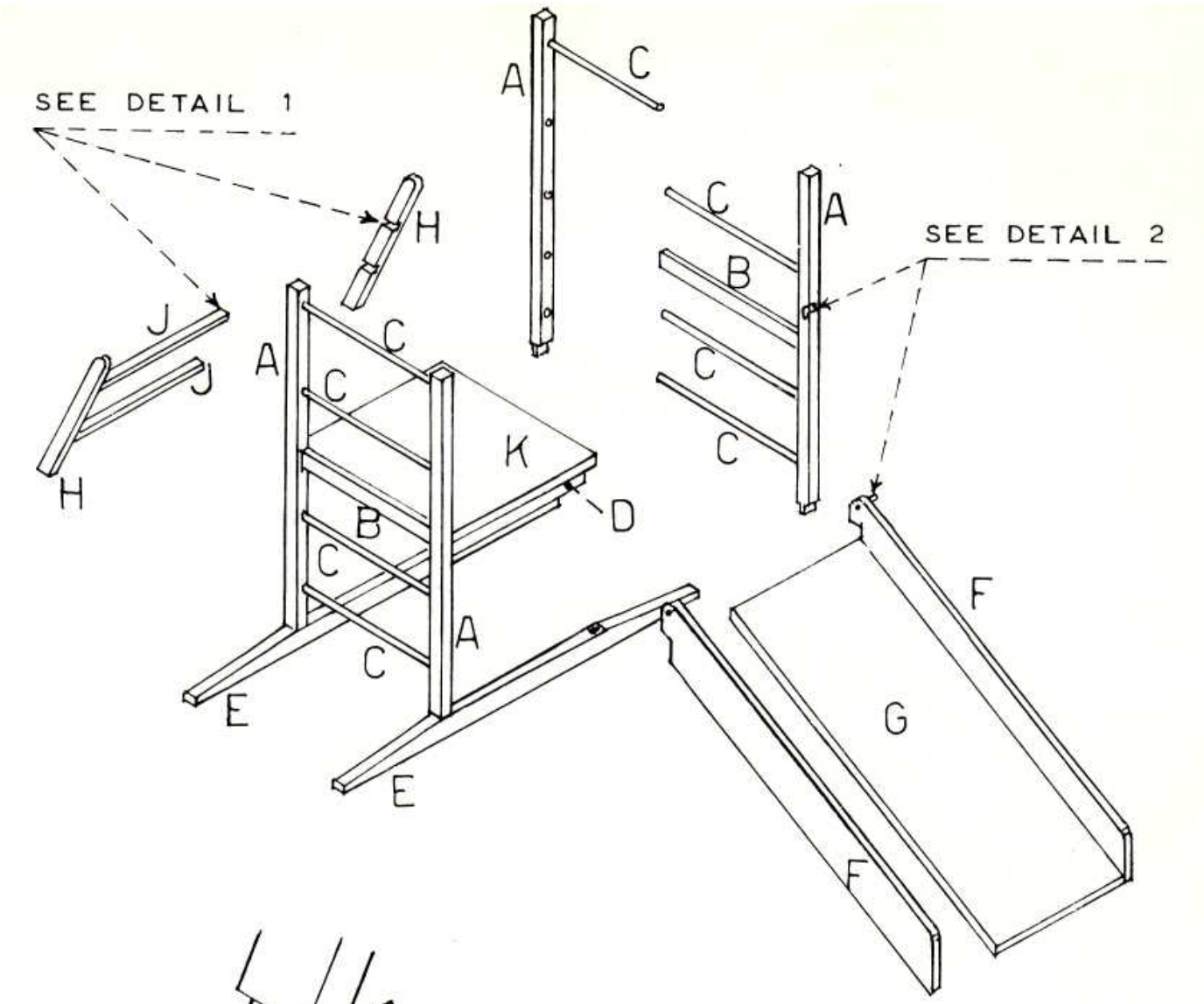


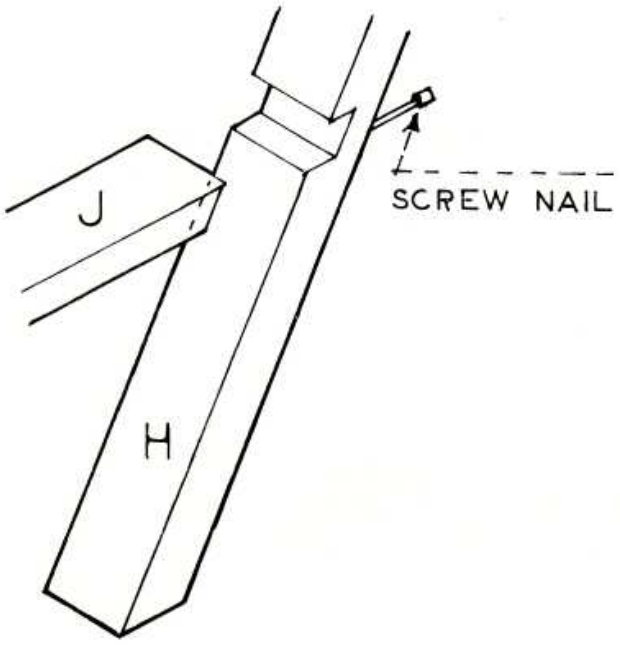


Instructions for Assembly

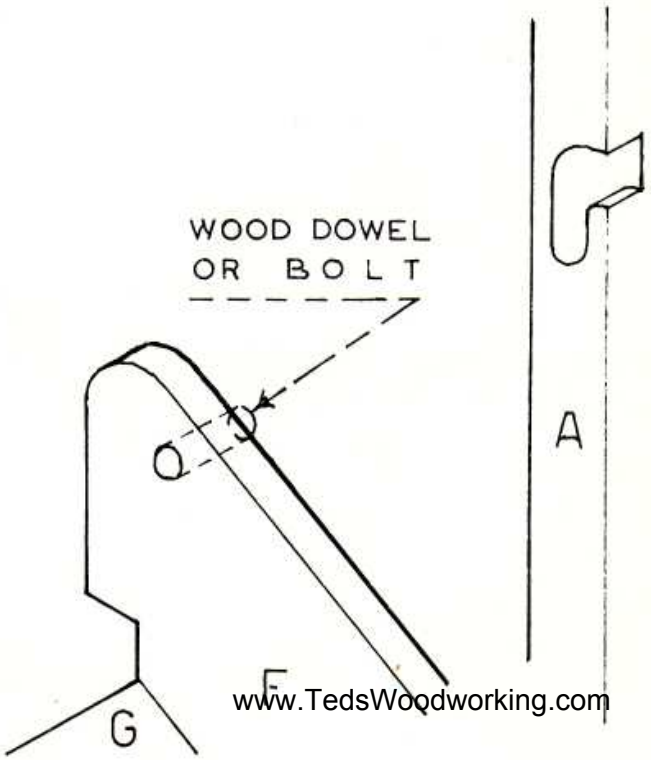
1. Join supports (A) to rails (B) and dowels (C).
2. Fasten supports (A) to rails (D) and (E) and attach panel (K).
3. Join sides (H) with rails (J) and attach sides (H) to (A) with screws.
4. Join sides (F) to sides (G).
5. Apply finish and install slide (F, G) by attaching to supports (A).

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DETAIL 1

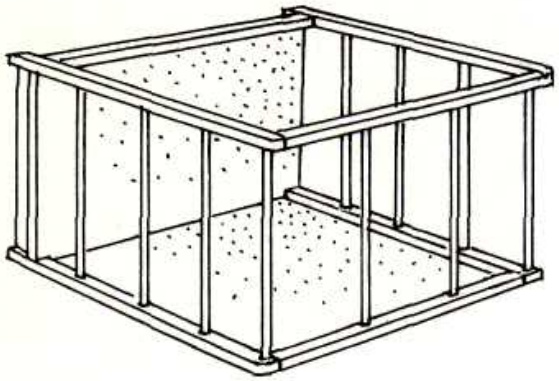


DETAIL 2

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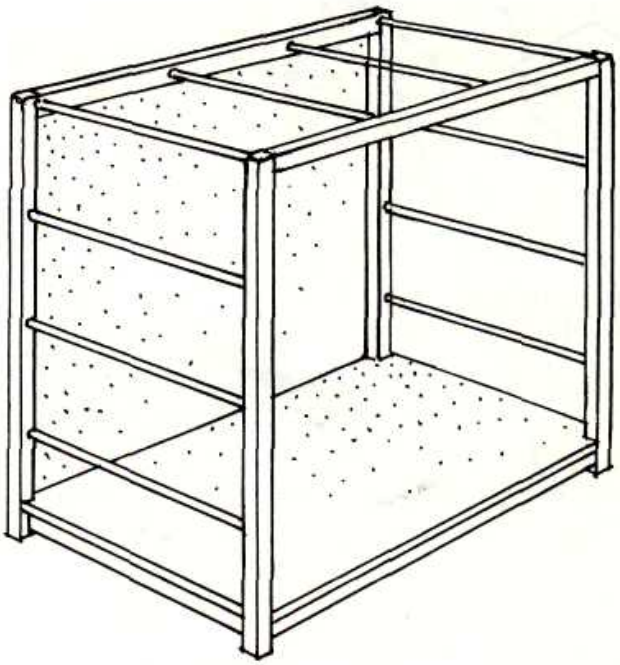
6.12 LADDER BOX

For tots of a certain age, this can be the all-purpose fun machine par excellence. Stand it upright and it's an economy-size "monkey cage" like the one in the park; lay it on its side and it's a walk-through play pen or county jail; cover it temporarily with boards or sheets and it's a tent, an igloo, a fortress, an ogre's cave.



List of Materials

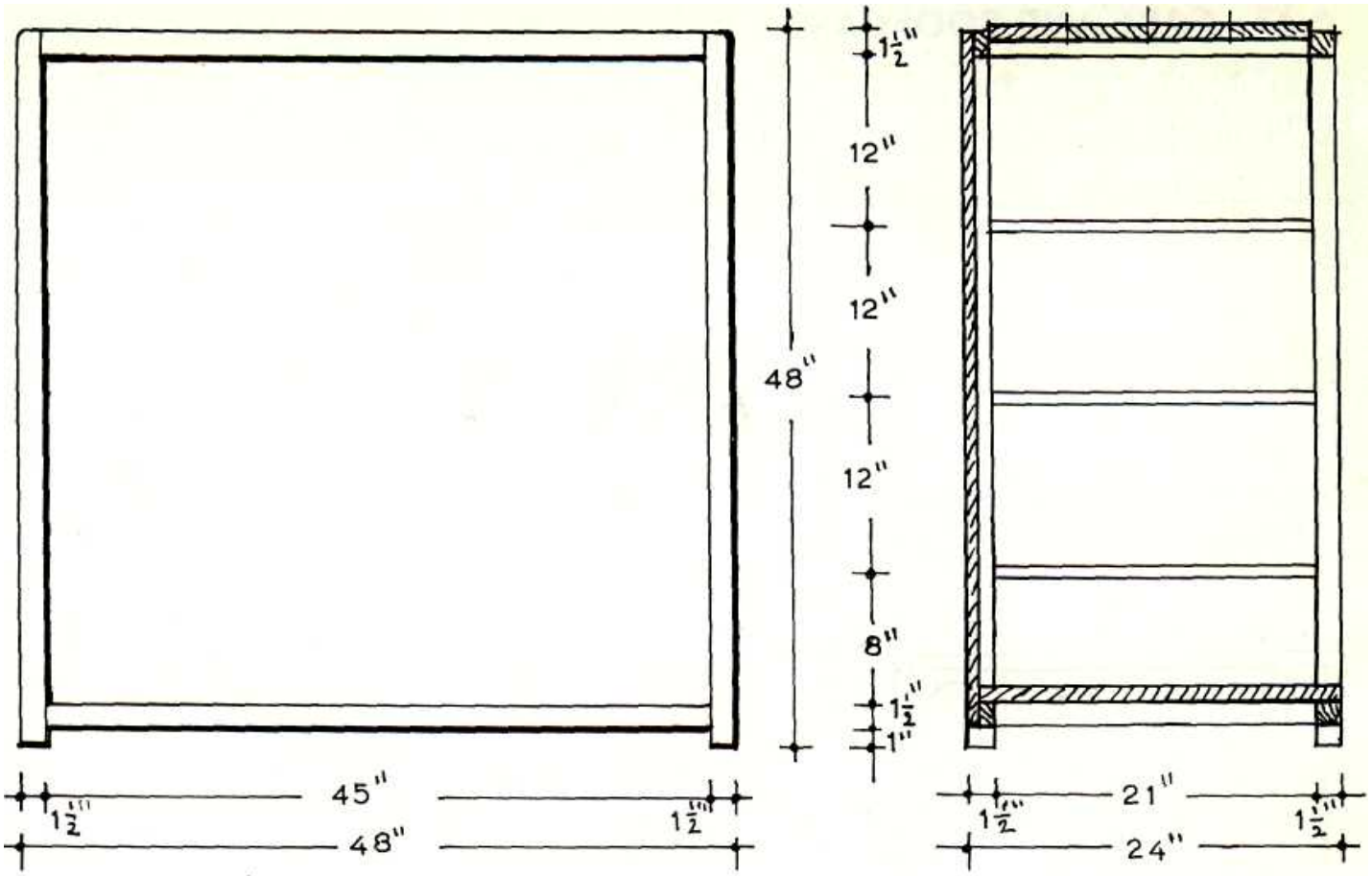
PART	NO.	FUNCTION	DIMENSION IN INCHES thickness × width × length		
A	4	legs	1½	1½	48
B	2	rails	1	1½	21
C	2	rails	1½	1½	45
C	2	rails	1	1½	45
D	9	dowels	1 diam.		24
E	1	back panel	½	45	47
F	1	bottom	¾	23½	48
G	4	planks	½	5¼	48

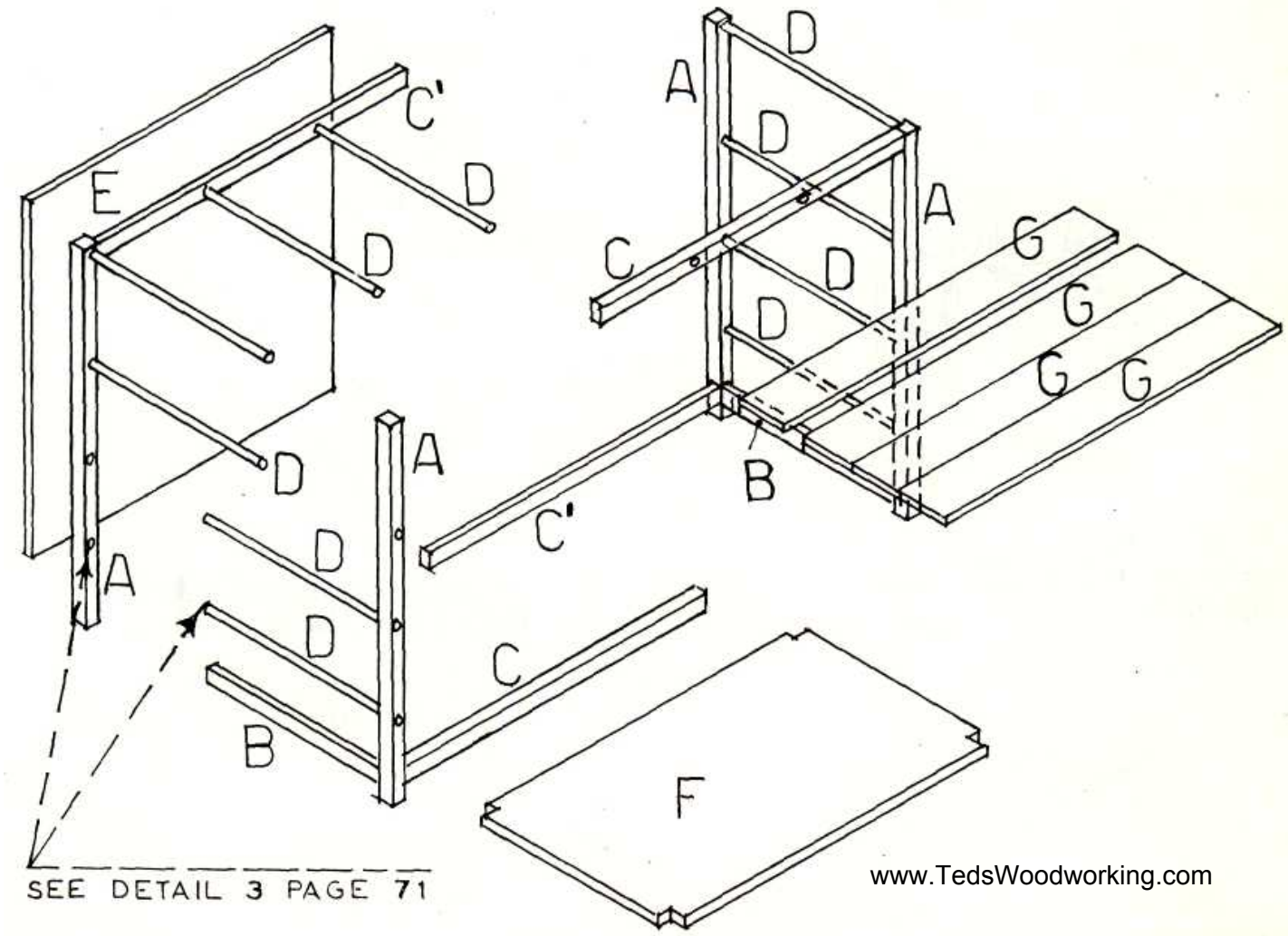


Instructions for Assembly

1. Join legs (A) to rails (C) and (C′).
2. Fasten legs (A), rails (C, C′) and sides (B) with dowels (D).
3. Attach back (E) and bottom (F).
4. Apply finish.
5. Add planks (G) when box is used as a playhouse.

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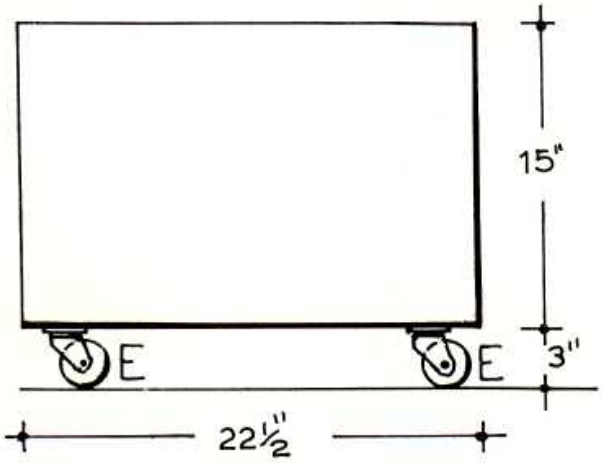


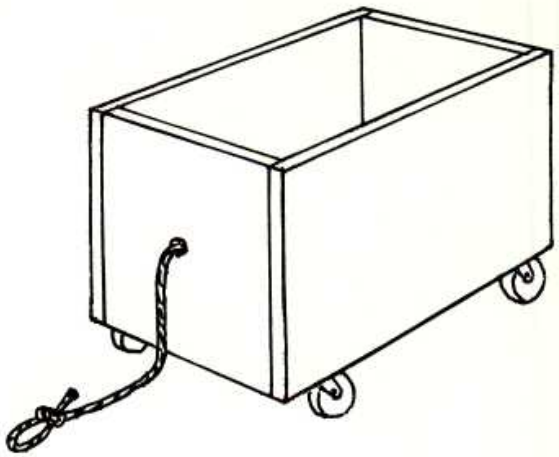


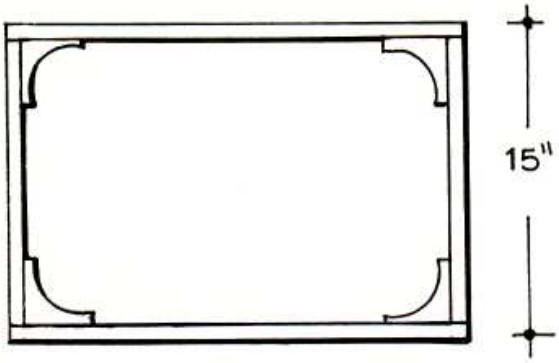
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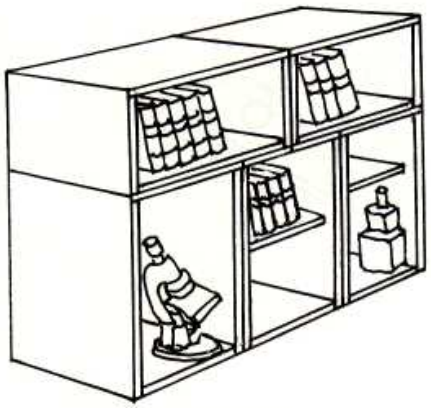
6.13 CART AND BOOKCASE

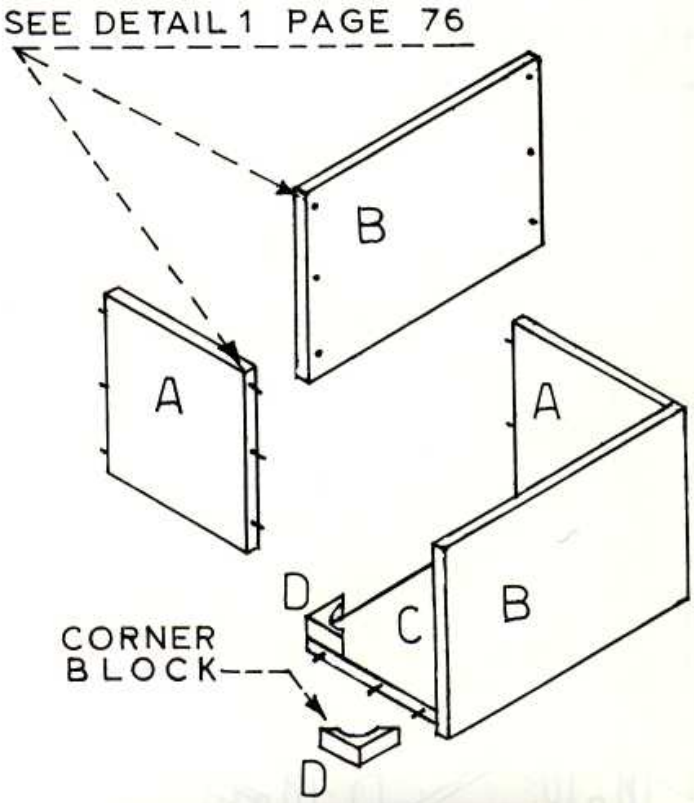
Very simple to make, this cart can be a lot of fun in a children's playroom. Make several of them, join them together, and you have a modular bookcase.











List of Materials

A	2	sides	¾	15	13½
B	2	fronts	¾	15	22½
C	1	bottom	¾	13½	21
D	4	corner blocks	¾	3	3

For cart, add 4 casters and about 3 ft. of rope.

Instructions for Assembly

1. Join sides (A) to bottom (C); then front (B) to bottom (C) and sides (A).
2. Attach corner blocks (D).
3. Apply finish.
4. To use as cart, attach casters and rope.

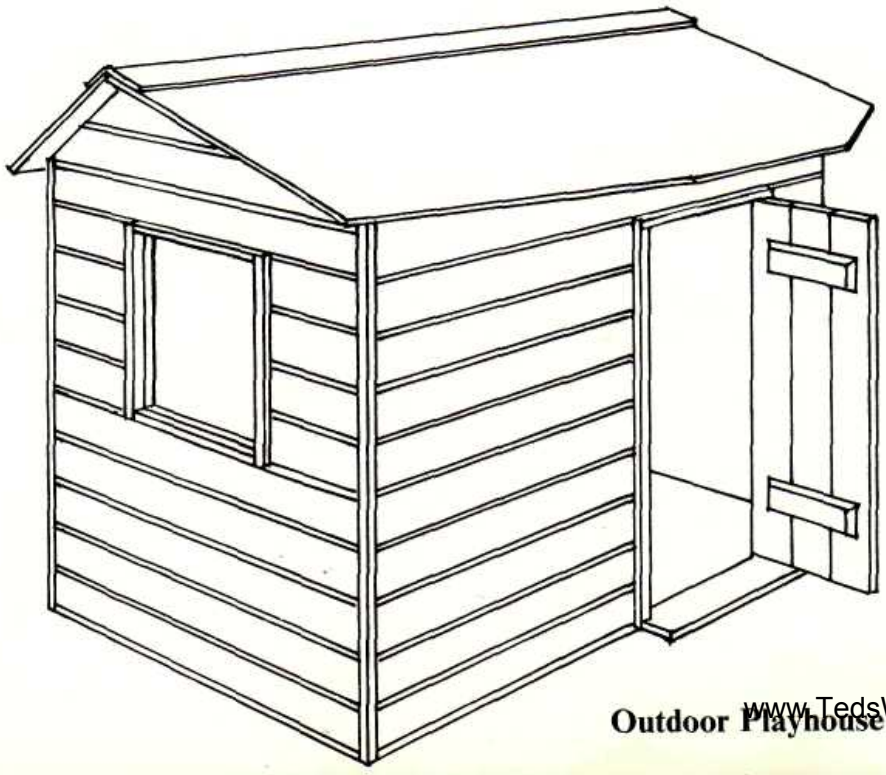
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7.1 OUTDOOR PLAYHOUSE and storage shed

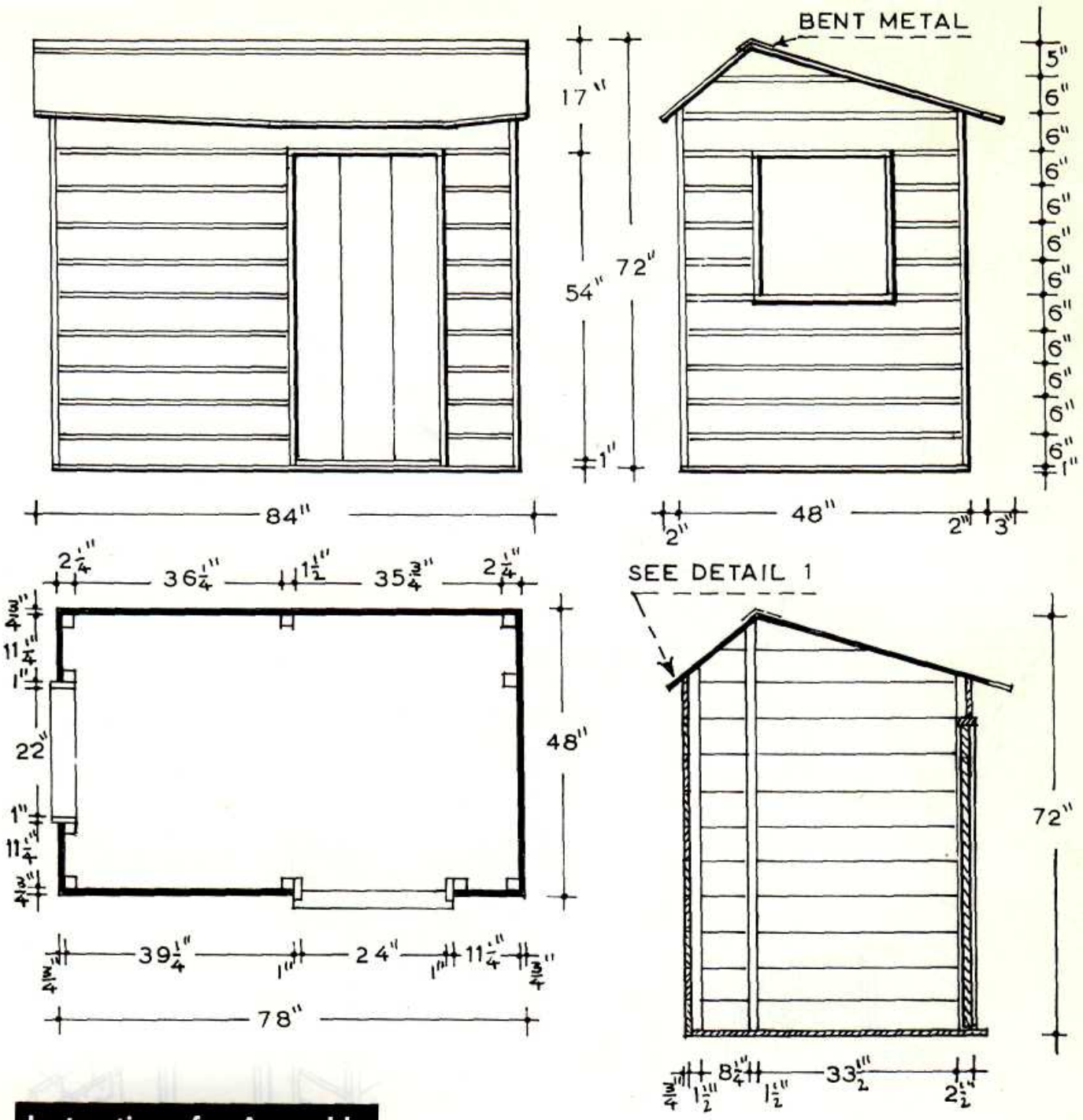
As the above title indicates, this unit serves two distinct purposes—one at a time, of course. At first it is the exclusive property of the children—its use limited only by the imagination of the young people themselves. And when the summer days of childhood give way to the homework-ridden nights of the teen-ager, it can have a second life as a workshop, storage shed for bikes and lawn mower, croquet equipment, ice skates, and the like.

List of Materials

PART	NO.	FUNCTION	DIMENSION IN INCHES thickness	×	width	×	length
A	4	planks	1		11⅝		76½
B	3	rails	2		2		46½
C	7	supports	1½		1½		62
D	2	supports	1½		1½		71
E	1	support	1½		1½		66
F	2	rails	1		2½		54
G	1	rail	1		2½		26
H	1	step	1		2½		26
J	2	rails	1		2½		23¼
K	2	rails	1		2½		24
L	4	cleats	¾		¾		62
M	3	boards	¾		8		54
O	2	rails	¾		3		23
P	1	Masonite panel	¼		45		84
Q	1	Masonite panel	¼		21		84
R	22	boards	¾		6¼		46½
S	20	boards	¾		6¼		76½



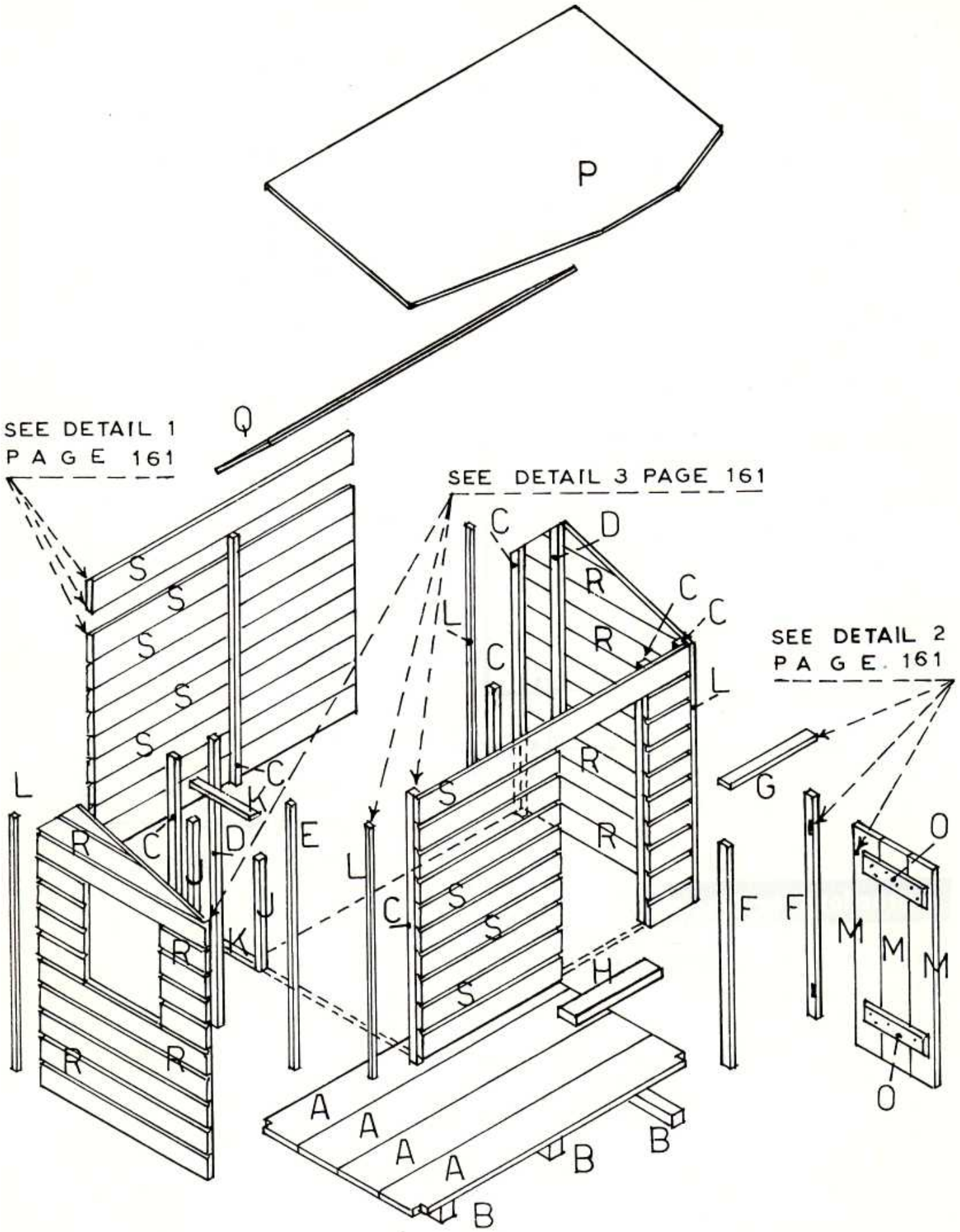
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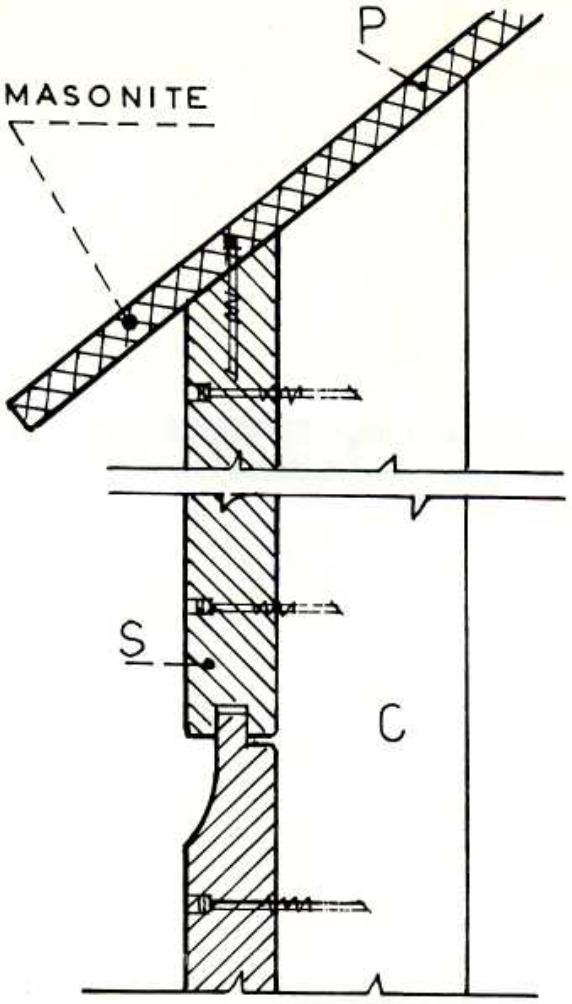
Instructions for Assembly

1. Connect floor (A) with rails (B).
2. Erect walls, joining boards (S) with supports (E) and fasten to floor.
3. Attach boards (R) to supports (C, D, E) and floor; cut space for window and door.
4. Install roof (P, Q) and fasten metal to it for water protection.
5. Attach rails (F) and (G) and bottom (H); assemble door and join rails (O) with boards (M) and rails (F).
6. Attach rails (J) and (K) to window, using clear polyethylene plastic film in place of glass.
7. Apply finish.

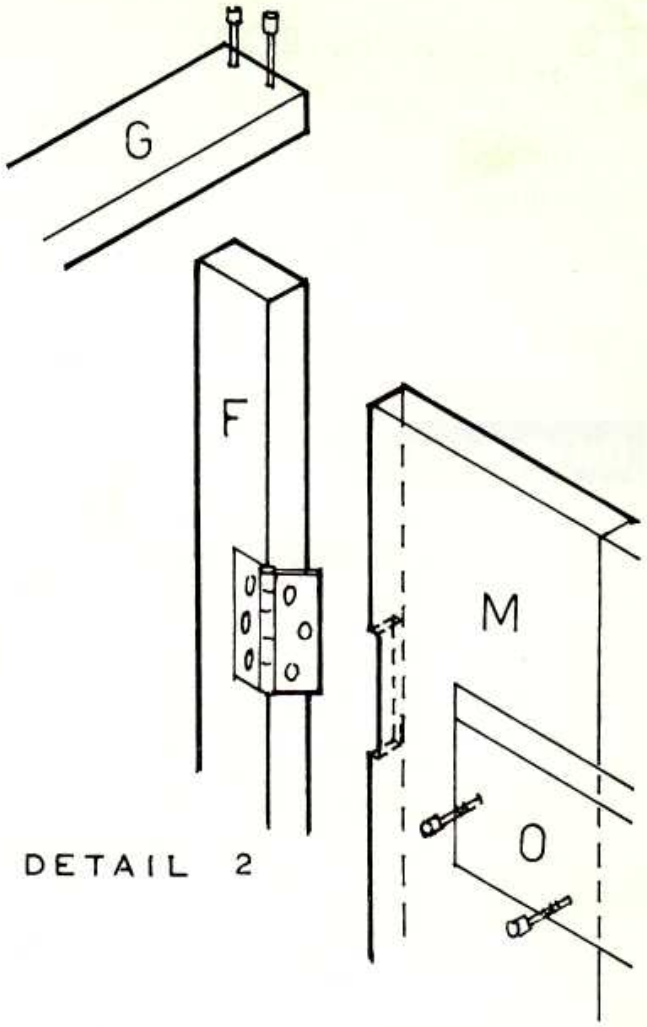
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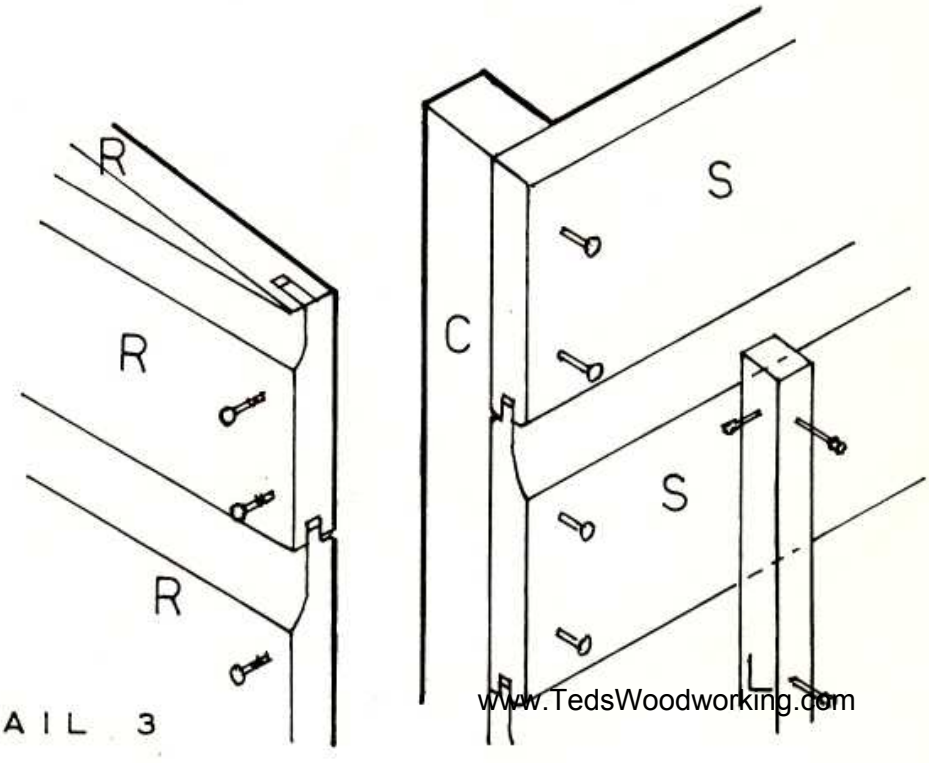
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DETAIL 1



DETAIL 2



DETAIL 3

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7.2 ROCKING BOAT

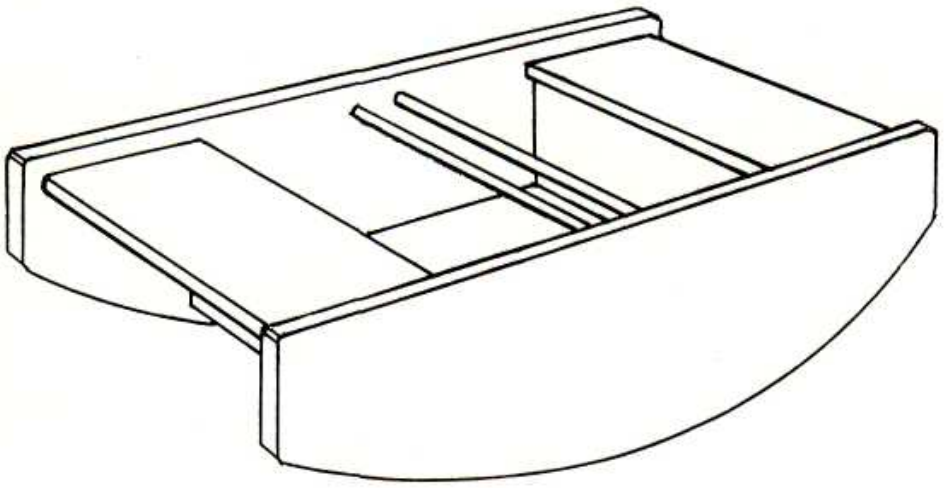
For dry-land sailors, junior grade, as well as owls and pussycats—as seaworthy as the *Enterprise* if the billows remain imaginary. The fearful trip done, our captain and crew become mountain climbers by the simple expedient of turning the craft over. Easy to make and easier to store.

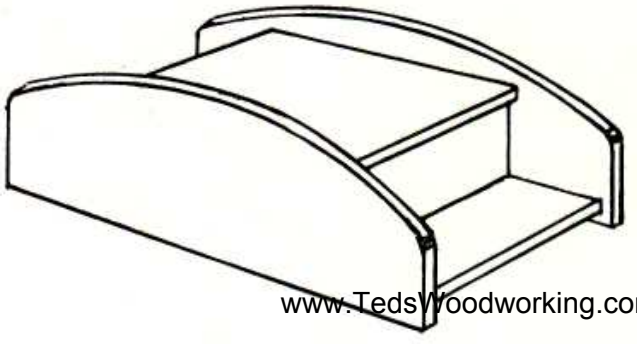
List of Materials

PART	NO.	FUNCTION	DIMENSION IN INCHES thickness × width × length		
A	2	sides	¾	12	36
B	2	seats	¾	9	16½
C	2	partitions	¾	6	16½
D	1	bottom	¾	22	16½
E	2	dowels	1 diam.		18

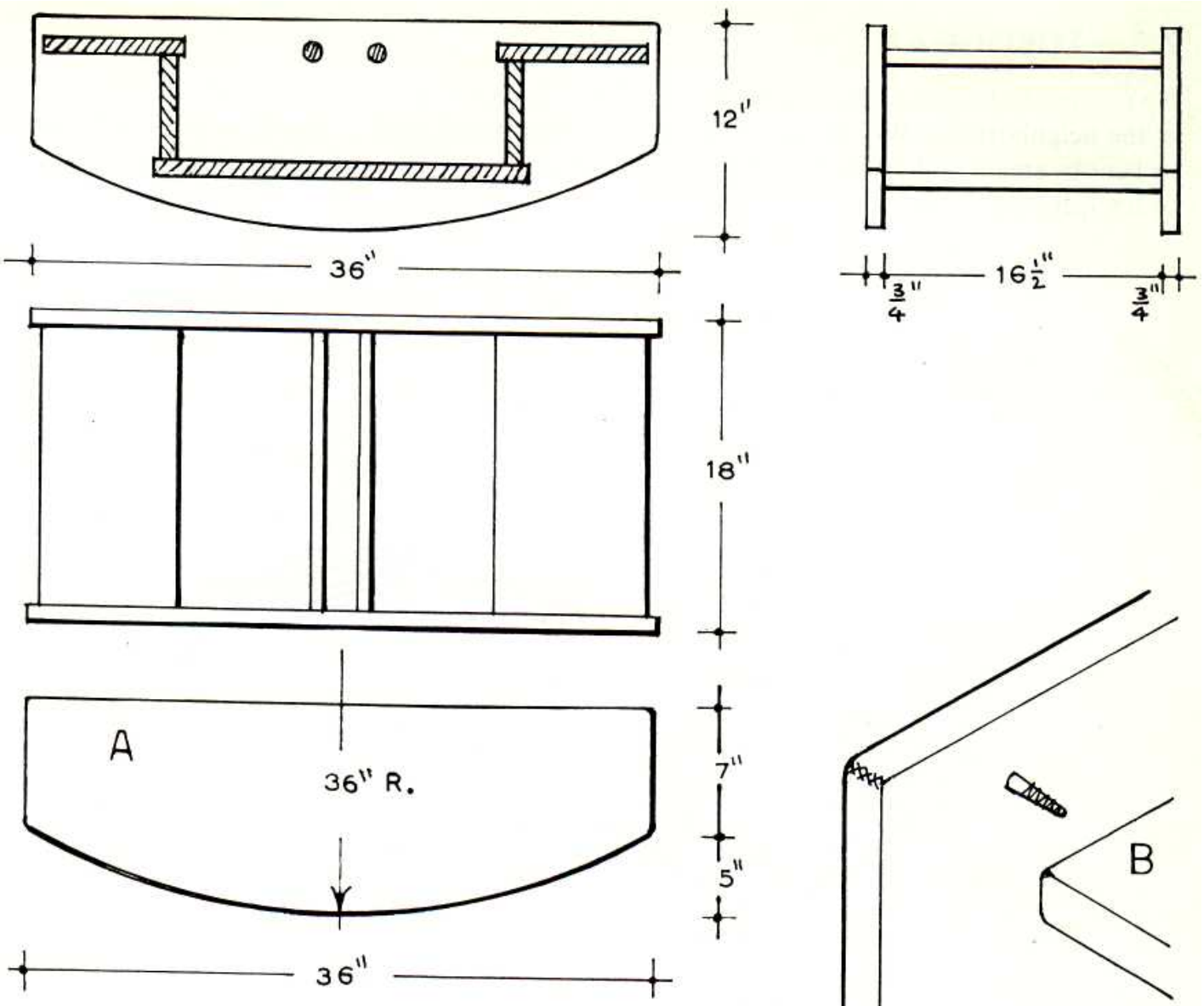
Instructions for Assembly

1. Join seats (B) with bottom (D) and partitions (C).
2. Fasten sides (A) to seats (B), partitions (C), bottom (D) and dowels (E).
3. Apply finish.

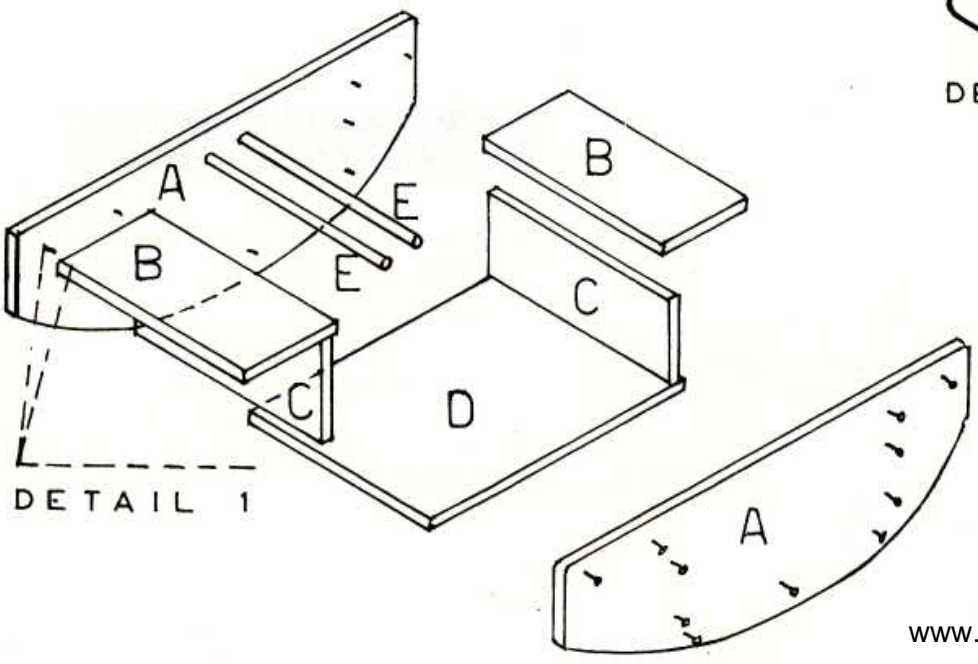




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DETAIL 1

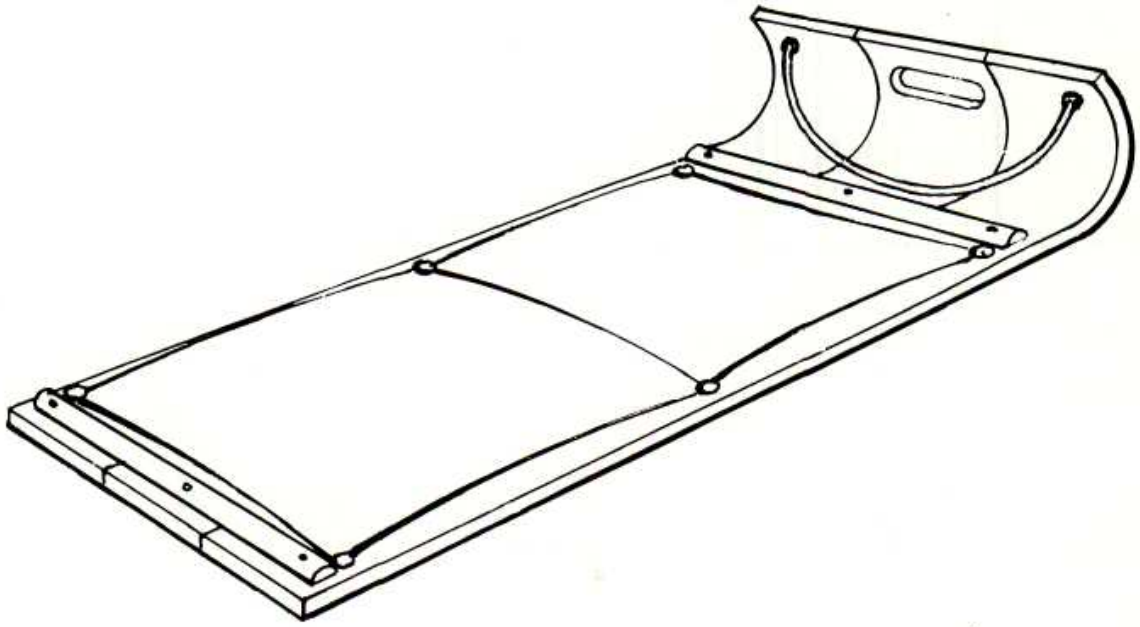


DETAIL 1

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7.3 TOBOGGAN

No toy this, but a full-scale, six-foot inflexible flyer for teen-agers hopeful of finishing second in the neighborhood Winter Olympics. Built of hardwood, such as beech or elm, that can be bent by steam and pressure to form the curved prow as indicated. You can make it seven or ten feet long if you wish!



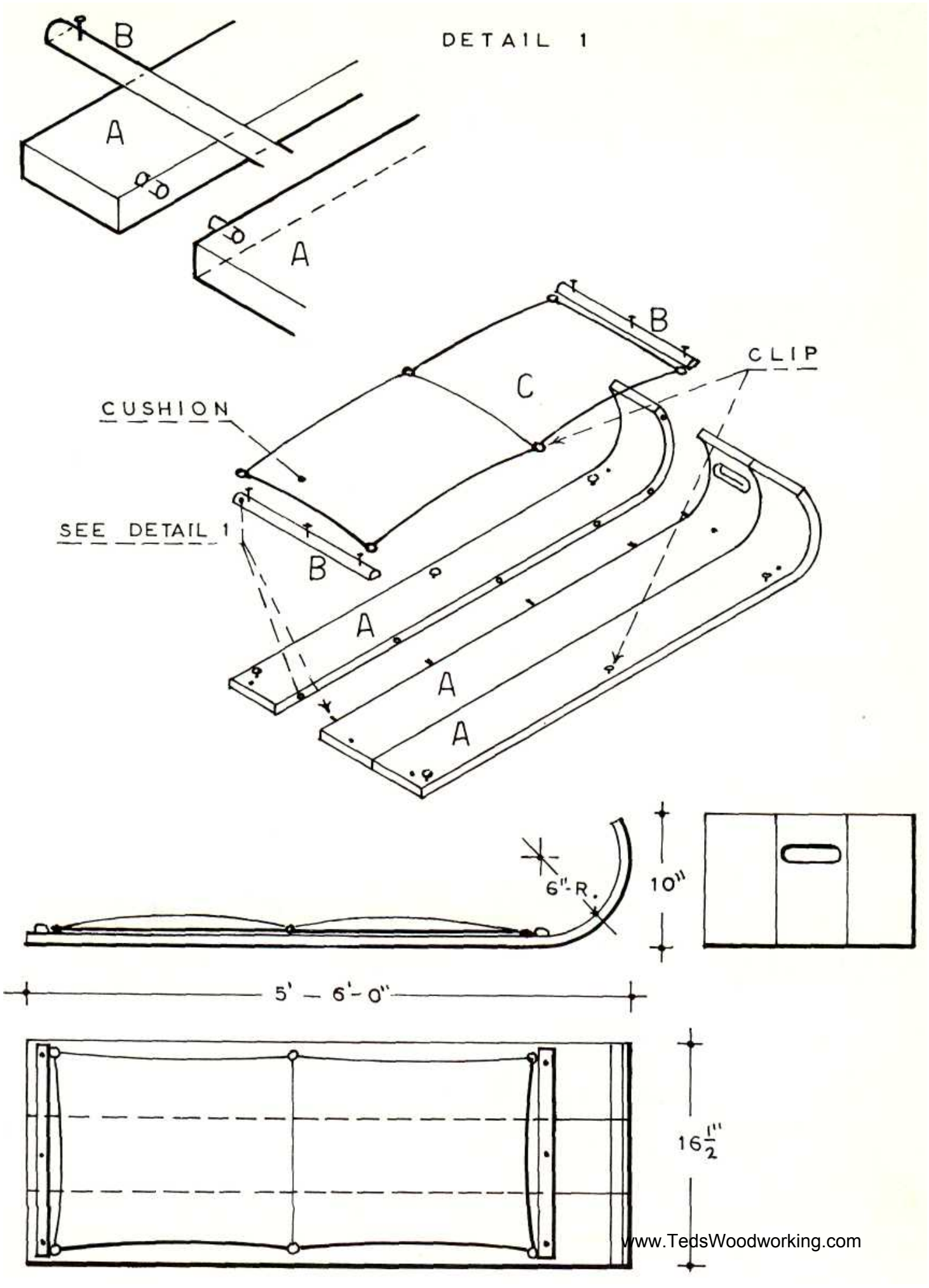
List of Materials

PART	NO.	FUNCTION	DIMENSION IN INCHES thickness × width × length
A	3	boards	¾ × 5½ × 66 (or more)
B	2	half dowels	1½ diam. × 15½
C	1	cushion	2 × 14 × 45 (or more)

Instructions for Assembly

1. Bend the three boards (A) using steam and pressure to indicated radius.
2. Join the three boards (A) together and attach dowels (B).
3. Apply finish.
4. Fasten cushion (C) to base with metal clips.

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7.4 PARALLEL BARS

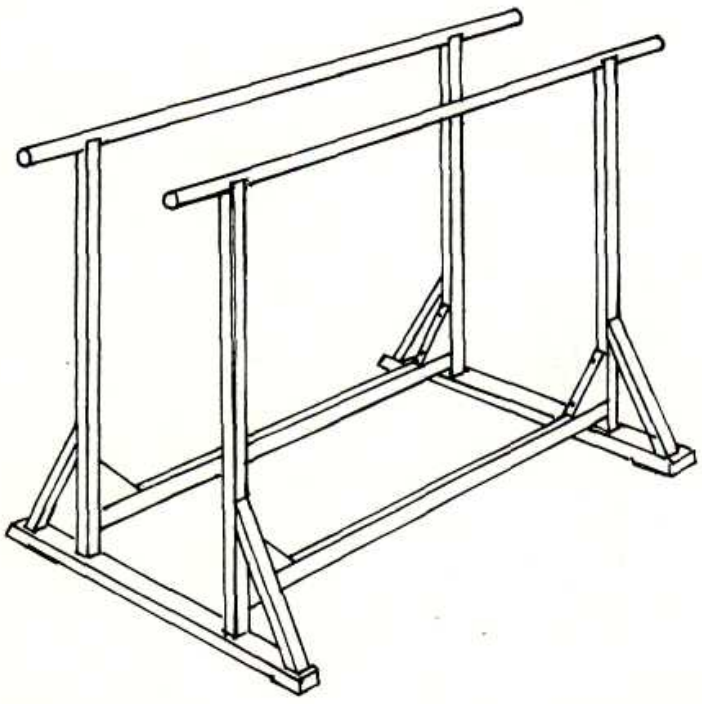
An inexpensive but serviceable version of the professional models found in high-school gyms, this exerciser will see a lot of muscle-building action before it is dismantled. Built in hardwood with tenon-and-mortise joints to withstand the vertical pressures.

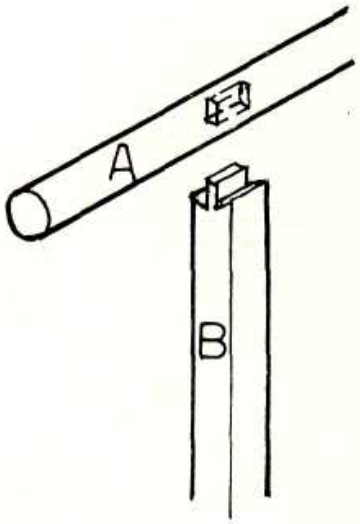
List of Materials

PART	NO.	FUNCTION	DIMENSION IN INCHES thickness × width	× length
A	2	bars	2 diam.	78
B	4	supports	1½ 2½	53
C	2	cross rails	1½ 4	42
D	2	rails	1½ 2½	62
E	4	cross rails	1¼ 3½	19
F	4	corner blocks (cut diagonally from two blocks)	1¼ 7	7

Instructions for Assembly

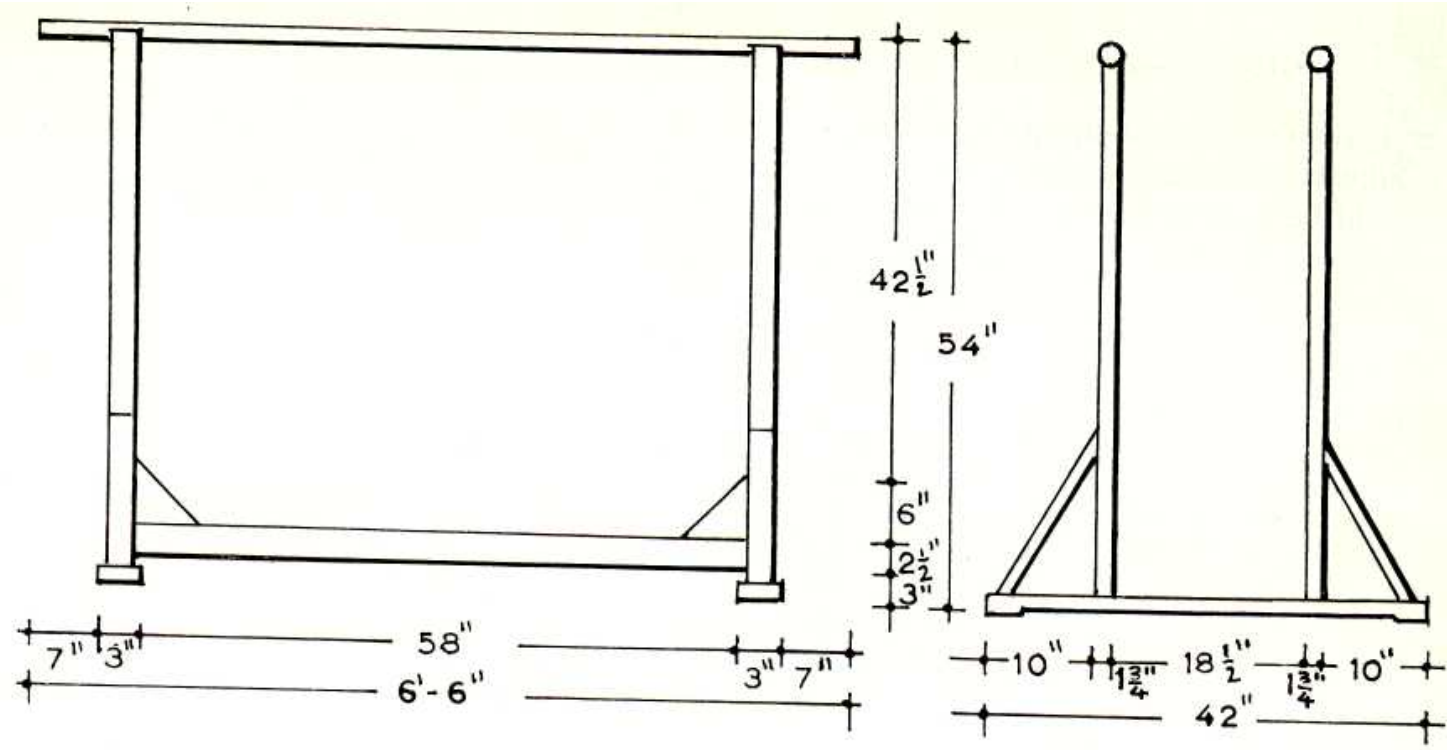
1. Join supports (B) to rails (C) and (E).
2. Fasten rails (D) and bars (A) to supports (B) and attach corner blocks (F) to (B) and rails (D).
3. Apply finish.

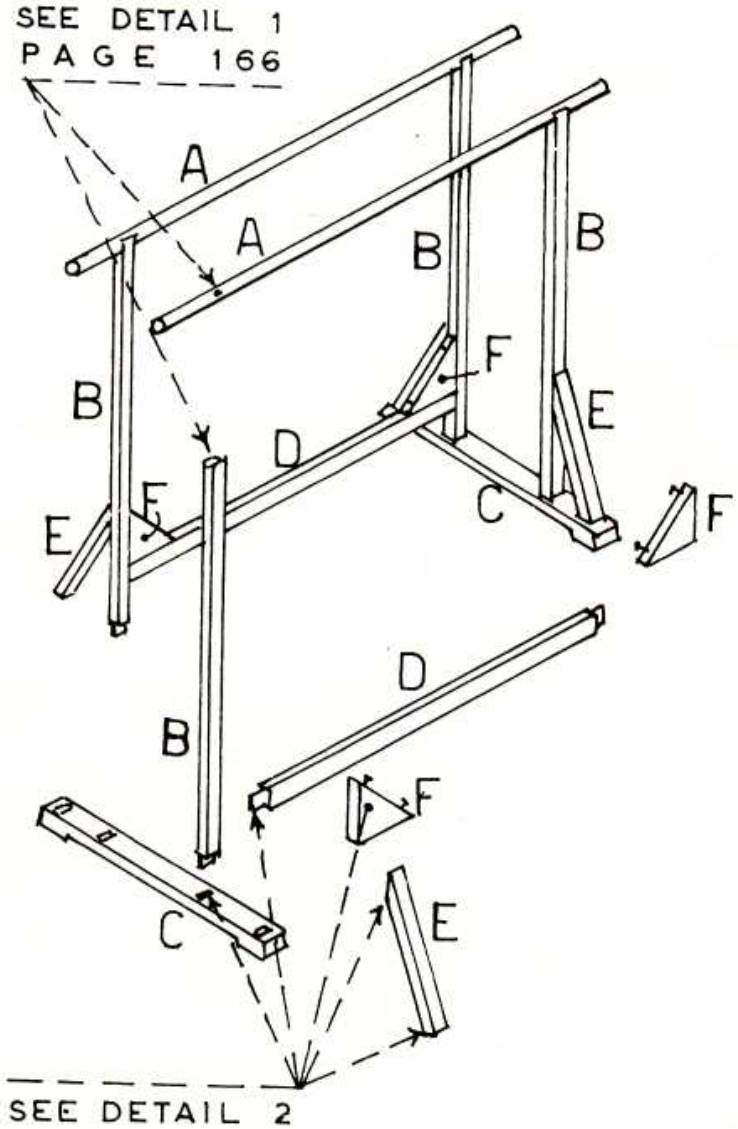


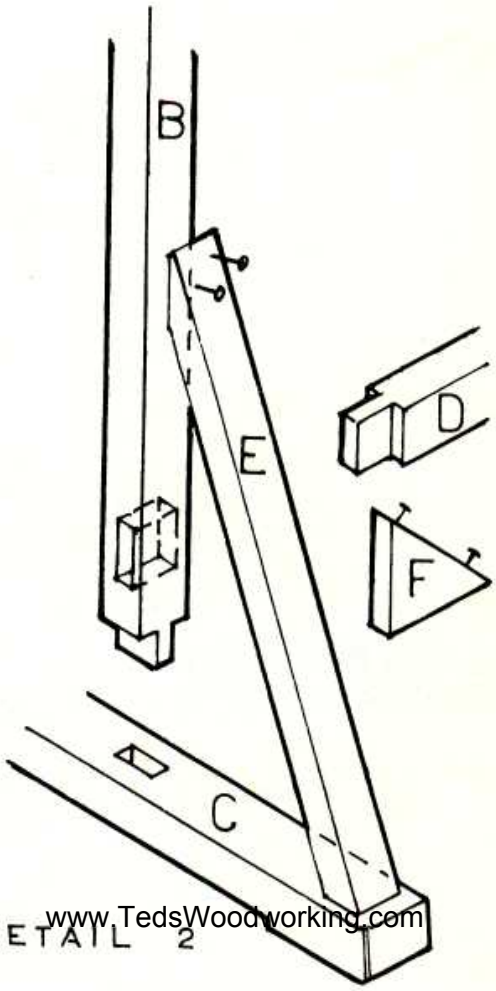


DETAIL 1

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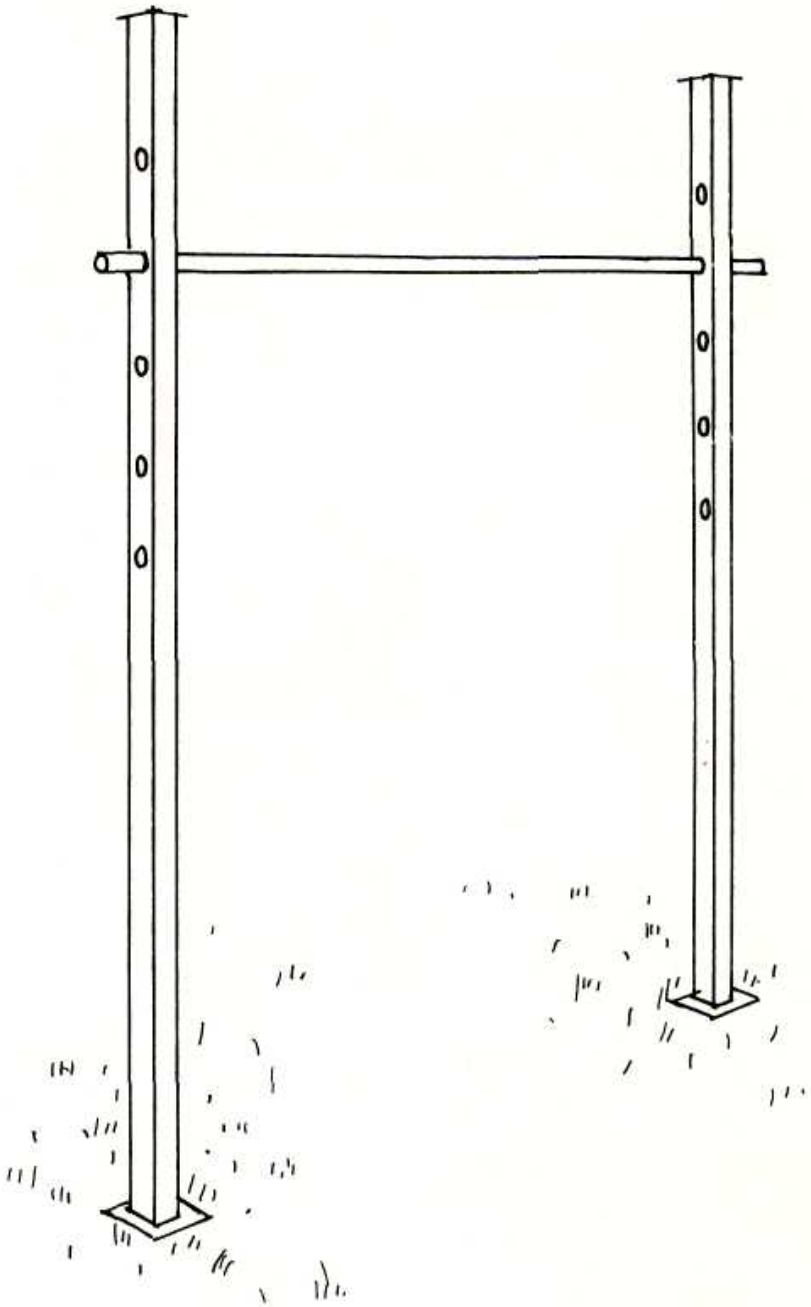




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7.5 HIGH BAR (for chinning)

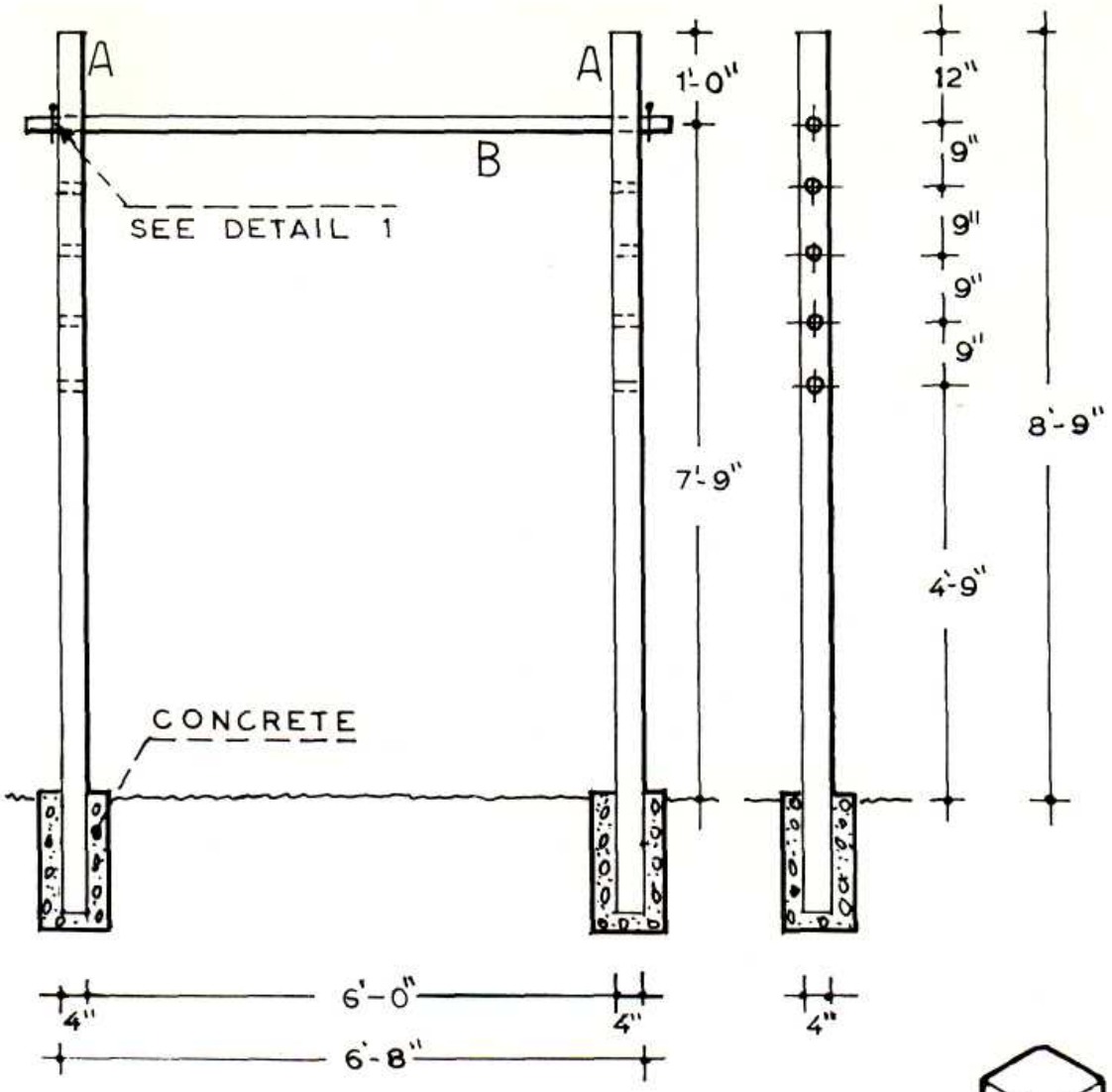
Not intended for high jumps or pole vaults, since the crossbar is fixed in the holes. Its height is adjustable to accommodate a broad range of young athletes. The lumber for the uprights should be treated with creosote before the ends are placed in the ground. For increased safety and sturdiness, concrete footings are indicated.



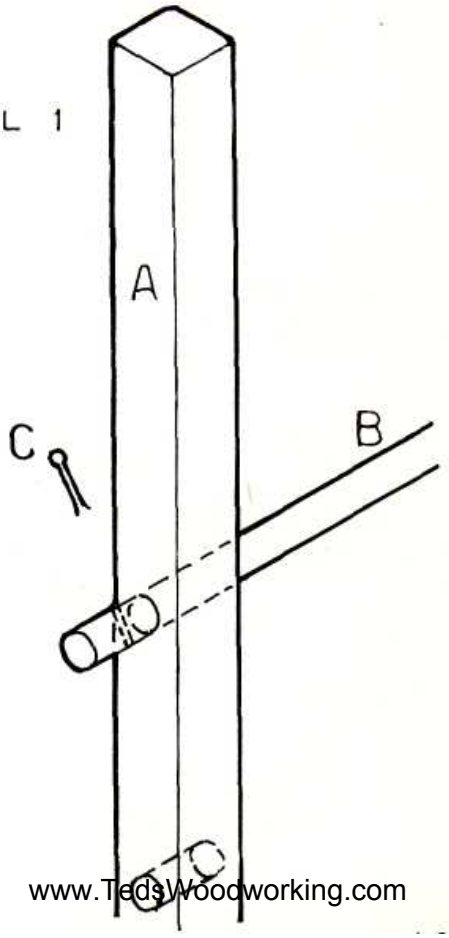
List of Materials

PART	NO.	FUNCTION	DIMENSION IN INCHES thickness	×	width	×	length
A	2	supports	4		4		126
B	1	galvanized pipe 1–1¼ outside diameter					80
C	2	metal clips					

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DETAIL 1



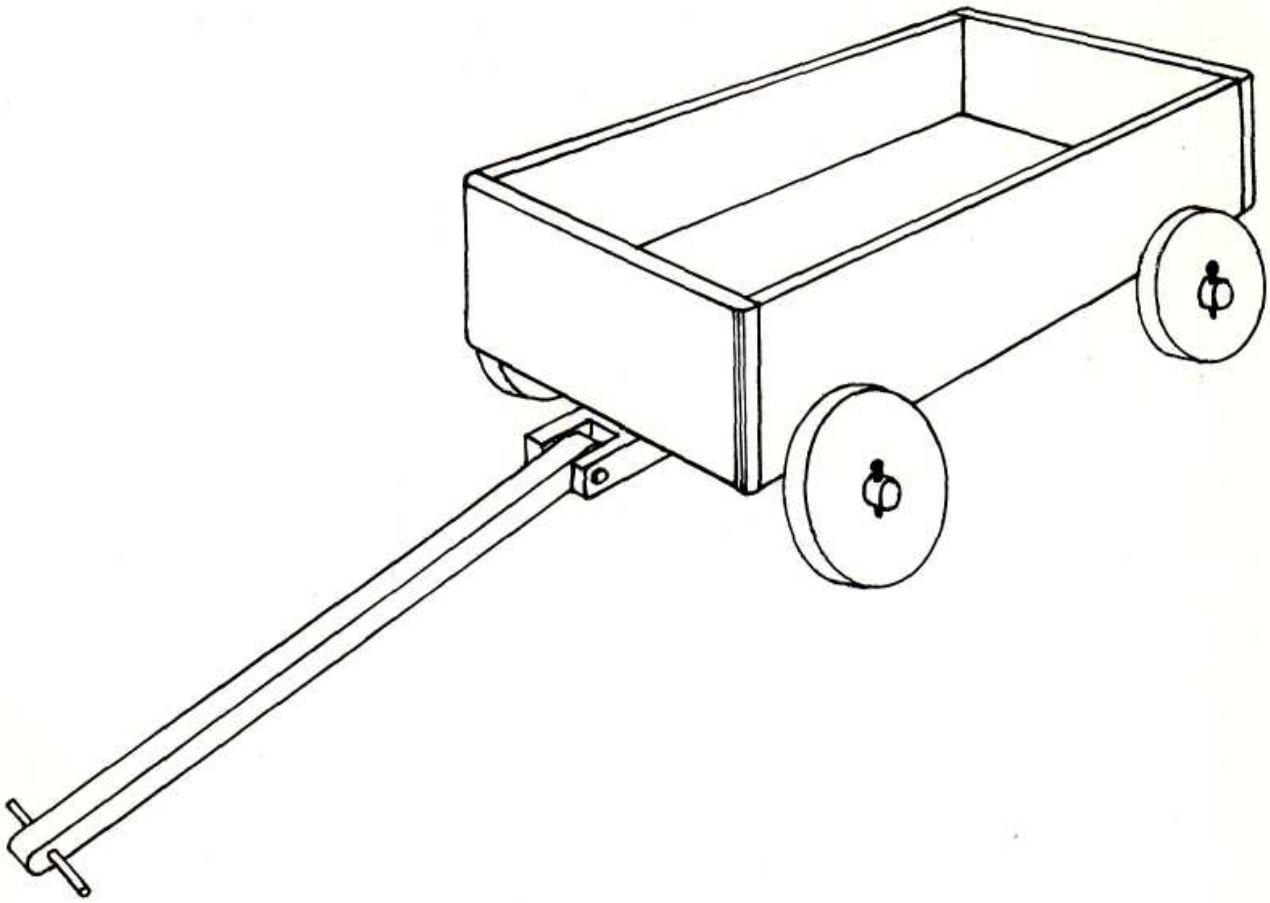
Instructions for Assembly

1. Install supports (A) in ground with concrete (min. 10 in. deep).
2. Apply finish.
3. Insert galvanized pipe (B) in desired pair of holes and secure with clips (C).

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7.6 WAGON

One of the most old fashioned yet perennially popular toys with children everywhere is the wagon, such as the one illustrated here. Made of hardwood and fastened together with screws, this wagon is very solid and easy to make.



List of Materials

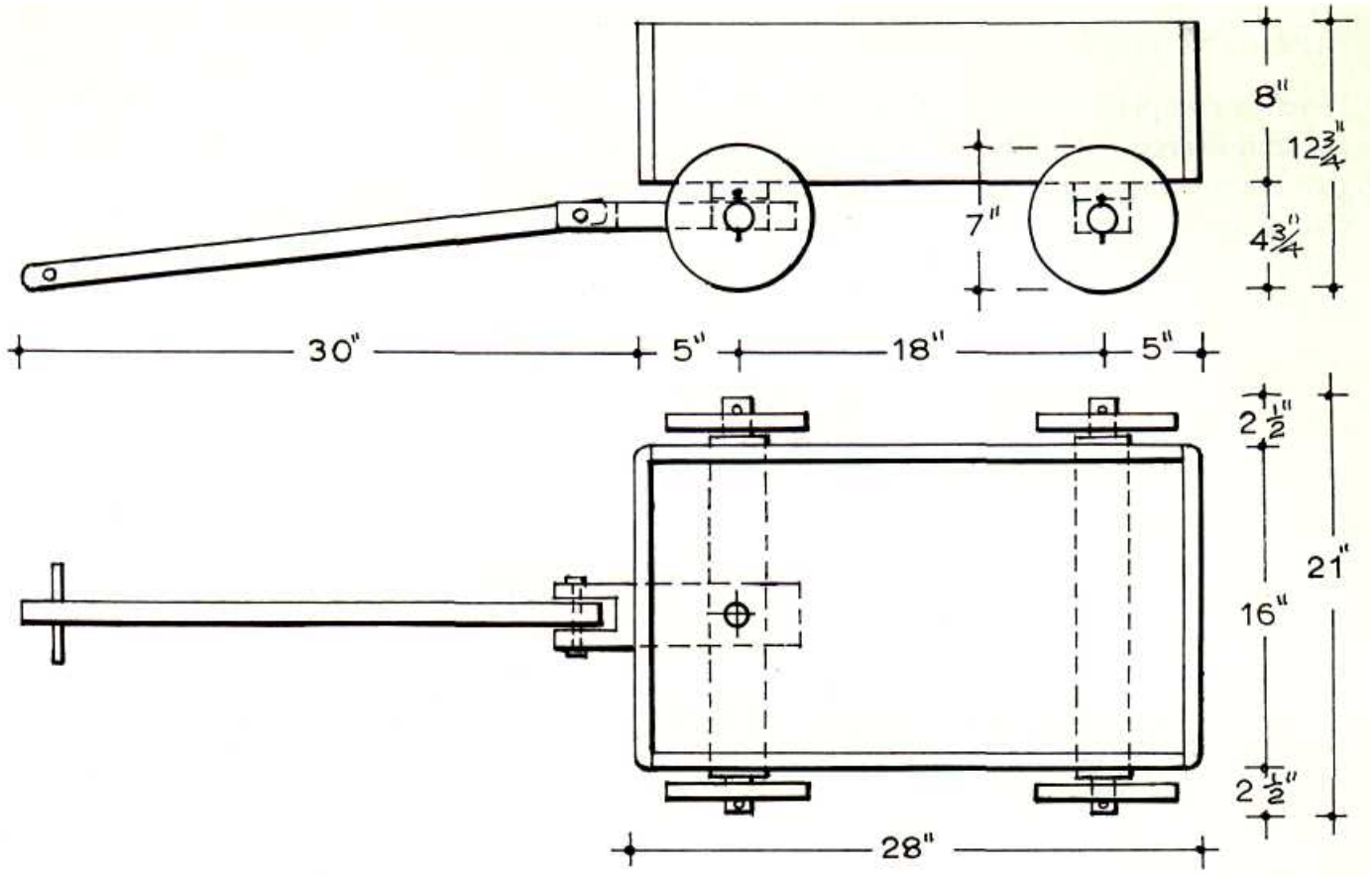
A	1	bottom	¾	14½	26½
B	2	front & back	¾	8	16
C	2	sides	¾	8	26½
D	2	cross rail	¾	2½	16
E	2	axles	1	2½	21
F	1	block	1	3	13
G	4	wheels	¾	7 diam.	
H	1	handle	1	1¼	30
J	1	dowel	¾ diam.		6

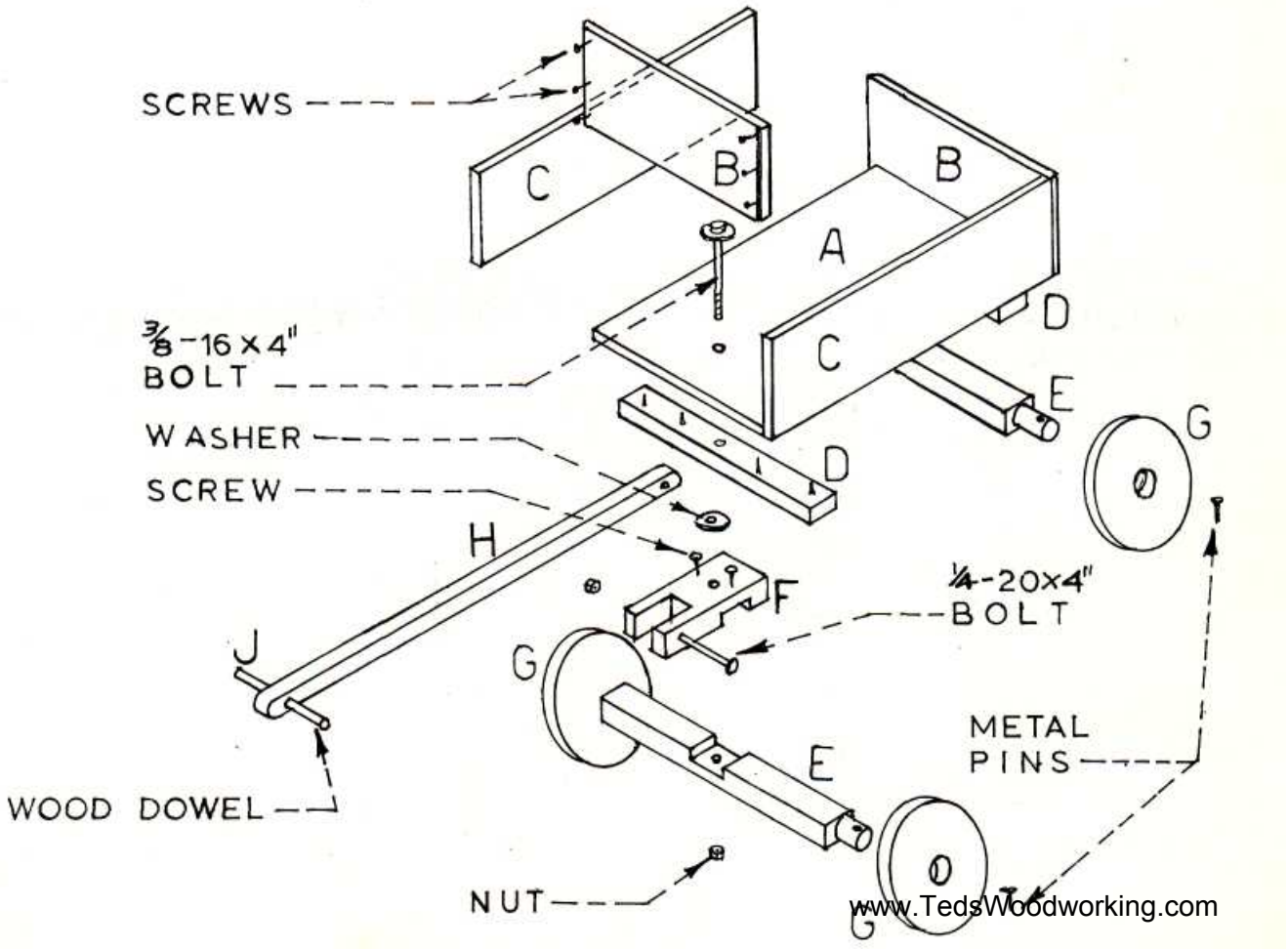
2 bolts as indicated

Instructions for Assembly

1. Join bottom A with sides C and front and back B.
2. Attach cross rails B and back axle E to bottom A.
3. Attach block F to front axle E, and join together all parts (A, D, F, E) with ⅜–16 bolt.
4. Attach dowel J to handle H, and join handle H to block F with ¼–20 bolt.
5. Insert wheels G to axles F, and apply one or two coats of linseed oil.

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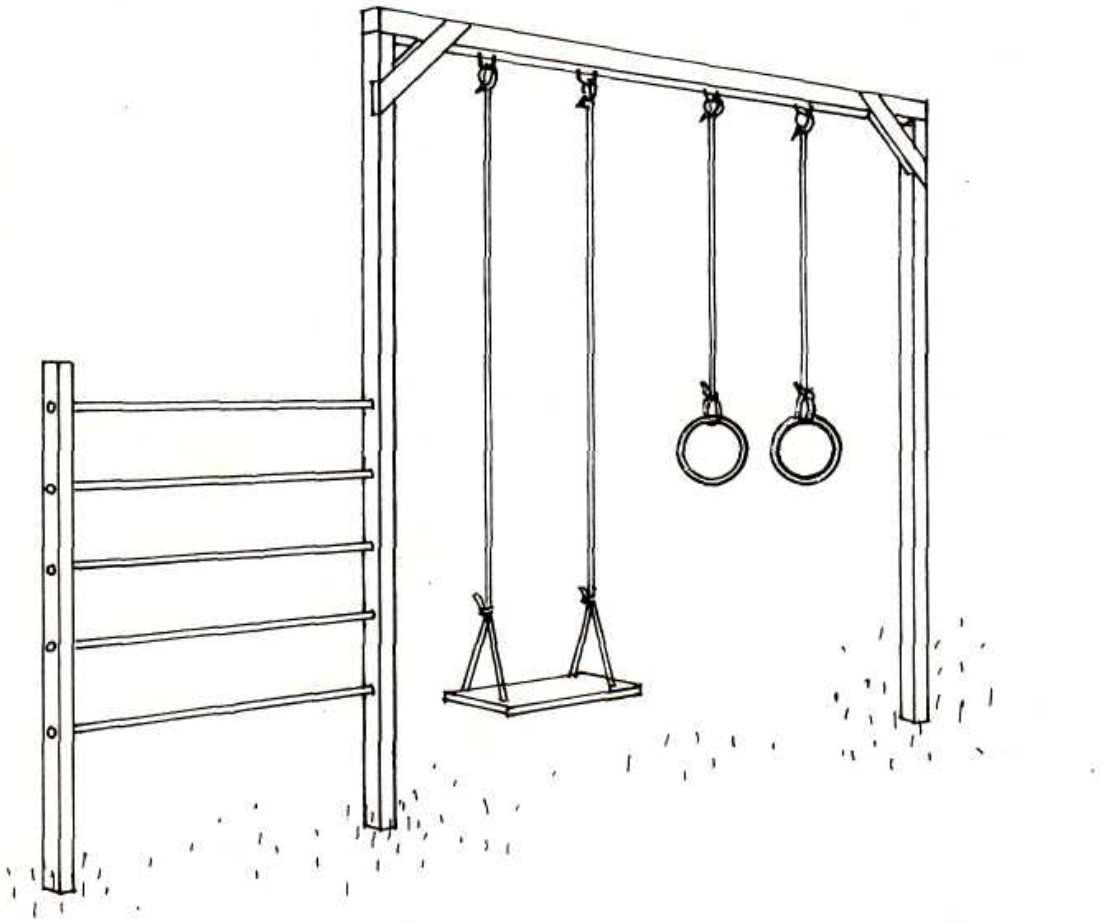




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7.7 SWING AND TRAPEZE with climbing bars

Here's a complete outdoor gymnasium for young folks, designed for safety as well as good fun and exercise. The four-by-four uprights will take all the bending stress a swinger can give them without the need for sway-bracing, which makes for a less cluttered appearance. Use nylon rope or approved swing chain rather than trusting to clothesline cord or other dubious substitute. As in other outdoor projects, treat ends of uprights before setting in concrete.



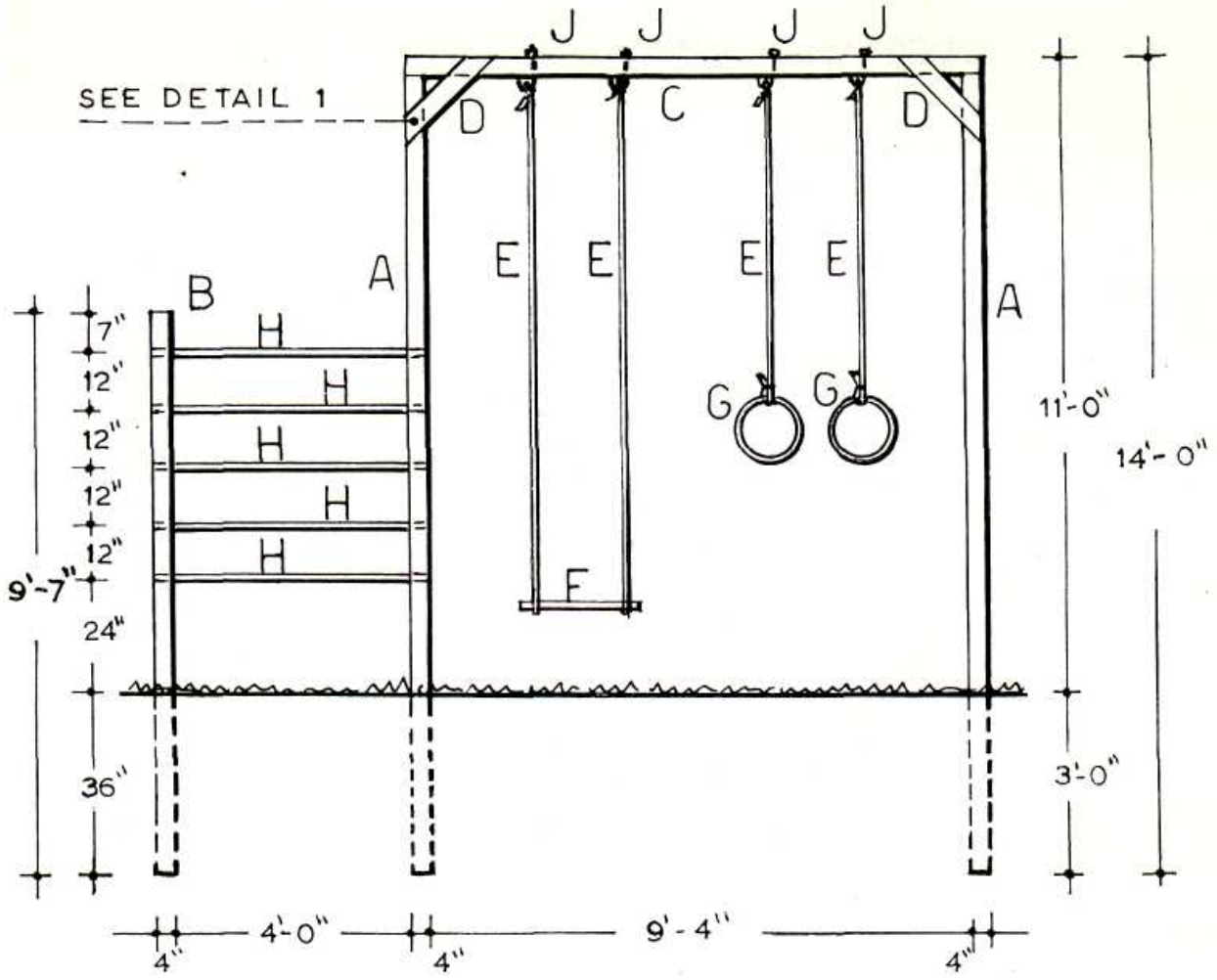
List of Materials

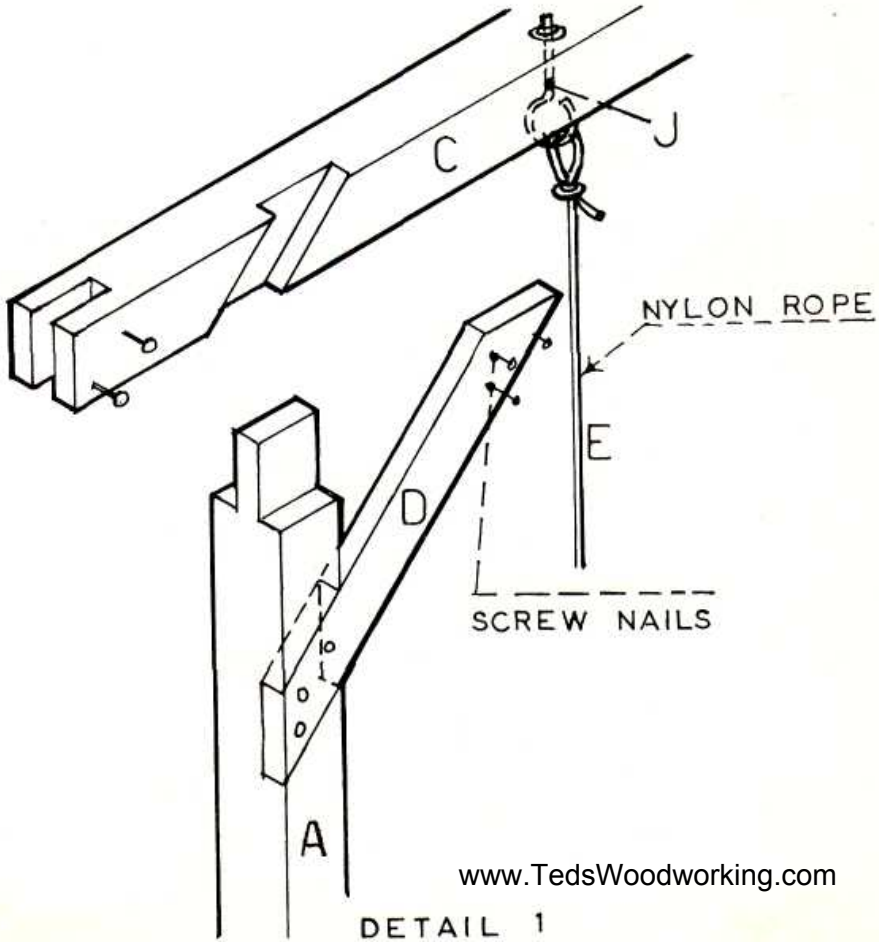
PART	NO.	FUNCTION	DIMENSION IN INCHES thickness × width × length		
A	2	supports	4	4	168
B	1	support	4	4	115
C	1	cross support	4	4	120
D	2	cross rails	1½	3	27
E	4	lengths of nylon rope or chain			
F	1	seat	1	8	22
G	2	metal rings	8 diam.		
H	5	bars	2 diam.		56
J	6	bolts with headrings			

Instructions for Assembly

1. Join supports (A) to crossbar (C) and rails (D).
2. Insert supports (A) and (B) in ground with concrete after treating ends.
3. Fasten crossbars (H).
4. Install bolts (J) and attach seat (F) and rings (G) with nylon rope or chain (E).
5. Apply finish.

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DETAIL 1

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7.8 SWING, LADDER AND SEESAW

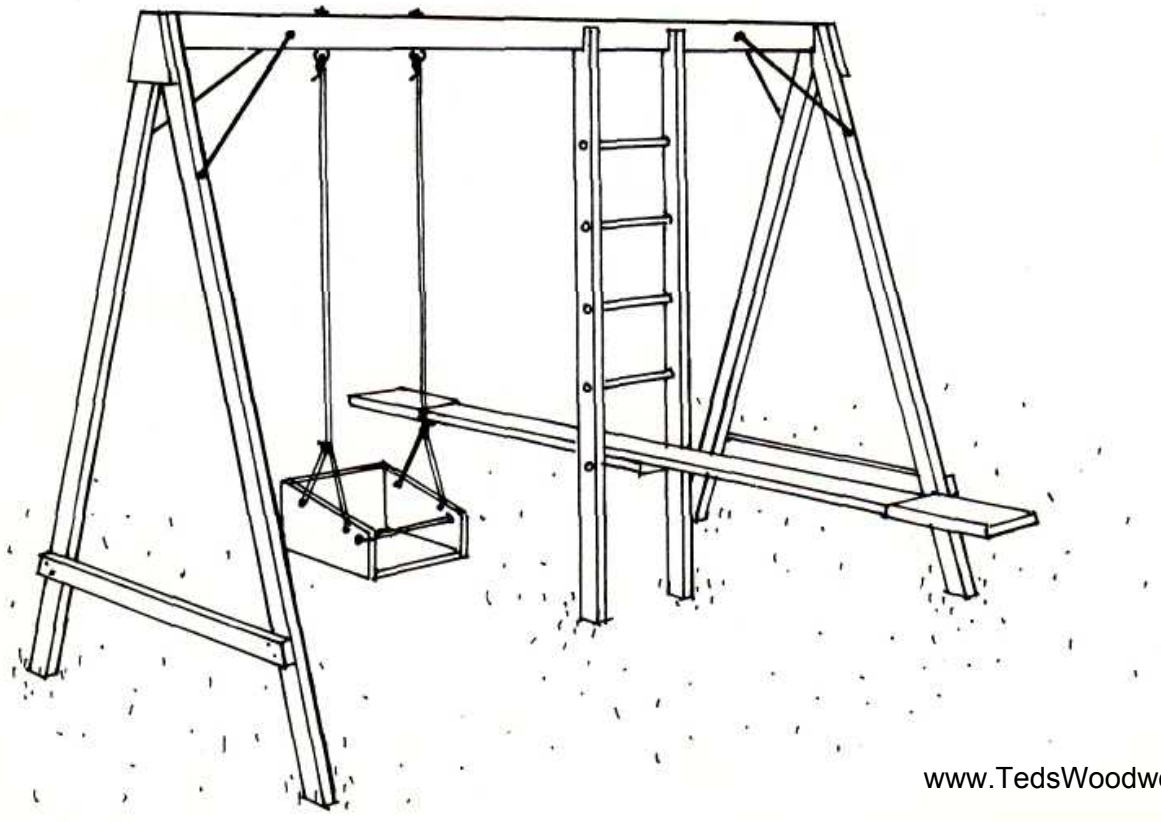
This well-liked preschool and kindergarten combination, useful up to about six or seven years, provides lots of fun and brightens up any backyard. As with all wooden exercise equipment, sandpaper all surfaces to guard against chance splinters and possible injury.

List of Materials

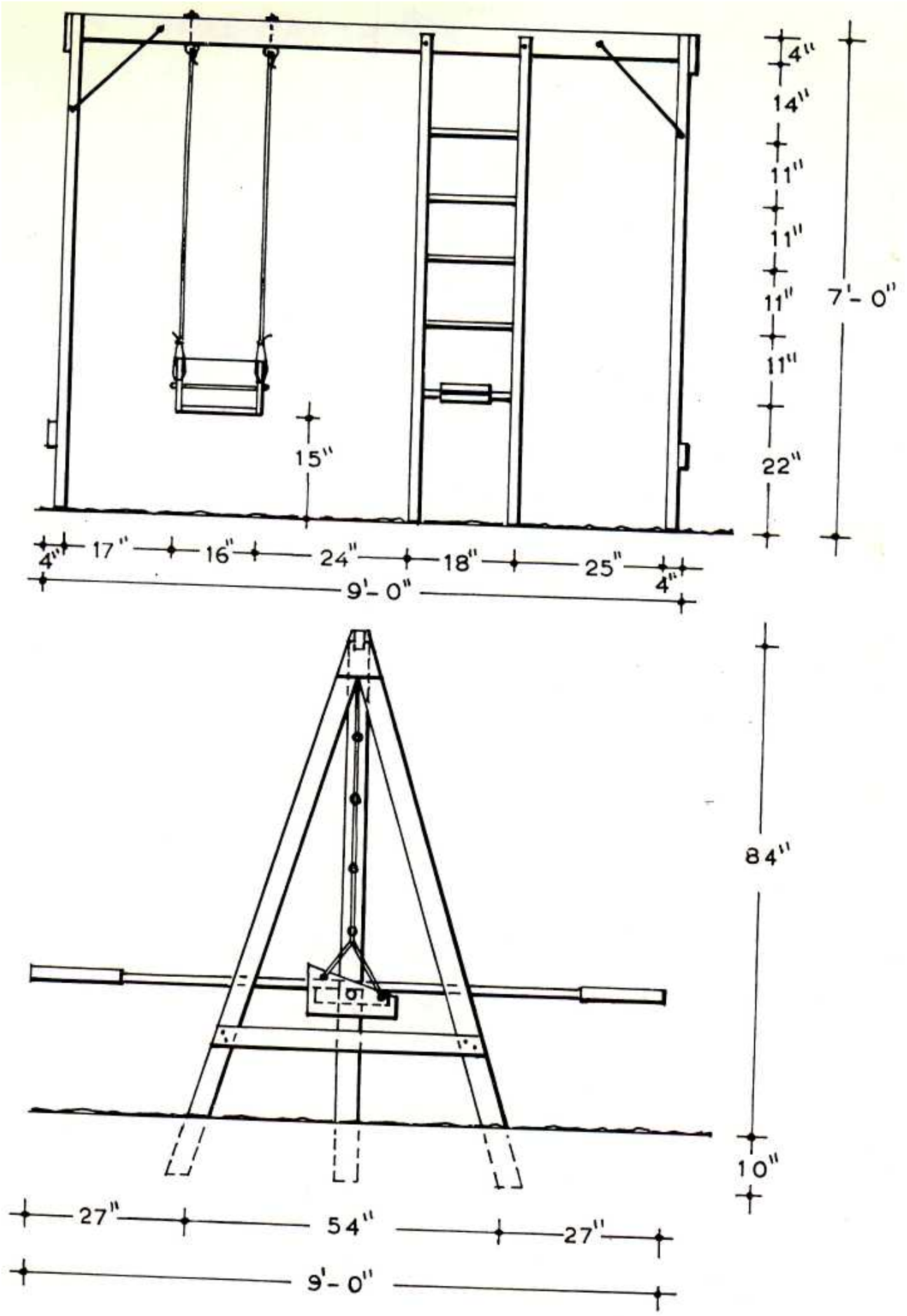
PART	NO.	FUNCTION	DIMENSION IN INCHES thickness × width × length		
A	4	supports	2	4	100
B	1	cross support	2	4	108
C	2	cross rails	1¼	3	48
D	2	blocks	1	8	8
E	2	supports	1¼	3	93
F	5	dowels	1 diam.		18
G	1	plank	1	8	96
H	1	block	1½	8	8
J	1	back	¾	8	14½
K	2	sides	¾	8	13
L	1	bottom	¾	12¼	14½
M	1	length of nylon rope or chain, 12 ft long			
O	4	metal rod	⅜ diam. × 21″ long		

Instructions for Assembly

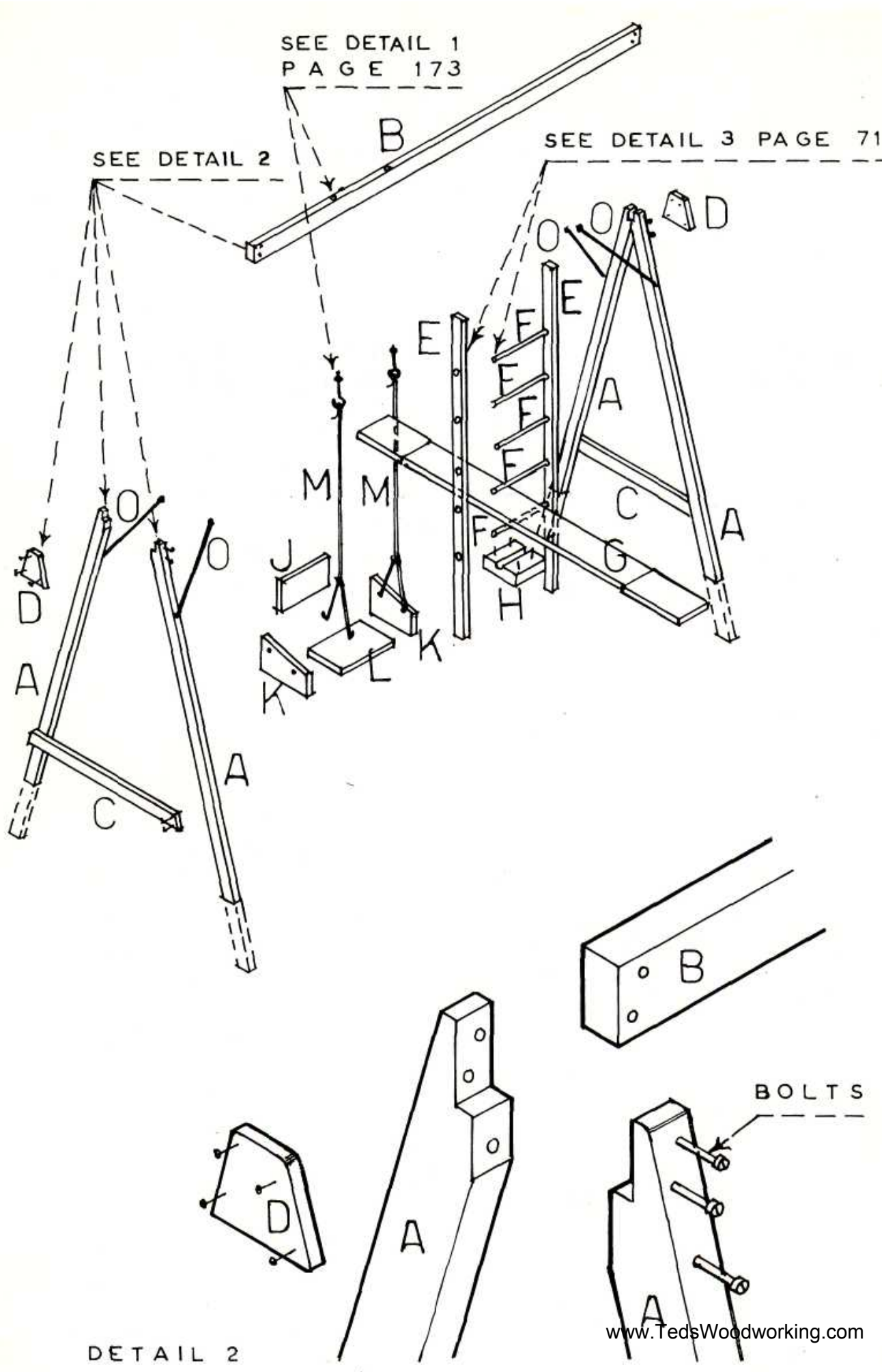
1. Join supports (A) together and with cross rails (C) and blocks (D).
2. Install dowels (F) in supports (E).
3. Insert supports (A) and (E) in ground (using concrete) and attach cross support (B) blocks (D) and metal rod (O).
4. Join seat or bottom (L) with back and sides (J, K), and attach nylon rope or chain (M) to sides (K) and cross support (B).
5. Install plank (G) and attach block (H).
6. Apply finish.



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DETAIL 2

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7.9 THREE-WAY LADDER

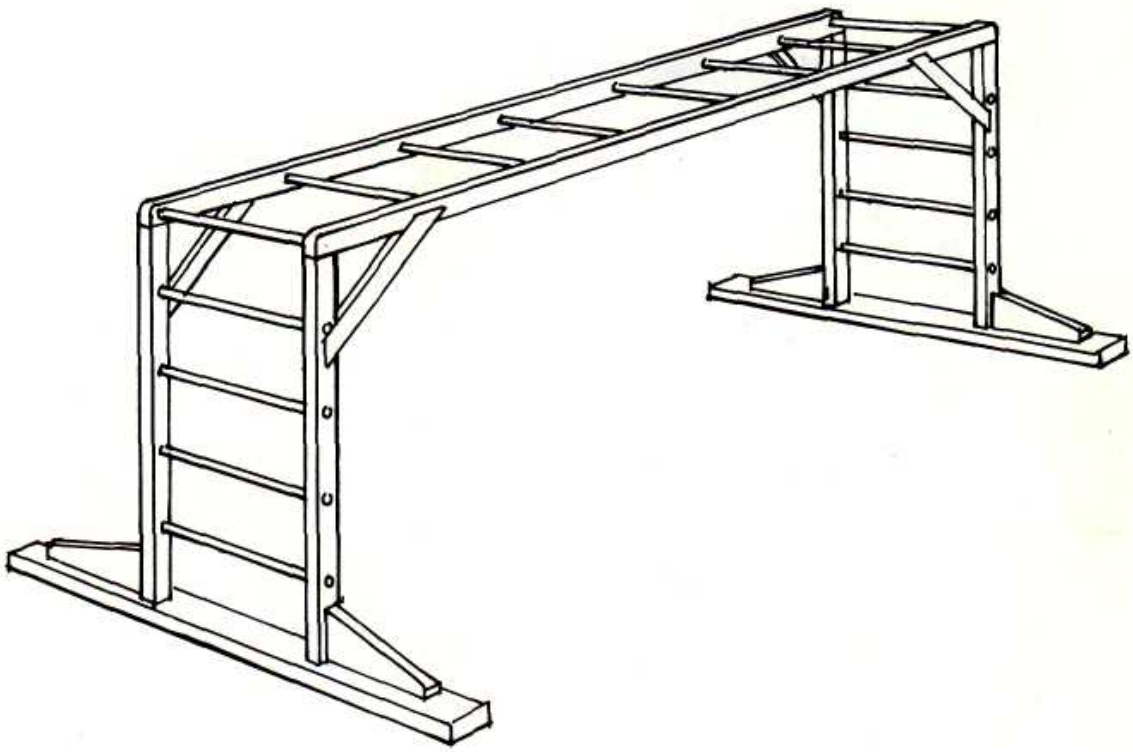
Another version of the "monkey-cage" idea, this securely supported vertical and horizontal ladder is high enough in the horizontal span to allow small children to swing from rung to rung without danger, and to hang upside down with legs through the rungs—thereby building muscles and appetites. Use selected hardwoods for this one.

List of Materials

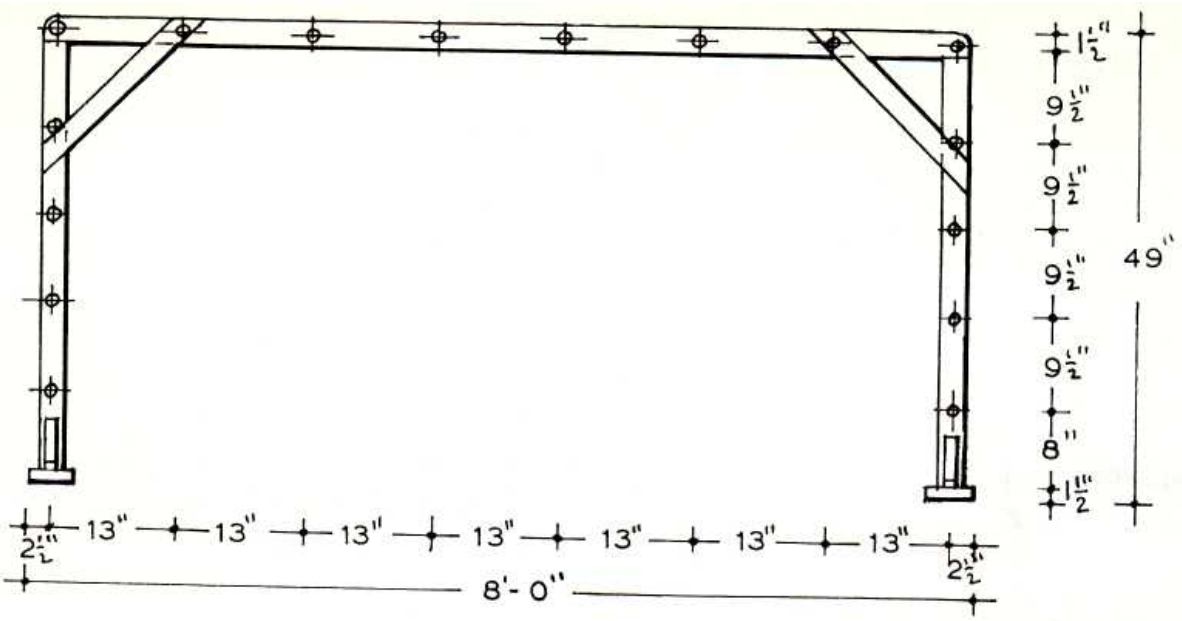
PART	NO.	FUNCTION	DIMENSION IN INCHES thickness × width × length		
A	2	cross rails	1½	3	96
B	4	rails	1½	3	49
C	2	bottoms	1½	5	48
D	4	corner blocks	1½	5	11
E	4	cross rails	1½	2	24
F	16	dowels	1 diam.		18

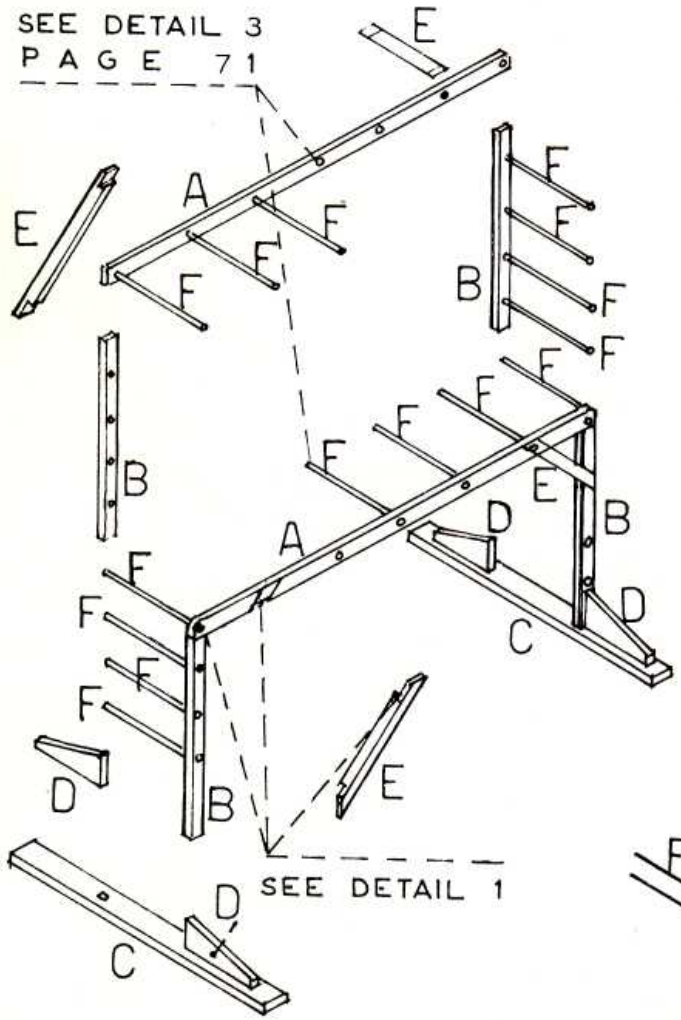
Instructions for Assembly

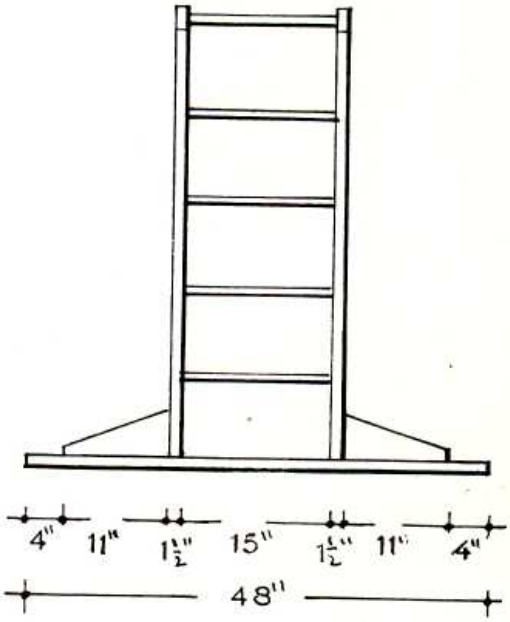
1. Join cross rails (A) with rails (B) and attach rails (E).
2. Install dowels (F) in rails (A) and (B).
3. Fasten rails (B) to bottom (C) and attach corner blocks (D).
4. Apply finish.

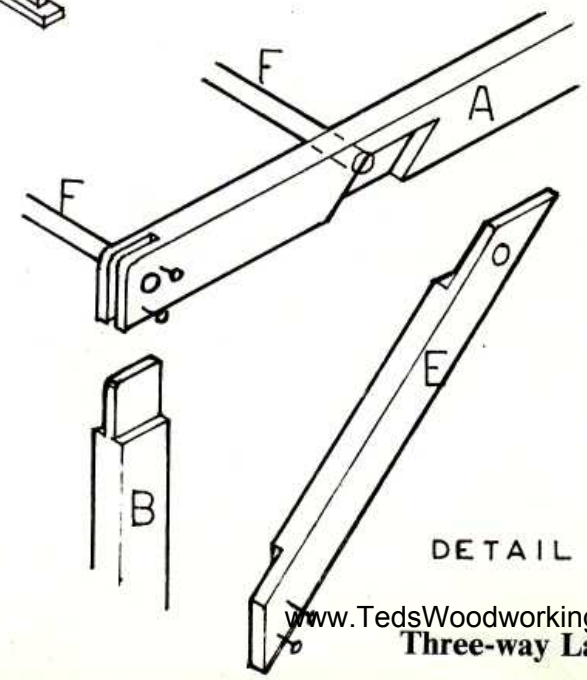


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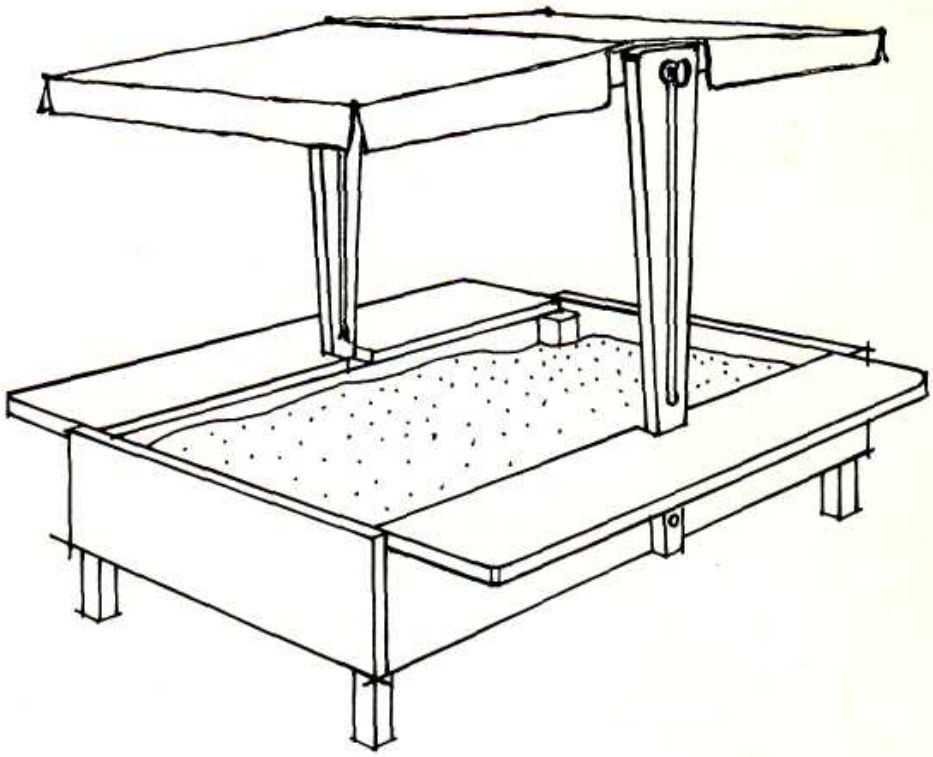


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Three-way Ladder

7.10 SAND BOX

The endless fascination of the sand box for preschool children is well known to parents everywhere; no outdoor play area is complete without it. The awning is of plastic material and helps prevent sunburn in prolonged sandpile operations. It keeps the sand from getting wet on rainy days, too.



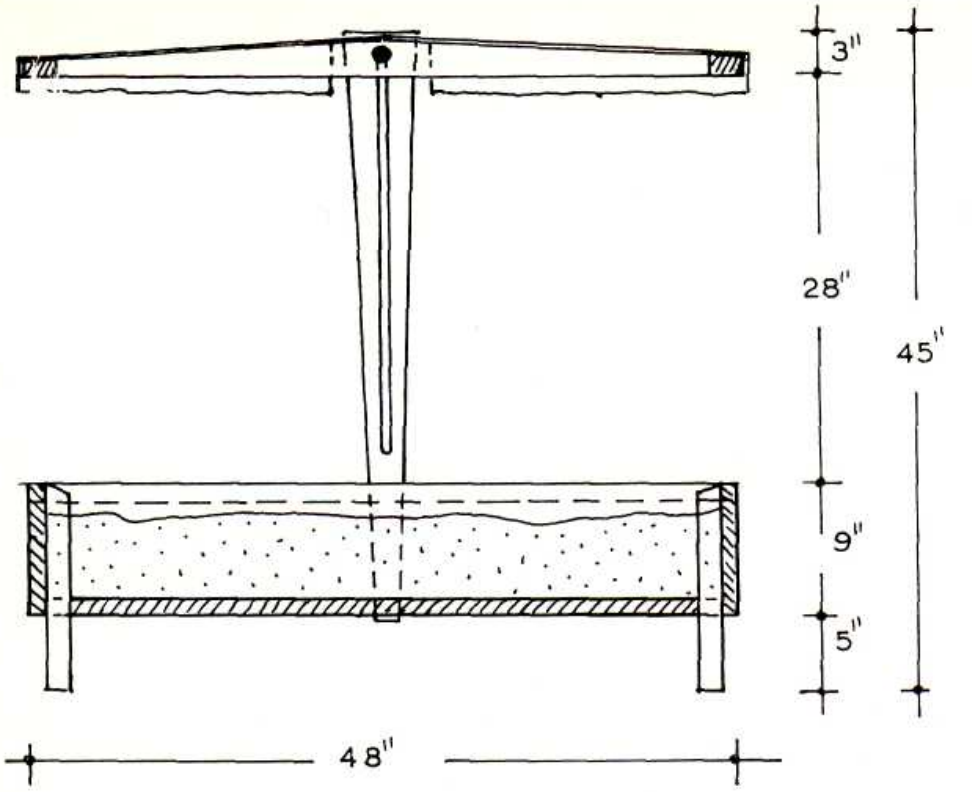
List of Materials

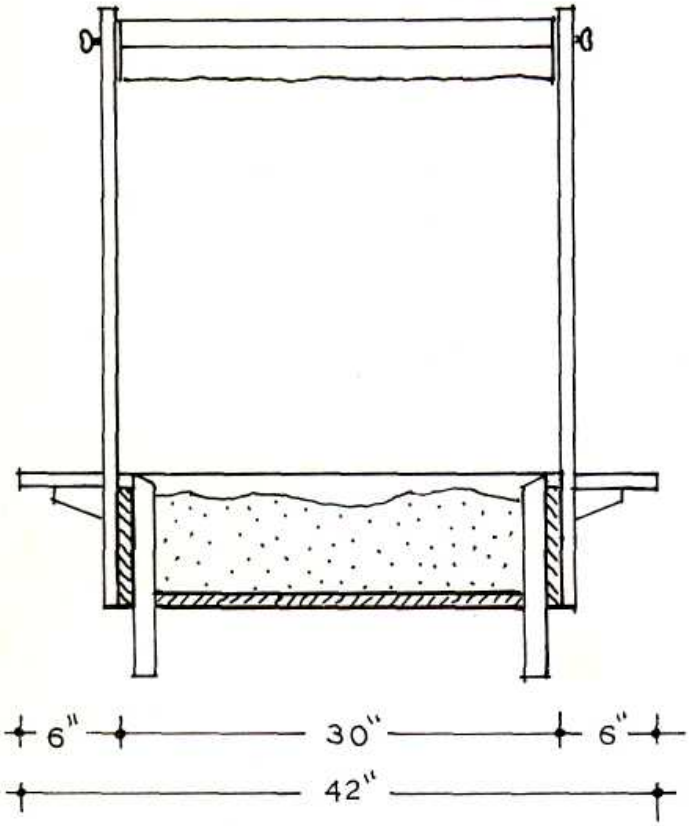
PART	NO.	FUNCTION	DIMENSION IN INCHES thickness	× width	× length
A	2	sides	¾	8¼	46½
B	1	front	¾	9	30
C	1	bottom	¾	28½	46½
D	4	legs	1½	1½	14
E	2	seats	¾	6¾	46½
F	2	supports	¾	5	40
G	2	sides	½	2½	48
H	2	rails	¾	2	28½
J	1	plastic sheet		36	72
K	4	corner blocks	1	2½	3½

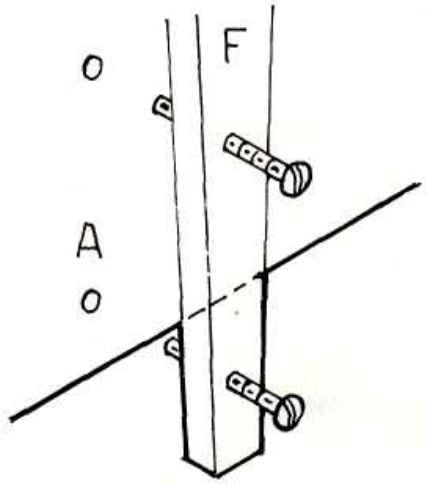
Instructions for Assembly

1. Join sides (A) with bottom (C) and legs (D).
2. Attach front (B) to sides (A), bottom (C) and legs (D).
3. Fasten corner blocks (K) to seats (E) and sides (A).
4. Join rails (H) with sides (G).
5. Apply finish.
6. Install supports (F) and cover (J).

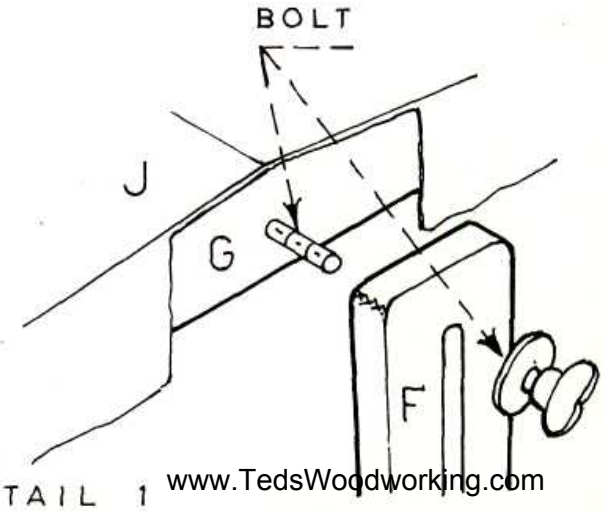
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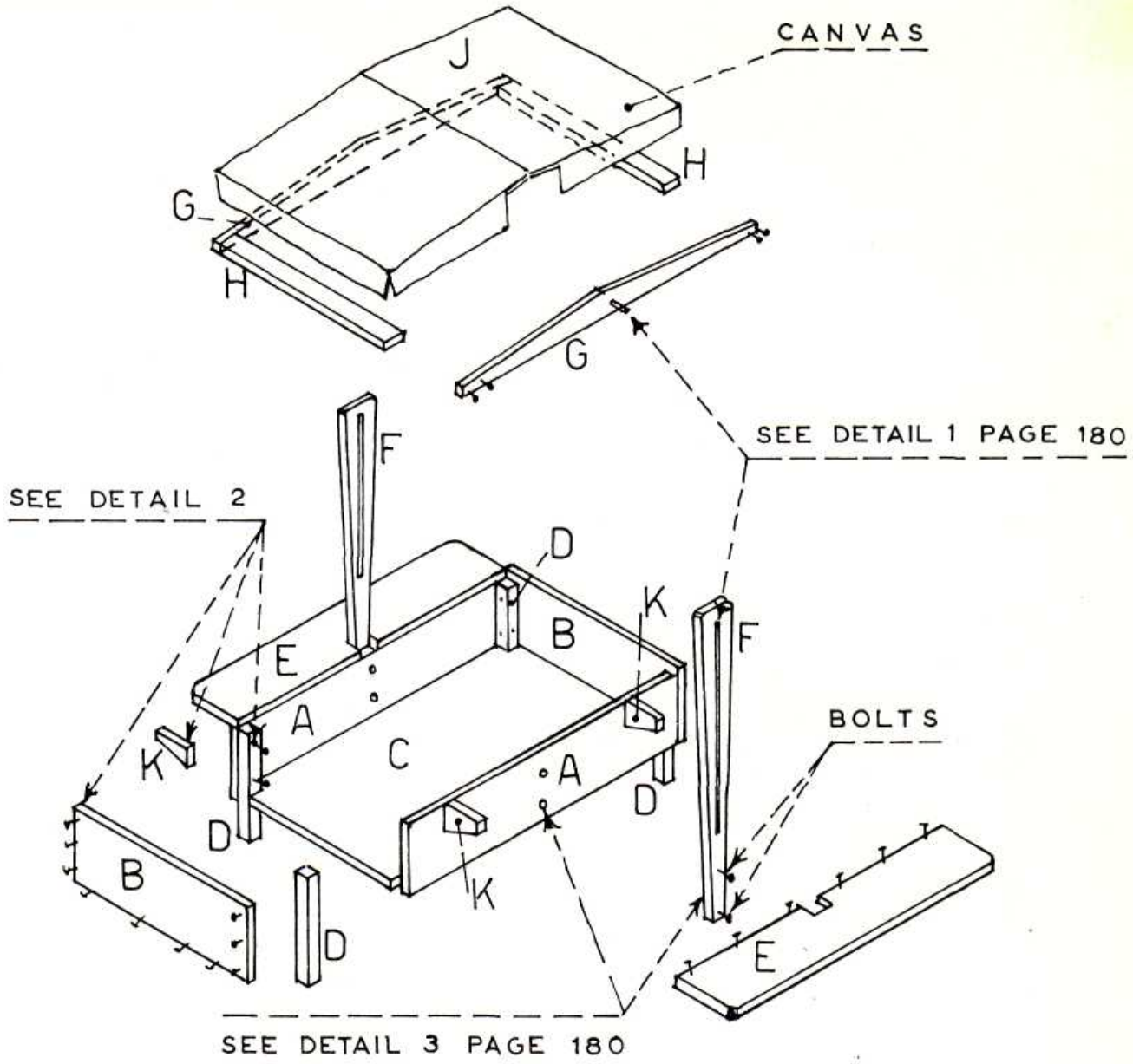


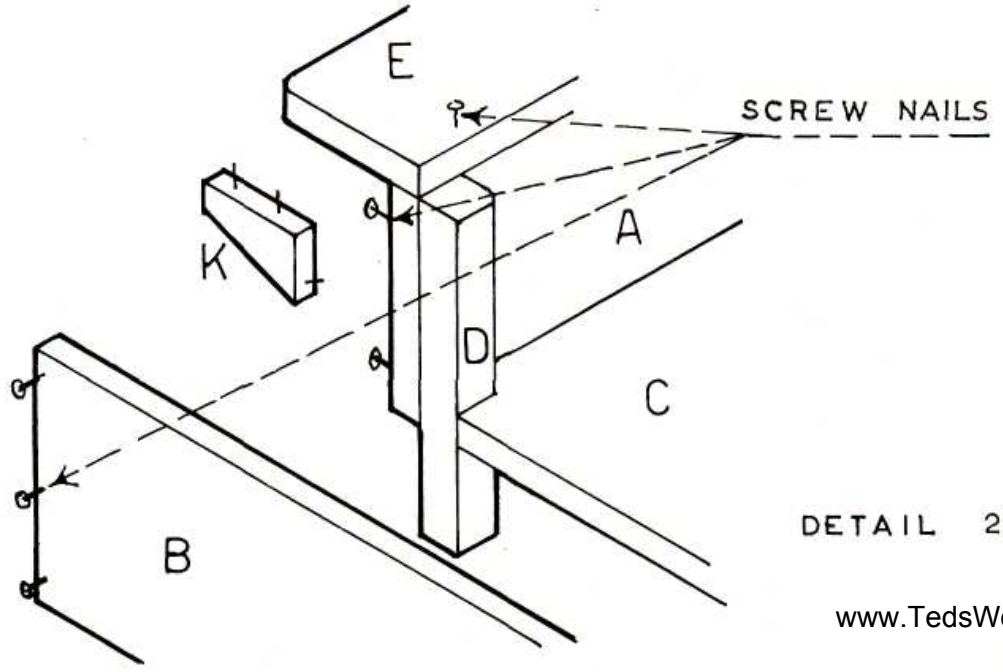
DETAIL 3



DETAIL 1

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DETAIL 2

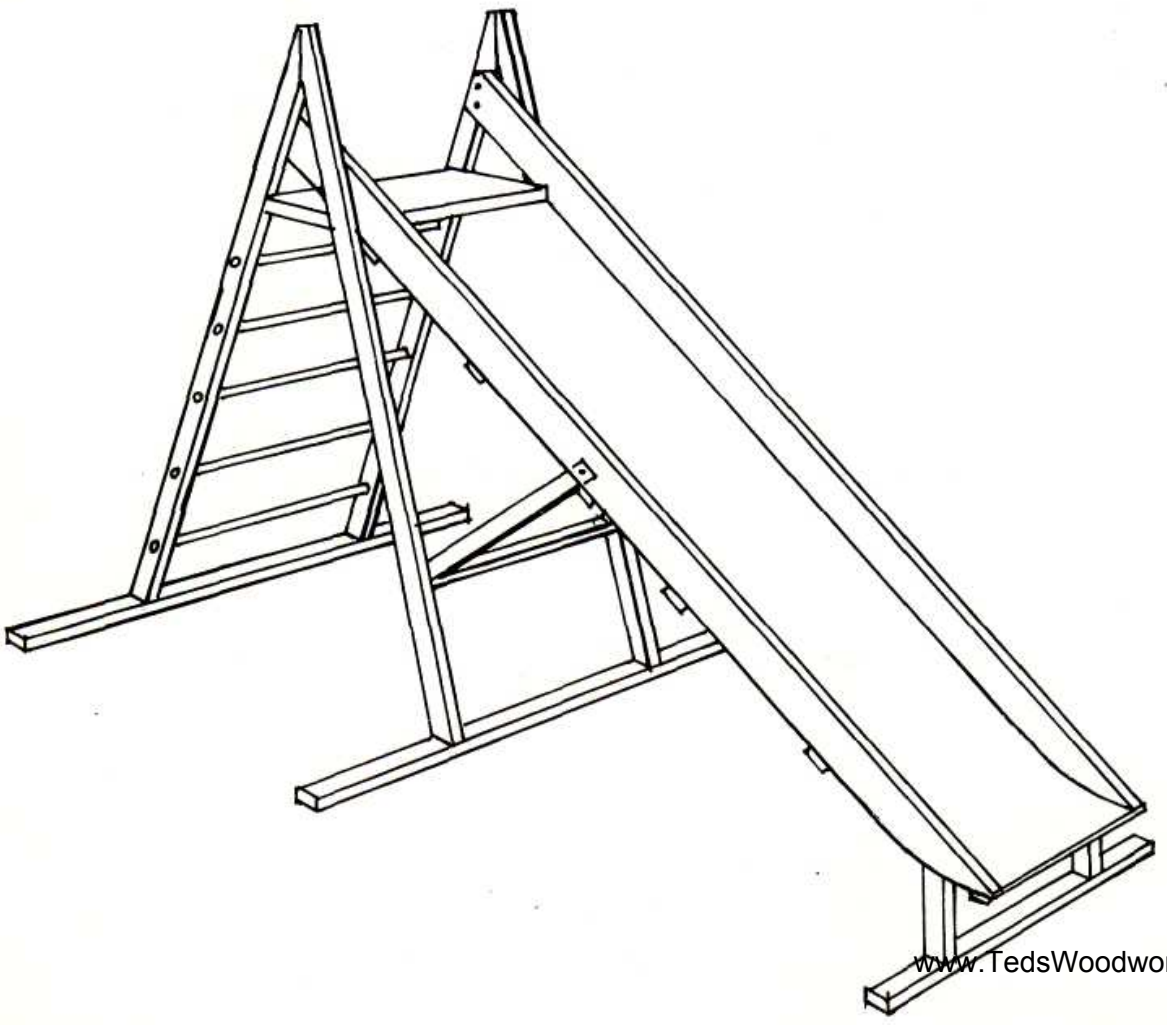
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7.11 OUTDOOR SLIDE

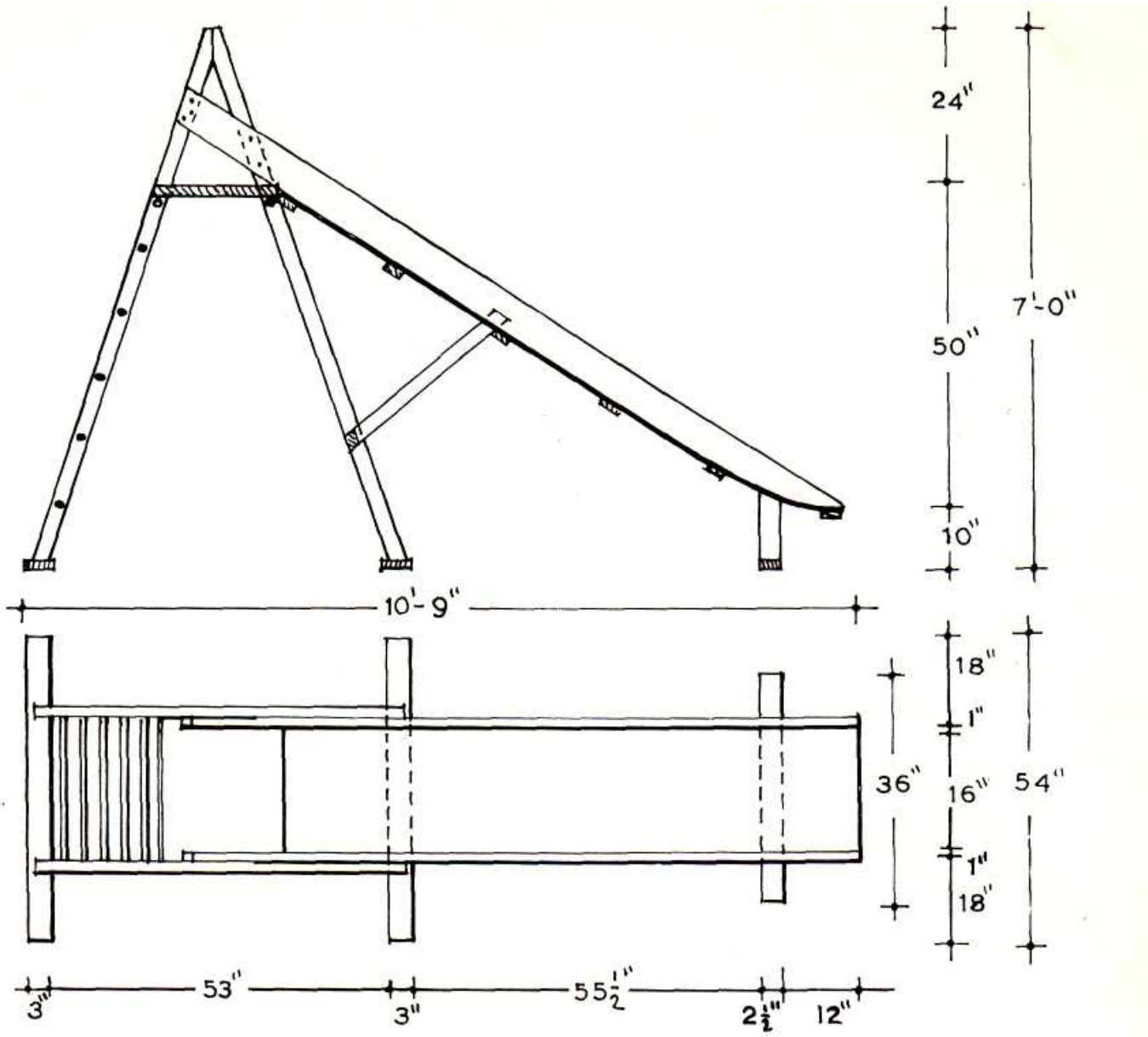
This is understandably more exciting than the slide of Project 6.11, having a drop of almost seven feet, which looks scary enough to six-year-olds. Not many slides as sturdy as this one are seen in backyards, and anyone can be justly proud of building it.

List of Materials

PART	NO.	FUNCTION	DIMENSION IN INCHES thickness	×	width	×	length
A	4	supports	1½		2½		90
B	1	panel	¾		18		21
C	2	bottoms	1¼		4		54
D	2	supports	1		2		33
E	1	rail	1		2		16
F	7	dowels	1 diam.				21
G	1	Masonite panel	¼		18		102
H	2	sides	1		5		120
J	6	cross rails	¾		1½		18
K	1	bottom	1¼		2½		36
L	2	supports	1¼		2½		18

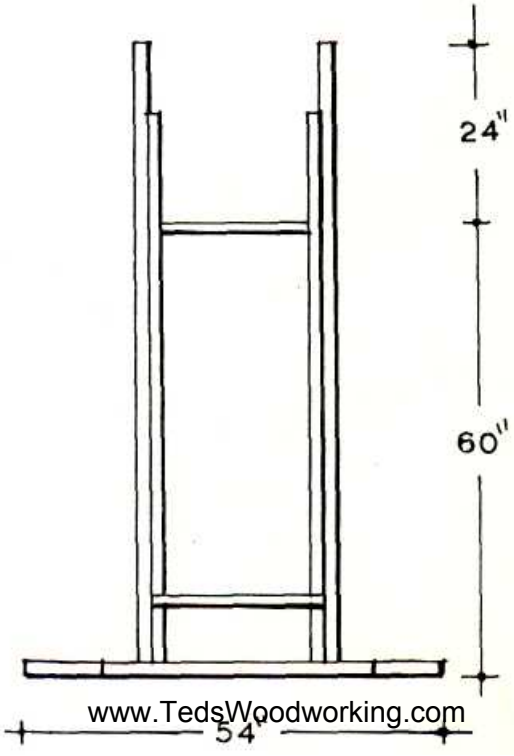


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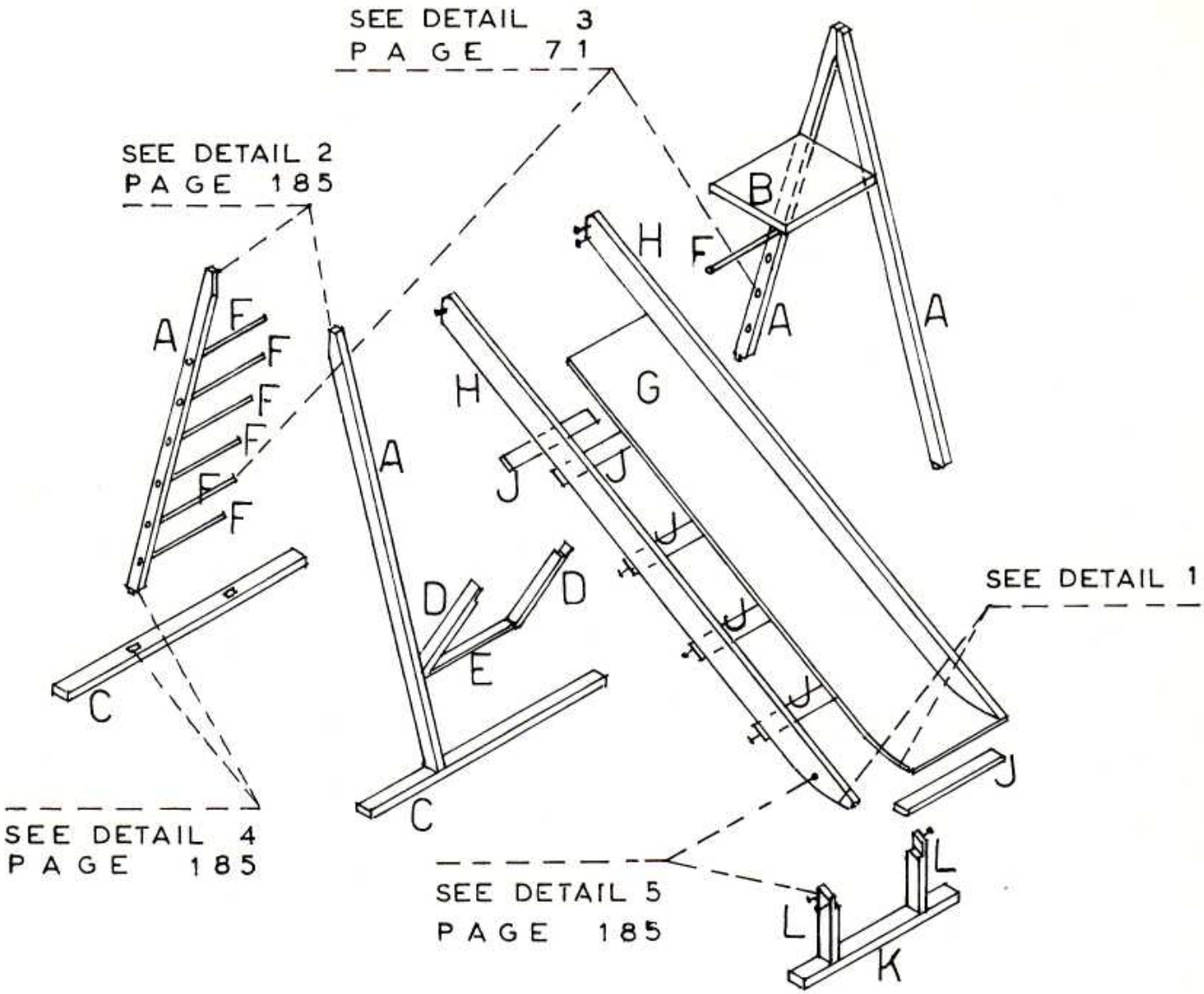


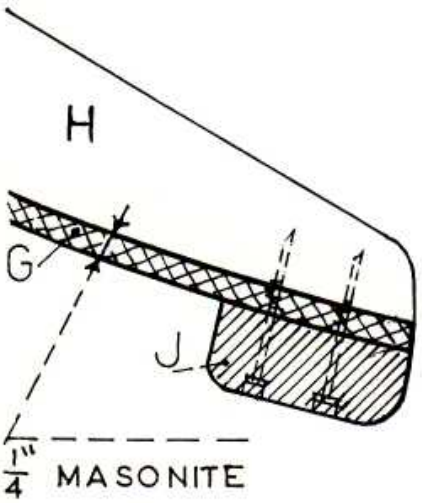
Instructions for Assembly

1. Join dowels (F) with supports (A).
2. Fasten supports (A) together with bolts and attach bottoms (C) and panel (B).
3. Attach panel (G) and support (J) to sides (H) and fasten latter to supports (A).
4. Fasten supports (L) to bottom (K) and sides (H).
5. Join supports (D) with cross rail (E) and supports (A) and sides (H).
6. Apply finish.



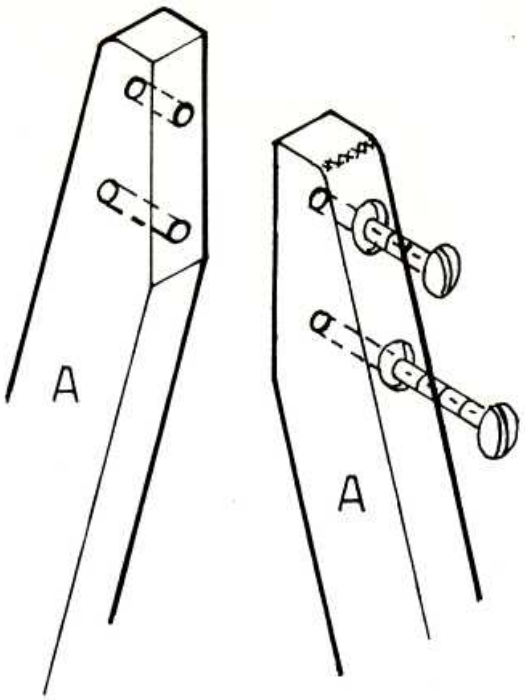
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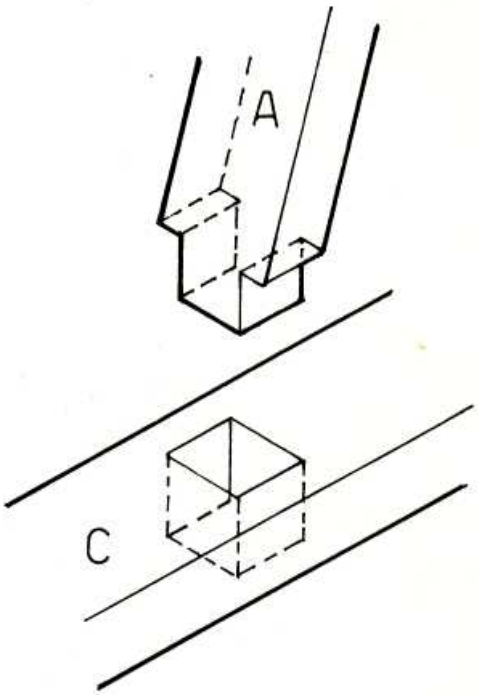


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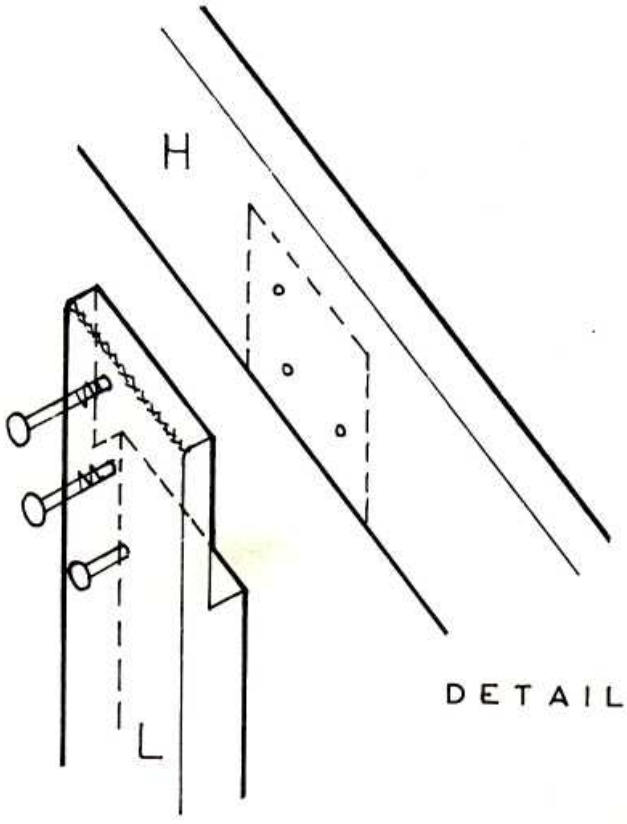
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DETAIL 2



DETAIL 4

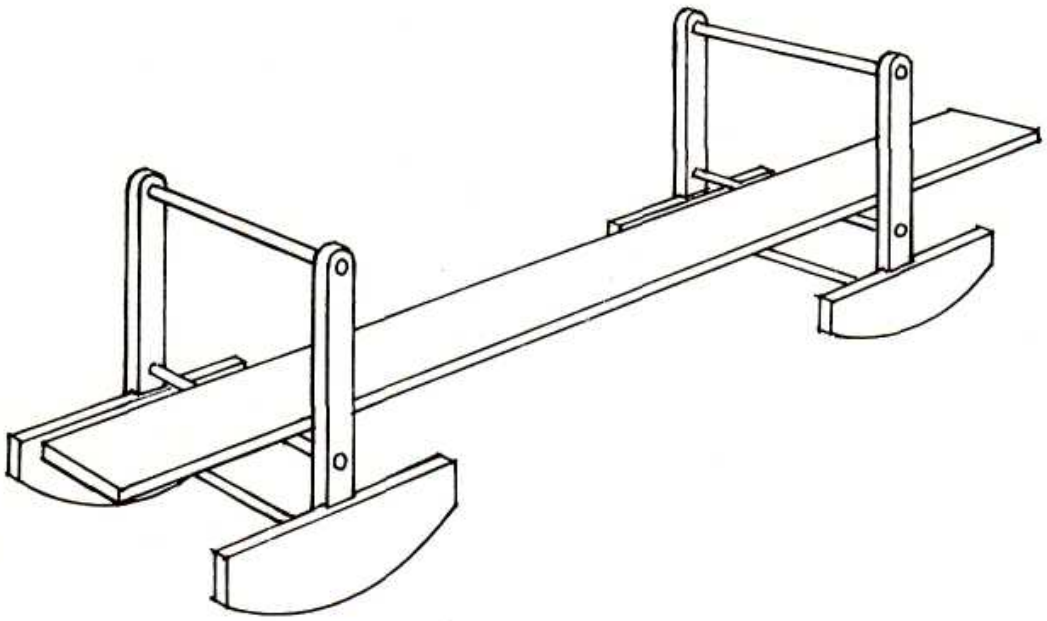


DETAIL 5

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7.12 ROCK 'N ROWBOAT

Less nautical-looking than the boat of Project 7.2, this unit is bigger and affords more action per childpower. With a series of coordinated pushes and pulls the rock 'n rowboat can be made to "walk" along the ground, which is great fun even when the boat comes apart. The board is not fastened to either end, making storage a simple matter.



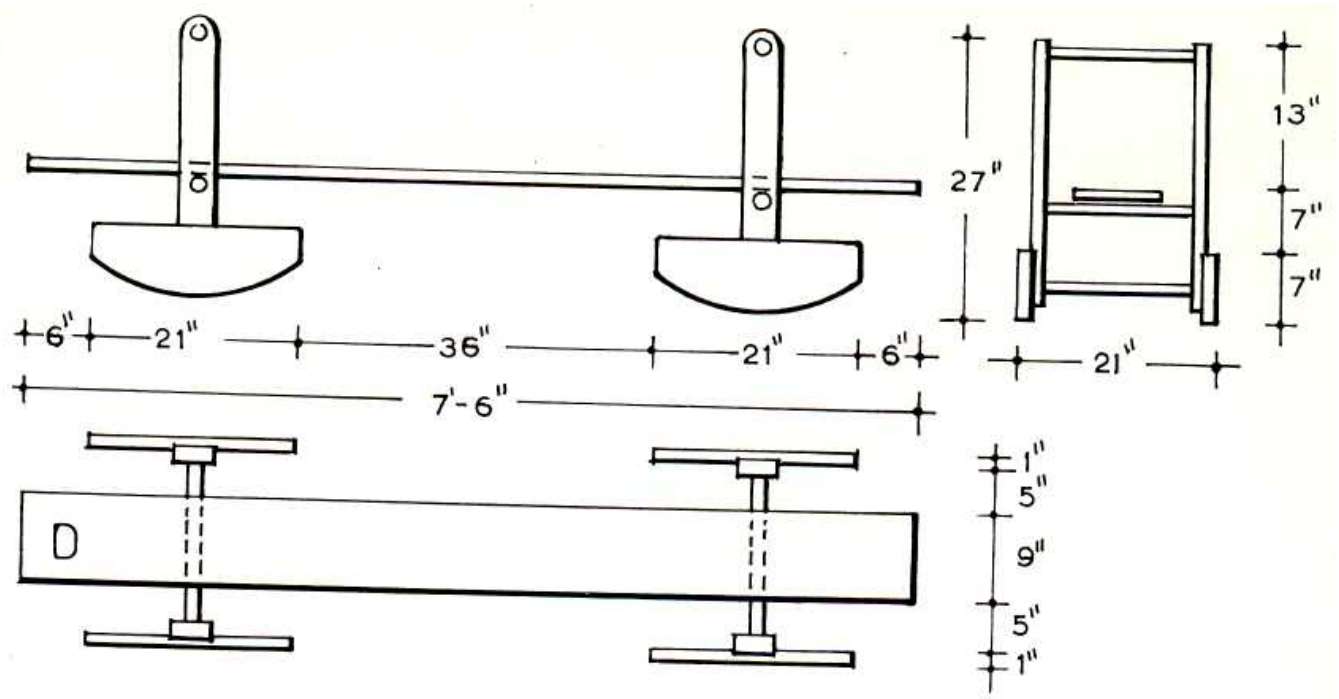
List of Materials

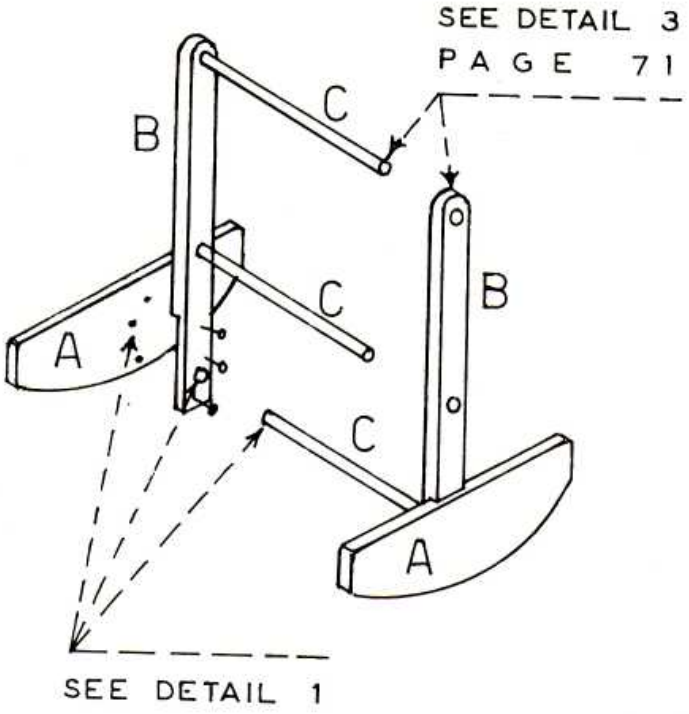
PART	NO.	FUNCTION	DIMENSION IN INCHES thickness × width × length		
A	4	sides	1	7	21
B	4	rails	1	2	26
C	6	dowels	1 diam.		19
D	1	plank	1	9	90

Instructions for Assembly

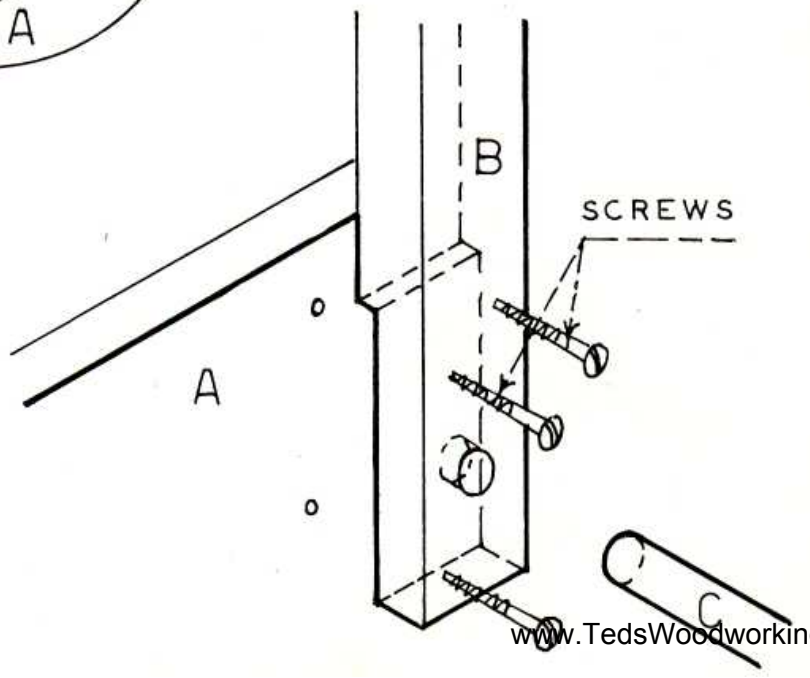
1. Join sides (A) with rails (B).
2. Fasten dowels (C) in sides (A) and rails (B).
3. Apply finish and insert plank (D) without fastening.

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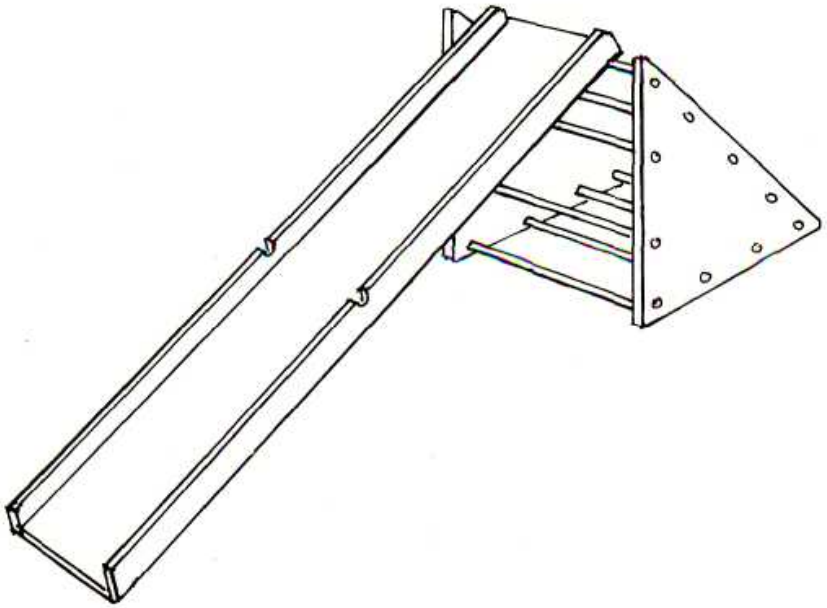
DETAIL 1

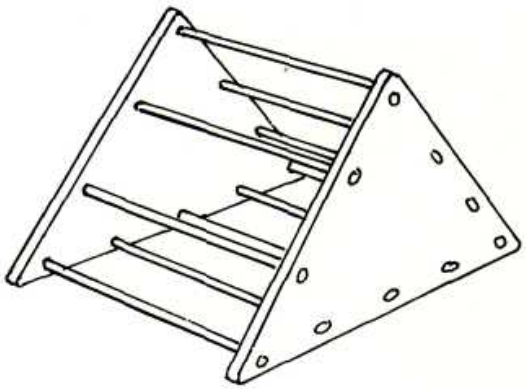


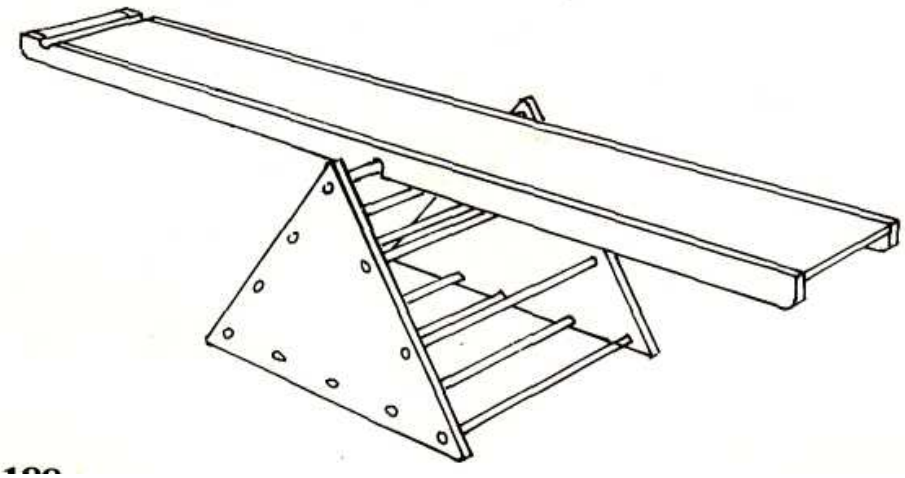
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7.13 COMBINATION SLIDE, SEESAW AND LADDER

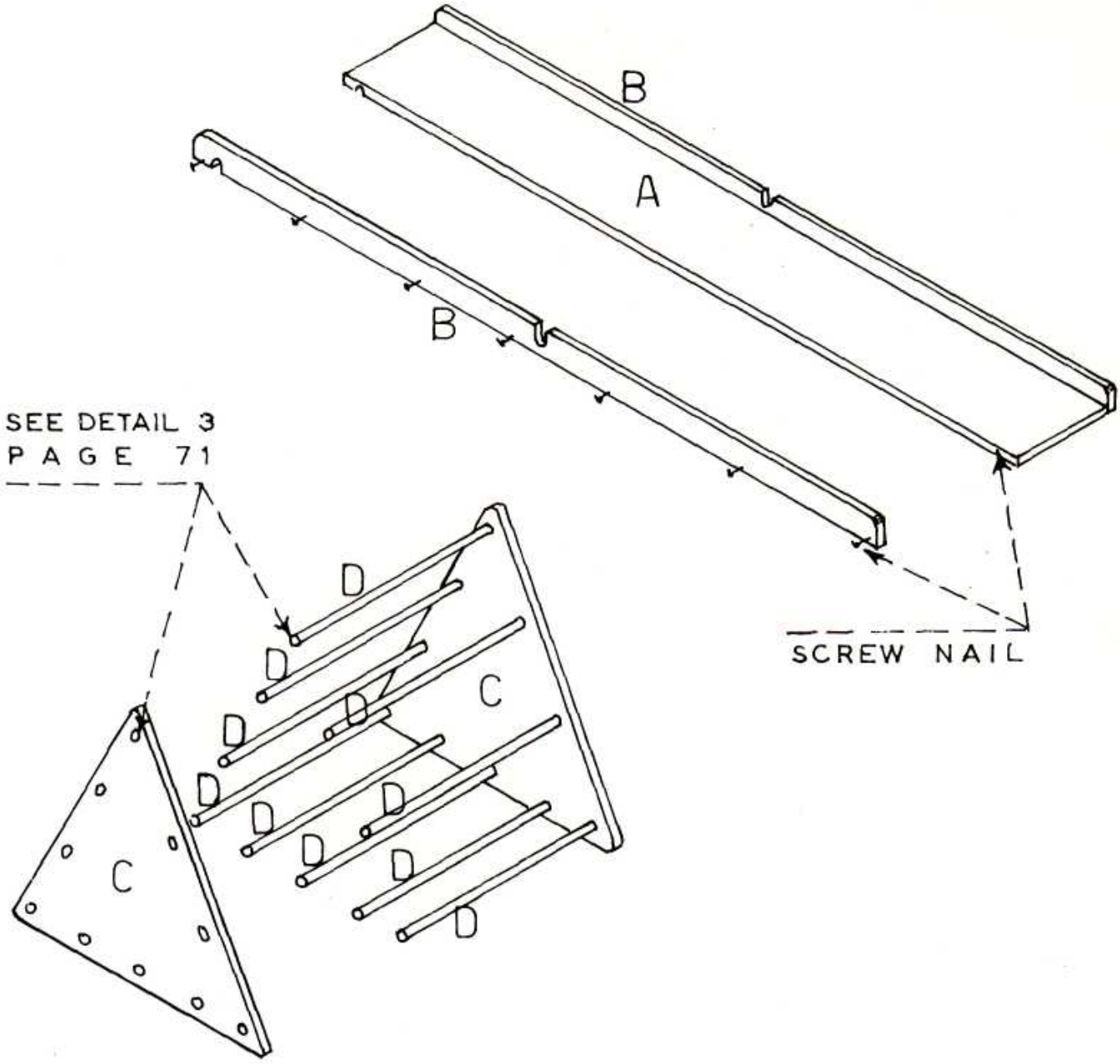
Ingenious and versatile, for indoors and out, this final project will give you the greatest return for your efforts in terms of sheer fun. Here is one item that can be "handed down" as the family increases, and it's not likely to wear out with reasonable care. Easy to make, easy to carry, easy to store, it's the answer to the baby-sitter's problem of how to entertain Junior.







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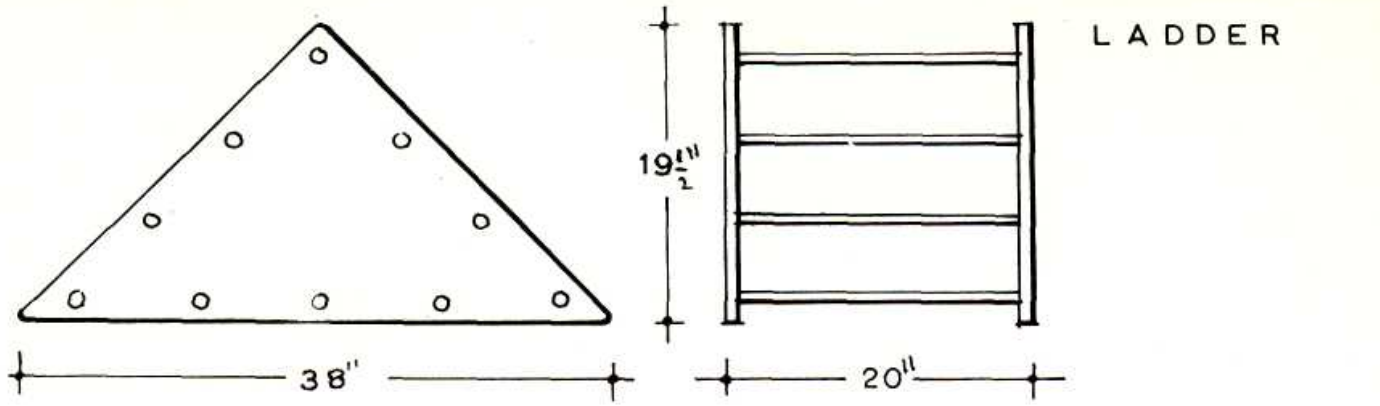
List of Materials

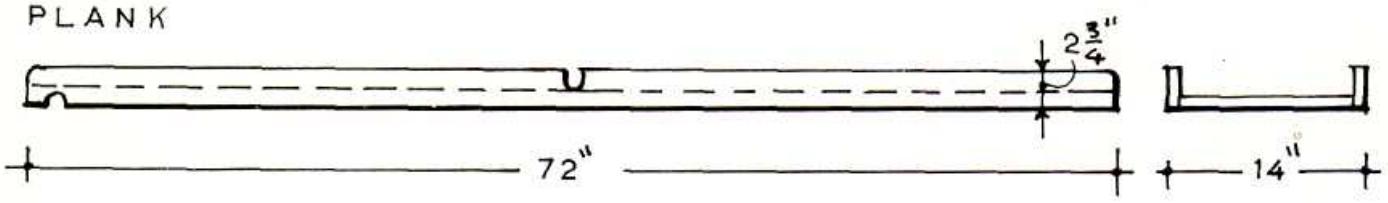
PART	NO.	FUNCTION	DIMENSION IN INCHES thickness × width × length
A	1	plank	¾ × 12 × 72
B	2	sides	1 × 2¾ × 72
C	1	panel cut diagonally to form two triangles	¾ × 27 × 27
D	10	dowels	1 diam. × 20

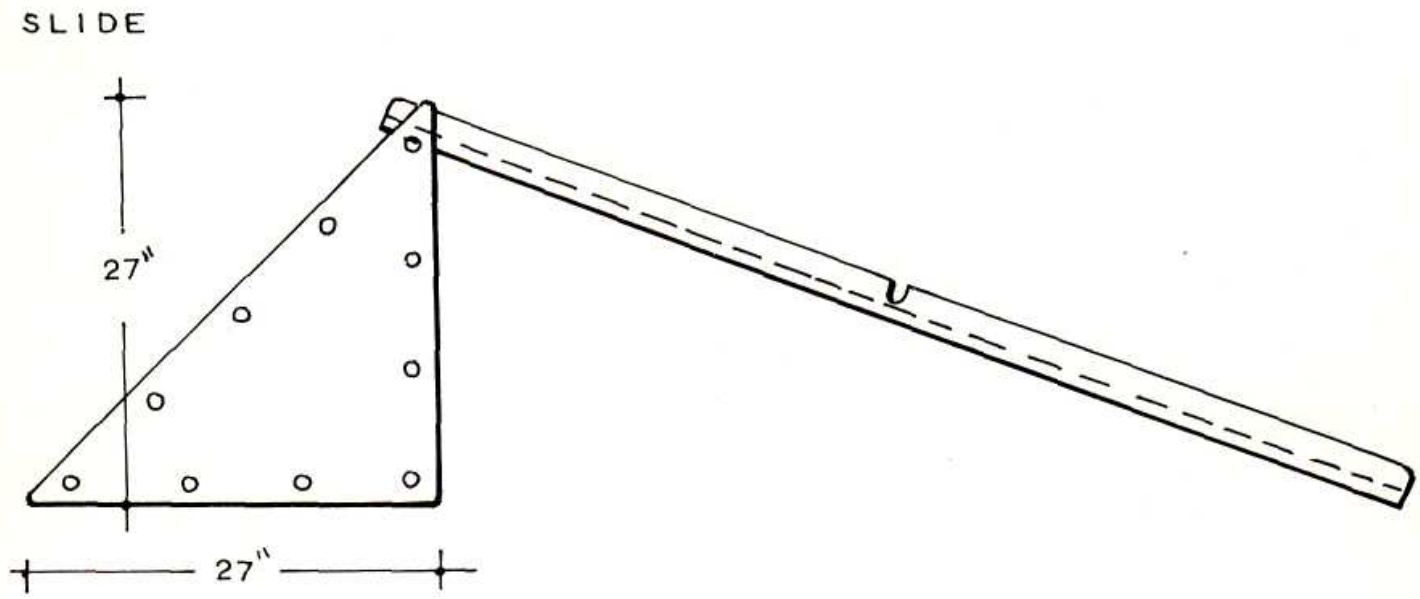
Instructions for Assembly

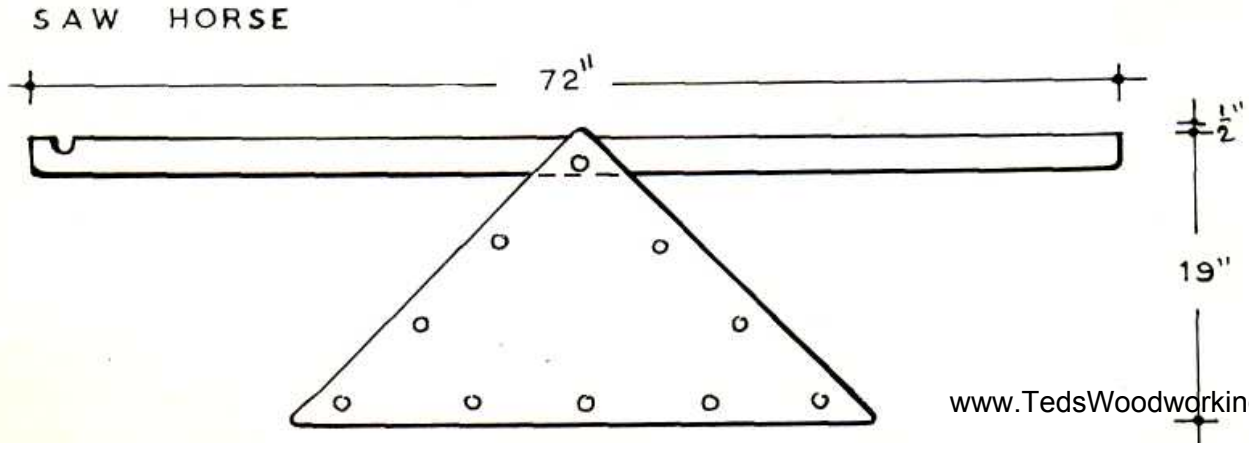
1. Fasten plank (A) to sides (B).
2. Join dowels (D) with sides (C).
3. Apply finish. *Note:* Make sure groove on back of slide is fitted over dowels when plank is used for either slide or seesaw.

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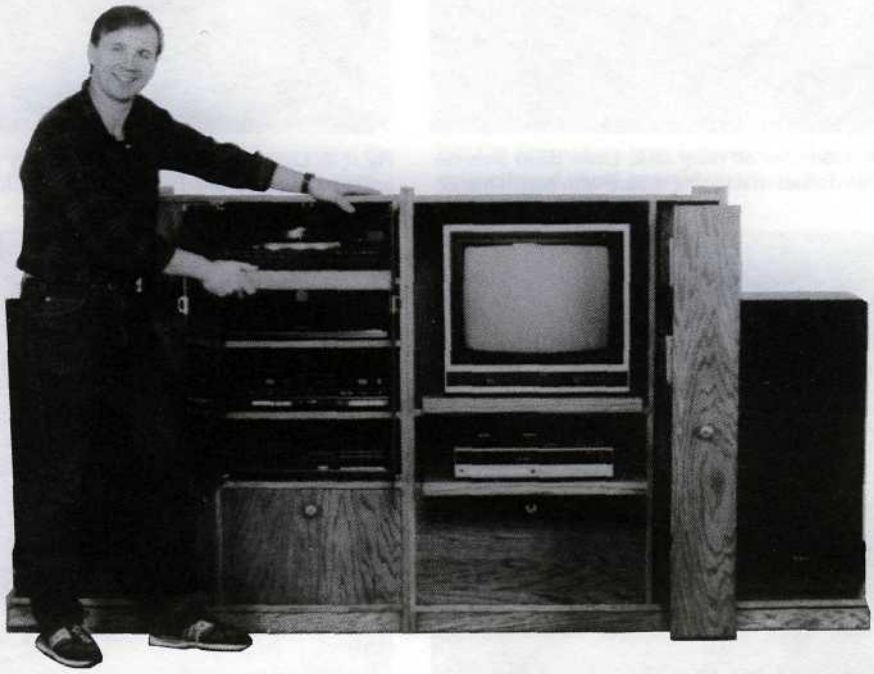






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All-In-One Entertainment Center



BEFORE YOU START this project, read the instructions carefully to familiarize yourself with what is involved. Check the sizes of the component shelves; your equipment may require more space. Change the dimensions accordingly. You will find it a pleasure to organize your home electronics in these handsome cabinets made of oak veneers. The larger unit holds a TV and VCR and has a storage compartment. To the right, a narrow vertical drawer stores video cassettes, stacked on the shelves so the labels can be easily read.

The TV rests on a pullout shelf which swivels, enabling the screen to be directed toward the viewer. The VCR rests on a pullout platform to accommodate top loading units. The audio equipment unit has four shelves, three of which are adjustable in 1-inch increments to accommodate components of varying heights. The top shelf has a pullout platform for a turntable.

The softly tinted glass doors keep out the dust and add to the appearance of the piece. Special hardware is used, eliminating the need for drilling the glass. A second vertical drawer, on the left, stores

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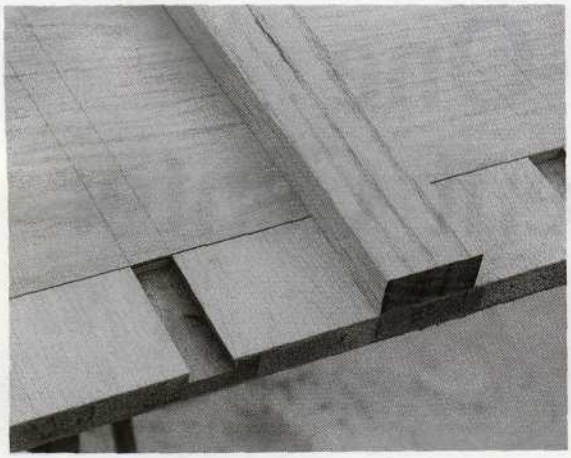


Fig. 1-1. Mark dado sites on story stick. Draw dado lines on board then align dadoes of dadoing square with pencil marks.

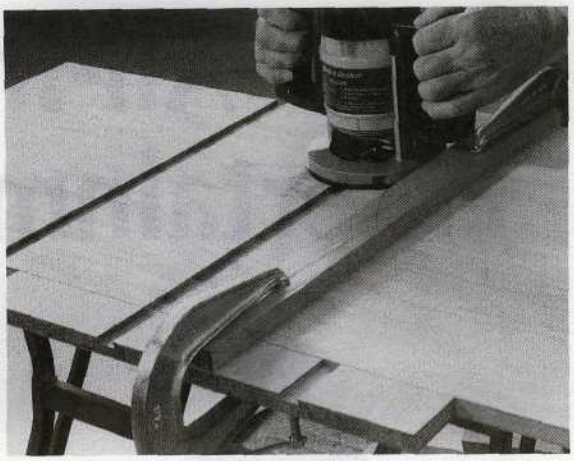


Fig. 1-2. Dadoing square is clamped into place then dadoes are cut with router fitted with ¾-inch bit. Clean burr at corners.

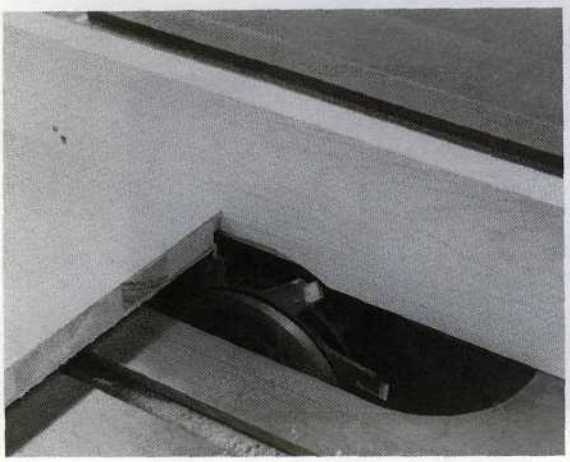


Fig. 1-3. The dado blade is made to cut slightly into the auxiliary wood fence. Set blade and fence to make ¼×⅜ rabbet.

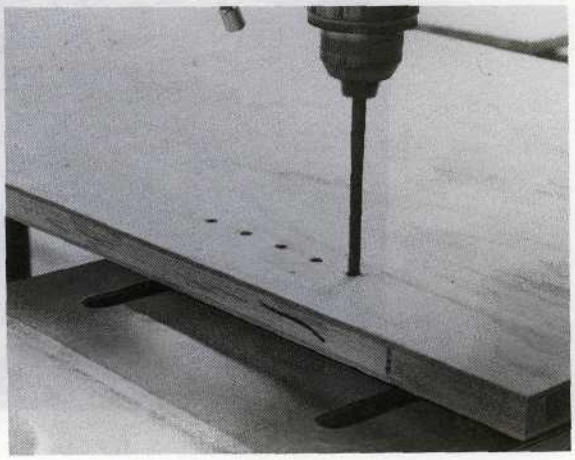


Fig. 1-4. Locate shelf support holes then use awl to mark centers for drill bit. Drill ¼-inch shelf support holes ⅜ deep.

audio cassette tapes. The bottom pull-out compartment holds record albums. Five metal dividers hold the records in small easy-to-manage groups.

Two base pieces are used for the speakers, one at each end. Each has a swivel platform to position speakers for the best acoustical results. Except for some solid lumber used for trim, construction is entirely of plywood: ¾ inch for the cabinets and ¼ inch for the rear panels. Oak was used for the project in the photo but other wood species may be substituted. Most joints are dadoed and glued, reducing the number of fasteners used.

Plywood is available in either veneer core or lumber core. You might prefer lumber core because it can be used without edging in some cases. It has a wide center band which can be sanded smooth and will take a finish far superior to the veneer core which must always be edged. For example, the vertical drawer fronts, the album drawer front and the storage

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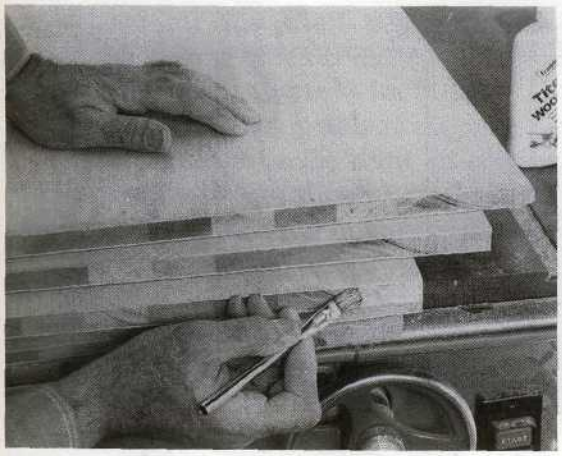


Fig. 1-5. Rough-assemble cabinet parts for fit. Glue sizing the edges of plywood panels with diluted aliphatic resin glue.

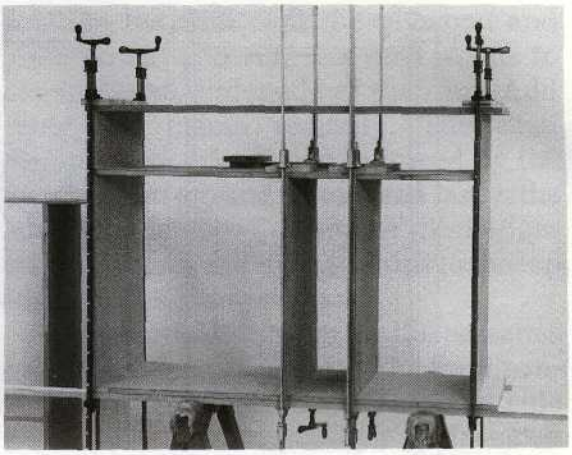


Fig. 1-6. Aprons have been fastened with glue and screws, holes counterbored. Final assembly is glued and clamped.

compartment door did not need to be edged.

Regardless of the plywood used, we recommend that your table saw and radial arm saw be fitted with a plywood blade because of the smooth cut it produces. The materials list shows the actual cut sizes of the various parts. The overall measurements will be greater because of the edging which is added after assembly in most cases.

Set the saw fence to rip the 19-inch widths of the sides, top and bottoms, then reset the fence to rip the dividers and fixed shelves which are 18¾ inches wide to allow clearance for the rear panel. The lengths of each piece are then cut to size. If your components require wider shelves, make the necessary adjustments in the measurements at this time.

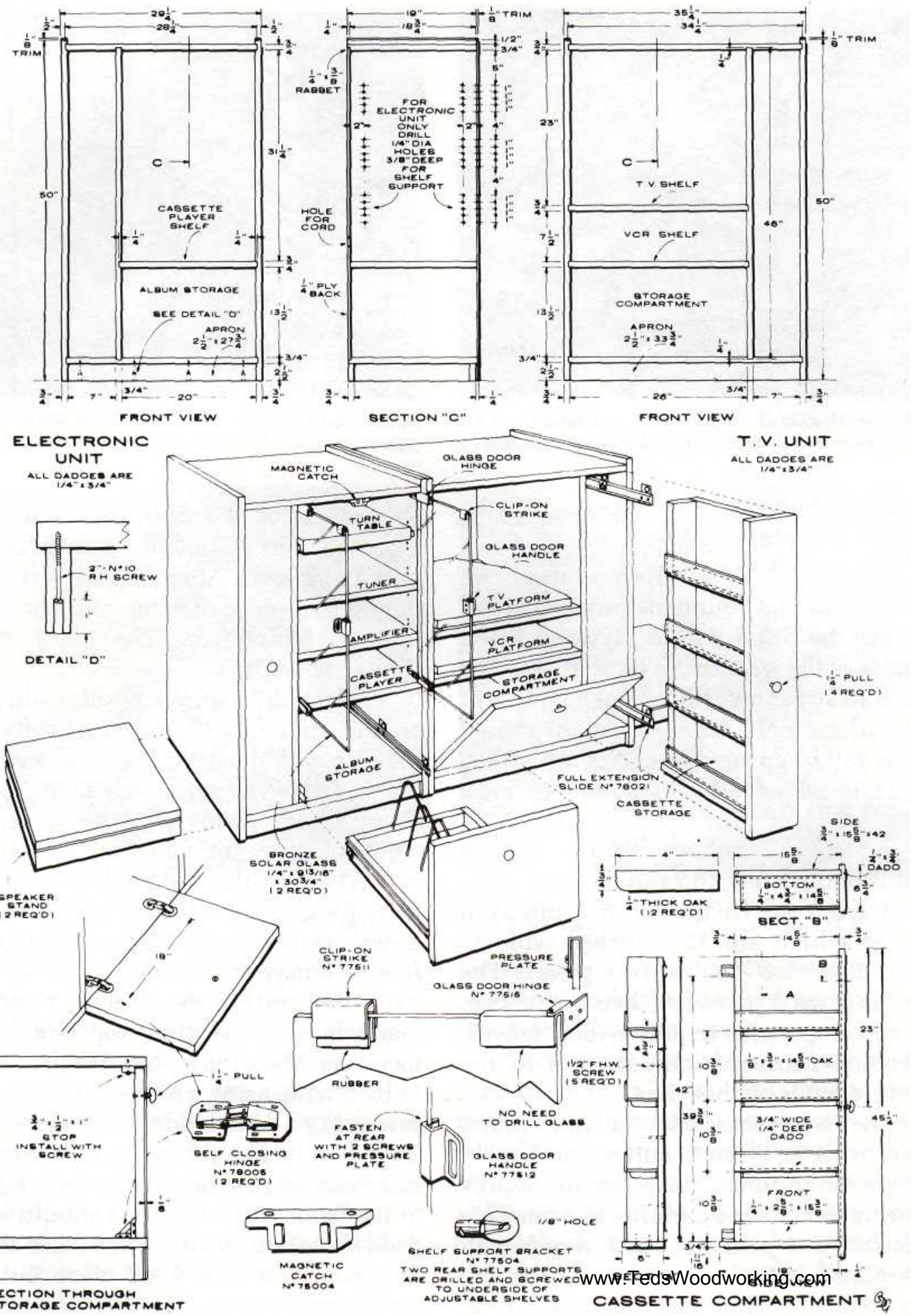
The dadoes should be cut with a router fitted with a ¾-inch cutter, preferably carbide. To ensure accuracy and to simplify dadoing, make up a dadoing square. This consists of a piece of hard wood with crosspieces fastened at each end. You can also make it with just one crosspiece. Regardless of the design, the members must be perpendicular. Assemble with glue and screws. After the glue sets, clamp the jig to a piece of scrap and cut a dado into the crosspiece. The depth of cut should be ¼ inch.

Mark the location of each dado on all boards, then position the jig so its dado lines up with the dado marks on the board. Clamp securely then cut the dado. Position clamps at both ends of the jig, but so they won't obstruct the travel of the router.

When all the dadoes have been cut, clean the corners with sandpaper. A 1-inch dowel wrapped with 220-grit paper works fine to remove the burr.

After cutting the dadoes, rabbet the rear edges of the side, top and bottom members. Make the rabbet ¼ inch deep and ⅜ inch wide using a router, or on the table saw using a dado blade. If the table saw is used, clamp a wood auxiliary fence to the saw fence so you can run the dado right up to the fence. Actually, you should let the dado blade bite into the wood fence slightly to assure you of a good clean cut. The divider and side panel of the audio cabinet

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FRONT VIEW
SECTION "C"
FRONT VIEW
ELECTRONIC UNIT
ALL DADOES ARE 1/4" x 3/4"
T.V. UNIT
ALL DADOES ARE 1/4" x 3/4"
DETAIL "D"
SECTION THROUGH STORAGE COMPARTMENT
CASSETTE COMPARTMENT
SECT. "B"
SECT. "A"
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are drilled for the shelf peg supports. Locate the ¼-inch holes as indicated in the drawing and drill them ⅜ inch deep.

The main cabinet members can now be assembled. This must be done in stages. The sequence is as follows: 1) shelf (or shelves) to the divider; 2) divider to top and bottom members; 3) sides to top and bottom.

Before assembly, glue-size the edges of the shelves and tops and bottoms. Do this by diluting the glue with water. Brush on and allow to dry (about 15 minutes), then sand lightly. Now apply the glue full-strength and assemble in the sequence outlined above. Use cauls under the clamps to prevent damage to the workpiece. Make sure the pieces are perpendicular after the clamps have been applied. Allow the glue to set then add the next section. The sides are added in the final assembly.

The edging can now be added to the exposed edges of the front and top. Use solid oak that has been dressed to a thickness of ¾ inch. This will require greater accuracy when applying, but it will mean far less work later. If you use 13/16-inch stock, it will be easier to apply, but then the overhang will have to be trimmed. Take your choice.

Rip the stock to a width of ⅛ inch, on the table saw. Set the fence ⅛ inch away from the blade then lock securely. Push the piece through the saw blade using a push stick. Glue the ⅛-inch trim to the plywood edging using double-pointed brads. To use the nails, grasp them with the pliers and force them into the plywood edges, spaced about 8 inches apart. Push them until about 1/16 inch protrudes.

Starting with the side members, apply glue to the plywood edge and to the undersides of the oak edging. Carefully position the trim over the plywood and press down, allowing the brad points to penetrate the underside of the trim. Add cauls and clamp securely. The shelf members are edged next followed by the divider, then top and bottom and lastly, the other side member. After the front edges are completed, add the two strips to the top edges of the side panels.

The vertical drawers for the cassettes are of simple construction. The front panel is dadoed to take the bottom and side panels. The rear and bottom are fastened with butt joints. When fastening the cassette shelf supports, use two spacer blocks to obtain the proper spacing. Make the blocks 4 × 10⅜ inches and place them at the sides of the opening starting at the bottom. Apply glue to the back of the 14⅝-inch support and, resting it on the blocks, fasten to the panel. Add the 4-inch side pieces then repeat for the next shelf working upward.

The shelves are made of ¼-inch oak plywood. The top of the front members are edged with solid oak. Cut ¼- × -¼-inch strips on the table saw and glue them carefully to the top edge of the shelf fronts. Here the double pointed nails are almost a necessity. You can make a simple clamping jig as shown in the photo. This is far better than trying to use clamps on such a thin piece. The same jig is used to edge the ¼-inch plywood of the turntable bases. Simply insert the glued-up stock against the backboard, then insert the wedges and tap them gently until the joint closes tightly. Do not wipe away any glue that squeezes out. Let it dry then scrape off and sand later.

When assembling the shelves, note that three have the fronts extending from the left and three from the right. This is

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Fig. 1-7. Sand cabinet with care. Close-up view of doublepointed nails. For ⅛-inch edging, let point protrude ⅛ inch.

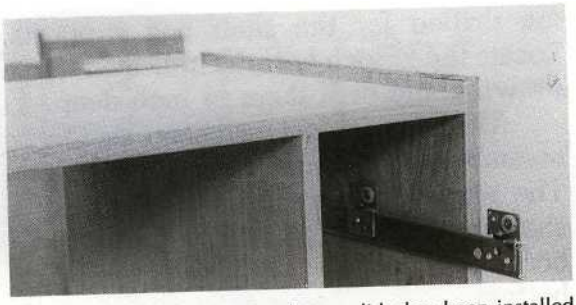


Fig. 1-8. Upper full-extension drawer slide has been installed into cassette compartment. Use slotted holes.



Fig. 1-9. The TV swivel is installed onto fixed shelf and platform is mounted into sides using access holes predrilled.

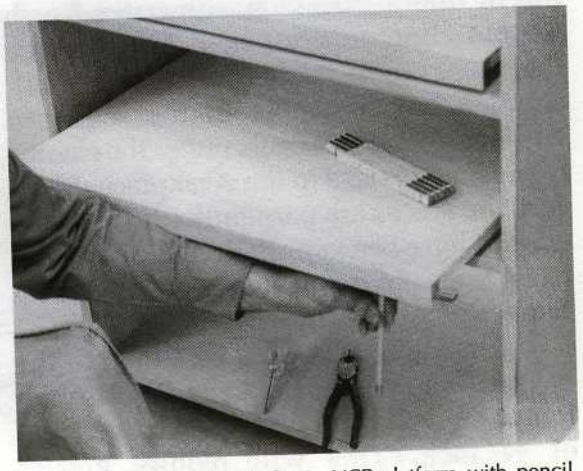


Fig. 1-10. Locating screw holes in VCR platform with pencil. Use awl to make screw pilot hole. Mount door spring hinge.

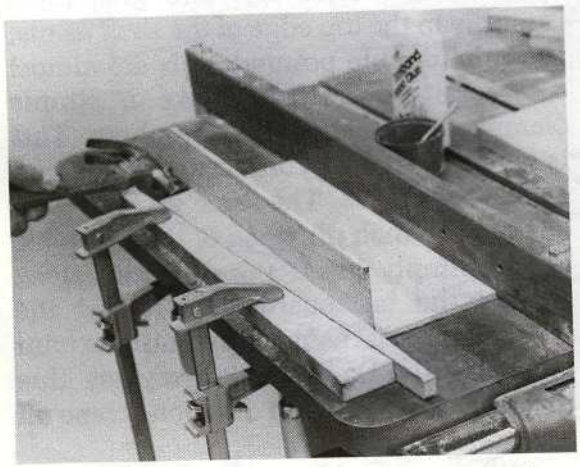


Fig. 1-11. Simple gluing jig for the ¼-inch shelves. Saw fence is used as a backstop. Tap wedge to tighten joint. Sand cabinet.

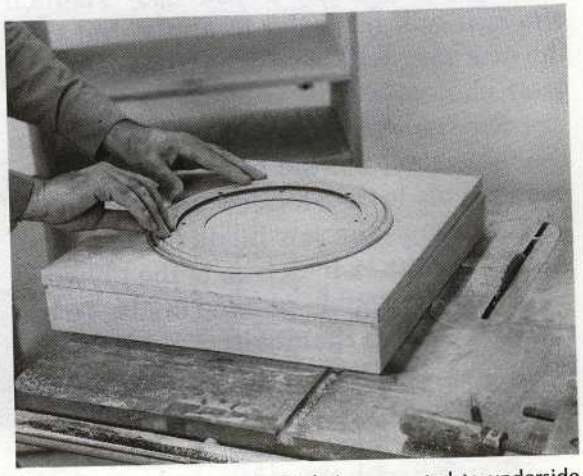
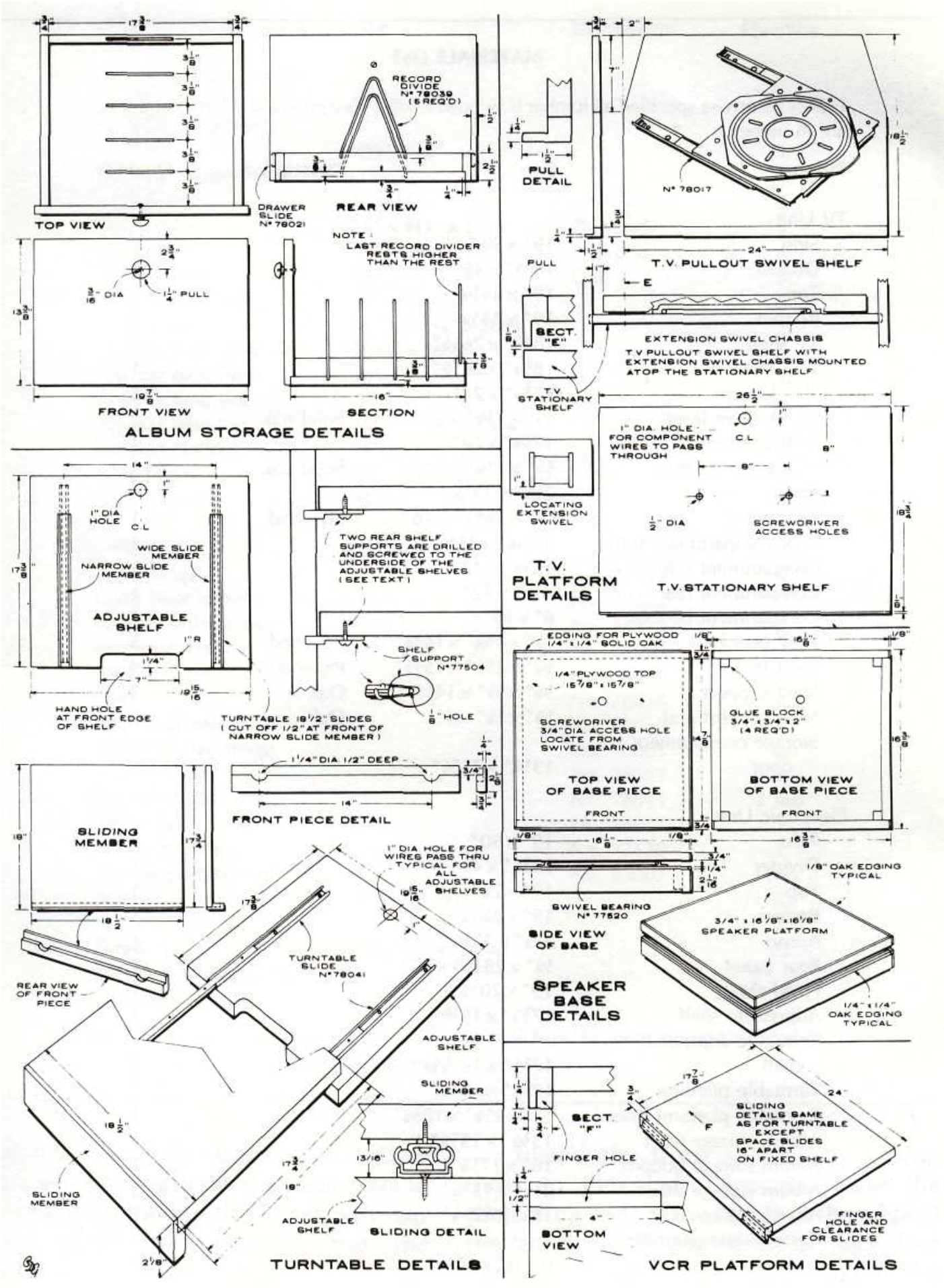


Fig. 1-12. Speaker base swivel is being mounted to underside of swivel top. Remove the swivel top before applying finish.

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MATERIALS LIST

Unless otherwise specified all lumber is ¾" oak lumber core plywood. All measurements are in inches.

Purpose	Size	Description	Quantity
TV Unit			
Side	19" × 50"		2
Divider	18¾" × 46"		1
Top	19" × 34¼"		1
Bottom	19" × 34¼"		1
TV shelf	18¾" × 26½"		1
VCR shelf	18¾" × 26½"		1
TV platform	17¾" × 24"		1
TV platform front	¾" × 1½" × 24"	Solid oak	1
VCR platform	17⅞" × 24"		1
VCR platform front	¾" × 1¼" × 24"	Solid oak	1
Apron	2½" × 33½"		1
Rear panel	¼" × 34⅜" × 46"	Plywood	1
VCR compartment front	6 13/16" × 45¼"		1
Compartment side	15⅝" × 42"		1
Compartment rear	4¾" × 42"		1
Compartment bottom	6" × 18"		1
Shelf bottom	¼" × 4¾" × 14⅝"	Plywood	3
Shelf front	¼" × 2⅝" × 15⅜"	Plywood	4
Shelf support	⅛" × ¾" × 14⅝"	Oak	3
Shelf support end	⅛" × ¾" × 4"	Oak	6
Storage compartment door	13¼" × 25⅞"		1
Electronic Unit			
Side	19" × 50"		2
Divider	18¾" × 46"		1
Top	19" × 28¼"		1
Bottom	19" × 28¼"		1
Apron	2½" × 33¾"		1
Rear panel	¼" × 28⅜" × 46"		1
Fixed shelf	19" × 20½"		1
Adjustable shelf	17¾" × 19 15/16"		2
Turntable adjustable shelf	17⅜" × 19 15/16"		1
Turntable platform	17¾" × 18½"		1
Turntable platform front	¾" × 2⅛" × 18½"	Oak	1
Album storage front	13⅜" × 19⅞"		1
Album storage bottom	16" × 17⅞"		1
Album storage side	2½" × 15¾"		2
Album storage rear	1¾" × 17⅜"		1
Cassette compartment front	6 13/16" × 45¼"		1

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Purpose	Size	Description	Quantity
Cassette compartment side	15⅝" × 42"		1
Cassette compartment rear	4¾" × 42"		1
Cassette compartment bottom	6" × 18"		1
Shelf bottom	¼" × 4¾" × 14⅝"	Plywood	3
Shelf front	¼" × 2⅝" × 15⅜"	Plywood	4
Shelf support	⅛" × ¾" × 14⅝"	Oak	3
Shelf support end	⅛" × ¾" × 4"		6
Glass door	¼" × 9 13/16" × 30¾"		2
Speaker base front	2 1/16" × 16⅛"		2
Speaker base front	2 1/16" × 16⅛"		2
Speaker base side	2 1/16" × 14⅞"		4
Speaker base top	¼" × 15⅞" × 15⅞"		2
Speaker platform	16⅛" × 16⅛"		2
Glue block	¾" × ¾" × 2"		8
Solid oak trim	¾" × 12" × 8'		1
Miscellaneous			
Glass hinge		No. 77515	4
Glass door handle		No. 77512	2
Clip-on strike plate		No. 77511	2
Magnetic catch		No. 75004	1
Shelf support		No. 78040	6
Pull		No. 78038	4
Record divider		No. 78039	5
Spring loaded hinge		No. 78005	2
Drawer slide		No. 78021	3 sets
Turntable slide		No. 78041	2 sets
TV swivel		No. 78017	1
Swivel bearing		No. 77520	2
Double pointed nail		No. 83007	100
Screw	1½"—8 FH		10
Screw	2"—10 RH		6
Screw (for glass hinges & rear panels)	½"—6 Pan head		62

Note: The miscellaneous hardware items are available from Armor Products. The numbers shown are from the Armor catalog.

because the cassette drawers are mirror opposites. Apply glue to the front edge of the shelves and along the lower part rear of the shelf front. Again, use the double pointed brads and clamp in the jig.

Install the three shelves by gluing them to the shelf supports. Glue the projecting ends of the fronts to the edge of the rear panel. The lower front piece does not have a shelf. It rests on the floor of the

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drawer. Just use a glue block at the corner opposite the projecting part, and lay a bead of glue along the bottom edge.

The album drawer had a full-size front panel but the sides and rear are only 2½ inches high. This allows easy access to the albums: Cut ¼- × -¾-inch rabbets at the bottom of the front and side panels, then drill the 3/16-inch holes for the record dividers. The one set of holes made in the rear panel will make that divider stand higher than the rest. This will have no effect on the storage of the records. If you like, you can drill these holes deeper so the last divider will be even with the rest.

The adjustable shelves are made as shown. The two lower ones for the audio cabinet are identical. Cut them to size then add the ⅛-inch oak trim to the fronts. The notch at the front of the turntable shelf serves as a hand hole. Add ⅛-inch trim at the front edge then round off the corners with the router.

All three shelves should be drilled at the rear with a 1-inch hole. This will allow access for the component cables. The turntable shelf has a 2⅛-inch-deep front to conceal the shelf and slide hardware. Note that two mortises are required at the rear edge of the front piece, allowing clearance for the slide hardware.

The TV platform rests on the pull-out swivel which in turn rests on the fixed shelf. The platform has a 1½-inch oak front which is rabbeted along its length. The rear of the shelf is clipped diagonally to allow clearance for the shelf to turn either in its retracted or extended position. A suitable hole (1 inch diameter) should be drilled into the rear of the fixed TV shelf. This will allow cables to pass through from the VCR. Two screwdriver holes are also drilled into the fixed shelf as shown. These are needed to install the sliding track.

The VCR platform also pulls out to allow easy access to the top of the VCR. The platform has a ¾- × -1¼-inch oak front with finger grips at each end. These notches also serve as clearance for the movable part of the sliding hardware.

This door is a plain rectangle with the edges exposed. (If you used veneer core plywood, the edges should be trimmed with ⅛-inch oak edging.) Instead of opening sideways, this door drops down. The spring-loaded hinges serve as dropleaf supports and the springs allow it to self-close when it is raised. They eliminate the need for catches. All that is required is a stop block under the VCR shelf. The nice part about using these hinges is that they allow the door to set in ⅛ inch.

The glass doors are installed with the special hinges which eliminate the need to drill the glass.

The speaker bases consist of the base part and the movable top which turns on 12-inch swivels. Make the base sides and ends of plywood and use oak edging for the exposed end pieces. The top is covered with ¼-inch oak plywood with edges trimmed in ¼- × -¼-inch oak. Use the gluing jig to fasten the trim. The tops are made of ¾-inch plywood edged with ⅛-inch oak.

The rear panels are made to fit into the rabbeted parts of the cabinet. Drill the necessary holes for cords and cables then install with screws.

The adjustable shelf support pegs are drilled to take screws. The screws are installed after the shelves are in place. They prevent the shelves from moving toward the glass, but more important, they prevent

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the turntable platform from tilting when it is extended.

The turntable's movable slide members must be shortened about ¾ inch. Use a hack saw and cut off the front ends. If you cut away one of the screw mounting holes, redrill about 1 inch from the end. Install the slides with wood screws. The TV turntable is mounted with its fixed track 1 inch from the front of the shelf. The access holes are used to fasten the movable track to the underside of the platform.

The storage compartment is mounted with spring-loaded hinges. Support the free end of the door on blocks and butt the bottom edge against the front edge of the cabinet. Center the door from side to side, then position the hinges and mark the hole locations. Use screws only in the slotted holes then try the door. If okay, install the rest of the screws.

The left cassette drawer uses two lefthanded tracks and slides. The right hand door uses the right hand set. The lower set should be installed ⅛ inch above the bottom panel. The fixed track should be placed as far back as possible so the drawer fronts set in ⅛ inch when closed. The album drawer hardware is installed like the cassette drawers, ⅛ inch from the bottom panel.

Install the glass doors with the special hinges. Set the hinges ⅛ inch in from the cabinet frame then mount one in each corner. Insert the pressure plates onto the glass. These have adhesive on one surface. Peel off the protective backing then apply to the glass at the inside corners. The set screws of the hinges are made to bear against these plates. Adjust the glass so that it is properly centered. Install the strike plates at the top of the doors, then install the magnetic catch so that it contacts the back of the strike plates.

The cabinet may be finished by applying a paste wood filler with the desired color (stain) such as a light oak, medium oak or dark oak (Golden Oak). Apply the filler as per the manufacturers instructions then apply suitable sealer and topcoats of lacquer.

Another method of finishing is to use a Danish oil finish. We chose Deftco Danish Oil Finish. Simply brush it on, let stand for 30 minutes, then wipe with clean cloths. The resulting finish is deep, mellow, and long lasting.

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Banjo Wall Clock



THIS BANJO CLOCK doesn't play musi but the sound of its battery-operate movement is pleasing, and it will keep yo well informed of the time. Made of pine the case is not difficult to build. Th moldings are standard and available a lumber yards. The turned finial, decorativ eagle, and clock works can also b purchased.

Using a saber saw or jigsaw, cut th outline of the clock, including th rectangular cutout for the movement. Next shape the edge with a router. If you do no have a router, you can round the edge with sandpaper. A beading cutter was used on the clock shown, but you may prefer an other shape. Note that the shaping i interrupted at several points, (see drawing) Add the molding, attaching it with brads and glue.

At the top, allow the ends to protrude then trim off with a coping saw after the glue has dried. The molding at the neck i mitered. Cut the front piece first, then fi the side sections to it.

To mount the finial, drill a ⅜-inch hole ¾ inch deep into the bottom. Then insert a 1½-inch length of dowel. Drill a corresponding hole into the ¼-inch platform and the top of the case. Also dril a clearance hole at the rear of the case for the hanger.

The eagle was shiny bright when purchased, but it was "antiqued" by spraying it with black paint. Before the

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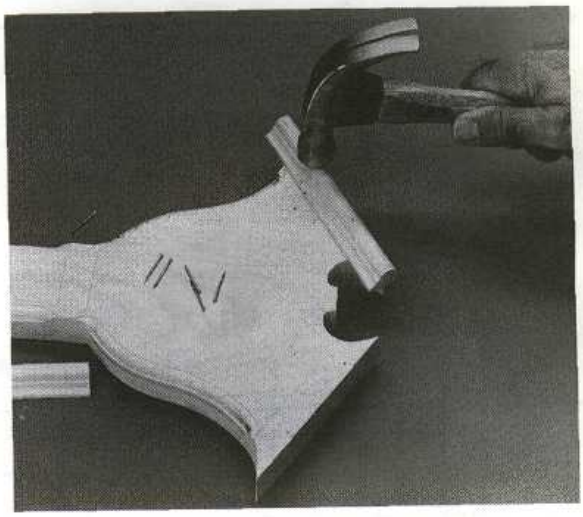


Fig. 2-1. Having cut the case and shaped the edges with a router, attach the molding pieces.

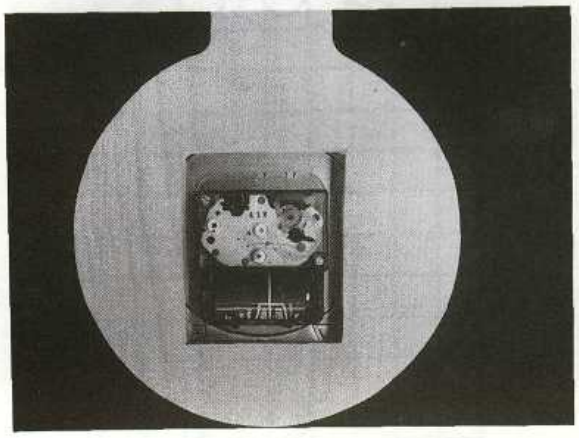


Fig. 2-2. Cut an opening in case to accommodate the clock's battery operated mechanism.

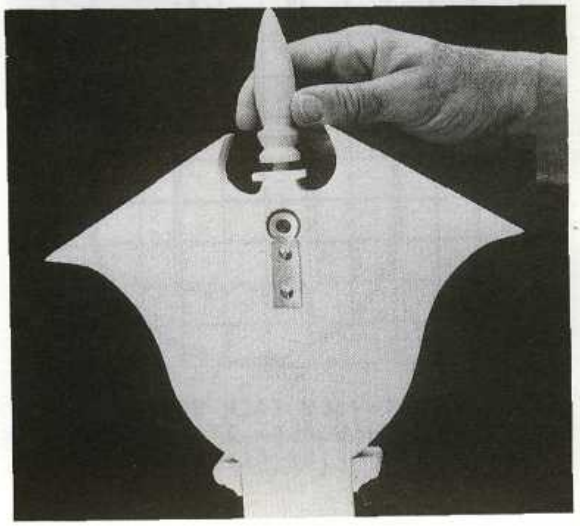
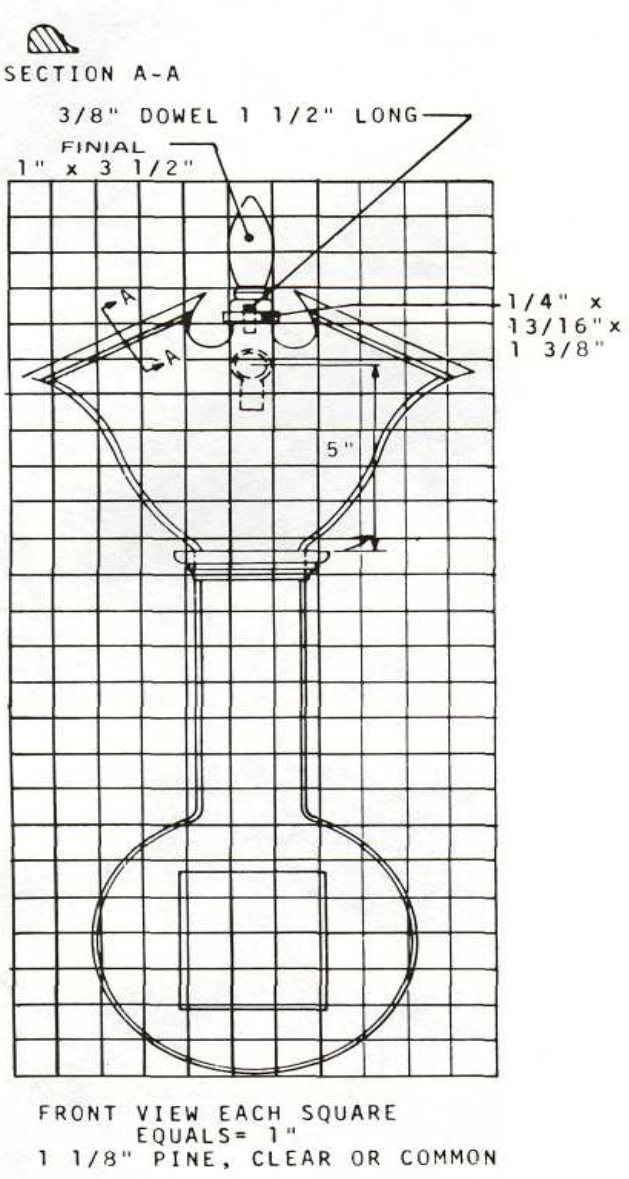
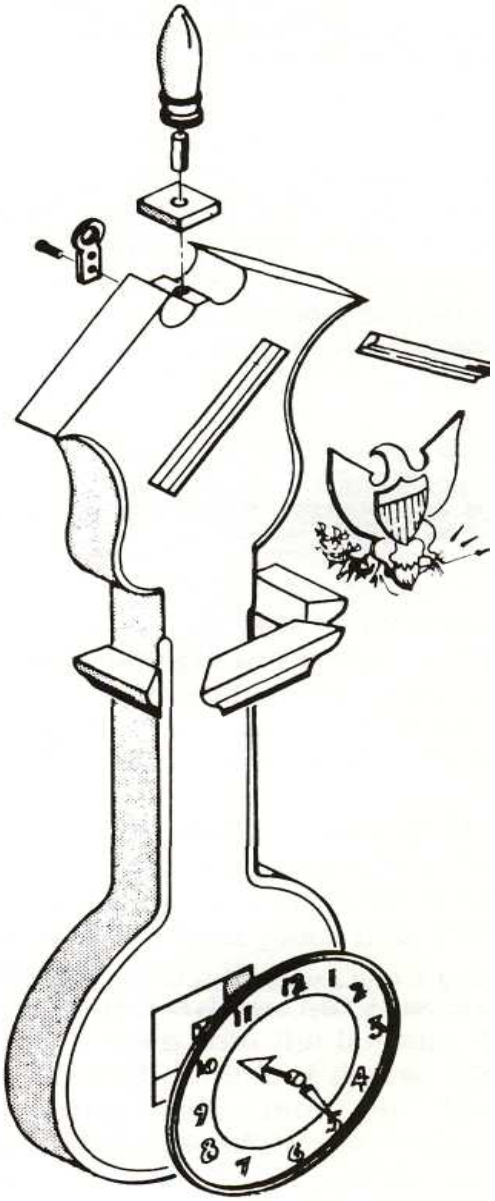


Fig. 2-3. Drill a ⅜-inch hole ¾ inch deep into both finial and case. Attach finial with 1½-inch dowel.

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MATERIALS LIST

Purpose	Size	Description	Quantity
Basic unit	1⅛" × 11" × 23"	Pine	1
Finial platform	¼" × 1" × 1½"	Pine	1
Trim	¾" × 2'	Nose and cove molding	1

Note: You will also need, finial, eagle, dial, clock movement, hardware, etc.

paint has a chance to dry, wipe the surface with a cloth. This will create highlights while the depressions remain dark. To mount the eagle, pierce two tiny holes with a brad, then install with escutcheons. The dial is also mounted with escutcheons.

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Bedside Table



WHY MUST A bedside table be boring? They always look alike. Simple and square, often useful, but never interesting.

This table, however, would be an unusual addition to any bedroom. It's made with a handsome curve that's painted a bright color, and includes plenty of tabletop space for phone or bedside lamp. There's also a convenient drawer and even a bin ideally suited for tucking away your telephone directory where it can be found when needed. Drawer and fronts are naturally finished wood, a nice accent to the rest of this colorful table.

It's all made from ¾-inch birch plywood (except for the drawer bottom and slides). See the adjacent Materials List.

To begin construction, cut out the top, bottom, sides, and back as shown. Take the sides, and lay out the cutout. This can be cut with a hole saw for the curves and a table saw for the straight cuts. Or use a saber saw or band saw for everything. Now, assemble the top, bottom, back, and sides with glue and No. 4 finish nails.

The drawer and front are made next, so they fit exactly to the dimensions of the main body of the table. Cut out the drawer pieces as shown in the drawing. Assemble the drawer with No. 4 finish nails through the sides into the front and back of the drawer and glue.

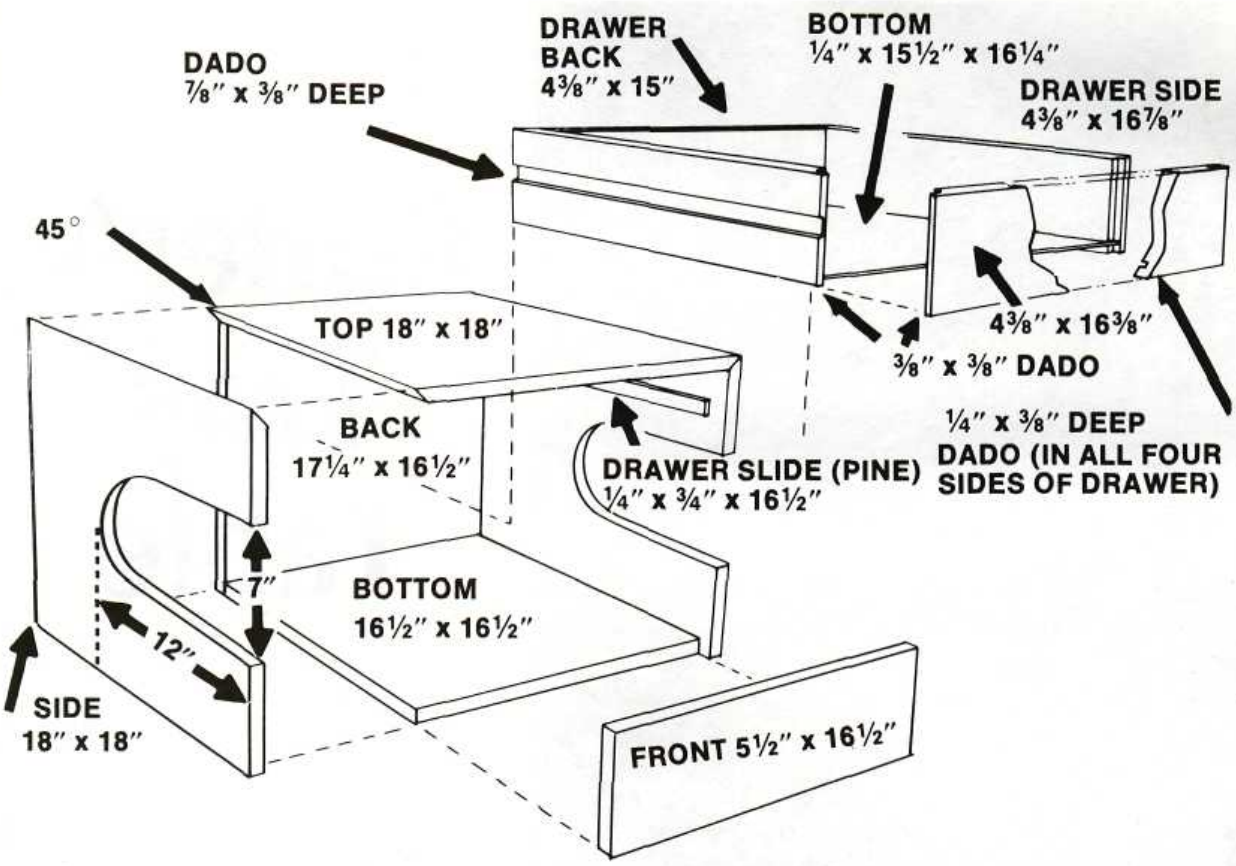
Cut the drawer slides out of a piece of scrap pine and attach them to the inside of the table with glue and No. 17 brads. Use the drawer that you have made to determine the exact position of the slides.

Next, attach the front with glue and No. 4 finish nails through the sides.

To finish the table, start by covering all exposed plywood edges with veneer tape. Set all nails and apply wood putty. Sand unit with No. 80, then with No. 120 sandpaper until smooth enough for finishing.

The drawer and front were finished with a fine natural stain made from 60 percent boiled linseed oil and 40 percent turpentine. The main body of the table was finished with four coats of high gloss latex enamel. Each coat was brushed on and sanded with No. 220 paper between coats.

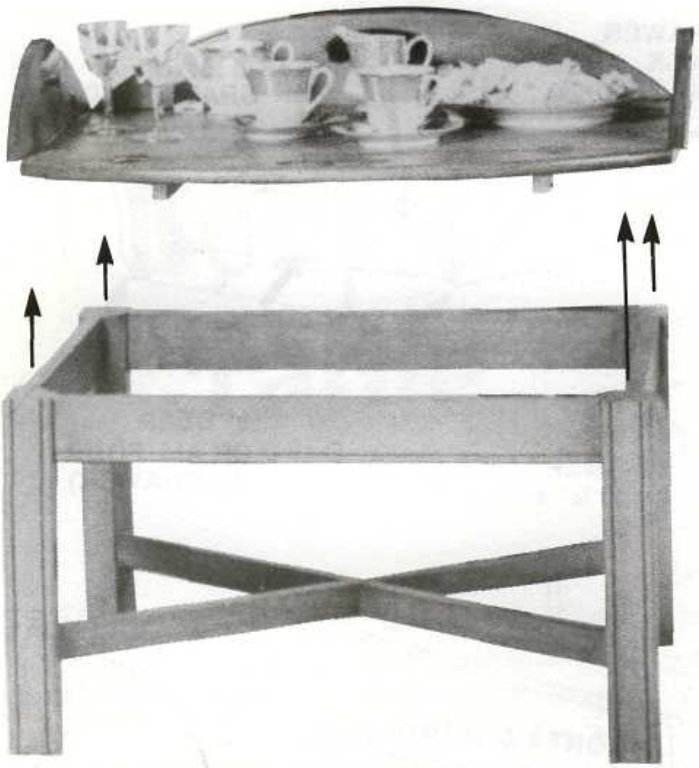
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MATERIALS LIST

Size	Description	Quantity
¾" × 18" × 18"	Birch plywood	3
¾" × 17¼" × 16½"	Birch plywood	1
¾" × 16½" × 16½"	Birch plywood	1
¾" × 5½" × 16½"	Birch plywood	1
¾" × 4⅜" × 16⅜"	Birch plywood	1
¾" × 4⅜" × 15"	Birch plywood	1
¾" × 4⅜" × 16⅞"	Birch plywood	2
¼" × 15½" × 16¼"	Masonite	1
¼" × ¾" × 16½"	Pine board	2
1½"	No. 4 finish nails	
¾"	No. 17 finish nails	
	Veneer tape	
	Contact cement	15′
	White glue	

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Butler's Tray Table

HERE'S A NEAT woodworking project that you'll be proud of—a butler's tray table. As the name implies, it serves two purposes—a sturdy table and a handsome serving tray. Special butler tray hinges have no projections and are spring loaded so they will hold in any position. A clever self-centering arrangement on the underside of the tray holds it in place on the base so it cannot accidentally slide off. The unit shown was made of lumber-core birch, but other woods may be substituted. For a colonial look, pine may be used.

Start with the base. Cut the squares for the legs to size, then clip the diagonal on the table saw. Be sure to place the fence so the waste will fall away from the blade, otherwise a kickback may result.

The legs are now ready to be grooved. This can be done either on the shaper, if you have one, or with the router. If the router is used, it would be best to mount it inverted on a table, as shown. This converts it to a mini-shaper and mak much easier to use. Insert a V cutter in router collet and set the proper dept cut. The cut should be ⅛ inch deep makeshift fence consisting of a small p of wood and a couple of clamps will Set the fence so the cut is ⅜ inch in f the edge of the work. Run the v through, then change cutters and roun the three corners shown. If your cutter a pilot, you will not require the fenc

Rails for the table are cut to size drilled to take two ⅜-inch dowels. Dc transfer points are used to locate the hc Prop up the work as shown for pr alignment. Center punch the prick m left by the points, then proceed to drill holes for the dowels. The depth of the h should be 1 1/16 inch. Insert dowels glue and assemble the base.

The top board is prepared next. If table saw fence will not extend far eno try this: clamp a strip of wood to

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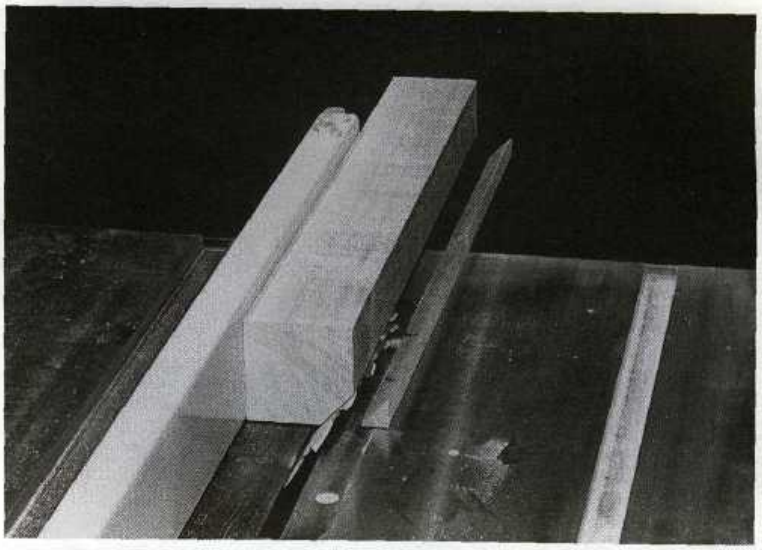


Fig. 4-1. When ripping the diagonal for the legs, it is best to set the fence on the proper side to give you the maximum safety.

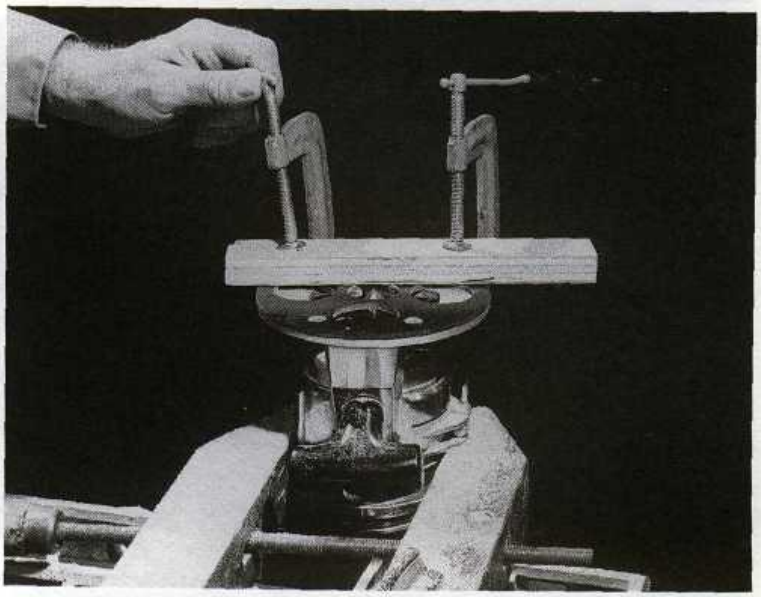


Fig. 4-2. The router is being used to groove the legs. The inverted position shown makes it easier working small pieces.

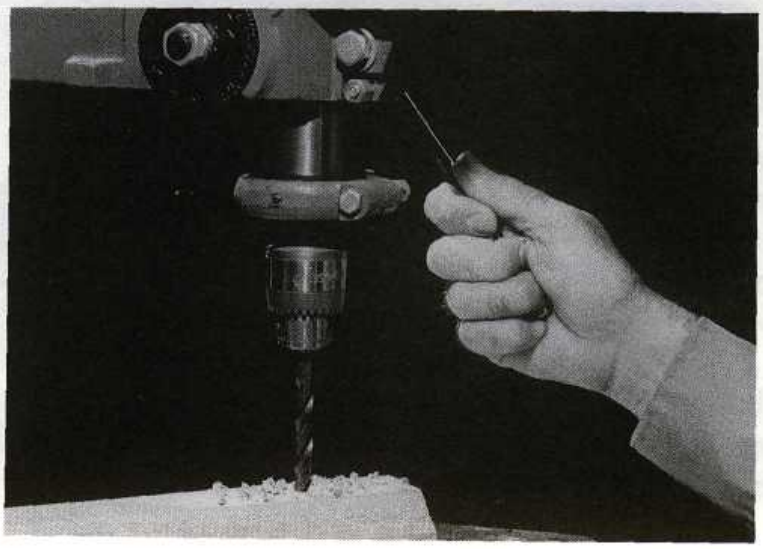


Fig. 4-3. Accuracy makes the drill press ideal for holes. If you use a portable drill, be sure it's straight and square.

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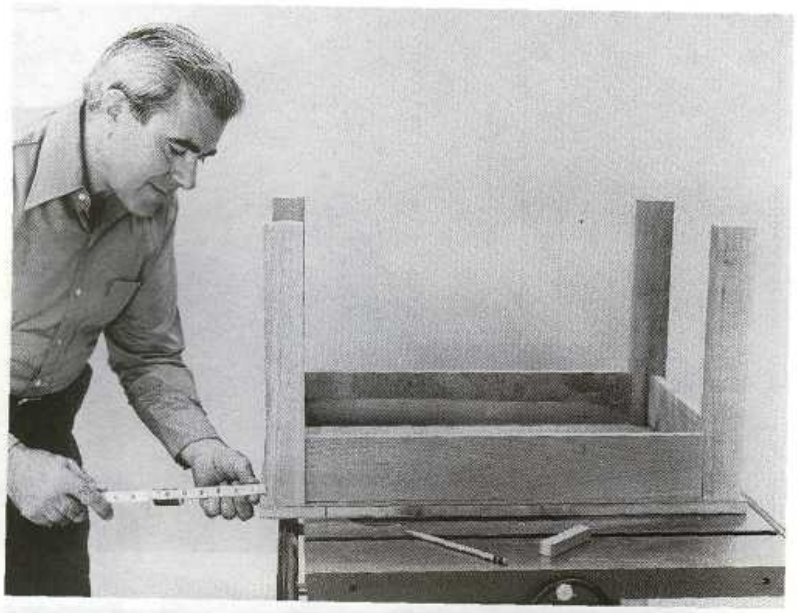


Fig. 4-4. Place base on top, center carefully. Mark off the inside edges of the rail, then slowly cut along the guides.

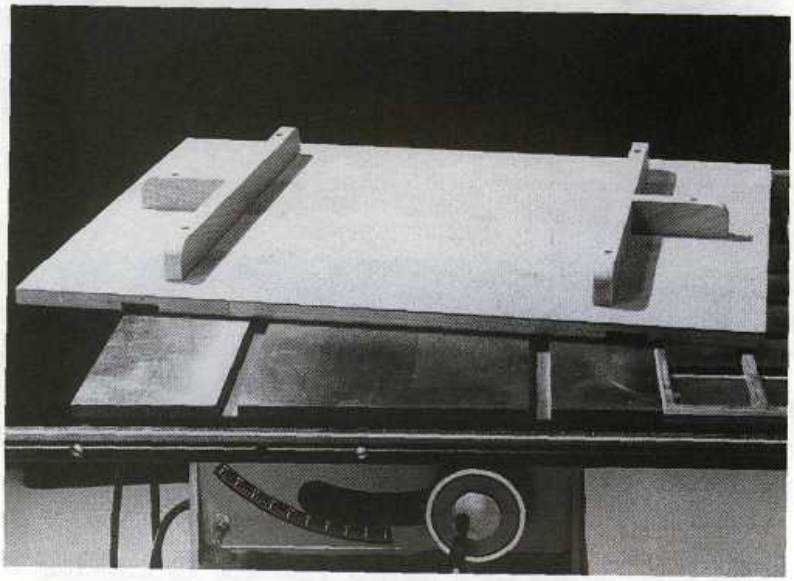


Fig. 4-5. The aligning jig on the underside of the top is made with rounded corners to make the tray "fall" into its place.

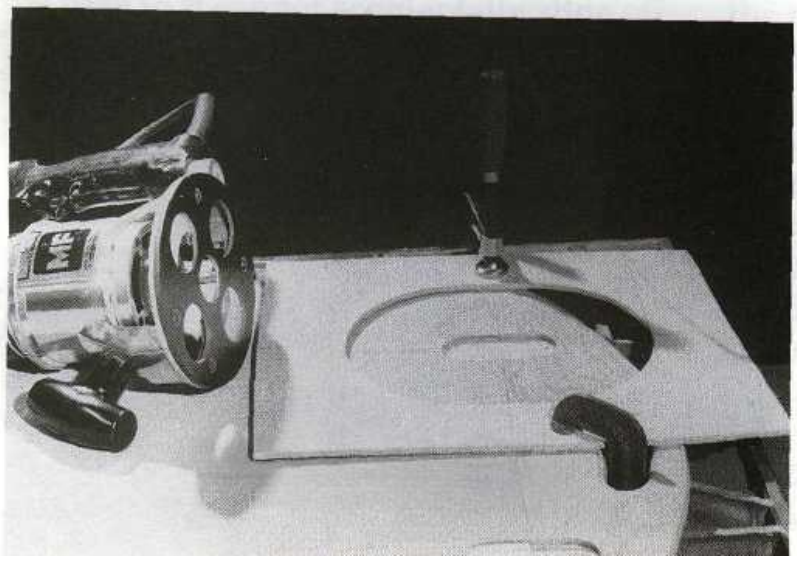


Fig. 4-6. Shown here is the easy way to mortise hinges. The plywood jig will give perfect results every time. Note center lines.

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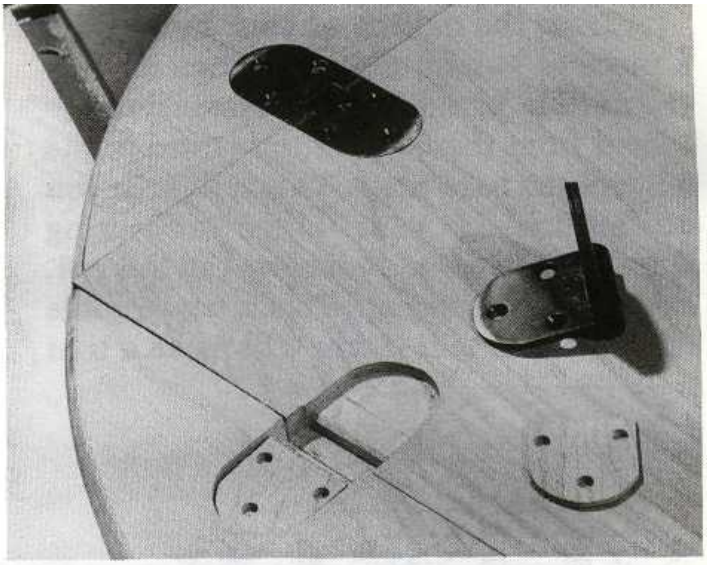


Fig. 4-7. One hinge is already mounted and the other is ready to be. Remember other types of wood, as pine, may be used.

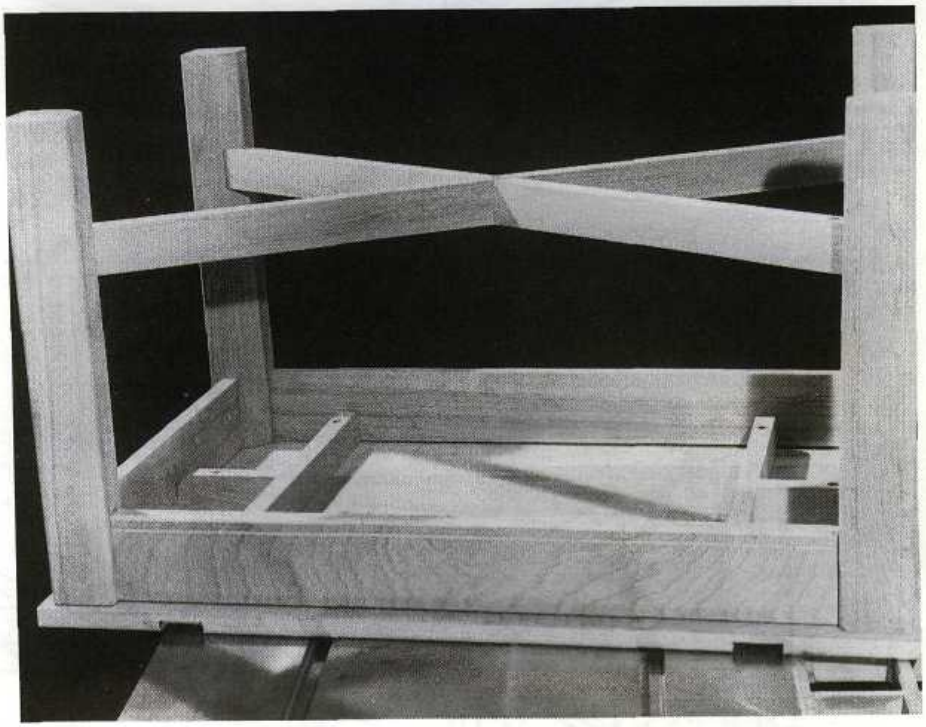


Fig. 4-8. One advantage of lumber-core plywood is that edges can be sanded easily. Here the table base is ready for finishing.

underside of the work, then use the edge of the table as a guide. Place the assembled base on the tabletop and carefully center it. Next mark off the jig which consists of four cleats, two long and two short. They are cut so they will be a trifle smaller than the inner dimension of the rails. Align and then install.

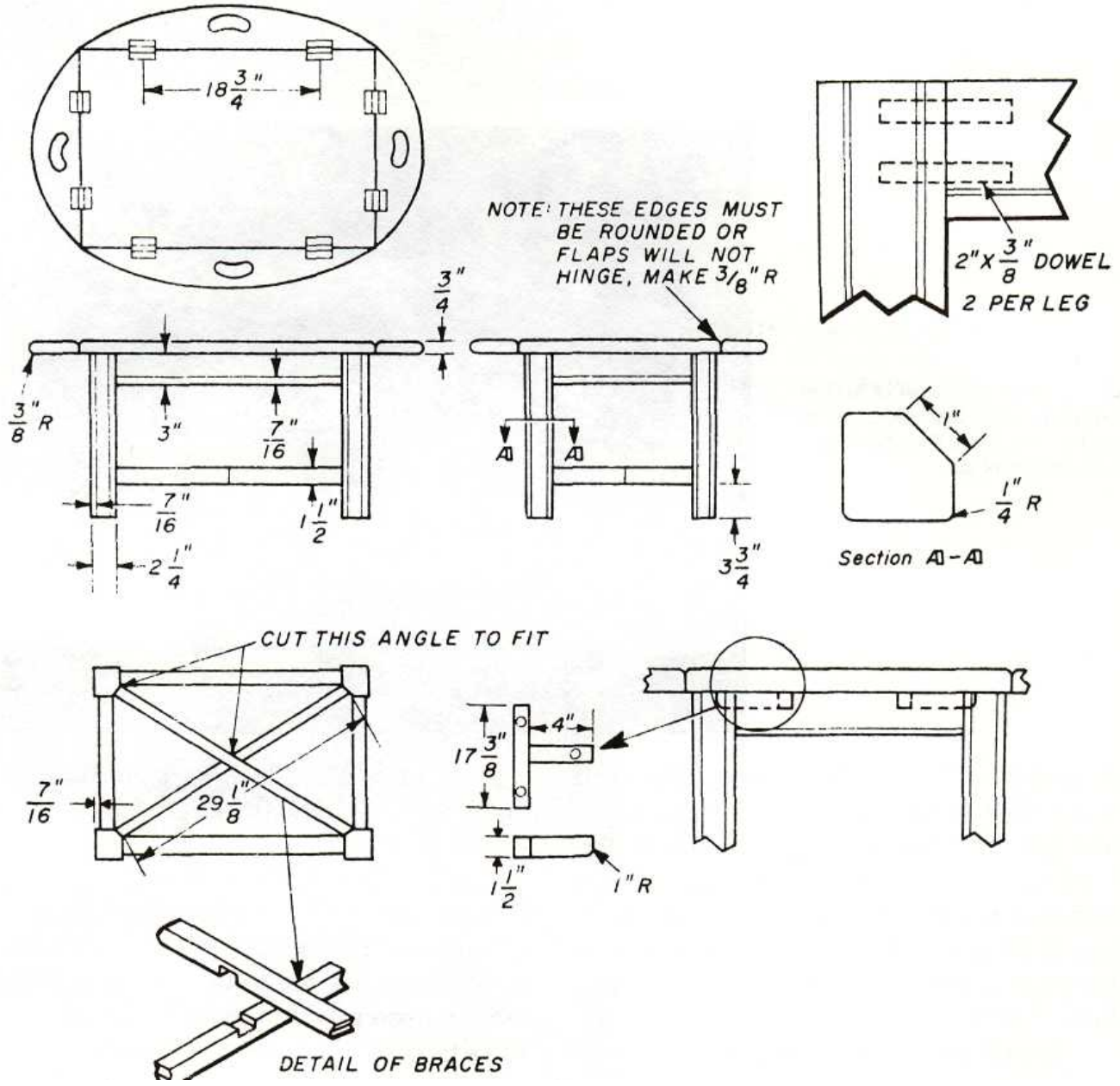
The curved sides are made next. These can be cut either on the band saw or with a saber saw. After cutting, sand the edges smooth then shape the edge still using the router as a shaper.

Next, mortise the hinges. Some butler hinges have half-round ends while others are square. Regardless of the hinge used, a mortising jig made of ¼-inch plywood can be used advantageously. Simply note the distance from the outside of the cutter to the outside of the router base plate.

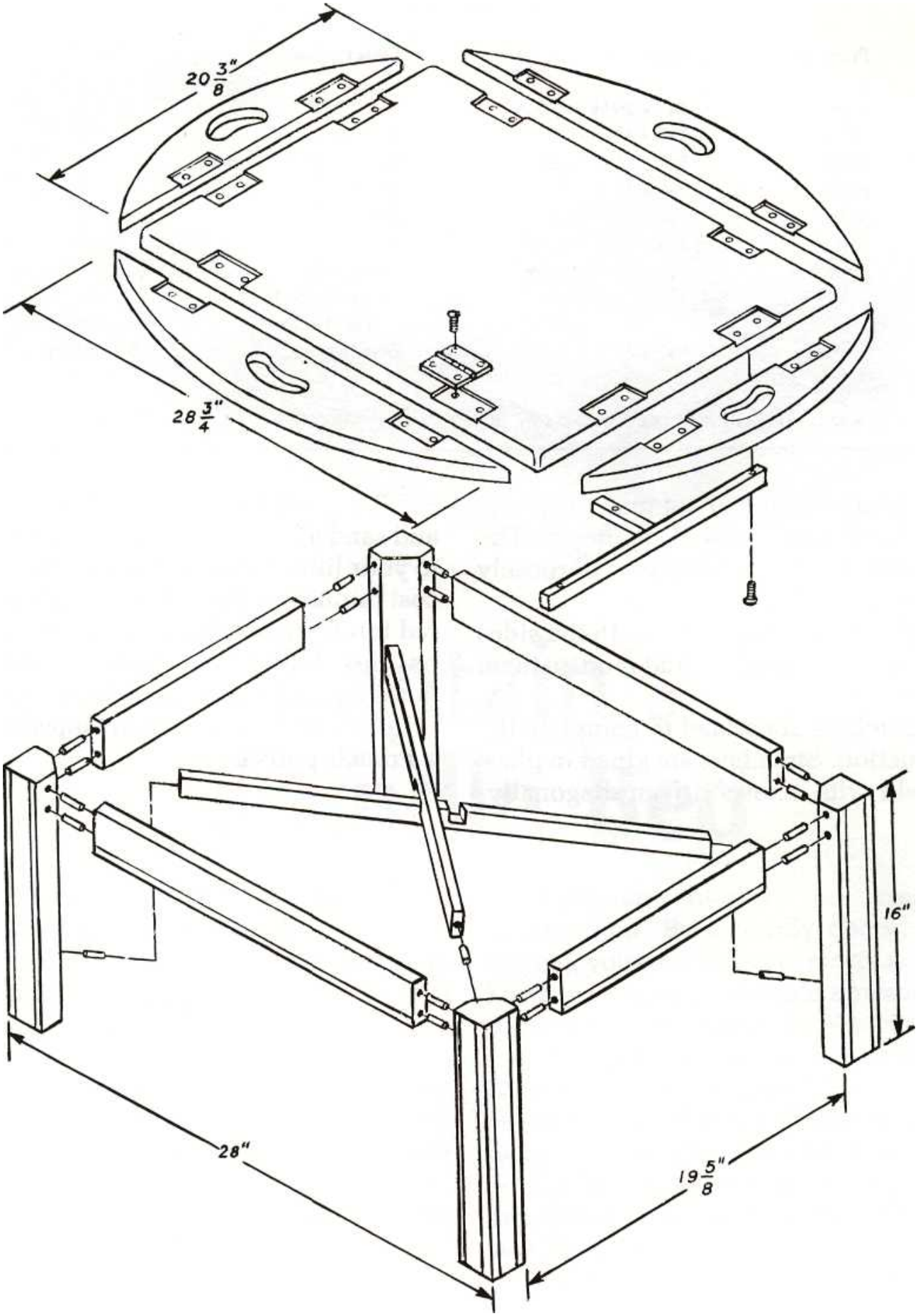
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Trace the outline of your hinge onto a piece of ¼-inch plywood, then enlarge the outline by adding the dimension obtained from the edge of the cutter to the edge of the base plate. This will give you an outline of your hinge measuring something like 8 × 14 inches. Cut this out, saving the outside part. This is now a guide for the router and if you will make a trial cut on scrap wood, you should find that the hinge will fit perfectly into the mortise.

The butler hinge is unique in that the leaves are not the same thickness. This means that the mortise will have to be made to the deepest part of the hinge. Shims are made to be placed under the thinner part, as shown. Some butler hinges have the same thickness leaves, so it is



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MATERIALS LIST

Purpose	Size	Description	Quantity
Top	¾" × 20⅜" × 28⅞"	Red birch	1
Flaps	¾" × 4¾" × 28¾"	Red birch	2
Flaps	¾" × 4¾" × 20⅜"	Red birch	2
Rails	¾" × 3" × 23½"	Red birch	2
Rails	¾" × 3" × 17⅛"	Red birch	2
Legs	2¼" × 2¼" × 16"	Red birch	4
Stretcher	¾" × 1½" × 29⅛"	Red birch	2
	1½"	No. 8 Round-head screws	as needed
	⅜" × 2"	Dowels	as needed

Note: You will also need butler tray hinges and finishing materials.

recommended that you not mortise for the hinge until you have it in hand. The dimension for the mortise was purposely left out of the drawing.

When mortising, place both the sides and table top in position and mortise them together.

Stretchers are added to complete the construction. Stretchers are glued in place and held with screws driven diagonally.

To finish the table, remove the hinges and sand all parts thoroughly. Then finish to your liking. Antique red (with the base coat thinned so the rich grain pattern of the red birch would show through) was used on this tray table. Many finishes are possible, and if antiquing is not your cup of tea, try a wood-tone stain topped off with a French polish.

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Captain's Trundle Bed

THIS CAPTAIN'S TRUNDLE BED has a lower drawer that rolls out to be used as an extra bed or as a bin for clothes, bedding, toys, or whatever. It is designed so that both upper and lower sections take a 39- × -75-inch mattress (standard twin size). The drawer is mounted on casters and rolls out easily from either side. Prefinished paneling, in the head- and footboards as well as the roll-out bin, simplifies construction and adds to the appearance of this fine furniture. Finish of the solid lumber can be made to match or contrast with the paneling.

Common lumber is used for construction. By carefully choosing and cutting, you can eliminate most knots. The knots are not objectionable however, and some folks prefer them, so take your pick.

Rip the legs from a length of 8/4 (2-inch) - × - 12-inch pine. The actual size of the board is 1 13/16 × 11¼ inches. Cut four pieces, each 2 1/16 inches wide. After cutting, use a plane or jointer if you have one and smooth the rough edges left by the saw blade.

Next rip the two side pieces from 5/4- × -10-inch stock (actual size 1 3/16 × 9¼

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inches), and trim the ends to make them 7⅜ inches long. Cut the cross members from the same material. Make two pieces each 6 × 39 inches and from the remaining strip, make two pieces each 3 × 39 inches.

Make a pattern for the scroll at the top of the crosspieces. Draw the necessary squares and plot the shape onto the pattern, using wrapping paper or thin cardboard. Cut the curved portion of the pattern, then trace onto the crosspieces. Cut the shape with a saber saw fitted with a 10-tooth contour blade—this should leave a fairly smooth cut.

The side rails are made next. The offset step can be cut in several ways. You can rip most of the long section, then use a saber saw to finish at the offset. You can also use a band saw, or (although slower), you can cut the entire length with a saber saw. In either case, you will have to smooth out the edge. The best way to do this is to use

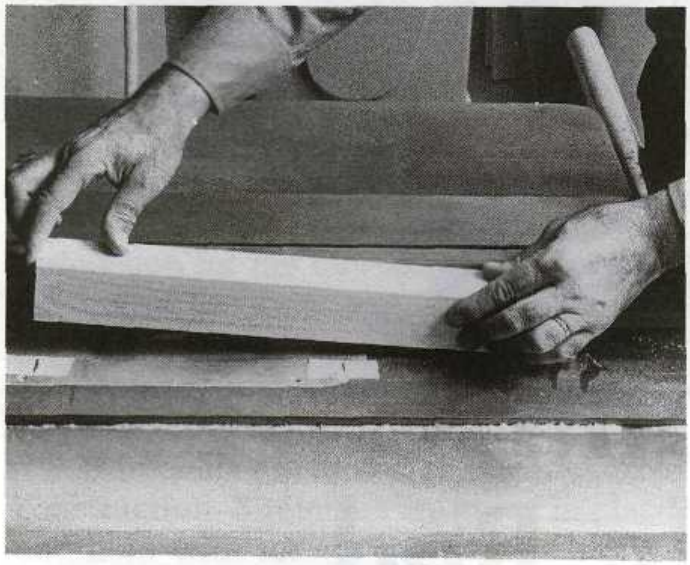


Fig. 5-1. Cut the slots for the paneling on a table saw. Notice the tape marks which indicate the start and stop points of blind slots.

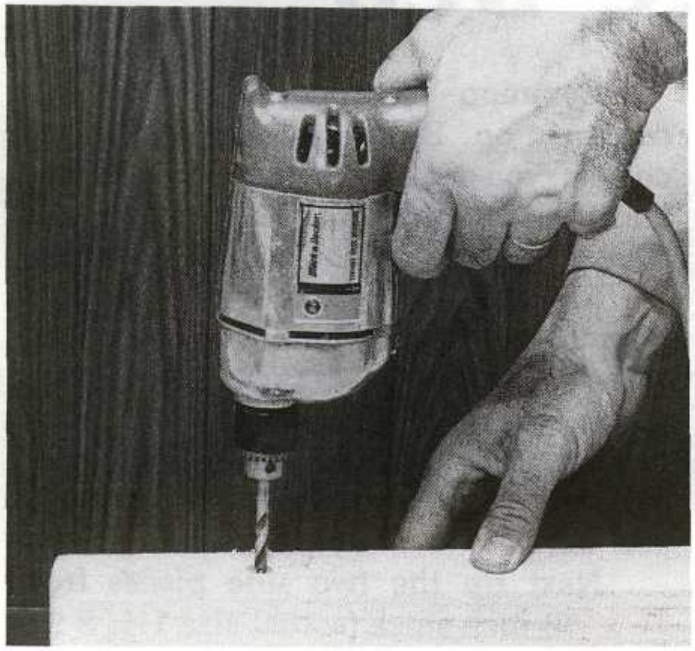


Fig. 5-2. The pilot holes for the screws in the bed posts are drilled as pictured above. The countersunk holes should be drilled first.

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the router and template. The template is made only for the offset. A straight edge is then used for the long, straight part. The router is fitted with a flush cutter at least 1¼ inches long. Make the template from a piece of ⅛-inch hardboard. See detailed drawing.

Tack the template in place so that the cutter just bites into the rough saw-cut edge of the board. Nail the template to the inner surface of the side so the holes won't show.

Of course you can finish the edge by using a plane on the straight part and sandpapering the offset. Round the two

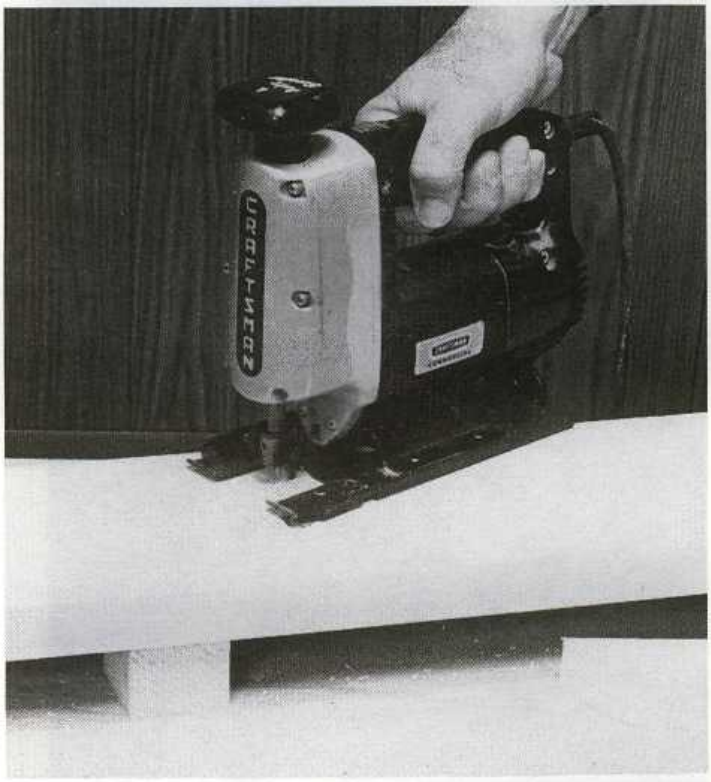


Fig. 5-3. Use a saber saw to cut the shaped edges of both the head and the foot boards. For the best results, use a smooth cutting blade.

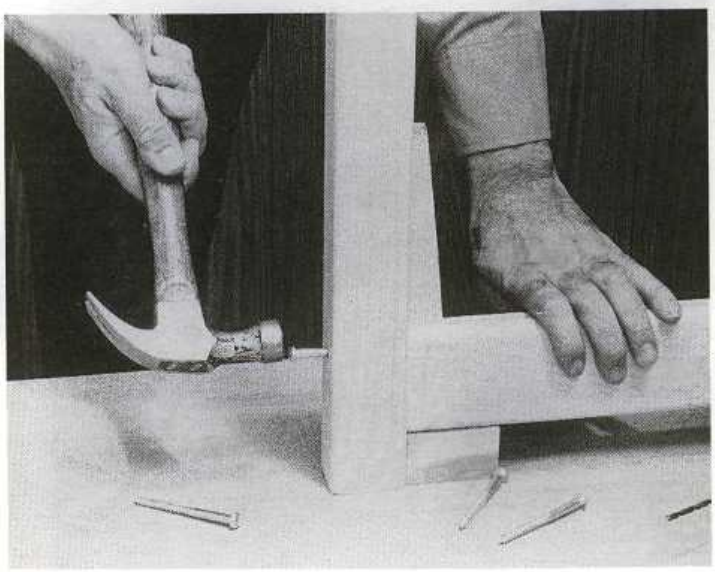


Fig. 5-4. Place a piece of scrap paneling in corners to align posts and cross members. Put scrap wood under crosspiece to position it.

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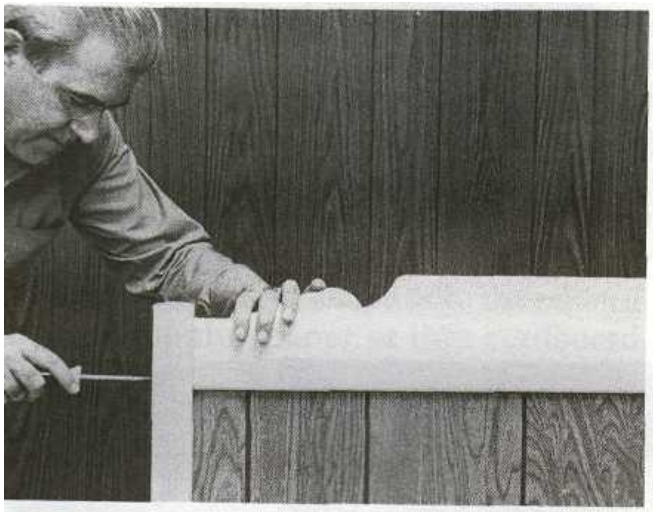


Fig. 5-5. Assemble the head and foot board sections with glue and screws. Countersunk screw heads will be concealed by wood buttons.

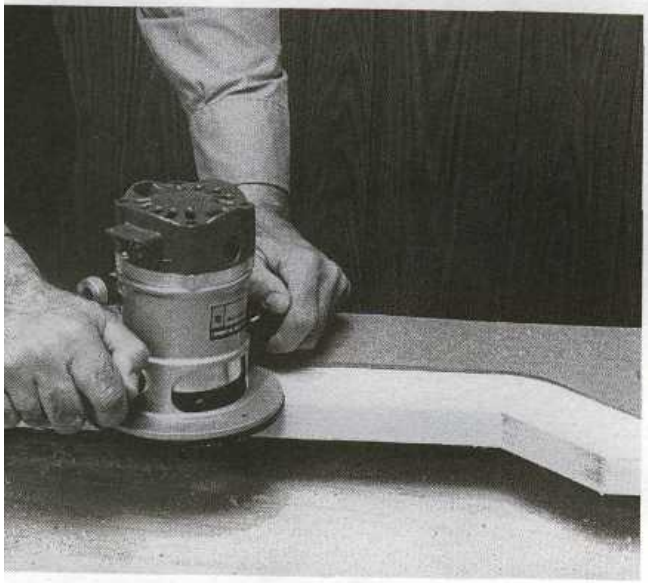


Fig. 5-6. Having cut side pieces with a saber saw, you can clean edges using a router and template, or else plane and sandpaper.

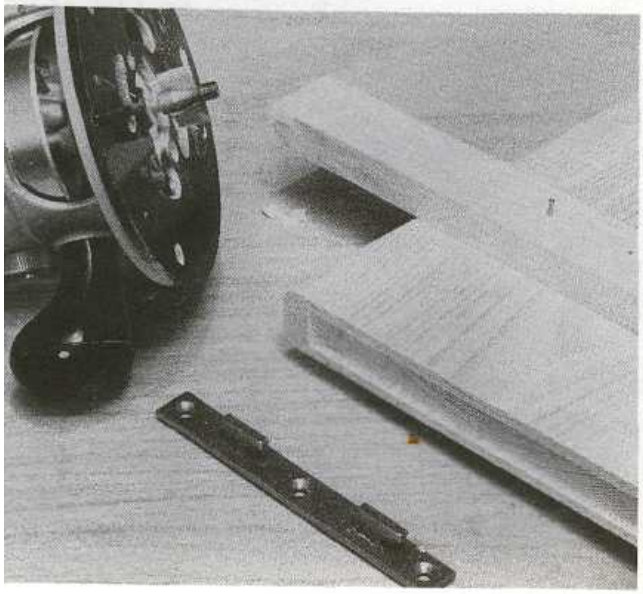


Fig. 5-7. The ends of the side pieces are dadoes to receive the bed hooks. Use a side cutter about ⅜ or ½ inch deep and use a guide.

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upper edges and outer edge of the lower part of the sides. The cross members are rounded on all four edges.

Cut a groove for the end panels in each of the crosspieces. Note that the groove is centered. Use either a dado blade or make several passes with a regular blade on your table saw. The upper pieces are cut on the lower edge. The top edge is cut in the lower pieces.

Before making the cut in the workpiece, check the width of the cut on a scrap piece. The panel should fit snugly. Make the groove 11/32 inch deep.

Reset the fence for the posts, placing the grooves in the center. Note that blind grooves are made. Place masking tape on the saw table and draw starting and stopping lines as shown. Make test cuts on scrap lumber first. Hold the work slightly above the revolving blade with the end of the piece aligned with the pencil mark. Carefully lower the work into the blade and advance until the rear end of the post reaches the mark on the second piece of tape. Grooves (dadoes) should start and stop 3 inches before ends of posts. See detail.

Locate the screw holes in each of the posts. Note that the spacing is different at the tops and bottoms. Drill the ½-inch counterbore hole first. Make it ⅜ inch deep,

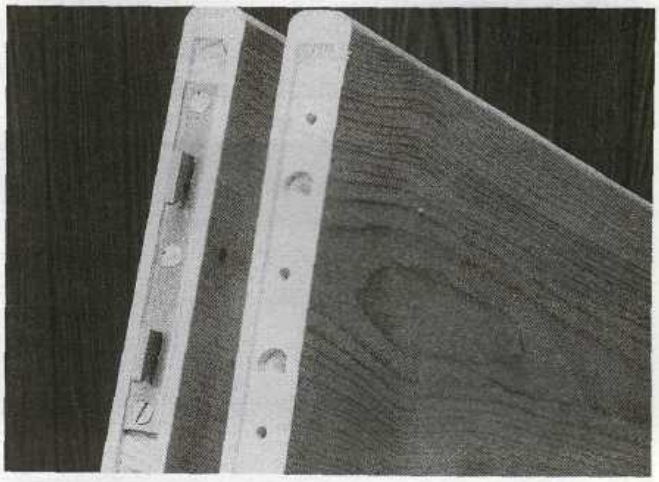


Fig. 5-8. Here we see the side piece ends, one with hooks, the other without. The larger holes are drilled clearance for rear projections.

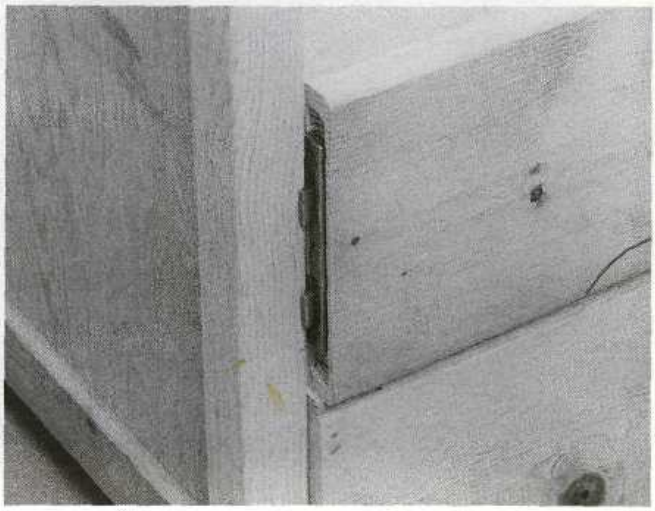


Fig. 5-9. To locate the mating parts of the hook hardware, match posts to side which are on trundle with ½-inch spacer in between.

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then follow with the screw clearance hole.

After the holes have been drilled, round off the edges of the posts and form the slight curve at the top. Do this on a lathe if possible, otherwise use a block of wood wrapped with rough sandpaper and do it by hand. Drill a dowel hole at the top to receive the dowel for the acorn ornament. The ornaments are available at home improvement centers and lumber yards. Some of these have a rather large threaded dowel. To simplify matters, insert the threaded dowel, cut it off at the base, then redrill a ⅜-inch hole to take a regular dowel.

Round off the edges of the posts with a small rounding cutter in your router. A ¼-inch radius cutter is recommended.

Before assembling the parts, sand all pieces carefully. Install a scrap piece of ¼-inch paneling into the corners to align the posts and cross members. Place a piece of 1½-inch wood under the crosspiece to position it on the post. Then mark and drill pilot holes for the screws into the ends of the cross members. Assemble the parts with glue.

The ends of the side pieces are dadoes to receive the bed hooks. Use a side cutter about ⅜ or ½ inch deep. Nail a guide strip on the inner surface of the rail. Place it so the depth of cut will match the thickness of the hardware.

For the hooks shown, the depth is ⅛ inch. Make the cut just a trifle deeper. At the rear end of the side rail, the dado is blind. At the front, only the top need be blind. The bottom can run off the edge. See detailed drawing. You will have to file the back of the hook to match the curve of the

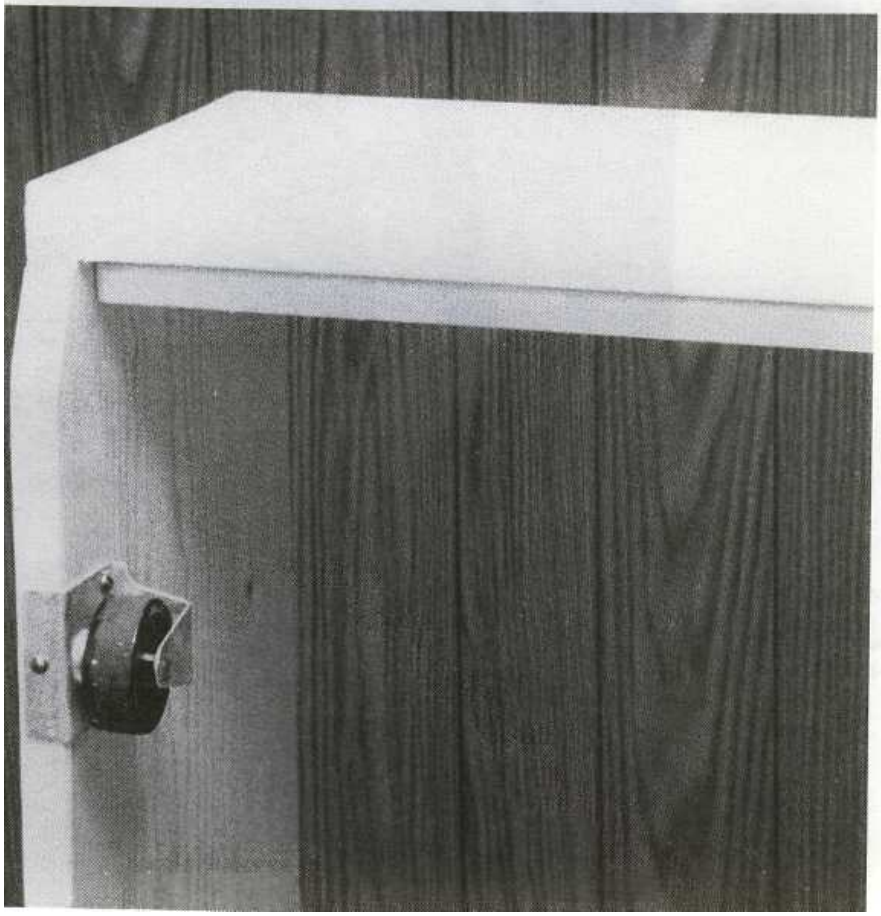
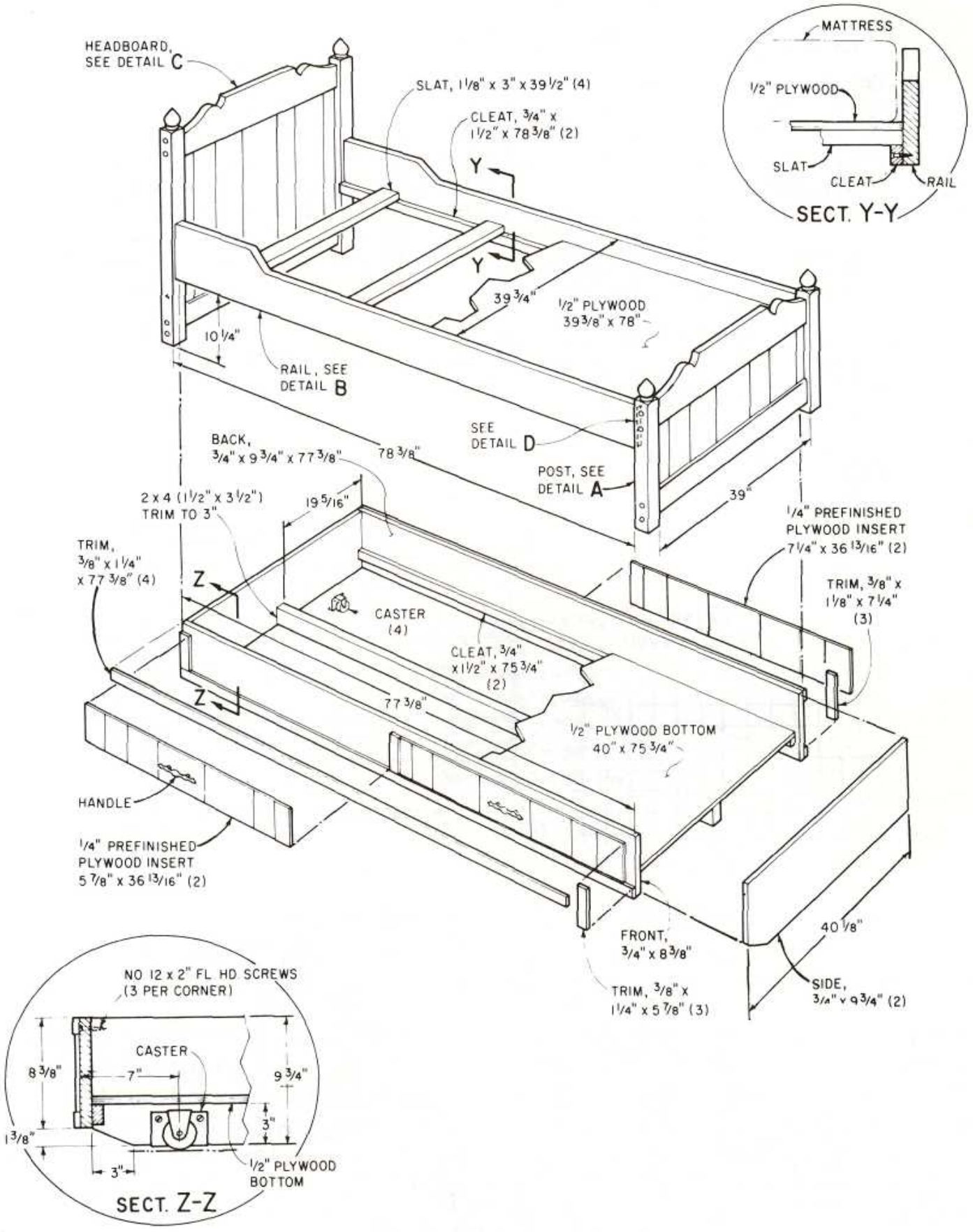
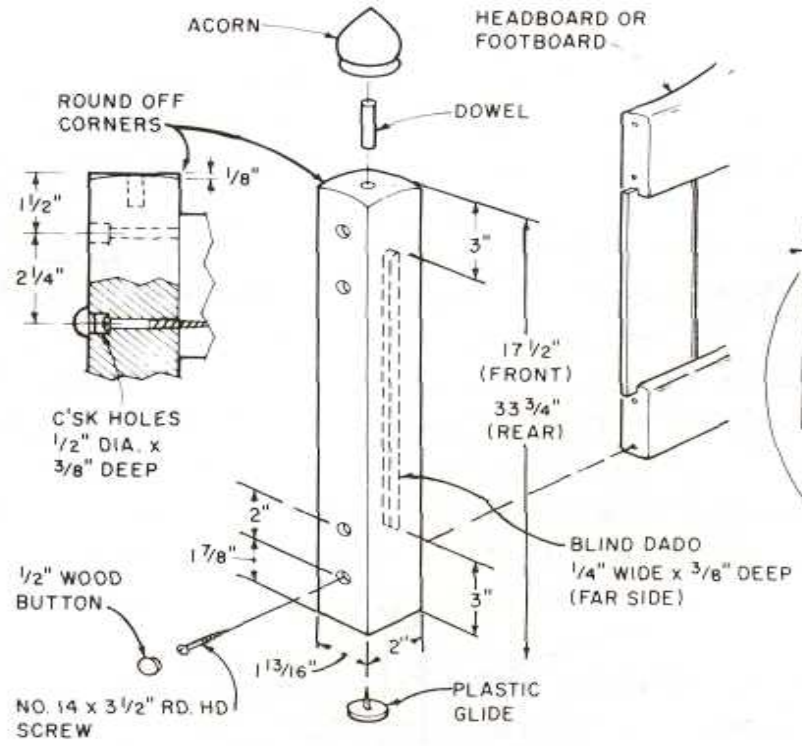


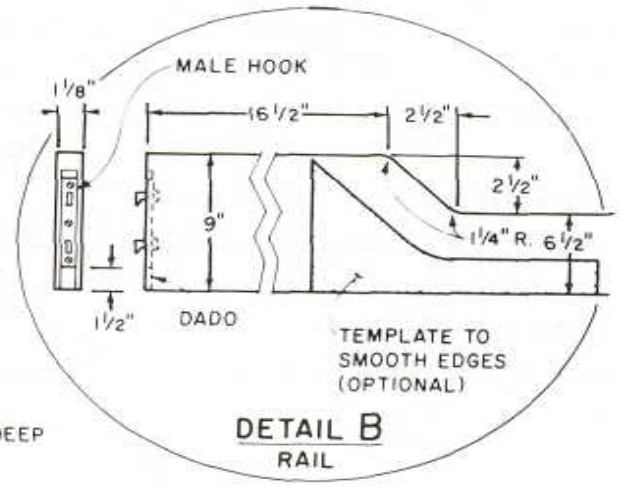
Fig. 5-10. The casters shown here are a special type made for the trundle beds. They can be installed quite easily with just three screws.

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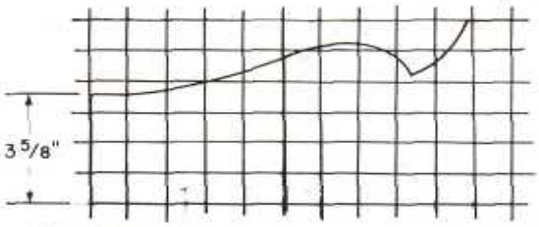
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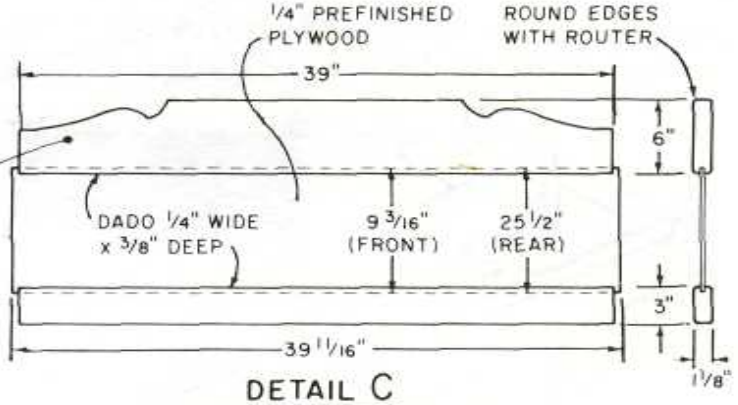




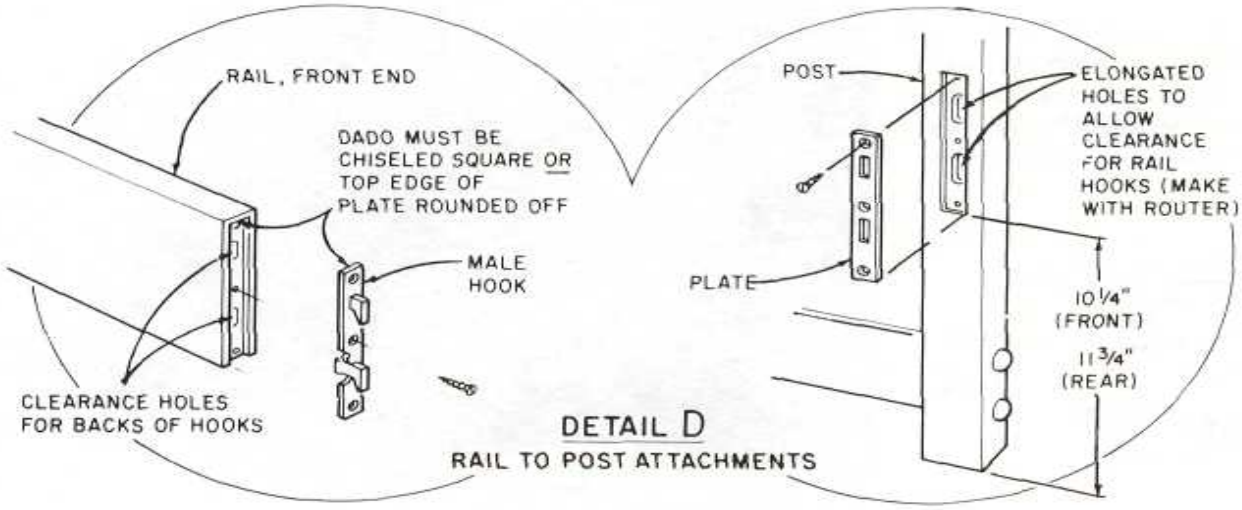
DETAIL B
RAIL

DETAIL A
POST ASSEMBLY





DETAIL C
HEADBOARD AND FOOTBOARD



DETAIL D
RAIL TO POST ATTACHMENTS

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MATERIALS LIST

Purpose	Size	Quantity
Bed		
Post, rear	1 13/16" × 2" × 33 3/4"	2
Post, front	1 13/16" × 2" × 17 1/2"	2
Header rail	1 3/16" × 6" × 39"	2
Bottom rail	1 3/16" × 6" × 39"	2
Side	1 3/16" × 9" × 78 3/8"	2
Front panel	1/4" × 9 3/16" × 39 11/16"	1
Rear panel	1/4" × 25 1/2" × 39 11/16"	2
Cleats	3/4" × 1 1/2" × 78 3/8"	1
Slats	1 13/16" × 3" × 39 5/8"	6
Bed hooks	3/4" × 8" FH screws	4 sets
Acorns		4
Buttons (to conceal screws)		16
Plywood	1/2" × 39 3/8" × 78"	1
Glides		4
Screws	3 1/2"-14 RH	16
Trundle		
Front and rear	3/4" × 8 3/8" × 77 3/8"	2
Sides	3/4" × 9 3/4" × 40 1/8"	2
Plywood	1/2" × 40" × 75 3/4"	1
Cleat	3/4" × 1 1/2" × 75 3/4"	2
Center support	1 1/2" × 3" × 75 3/4"	1
Trim	3/8" × 1 1/4" × 34'	
Panel insert	1/4" × 5 7/8" × 36 13/16"	4
Casters		4
Screws	2"—12 FH	12

Note: If you cannot locate the bed hooks or casters locally, write to J.C. Armor, P.O. Box 290, Deer Park, N.Y. 11729.

blind dado, or you can chisel out the corner so the hardware will fit.

You will also have to make two passes with the router to obtain the correct width for the hook. Drill out clearances for the protrusions at the rear of the male hooks, then attach with FH screws.

Note that the female plate is not symmetrical. The slots are closer to one end than the other. Orient them properly, then mate with the male. Stand the bed up with props and with trundle in place, lay a ½-inch spacer on the trundle, then rest the rail on it. Carefully mark the posts, indicating the location of the plate vertically.

Now place the post assembly on the work table and draw the exact position for the plate. Route with an end cutter, then

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clean out the corners with a chisel. Also, chisel out the clearance for the male sections. Install the plate with FH screws.

To make the trundle, rip four pieces of pine. Make two of them 8⅜ inches wide × 77⅜ inches long and two pieces 9¾ × 40⅛ inches. Bevel one corner of each of the 40⅛-inch pieces as shown. Assemble these with nails and glue, using two nails in each side. After the piece has been assembled and squared, add a few screws as shown.

Add two long cleats with their top edge 6⅜ inches from the top of the frame. Apply glue and nail from the inside, usin 1½-inch nails, slanting them slightly. Ad a piece of 1½- × -3-inch stock to the cen ter. Be sure its top edge is level with th two cleats.

Add trim to the front and rear a shown, then cut the inserts to size an install with glue. Drill holes for the pull centering the pulls in each panel.

Finish the piece as you desire. Plac masking tape on the paneling to simplif the finishing. Then remove carefully.

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Charming Pine Rocking Horse



THE ROCKING HORSE has long been a favorite toy in America. Colonial children played on crude log horses made by their fathers using the most basic of tools. As the rocking horse grew in popularity, skilled carpenters started to make them to order. They were well made and many were passed on from generation to generation as family heirlooms and collectors' items. The rocking horse made from our plan is also sturdily built and designed to last a long time. Hopefully, it too will become a family heirloom while giving your youngsters many hours of joy.

Be sure to read all instructions carefully before starting actual construction.

The horse is constructed of pine and stands 37½ inches tall. The runners are 58½ inches long. The body and runners are cut from 5/4-inch stock (1⅛inch actual size). The supports are 4/4-inch stock (¾ inch actual size). The "saddle" is padded with foam for greater seating comfort.

The head and body are joined at the neck for two reasons. One is that the lumber is not readily available in widths over 12 inches and secondly, that the grain

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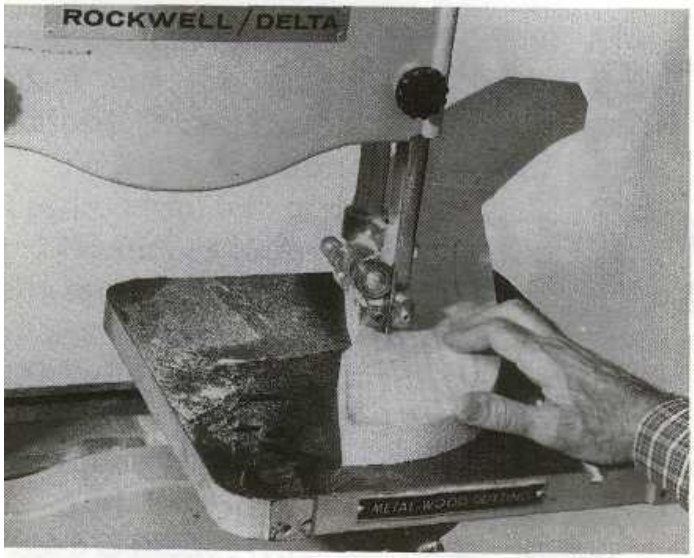


Fig. 6-1. Rocker member is being cut on the band saw. A saber or jigsaw can be used. Rocker is held in a jig for cutting ends.

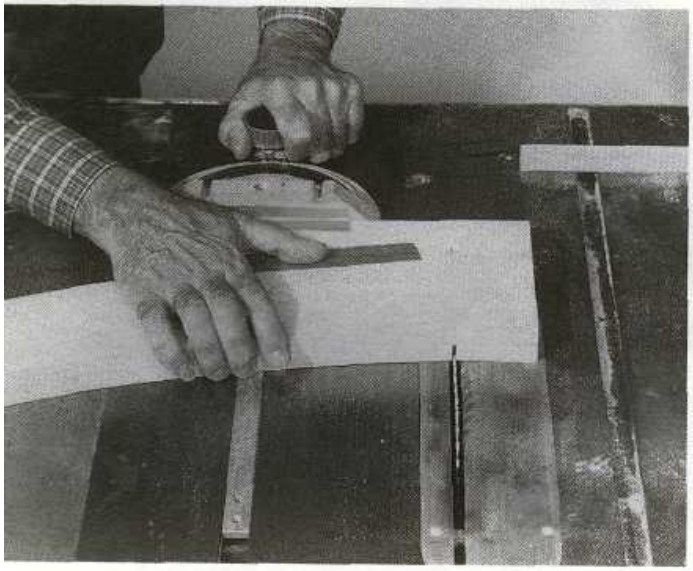


Fig. 6-2. After the end is trimmed, the jig is moved 2½ inches and the first cut of the half-lap is made with lowered saw blade.

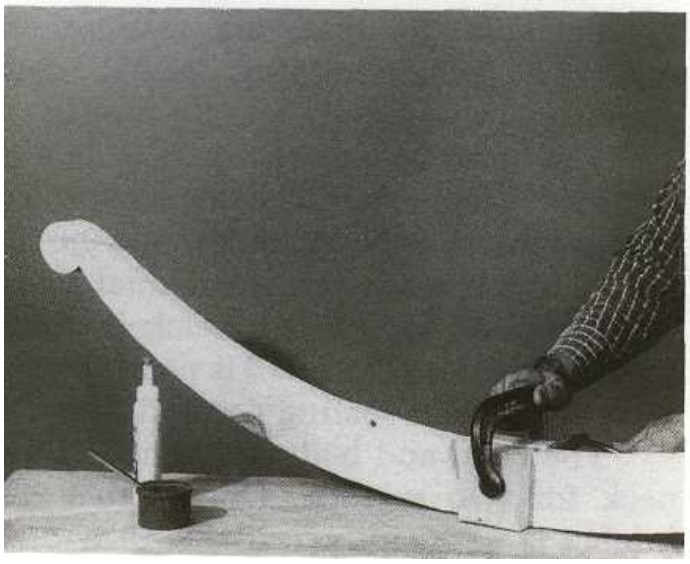


Fig. 6-3. Runner sections are joined at the half-lap to make full runner. Apply glue and clamp securely. Scrap wood protects.

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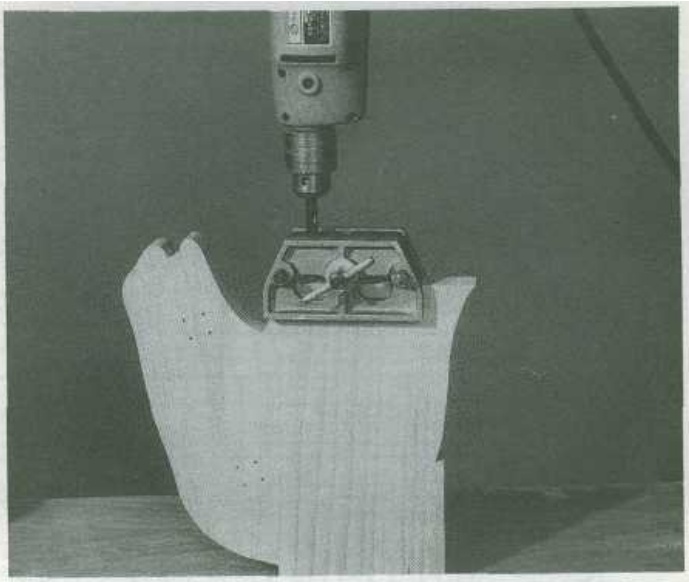


Fig. 6-4. Drilling the dowel holes in the neck. Jig assures accuracy. If done by hand, make hole straight. Insert dowels, then glue.

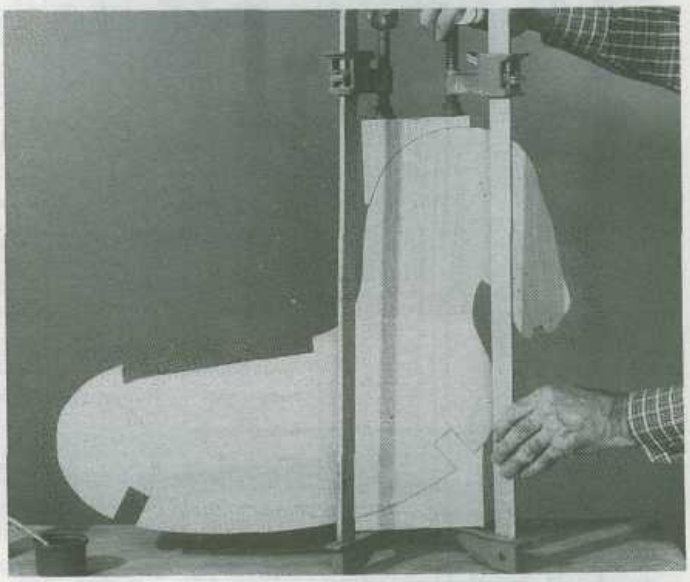


Fig. 6-5. Clamps are applied to join the head and body. The lugs will be sawed away later. Spacer block is then inserted.

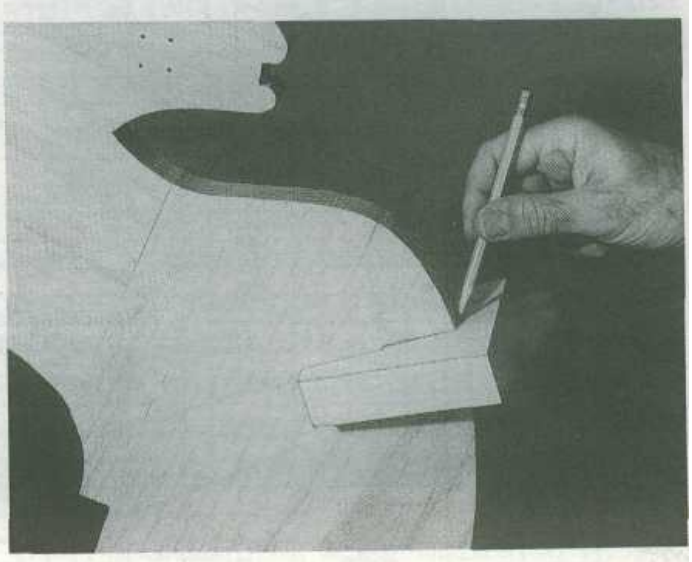
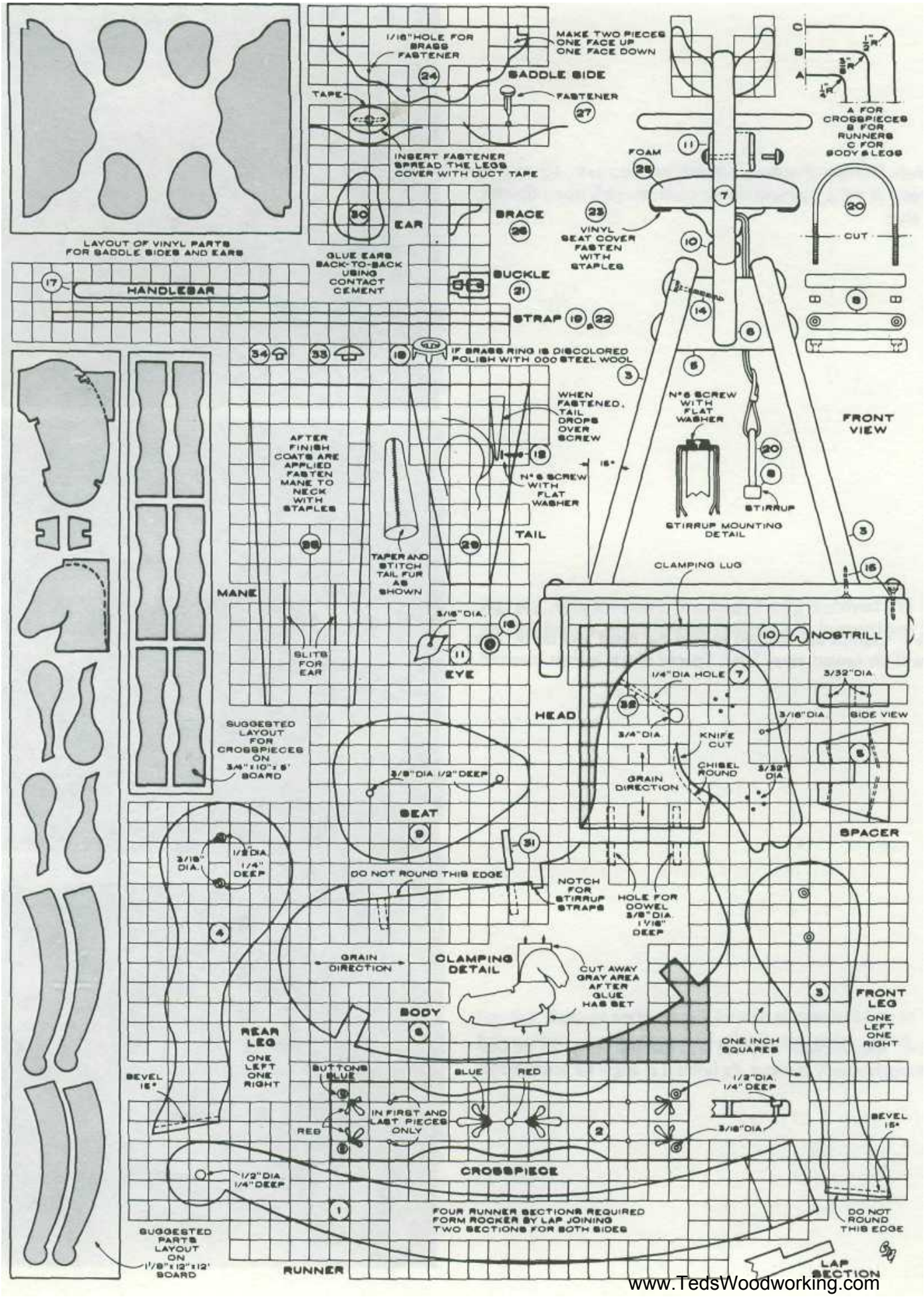
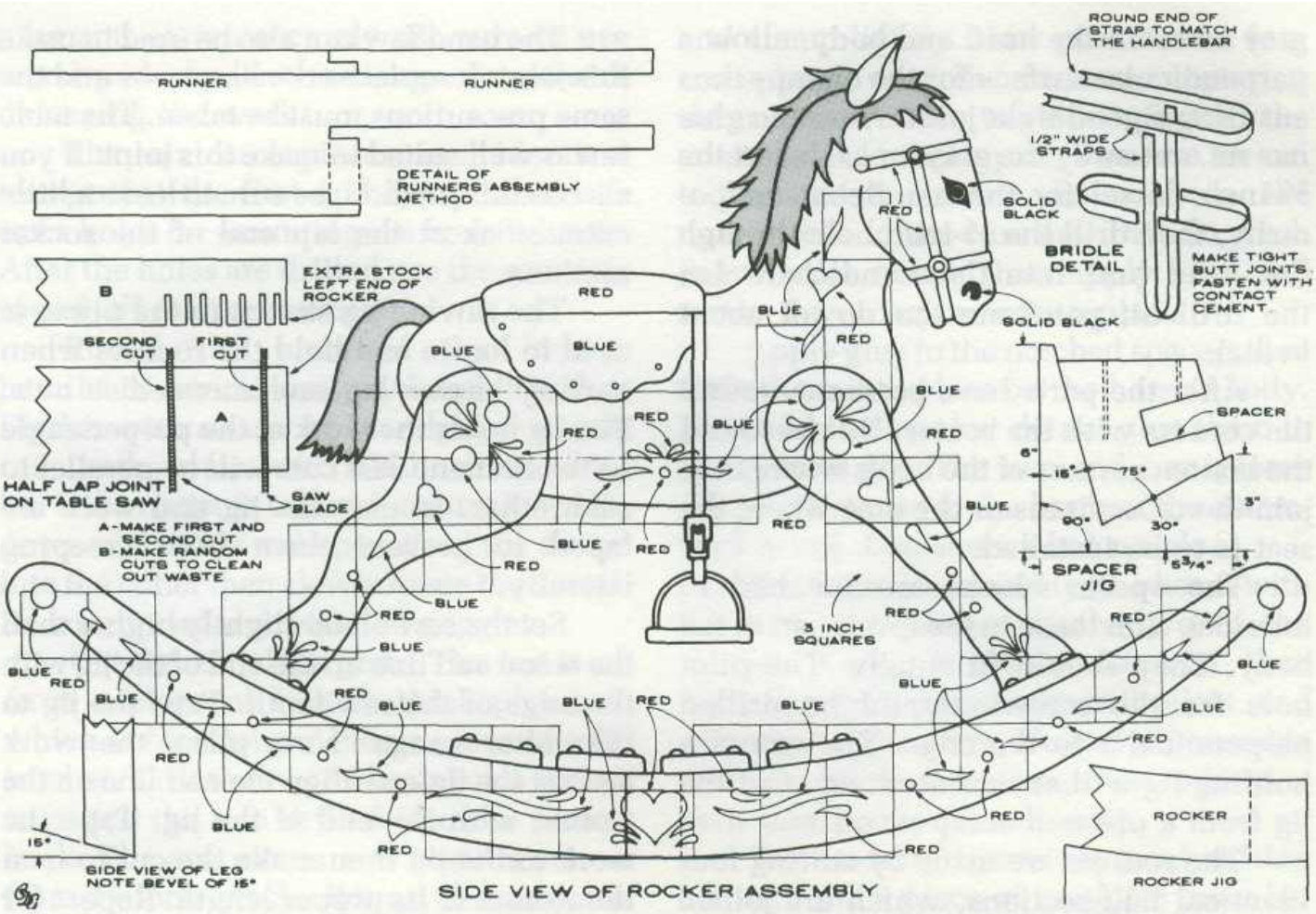


Fig. 6-6. Spacer block inserted and marked so it can be beveled to match body contour. Jig holds it at angle for screw holes.

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SIDE VIEW OF ROCKER ASSEMBLY

direction of the head and body should be perpendicular to each other for strength. The runners are also made in two sections because of their size and grain direction.

In the illustrations, each square equals 1 inch of the full-size plan. It's best to make a full-size pattern for each piece. When the layouts are complete, cut the wood pieces to shape using a jigsaw, band saw or saber saw.

Next, drill the holes in the face and legs. The two clusters of four 3/32-inch holes are for the harness rings and should be drilled through the stock. The two 3/16-inch screw clearance holes in each leg are drilled through the stock, but the larger 1/2-inch counterbored holes must be drilled from the outer surface of the legs. legs are mounted from opposite sides, the holes must be drilled accordingly, one set faceup and the other facedown.

Before joining the head to the body, drill the two 3/8-inch dowel holes into the mating surfaces. Make the holes 1 1/16 inches deep. Locate the holes accurately by using a doweling jig or dowel centers.

Because the bottom of the head is end grain, you will have to glue size the surface before joining the parts. To size the end grain, thin your glue with an equal amount of water, then brush onto the surface and allow to air dry. The parts can now be glued in the normal manner using the glue full-strength. Insert the dowels and clamp securely.

The clamping lugs, indicated by the

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gray areas on the head and body, allow a perpendicular surface for the clamps thus ensuring a good tight joint. After the glue has set, cut away the gray areas. Insert the ¾-inch dowel for the handlebar temporarily, then drill the ¼-inch hole through the head and into the handlebar. Let the drill bit penetrate the dowel about ¼ inch.

After the parts have been cut, round the corners with the router. Do not round the bottom corners of the hoofs where they join the crosspieces or the area where the seat is to be installed.

The spacer blocks are notched to interlock with those in the lower part of the body. They should fit snugly. The pilot hole for the screws should be drilled perpendicular to the edge. The use of a holding jig will ensure accuracy. Cut the jig from a piece of scrap wood.

The rockers are made by cutting four identical half-sections, which are joined with half-lap joints, all cut from the same side. Note that the ½-inch holes for the decorative buttons at the ends are not drilled from the same side; two must be placed on the opposite side so that when the rockers are glued up, all four ½-inch holes will be on the outside.

The half lap must be made carefully to ensure a clean glue line. There are several ways to do this; choose the method you are most comfortable with. Make the half lap one-half the thickness of the lumber and 2½ inches wide. If the joint is made by hand, use a back saw and cut close to the line, then finish with a chisel. Check the mating pieces frequently and try not to undercut them. If you do, you will have to use shims to correct the joint. When properly done, the outside surfaces should be flush.

The band saw can also be used to make this joint. It replaces the hand saw and the same precautions must be taken. The table saw is well suited to make this joint. If you choose this method, be sure to leave a little extra stock at the lap end of the rocker sections.

The sawing jig shown in the photo is used to locate and hold the rockers when making the end, lap, and intermediate cuts. The jig holds the work at the proper angle so the first and last cuts will be parallel to each other. In use, the jig and work are taped to prevent them from creeping laterally.

Set the saw blade slightly higher than the wood and line up the end of the jig with the edge of the saw tooth. Tape the jig to the miter gauge. Now place the work against the jig and align the end line on the runner with the end of the jig. Tape the work to the jig then make the cut to trim the runner to its proper length. Repeat for all four runners.

Now lower the saw blade so its height is exactly one-half the thickness of the runner stock. Reposition the jig, moving it exactly 2½ inches closer to the saw blade then again tape it to the miter gauge. Align the end of the runner with the end of the jig as was done for the first cut, then saw again.

The following cuts need not be measured. Make a series of cuts between the original cuts to clear out the waste. Make the kerf cuts close to each other to achieve the same effect as if you were using a dado blade. An alternate to this method is to use the dado blade to clean out the waste after the first and second cuts are made. Check that the parts fit together okay, then proceed to glue the half sections to make up the full length runners. Apply

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glue and clamp securely. Be sure to use wood pads under the clamps to prevent damaging the work.

The six crosspieces are identical except that the first and last pieces have extra holes for mounting the horse's hoofs. After the holes are drilled use the router to round off the top corners.

Round the ends of the ¾-inch handlebar which was previously drilled. Do this with a rasp and sandpaper or you can use the router with a 5/16-inch rounding bit. If the router is utilized, mount it upside down and use as a shaper. Feed the dowel into the cutter then slowly rotate the dowel. Be sure to wear protective goggles.

Cut the rest of the parts. The seat is cut from a piece of ¾-inch thick plywood, which is far stronger than a piece of solid lumber. Drill the two ⅜-inch holes spaced to match the two drilled into the horse's back. The eye pieces and nostrils are cut from ¼-inch stock. Round the edges of these with sandpaper.

After all pieces have been cut and rounded, they must be sanded for a superb finish. Two important areas when sanding are the joints at the halflaps on the rockers and the butt joint where the head is joined to the body. These must be sanded to remove the "step" if one exists between the two surfaces. Start sanding with 100-grit paper then work down to the finer grits of 120, 220, then 320. Pay particular attention to the end grain. The smoother the end grain, the finer the finish.

Start assembling by placing the rockers on a flat surface with the ends of the rockers aligned. The rockers should be spaced 16¼ inches apart. To simplify assembly, you may wish to cut two pieces of wood 16¼ inches long for use as temporary spacers. Place these spacers between the rockers and clamp lightly. Now position the four crosspieces onto the runners, centering them from side to side. Space the crosspieces ½ inch apart, then use an awl to locate the screw holes from the crosspieces to the runners. Drill 3/32-inch screw pilot holes, then apply glue and screw the crosspieces into place.

Apply glue to the notched spacers then slide them into place on the horse's body. Next add the legs but do not glue them to the spacers yet. The two end crosspieces are now fastened to the hoofs of the assembled horse. Use screws but no glue.

Place the subassembly (the horse with the two crosspieces attached) onto the runners. Center it from end to end, then mark the screw locations, drill pilots, and assemble with screws. If okay, disassemble the legs, hoofs and crosspieces, add glue then reassemble permanently.

The "saddle" is made by sandwiching a 1-inch-thick piece of urethane foam between the plywood and the vinyl. Trim the foam to the outline of the seat then squeeze the sandwich tightly using a clamp as shown. Pull the material taut and staple. When the clamp is removed, the foam will expand, leaving a nicely upholstered seat without wrinkles.

Note that the seat, flaps, mane, and so on should be installed after the finish has been applied to the wood.

Cut the saddle flaps with wavey outline as shown. Make one piece faceup and the other facedown as they are not symmetrical. Punch the holes either with a hole punch or with a nail with the point ground flat. Place the vinyl onto a piece of end-grain hardwood and strike with a hammer for a cleanly punched hole. Add the paper fasteners then spread the legs and cover them with a small piece of tape.

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The fasteners can be eliminated and decorative nails substituted. These would be driven into the body of the horse. The fasteners allow the saddle flap to hang loosely for a pleasing effect.

Make the stirrup as shown. The U-bolt is shortened by cutting away the threads as indicated in the drawing. Before installing it you may want to spray it with bronze paint so it matches the buckle. If so, rub the bolt with fine steel wool before spraying or painting.

The stirrup straps are nonadjustable. They are fixed at the height shown which has been determined to be the average height for this size horse. After the stirrups are looped through the buckle, coat them on the back sides with contact cement and join, eliminating the space between the two straps This is a safety precaution, eliminating the possibility of a child placing his head between the straps, a potential hazard. For this reason we do not recommend the use of reins.

Fasten the saddle flaps with staples along the top edge then install the stirrup straps using No. 6 screws and flat washers. Follow by adding the seat which is positioned with the two dowels. Press the seat down as far as it will go then secure it with the metal brackets. The seat is not glued because of the gathered vinyl on the underside.

The mane and tail are cut from a piece of 6-inch-wide fur. Before installing the mane, install the handlebar and pin it in place with the ¼-inch dowel. Install the mane with staples along its edges. Pull the hair away and staple only through the backing material. Use your fingers to "comb" the fur after it is installed.

The ears are made of vinyl. Cut the pieces as shown then apply contact cement and join them back-to-back. This will give the ears a finished vinyl surface on both sides. Install the ear flaps with screws and flat washers, placed slightly forward of center. Then fold the ear in half and cement the bottom to conceal the screw. Use vinyl cement or epoxy for this.

The tail is sewed along the seam into a cone shape. It is then fastened with a screw and flat washer. See detail.

Fasten the bridle straps with contact cement. Install the longer pieces first. The strap detail drawing shows a space between the various pieces. This was done only for clarity. Cut the parts so they butt against each other snugly.

After the bridle is in place install the rings. They are made of hardened steel which has been brass plated. Some may have a tarnished appearance. If so, rub lightly with steel wool to restore the color. A little clear nail polish will maintain the bright color. The best way to install the rings is to squeeze them on using a clamp. Place the four rings into the holes provided, then use a clamp to seat them. Be sure to position the clamp jaws so the rings seat squarely and not at an angle.

Finish the horse as desired. It may be stained, left natural, or painted as shown, If stained or left natural, it should be given a coat of sealer followed by several coats of brushing or spraying lacquer.

If you prefer to stencil the horse as shown here, give the entire project a coat of white undercoat followed by two coats of white semigloss lacquer or paint. The stencils are applied after the white coats have dried thoroughly. The acrylic colors used for stenciling are easy to use and dry fast.

You may wish to create your own stencils or use the shapes shown. These

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MATERIALS LIST

Except where noted, lumber is pine. All measurements are in inches.

Purpose	Size	Description	Quantity
Runner	1⅛" × 8" × 32"		4
Crosspiece	¾" × 4" × 18"		6
Front leg	1⅛" × 5¾" × 17"		2
Rear leg	1⅛" × 7" × 17"		2
Leg spacer	1⅛" × 3½" × 4⅞"		2
Body	1⅛" × 10½" × 22½"		1
Head	1⅛" × 11¼" × 12"		1
Stirrup	⅝" × 13/16" × 5"	Oak	2
Seat	¾" × 7" × 9½"	Plywood	1
Nostril	¼" × ¾" × 1"		2
Eye base	¼" × 1" × 2"		2
Screw	No. 6" × 1" RH		3
Screw	No. 10" × 3" FH		4
Screw	No. 10" × 2½" FH		4
Screw	No. 10" × 1½" FH		32
Eye	¾" dia.		2
Handlebar	¾" × 9"		1
Ring	⅞" dia.		4
Bridle strap	½" × 24"		2
U-Bolt	5/16" × 4"		2
Buckle, Western			2
Stirrup strap	½" × 24"		2
Seat, vinyl	10" × 12"		1
Saddle flap, vinyl	12" × 12"		1
Foam	1" × 7" × 9½"		1
Brace	1½" × 1½"		2
Paper fastener		Brass	10
Mane, long pile	6" × 16"		1
Tail, long pile	6" × 10"		1
Ear, vinyl	2½" × 3½"		2
Dowel	⅜" × 2"		4
Dowel	¼" × 3¼"		1
Button	1¼" dia. × ½"	Tenon	12
Button	⅝" dia. × ½"	Tenon	24
Staple	9/16"		1 box

Note: Altogether, you will need one piece of ⅝" × 12" × 12' pine, one piece of 1" × 10" × 5' pine, and one piece of ¾" × 7" × 9" fir plywood.

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may be cut from various materials, such as file folder stock, acetate, polyester or even tracing paper. The acetate and mylar should have a matte surface which will take pencil. We recommend the acetate and polyester as they are translucent and durable.

Lay out the designs selected onto the stencil material, then cut with a sharp knife. We used an Exacto with a No. 11 blade.

Errors can be minimized by coating the stencil back with adhesive. We used a spray adhesive (3M Company) which has a low tack when sprayed on only one surface. Allow the adhesive to dry five minutes before using the stencil.

Position the stencil on the work then use a stencil brush to apply the color to the work. In stenciling, it is very important to remember that the brush should be almost dry. Dip just the tip of the brush into the jar of paint, and no more than 1/16 inch deep,then rub it on paper towels to remove most of the paint. Rub in 2-inch circles. Repeat several times. Now you can apply it to the work. Dab the brush onto the stencil. Keep on dabbing until the desired shade is achieved.

Note that some of our patterns consist of lefts and rights. You can use one pattern for both, but you will have to clean the stencil of paint and adhesive before reusing it. It may be simpler to just make new stencils. Just trace one set faceup and the other facedown.

The bridle and stirrup straps are available only in light brown. To match your stenciling colors, first give them a base coat of white then apply the desired color.

A full-size plan for building this rocking horse is available from *Armor Products* (see Introduction for address).

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Cheese and Wine Cart



HOME CRAFTSMEN are often discouraged from makinga rolling cart on wheels because they don't have a lathe for the spokes. This elegant cart was designed and built without a lathe. The turnings are ready-made and available at most lumberyards and home-improvement centers. Even the wheel hubs and rims are made with conventional tools: a router and saber saw.

The cart is made of ¾-, 1⅛-, and 1⅜-inch pine stock (nominal sizes, 1, 1¼, and 1½ inches). It measures 18 × 29 × 29 inches and has a roomy drawer for storing odds and ends. Most rolling carts have a movable hand grip, which must be dropped out of the way to permit the drawer to open. We used a fixed hand grip and simply made the drawer open from the front. It looks better and is more practical.

Make the top of the cart of 1⅜-inch pine. Glue up four boards, each 5 inches wide, to obtain the necessary width. Note that the Materials List shows the lengths to be 3 inches longer than the finished size. You will trim away the excess after gluing. Dowel pins are necessary to ensure a good, permanent glue line. To prevent warping, invert the first and third boards so the annular rings will alternate. Use four dowels in each section, locating them carefully. If you have a doweling jig, you will be able to center the dowel holes automatically. If you do not have a jig, drill the holes in the first board, then use dowel centers to transfer the location of the holes

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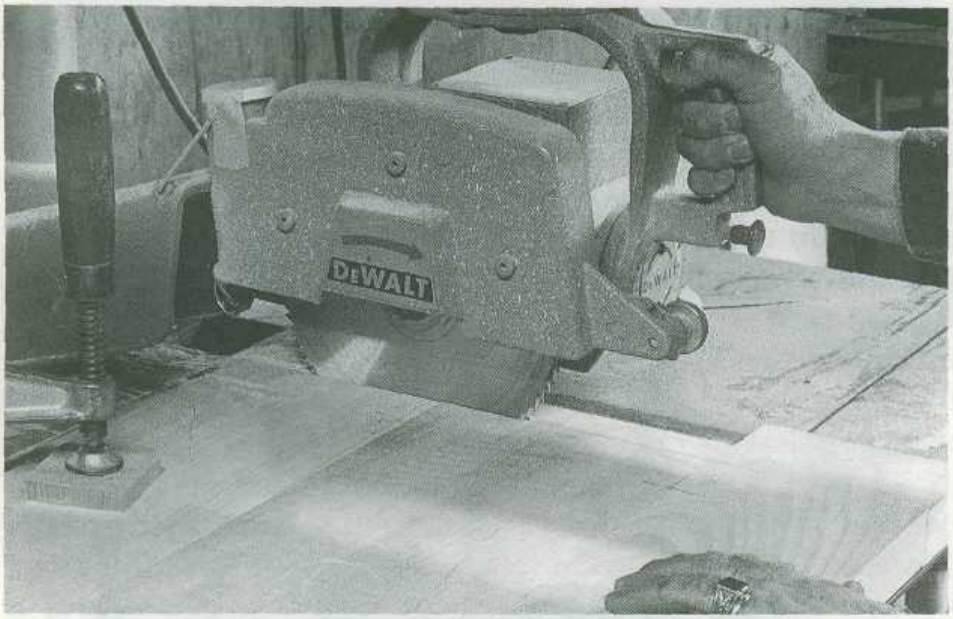


Fig. 7-1. Top panel is made by doweling and gluing several boards together. When the glue dries, trim the excess at the ends of the panel.

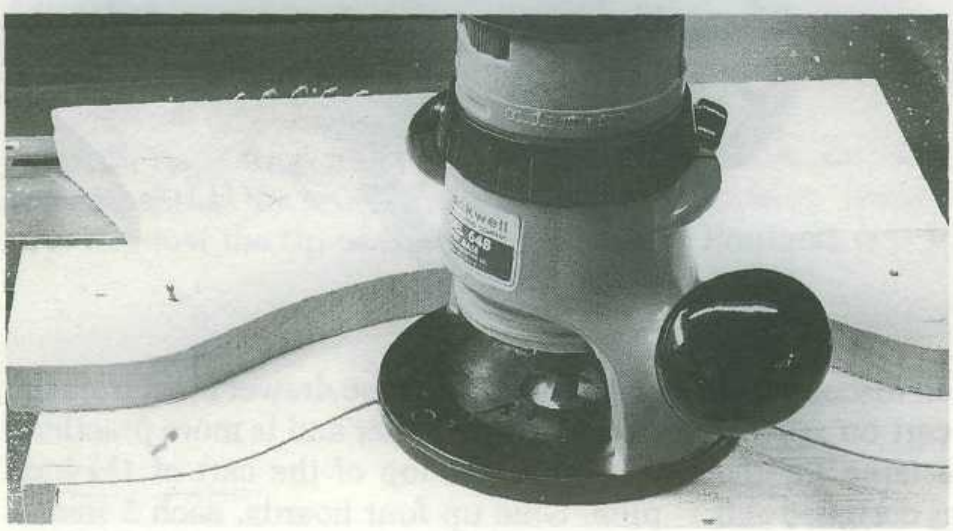


Fig. 7-2. Make the decorative bead on the end panels with a router. Make a wooden template (see diagram) for the router base to follow.

to the mating board. Repeat for the four boards, then apply glue and clamp. After the glue sets, trim the ends to size.

If the surface joints are uneven, use a belt sander to even the surface. Belt sanders cut fast, especially on pine, so use care when sanding. Start with a medium-grit belt, followed by fine.

Make the upper rails of 1⅛-inch stock. After ripping the pieces to width, run a groove along the lower edge using the router fitted with a V-shaped cutter. Tack a wood strip to the rail to guide the cutter. You will need two side rails and one rear rail. The front is left open for the drawer.

Make the lower side rails in a similar manner, but narrower. The front and rear rails are a bit more tricky to make.

The upper edge must be contoured. In addition, the upper edge is contour grooved. This process requires that you use a shaped wood template to guide the router. Trace the contour of the end panel onto a piece of scrap about 2 inches longer than the panel. Use a narrow piece of wood for the template strip and nail it to the base

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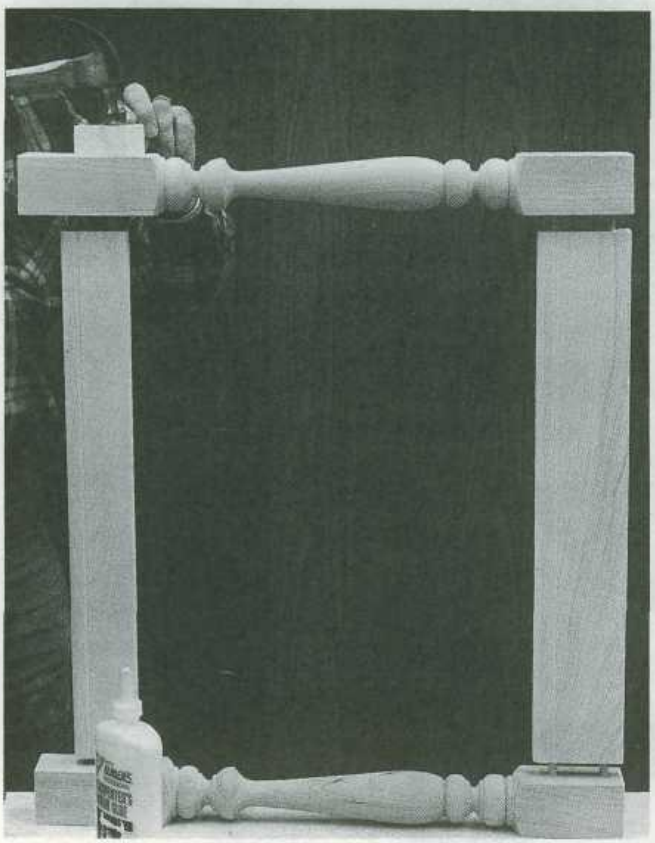


Fig. 7-3. Using ready-made legs saves a lot of work. Cut the legs to size and join to the apron with glue and dowels. Use the block to protect the legs.

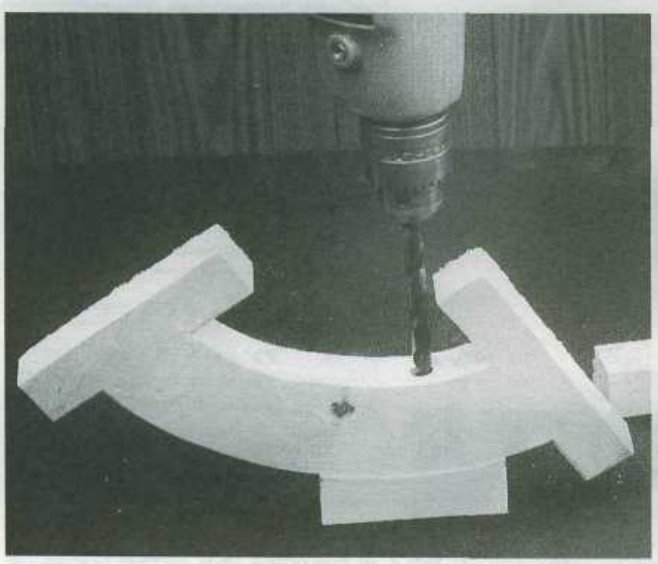


Fig. 7-4. The rims for wheels are made in four sections. When cutting curved rims, leave end tabs for later assembly. Predrill for spokes.

piece. To contour-cut it parallel to the shape of the panel, you need to use a marking gauge to draw the shape of the template. (To set the gauge, measure the radius of the router base, then add ½ inch.) Trace the shape onto the guide strip and cut with a saber saw. Fasten the strip to the base with a couple of nails, then place the panel into the shaped base. Hold it securely with a stop on the table or with a clamp.

Cut the ⅜-inch deep groove in the rail pieces. They are for the top fasteners. Locate the groove ½-inch from the top edge. The width of the saw kerf is not important. Cut the lower shelf to size, but do not notch the corners yet.

The legs are standard 3- × -32-inch turnings available at your lumberyards. Since the finished length required is 24½ inches, you will need to trim the lengths to size. The square block at the top should measure 5 inches and the lower one 6 inches. (See drawing.) *Note:* If you have a lathe, simply make a template on kraft paper, then turn in the usual manner.

Use the doweling jig to locate and drill the ⅜-inch-diameter holes at the ends of

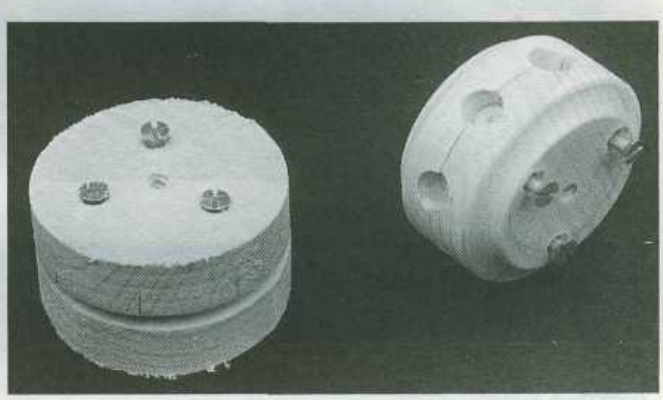


Fig. 7-5. Cut hubs from ¾-inch stock, then saw in half. Reassemble with wood screws and drill for spokes. Hubs are cross-grain for strength.

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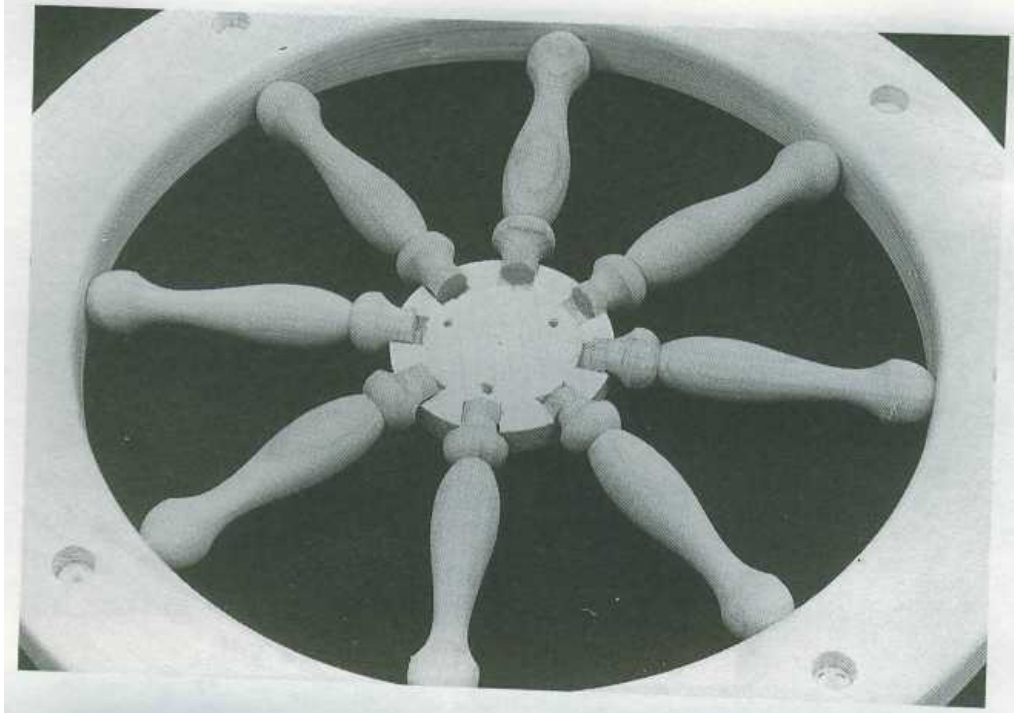


Fig. 7-6. Separate hub halves, insert spokes, glue, and rejoin hubs with screws. Make the spokes from ready-made spindles cut in half.

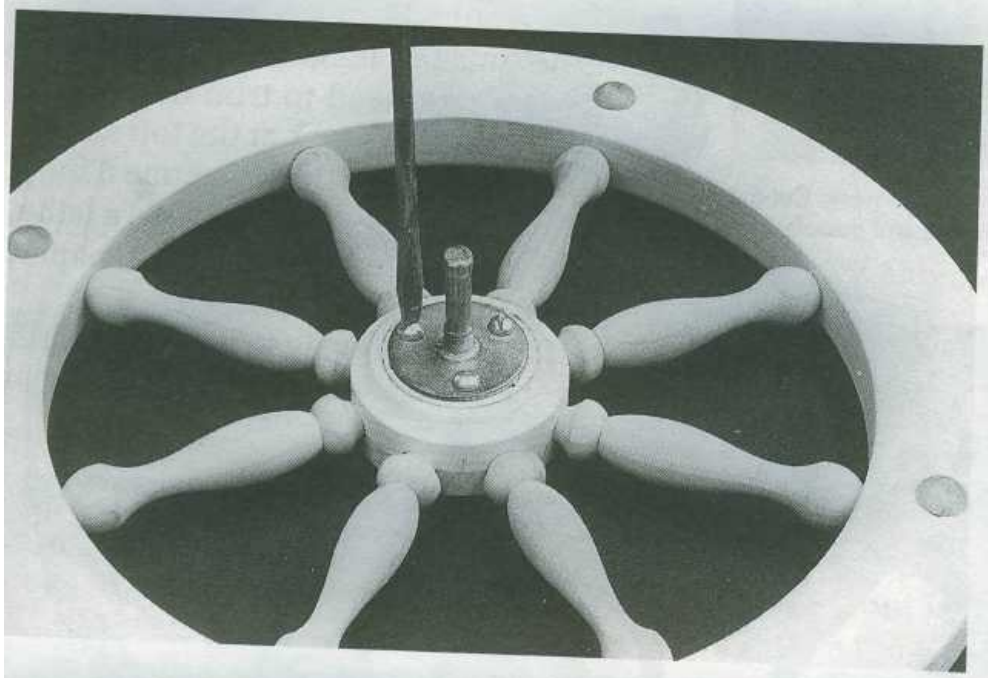


Fig. 7-7. Attach the wheel shaft to the hub with three screws. The metal stem will snap into the socket that is placed in the leg.

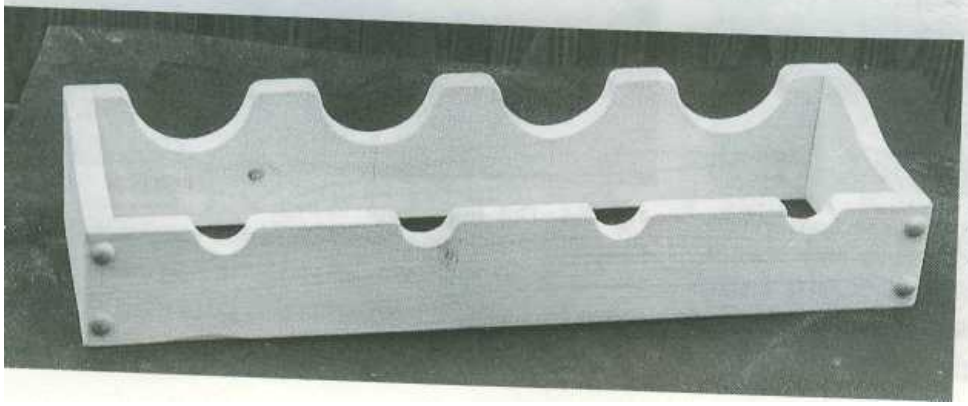
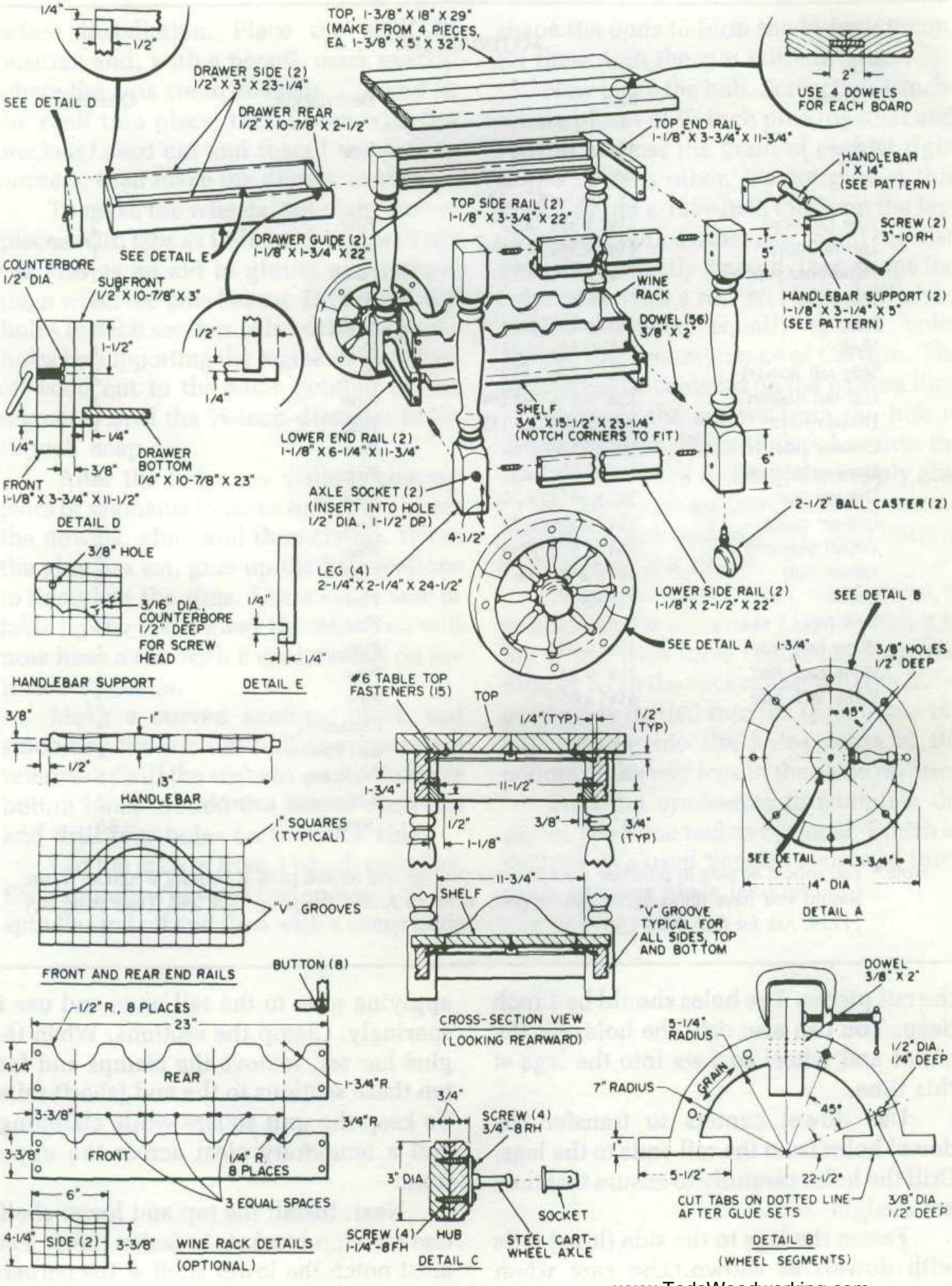


Fig. 7-8. The wine rack is removable. Cut the bottle rests so that bottles lie with necks down. Add wood buttons for looks.

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MATERIALS LIST

Purpose	Size	Description	Quantity
Top	1⅜" × 18" × 29" (Make from 4 pieces, ea. 1⅜" × 5" × 32")	Pine	1
Side rail (top)	1⅛" × 3¾" × 22"	Pine	2
End rail (top)	1⅛" × 3¾" × 11¾"	Pine	1
Handlebar support	1⅛" × 3¼" × 5"	Pine	2
Handlebar	1" × 14"	Pine	1
Leg	2¼" × 2¼" × 24½"	Pine	4
Shelf	¾" × 15½" × 23¼"	Pine	1
Side rail (lower)	1⅛" × 2½" × 22"	Pine	2
End rail (lower)	1⅛" × 6¼" × 11¾"	Pine	2
Drawer front	1⅛" × 3¾" × 11½"	Pine	1
Drawer side	½" × 3" × 23¼	Pine	2
Drawer subfront	½" × 10⅞" × 3"	Pine	1
Drawer rear	½" × 10⅞" × 2½"	Pine	1
Drawer guide	1⅛" × 1¾" × 22"	Pine	2
Wheel segment	1⅛" × 5" × 12½"	Pine	8
Wheel hub	¾" × 2¾" dia.	Pine	4
Spoke	¾" × 4¾"	Pine	16
Buttons	½" × ⅝"	Pine	32
Wine rack front	3⅜" × 23"	Pine	1
Wine rack rear	4¼" × 23"	Pine	1
Wine rack side	4¼" × 6"	Pine	2
		Ornament	3
	2½"	Ball casters	2
	#6	Table top fasteners	15
		Wheel axle assembly	2
	⅜" × 2"	Dowels	56

Note: You should be able to purchase the necessary turnings and related parts at your local lumber dealer. Should you have difficulty in this respect, write to Armor Products, Box 290, Deer Park, N.Y. 11729. Ask for Cart Price List.

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the rail pieces. The holes should be 1 inch deep. You can also drill the holes for the caster and wheel sockets into the legs at this time.

Use dowel centers to transfer the dowel holes from the rail ends to the legs. Drill the holes carefully to ensure that they are straight.

Fasten the legs to the side (long) rails with dowels as shown. Use care when applying glue to the rail ends and use it sparingly. Clamp the sections. When the glue has set, remove the clamps and fasten these sections to the end (short) rails. To keep the unit square while clamping, nail a temporary cleat across the upper front.

Next, install the top and lower shelf. Use tabletop brackets to fasten them. You must notch the lower shelf at the corners

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before installation. Place the shelf in position and, with a pencil, mark exactly where the cuts are to be made. Cut and fit the shelf into place, then fasten with the brackets. Next cut and install the drawer runners, then make the drawer as shown.

To make the wheels, cut eight curved pieces with tabs as indicated.You will use the tabs as an aid to gluing and remove them when the glue has set. Drill the dowel holes in each section. Also drill the spoke holes by supporting the segments in a scrap of wood cut to the same contour as the segment. Drill the ⅜-inch-diameter holes ½ inch deep.

After the holes are drilled, glue up pairs of segments to make half rims. Insert the dowels, glue, and then clamp. When the glue has set, glue up the half sections to complete the rims. Use a saber saw or table jigsaw to cut away the tabs. You will now have a rim with 8 spoke holes on the inside diameter.

Make a curved sanding block and smoothen the rim until all saw marks are removed. Drill the eight ½-inch- diameter button holes around the face of each rim and drill four holes on the back side.

Cut the spokes from 11-inch spindles. Each spindle will yield two spokes. Cut the spindles in half and then with a sharp knife shape the ends to form the ⅜-inch tenon. Fit these into the rim without glue.

Now make the hub. Screw two 4-inch-square pieces of ¾-inch pine together and be sure to cross the grain of each at right angles to each other. Do not glue at this time. Lay out a 13¾-inch circle on the lay-up and cut with a saber saw. Sand the disc until it is perfectly smooth, then shape the outer edge with a router. Next, drill eight ⅜-inch-diameter, equally spaced holes around the circumference of the disc. The holes must be centered on the parting line.

Remove the screws from the hub to disassemble it. Place the spokes into the sockets formed by drilling, then apply glue to the inner hub surface. Add the second half of the hub and rescrew. Add buttons to complete the wheel.

A special wheel shaft with socket is available. (See Materials List.) Fasten it to the wheel with three round-head screws. Simply force the socket part into the holes previously drilled into the legs. Insert the ball casters into the holes made at the bottom of the rear legs in the same manner.

Add the ornaments to complete the piece. The wine rack is optional. Finish as desired. We used Sapolin stain and three coats of clear gloss lacquer.

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Chessboard Game Table



PRIMARILY A GAME TABLE which can be used for playing numerous games, this table features a solid-block chessboard made of light-and-dark-colored squares, glued together and easily made. The roomy drawer will hold plenty of games and other supplies. Leatherette panels at each side of the chessboard add to its elegant appearance.

In the game of chess, the board is placed so that each player has a white square at his right hand. The table shown is for end seating, however if you desire, you can position the board so the players sit at the long sides. The pull-out trays will hold your favorite drink or snack.

Construction of this table is simplified by making use of ready-made legs. These are available at most lumberyards and department stores and they come in various styles and sizes. For this game table, a tapered Italian provincial design 28 inches tall was selected. For the ambitious woodworker, the legs can be made without difficulty, using the table saw for cutting the tapers and the router for fluting.

Assuming you are using the ready-made legs, check the lengths carefully, for although they are made by machine and should be uniform in length, there is sometimes a variation of ⅛ inch between units. If you find this so, recut the legs to make them all equal. Break all sharp edges with fine sandpaper, then set the legs aside.

The aprons are cut to size from a straight piece of poplar or maple. The two end pieces are then notched along the top edge to allow clearance for the sliding trays. The depth of the notch depends on the thickness of the lumber you use. For example, 1-inch-thick stock will be either ¾-inch thick or 13/16 inch. Most pine purchased at the lumberyards will be ¾-inch thick but the hardwoods, in most cases will be 13/16 inch. For our purpose, we

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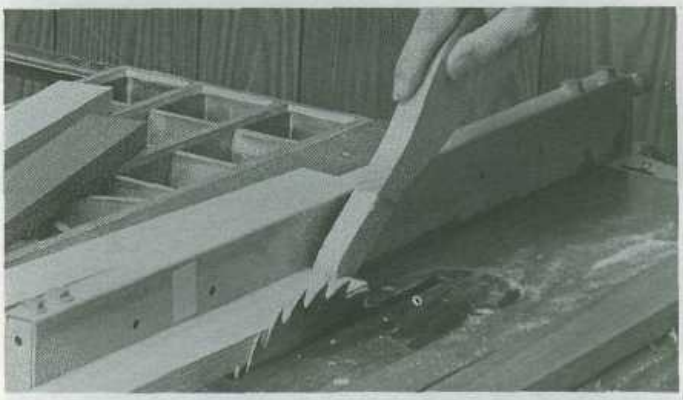


Fig. 8-1. To make the chessboard, begin by cutting strips of ash and mahogany for the light and dark colored squares.

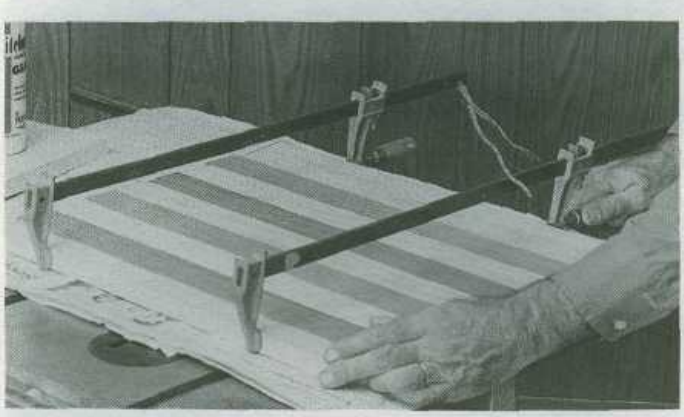


Fig. 8-2. Assemble and clamp the strips in an alternating pattern. It is important that this is done on a flat surface.

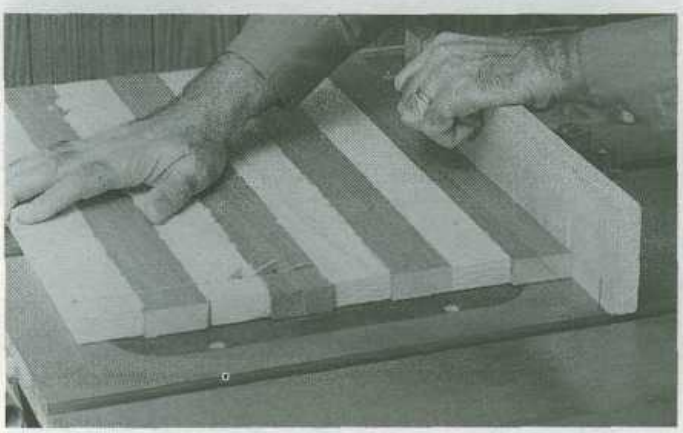


Fig. 8-3. The next step is to true-up the assembled block. Here, a miter gauge is being used to make these cuts.

want the notch to be 1/16 inch deeper than the thickness of the trays so that it will slide without binding.

The notch can be cut in several ways, but the method shown is preferable as it results in straight smooth cuts. Lower the blade of your table saw until the teeth are below the table surface. Set the fence to the desired width of cut, then position the work against the fence. Holding it firmly, turn the power on and raise the blade. A mark on the fence is used as a guide for the start of the cut. Slowly feed the work until the length of the notch is cut and use the miter gauge to cut the ends of the notch.

The decorative groove along the bottom edge of the apron is cut next. Use the router with a V cutter for this operation.

The legs are held to the apron with round-head screws. To locate the diagonal screw holes accurately, make a drilling jig with two pieces of scrap wood. Hold the jig tightly when using and drill two holes in the ends of the three apron sections. The

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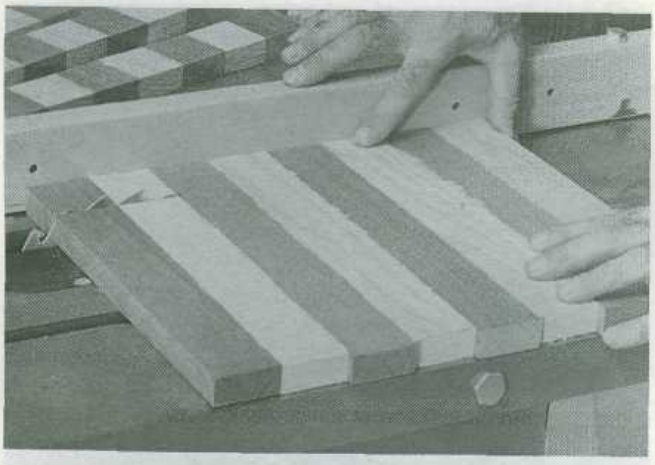


Fig. 8-4. Having cut out the blocks, you will then have to prepare for the assembly and gluing step. Because all of the gluing in this operation will be with cross grains, it will be necessary to first size all of the edges with thinned-out glue.

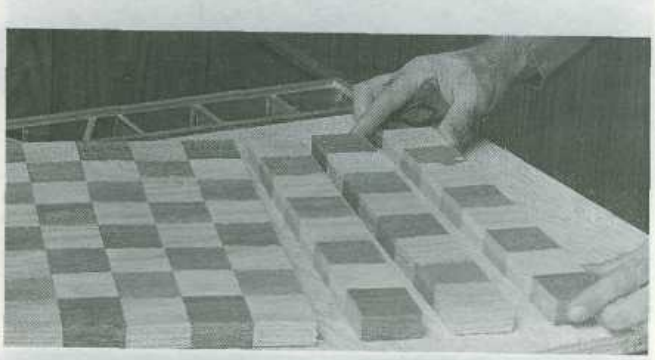


Fig. 8-5. Set the fence to recut the block so that each square measures 1⅞ × 1⅞ inch. Use a mark on fence as guide.

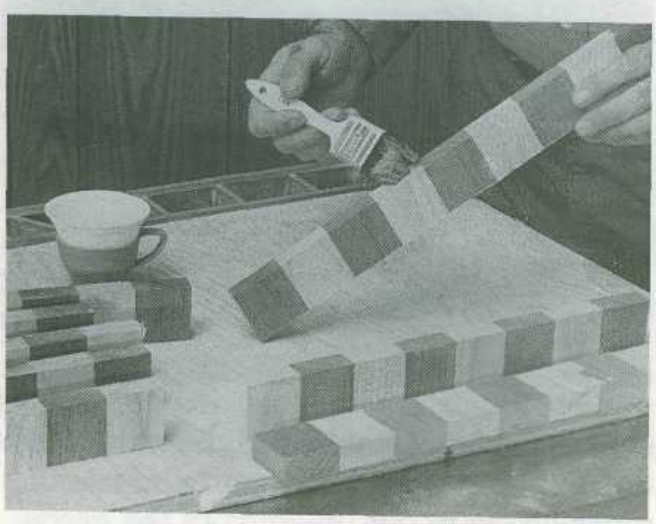


Fig. 8-6. When the application of thinned-out glue has dried, you can assemble, glue, and clamp the blocks together. By reversing every other block, you will obtain the checkerboard pattern. Make certain you are again working on a flat surface.

front drawer support is also assembled at this time. Use screws and glue at all joints.

The trays are made of the same stock as the apron. Cleats attached to the rear serve as stops to keep the trays from being pulled out too far. Two cleats screwed to the underside of the top limit the closing travel of the trays so that the front edge of the tray closes flush with the apron. Runners for the tray prevent sidewise swaying. The drawer runners are assembled, then screwed to the lower part of the side aprons.

The chessboard is made up of alternating light- and dark-colored wood squares, in ash and mahogany. Rip four strips each of the ash and mahogany woods to exactly 1⅞ inch wide, then glue these

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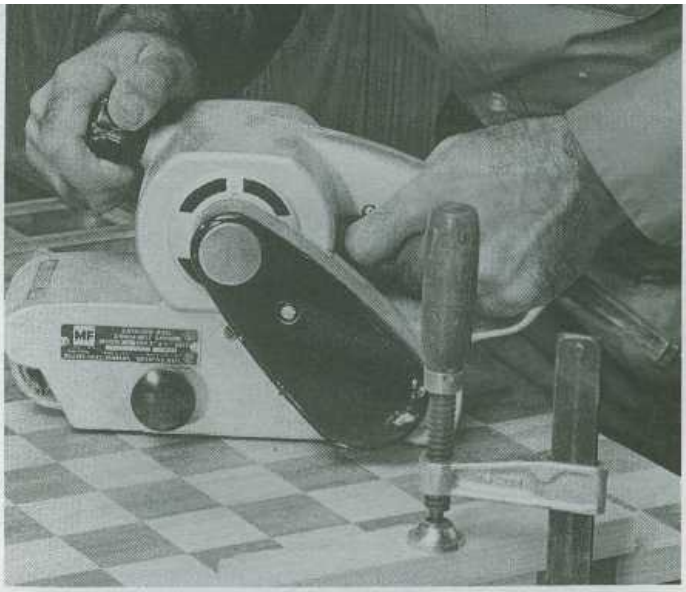


Fig. 8-7. After the glue has set, sand the surface of the chessboard to produce a flat, even surface. A belt sander is best.

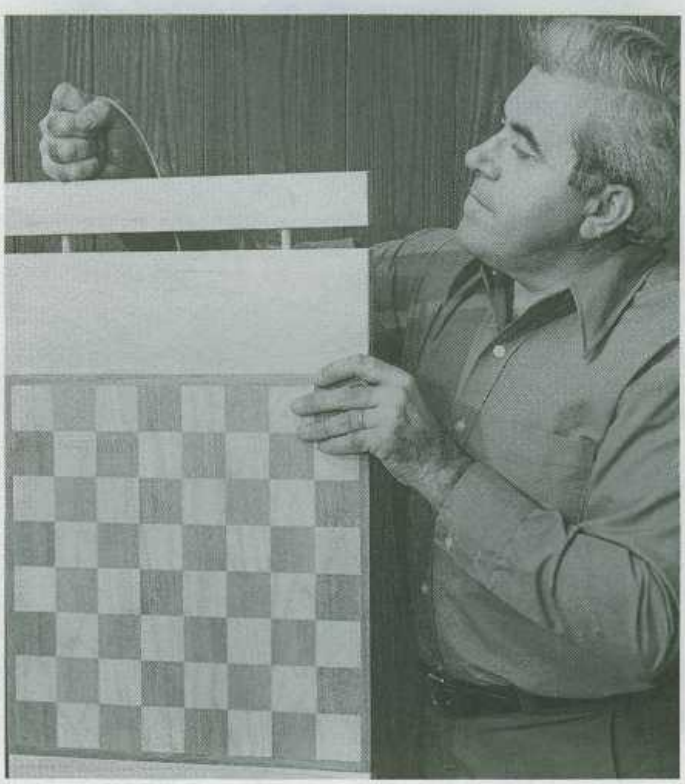


Fig. 8-8. Note the dowels used in assembling the tabletop sections. You should do ends first, and then the long sides.

alternating dark and light strips as you go. If you have trouble getting the ash, any other light-colored wood, such as poplar or maple, may be substituted.

When the glue has set, cut apart the striped block to 1⅞-inch widths. Remove all splinters or burrs with fine sandpaper. Next, glue to form the chessboard pattern and since all gluing in this operation will be cross-grain, be sure to size the edges using thinned down glue. Apply with brush to all edges and allow to dry about twenty minutes. Then apply glue full strength as it comes from the container, and clamp firmly.

The table saw is a good place to work as the surface is flat. Protect the top with newspaper when clamping. When the glue

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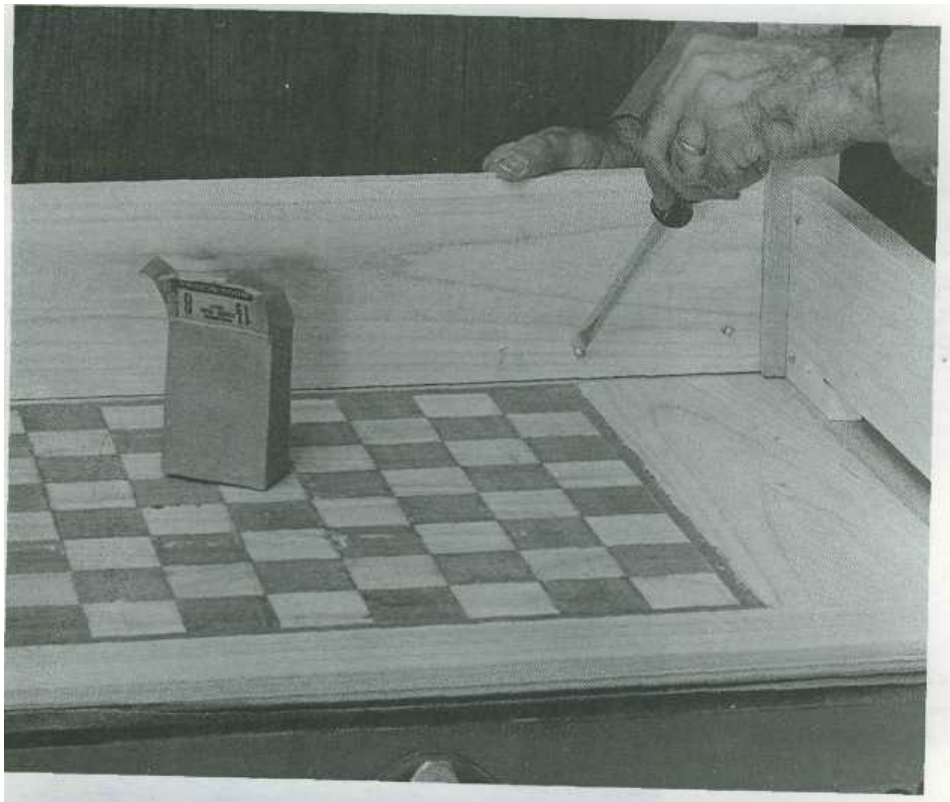


Fig. 8-9. The apron is attached to the tabletop with round head screws which angle in through the pre-drilled holes.



Fig. 8-10. Drawer is of simple construction, using a double front. Screws in front panel can be removed after glue sets.

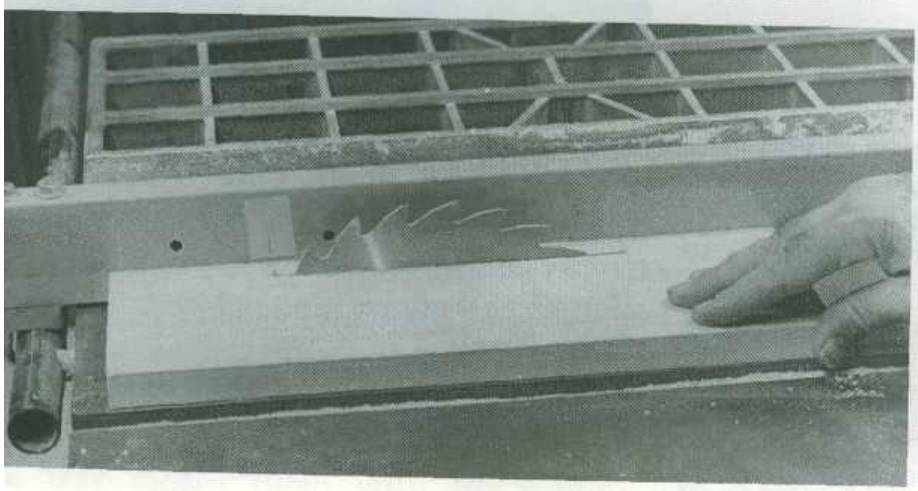


Fig. 8-11. The notching for the end panel trays is done by raising the saw blade as the work is held in stationary position.

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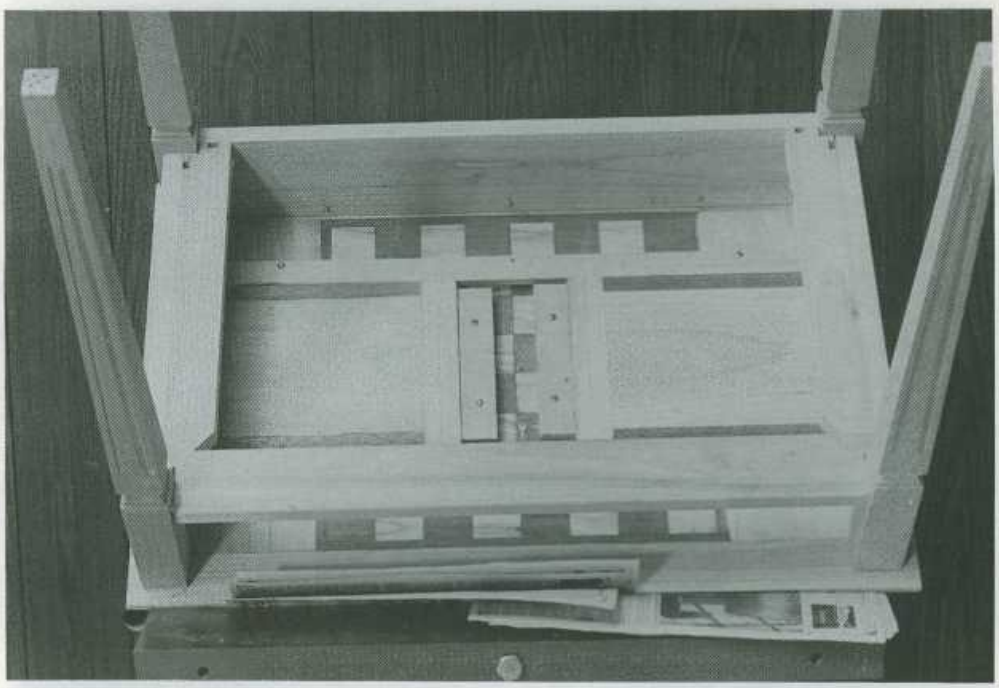


Fig. 8-12. This view shows the trays in closed position. Cleats will limit their travel to keep fronts flush with the apron.



Fig. 8-13. Pictured is the completed table before the finish is applied. Lion head pulls are on drawer; knobs go on the trays.

has set, sand the surface flat using a belt sander. Start with an 80-grit belt then work up to 120 and finally finish with a finishing sander and 220 paper.

Add the trim of dark wood all around. The leatherette panel is mounted independently of the ends. The reason for this is the bevel at the top edge of this panel. The small bevel is made before the panel is installed. Use a router fitted with the V cutter and make the bevel cut about 1/16 × 1/16 inch. This bevel will allow the

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Fig. 8-14. A simple jig is used to drill the diagonal pilot holes for the screws. Make it from available scrap wood.

edge of the leatherette to be protected. It also gives the appearance that the surface below is padded. Assemble with dowels.

Add the ends and sides, then shape the edge with the router fitted with a suitable cutter.

Again using the drilling jig, make the necessary pilot holes for mounting the top.

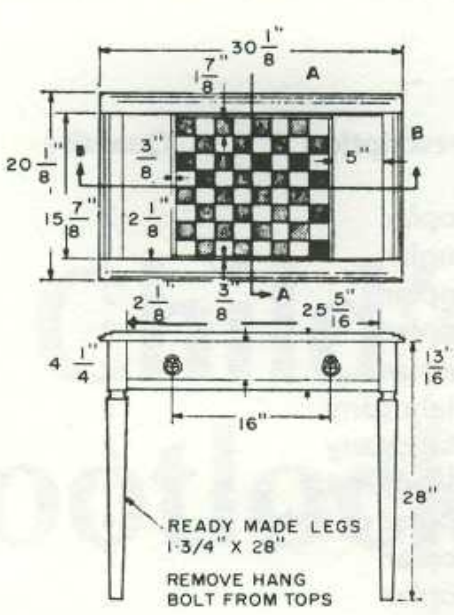
The drawer is easily made using a double front. The face piece matches the apron; sides, front, and rear are ½-inch plywood and the bottom is ¼-inch plywood. Make rabbet cuts for the rear and bottom section. Drill clearance holes for the pull screws in the front inner panel. Assemble the drawer with glue and 1½-inch finishing nails.

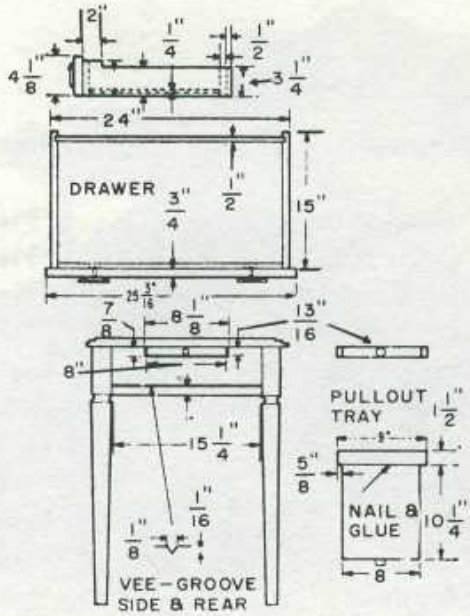
The leatherette panels are cut to size but are not installed until the table has been stained and lacquered. If spraying equipment is used, mask off both the panel and checkerboard areas. Masking can best be done with kraft paper and masking tape. If you use a brush, you can eliminate the kraft masking over the checkerboard area—however, the edges should be taped anyway to prevent color from running into clear areas.

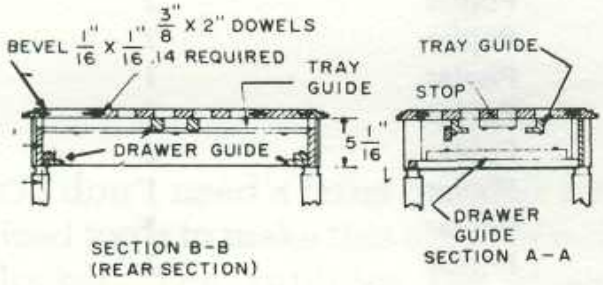
After color finish is completed, remove masking from chessboard area and apply clear lacquer or varnish over the entire table. When dry, remove the mask from the panel area and cement the leatherette. Spray adhesive works best for this. Apply to leatherette and when the adhesive becomes tacky, apply leatherette to the table surface. Work the edges into the beveled edges.

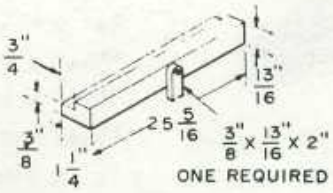
This completes the table. Add the hardware and get out the chessmen.

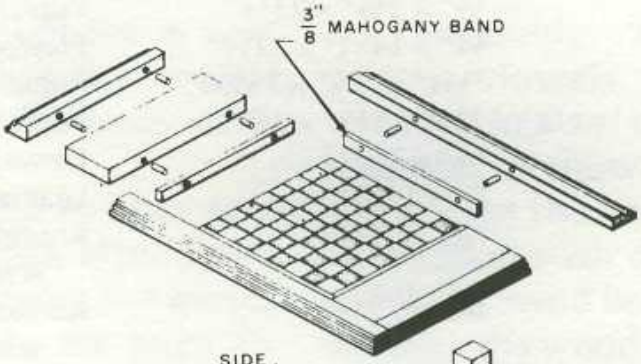
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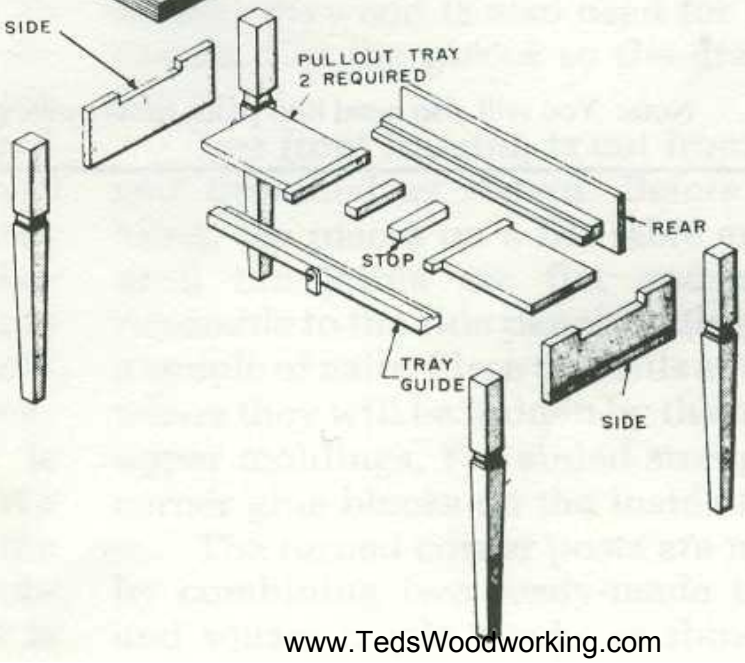


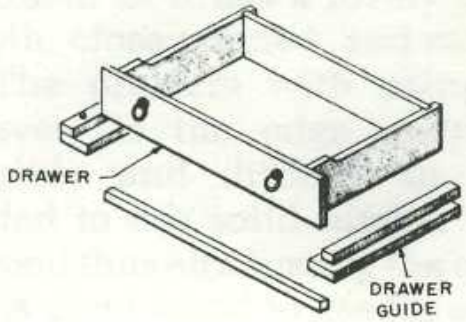












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MATERIALS LIST

Purpose	Size	Description	Quantity
Apron sides	13/16" × 5 1/16" × 15 1/4"	Poplar	2
Apron rear	13/16" × 5 1/16" × 25 5/16"	Poplar	1
Top front and rear ends	13/16" × 2 1/8" × 30 1/8"	Poplar	2
Top side ends	13/16" × 2 1/8" × 15 3/4"	Poplar	2
Top panel	3/16" × 5" × 15 3/4"	Poplar	2
Band end	3/8" × 13/16" × 15"	Mahogany	2
Band end	3/8" × 13/16" × 15 3/4"	Mahogany	2
Strip	13/16" × 1 7/8" × 15"	Mahogany	4
Strip	13/16" × 1 7/8" × 15"	Poplar or Ash	4
Tray	13/16" × 8" × 10 1/4"	Poplar	2
Tray rear	13/16" × 1 1/2" × 9"	Poplar	2
Tray guide	13/16" × 1 1/4" × 25 5/16"	Poplar	2
Tray stop	13/16" × 1 1/8" × 8"	Poplar	2
Drawer stop	3/8" × 13/16" × 2"	Poplar	1
Drawer runner	13/16" × 1 3/4" × 14 1/4"	Poplar	2
Drawer guide	13/16" × 1 1/8" × 14 1/4"	Poplar	2
Drawer front	13/16" × 4 1/8" × 25 3/16"	Poplar	1
Drawer subfront	1/2" × 3 3/4" × 23"	Poplar	1
Drawer sides	1/2" × 3 3/4" × 15"	Poplar	2
Drawer rear	1/2" × 2 3/4" × 23 1/2"	Poplar	1
Drawer bottom	1/4" × 14 3/4" × 23 1/2"	Plywood	1
Drawer support	13/16" × 2 3/4" × 25 5/16"	Poplar	1
Legs	1 3/4" × 1 3/4" × 28"	Poplar	4
	3/8" × 2"	Dowels	12
Panels	5" × 15 3/4"	Leatherette	2
	No. 8 1 1/2"	Round-head screws	as needed
	No. 8 2 1/2"	Round-head screws	as needed

Note: You will also need lion pulls, brass pulls, glue, spray adhesive, stain and lacquer.

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Child's Footlocker



YOU don't need a lathe or other specialized tools to make this attractive child's footlocker. The spindles are assembled from stock items and, except for a few scroll cuts made with a saber saw, every bit of the construction can be done with ordinary hand tools.

The combination of solid lumber and plywood used in construction eliminates the problems that often confront the home craftsman. Wide flat boards are hard to come by in solid lumber except perhaps for knotty pine which is not suitable in this case. Our solution was to use plywood which is available in many types of wood and in several thicknesses. Birch was selected for the child's footlocker illustrated as it has a lovely grain and is smooth, close grained, and easy to finish.

The problem with using plywood, however, is the edge grain which is unsightly and difficult to finish. We decided to use solid lumber to edge the plywood thus eliminating the second problem. A good wood to use for edge work is poplar. It, too, has an excellent grain pattern, is close-grained and is easy to work.

Assembly is accomplished with screws, dowels, nails and glue. Cut all sections to size, check for proper fit, then assemble as shown in the photographs. The edging for the seat section is mitered and assembled with dowel pins. If you cut the miters by hand be sure they are straight and square. Plywood is also used for the end panels. Cut the pieces so the grain runs vertically.

The front framing is cut from poplar and dowelled as shown. Before assembling, lay pieces on a flat table and sand until the joints are flat and smooth. Assemble to the side panels with glue and a couple of nails. Place the nails at the ends where they will be hidden by the base and upper moldings. For added strength, use corner glue blocks on the inside corners.

The turned corner posts are made up by combining two ready-made turnings and square maple blocks as shown. The

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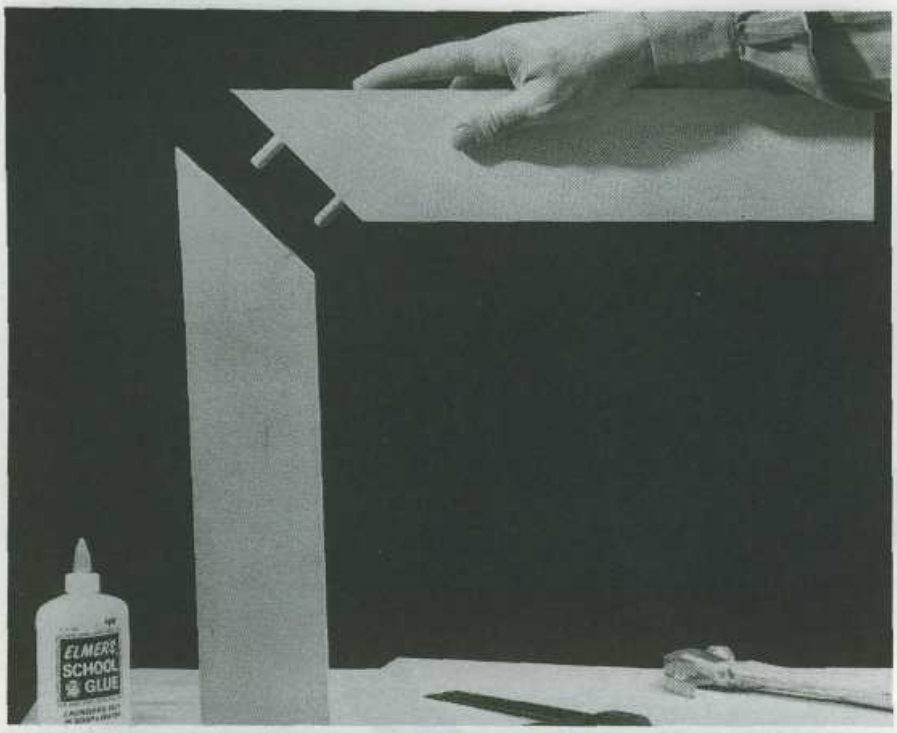


Fig. 9-1. The frame of the footlocker seat is cut from ¾-inch poplar. First miter the corners, then assemble with the aid of both dowels and glue, as pictured in this photograph.

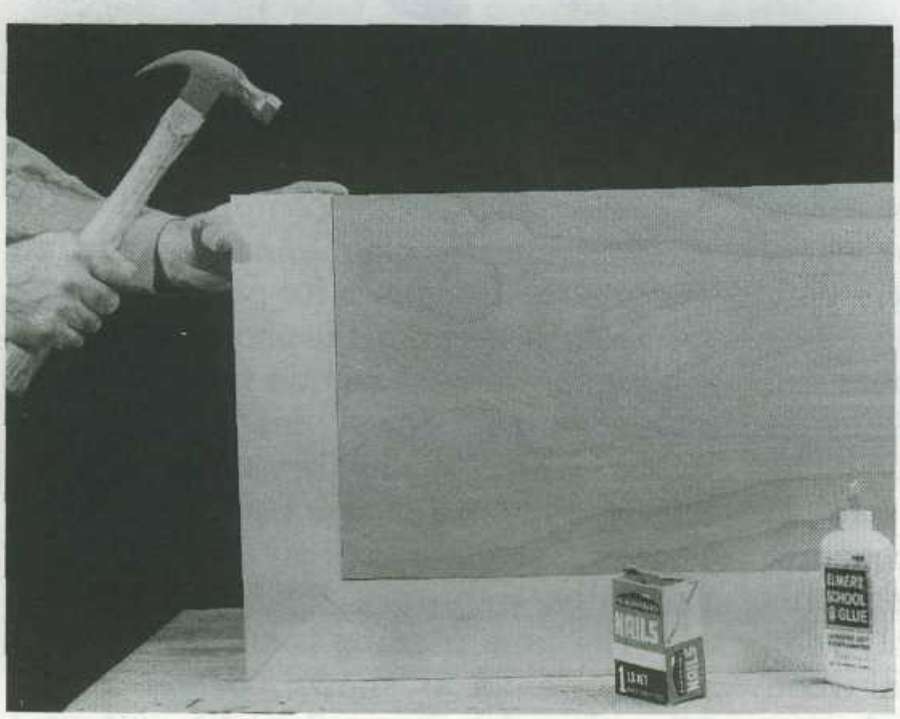


Fig. 9-2. As shown here, nails and dowels are used to attach the poplar frame to the birch plywood seat. If they are readily available, clamps will prove to be very helpful, also.

squares are cut from a length of maple base block. The ends are rounded by using a file and following up with sandpaper. Assemble with dowels and white glue. Ordinary dowels may be used, but grooved dowel pins are best as they will retain the glue better.

The spindles for the seat back and arm rests are also stock items. For the arm rests, the spindles are cut in half. The cut end of the spindles will have to be whittled so they will fit the holes drilled into the seat. Refer to the drawing.

The drawers are made of ½-inch lumber with ¼-inch plywood bottoms. Three-quarter-inch false fronts are added to the drawers. This greatly simplifies construction and eliminates the need for

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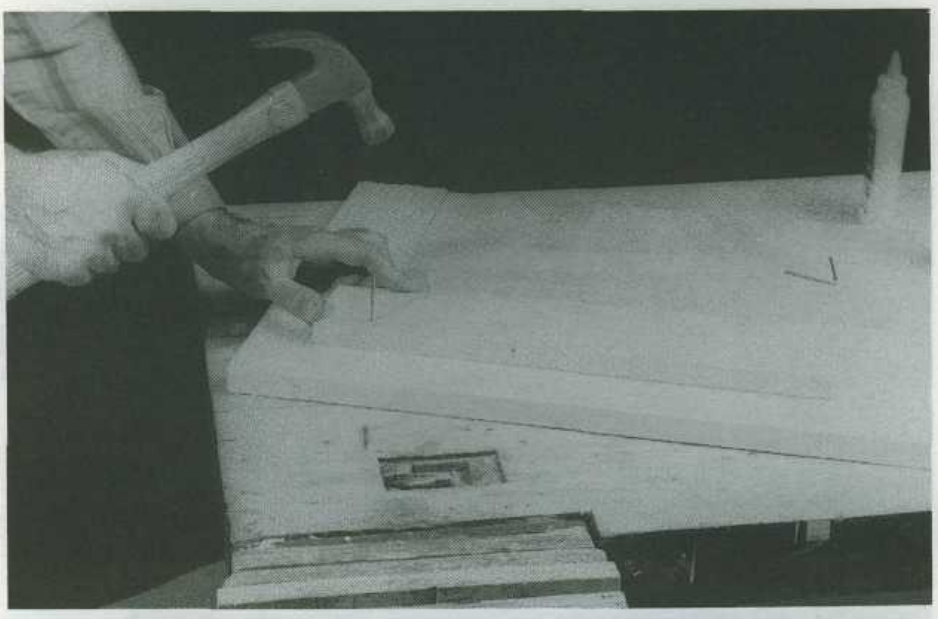


Fig. 9-3. The cleats are attached to the underside of the footlocker seat with the aid of both nails and glue. Note the dimensions for same as listed in the adjacent Materials List.

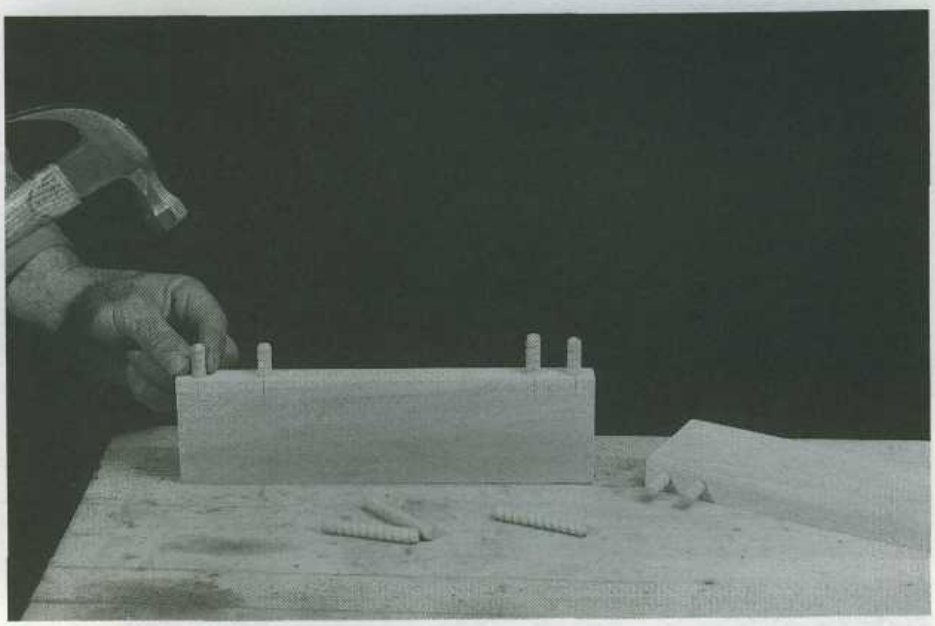


Fig. 9-4. The poplar front framing is doweled as pictured here. Before beginning the assembly, lay all the pieces on a flat table and sand the joints until they are flat and smooth.

shaping and undercutting. Single track drawer hardware is recommended. The type used here was Knape-Vogt No. 1175.

The base is cut to shape then assembled by means of screws from the inside. Likewise, the seat is assembled to the side, rear and front by means of cleats and round-head screws.

After assembly, sand smooth then stain and finish as desired.

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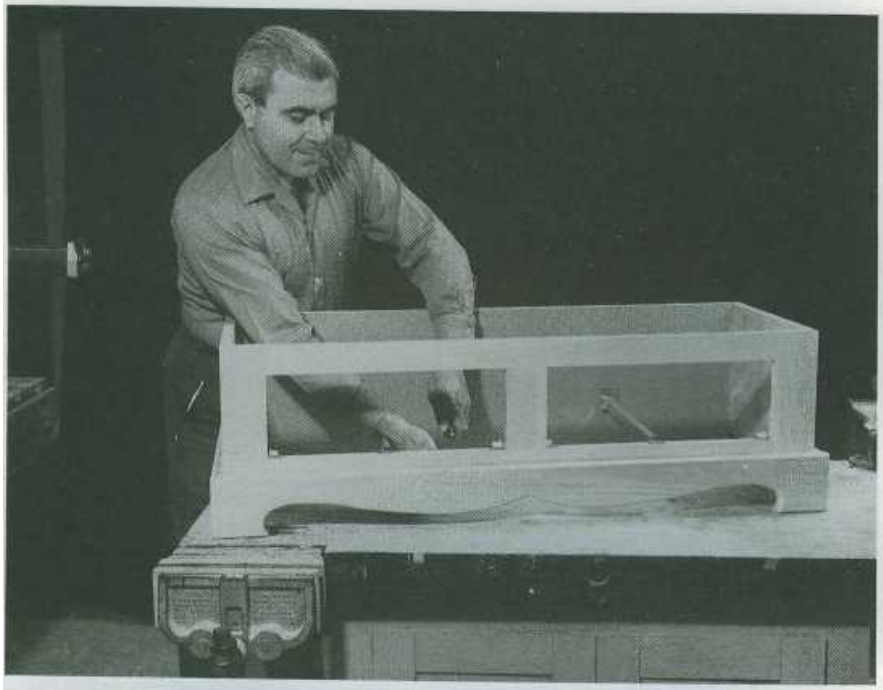


Fig. 9-5. The base section is fastened to the main section with the aid of screws. Note the single track drawer slide hardware. Knape-Vogt No. 1175 was selected for use in this project.

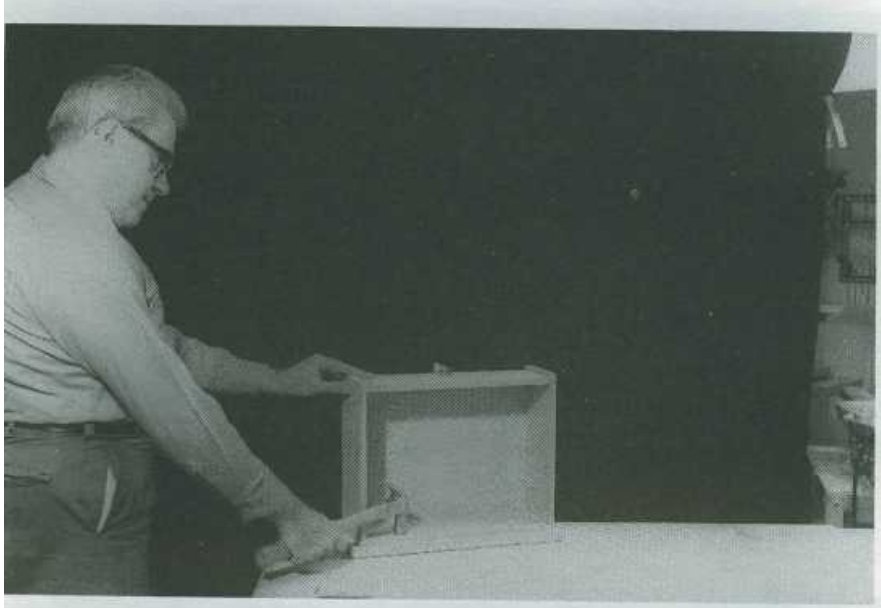


Fig. 9-6. Drawer construction is greatly simplified by the use of false fronts which also eliminate need for shaping, undercutting. Drawer's completed first, then false front added.

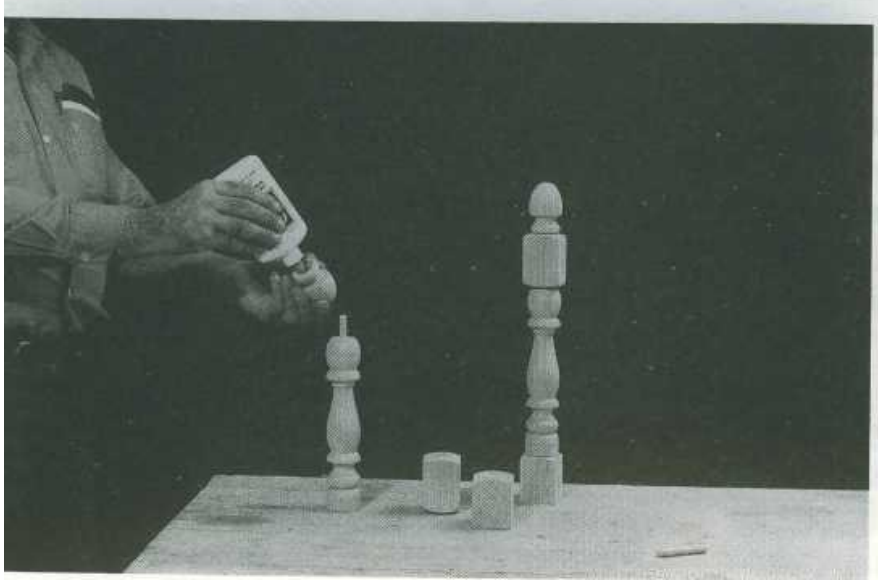


Fig. 9-7. No lathe is needed—corner posts are made up by combining two ready-made turnings with square maple blocks. Ends are rounded by a file, sandpaper.

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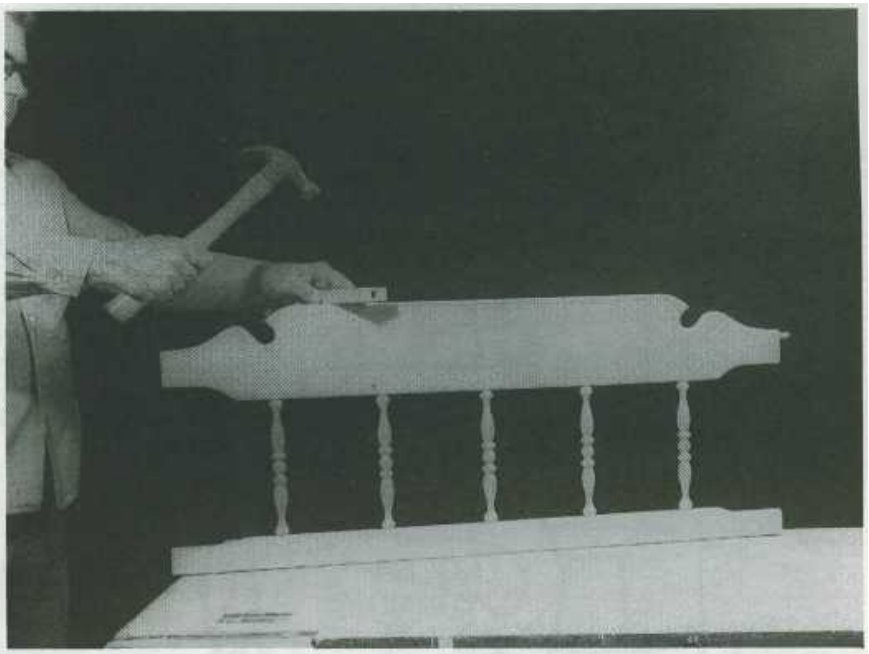


Fig. 9-8. The back piece is drilled to accept the spindles. The scrap under the hammer serves to prevent any damage. Seat back and arm rest spindles are both stock items.

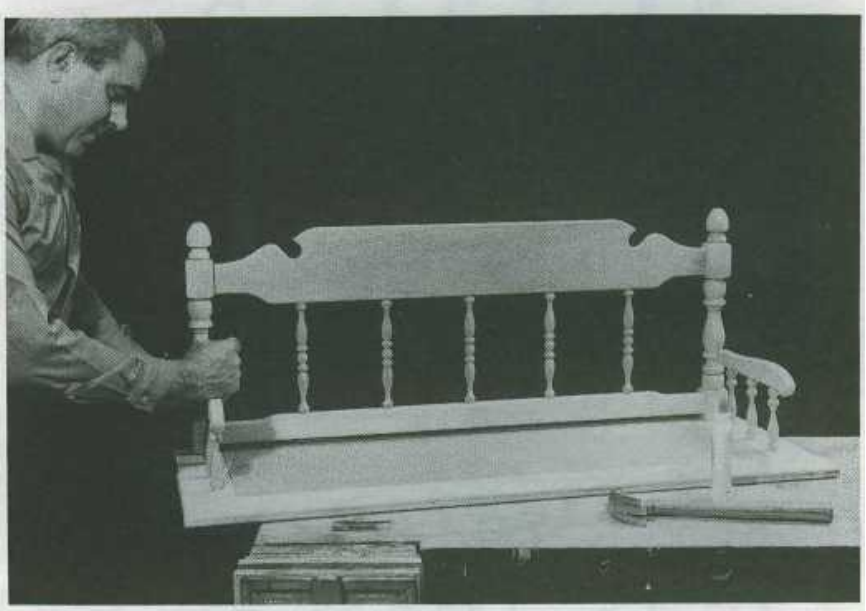


Fig. 9-9. For the two poplar arm rests, the 5 7/16-inch-long side spindles are cut in half. You will have to whittle their cut ends so as to fit the holes drilled into the seat, as shown here. For further information, refer to the drawing.

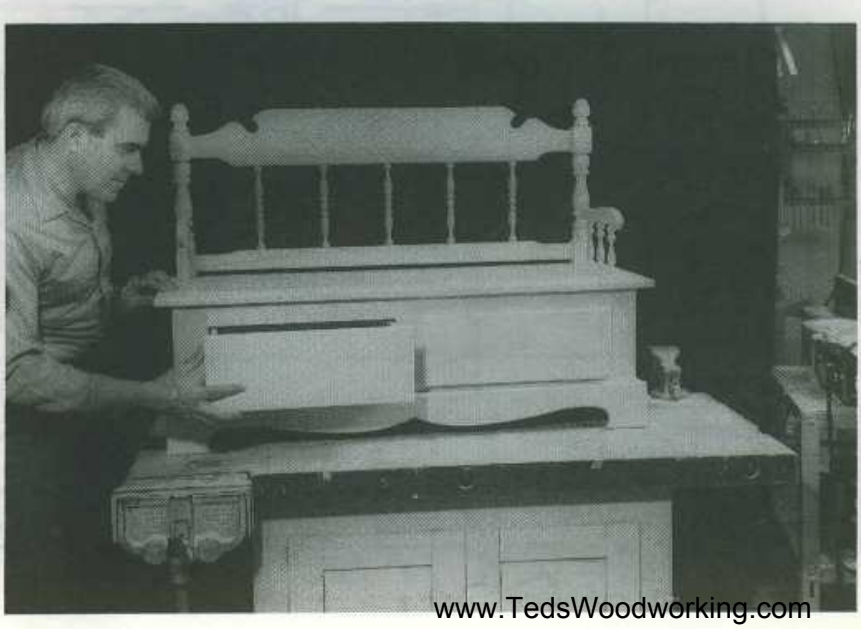
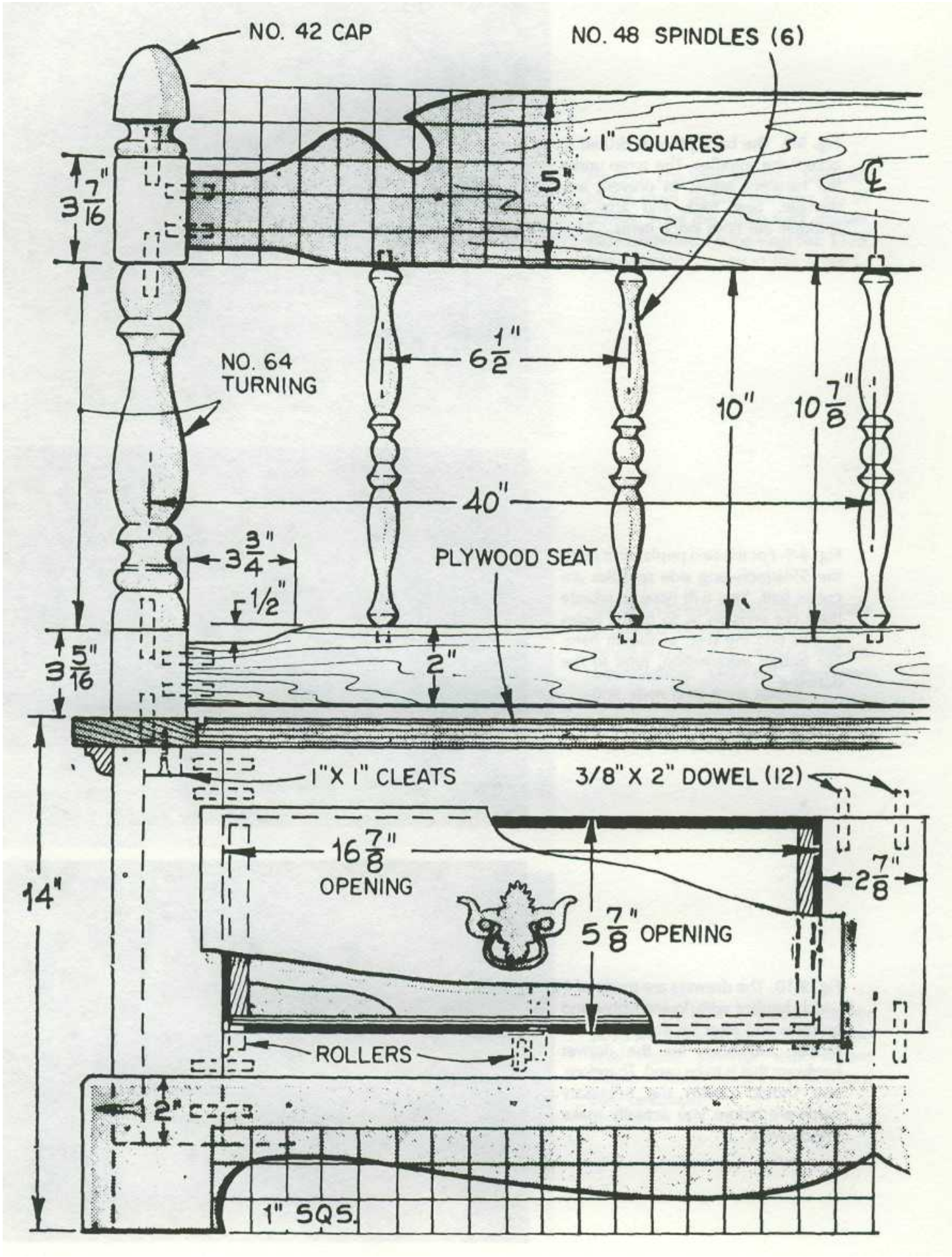
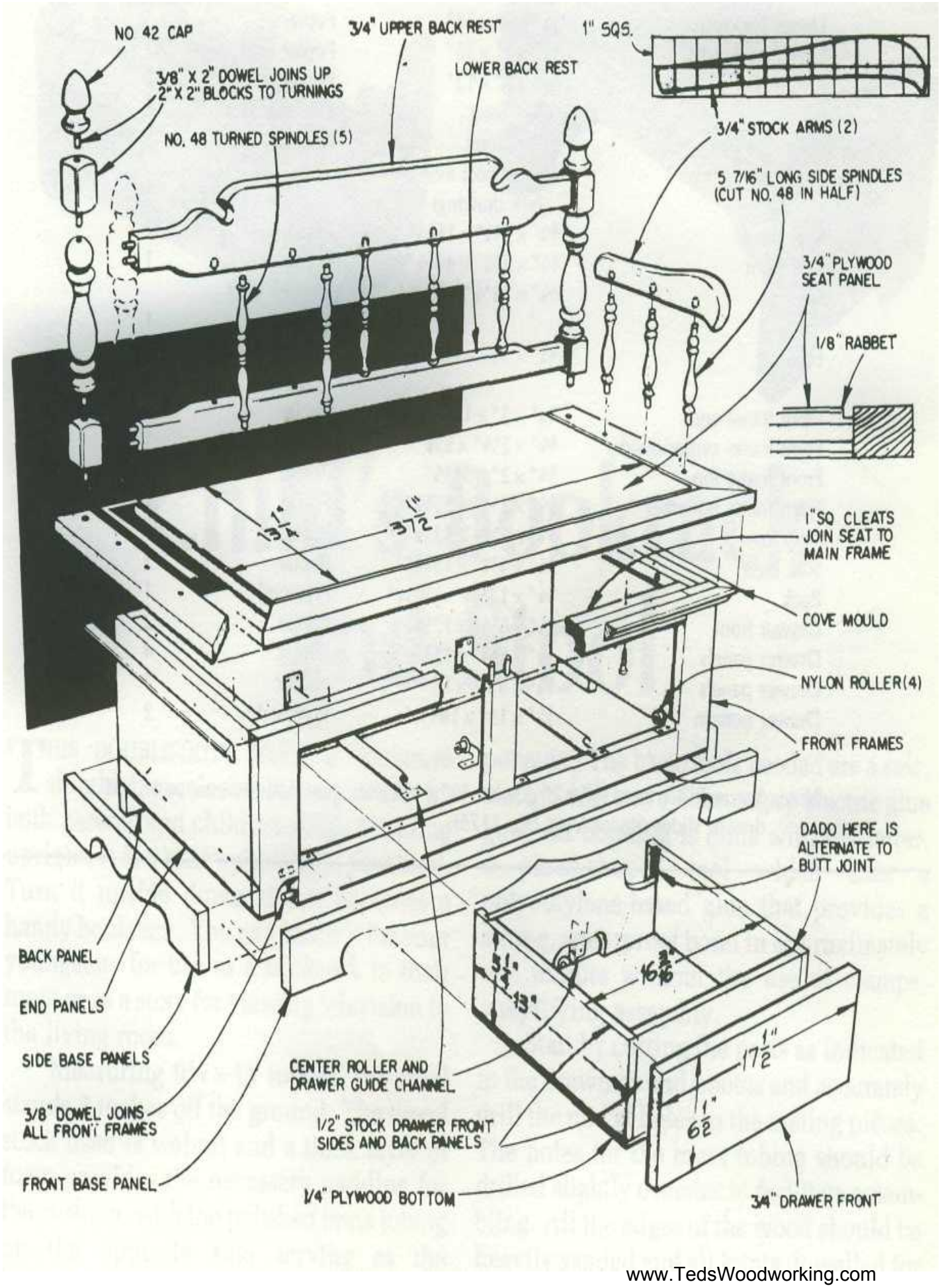


Fig. 9-10. The drawers are made of ½ -inch lumber with ¼-inch plywood bottoms and must be made with the proper allowance for the drawer hardware that is to be used. Therefore, you should obtain the necessary hardware before you actually make the drawers.

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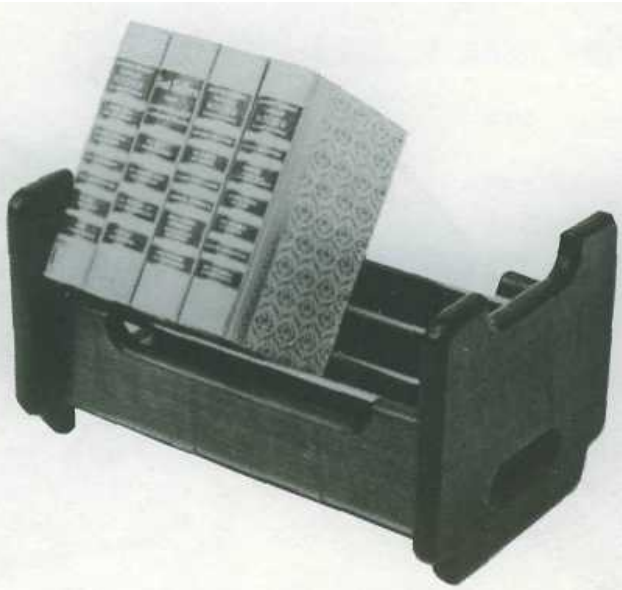
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MATERIALS LIST

Purpose	Size	Description	Quantity
Upper backrest	¾" × 5" × 38"	Poplar	1
Lower backrest	¾" × 2" × 38"	Poplar	1
Armrests	¾" × 2" × 12"	Poplar	2
	5 7/16" long	Side spindles	6
	10 7/8" long	Rear spindles	5
	Corner post assembly (see drawing)		2
Seat sides	¾" × 3½" × 16¾"	Poplar	2
Seat front	¾" × 3½" × 44½"	Poplar	1
Seat	¾" × 13¼" × 37½"	Lumber core birch	1
Ends	¾" × 11" × 15"	Lumber core birch	2
Front frame ends	¾" × 3" × 11"	Poplar	2
Front frame center divider	¾" × 2 7/8" × 5 7/8"	Poplar	1
Front frame top	¾" × 2" × 35¾"	Poplar	1
Front frame bottom	¾" × 3⅛" × 35¾"	Poplar	1
Front base	¾" × 4¼" × 43¼"	Poplar	1
Side base	¾" × 4¼" × 15¾"	Poplar	2
Back	¾" × 13 3/16" × 40¼"	Plywood	1
Drawer front	¾" × 6½" × 17¼"	Poplar	2
Drawer panels	½" × 5¼" × 15 3/16"	Poplar	4
Drawer panels	½" × 5¼" × 13"	Poplar	4
Drawer bottom	¼" × 13" × 16 3/16"	Plywood	2

Note: You will also need ⅜" × 2" dowels, ¾" × 1" cleats, glue, nails, screws, pulls, and drawer slides (Knape-Vogt No. 1175).

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Child's Bookrack and Stool

THIS DOUBLE-DUTY PIECE of furniture should be welcome in any home by both parents and children alike. Standing upright, it is a neat upholstered footstool. Turn it upside down and it becomes a handy bookrack. You can build it for your youngsters for use as a bookrack in their room or as a stool for viewing television in the living-room.

Measuring 9⅜ × 13 inches, the stool stands 8 inches off the ground. The wood stock used is walnut and a thick layer of foam provides the necessary padding for the cushion, with the polished brass tubing on the opposite side serving as the bookrest. Construction is very easy, with all the dimensions shown on the plans. (See materials list for size of all components.) The basic tools needed are a saw, electric drill and a Thermogrip electric glue gun. All bonding is done with the latter, a pistol-shaped tool which uses a polyethylene-based glue that provides a strong, waterproof bond in approximately one minute without the use of clamps, simplifying assembly.

Start by cutting the parts as indicated in the drawings and photos and accurately drill the dowel holes in the mating pieces. The holes for the brass tubing should be drilled slightly oversize to facilitate assembling. All the edges of the wood should be heavily sanded and all joints dowelled for added strength and rigidity. Next bond with the Thermogrip gun. There is no need to wait while the glue sets—just apply glue,

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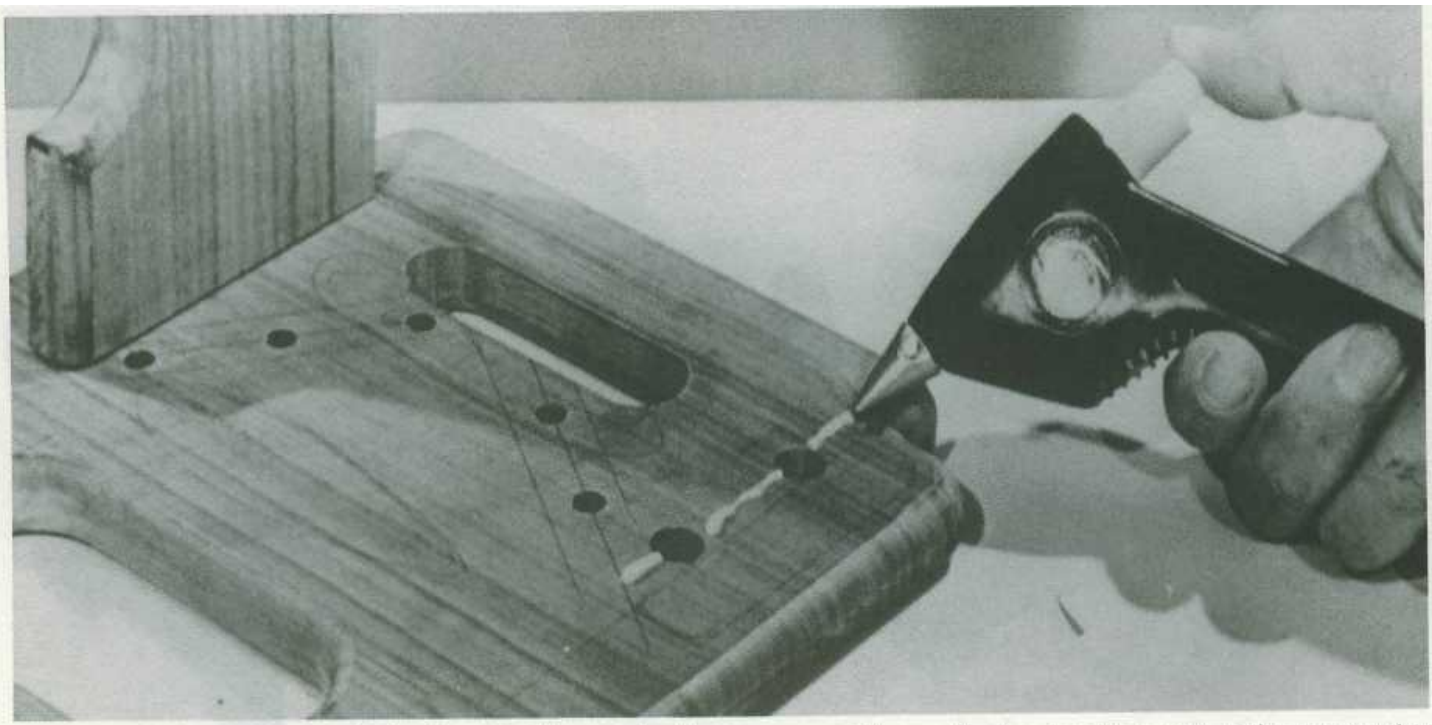
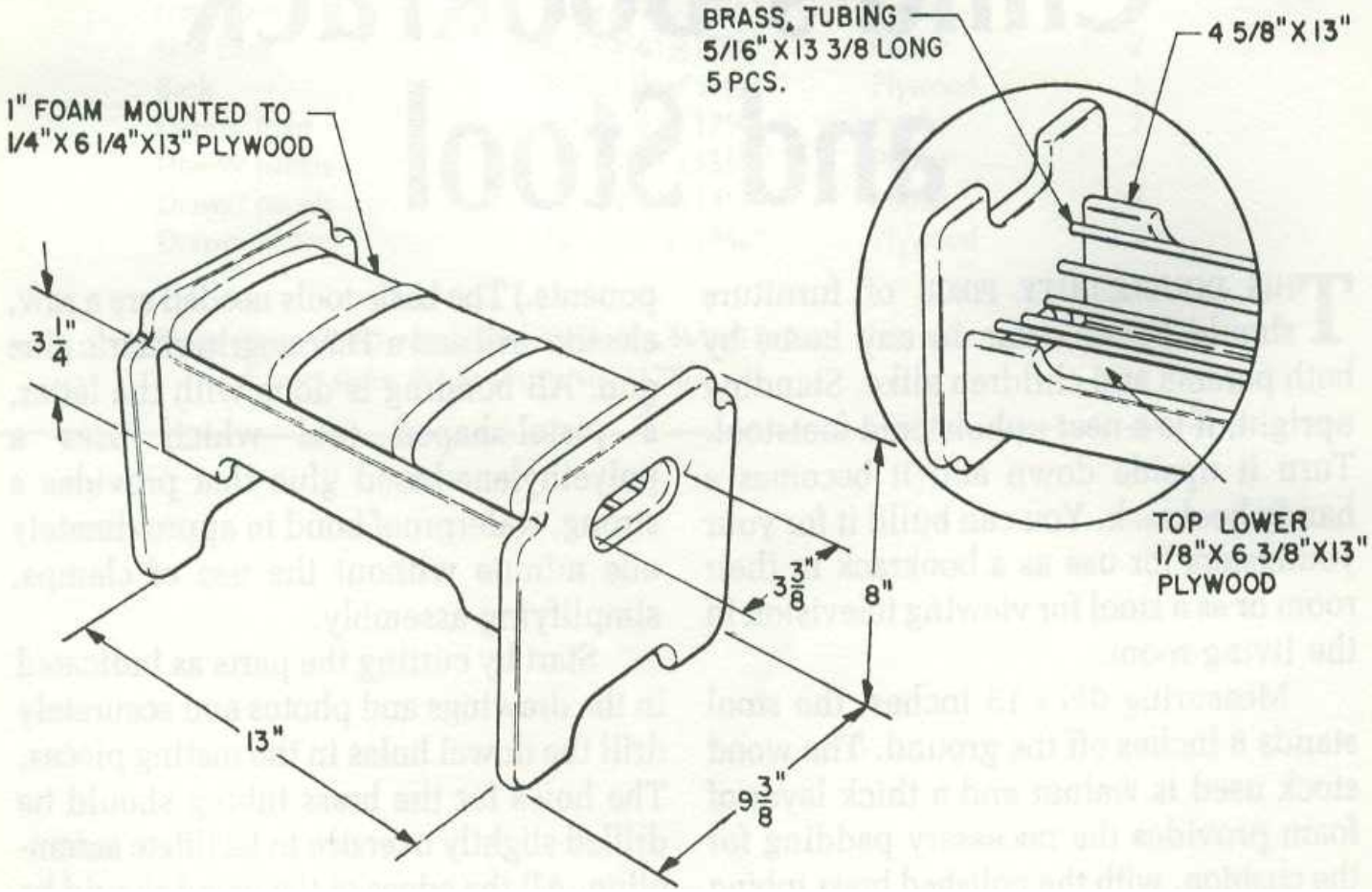


Fig. 10-1. A thin line of hot-melt glue from the Thermogrip electric gun provides an effective bonding agent in the construction of the combination bookrack-stool. The glue dries in approximately 60 seconds.



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MATERIALS LIST

Purpose	Size	Description	Quantity
Ends	8″ × 9⅜″	Walnut	2
Front	3¼″ × 13″		
Rear	4⅝″ × 13″		
Top upper	¼″ × 6¼″ × 13″	Plywood	
Top lower	⅛″ × 6⅜″ × 13″	Plywood	
Brass tubing	5/16″ × 13⅜″	1-inch foam	5
	½″ dia.	Dowel rod	
		Cushion cover material	

press the parts together for twenty seconds and the project is completed.

If you have a router or shaper available, break all the corners with a quarter round cutter. Otherwise, sand first with a coarse paper, then fine and finally an extra fine grade. Use a paste wood filler to seal the pores. For finishing use a thin wash coat of shellac; apply coat of shellac or varnish.

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Colonial Desk with Bookrack

THIS ATTRACTIVE DESK will enhance any room in your home. The single pedestal is an offshoot of the more common double pedestal, which was very popular in colonial days. It has four roomy drawers, with the largest one at the bottom made to hold letter-size folders. The pedestal support serves as a bookrack to hold a good supply of reading materials.

As shown in the drawing, cleats are used extensively. They greatly simplify construction and assembly, as well as eliminate the need to drive nails or screws through the top surface of the desk. Some nails are driven through the side members, but they can be replaced with nails or screws driven from the inside of the cabinet.

The pedestal and bookrack are cut from 1⅛-inch white pine. We used common lumber because it costs about one-half as much as clear. Colonial furniture should have knots, but by carefully selecting your lumber you can eliminate the really bad ones.

You will note that fake tenons are used on the bookshelf members. The final effect looks like the real thing, but the fake method shown is easier and perhaps a little stronger.

The tools required for this project are a table saw, saber saw, router, and drill. In addition, you will need the usual hand tools, such as a hammer, screwdriver, and wrench.

Select flat boards for the top and sides. Cut the pieces to size and shape the bottom edges as shown in the drawing. After cutting the scallop design, use a router with a rounding-off cutter to round off the outside face of the cut. Do not rout the inside face.

Place the top board face down onto a flat surface. (The top of a table saw is ideal because it is exceptionally flat.) Next cut and install the cleats as indicated, using glue and 1¼-inch brads. Rabbet the rear cleats to accept the ¼-inch back panel. Make the rabbet either on the table saw or with the router. Note that the front cleat is

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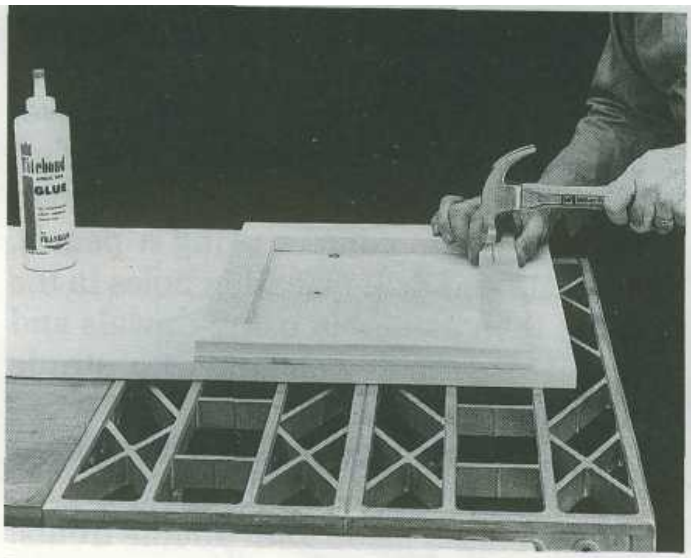


Fig. 11-1. In assembling the colonial desk, cleats are used extensively as in most fine furniture construction. Attach with glue and nails.

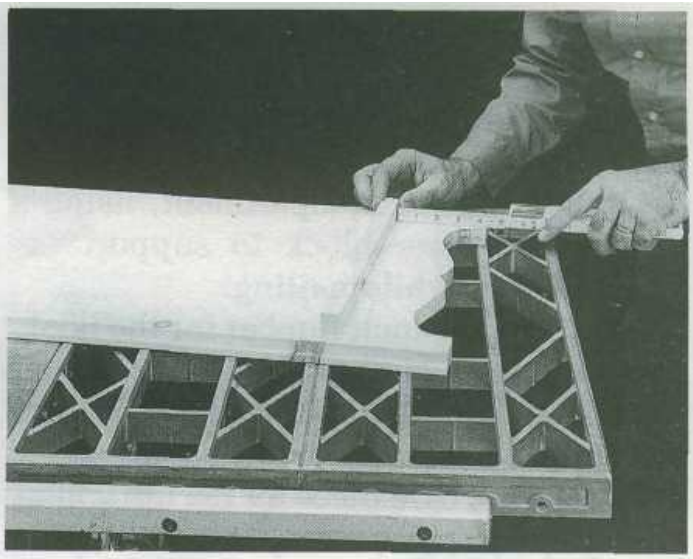


Fig. 11-2. An exception is a temporary cleat in the base of the cabinet. Attach it with nails only. Remove it when you install the bottom panel.



Fig. 11-3. Installing the bottom board. Note the two blocks that are aids to positioning. Remove them after you have nailed the bottom board in the proper position.



Fig. 11-4. Use lag screws to join shaped pedestal and base sections, as well as the top section to the pedestal. Use washers under screw heads.

1 inch in from the front. Side cleats are 1¾ inch from the edge.

Next, prepare the side panels. Rabbet the rear edge of both, but note that the left upright is rabbeted at two places near the top. The smaller rabbet is to accept the rear panel of the wide drawer compartment.

To ensure proper alignment in assembly, make up a couple of temporary cleats. At this time also cut the bottom panel for the drawer compartment. Install the temporary cleats so that the bottom panel rests on them as shown. Glue up the section and nail it in place, using a square

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to make sure the sections are perpendicular. If necessary, nail a diagonal to hold the sections while the glue sets. Add the drawer compartment cleats and install the single drawer compartment, using a temporary spacer block to support the bottom board while nailing.

Cut the 1⅛-inch lumber for the bookrack section to size and round the edges with the router. This time round both sides to obtain a half-round effect.

Make the base piece for the upright by gluing up two pieces of ¾-inch stock. After shaping, assemble to the upright with two 3-inch lag screws.

To align the shelves, drill the dowel holes in the end piece and place it right up to the center upright. Center it and then transfer the hole centers using a pencil. Next locate and drill matching holes in the shelves, then assemble using dowels and screws. Drive the dowels so they protrude ½ inch from the outside.

Make up two fake tenons and assemble with glue.

Drawers are made with double fronts.

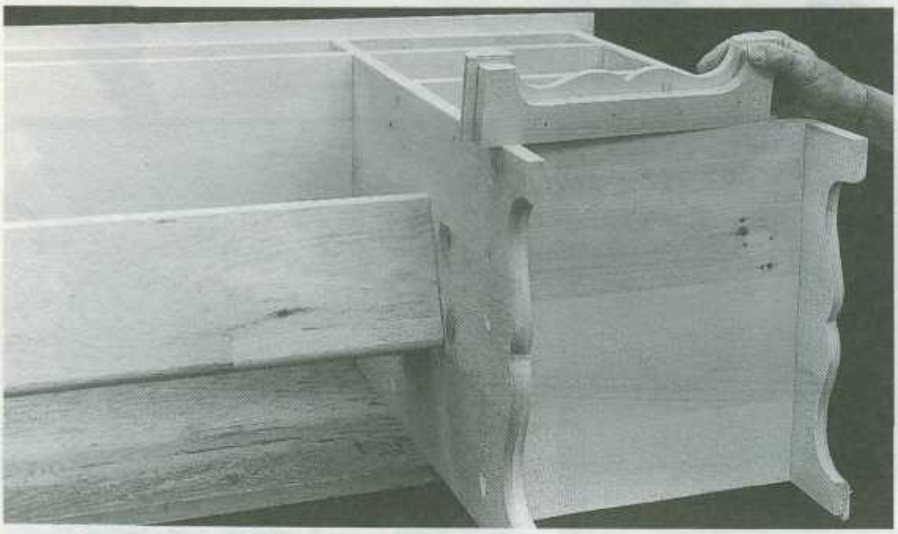


Fig. 11-5. Attaching the scalloped base to the backup board at the front of the desk. Glue with nails only at the sides.

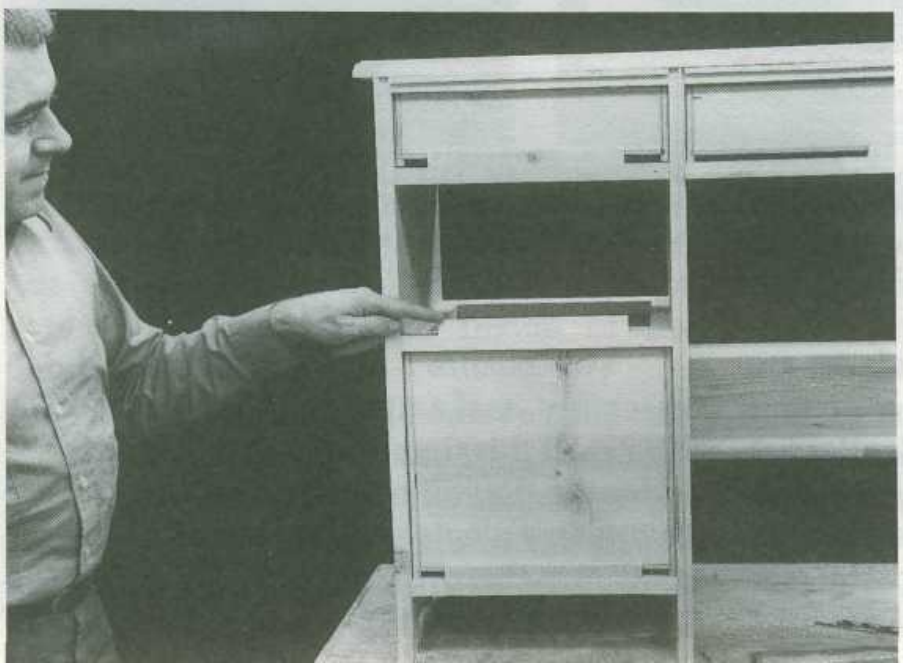
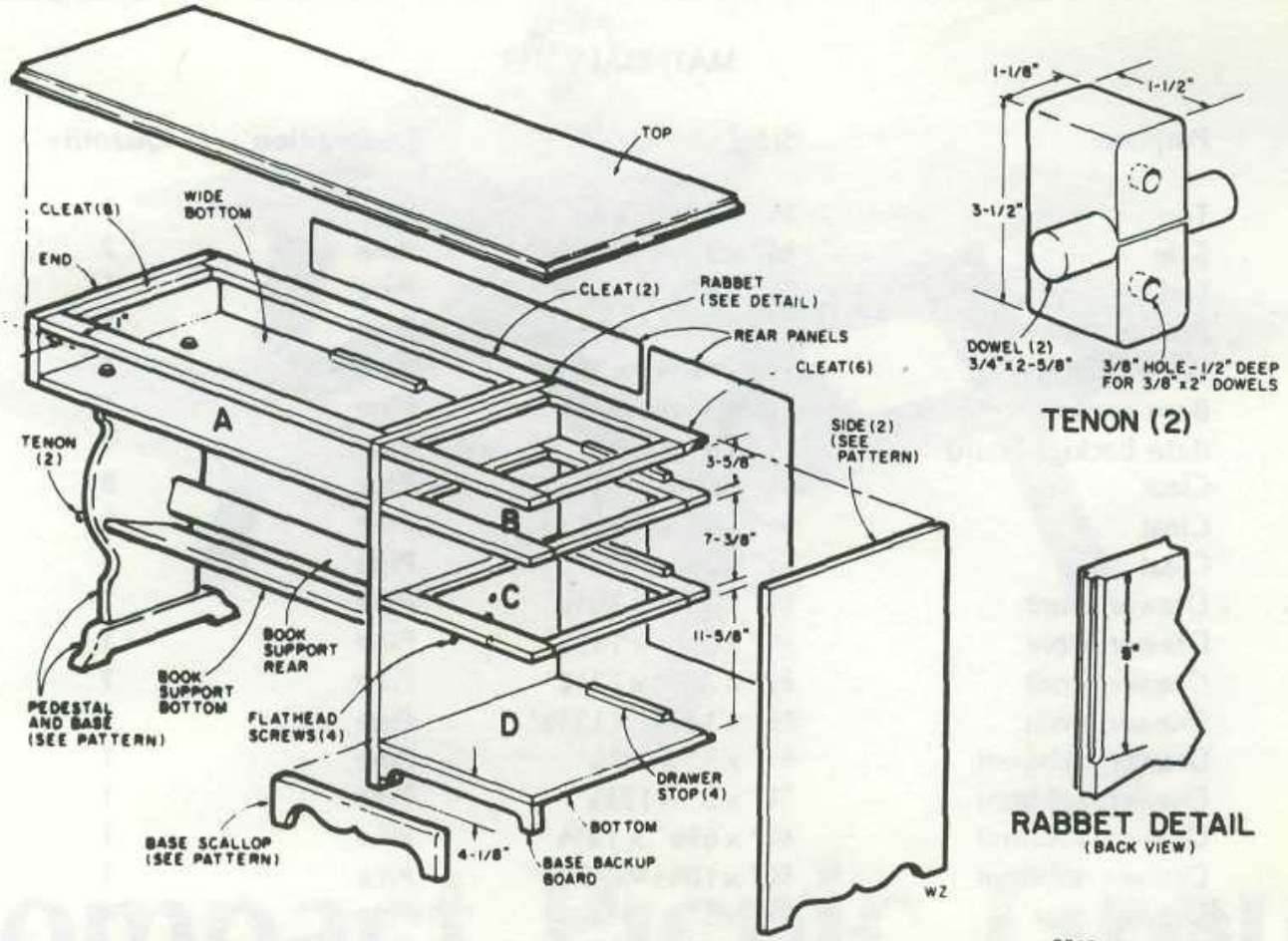


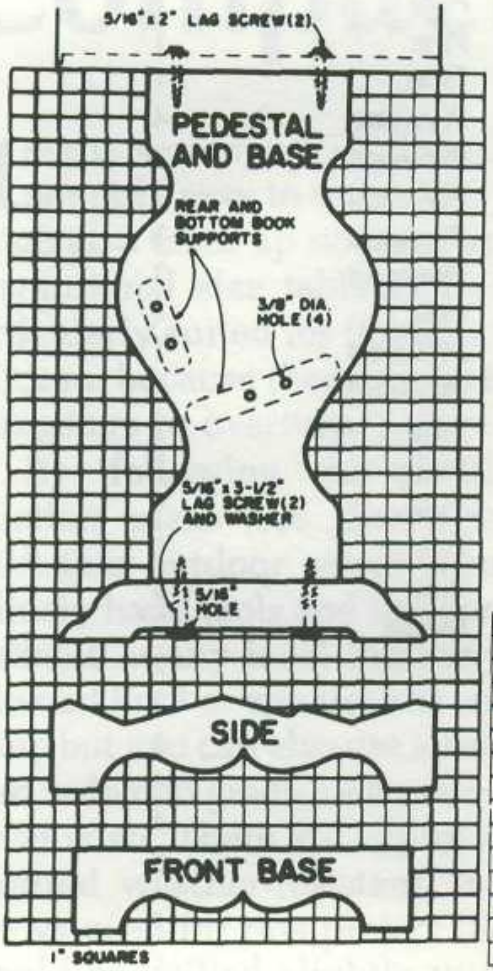
Fig. 11-6. Nail and glue the drawer stops to the rear of each compartment. Place them so the drawer fronts protrude ⅜ inch.

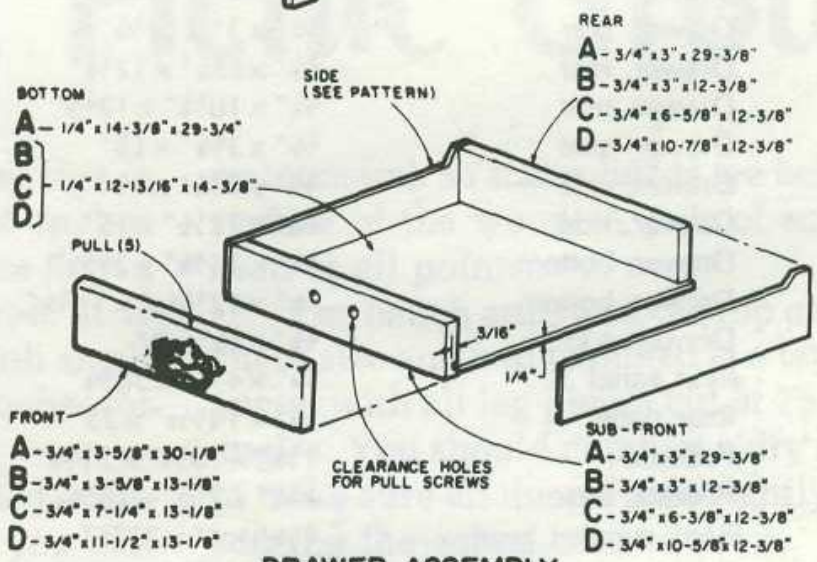
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TENON (2)

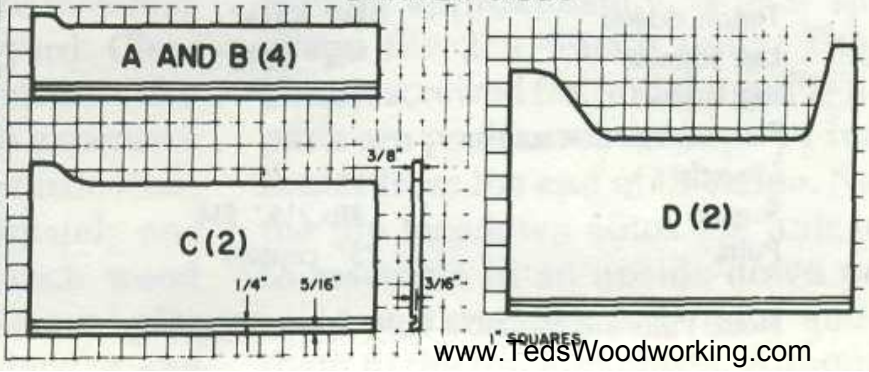
RABBET DETAIL
(BACK VIEW)





DRAWER ASSEMBLY

DRAWER SIDES



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MATERIALS LIST

Purpose	Size	Description	Quantity
Top	¾" × 17¼" × 48"	Pine	1
Side	¾" × 16⅛" × 29¼"	Pine	2
End	¾" × 5¼" × 16⅛"	Pine	1
Bottom	¾" × 13¼" × 16⅛"	Pine	1
Wide bottom	¾" × 16⅛" × 30¾"	Pine	1
Base scallop	¾" × 3½" × 14¼"	Pine	1
Base backup board	¾" × 3" × 13¼"	Pine	1
Cleat	¾" × 1" × 11⅞"	Pine	8
Cleat	¾" × 2" × 13¼"	Pine	6
Cleat	¾" × 2" × 30¼"	Pine	2
Drawer, front	¾" × 3⅝" × 30⅛"	Pine	1
Drawer, front	¾" × 3⅝" × 13⅛"	Pine	1
Drawer, front	¾" × 7¼" × 13⅛"	Pine	1
Drawer, front	¾" × 11½" × 13⅛"	Pine	1
Drawer, subfront	¾" × 3" × 29⅜"	Pine	1
Drawer, subfront	¾" × 3" × 12⅜"	Pine	1
Drawer, subfront	¾" × 6⅜" × 12⅜"	Pine	1
Drawer, subfront	¾" × 10⅝" × 12⅜"	Pine	1
Drawer, rear	¾" × 3" × 29⅜"	Pine	1
Drawer, rear	¾" × 3" × 12⅜"	Pine	1
Drawer, rear	¾" × 6⅝" × 12⅜"	Pine	1
Drawer, rear	¾" × 10⅞" × 12⅜"	Pine	1
Drawer, side	⅜" × 3⅝" × 15"	Plywood	4
Drawer, side	⅜" × 7¼" × 15"	Plywood	2
Drawer, side	⅜" × 11½" × 15"	Plywood	2
Drawer, bottom	¼" × 14⅜" × 29¾"	Plywood	1
Drawer, bottom	¼" × 12 13/16" × 14⅜"	Plywood	3
Drawer stop	⅜" × ¾" × 8"	Pine	4
Rear panel	¼" × 4½" × 30¾"	Plywood	1
Rear panel	¼" × 14 3/16" × 25"	Plywood	1
Pedestal	1⅛" × 10¾" × 21⅝"	Pine	1
Pedestal base	1¾" × 2½" × 15 7/16"	Pine	1
Book support, rear	1⅛" × 4" × 27⅜"	Pine	1
Book support, bottom	1⅛" × 6¾" × 27⅜"	Pine	1
Tenon	1⅛" × 1½" × 3½"	Pine	2
Tenon dowel	¾" × 2⅝"	Maple	2
Lag screws	5/16" × 3½"		2
Lag screws	5/16" × 2"		2
Flat washers for screws			4
Dowels	⅜" × 2"		4
Screws	#8x2½" FH		4
Pulls	3" centers		5

Note: Pulls are available from Armor Products.

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Compact Picnic Group

HERE IS A compact picnic group that is not only easy to move and set up, but which also takes up no more space than a conventional size table of its type. It is particularly suited for families with small children, because there are no benches for youngsters to overturn.

By following the simplified construction plans (see drawings) you can build this outdoor set of furniture with ordinary hand tools and standard materials available at any local lumber yard. Clear redwood lumber was used to construct this group but you can also use a less expensive heart redwood grade for a more rustic look, if you wish. There are approximately one hundred weather-resistant, 3-inch wood screws used for this project. Screw holes should be drilled slightly undersize and countersunk so screw heads are below the surface of the wood. A pair of screws is used at all points.

The bench arms and the top cleats are cut to size and end trimmed at a 60-degree angle, with all leg pieces cut at 75-degree angles. You should conduct a dry run test to make sure all the parts fit tightly before starting the actual construction.

Begin by assembling the tabletop, leaving approximately ⅜-inch space between the 2- × -6-inch units. The center cleat is screwed flat and the end 2- × -4-inch parts are positioned on edge 14 inches on center from the end of the table. Next turn the top facedown since the unit is easier to assemble in an upside-down position.

Construct the leg units and attach them to the top and cleats. Although easy

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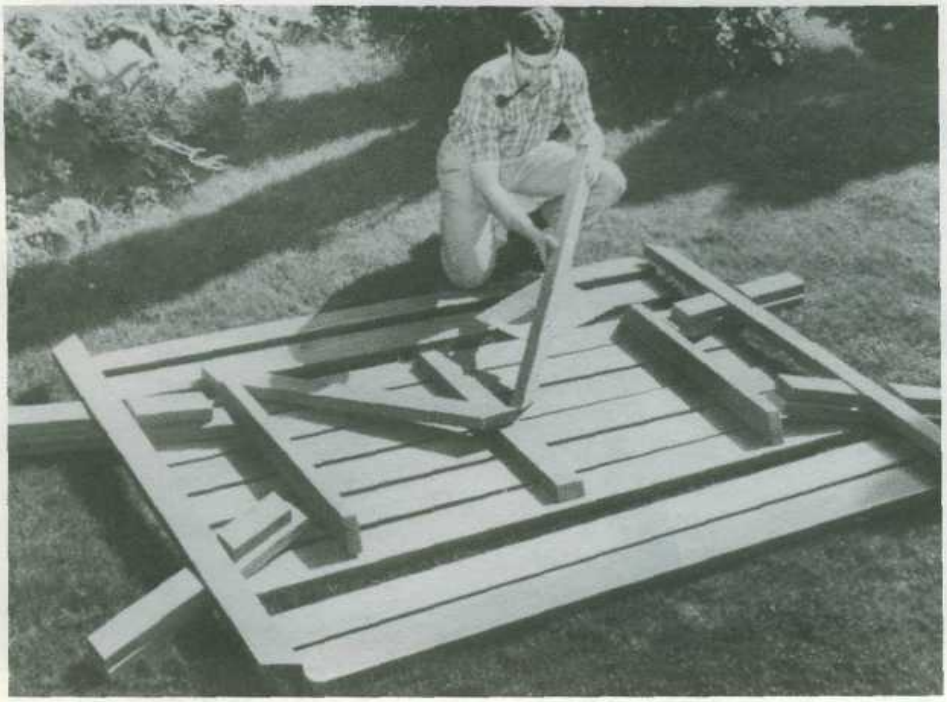
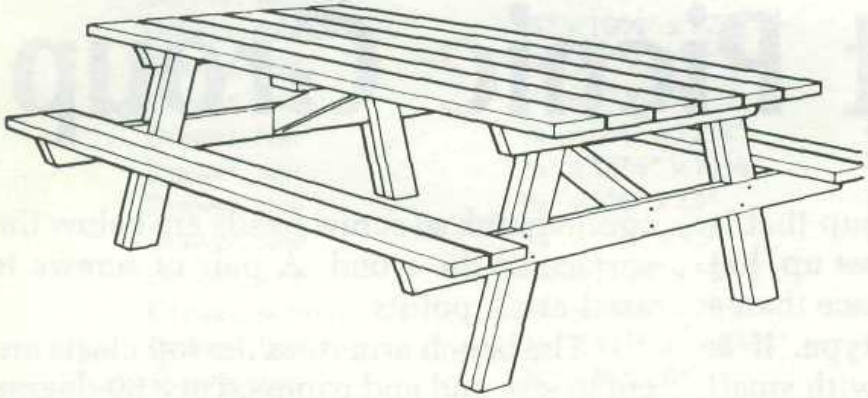
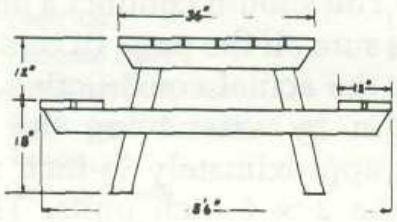
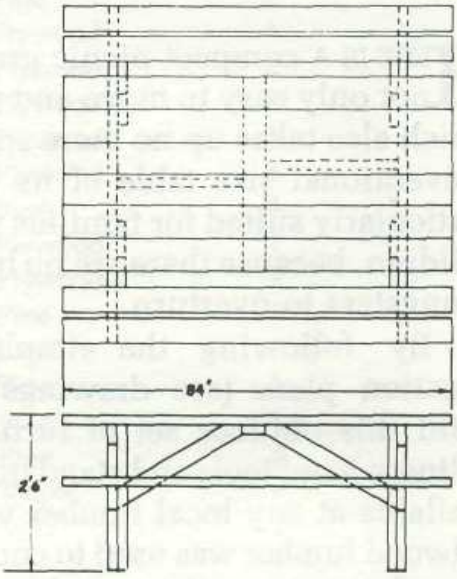


Fig. 14-1. Compact picnic table and bench set accommodates between eight and ten adults. Before beginning actual construction on the set, be sure to lay out all the parts to assure a tight fit.







to build, the interlocking legs and bench support with the lapped construction of the double 2- × -4-inch legs will result in an exceptionally sturdy bench and table set. Diagonal braces, cut at a 120-degree angle are then screwed to the center of the leg units. Finally, right the table to its proper position and fasten the pair of 2- × -6-inch bench boards on each side.

When the group is completely assem-

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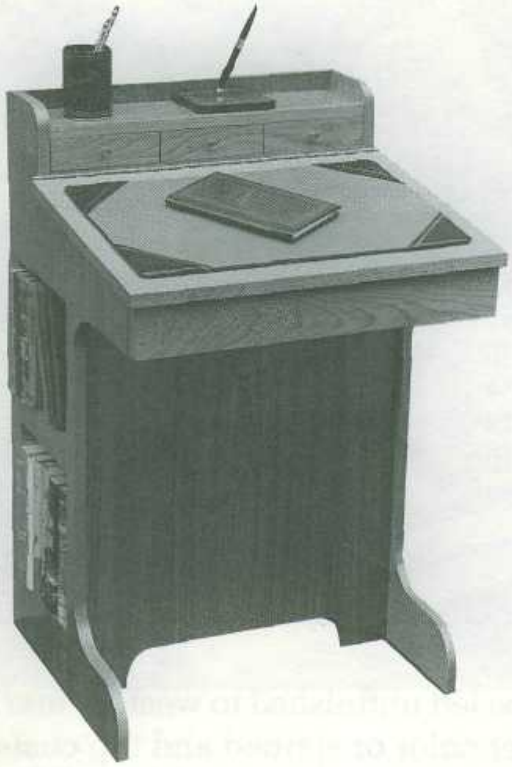
MATERIALS LIST

Note: All lumber indicated is redwood.

Purpose	Size	Quantity
Top	2″ ×6″ ×84″	6
Cleats	2″ ×4″ ×35″	3
Bench arms	2″ ×4″ ×65″	2
Top & leg braces	2″ ×4″ ×40″	2
Legs	2″ ×4″ ×34″	4
Leg doubles	2″ ×4″ ×14″	4
Leg doubles	2″ ×4″ ×10″	4
Bench seats	2″ ×6″ ×84″	4
Wood screws (weather resistant)	3-inch	100

bled, round off the tabletop and seat corners to a 2-inch radius, then sand the entire picnic unit smoothly to eliminate any danger of splinters. The redwood set may be left unfinished to weather into a soft pewter color or stained and top coated for additional protection and long life.

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Compact Writing Desk

THIS GRACEFUL DESK features a storage well, a drawer, and two bookshelves which run completely through the unit. A modern version of the famous Davenport styling, it is generously proportioned and equally suitable for child or grownup. The lid slopes slightly toward the front, making it far more comfortable than the usual flat-topped desk. A lid support bracket holds the top open so that both hands are free while tidying up, etc. If the desk is to be used by a girl, a mirror may be mounted on the underside of the lid, so the desk can also double as a vanity.

Plywood construction eliminates the need for gluing boards to make up wide panels, and it also does away with bothersome framing. Construction is clean and simple. Judicious use of cleats permits assembling sections without screws or nails on any exposed surfaces. This is the way professional furniture is made.

You can build this desk using hand tools alone, but the work will go much quicker and easier if you have a saber saw, portable drill and sander. Through judicious planning of your cuts, one 4 × 8–foot panel of ¾-inch plywood should be sufficient. You'll need a piano hinge and a 10-inch lid support.

Lay out the sections on the plywood with the grain running the length of the pieces. Inasmuch as the sides are not symmetrical, be sure to lay them out one faceup and the other facedown.

When all sections are laid out, cut them apart with the saber saw. This should be a rough cut close to the line, just to separate the large board into easy-to-handle sections. Curves are cut freehand, but straight lines should be made with the guide wherever possible. Use a new blade and feed the saw slowly to prevent chipping or splintering.

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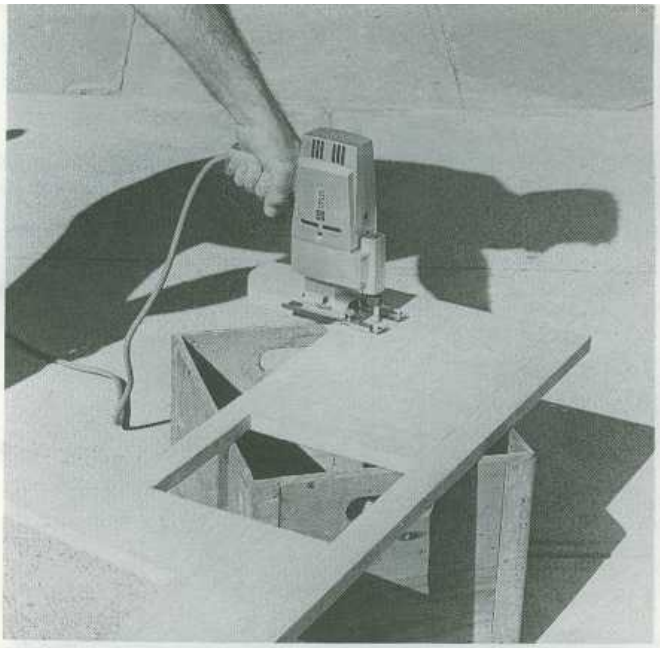


Fig. 15-1. Lay out sections on the plywood and cut apart with saber saw. To make cutouts for bookshelves drill entry hole in one corner.

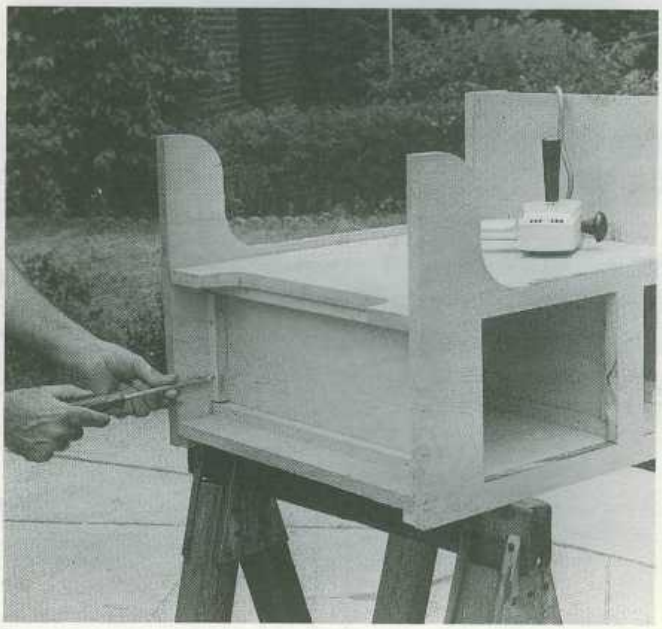


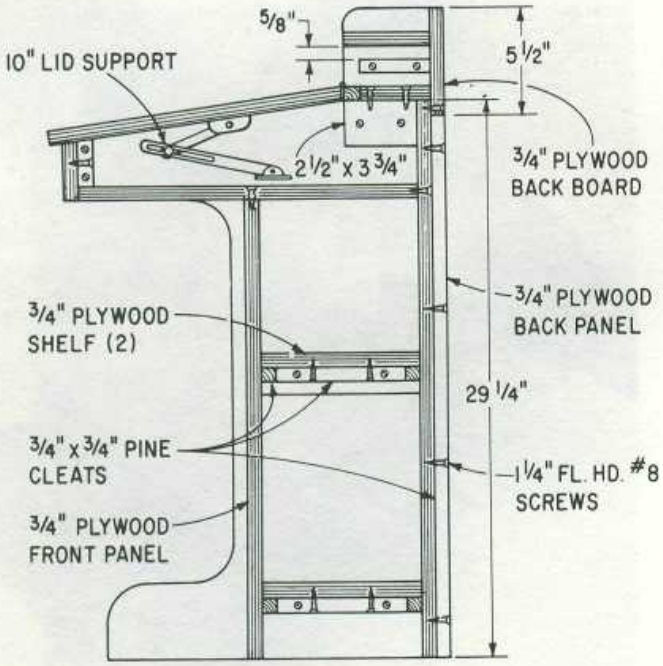
Fig. 15-2. Judicious use of cleats permits assembling sections without screws or nails on any exposed surfaces—a professional technique.

To make the cutouts for the bookshelves, drill entry holes for the blade near one corner, then proceed to drop out the center. When you near the end of the cut, support the waste to prevent it from falling prematurely, since this could damage the work.

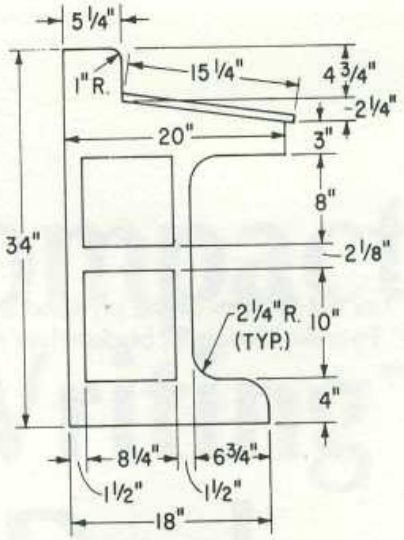
Cut all cleats to size and drill pilot holes for the screws as indicated. A screw pilot bit will make the necessary clearance hole including the countersink for the screw head. Spring clamps are fine for holding the cleats.

Fasten the cleats with glue and screws, then follow by assembling the sections, adding the front panel last. The drawer compartment and lid are added to complete the main construction. The drawer is made

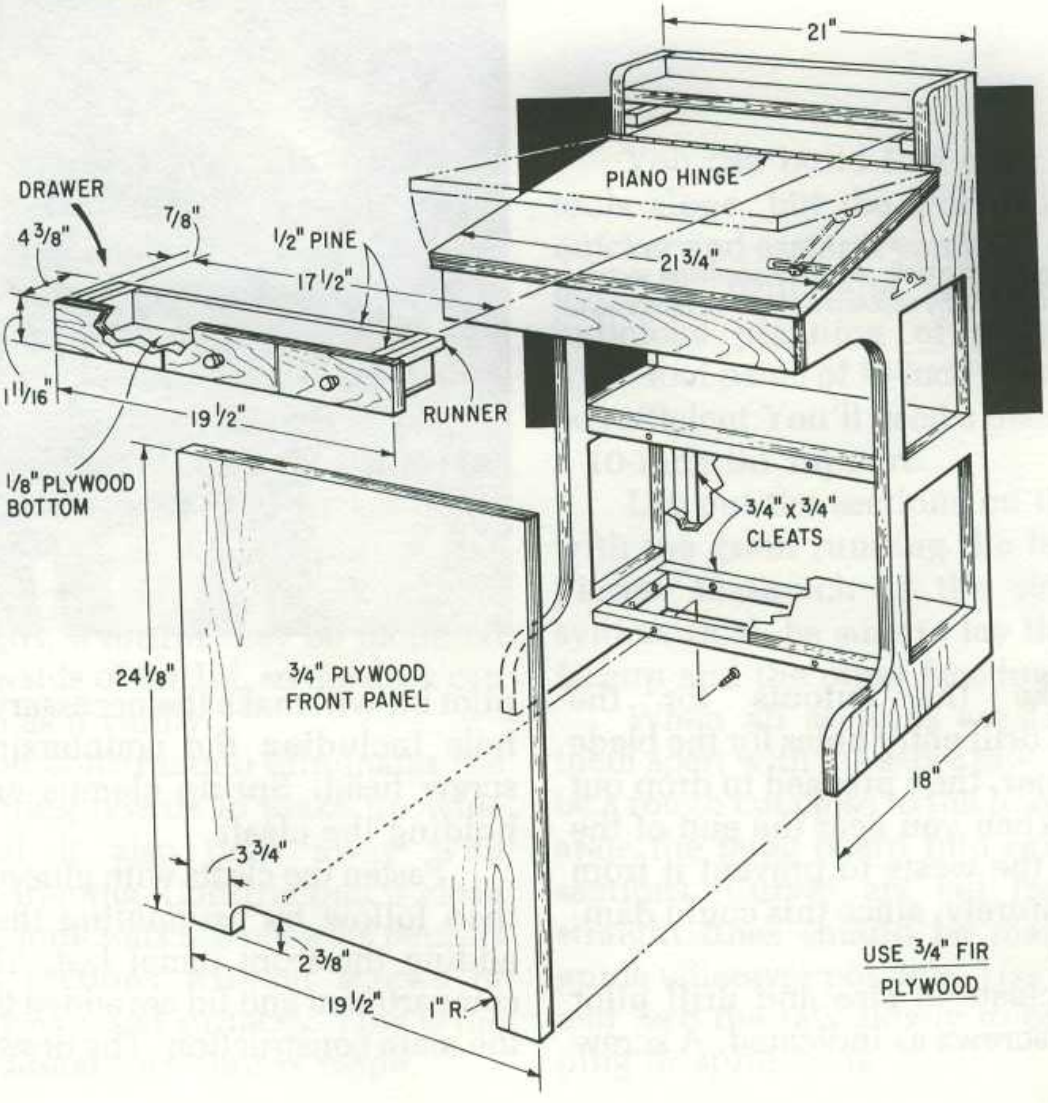
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CROSS SECTION



DETAIL OF SIDE



USE 3/4" FIR PLYWOOD

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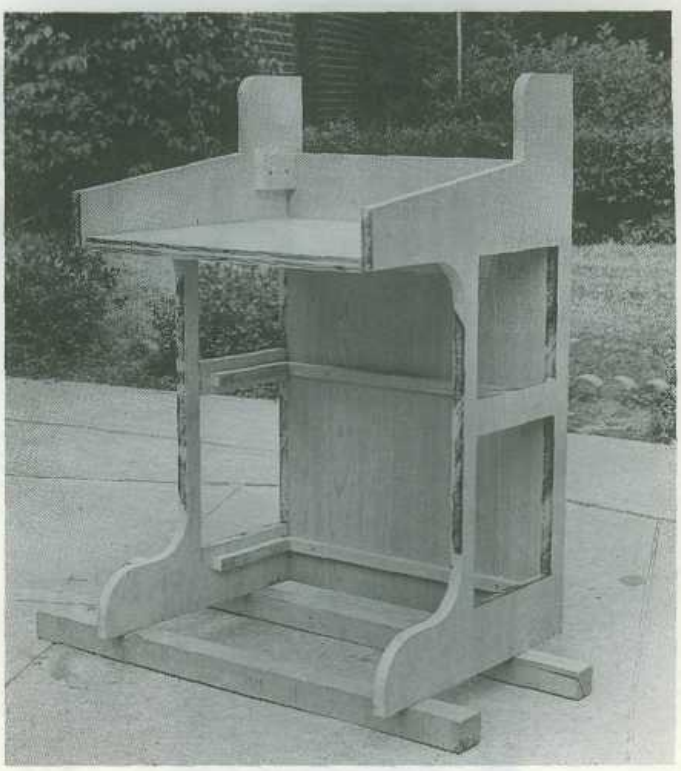


Fig. 15-3. Curves are cut free hand with a saber saw. One piece construction of the sides saves time spent on separate cuts and assembly.

by dadoing the ends as indicated. Make two parallel cuts ½ inch apart and halfway through the stock, then clean out in between with a chisel. Assemble as shown using a small triangular glue block at the bottom front.

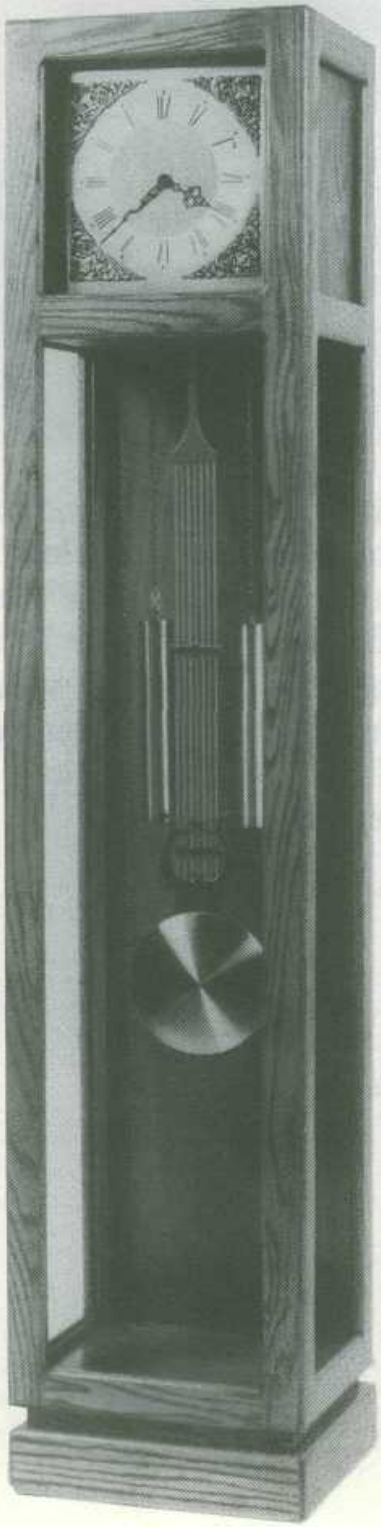
Sand all surfaces thoroughly, first with medium grade paper, followed by fine and extra fine.

Finish as desired. A good treatment consists of two coats of clear brushing lacquer followed with paste wax.

The finished desk will beautify any unused space in your home whether it be the bedroom, living room or entry hall, and its usefulness will more than equal its decorative value.

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Contemporary Hall Clock



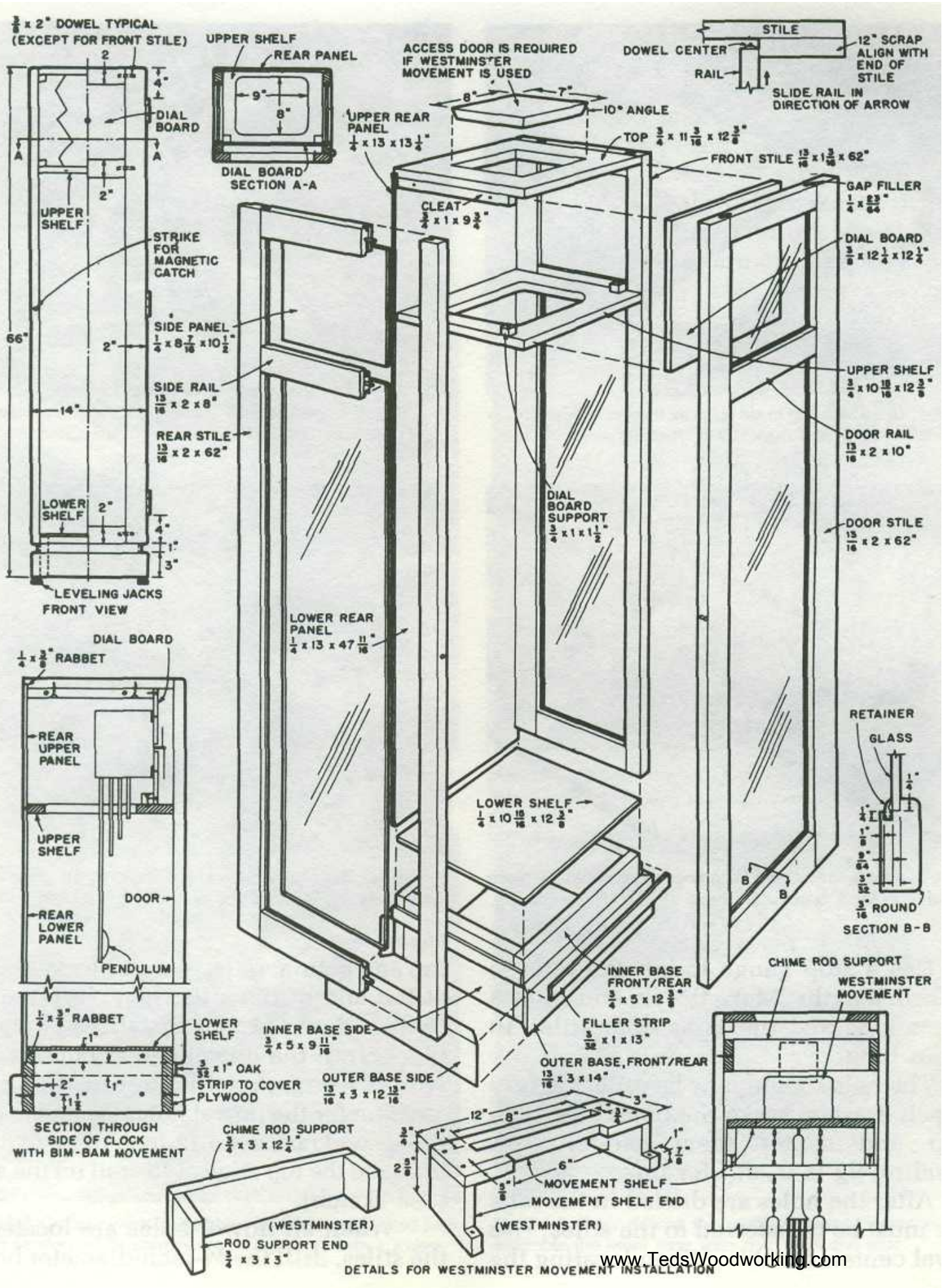
BUILT OF OAK, this contemporary Scandinavian-style Hall Clock has a rich elegant appearance when finished. With straight simple lines, it is easy to build and features a 10-inch-square dial and a choice of two movements, Bim-Bam or Westminster Chime, imported from West Germany. Both movements are weight-driven and can be purchased with a decorative lyre pendulum.

Basically, the clock case consists of three 62-inch frames. The wider one serves as the door. The others make up the end members. Butt joints are used throughout except for the four base pieces which are mitered. A single dowel is used at each butt joint. This means that you'll have to be more careful when gluing as the pieces could twist. Two dowels at each joint would prevent twisting, but two dowels in a 2-inch-wide piece could be a problem, especially with the rabbets and grooves cut in each edge.

The frame members are 2 inches wide, ripped from wide boards. Some lumber dealers sell 2-inch-wide stock. It may cost a little more than the wider boards, but it does save a lot of ripping and jointing.

Select good flat stock, mark and cut the lengths to 62 inches. If wide boards are being used, rip the widths to 2-inches except for the two front stiles which are ripped to 1 3/16 inch widths. Be sure to rip the extra 2-inch pieces for the rails. You will need about 7 feet of 2-inch stock for these.

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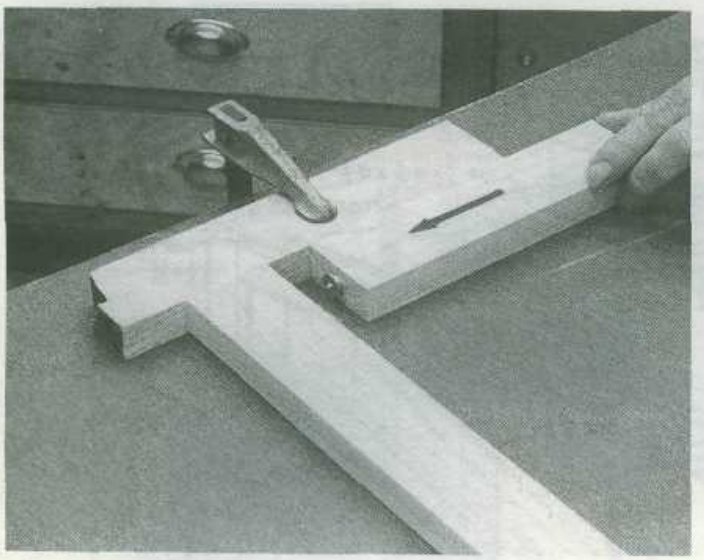


Fig. 16-1. Use a backstop to aid accurate transfer of dowel holes from rails to stiles and mark joints for easier assembly later.

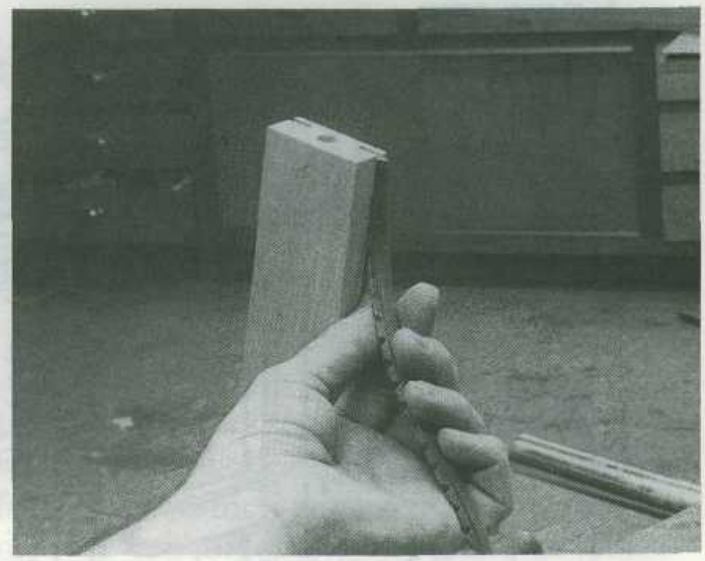


Fig. 16-2. Grooves are cut into frame parts to accept insert-type panel retainer. Test each groove to ensure a snug fit.

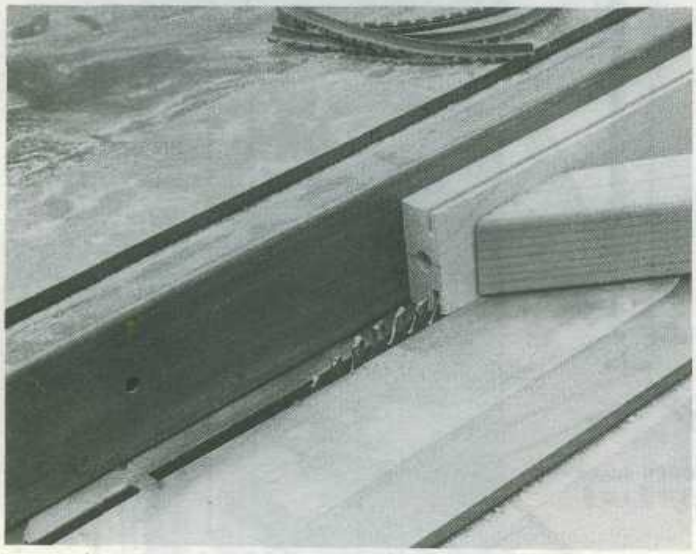


Fig. 16-3. A table saw is used in cutting rabbets; hold the piece vertically on the first cut and horizontally on the second.

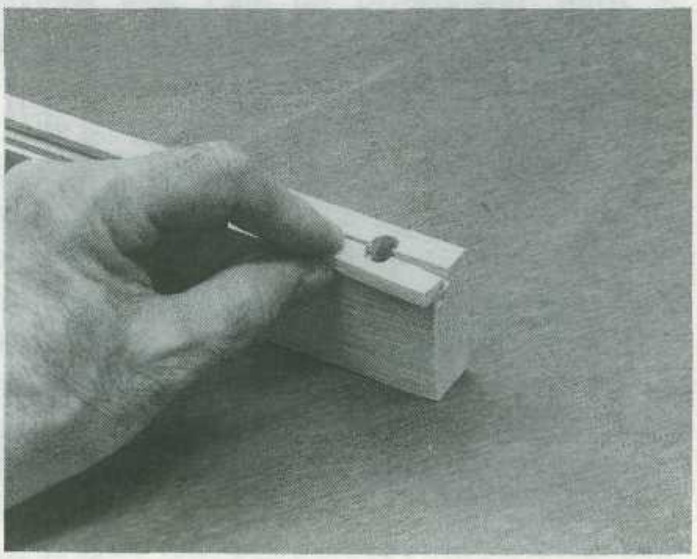


Fig. 16-4. Filler blocks are added to stiles to fill space left by rabbets. Access to dowel holes is cut with a coping saw.

Use a stop gauge to cut the rails to uniform lengths. Make the six end stiles 8 inches long and the three door stiles 10 inches long.

The rails should now be drilled to take ⅜-inch dowels. Make the holes 1 1/16-inch deep and center them carefully. A doweling jig is useful for this.

After the holes are drilled in the rails they must be transferred to the stiles. Use dowel centers for this. When locating the top and bottom rails, place a block of wood at the end of the stile then slide the rail (with a dowel center installed) along the block until the dowel center contacts the stile. The mark will indicate the exact location for the dowel hole. When locating the second rail, use a 12-inch piece of wood to locate the top edge of the rail on the stile. (See sketch).

When all dowel holes are located in the stiles, drill the ⅜-inch-diameter holes,

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1-inch deep. The only exceptions are the holes in the front stiles. These holes should be made only ½ inch deep because this stile is narrower than the rest. Also, the dowels for these holes should be cut to 1½-inch lengths.

If you study the drawing you will note that the edge to receive the glass and retainer is grooved and rabbeted. The groove is cut first; it is 9/64 inch wide and ¼-inch deep. If you have a table saw blade with a 9/64-inch kerf, use it. Otherwise, you will have to make a couple of passes to obtain the required width.

Make test cuts on scrap wood before cutting the actual stock. Make the first pass in all the pieces including the short rail pieces. When all are grooved, adjust the

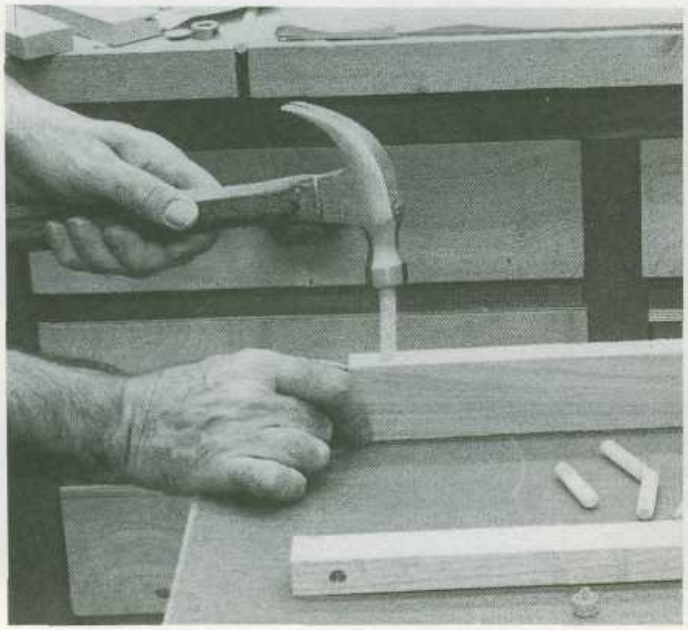


Fig. 16-5. Apply a full-strength glue to the walls of the holes, and then drive the ⅜-inch dowels firmly into place.

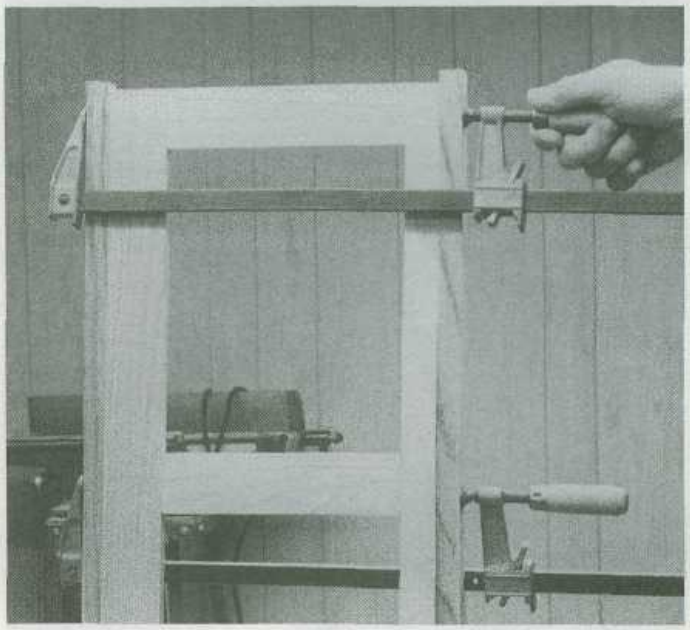


Fig. 16-6. Clamp the pieces together securely, using scraps of wood in the clamp jaws to avoid damaging surfaces of the work.

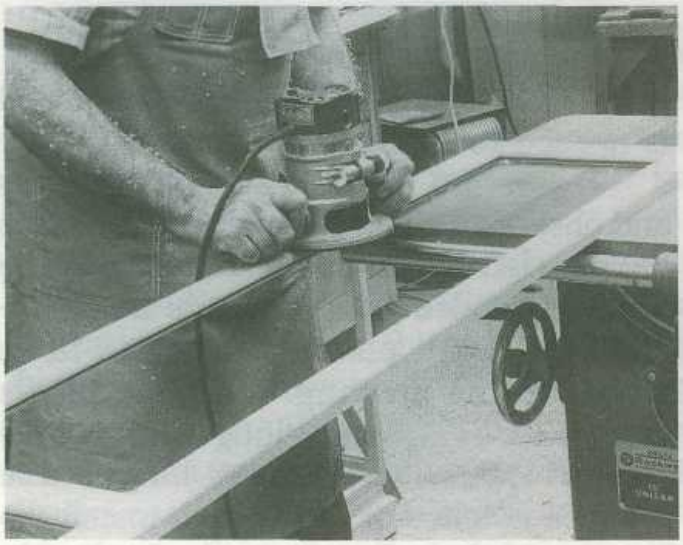


Fig. 16-7. Uneven joints in the glued-up frame are leveled with a belt sander, while corners are rounded off with a router.

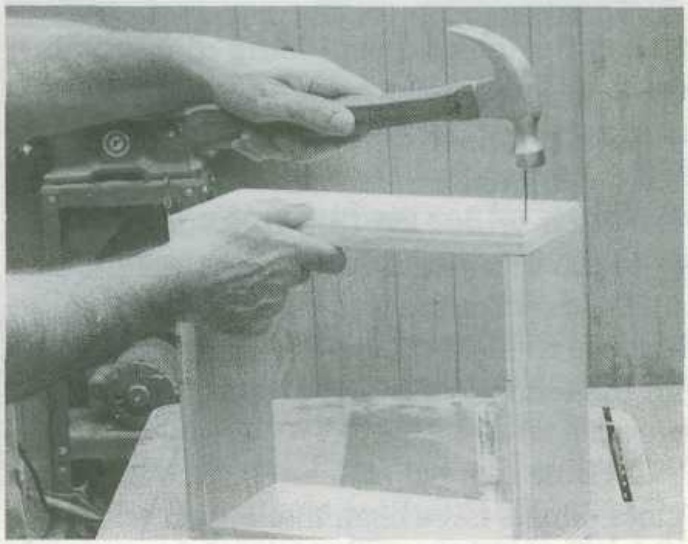


Fig. 16-8. After drilling the required screw clearance holes, assemble the inner base with both nails and glue.

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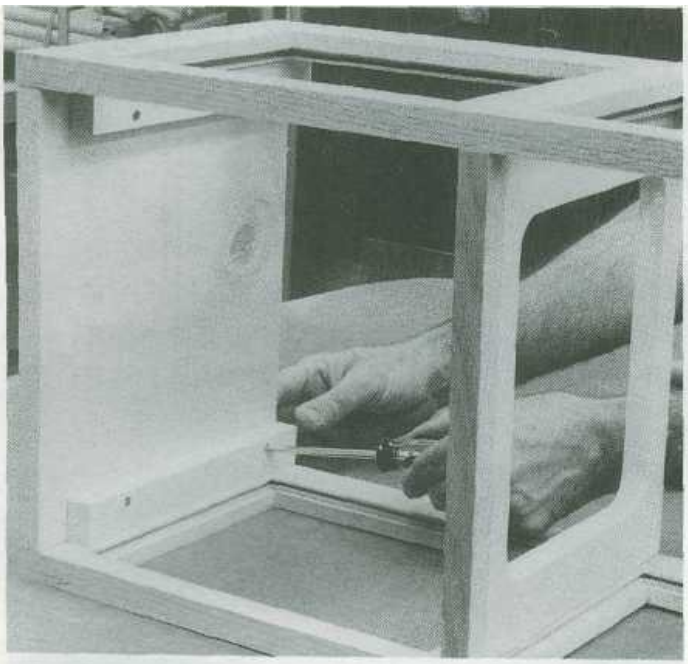


Fig. 16-9. The top is fastened to the side frames with cleats. Note that the cleats are set back to make room for the dial face.

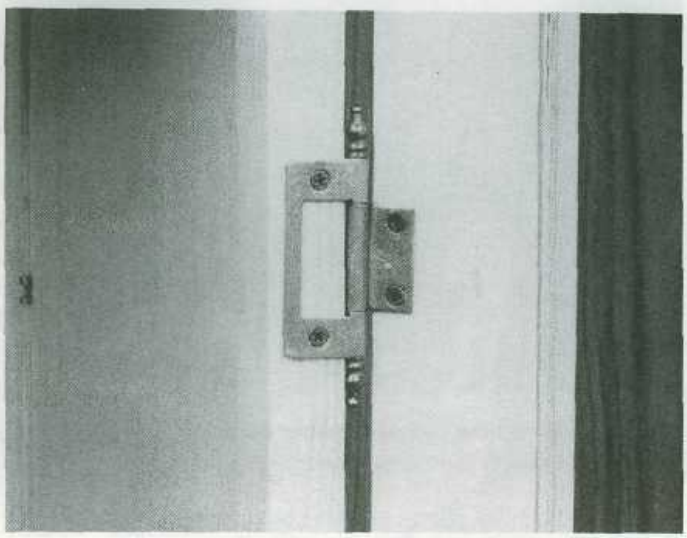


Fig. 16-10. Hanging the door with non-mortise hinges eliminates the need for mortising; three of these hinges are needed.

fence and make the second pass. Follow with the rabbet which is also cut on the table saw. Make the rabbet ¼ inch deep and 23/64-inch wide. Do this in two cuts; first with the work held vertically, then the second pass with the work held horizontally. Be sure to reset the blade height and fence for the second pass. Make test cuts on scrap wood first.

After the grooves and rabbets for the glass panels have been made, you will have to cut the rabbets at the rear of the two rear stiles. This rabbet is made ¼ × ⅜-inch and is needed to receive the plywood panel.

If you butt the rails against the stiles and observe the rear surface, you will note the gap left by the rabbet. This must be plugged or filled before the parts are assembled. Cut small pieces of wood to fit as shown in the drawing. Make six pieces ¼ × 1 23/64 × 1½ inches long and twelve pieces ¼ × 23/64 × 1¾ inches long. These must be notched at the ends to match the grooves of the stiles. Since the pieces are

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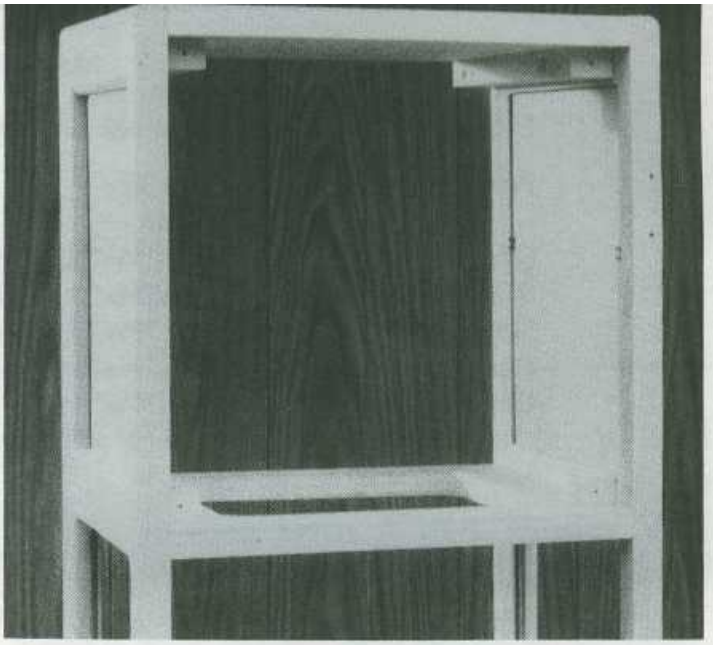


Fig. 16-11. The upper part of the clock case should look like this before putting the dial board and movement in place.

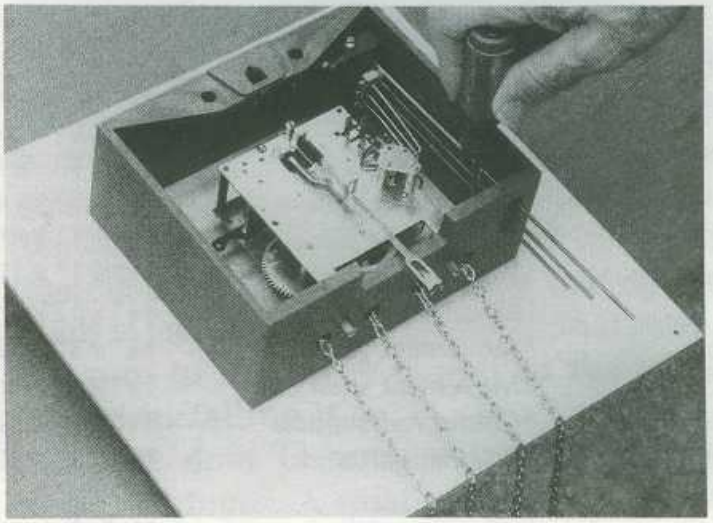


Fig. 16-12. A boxed two-weight movement is fastened to the dial board. Four wood screws should be used to hold it firmly.

small, you won't be able to use the table saw. Instead, use a band saw or coping saw holding the pieces in a vise. The groove is necessary so the panel retainer can be inserted neatly into the center.

Glue the filler pieces into place on the stiles, holding them with a spring clamp or masking tape. When the glue has set, the frames can be assembled. To prevent dry joints, glue size the end grain of the rails using a thin (one part white glue to one part water) coating of glue. Allow to dry about 15 minutes then coat all mating parts with full strength glue. Insert dowels, then join the pieces and clamp securely. Use cauls (scrap strips of wood) under the clamp jaws to prevent marring the work surfaces. The top, shelf pieces and base can be made now while you wait for the glued frame sections to set.

The top is a rectangular board with an access door cut as shown. The door is cut with a jigsaw with the blade set at a 10-degree angle. This will allow the door to drop into place without the need for latches or catches. The angular cut will

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MATERIALS LIST

Except as noted all lumber is oak and all measurements are in inches.

Purpose	Size	Description	Quantity
Stile, rear	13/16" × 2" × 62"		2
Stile, front	13/16" × 1 13/16" × 62"		2
Side rail	13/16" × 2" × 8"		6
Door stile	13/16" × 2" × 62"		2
Door rail	13/16" × 2" × 10"		3
Gap filler	1/4" × 23/64" × 36"		1
Top	3/4" × 11 3/16" × 12 3/8"	Fir plywood	1
Shelf, upper	3/4" × 10 15/16" × 12 3/8"	Fir plywood	1
Shelf, lower	1/4" × 10 15/16" × 12 3/8"	Oak plywood	1
Base front/rear, inner	3/4" × 5" × 12 3/8"	Fir plywood	2
Base side, inner	3/4" × 5" × 9 11/16"	Fir plywood	2
Base front/rear, outer	13/16" × 3" × 14"	Oak	2
Base side	13/16" × 3" × 12 13/16"	Oak	2
Filler strip, front	3/32" × 1" × 13"	Oak	1
Filler strip, end	3/32" × 1" × 13"	Oak	2
Side panel	1/4" × 8 7/16" × 10 1/2"	Oak plywood	2
Rear upper panel	1/4" × 13" × 13 1/4"	Oak plywood	1
Rear lower panel	1/4" × 13" × 47 11/16"	Oak plywood	1
Cleat	3/4" × 1" × 9 3/4"	Pine	2
Dial board support	3/4" × 1" × 1 1/2"	Pine	2
Dial board	3/8" × 12 1/4" × 12 1/4"	Plywood	1
*Movement shelf	3/4" × 3" × 12"	Fir plywood	1
*Movement shelf end	3/4" × 2 5/8" × 4"	Fir plywood	2
*Chime rod support	3/4" × 3" × 12 1/4"	Fir plywood	1
*Rod support end	3/4" × 3" × 3"	Fir plywood	2
Dowel	3/8" × 2"		18
Magnetic catch	5/16" dia.		1
Hinge	2"	Non-mortise	3
Panel retainer		Insert type	30'
Screw	No. 8—1 1/2" FH		34
Screw	No. 8—3/4" FH		4
Screw	No. 5—3/4" FH		22
Leveling jacks	miniature		4
Glass, door upper	Cut to fit		1
Glass, door lower	Cut to fit		1
Glass, side	Cut to fit		2
Dial	10" × 10"		1
Movement		Bim-Bam or Westminster	1

Note: The items marked with asterisks are required only if Westminster Chime Movement with separate chime rods is used.

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permit the door to drop in without any space between the kerf thus keeping out dust.

The upper shelf is made with a cutout to allow chains, weight shells and pendulum to pass through to the waist section.

The base consists of two parts, inner and outer. Plywood is used for the inner base pieces. Cut the parts to size then drill the screw clearance holes before assembling the parts. The outer base pieces are cut to size then mitered.

Assemble the inner base using nails and glue, then add the oak outer pieces fastening them to the inner base with 1½-inch screws as shown. Apply glue to the mitered corners. Do not glue the outer base pieces to the plywood.

Cut three thin strips of oak, 3/32 × 1 × 13 inches long. Glue these to the plywood just above the outer base pieces. They serve to conceal the plywood underneath. Cut the end pieces to length, taking the measurements directly from the base piece. Glue these into place, then cut the front to size and install. None is required at the rear as it won't show.

Use a router with a 3/16-inch rounding bit to round off all corners of the base.

The glued-up frames should now be ready for work. Remove the clamps and place a frame on a flat surface. Sand the entire surface with a belt sander. Pay particular attention to the joint areas. Sand the front and back of each frame, then use the router to round off the corners as indicated.

The end frames can now be attached to the base and top sections. Cleats are used at the top. Be sure to set the cleats to the rear leaving room at the front ends for the dial board. Screws are used to fasten the cleat to the sides and top. The upper shelf is fastened only with glue, no screws. Be sure to make the cutout in the shelf before installing it.

The door is hung using three non-mortise hinges. A small magnetic catch is used on the door. Drill a 5/16-inch-diameter hole 9/16 inch deep into the door stile then install the magnet strike on the front stile. Since a small magnet is used, no door pull is necessary. Simply grasp the stile to open.

The glass should be installed after the finish has been applied. The best way to secure the glass is to use insert type plastic retainer. This material is made to fit into a narrow groove allowing the top or exposed part to hug the glass snugly. It eliminates the need for staples or nails and provides very neat appearance. Another

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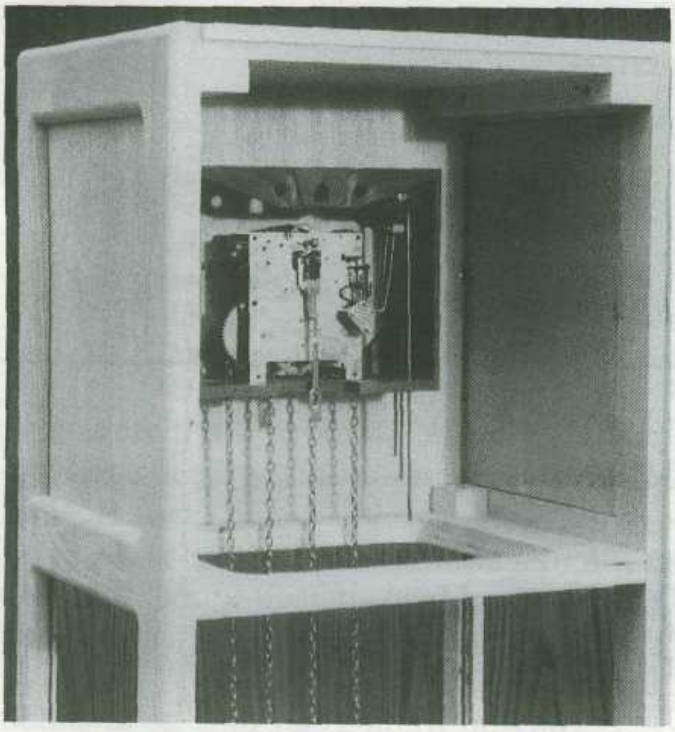


Fig. 16-13. The Bim-Bam movement, shown installed above, does not require any shelves or supports to be added to the upper case.

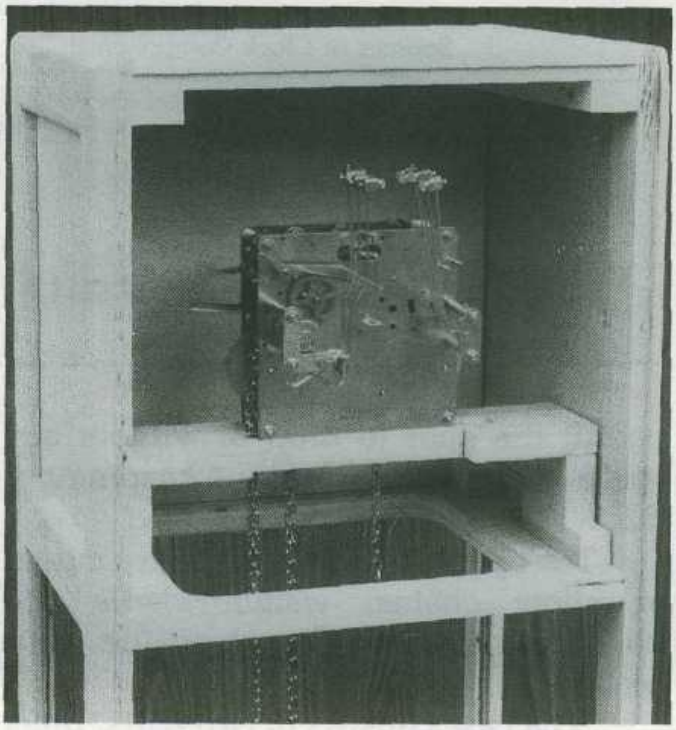


Fig. 16-14. Appearing without chime rods in the above view, the Westminster movement requires a shelf and chime rod support.

advantage of this material is its ease of removal when necessary to replace or clean the glass. Force it all the way down into the groove with your fingertips.

The movement used will determine if special shelf and support are required. If the Bim-Bam movement is used, no supports are required as the movement is boxed and simply screwed to the rear of the dial board. If the Westminster movement is used, a shelf and chime rod support will be needed. These are shown in the drawing. However, be sure to have the movement on hand before making these supports as the sizes may vary depending on the make of movement.

The wood is finished by using a paste wood filler followed by two coats of sanding sealer and two coats of semigloss lacquer. The filler used was Golden Oak which contains the stain mixed in with the filler. After applying the filler, allow to dry overnight before applying sealer and lacquer.

The filler, flexible molding, hardware, clock movement and dial are available from Armor Products (see Introduction). Other sources of clock movements and components are listed in the Materials List. Write them for catalogs.

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Corner Bookcase/ Desk



CORNERS usually present a problem when decorating a room. Here's an ideal piece of furniture that will fit neatly into that wasted corner and serves as a combination desk andbookcase. The desktop provides ample writing space and storage for stationery,bills, pens, clips, etc. The two bottom shelves hold a stack of your favorite books within easy reach.

The desk is very easy to make as it utilizes ready-made turnings which are available at lumber dealers and home improvement centers throughout the nation. It is made of common pine and only a few basic tools are needed. A drill and saber saw are essential. A router is needed only if you want to shape the edges of the desktop and drawer front. These could be rounded off with a hand plane instead.

The desk measures 30¼ inches high × 40 inches wide × 25 inches deep. The top provides a writing area of more than 3 square feet.

Unless you use plywood, the top and shelves must be glued up to obtain the proper width. The top involves straight or parallel gluing. The shelves, however, must be mitered. This looks tricky but it can be done easily by using cleats and clamps as shown. Select flat boards and arrange them so that knots will not fall on the cutting lines. Lay out the shelves and draw the 45-degree lines for the miter cuts. The cuts can be made in several ways. The table saw, portable saw or saber saw may be used.

Regardless of the saw used, the cut edges must be perfectly square and smooth. After cutting, a router can be used to true up the edge. This is done with a flush trimmer bit. A guide strip of ¾-inch stock is nailed to the bottom of the shelf. Set the strip exactly at 45 degrees using a miter square as a guide. Set the strip so that it is just a trifle in from the edge. About 1/32 inch will do.

Adjust the cutter so that the bearing will ride on the strip. Take a cut and check the edge. It should be smooth and straight. Incidentally, the edge will be as straight as

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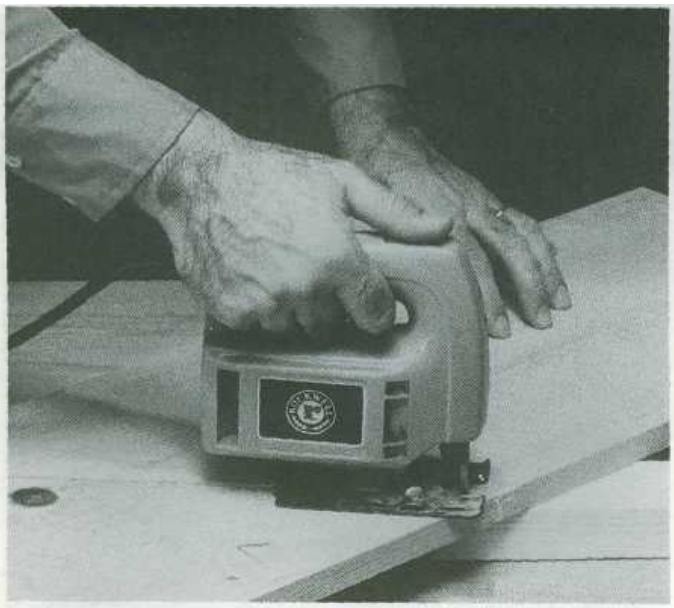


Fig. 17-1. The miter is cut with a saber saw. Be sure to use fine blade, and cut slowly.

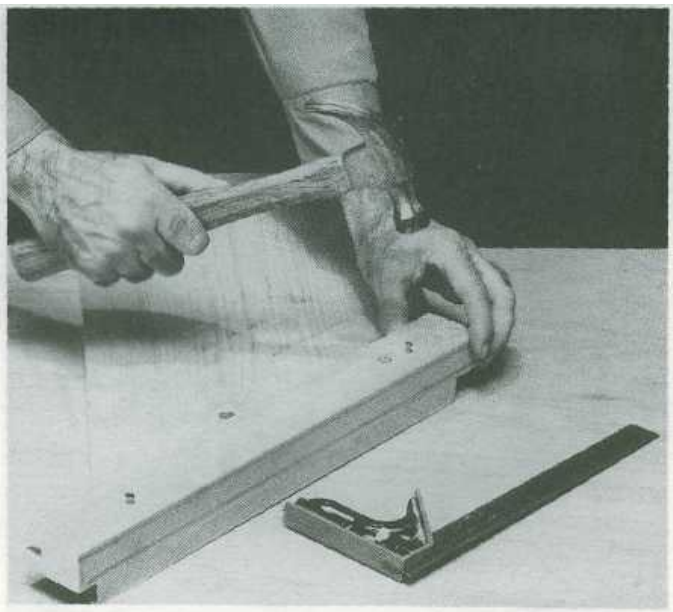


Fig. 17-2. Guide strip's nailed to the underside of shelf. It should be set in from edge.

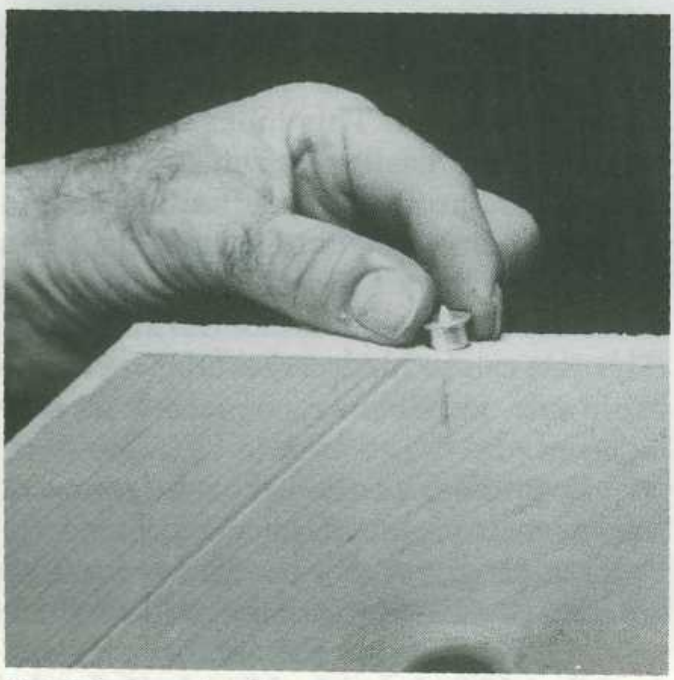


Fig. 17-3. Insert dowel centers into holes; the sharp point transfers center to mating board.

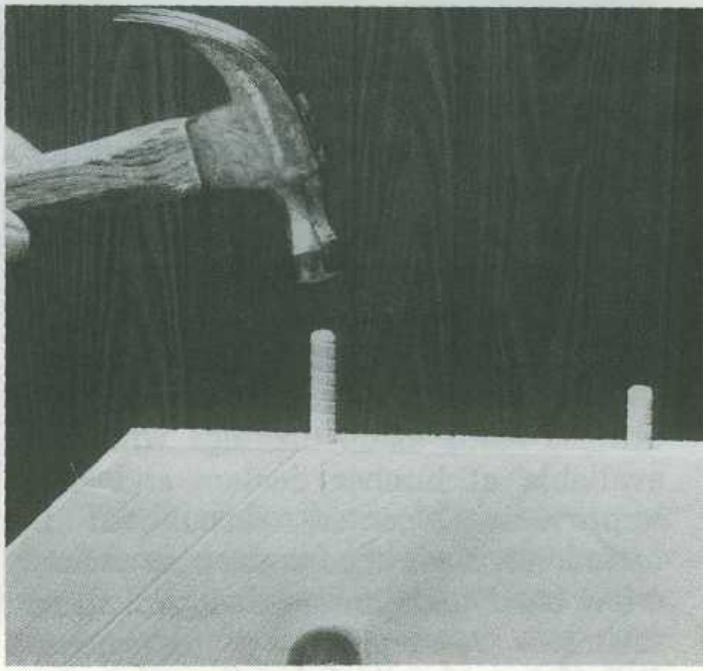


Fig. 17-4. Glue is applied to the lower half of the dowel. Hammer blows drive them home.

the guide strip so be sure to choose a good straight piece for the guide.

Mark the location of the dowels. These should be placed as shown so they will clear the postholes and the curved edge which will be cut later on. A dowel drilling guide is used for the next operation. Several types are available.

The units are self-centering and assure straight accurate holes. Drill ⅜-inch-diameter holes 1¼-inches deep to accept the 2-inch spiral dowels. Dowel centers are

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used to locate matching holes in the mating pieces.

Insert three dowel centers in the holes drilled into the first piece. Align the two boards then press together. The hole centers will be transferred to the second piece. Drill these holes to the same depth as the first piece.

Because the end grain is porous, it will be necessary to size the edge with a thin

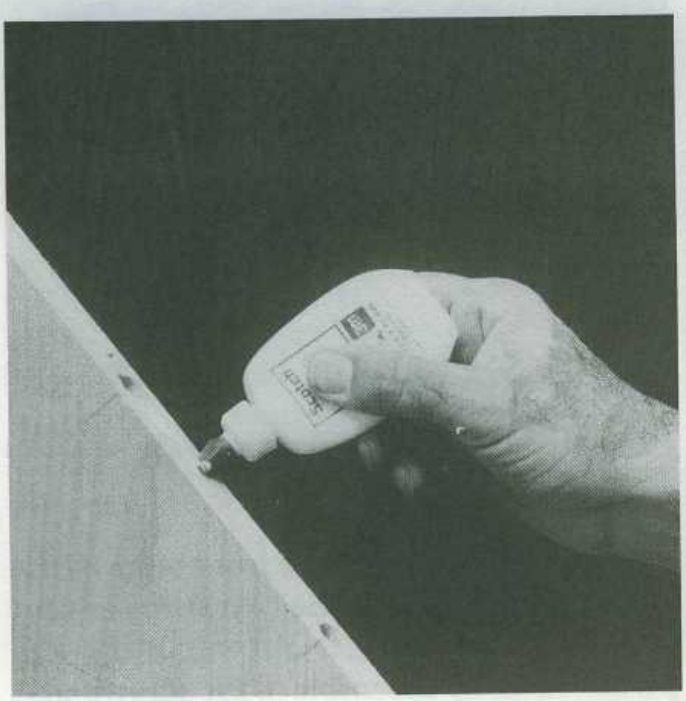


Fig. 17-5. Apply glue to edge grain to size it. Apply second coat before joining the parts.

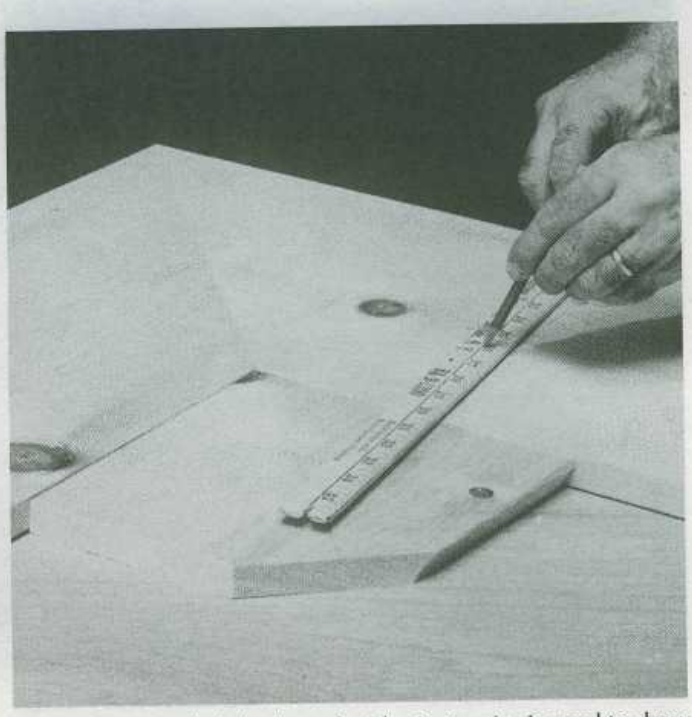


Fig. 17-6. A yardstick adapted with pivot point is used to draw the radius for the shelf.

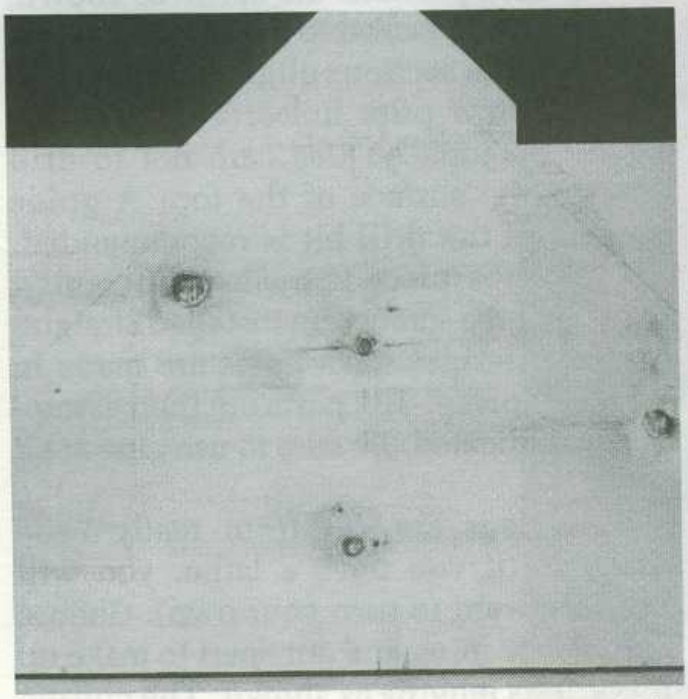


Fig. 17-7. Desktop is glued up in order to conserve wood. The knots should be sound.

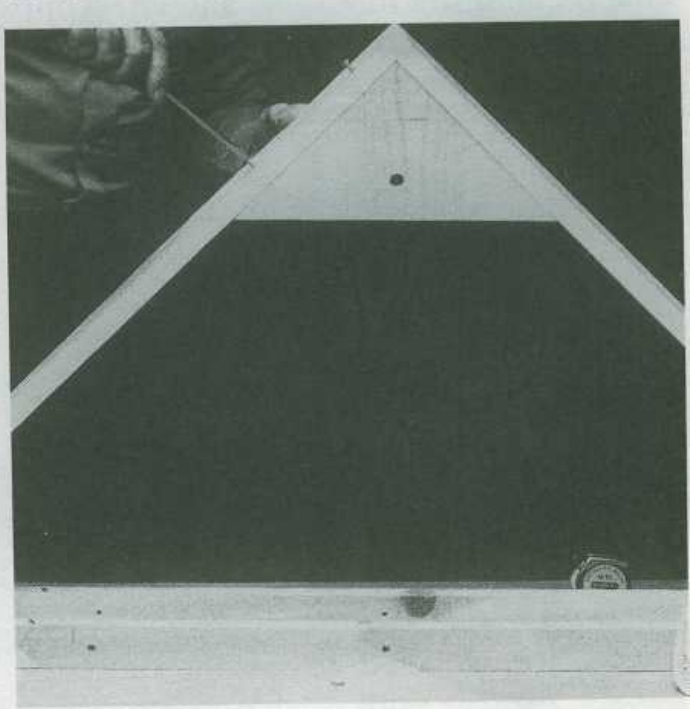


Fig. 17-8. The desk sides are assembled with glue, screws. Predrilled holes are for the legs.

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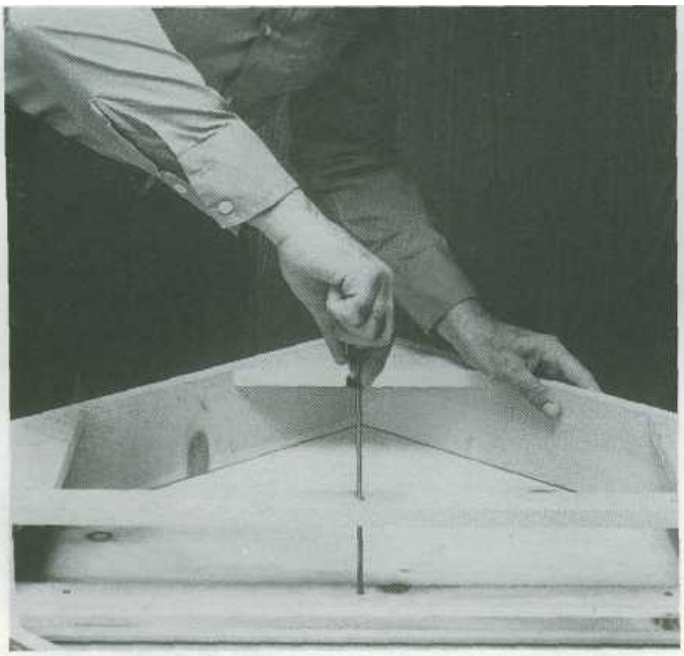


Fig. 17-9. Clearance holes are drilled through the crosspiece to allow screwdriver to enter.

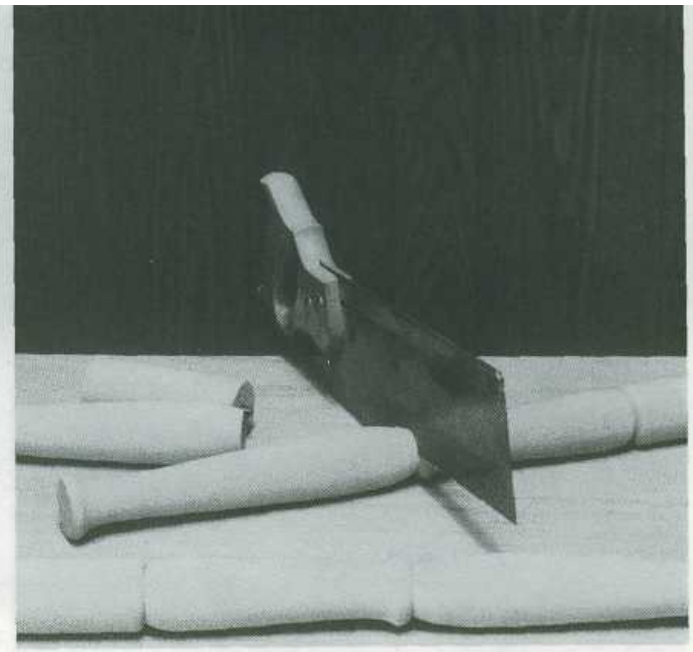


Fig. 17-10. The stock legs are cut apart with back saw. A radial arm saw can also be used.

coat of glue. Apply a bead of glue then spread and allow to dry. Apply some glue to the dowels and insert. Tap with a hammer until the dowels are halfway into the holes. To obtain a good tight joint, attach clamping blocks as shown. Apply more glue to the edges and to the dowels, then join the pieces and clamp tightly. The clamping blocks should be 2- × -3 or 2- × -4 lumber. Draw the pieces together until the glue starts to ooze out of joint. Be sure the boards are flat. Use clamps on both sides.

The top is also glued with dowels. Follow the same procedure to make the holes then clamp using glue strips on the edges. To save lumber for the top piece, you can step the sections as shown.

Set the shelves and top aside, allowing the glue to set thoroughly. In the meantime, you can cut the pieces for the apron and front frame. The rear edges of the side pieces are rabbeted to accept the back panels. Do this with a table saw or use a backsaw and finish off with a chisel.

The bevel cut for the front edge of the sides and the ends of the two strips are cut at a 45-degree angle. After cutting the pieces to size, assemble with screws and glue. After the apron is assembled, invert the top then position the apron as shown. Strips of wood tacked to the front and sides will keep the sections aligned while drilling the screw pilot holes. The holes are drilled diagonally. Use care not to drill through the surface of the top. A guide marked on the drill bit is recommended.

The crosspiece is treated differently. Here the three screws are installed straight. Screwdriver clearance holes are made in the lower piece. The parts are then assembled as indicated. Be sure to use glue at all joints.

The legs are cut from ready-made turnings. (If you have a lathe, you will probably want to turn your own). Choose a suitable turning and cut apart to make up the various lengths as shown. The cutting can be done with a handsaw or on the

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radial arm saw. Be sure the lengths are uniform and all cuts are square. If done by hand, a miter box should be used. The turnings we used are colonial style 28 inches long. They are manufactured by Michael-Reagan of California and we understand they are available throughout the country.

After cutting the turnings apart, drill the centers to take ½-inch dowels. Make the holes 1½ inches deep and be sure to center them. Drill corresponding holes ½-inch diameter in the two shelves to correspond to the holes previously made in the lower part of the top section. Also shape the edges at this time.

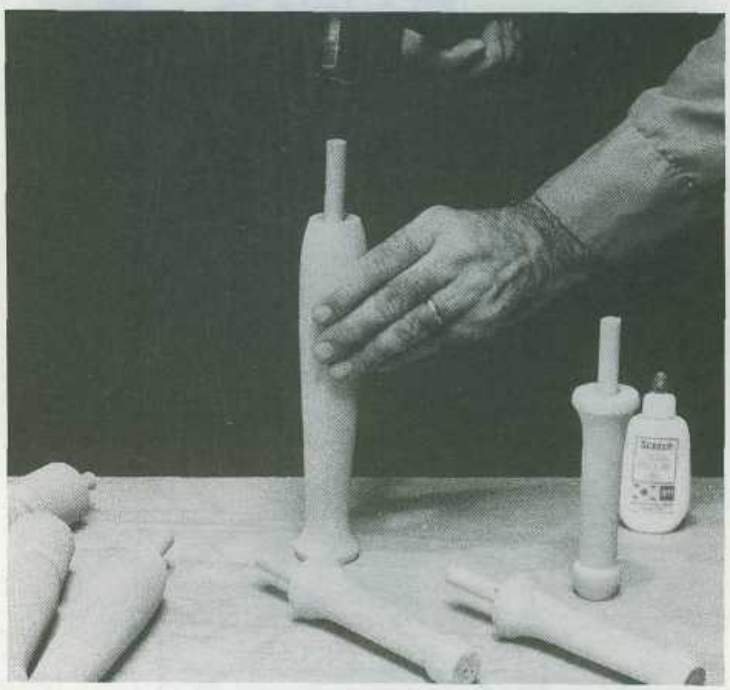


Fig. 17-11. Dowels are driven into the upper section of leg. Be sure to groove dowel.

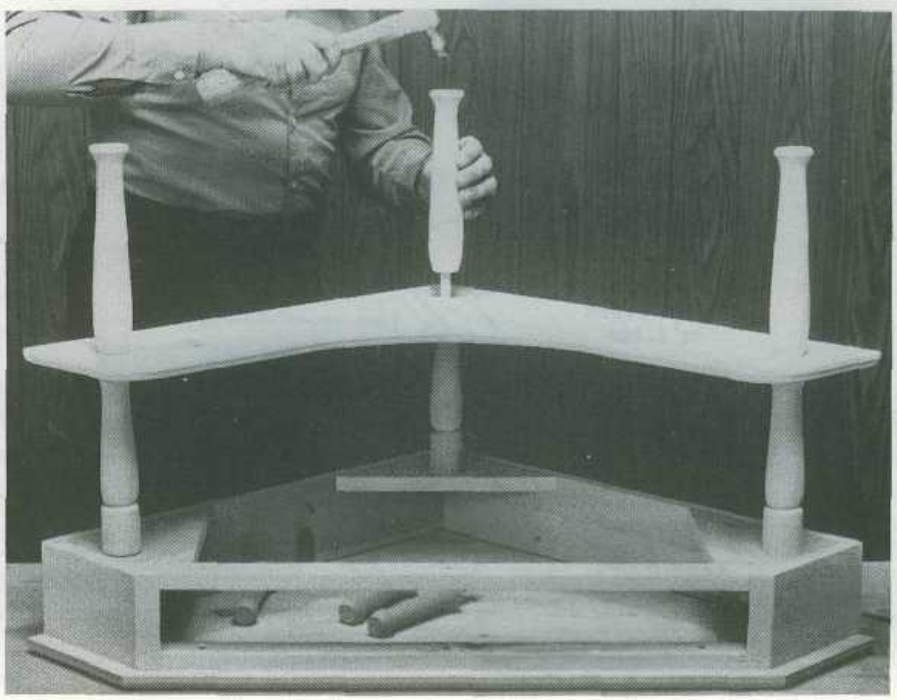
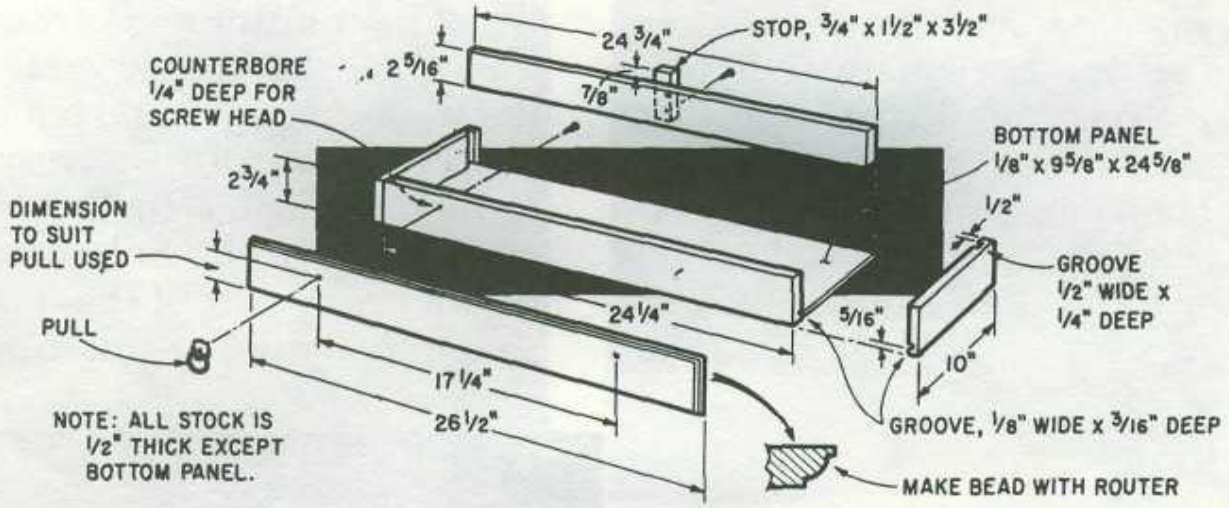
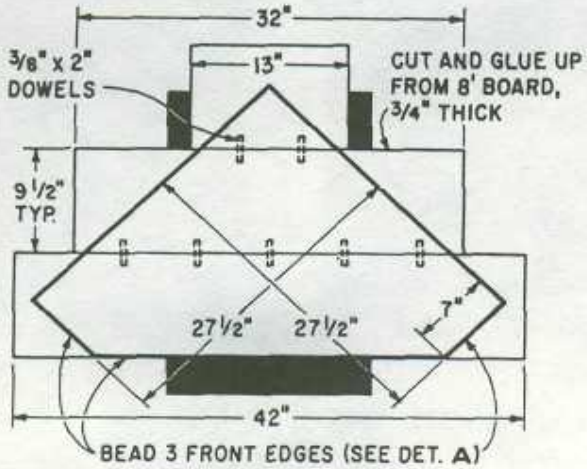


Fig. 17-12. Assembling the desk is simple. Add the shelves and legs to the inverted unit.

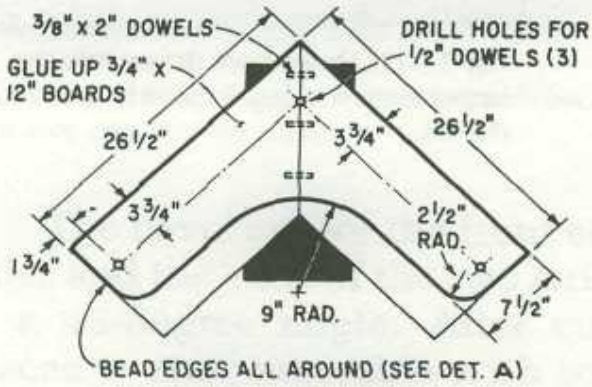
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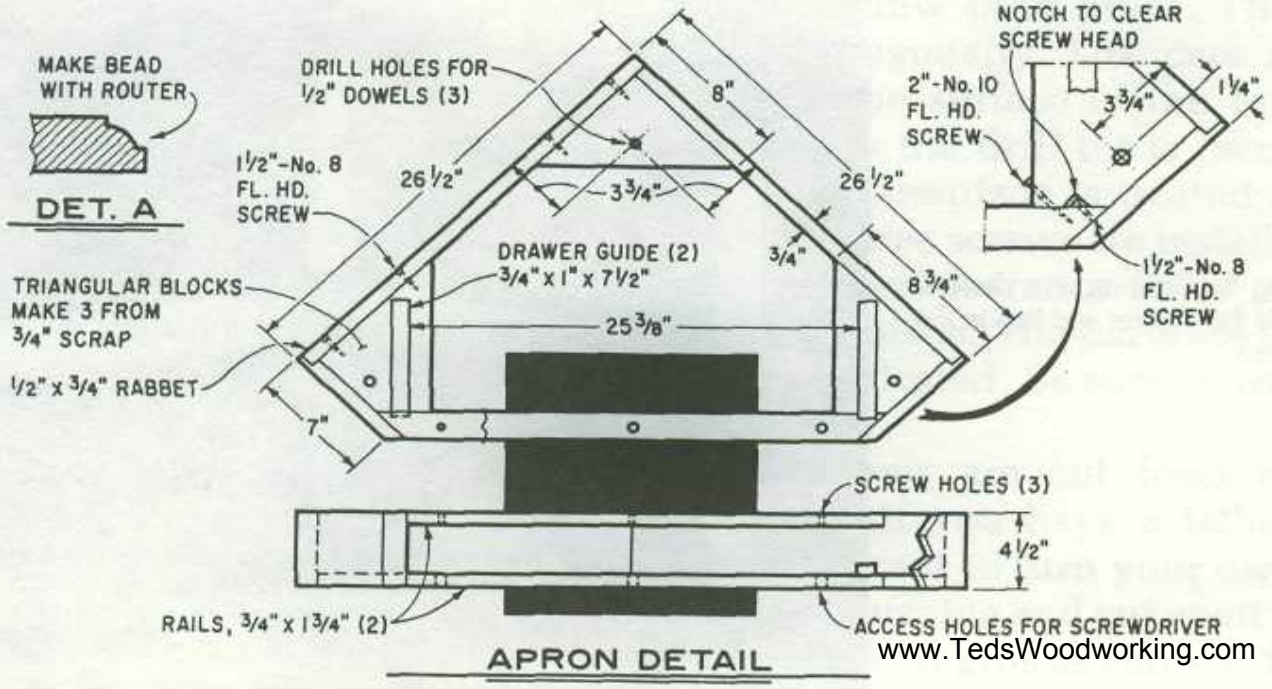
DRAWER DETAIL



TOP DETAIL

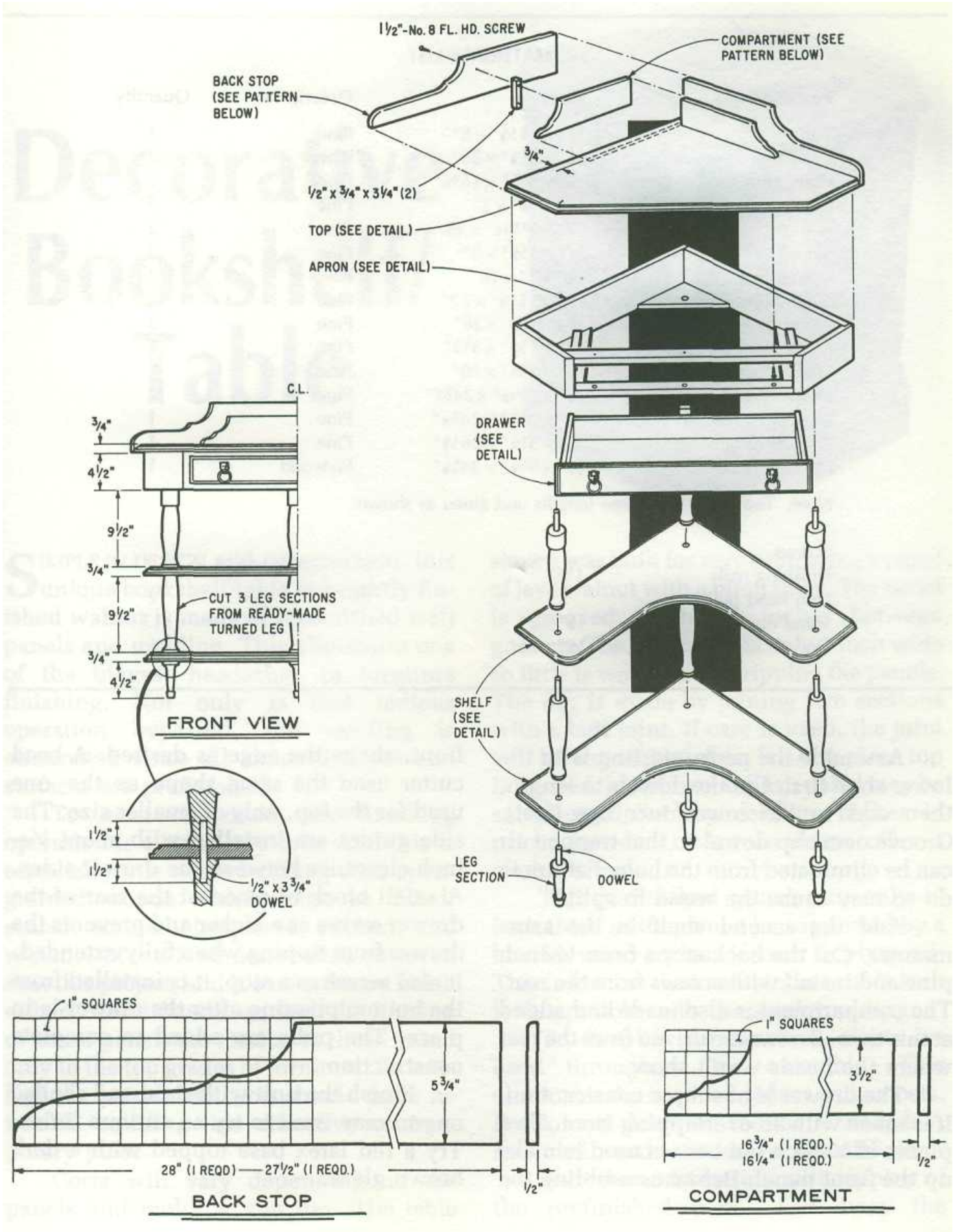


SHELF DETAIL



APRON DETAIL

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MATERIALS LIST

Purpose	Size	Description	Quantity
Top	3/4" × 11 1/4" × 8"	Pine	1
Back stop	1/2" × 5 3/4" × 28"	Pine	2
Compartment	1/2" × 3 1/2" × 16 3/4"	Pine	2
Compartment blocks	1/2" × 3/4" × 3"	Pine	2
Rail	3/4" × 1 11/16" × 29"	Pine	2
Sides	3/4" × 4 1/2" × 8"	Pine	2
Corner blocks	3/4" × 7" × 10"	Pine	3
Shelf (half)	3/4" × 11 1/4" × 27"	Pine	4
Turnings	1 3/4" dia. × 28"	Pine	3
Kicker	3/4" × 1 1/2" × 3 1/4"	Pine	1
Drawer (side)	1/2" × 2 3/4" × 10"	Pine	2
Drawer (rear)	1/2" × 2 5/16" × 24 3/4"	Pine	1
Drawer (subfront)	1/2" × 2 3/4" × 24 1/4"	Pine	1
Drawer (front)	1/2" × 3 1/4" × 26 1/2"	Pine	1
Drawer (bottom)	1/8" × 9 5/8" × 24 5/8"	Plywood	1

Note: Top is cut into three lengths and glued as shown.

Screws		
Finishing nails	1 1/2"	
Lion head pulls		2
Spiral dowel	3/8" × 2"	13
Dowel	1/2" × 36"	1

Assemble the parts, starting with the lower shelf first. Cut the dowels to length, then add to the lower turnings (feet). Groove or crimp dowel so that trapped air can be eliminated from the hole. Failure to do so may cause the wood to split.

Add the second shelf in the same manner. Cut the back stops from ½-inch pine and install with screws from the rear. The compartment is also made and added at this time. Screws are driven from the rear where the heads won't show.

The drawer is of simple construction. It is made with an overlapping front. Two pieces of ½-inch lumber are used to make up the front panel. Before assembling the front, shape the edge as desired. A bead cutter used the same shape as the one used for the top, only of smaller size. The side guides are installed with about 1/16-inch clearance between the drawer sides. A small block of wood at the rear of the drawer serves as a kicker and prevents the drawer from tipping when fully extended. It also serves as a stop. It is installed from the bottom opening after the drawer is in place. The pulls are added to complete construction.

Finish the unit with stain and shellac or you may want to try an antique finish. Try a red latex base topped with a dark brown glaze.

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Decorative Bookshelf/ Table



SIMPLE IN DESIGN and construction, this unique bookshelf/table in brightly finished walnut is made of prefinished wall panels and molding. This eliminates one of the biggest headaches in furniture finishing. Not only is that tedious operation bypassed, but sanding is eliminated since all exposed edges and surfaces are prefinished.

To most craftsmen, the finishing operation is a necessary evil. And this is especially true when working with open-grained woods which must be filled, sealed, stained, lacquered, rubbed, and waxed. But this is all done before you even start this project, and it's no ordinary finish either. Scientifically applied, the finishes of better panels are similar to those found only in the top grades of furniture. So with half the battle over, you should have no trouble building this attractive contemporary piece.

Costs will vary depending on the panels and molding you use. The table shown was built for very little using a panel of Java walnut with a birch inlay. The panel is grooved, with 16 inches between grooves. The birch strip is only 1 inch wide so little is wasted when ripping the panels. The top is made by joining two sections with a butt joint. If care is used, the joint will be almost invisible. If a one-piece top is desired, a Weldwood flush panel may be substituted. Such panels are higher in price, however. Manufacturers offer a choice of woods.

The prefinished panels are only ¼ inch thick so they must be supported by a heavier wood such as ½-inch fir plywood. This is ideal as the total thickness of ¾ inch is compatible with the stock molding.

To simplify construction, cleats are used throughout the assembly. This eliminates the need for dadoes and rabbets. It also cuts down on the tools needed. A saw, drill, and screwdriver are sufficient.

Start the construction with ripping of the prefinished panel. Cut away the

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Fig. 18-1. Using cleats throughout the assembly of the unit not only eliminates the need for rabbets and dadoes, but also cuts down on the number of tools required in the construction.

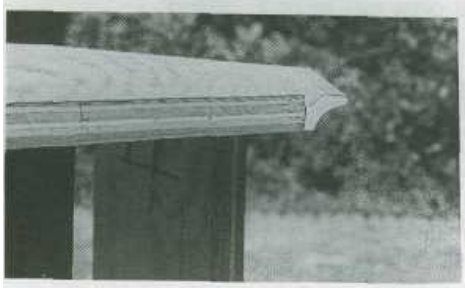


Fig. 18-2. In this view, the top section is lying upside down and a strip of cove molding has been attached to one of the octagonal sides. The ends of the molding are cut at 45-degree angles.



Fig. 18-3. Because there are so many pieces which look alike, it's a good idea to write an identifying number on the various sections to be joined together, thereby avoiding confusion.

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Fig. 18-4. Here the panels are shown in various stages of assembly. The ¼-inch prefinished stock is laminated to the ½-inch plywood backing before the octagonal opening is cut out.

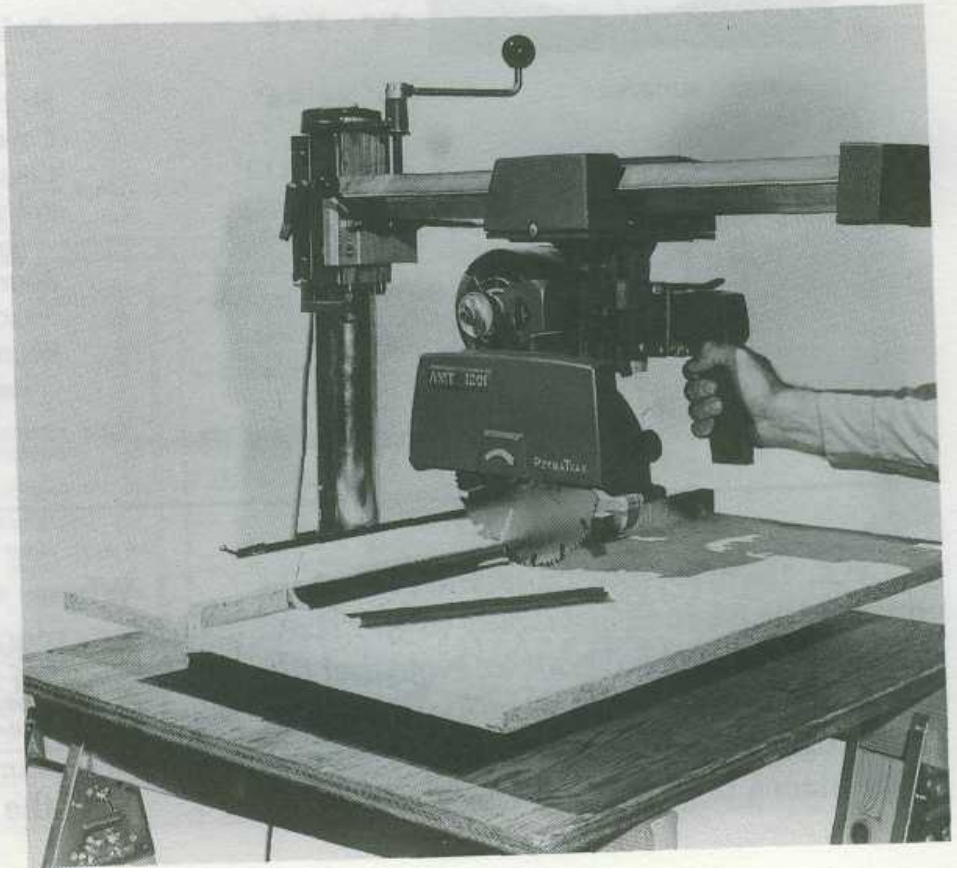


Fig. 18-5. A radial arm saw can greatly simplify the work of trimming and bevel cutting. Use a sharp blade and be sure to check bevels on scrap wood before cutting the prefinished work.

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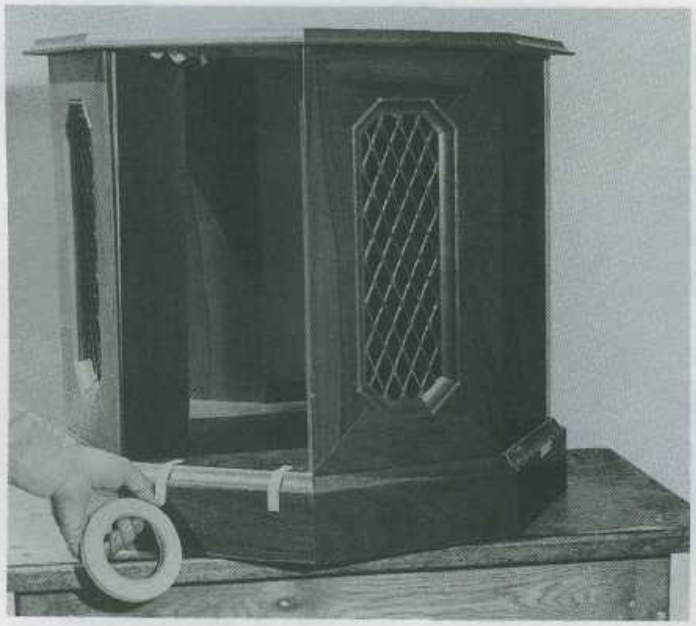


Fig. 18-6. An easy way to hold the moldings in place while the glue sets is to use masking tape, as shown. It's a good idea to first check the fit of all parts before applying the glue.

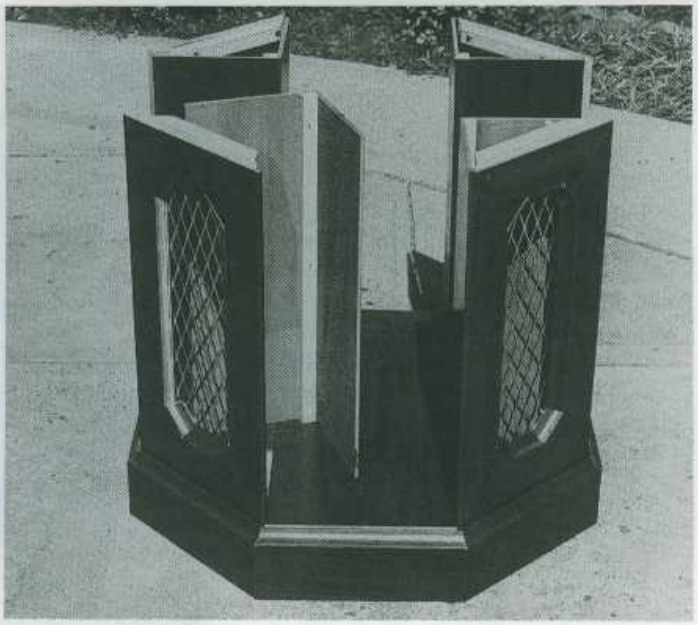


Fig. 18-7. Partially assembled unit is shown here. Note how diagonals are squared off on the inside. Paint interiors flat black.

MATERIALS LIST

Purpose	Size	Description	Quantity
Outer surfaces	¼" × 4' × 8'	Prefinished plywood	1
Inner surfaces	½" × 4' × 4'	Fir plywood	1
	¾" × 30'	Cove molding	
	¾" × 1" × 12'	Cleats	
	6" × 15"	Polished brass grille	4
	1¼"	Round-head screws	as needed
	½"	Round-head screws	as needed

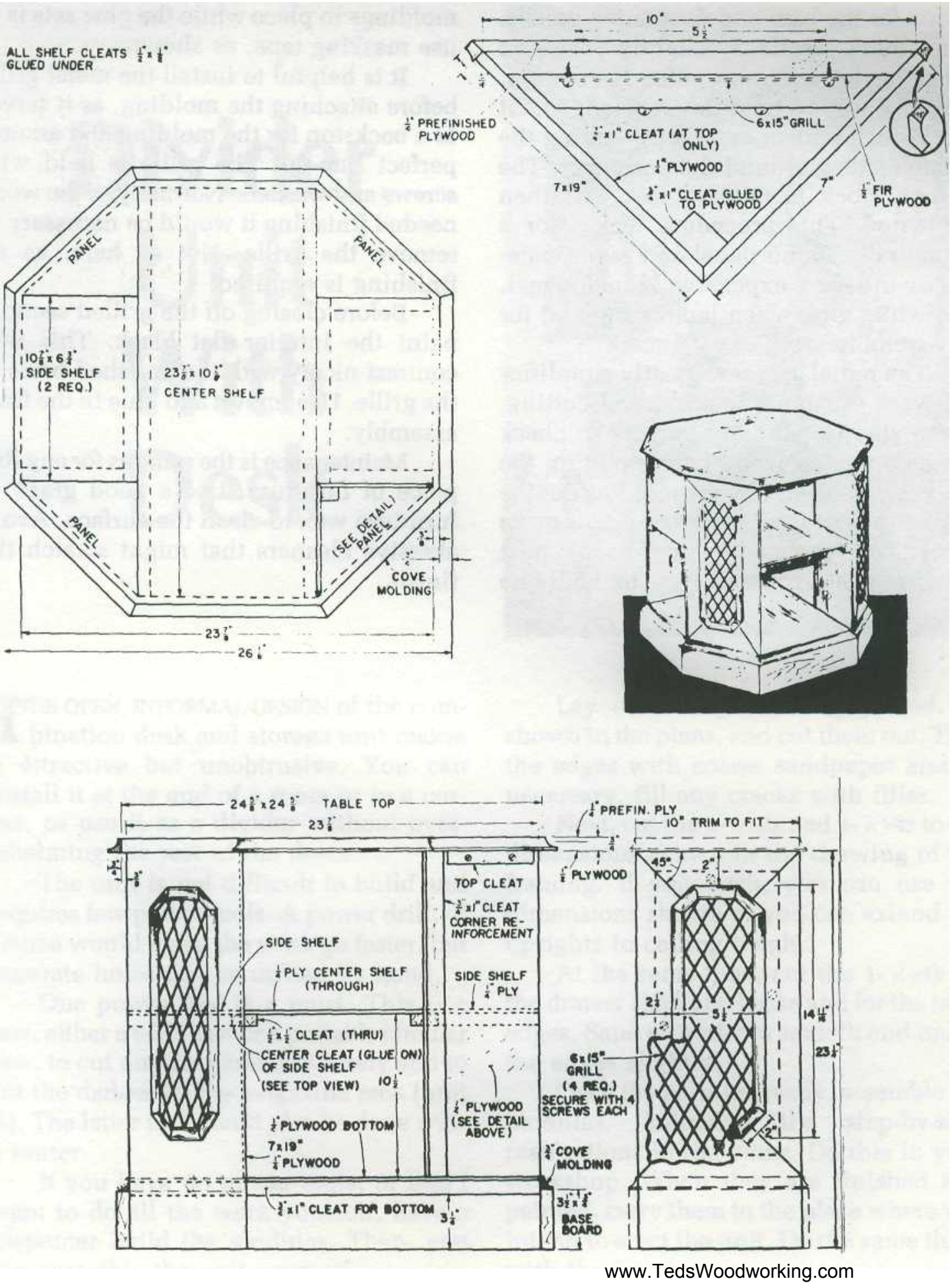
Note: You will also need, white glue and washers.

grooves, then set the panels aside while you cut the ½-inch plywood to the sizes shown for the top and bottom. Note that the top panel is larger than the bottom as it overhangs the sides slightly. The shape of these pieces is octagonal (see detail).

When taking measurements and cutting pieces, bear in mind that the thickness of the material is ¾ inches and not ¼ or ½. This can be confusing to the unwary.

With the top and bottom cut, make the

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strips for the base and decorative panels. Cut these sections slightly oversize allowing for trimming after laminating. The best way to treat the panels is to cut the ½-inch part in one piece, adding the ¼-inch facing around the perimeter. The ¼-inch stock is mitered first and then laminated. This procedure makes for a structurally sound panel and saves material on the more expensive ¼-inch panel. Use white glue when laminating and for all assembly work.

The radial arm saw greatly simplifies the work of trimming and bevel cutting. Use a sharp blade and be sure to check bevels on scrap wood before cutting the work. When trimming the molding cut the longest pieces first; this way if you make a mistake, you can recut for the next smaller size. An easy way to hold the moldings in place while the glue sets is to use masking tape, as shown.

It is helpful to install the metal grille before attaching the molding, as it serves as a backstop for the molding and assures perfect line-up. The grille is held with screws and washers. Normally, if the wood needed finishing it would be necessary to remove the grille. Not so here, as no finishing is required.

Before closing off the grilled section, paint the interior flat black. This will contrast nicely with the polished brass of the grille. Use screws and glue in the final assembly.

Maintenance is the same as for any fine piece of furniture. Use a good grade of furniture wax to clean the surface. Avoid abrasive cleaners that might scratch the finish.

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Divider Unit With Desk



THE OPEN, INFORMAL DESIGN of the combination desk and storage unit makes it attractive but unobtrusive. You can install it at the end of a room or in a corner, or use it as a divider without overwhelming the rest of the decor.

The unit is not difficult to build and requires few power tools. A power drill, of course would make the work go faster, but accurate holes can be drilled by hand.

One power tool is a must. This is a saw, either a table saw or a portable circular saw, to cut out the parts accurately and to cut the dadoes in the magazine rack (unit A). The latter task could also be done with a router.

If you have no power tools, or don't want to do all the work yourself, have a carpenter build the modules. Then, you can assemble the unit yourself.

Lay out the parts on plywood, as shown in the plans, and cut them out. True the edges with coarse sandpaper and, if necessary, fill any cracks with filler.

Next, cut the 2- × -2s and 1- × -4s to the dimensions shown in the drawing of the framing. If you wish, you can use the dimensions shown or you can extend the uprights to ceiling height.

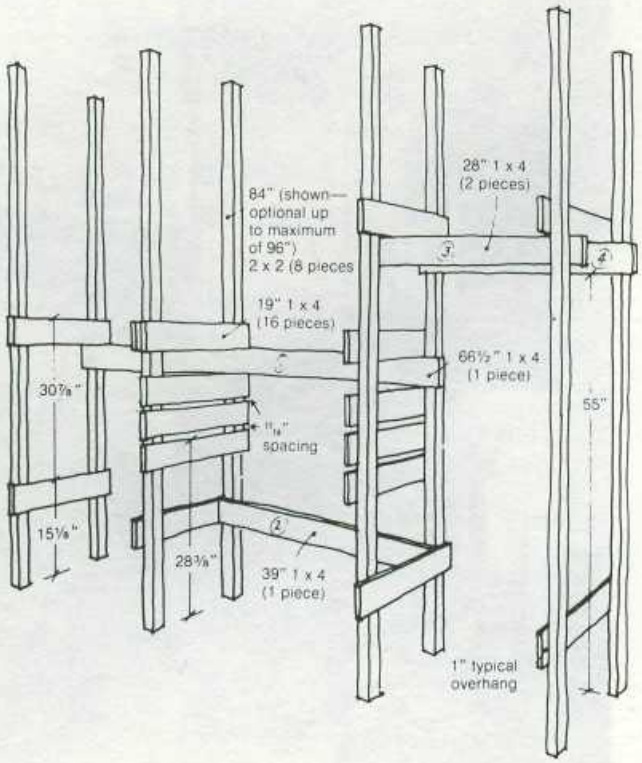
At the same time, cut the 1- × -4s for the drawer sides and backs and for the table edges. Sand all surfaces smooth and round the edges slightly.

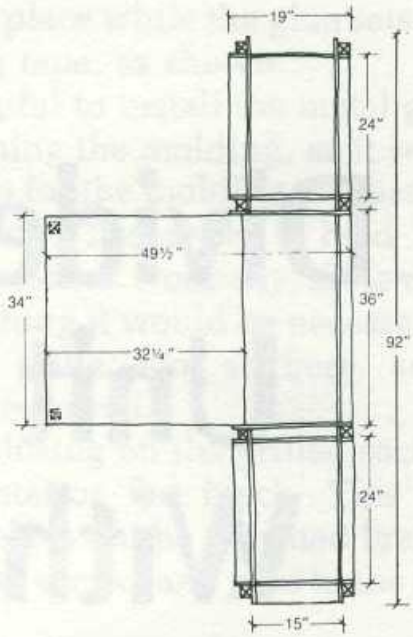
Once the parts are ready, assemble the modules, following the step-by-step instructions in the plans. Do this in your workshop. When they are finished and painted, carry them to the place where you intend to erect the unit. Do the same thing with the framing.

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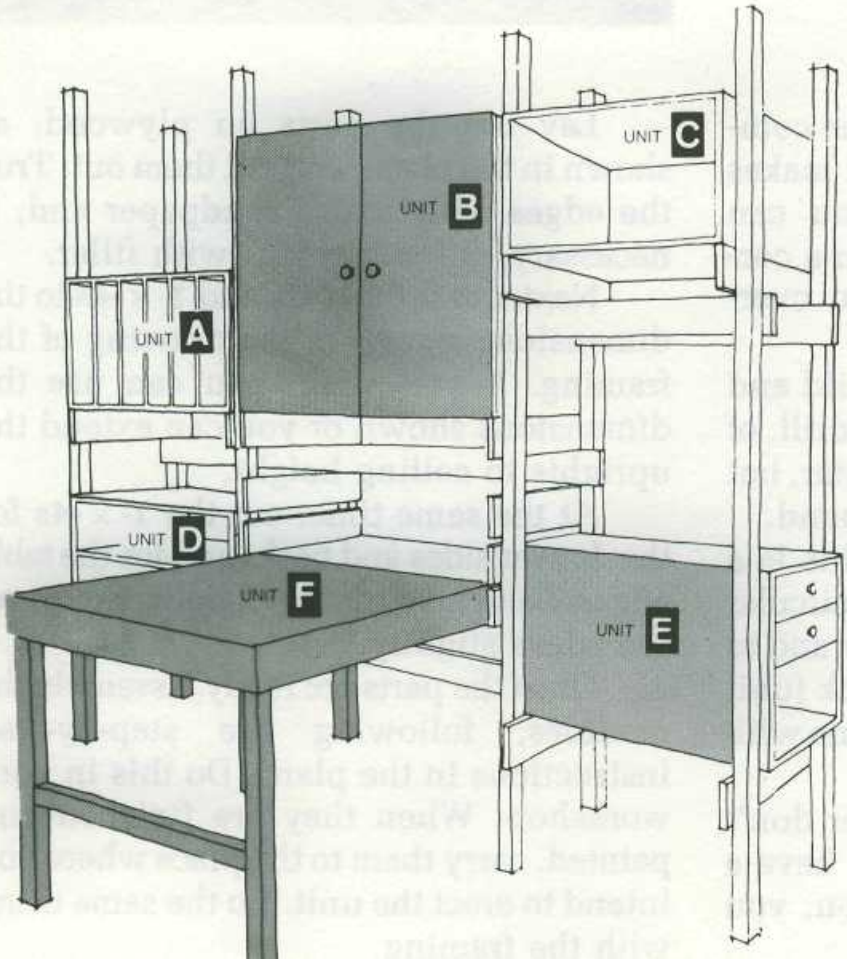
Stain or paint all framing members and allow to dry thoroughly, then move framing into room for assembly.

Predrill and screw together all 2 x 2 and 1 x 4 framing members, attaching members marked 1-4 last.

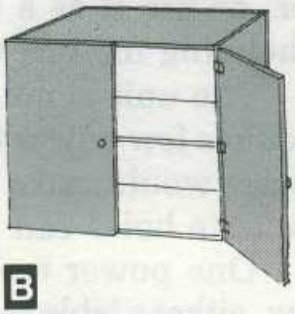




Set up desk as shown. To fold desk down, unlatch screen door hooks on legs, fold legs under and latch with screen door hook. Remove desk assembly from support framing and place assembly into channels directly above the previous channels. Desk top will fold down compactly without touching floor.



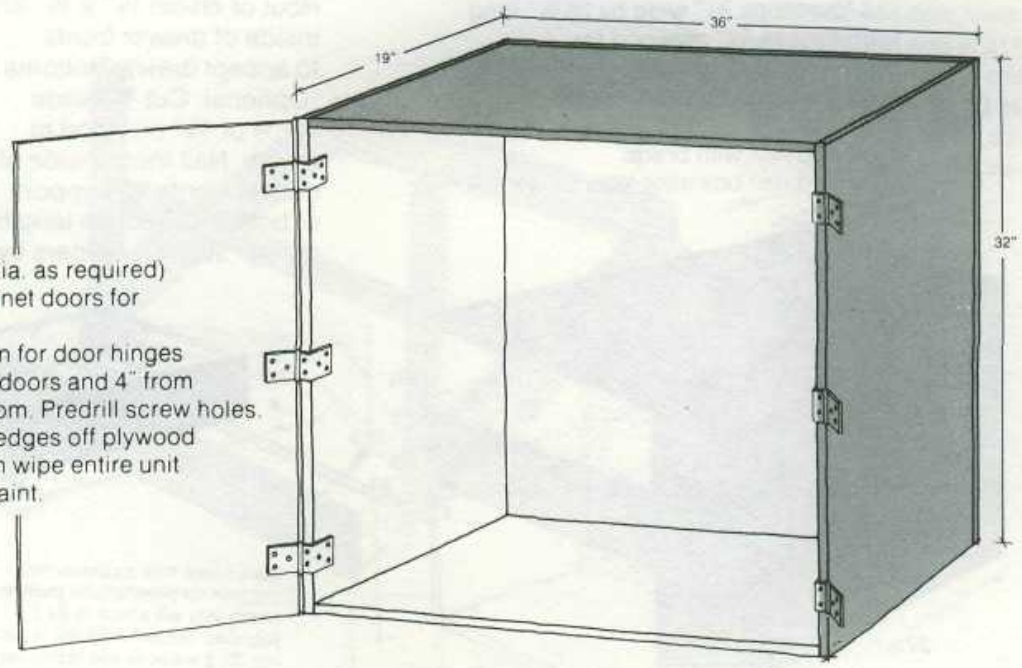
When thoroughly dry, install hinges on doors, and doors on cabinet; apply door pulls and magnetic catches.



UNIT B

Glue and nail basic cabinet parts together, including the shelf. Countersink nail holes before glue sets, and wipe away excess glue. Fill nail holes, allow to dry, and sand smooth.

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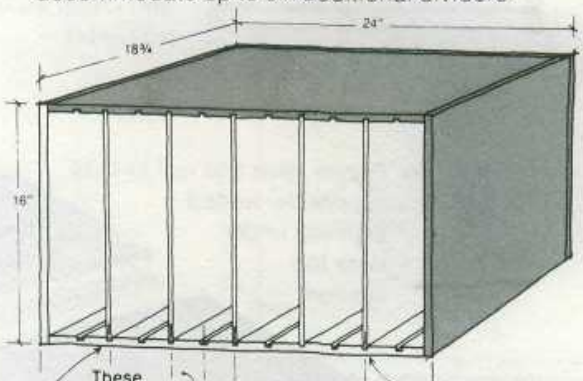


UNIT **B**

Drill holes (dia. as required) through cabinet doors for door pulls.
Mark location for door hinges on center of doors and 4" from top and bottom. Predrill screw holes. Sand sharp edges off plywood corners, then wipe entire unit clean, and paint.

UNIT **A**

On top and bottom, rout or saw and chisel five ¼" x ¼" channels for dividers, spacing them as shown. (Note: six additional channels are shown as optional so dividers can be moved closer together or farther apart, or to accommodate up to six additional dividers.



Glue and nail basic parts together, then finish as described for Unit B.

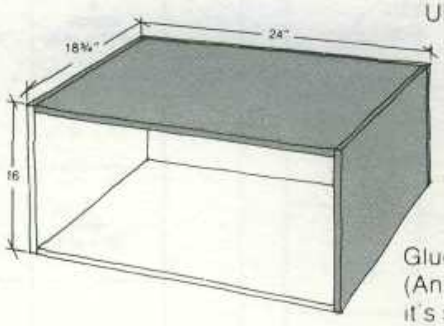
This "end" channel is centered 3½" in from edge.

These inside channels are 3⅝" centered.

These optional channels are 1¹³⁄₁₆" centered.

This "end" channel is centered 3½" in from edge.

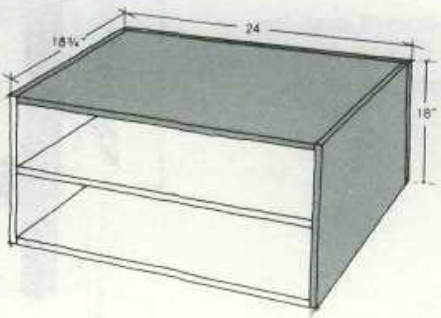
UNIT **C**



Glue and nail parts together. (An extra shelf may be added; it's shown on panel layout as optional.)
Finish as above.

UNIT **D**

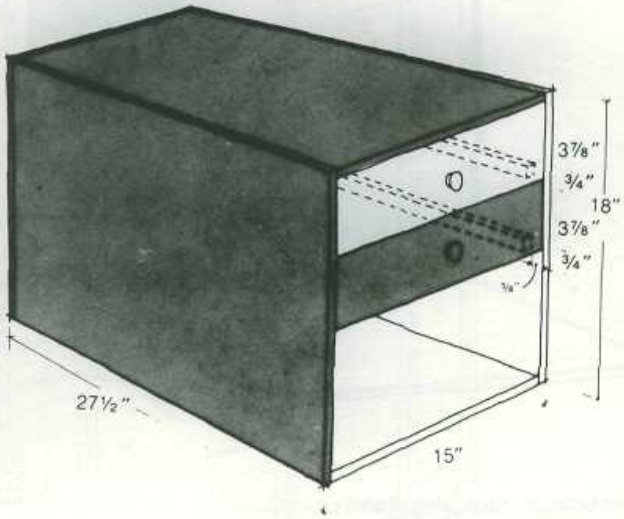
Nail and glue parts together and finish as above.



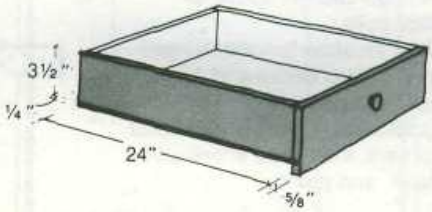
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UNIT **E**

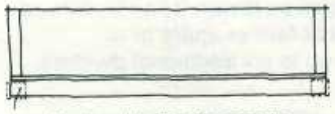
Cut four strips ¾" wide by 26½" long from excess ⅝" plywood for drawer support runners.
Mark their locations on insides of E sides.
Glue and nail with brads.
Glue and nail box assembly together.



Rout or chisel ¼" x ¼" channels inside of drawer fronts to accept drawer bottoms. (Optional: Cut ¾" wide strips of ⅝" plywood to length. Nail them inside of drawer fronts for support of bottoms. Reduce length of drawer support runners by ⅝".)



Mark screw hole locations (four per unit) on plywood unit modules where they will attach to 2 x 2 supports. Set unit modules in place, predrill into 2 x 2 supports and fasten securely



¾" runner fastened to E side panels.

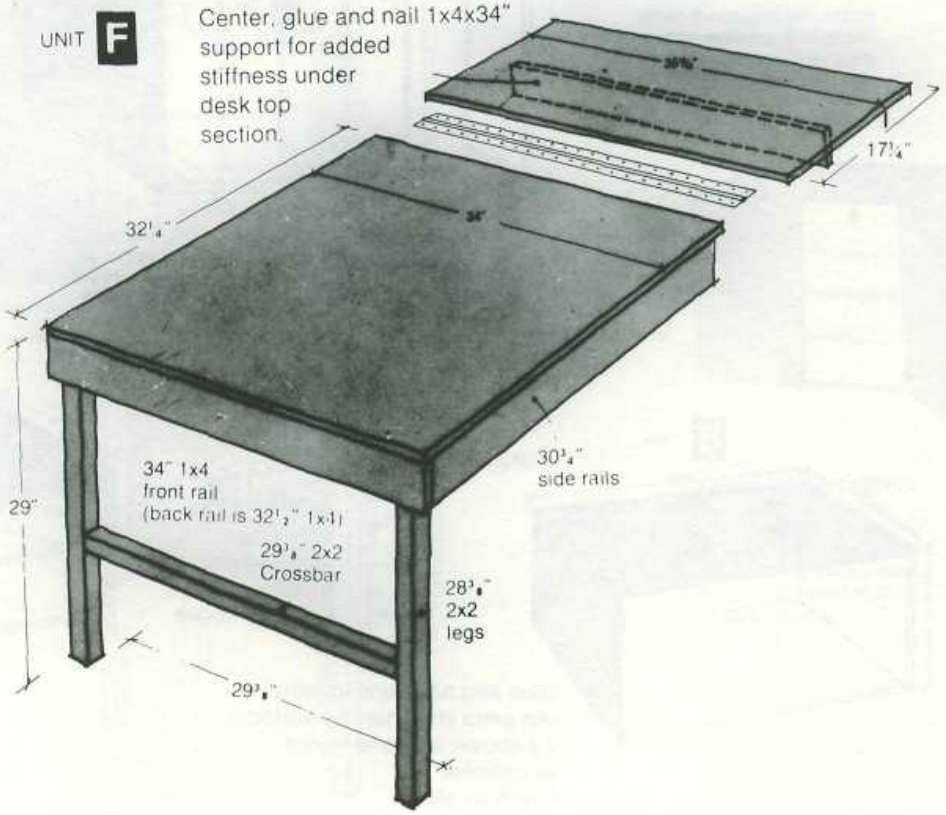
Drill holes for drawer pulls.
Nail and glue drawer assemblies, and finish as described for unit B.

UNIT **F**

Glue and nail 1x4's to bottom of desk at front, sides and back.
Make ¼" bevel on ends of legs opposite the side on which hinges will be installed.
Install butt hinges to both legs.
Pre drill and countersink holes in both legs for 2" flat head screws and attach 2x2" cross piece. Fill holes, allow to dry, and sand smooth. Then fasten hinged legs to bottom of desk top.

Fasten bottom of desk top section to folding desk top with piano hinge, and finish as above.

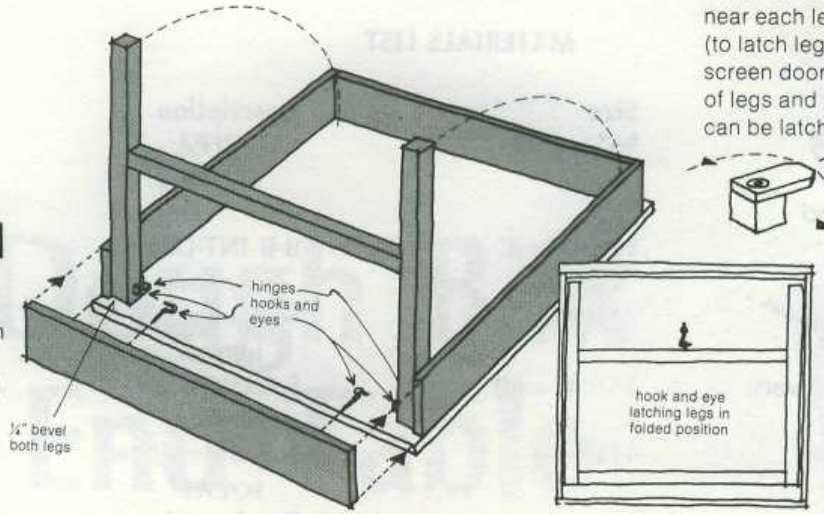
Center, glue and nail 1x4x34" support for added stiffness under desk top section.

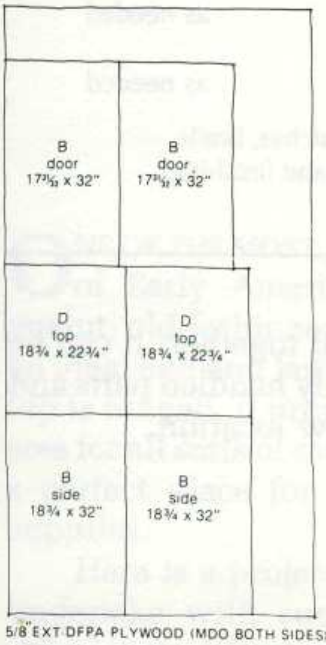


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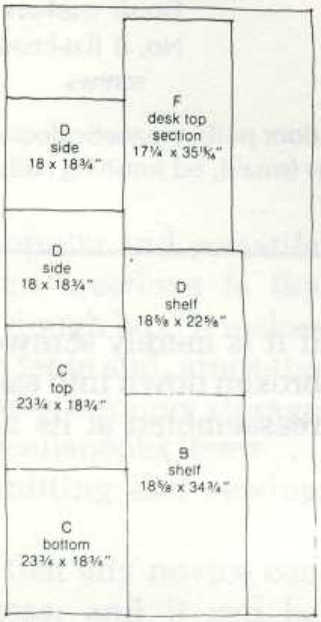
Attach screen door hook to inside of desk near each leg, and attach eye to each leg (to latch legs in open position). Also attach screen door hook and eye to cross piece of legs and bottom of desk (so legs can be latched in folded position).

alternate latch UNIT F to hold legs in folded position. 2x2x2" block (glued to bottom of folding desk top) with piece of plywood screwed into block. Use washers on both sides of plywood.

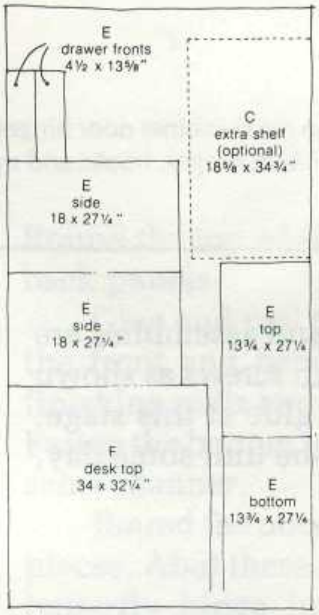




5/8" EXT DFPA PLYWOOD (MDO BOTH SIDES)

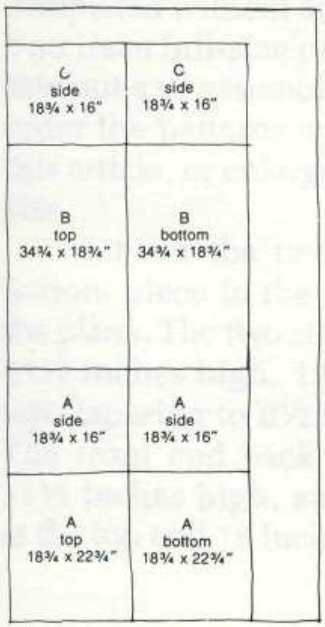


5/8" EXT DFPA PLYWOOD (MDO BOTH SIDES)

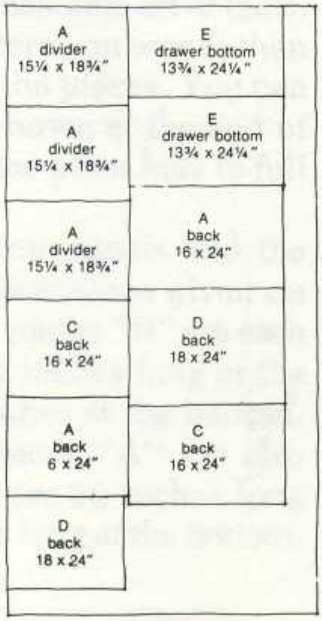


5/8" EXT DFPA PLYWOOD (MDO BOTH SIDES)

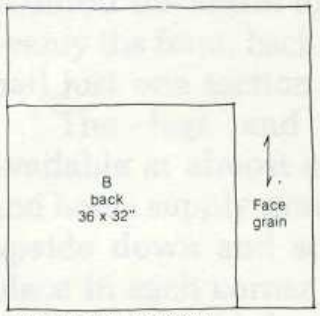
Most of the unit is made from plywood. Drawings at left give suggestions for making various cuts



5/8" EXT DFPA PLYWOOD (MDO BOTH SIDES)



1/4" B-B INT DFPA PLYWOOD



1/4" B-B INT DFPA PLYWOOD

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MATERIALS LIST

Purpose	Size	Description	Quantity
Cabinets, shelves	5/8" × 4' × 8'	EXT-DFPA plywood	4
Dividers, backs, and drawer bottoms	1/4" × 4' × 8'	B-B INT-DFPA plywood	1½
Frame and desk legs	2" × 2" × 72'	Select-grade lumber	1
Frame and desk drawers	1" × 4" × 60'	Select-grade lumber	1
	1¼"	No. 8 oval-head screws	as needed
		Finish washers	as needed
	2"	No. 8 flat-head screws	as needed

Note: You will also need cabinet door hinges, door pulls, magnetic door catches, brads, piano hinge, butt hinges, hooks and eyes (small), 6d finishing nails, and finishing materials.

When all the parts and assemblies are on site, erect the unit with screws as shown in the plans. Don't use glue at this stage. You may wish to move the unit some day. If it is merely screwed together, it can be broken down into easily handled parts and reassembled at its new location.

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Dough Box End Table



ONE OF THE MOST popular and versatile of Early American creations is the quaint, old-fashioned dough box. It makes an ideal end and lamp table and, since the top is hinged, it provides a roomy storage area for all sorts of miscellaneous items . . . a perfect place for knitting and sewing supplies.

Here is a project that any novice can undertake with success, and it can be completed without an elaborate set of tools. You trace full-size patterns on wood, then saw out and assemble the pieces. You can order the patterns as shown at the end of this article, or enlarge the plans here to full size.

Cut out the two top panels and the bottom piece to the dimensions given on the plans. The two side pieces "B" are each 11½ inches high, 12½ inches long at the top, tapering to 8½ inches at the bottom. The front and back pieces "A" are also 11½ inches high, and are 20 inches long at the top and 16 inches long at the bottom. Round the top edges of the front, side and back panels.

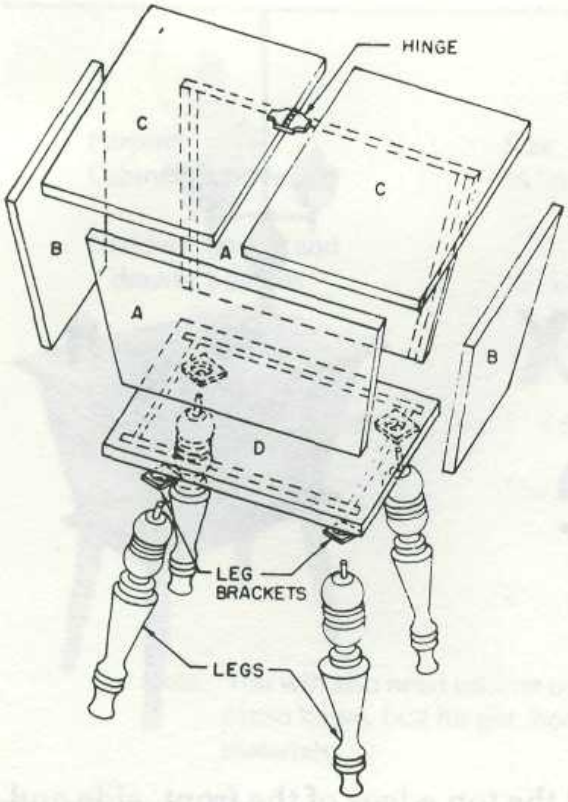
Glue and nail the end pieces between the front and back panels. Use 3-penny finishing nails and countersink the heads. Fasten the bottom in place as shown, in the same manner.

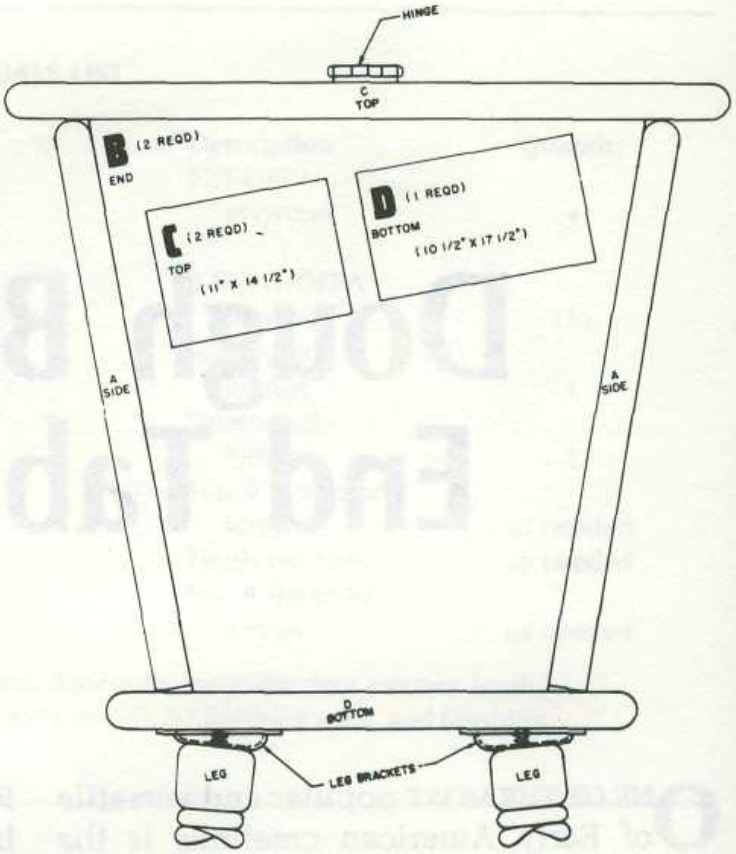
Round the outside edges of the two top pieces. Abut these together and install the butterfly hinge in the center. Carefully position the entire top so that it overlaps evenly the front, back and side pieces, then nail just one section in place.

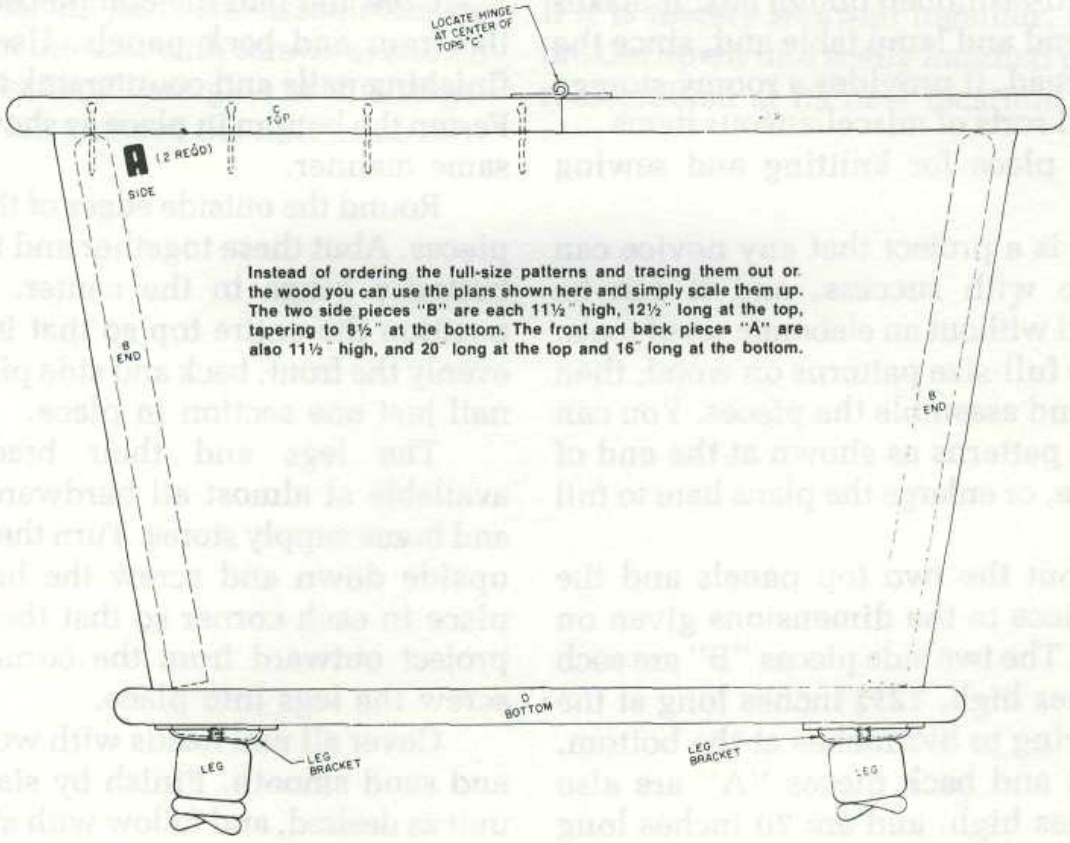
The legs and their brackets are available at almost all hardware, lumber and home supply stores. Turn the assembly upside down and screw the brackets in place in each corner so that the legs will project outward from the corners. Then screw the legs into place.

Cover all nail heads with wood putty, and sand smooth. Finish by staining the unit as desired, and follow with at least two coats of a good varnish or similar coating.

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Instead of ordering the full-size patterns and tracing them out or the wood you can use the plans shown here and simply scale them up. The two side pieces "B" are each 11½" high, 12½" long at the top, tapering to 8½" at the bottom. The front and back pieces "A" are also 11½" high, and 20" long at the top and 16" long at the bottom.

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MATERIALS LIST

Purpose	Size	Quantity
Sugar pine, smooth 4 sides	1" × 12" × 10"	1
"Gerber" colonial-type legs	12" long	4
Butterfly-type mounting hinge		1
No. 10 wood screws	5/8"	24
Nails	3-penny	1/4 lb.

Sand lightly between coats. A semigloss finish is recommended.

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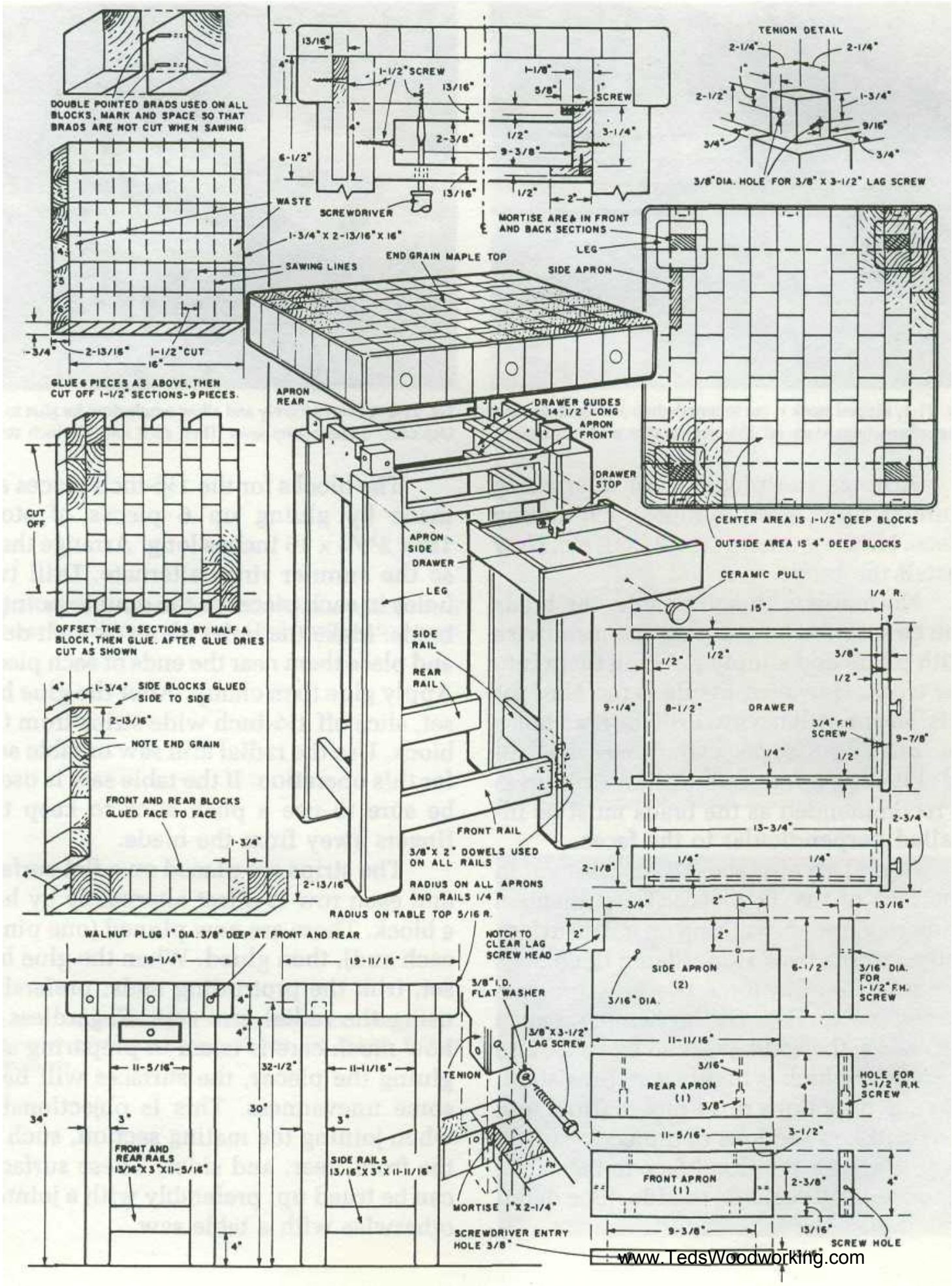
Durable Butcher Block Table

THIS STURDY butcher block table will make a fine addition to any kitchen. The end-grain maple top will withstand years of chops and cuts, and its simple lines will fit into any decor. Commercial butcher blocks are usually made 12 inches thick and weigh about 250 lbs.—far too heavy for home use. Ours is made with a dual-thickness top and weighs about 60 lbs. The perimeter blocks are 4 inches thick; the internal blocks are 1½-inch thick. We also added a small drawer to hold knives and other utensils.

The tabletop consists of 82 pieces of end-grain red maple, cut from ¾ stock. The ¾ stock (2 inches) has a dressed thickness of 1¾ inch. The technique used calls for some of the blocks to be precut to the finished size before gluing. This greatly simplifies the layout and arrangement of the blocks when alternating the annular rings. However, you may be wondering how as many as 11 pieces can be glued successfully. The trick is to use double-pointed brads. Without the use of these brads, it would be almost impossible for the average home workshopper to accomplish such a job.

Select good flat lumber then set the table saw at $2\frac{13}{16}$ inches and rip enough stock to produce 32 pieces, each 4 inches long. Be sure the fence is set parallel to the blade as any discrepancy now will show up in the finished top later on. These 32 blocks will make up the outer perimeter of the top.

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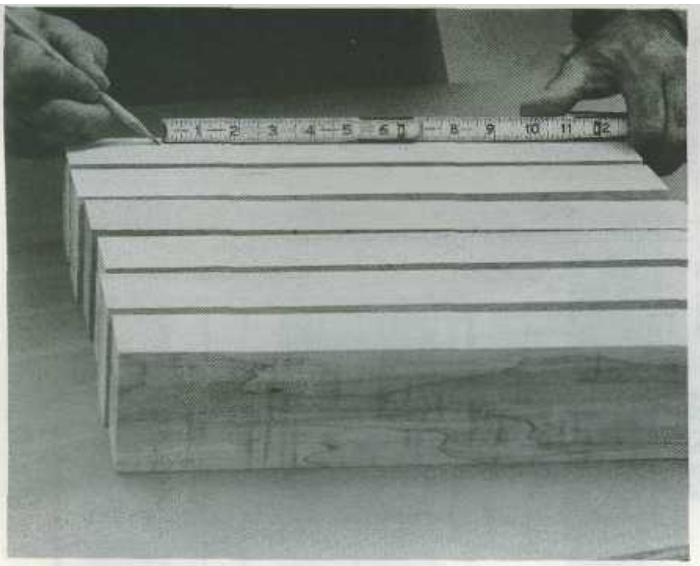


Fig. 21-1. Ripped stock is cut to length then arranged, annular rings alternating. Mark off 1½-inch lengths and kerf cuts.

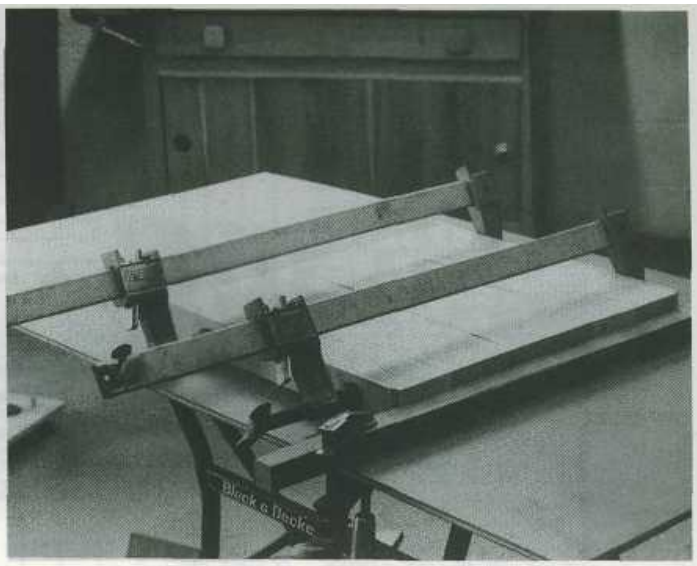


Fig. 21-2. Clamp securely and allow ample time for glue to set. Use cauls under clamp jaws. Then slice into 1½-inch strips.

Arrange the pieces with alternating annular rings, then number each mating piece. Number them 1-1, 2-2, 3-3, etc. Now install the brads.

Normally with soft woods, the brads can be inserted by grasping them endwise with pliers and simply pushing them into the work. However, maple is too hard for this, so you will have to drill the brad holes into one face. Use one of the brads as a drill by chucking it into your drill. A drill press is recommended as the brads must be installed perpendicular to the faces.

Insert two pins about 2 inches apart in one face of the 11 pieces. Keep them in numerical order, working on a flat surface and against a back stop. Clamp the blocks (without glue) to force the pins into the mating pieces. Remove the clamp, separate the pieces, then add glue and reclamp. Use resin glue which is highly water-resistant. Make two sections of 11 pieces (front and rear) and two sections of 5 pieces (sides). The 11 pieces are glued face-to-face. The 5 pieces are glued side-to-side. (See detail drawing).

The blocks for the 1½-inch pieces are made by gluing up 6 pieces of stock 1¾ × 2 13/16 × 16 inches long. Arrange these so the annular rings alternate. Drill two holes in each piece for the double-pointed brads. Make the holes about ¼ inch deep and place them near the ends of each piece. Apply glue then clamp. After the glue has set, slice off 1½-inch wide strips from the block. Use the radial arm saw or table saw for this operation. If the table saw is used, be sure to use a push stick to keep the fingers away from the blade.

The strips are placed on a flat surface and each row is offset alternately by half a block. These are now pinned (one pin at each end), then glued. When the glue has set, trim the protruding ends, preferably using the radial arm saw. Regardless of how much care is taken in preparing and gluing the pieces, the surfaces will have some unevenness. This is objectionable when joining the mating section, such as the front, rear, and sides. These surfaces can be trued up, preferably with a jointer, otherwise with a table saw.

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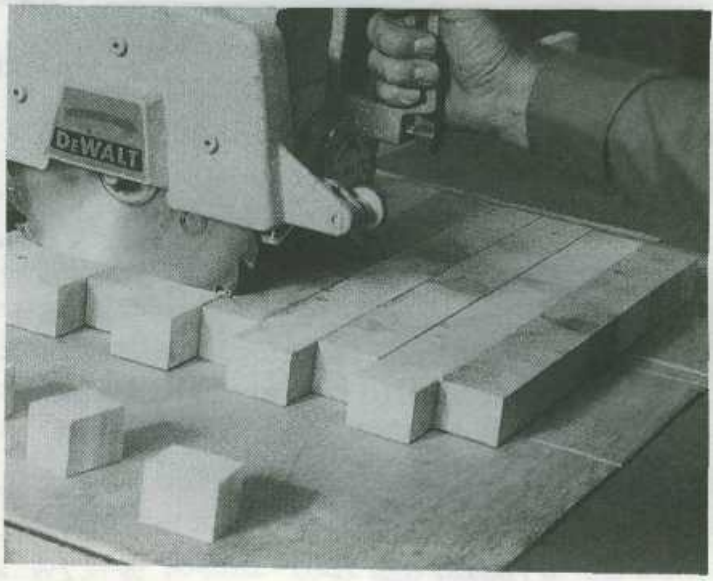


Fig. 21-3. Arrange 1½-inch strips, stagger joints. Double-pointed brads go in each end of face pieces. Trim block with radial saw.

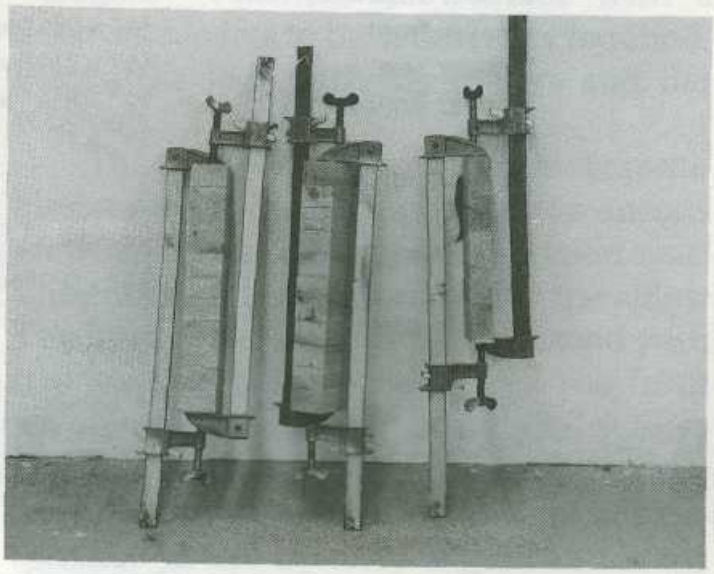


Fig. 21-4. Cut perimeter blocks at saw fence using stop clamp. Arrange for best grain appearance and number. Allow to set.

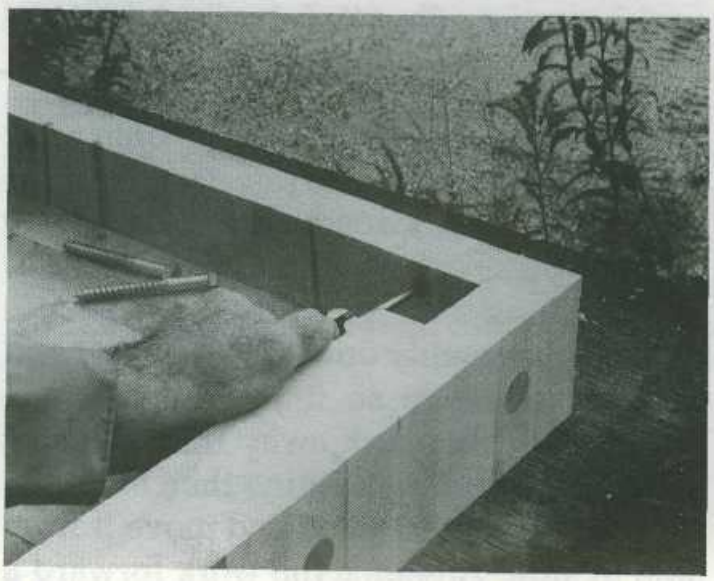


Fig. 21-5. Mortise for legs is made with one-inch Forstner bit. Lag screw pilot hole made with red hot ¼-inch Phillips screwdriver.

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MATERIALS LIST

Purpose	Size	Description	Quantity
Block	1¾" × 2³⁄₁₆" × 4"	Maple	32
Block	1¾" × 2¹³⁄₁₆" × 1½"	Maple	50
Leg	3" × 3" × 32½"	Maple	4
Apron side	¹³⁄₁₆" × 6½" × 11¹¹⁄₁₆"	Maple	2
Apron front/rear	¹³⁄₁₆" × 4" × 11⁵⁄₁₆"	Maple	2
Rail, side	¹³⁄₁₆" × 3" × 11¹¹⁄₁₆"	Maple	2
Rail, front/rear	¹³⁄₁₆" × 3" × 11⁵⁄₁₆"	Maple	2
Drawer guide, side	1⅛" × 3¼" × 14½"	Pine	2
Drawer guide, top	½" × ⅝" × 14½"	Pine	2
Drawer guide, bottom	½" × 2" × 14½"	Pine	2
Drawer side	½" × 2⅛" × 15"	Poplar	2
Drawer subfront	½" × 2⅛" × 8½"	Poplar	1
Drawer front	⅜" × 2¾" × 9⅞"	Maple	1
Drawer rear	½" × 2⅛" × 8½"	Poplar	1
Drawer bottom	¼" × 8½" × 13¾"	Plywood	1
Plug	⅜" × 1"	Walnut	6
Drawer pull		(No. 71002)	1
Lag screw	⅜" × 3½"		8
Flat washer	⅜" ID		8
Dowel	⅜" × 2"	(No. 51017)	16
Double pointed brad		(No. 83007)	80
Screw	¾"	No. 8 FH	2
Screw	1"	No. 8 FH	12
Screw	3½" × 10"	RH	2
Brad	1" No. 17		8
Salad bowl finish		(No. 85006)	1 pint
Drawer stop		(No. 78015)	1

Note: If you have difficulty locating the items in parentheses, write to Armor Products, Box 445, E. Northport, NY 11731 and ask for free catalog.

Set the pieces to be trued up onto a flat surface, such as the table saw. Rest the ends onto ¼-inch plywood then clamp two chunky pieces of wood, one at each end, thus forming a bridge as shown in photo. Place the assembly onto the table saw and elevate the blade so it just touches the work. With the work away from the saw blade, turn on the machine then slide the "bridge" over the blade and move it from side to side. Advance the work forward a little at a time after each pass. If you find low spots, elevate the blade and repeat. Take only very small bites each time. When done, the surface should be as flat as your saw table.

The walnut plugs for the front and rear blocks are made with a 1-inch plug cutter. The holes for these should be made with a 1-inch Forstner bit. Apply glue to the walls of the hole, then insert the plug.

The final assembly of the top can now

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take place. Again, using double-pointed brads glue the sides to the top member. When the glue has set, add the front and rear sections.

The legs are made from solid stock, if available. Otherwise two or more pieces are glued up to make the required thickness. The finished size of the legs are 3 × 3 × 32½ inches. Assuming two pieces of 1¾-inch stock are glued up, resaw the pieces to obtain the 3- × -3-inch cross section. After sawing, use a jointer to smooth the surface. Otherwise, use a belt sander.

The top end of each leg is tenoned to fit the mortise which will be made at each corner of the top. There are various ways of making the tenon. The easiest way is to use the radial arm saw and make successive cuts on two surfaces. Be sure to clamp a stop to the fence for the first (2½ inches) cut. After the tenons are cut, drill the holes for the lag screws.

Use the router with a 5/16-inch rounding bit to round the corners of the legs. After rounding, locate and drill the ⅜-inch diameter holes for the rail dowels. Make the hole a trifle deeper than 1 inch to ensure that the joint closes fully. Use dowel centers to transfer the holes from the legs to the rails. Using spiral dowels, assemble the leg to the rails and be sure to note that the rails are used in pairs as the lengths vary.

The underside of the top is mortised at each corner to receive the tenoned legs. One simple method of mortising the end-grain makes use of a Forstner bit. This tool is ideal because of its ability to make overlapping cuts without "walking." Lay out the mortise lines, then drill out the waste area. Set the depth to cut 2½-inches deep. Clean out the mortise with a chisel.

Install the legs into the mortises then mark the hole centers for the screws. Remove the legs and drill the ¼-inch pilot holes. One hole in each corner can be drilled, but the second hole cannot be drilled because of the space limitations.

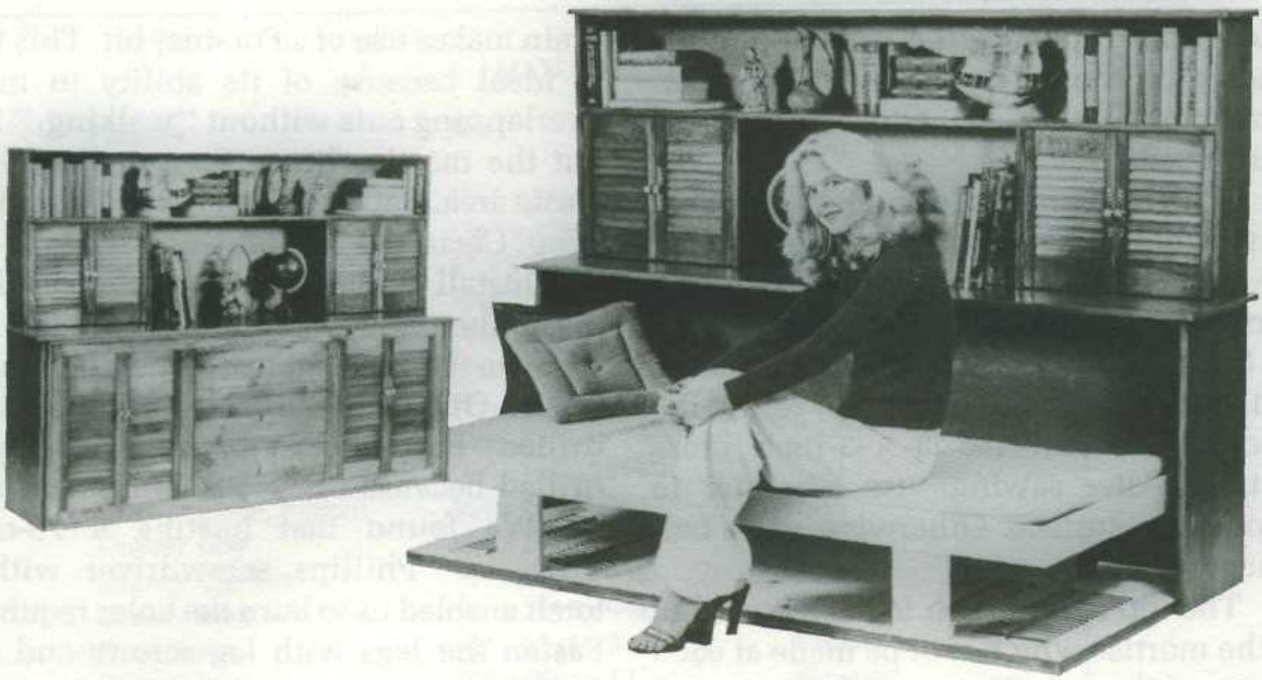
We found that heating a 79-cent "bargain" Phillips screwdriver with a torch enabled us to burn the holes required. Fasten the legs with lag screws and flat washers.

The aprons are cut, drilled, and assembled as shown. Note that the side aprons are deeper than those of the front and rear. They are fastened with screws at the sides. The front and rear aprons are fastened with two screws through the edges. The front apron or frame has two additional screws fastened at the ends.

The drawer and guides are cut and assembled as indicated. Use glue and brads to fasten the drawer members. The top is sanded with a belt sander followed by a finishing sander. Start with a coarse belt working down to 120 grit. Dust carefully, then use the finishing sander until the top is glassy-smooth.

The table should be finished with mineral oil or a good salad bowl finish which has been approved for contact with food.

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Foldaway Bed/Storage Unit

DO YOU NEED an extra bed or bookcase? Build this unit and you'll have both—a handsome storage unit and a comfortable bed. This is a modern version of the Murphy bed which was very popular at one time. The Murphy beds folded into a wall when not in use, and you may still see them occasionally on TV reruns of the old Laurel and Hardy films, with one comedian being accidentally slammed into the wall while still asleep.

With living space at a premium today, this unit should find wide acceptance among apartment dwellers and home owners alike. Because of its ease of operation, it takes little effort to convert from books to bed. Simply roll out the bottom section and tilt. It's a great idea for a small guest room. It occupies little space either open or closed, and it's attractive as well as useful.

The unit shown was made of pine plywood, but solid pine or other woods may be substituted. Construction has been simplified so that even the novice woodworker should have no problem in making the piece. No tricky cuts are involved, and butt joints are used throughout.

The piece consists of three parts: upper shelves, lower bed compartment, and the bed itself. The dummy doors and drawers

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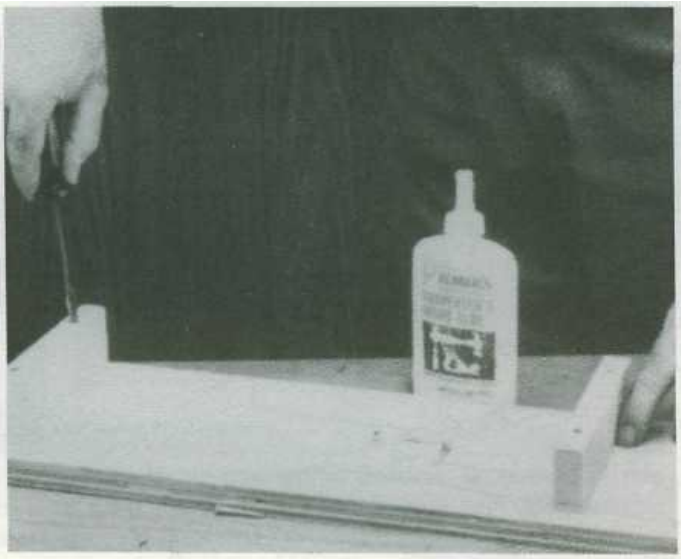


Fig. 22-1. The cleats used to fasten side members are 2 inches wide and receive 3/16-inch-diameter holes.

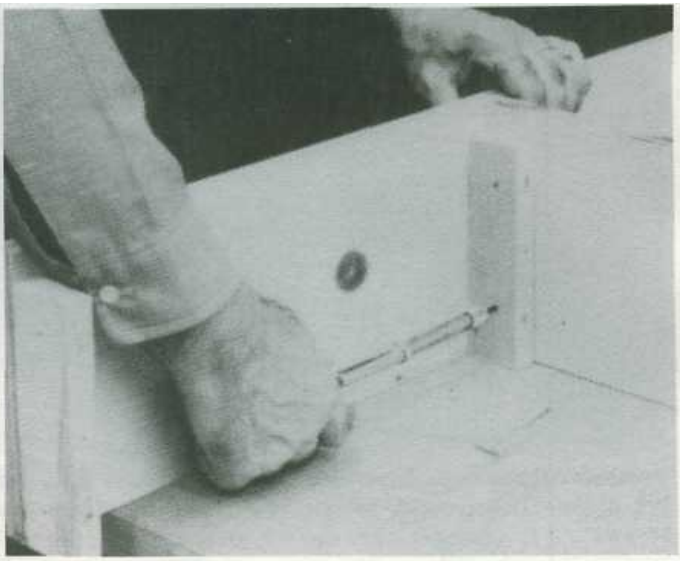


Fig. 22-2. Assembling the side to shelf. Push drill is handy for making the screw pilot holes.

are actually the base of the bed. The bed rides on specially designed non-swivelling casters. These are necessary because they ensure that the bed will roll in and out in a straight line. If conventional casters are used, it becomes very difficult to withdraw and replace the bed without striking the compartment sides.

In order to keep the knobs and pulls clear of the floor when the bed is in use, the edges of the front panel are thickened by the use of appropriate moldings.

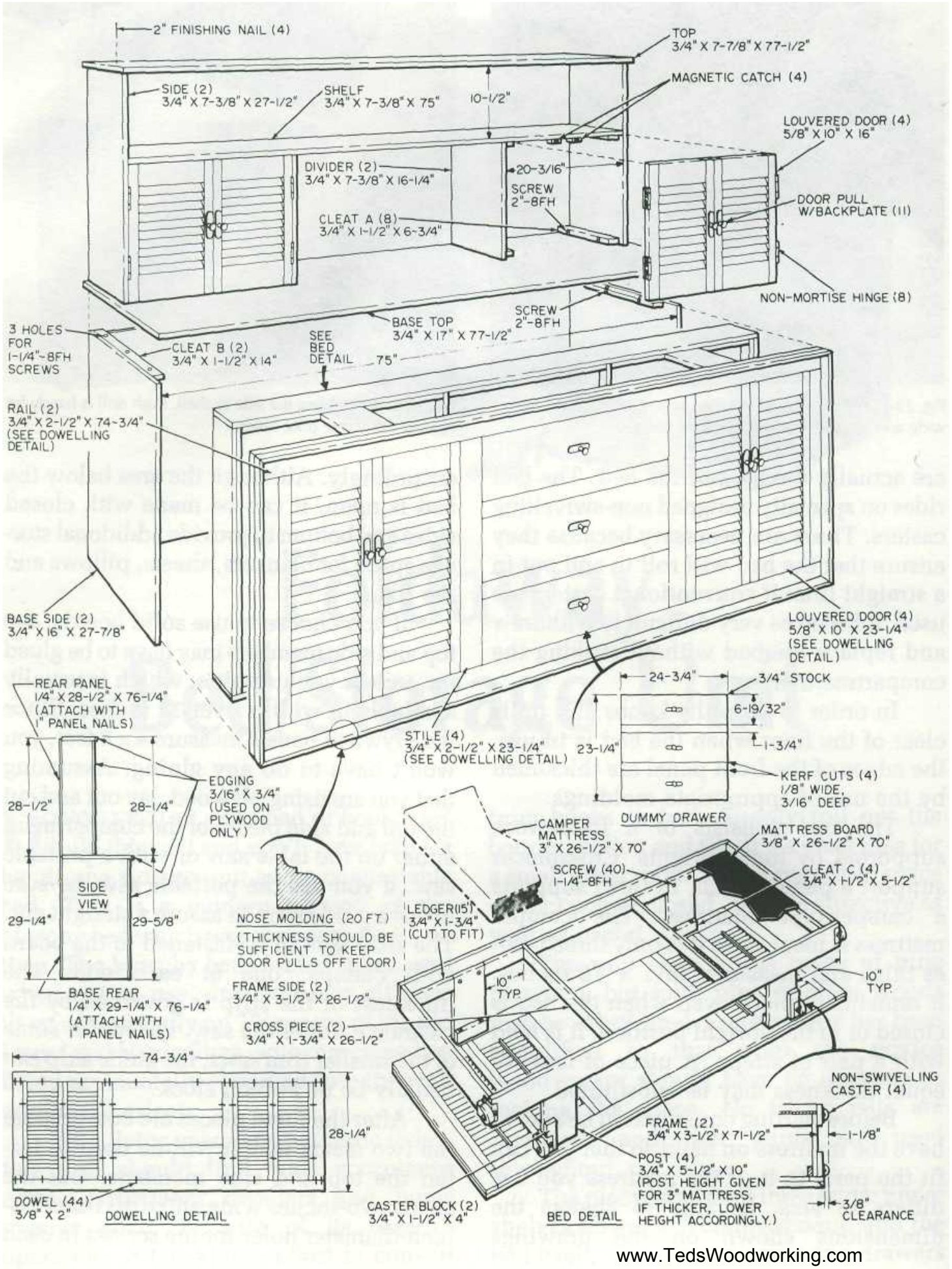
The bed consists of a framework supported by four uprights. Crosspieces support a panel which, in turn, supports a camper-type mattress. The camper mattress is ideal since it is only three inches thick and measures 26½ × 70 inches. It remains in place even when the bed is closed or in the upright position. It is held with a pair of straps. A piece of foam of equal thickness may be substituted.

Before starting construction be sure to have the mattress on hand so that you can fit the parts to it. If the mattress you use differs in size, be sure to change the dimensions shown on the drawings accordingly. Although the area below the bed is open, it can be made with closed sides and bottom to provide additional storage space for blankets, sheets, pillows and the like.

If you choose to use solid boards, the top and side members may have to be glued up, unless you use pine, which is usually available in widths over 12 inches. Since the plywood panels measure 4 × 8 feet, you won't have to do any gluing. Assuming that you are using plywood, lay out and cut the top and side pieces of the compartment either on the table saw or with a portable saw. If you use the portable saw, be sure to use a guide strip to assure a straight cut. The strip should be fastened to the board with clamps, one at each end. The thickness of the strip is governed by the clearance under the saw. Except for some of the smaller trim saws, the guide strip can usually be of ¾-inch stock.

After the three pieces are cut, prepare the two cleats which will be used to fasten the top and side members. Cut the cleats two-inches wide and drill three 3/16-inch-diameter holes for the screws in each

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Fig. 22-3. To locate position for dividers, set two doors side by side, make a mark on shelf edge even with door, another mark 3/16 inch from first indicates inside edge of divider.

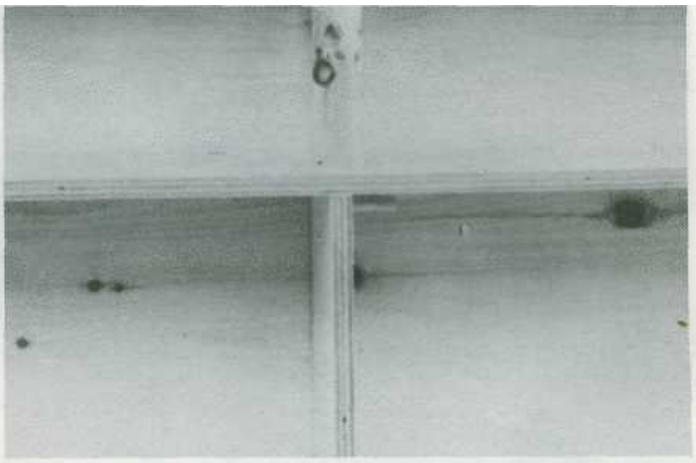


Fig. 22-4. When installing the rear panel, use a temporary spacer to keep the top board from sagging. When nailed in place, the rear panel will prevent the top from sagging.

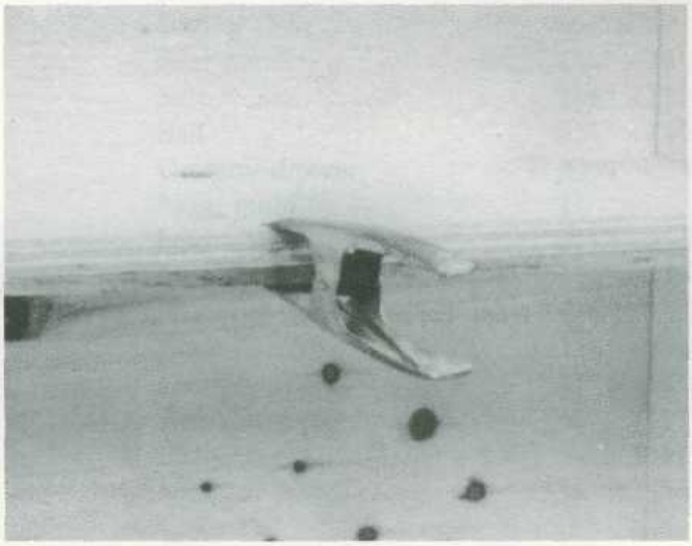


Fig. 22-5. To accurately position the dividers, use several wood strips, cut to proper length, to provide the correct spacing. Use a clamp to hold wood strip against the top.

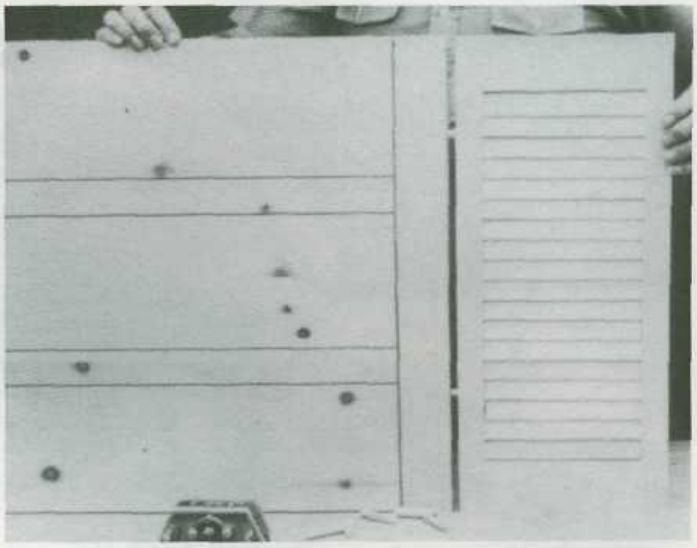


Fig. 22-6. Parts of the lower front section are installed with doweled joints. Two dowels are sufficient to hold louvered sections.

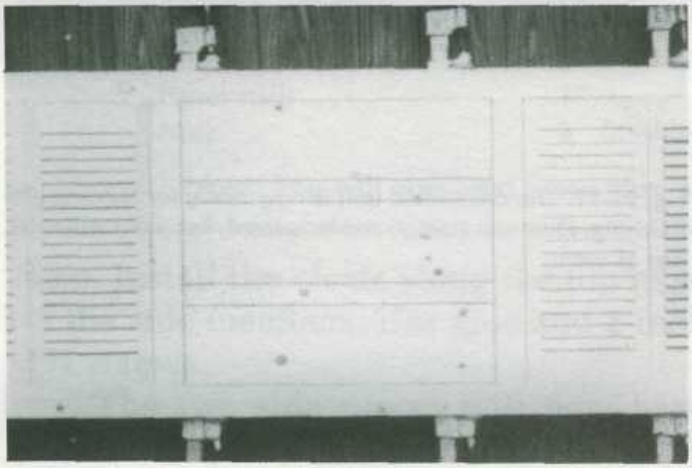


Fig. 22-7. Front panel consists of four louvered doors and center panel simulating three drawers. Add stiles, clamp entire assembly.

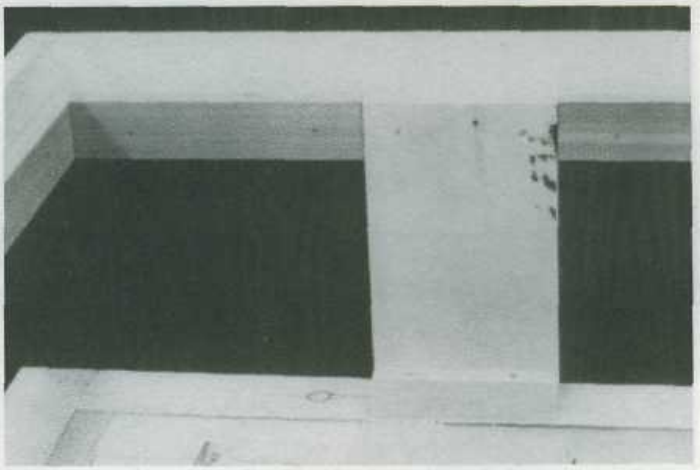


Fig. 22-8. The top of the bed post must be flush with the ledge strips. A 5½-inch cleat is used to mount the posts to the front panel.

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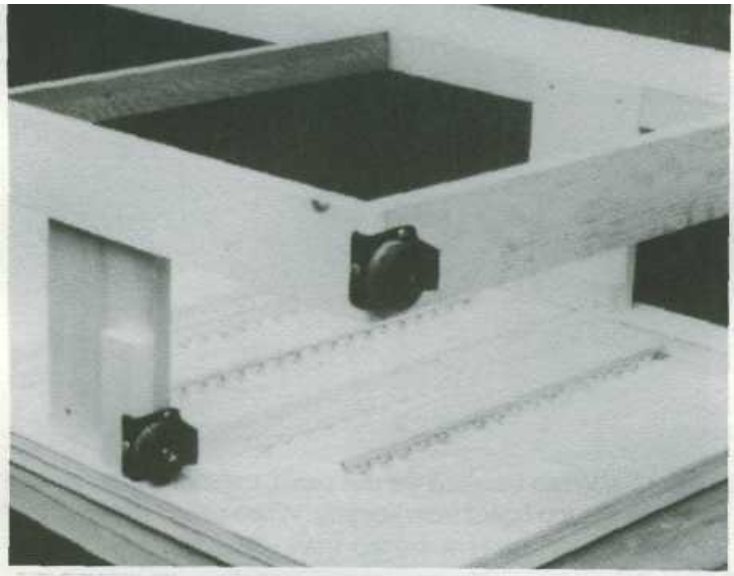


Fig. 22-9. Two of the casters attach to the bed frame. The other two casters attach to the posts by means of 1¼ × 4-inch blocks.

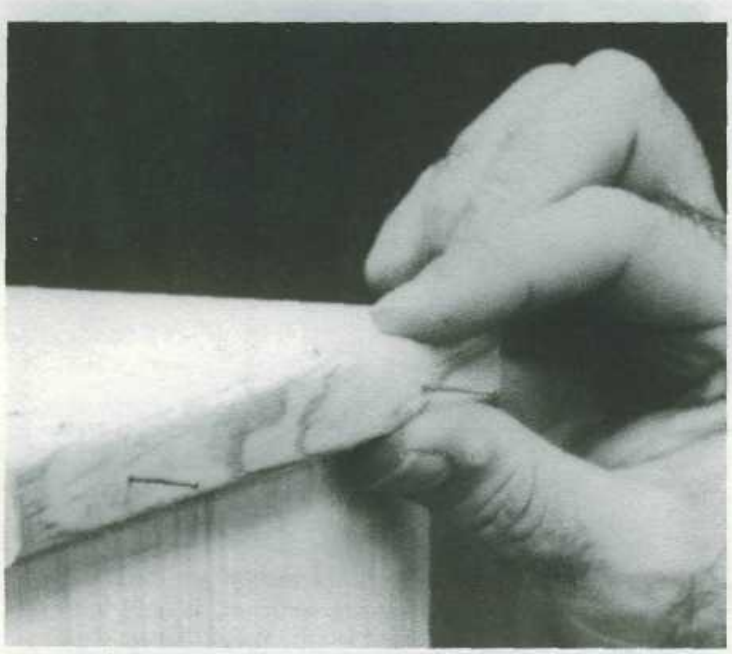


Fig. 22-10. Finishing off the plywood with 3/16 × ¾-inch edging. Use glue and brads. For best results, try mitering the corners.

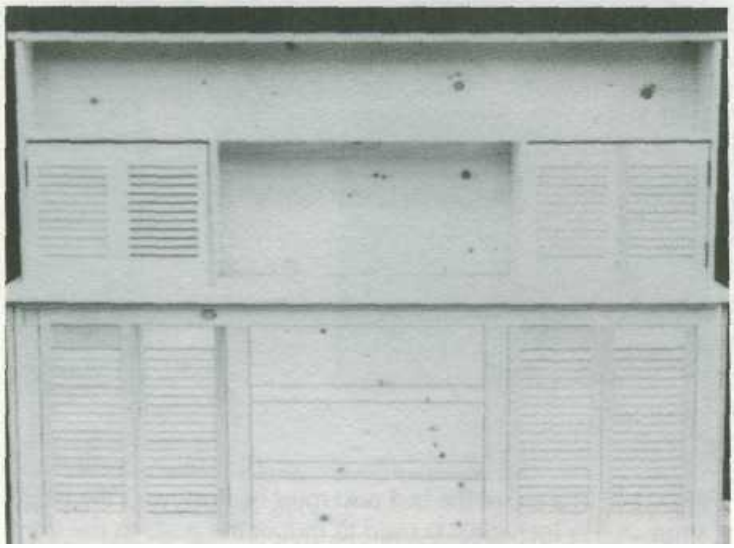


Fig. 22-11. The completed unit is now ready for sanding and finishing. Ours was stained and lacquered, but paint will work just as well.

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MATERIALS LIST

Purpose	Size	Description	Quantity
Base side	16″ × 28⅞″		2
Base top	17″ × 77½″		1
Base rear	¼″ × 29¼″ × 76¼″	Plywood	1
Cleat B	¾″ × 1½″ × 14″	Solid pine	8
Door	⅝″ × 10″ × 16″	Louvered	4
Top	7⅛″ × 77½″		1
Shelf	7⅜″ × 75″		1
Side	7⅜″ × 27½″		2
Divider	7⅜″ × 16¼″		2
Cleat A	¾″ × 1½″ × 6¾″	Sold pine	2
Door	⅝″ × 10″ × 24″	Louvered	4
Edging	3/16″ × ¾″		40′
Rear panel	1¼″ × 29¼″ × 76¼″	Plywood	1
Stile	2½″ × 23¼″		4
Rail	2½″ × 74¾″		2
Dummy drawer	23¼″ × 24¾″		1
Nose molding	1″		20′
Frame side	3½″ × 26½″		2
Frame	3½″ × 71½″		2
Post	5½″ × 10″		4
Cleat C	1½″ × 5½″	Solid pine	4
Ledger	¾″ × 1¾″	Pine	15′
Crosspiece	¾″ × 1¾″ × 26½″	Pine	2
Caster block	¾″ × 1½″ × 4″		2
Mattress board	⅜″ × 26½″ × 70″		1
Casters			4
Door pull with backplate			11
Magnetic catch			4
Non-mortise hinge			8
Dowel	⅜″ × 2″		40
Screw	2″—8 FH		24
Screw	1¼″—8 FH		40
Panel nails	1″		36
Nails	2″ finishing (for top panel)		4

Note: You will also need white glue, sandpaper, and finishing materials.

face. Install the cleats along the top edge of the side members. Use glue and 2-inch FH screws.

The two side pieces will now have cleats at one end. Put them aside and, while the glue sets, cut the rear panel. This should be ¼-inch plywood. However, since it doesn't show (except when the bed is in use), a less expensive wood, such as fir, can be used. This will help keep costs down. After cutting the panel to size, sand all edges and break the sharp corners. Use a piece of sandpaper wrapped around a block, or a power sander.

Now fasten the sides to the top. Position the sides so the top overhangs

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equally at both ends. Apply white glue to the joints then assemble with 1¼-inch screws. Before the glue sets, tip the U-shaped assembly forward so the rear edge is upright. Install the rear panel, noting that the lower edge is flush with the lower edge of the sides. The upper edge of the panel should be set back ⅜ inch at the top. The panel is also set back at the sides, but only by ⅛ inch.

Provided that the setbacks are equal at the sides, the assembly will be perfectly square because the rear panel acts like a large square. Fasten the panel with 1-inch panel nails. These are the nails used to install prefinished wall paneling: they are made with annular grooves and have excellent holding power. (Try removing one and you'll see how well they hold.) Use glue at all joints.

This is made as a separate unit which fastens to the base piece. The top, sides, shelf and dividers are of equal width. Set the fence of the table saw to 7⅜ inches and rip the required pieces, then cut them to the lengths shown in the Materials List. Cut the eight cleats to size and, as before, drill the screw clearance holes.

Install the cleats to the side pieces. Position them carefully, especially the upper ones which hold the shelf. The lower ones are fastened flush at the bottom. The cleats for the dividers are mounted flush at top and bottom.

Install the side pieces to the shelf first. Lay the shelf and ends on their backs and be sure to work on a flat surface. Apply glue to the joint, then screw the cleats firmly. To ensure that the assembly remains square, fasten a diagonal cleat to the back side as shown. Repeat the procedure for the opposite end. The top piece is added next. Center it so the overhang is equal at both ends and at the front.

To locate the position for the dividers, place two louvered doors side by side without space, as shown in the photo. Place a mark on the shelf edge in line with the door farthest from the side panel. Place another mark 3/16 inches from the first. This will indicate the inside edge of the divider. Cut and install the rear panel, then fasten the upper section to the lower.

Install the divider next. To simplify the installation, cut four strips of wood making the length equal to the width of the opening. Place two strips at the top and two at the bottom of the opening between the end panel and the divider. Mark the screw hole locations, apply glue and screw the pieces securely in place.

The doors are hung with non-mortise hinges. These are quickly installed since they do not require a gain to be cut in the door or side panel. The specially designed hinge automatically gives the proper clearance allowance between door and frame. Fasten the hinges to the door, then place into the opening, resting the bottom of the doors on a strip of ⅛-inch wood. Mark the position of the hinges on the frame (side panel and divider), then use an awl to pierce the center marks for the screws. Fasten the rest of the hinges and repeat for the other set of doors.

Drill a 3/16-inch-diameter hole in the center stiles of each door for the pulls. Also mount the magnetic catches to the underside of the shelf. Use one catch for each door.

The front panel for the bed is made with louvered doors and a center panel simulating three drawers. Make the center panel first. This should be equal in height to the doors. After cutting the panel to size,

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cut the double set of grooves representing the rails in between the drawers. Cut the grooves 3/16 inch deep. Drill the 3/16-inch holes for the pulls, then set the piece aside temporarily. Trim 3/4 inch from the door bottoms so they will measure 23 1/4 inches long.

Cut the rails and stiles to size, then lay them on a flat surface with the doors and dummy drawers in place. Be sure that the tops of the doors are oriented (Louvered doors have a top and bottom). With all the pieces aligned, mark a light gauging line on the face of each piece to indicate the dowel locations. Identify each stile with its adjacent part, for example, A-A, B-B, C-C, etc. If you don't, you'll have quite a job trying to match the various parts later on.

Drill 3/8-inch-diameter holes 1 inch deep for the dowels. A doweling jig is most useful for this operation. It will ensure straight holes perfectly centered and aligned. If you do not use a doweling jig, be sure that the holes are drilled exactly in the center of each piece.

When assembling the front panel install all of the stiles to the doors and drawer panel sides. If you use snug-fitting spiral dowels, you won't need to clamp the assembly. Likewise, you need not clamp the top and bottom rails. The width of the piece was assembled without clamps, because 80-inch clamps are hard to come by. If you have the clamps, use them, but in this instance they are not essential.

The bed is made with a 3 1/2-inch frame formed into a rectangle as shown. Butt joints glued and screwed make up the outer frame. A ledger strip is added to the inner wall of the frame. This, together with the crosspieces, support the mattress board. The four legs are cut to size and installed with the upper edge aligned with the top of the ledger strips. Cleats are used to attach the legs to the front panel. Two spacer blocks are added to the lower legs in order to align the casters.

To keep the pulls clear of the floor when the front panel is tilted downward, a nose molding is applied around the perimeter of the front section. Be sure the molding is deep enough to keep the knobs off the floor.

The cleats should be glued and screwed to the front panel. However, before applying glue, it is advisable to mount the bed without the glue at first as you test the fit between the bed unit and the lower compartment. Make sure that the clearances are okay and that the bed rides in and out freely. If okay, apply glue and secure permanently.

Add the plywood edging, then sand all surfaces and finish as desired. The unit shown was stained and lacquered, but a two-tone painted finish would be another possibility. The unit could also be left natural with several coats of varnish or lacquer.

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Functional Occasional Table

ALTHOUGH classified here as an "occasional" table, you'll find yourself relying more and more on this as an all-around utility table, continually in use rather than occasionally. Because of its solid construction and sturdiness it will withstand daily use and abuse effortlessly. It can be appropriate used as a coffee table, magazine table, lamp table, or whatever. It is ruggedly built of 1¾-inch pine and has three handy storage drawers. The finished table measures 20 × 44 inches and stands 16½-inches high.

The construction is simple and this project is recommended for all classes of woodworkers, from beginners to advanced.

Start with the construction of the top which is made of 1¾-inch stock. Chances are that you won't be able to get a 20-inch board, so you'll probably have to glue up two or more narrower pieces. True up the edges to be glued and if necessary, resaw to eliminate any bumps or dents at the edges. If you have a jointer or power plane, these will do fine.

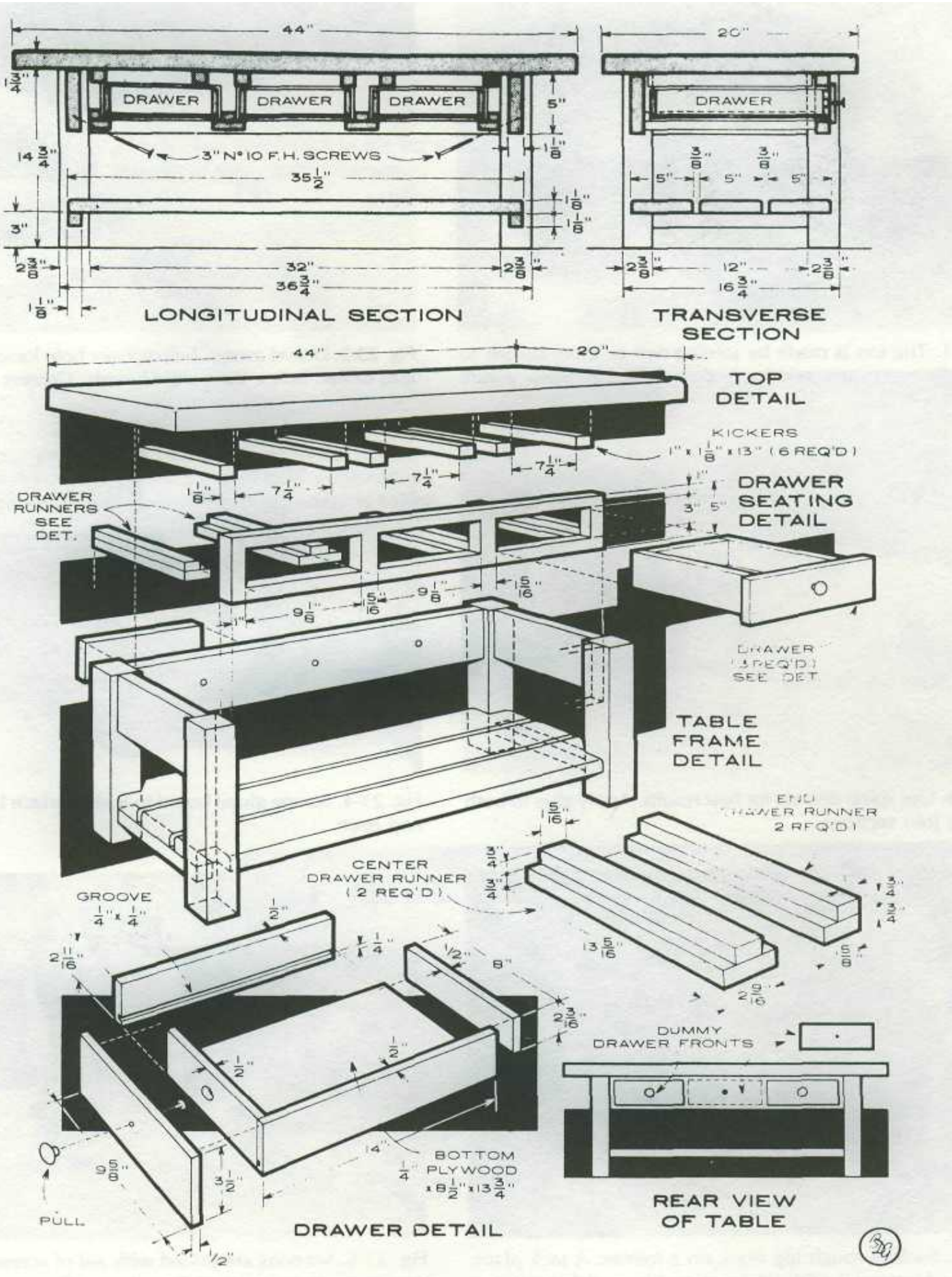
Next, drill a series of holes to accept the dowels—six holes should do the trick. Use a dowel drilling jig to accurately center the holes. Use dowel centers to transfer the holes to the mating edge. Drill the holes 1 1/16 inches deep, then apply glue to spiral dowels and insert into the drilled holes. Apply glue to both mating surfaces as well as the projecting dowels, then bring the boards together and clamp until the glue sets.

Make the legs next. Use 3- × 3-inch stock, or if not available, you can glue-up thinner material to make up the 2½-inch squares needed. If you have a jointer, clean the surfaces of the squares taking just a light cut. Trim the ends to size so each piece measures 14½ inches long.

The apron is cut next from 1¼-inch stock. The end and rear aprons are solid but the front is made up in the form of a web so it can accept the drawers. Cut the pieces to size and before assembling the web, drill diagonal screw holes through the top piece (three holes) and one each through the ends of the lower part of the front framework or web.

Diagonal screw holes are also drilled into the other three apron pieces. You can do this by hand with an electric drill or on the drill press. Use a 7/32-inch drill bit to make the clearance holes to take the No. 10 screws. After the frame is glued-up,

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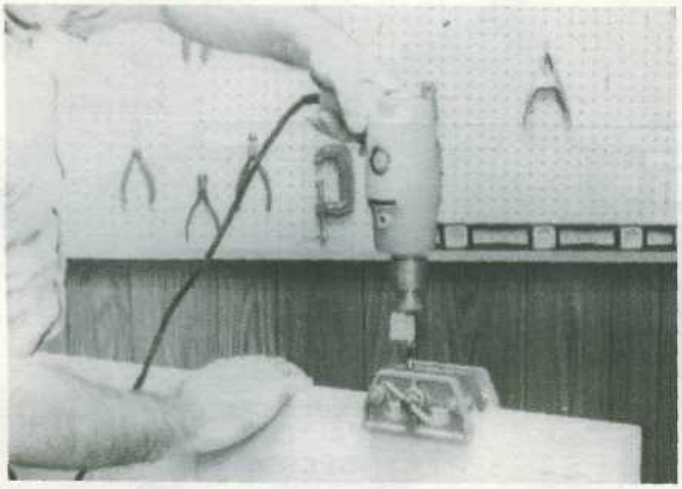


Fig. 23-1. The top is made by joining two or more boards to obtain the necessary width. A dowel jig can help assure accuracy.

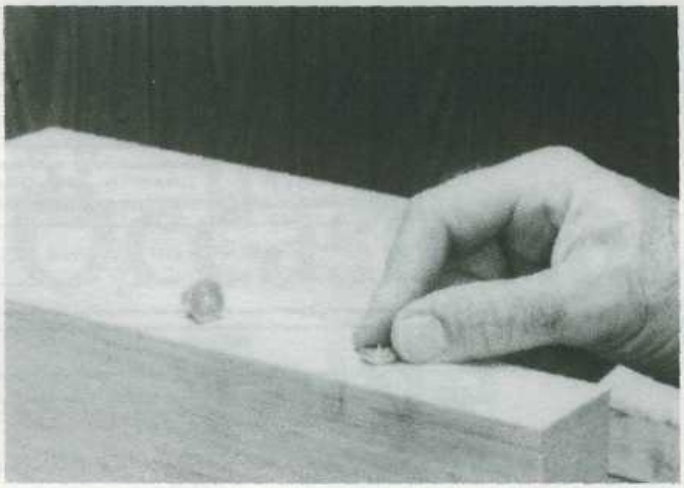


Fig. 23-2. Dowel centers help transfer hole locations. Insert them into drilled holes, then align boards. Centers mark the holes.



Fig. 23-3. Use spiral dowels for best results. Apply glue to both surfaces; join sections.



Fig. 23-4. Scrape glued board to make surface become smooth and even.

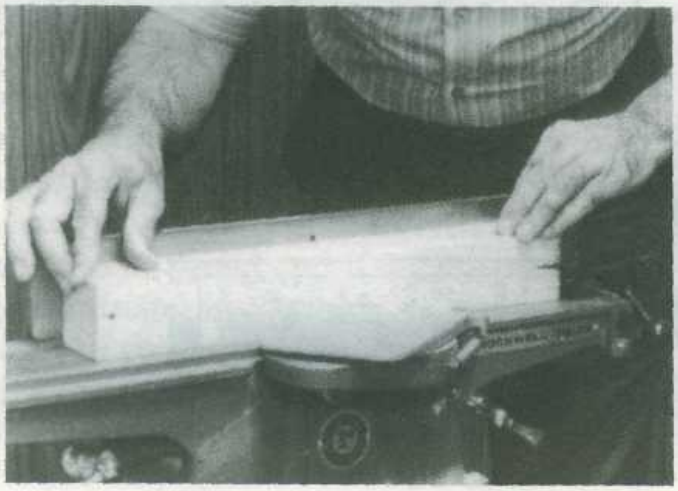


Fig. 23-5. Surface rough leg stock on a jointer. A jack plane can be used instead if a jointer is not readily available for your use.

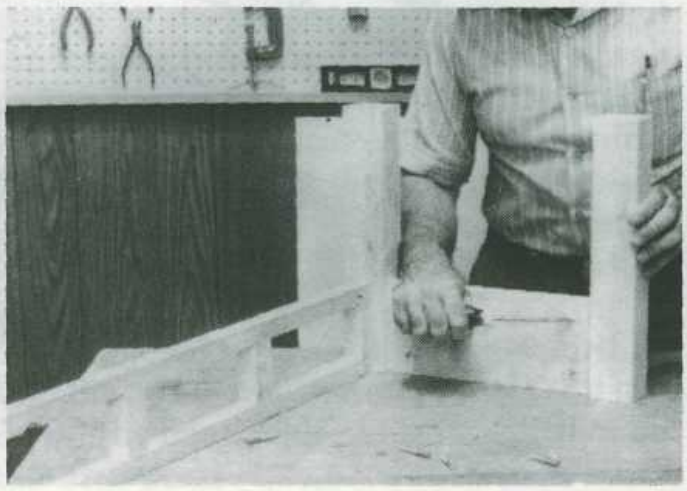


Fig. 23-6. Sections are joined with aid of screws and glue. Be sure to work on a flat surface during the assembly.

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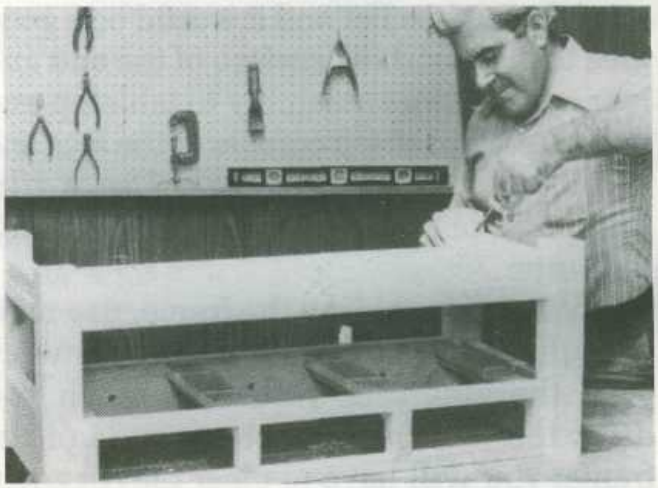


Fig. 23-7. In this step the shelf cleat is screwed to the leg as shown. Note the solid, snug fit of the notched corners.

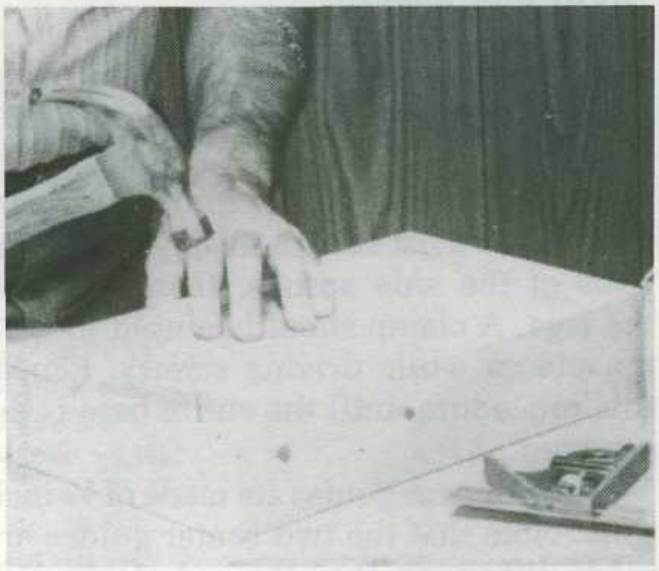


Fig. 23-8. The drawers are of simple butt-joint construction. The bottom panel fits into groove on three sides, is nailed at rear.

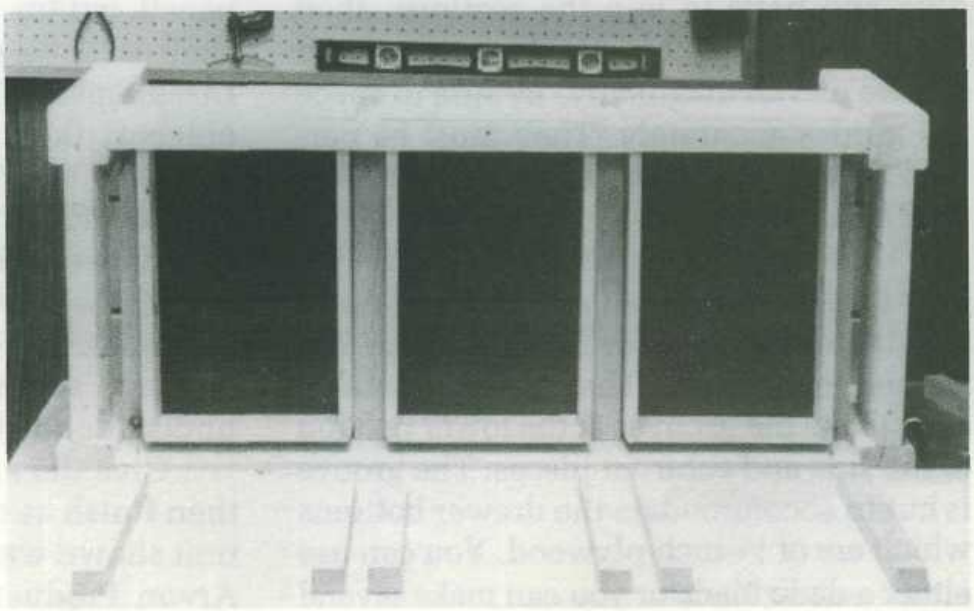


Fig. 23-9. The drawers set in place with the corresponding kickers in top panel.

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sand the surface flat and it would be a good idea to also sand the surface of the end and rear apron before assembly to tabletop and legs. Break the sharp corners of the legs and bottom of the apron pieces. Use a file, sandpaper or router fitted with a rounding-off cutter.

When assembling the frame, use nails and glue and if possible clamp the work until the glue sets. Note that when you drive the nails at the bottom ends of the frame, you will have to clear the diagonal screw. (See photo.)

The tabletop glue joint should be dry at this point. Trim the top to size and sand the edges. Break all sharp corners with a router.

Next, assemble the apron and legs, working on a flat surface. Apply glue to the ends of the side aprons, then attach to the legs. A clamp should be used to hold the pieces while driving screws. Repeat this procedure until the entire base is assembled.

The drawer guides are made of ¾-inch pine. Note that the two center guides are made differently than the end pieces. Use glue and nails to join the sections, then assemble to the apron using glue and screws driven diagonally. Be sure to space the guides accurately. They must be parallel from side to side to assure that drawers will slide freely.

Drawers are made of ½-inch pine, with butt joints. The fronts are doubled up to eliminate the need for fancy joinery. Cut the sections to size. Then, using the table saw, make the grooves at the lower portion of the side and subfront pieces. The groove is cut to accommodate the drawer bottoms which are of ¼-inch plywood. You can use either a dado blade or you can make several passes with a regular blade.

Check the width of the groove with a piece of the plywood to be sure of the fit. The plywood should slide freely in the groove, but it must not be a sloppy fit. Before assembly, drill the ½-inch screw head-clearance hole in the subfront panels. Assemble the drawers with the 1½-inch finishing nails and glue. Drill a 3/16-inch hole in the center of the three drawer fronts before assembling them to the drawers. Use glue and ¾-inch brads, driving the brads from the inside.

Kickers are added to the underside of the tabletop. These are strips of wood used to prevent the drawers from tipping when opened. Space these so they are in alignment with the drawer sides.

The bottom shelf is made next using three pieces of 1⅛-inch stock, 36 inches long. Round the edges and ends of the wood, then join the three with cleats at both ends. The cleats are cut to fit between the legs. Use screws only without glue at this time.

Place the shelf on a flat surface, then place the table in position on top of it. Center the table carefully, then with a sharp pencil, outline the area to be notched so the shelf will clear the legs at the corners. Disassemble the three pieces, cut the notches, then reassemble with glue and screws.

Before gluing, it might be a good idea to reassemble again without glue just to check the fit. If okay, apply glue and assemble. The shelf is held to the legs by driving screws diagonally from the underside of the cleats.

Give the entire table a good sanding, then finish as desired. Finish used on the unit shown was avocado green antique by Arvon Products. It consists of two base coats of latex, followed by a urethane glaze.

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MATERIALS LIST

Note: All lumber is Northern pine.

Purpose	Size	Quantity
Top	1¾" × 20" × 44"	1
Leg	2⅜" × 2⅜" × 14¾"	4
Apron end	1⅛" × 5" × 12"	2
Apron rear	1⅛" × 5" × 32"	1
Shelf	1⅛" × 5" × 36"	3
Cleat	1⅛" × 1⅜" × 12"	2
Frame vertical (end)	1" × 1⅛" × 3"	2
Frame vertical (center)	1⅛" × 1⅜" × 3"	3
Frame horizontal	1" × 1⅛" × 32"	2
End drawer guide (vertical)	¾" × 1" × 13 5/16"	2
End drawer guide (horizontal)	¾" × 1⅜" × 13 5/16"	2
Center drawer guide (vertical)	¾" × 1½" × 13 5/16"	2
Center drawer guide (horizontal)	¾" × 2½" × 13 5/16"	2
Kicker	1" × 1⅛" × 13"	6
Drawer front	½" × 3½" × 9⅝"	6
Drawer side	½" × 2 11/16" × 14"	6
Drawer subfront	½" × 2 11/16" × 8"	3
Drawer rear	½" × 2¼" × 8"	3
Drawer bottom	¼" × 8 5/16" × 13⅝"	3
Knobs		6
Screws	3"—No. 10 FH	16
Screws	2"—No. 10 FH	28
Glue		
Nails		

The glaze is applied after the base has dried, using either a brush or cheesecloth, making wiped or streaked patterns as you go. Add pulls to drawers and the table is ready to serve you.

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Handsome Wardrobe

THIS BEAUTIFULLY DESIGNED and well-proportioned dresser will be welcomed and proudly displayed in any home. Six of the drawers are the pull-out (tote) type, and the other six are conventional drawers. In addition, there are two adjustable shelves for convenient storage.

Construction is simplified greatly by the use of oak plywood. Narrow boards need not be glued-up to make the wide boards for the ends and top—something you would have to do if you were working with solid oak.

Another nice feature is the use of moldings to give the appearance of raised panels. Further simplification in construction is achieved by the use of butts joints.

Although it is a professional-looking furniture piece, it has been designed so that even a novice woodworker can make it without difficulty.

The main part of the case consists of four uprights fastened at the top with a plywood frame. The lower ends are fastened to the floorboard, which extends at the ends and front. Construction is simplified by the use of butt joints, but some woodworkers may prefer to use rabbets and dadoes for joining these parts. If so, the measurements will have to be altered accordingly.

Since plywood is used in the construction, the exposed edges will have to be covered with matching wood tape. The measurements do not include the thickness of the tape as it is nominal. Simply apply the tape to the plywood edges after the parts have been cut to size.

Cut the top frame using fir plywood

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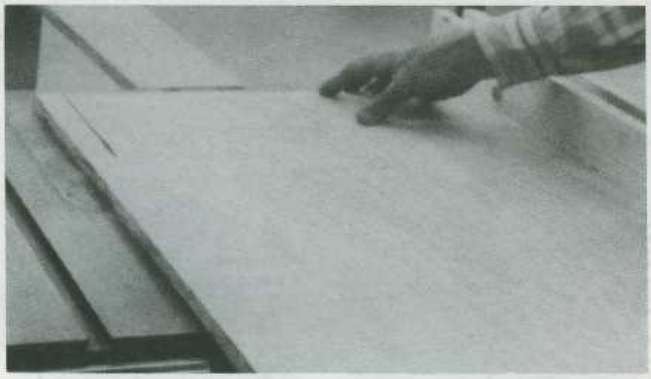


Fig. 24-1. The end panel is trimmed to size on a table saw. For a smooth, clean cut, use a plywood blade. Sand before assembly.



Fig. 24-2. Once the frame pieces have been cut, apply glue, insert the splines and clamp. Check to see if all right angles are true.



Fig. 24-3. Fasten the top frame to the end panel with glue and wood screws. Exposed plywood edges are banded with wood tape.

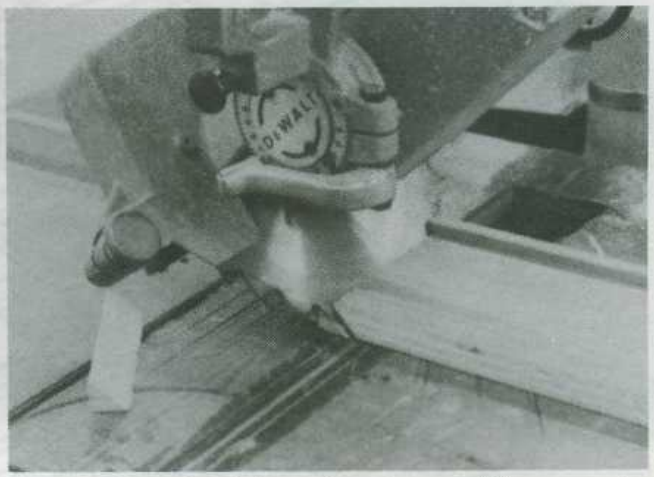


Fig. 24-4. Base piece is best mitered on a radial arm saw; try test cuts on scrap first. A special blade is called for here.

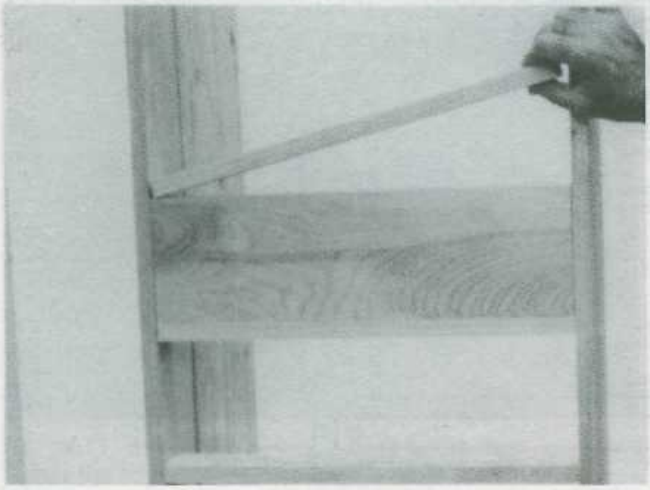


Fig. 24-5. Use a spacer to locate the proper position for the drawer frames within the larger frame; accuracy is very important.

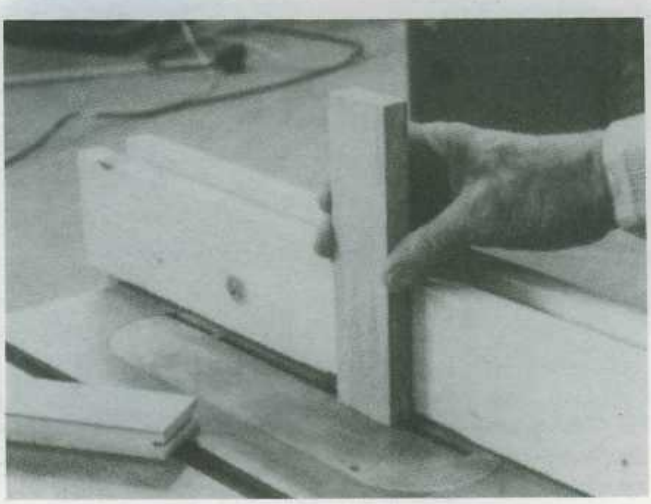
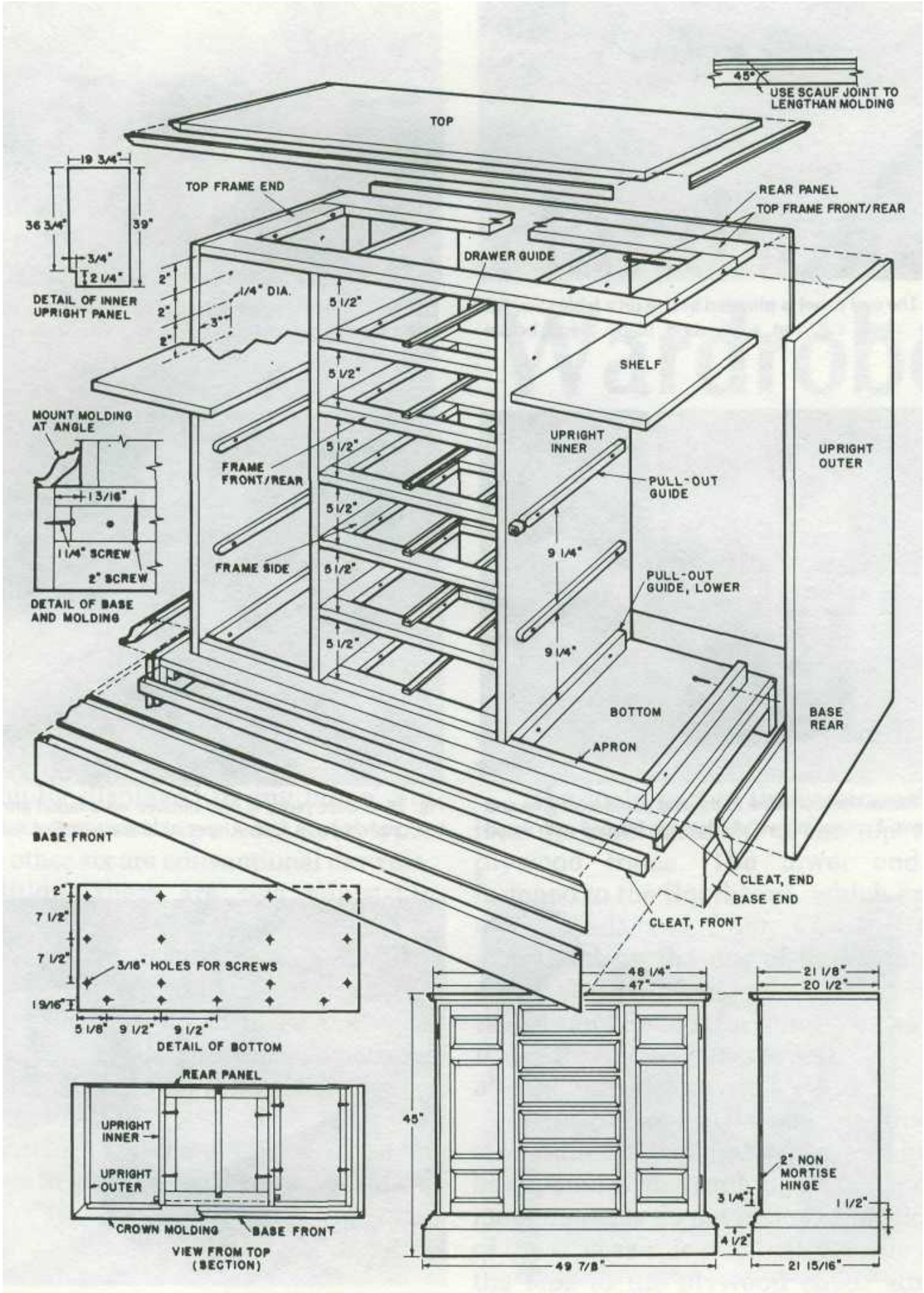


Fig. 24-6. The ends of the rails are grooved in order to accommodate ⅛-inch plywood splines. Keep your fingers away from the blade!

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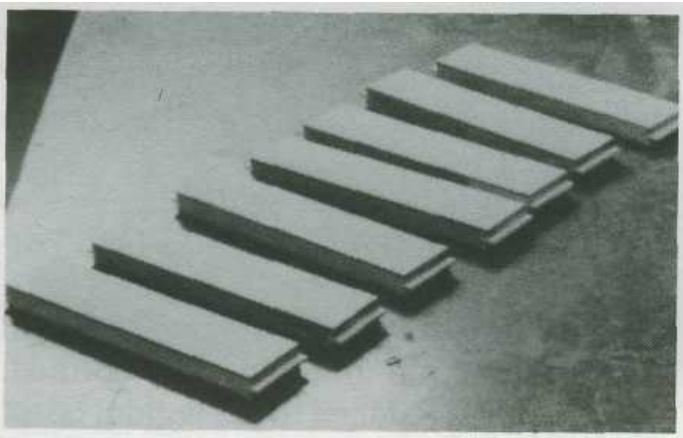


Fig. 24-7. Here, the rail members for the door frames have been fitted with splines and are ready to be glued on to the stiles.

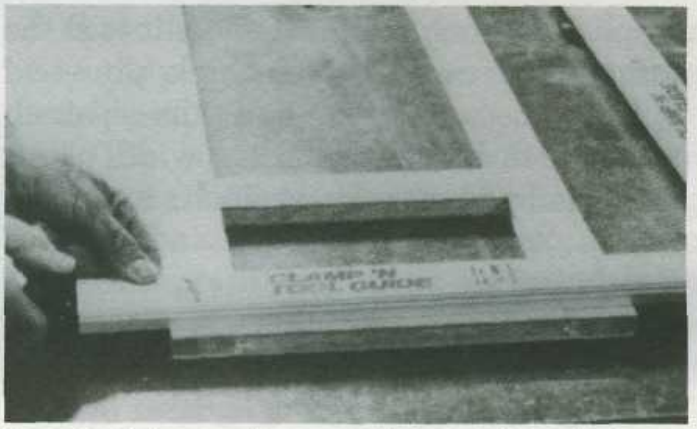


Fig. 24-8. A clamp tool is great for frame work. Its plastic jaws will not gouge surfaces, and squeeze-out is kept to a minimum.



Fig. 24-9. After you've finished assembling the door frames, break the sharp corners with a router fitted with a bevel-trimmer bit.

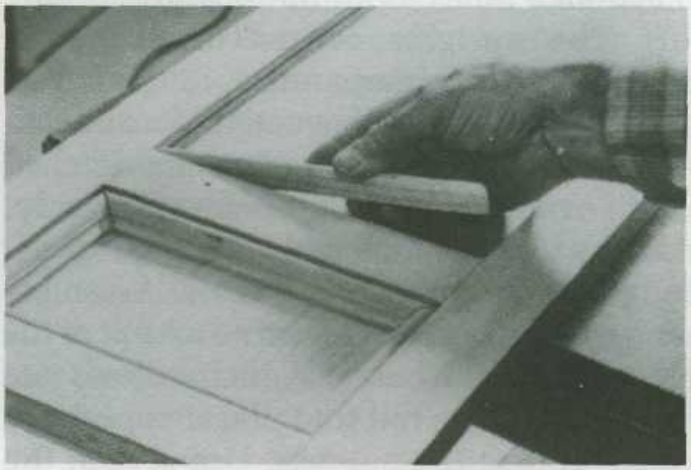


Fig. 24-10. The raised panel effect on the doors is achieved with mitered nose & cove molding. Install with glue only—no brads.

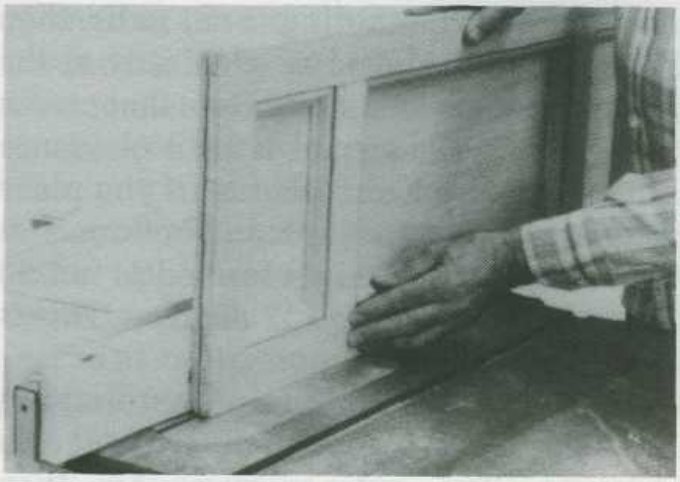


Fig. 24-11. Attach the plywood back to the door frame and rabbet the edges of the frame on a table saw. Watch those fingers!

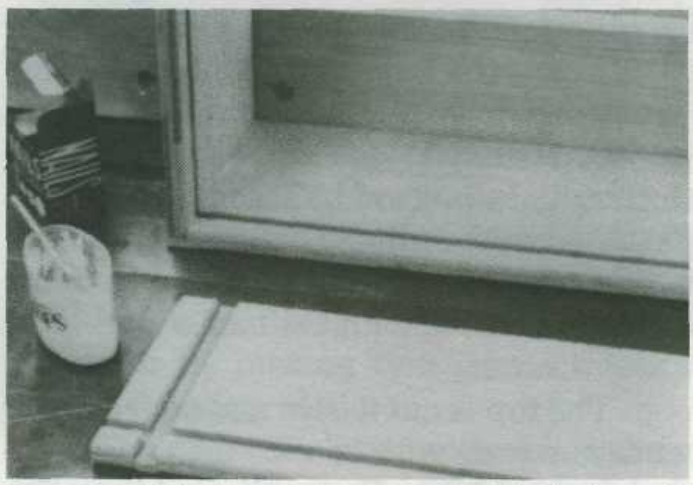


Fig. 24-12. All drawer members are made of birch plywood. The above side member with dado and groove is ready for assembly.

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ripped to 3-inch widths. Use splines at the joints. We used ⅛-inch-thick plywood splines because we had the ⅛-inch plywood on hand and the kerf width of our saw blade is exactly ⅛ inch, a perfect match. You can substitute ¼-inch splines if necessary.

After the frame parts are cut, apply glue, insert the splines, then clamp, making sure the frame is square.

Cut the floor board from a piece of ¾-inch fir plywood, then drill the screw clearance holes as in the layout.

The uprights consist of two outer members which measure 20 × 39¾ inches. The inner uprights are cut 19¾ × 39 inches and the lower front edges are notched to fit over the lower rail. Before assembly, cut the ¼- × -⅜-inch rabbets along the rear edges of the two outer panels. Assemble the parts using 2-inch screws except at the top outside, where 3½-inch screws are needed. Fit the rail into place, applying a little glue at the notches. Use glue at the other joints also.

The drawer compartment frames are prepared next. These are cut from ¾-inch plywood. Before cutting the five pieces for the front of the frames, apply the matching wood tape to an 8-foot length of the ripped (2-inch) stock, then cut apart into the individual pieces. These frames are fastened with splines. Before assembling, drill the holes for the screws into the frame sides. Assemble with 2½-inch round-head (RH) screws.

The top is cut to size and edged at the ends and front with ⅝- × -¾-inch nose-and-cove oak molding. Fasten the molding with glue and wire brads. Miter the molding at the ends. If your molding is too short to make the length, use a scarf joint to join the two pieces as shown. Hold the molding at the mounting angle when cutting the scarf joint and miters. This is especially important when mitering the crown molding at the base.

The top is fastened by driving screws through the top frame. Use 1¼-inch flat-head (FH) screws.

The base consists of the two ends and front, which are mitered and splined. These are then fastened to the bottom board with cleats. The rear base piece is mounted separately without a cleat.

A clamp nail was used for the mitered joints because they pull the joint tight and are far superior to using wood splines. To make the joint, cut the 45-degree miters in the usual manner using the radial arm saw or table saw. Now replace the regular blade with a 22-gauge blade which is made especially for clamp nails. Make the cuts 5/16 inch deep, then join as shown. Be sure to insert the wide or flared end of the clamp nail into the kerf cuts, then drive the nail home with a few hammer blows. Also be sure to apply glue to the mitered surfaces before nailing. Assemble the base with cleats as indicated.

The crown molding is cut to fit, then fastened with glue. Use glue only at the bottom surface as shown. Note that crown moldings are designed with a clearance angle at the back and bottom. If you place a square against the back and bottom, you will note that the angle formed is not 90 degrees, but closer to 112 degrees. This is intentional.

The runners for the pull-out drawers are cut to size and shape as per the drawing. The outer corners are then rounded using a router. Install using round-head screws.

The pull-out drawers are made of ½-inch birch plywood. Cut the members to

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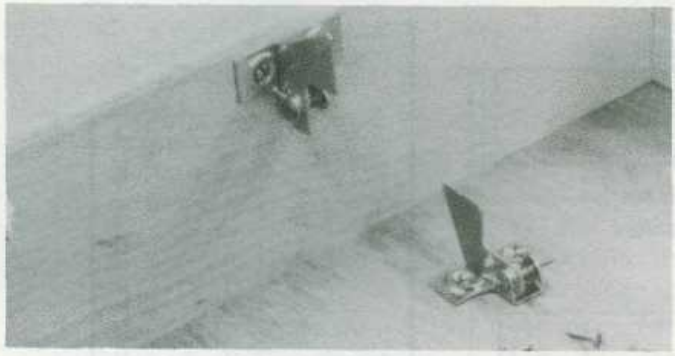


Fig. 24-13(A). These optional spring-loaded drawer stops will effectively prevent the drawers from being pulled out too far accidentally.



Fig. 24-13(B). A view of the assembled wardrobe with some of the drawers removed. Leave the back panel off until interior is finished.

size, then rabbet the front and rear panels to take the sides. Cut the ¼-inch groove ⅝ inch from the bottom. Then, before assembling, use the router with a 3/16-inch rounding bit to round all top edges. Stop the routing just short of the ends at the insides of the side panels. See detail. Cut the bottom panels to size and insert into place as you assemble the sides, front and rear. Apply glue to the joints and fasten with brads. Do not glue the bottom panel.

The center drawers are also made with ½-inch birch, but they have an additional front made of oak plywood to match the rest of the cabinet.

The grooves and rabbets are similar to the pull-out drawers, but at the rear, the side panels are dadoed since the rear panel is set back ½ inch. The other difference is that the bottom panel is installed after assembly, and nailed to the bottom of the rear panel.

The subfront is drilled for the two clearance holes and the four mounting holes. The clearance holes are necessary so the drawer pulls can be mounted from inside the drawer. The mounting holes are for the 1-inch screws which fasten the front to the subfront.

The raised panel effect is achieved by the application of molding at the edges of the front panel. Miter these at the corners and fasten with glue only—no brads. Apply the glue with a small brush to the backs of the molding as well as the mitered ends.

The drawer slide is made of hardwood. The 13/16-inch groove is cut ¼ inch deep using a dado blade. The 13/16-inch width allows 1/16-inch overall clearance over the ¾-inch wide drawer guide. Center the slide at the bottom of the drawer and fasten with glue.

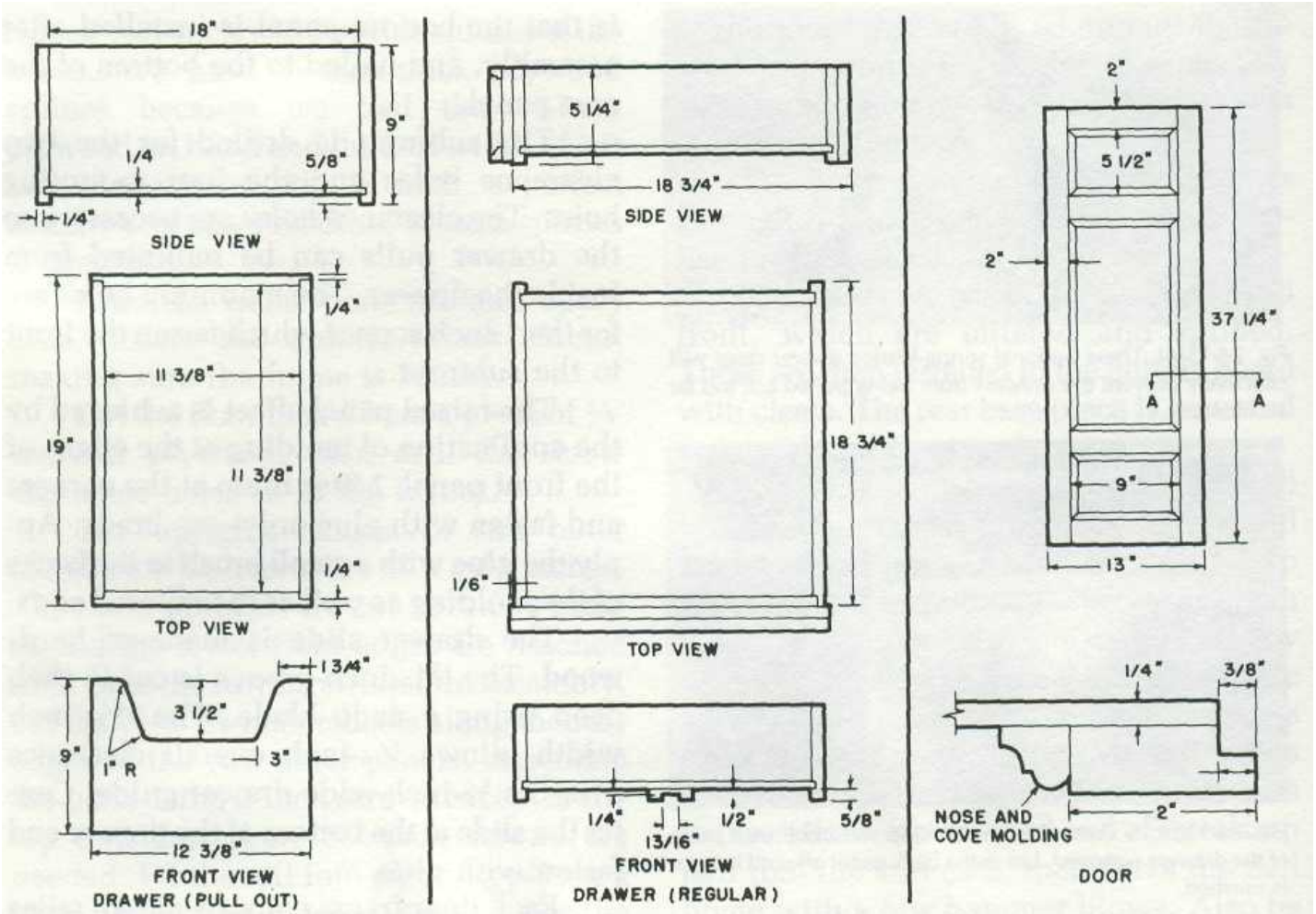
Each door frame consists of two stiles and four rails. These are fastened with splined joints, and a ¼-inch oak plywood backing is then fastened to the frame. Finally, nose-and-cove molding is mitered and glued into each of the openings for the raised panel effect.

The ¼-inch panel is fastened to the frame with glue and brads. Keep the brads away from the edges which will be rabbeted. The rabbeting can be done with a router or on the table saw using a dado blade or by making two passes using a regular cutting blade.

The doors are hung with non-mortise offset hinges, two per door. A 5/16-inch hole for the pendant pull is drilled on the inside stiles.

An adjustable magnetic catch is used to hold the door closed. Place the catch in

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line with the upper pull-out drawer guide so it will not interfere with the operation of the drawers.

The ¼-inch rear panel is installed using ⅝-inch round-head screws. Do not install the panel until the staining and topcoating operations are completed. With the back panel off, you will be able to finish inside the cabinet from front and rear.

The finishing operation consists of an application of paste wood filler, followed by two coats of sanding sealer and three coats of semigloss lacquer. After a one-week drying time, a final application of rubbing compound is made.

The filler is thinned to a consistency of heavy cream (*not* whipped cream). It should be brushed on with the grain. In a matter of minutes it will start to flatten and appear dull. When this happens, start to remove the surplus filler by wiping across the grain of the wood, using coarse rags—preferably burlap. Finish wiping with clean soft rags, stroking with the grain direction. Allow to dry, then apply the sealer. When the sealer has dried, apply the topcoats of gloss or semigloss lacquer.

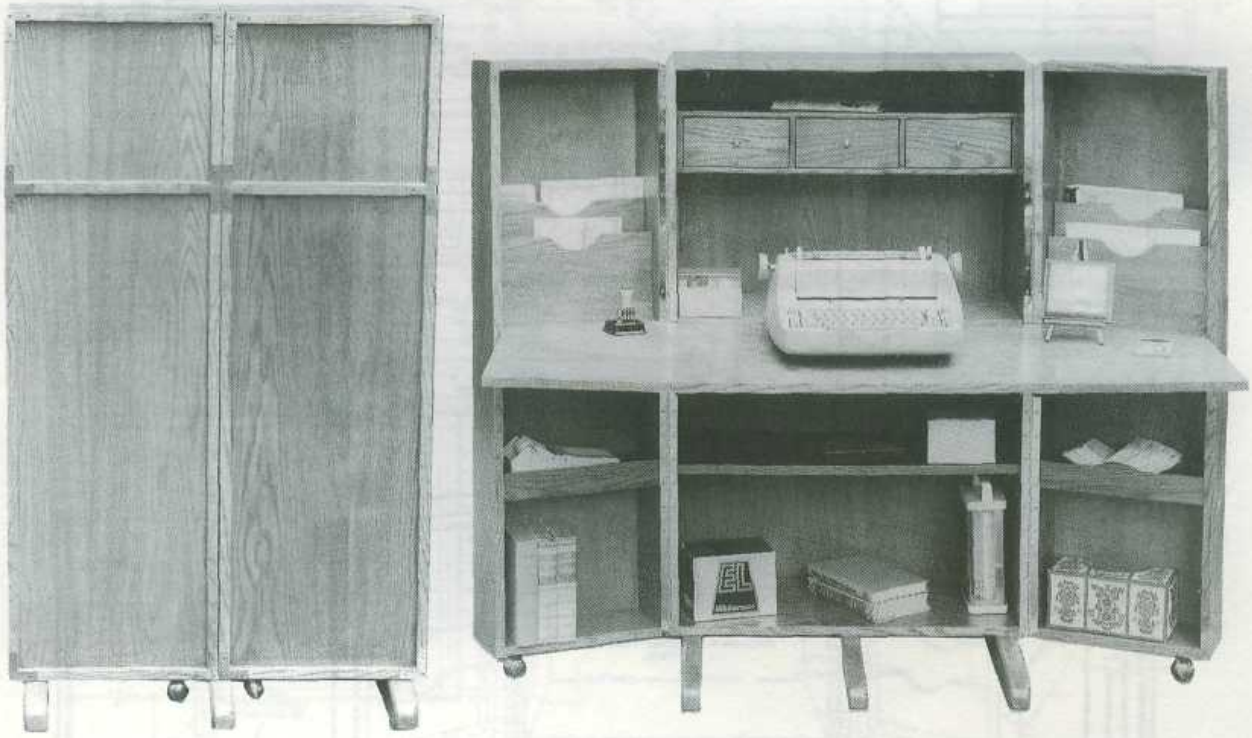
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MATERIALS LIST

Purpose	Size	Description	Quantity
Cabinet			
Upright, outer	¾" × 20" × 39¾"	Oak plywood	2
Upright, inner	¾" × 19¾" × 39"	Fir plywood	2
Top	¾" × 20½" × 47"	Oak plywood	1
Top frame end	¾" × 3" × 14"	Fir plywood	2
Top frame front/rear	¾" × 3" × 44½"	Fir plywood	2
Bottom	¾" × 21 3/16" × 48⅜"	Fir plywood	1
Base front	¾" × 4½" × 49⅞"	Oak plywood	1
Base end	¾" × 4½" × 21 15/16"	Oak plywood	2
Base rear	¾" × 3¾" × 48⅜"	Fir plywood	1
Rear panel	¼" × 39 11/16" × 45 3/16"	Fir plywood	1
Cleat, front	¾" × 1½" × 48"	Pine	1
Cleat, end	¾" × 1½" × 19"	Pine	2
Frame front/rear	¾" × 2" × 18"	Fir plywood	12
Frame, side	¾" × 2" × 15¾"	Fir plywood	12
Drawer guide	7/16" × ¾" × 18¾"	Solid oak	6
Pull-out guide	¾" × ¾" × 18"	Solid oak	8
Pull-out guide, lower	¾" × 2 5/16" × 19"	Solid oak	2
Apron	¾" × 2¼" × 44½"	Oak plywood	1
Shelf	¾" × 12⅜" × 18½"	Oak plywood	2
Door			
Stile	¾" × 2" × 37¼"	Oak plywood	4
Rail	¾" × 2" × 9"	Oak plywood	8
Door panel	¼" × 13" × 37¼"	Oak plywood	2
Drawer (pull out)			
Side	½" × 9" × 19"	Birch plywood	12
Front/rear	½" × 9" × 12⅜"	Birch plywood	12
Bottom	¼" × 11 13/16" × 18 7/16"	Fir plywood	6
Drawer (regular)			
Side	½" × 5¼" × 18¾"	Birch plywood	12
Subfront	½" × 5¼" × 17¼"	Birch plywood	6
Rear	½" × 4⅜" × 17¼"	Birch plywood	6
Front	¾" × 5⅜" × 17⅞"	Oak plywood	6
Bottom	¼" × 17 3/16" × 17¾"	Fir plywood	6
Slide	½" × 2¼" × 18"	Solid oak	6
Miscellaneous			
Molding, nose and cove	⅝" × ¾"	Oak	48 ft.
Molding, crown	2½"	Oak	11 ft.
Screw	⅝"—5 RH		16
Screw	3½"—10 RH		20
Screw	1"—8 FH		8
Screw	2"—10 RH		38
Screw	2½"—10 RH		20
Screw	1¼"—8 RH		8
Brad	1"	No. 18	36
Nail	1½"		144
Pull, Chippendale		(No. 70002)	6
Pull, Pendant		(No. 70008)	2
Glue			8 oz.
Wood Tape		Oak type	16 ft.
Hinges, Non-Mortise		(No. 78006)	4
Magnetic Catch		(No. 75002)	2
Shelf Bracket		(No. 77504)	8
Spline	⅛" × ½" × 2"	Gum plywood	36
Clamp nail	4"		2

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Home Office



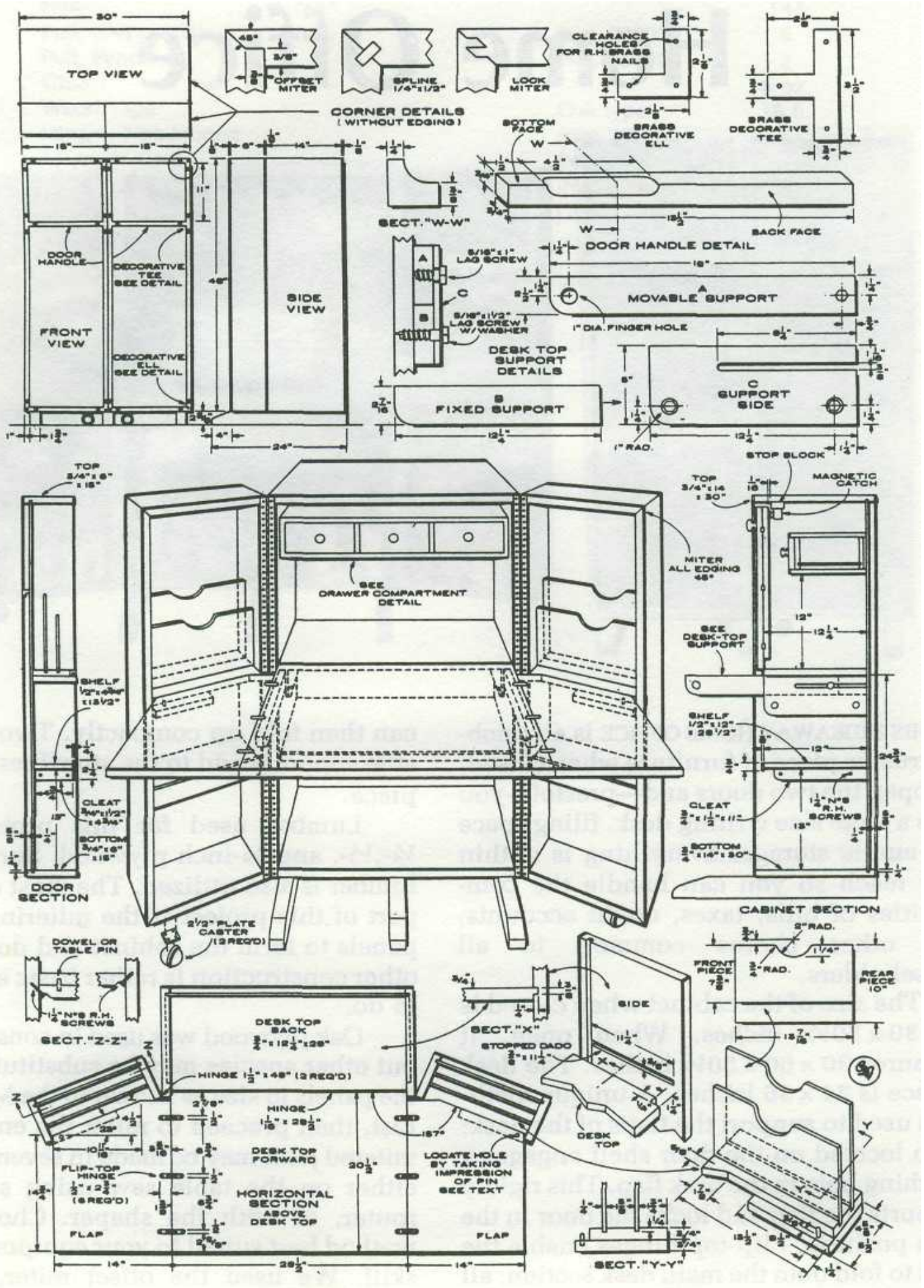
THIS HIDEAWAY HOME OFFICE is an unobtrusive piece of furniture when closed, but open the two doors and—presto!—you have a large size writing desk, filing space and ample storage. Everything is within easy reach so you can handle the complexities of bills, taxes, credit accounts, and other chores common to all householders.

The size of the cabinet when closed is 20 × 30 × 50½ inches. When open, it measures 30 × 60 × 50½ inches. The desk surface is 21 × 56 inches. A unique method is used to support the flaps of the desk: a pin located on the door shelf engages a matching hole in the desk flap. This rigidly supports the flap and locks the door in the open position. Flip-top hinges enable the flaps to fold onto the main desk section: all can then fold up compactly. Two retractable supports add to the sturdiness of this piece.

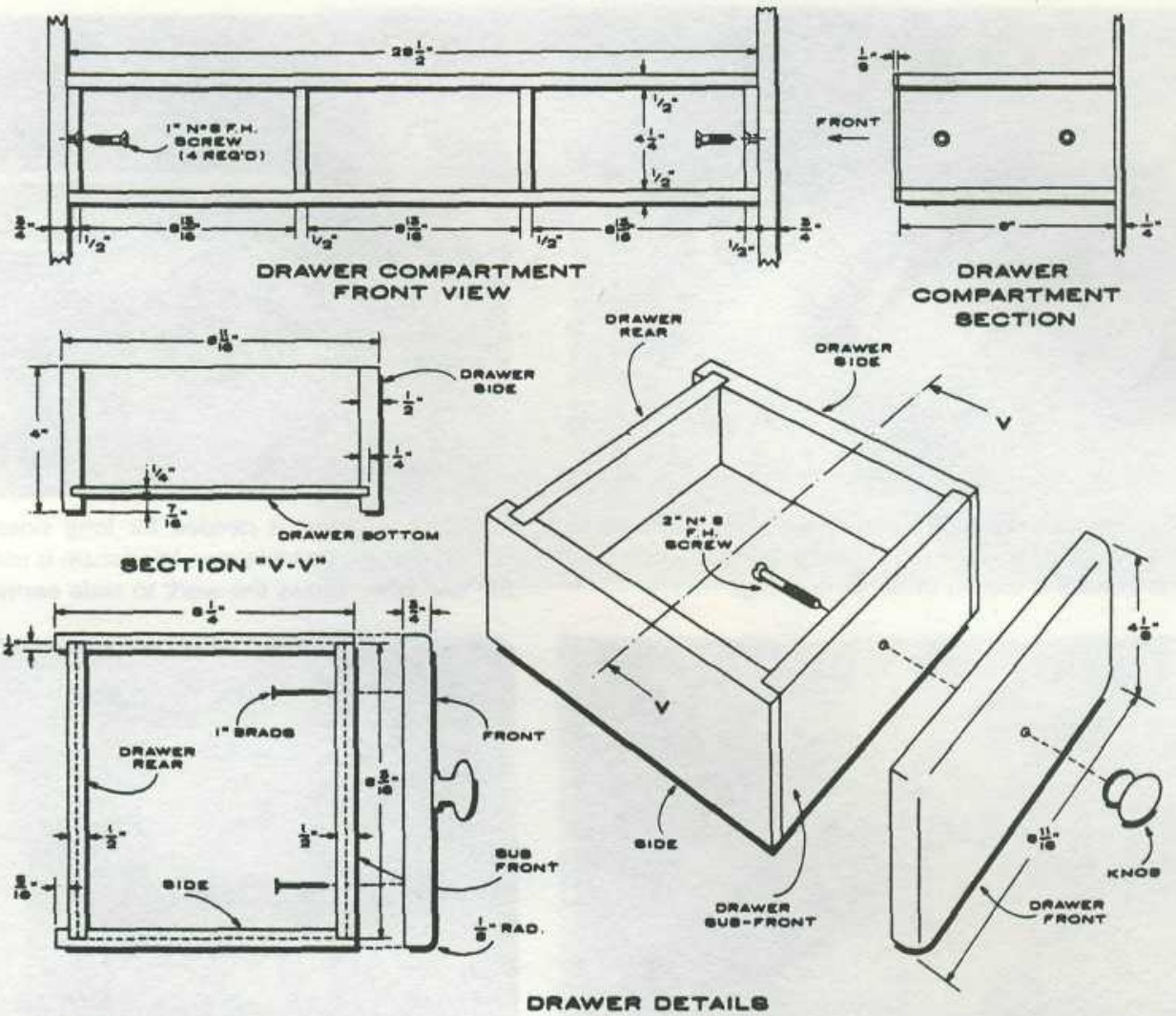
Lumber used for this project was ¼-, ½-, and ¾-inch plywood. Some solid lumber is also utilized. The most difficult part of this project is the mitering of the panels to form the cabinet and doors. All other construction is rather basic and easy to do.

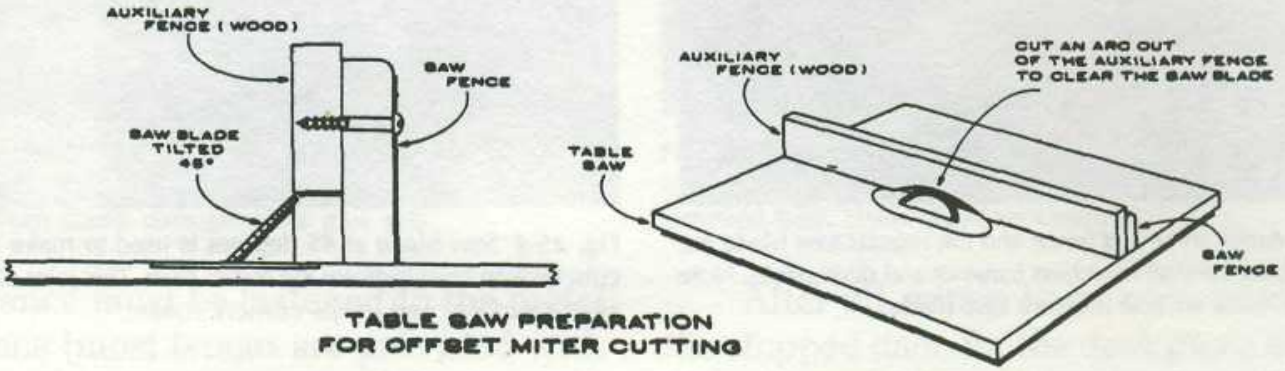
Oak plywood was used in construction but other species may be substituted. Rip the panels to size as shown in the Materials List, then proceed to miter the ends. The mitered joint may be made in several ways, either on the table saw using saw and router, or with the shaper. Choose the method best suited to your equipment and skill. We used the offset miter, which

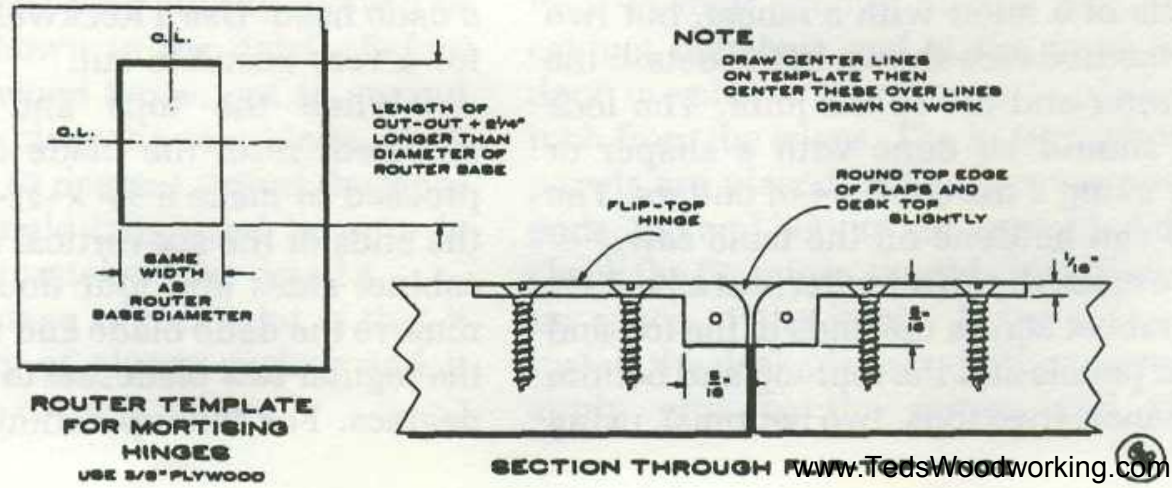
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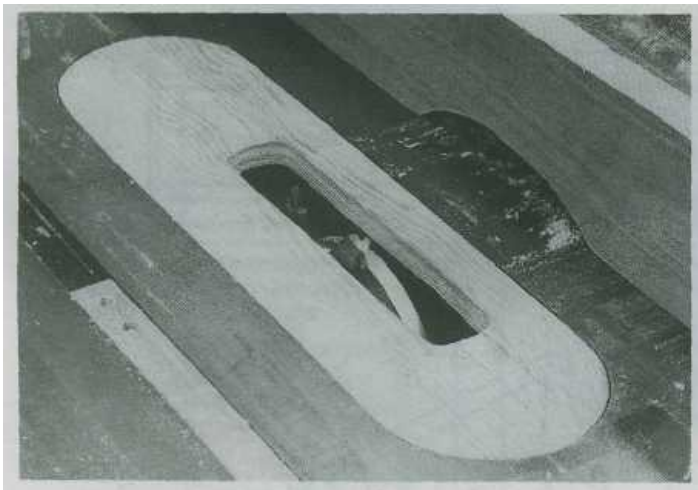


Fig. 25-1. Wide-slot plywood insert replaces regular insert in table saw. Wobble head is used to rabbet panels. Alternative cutting methods are shown in detail drawing.

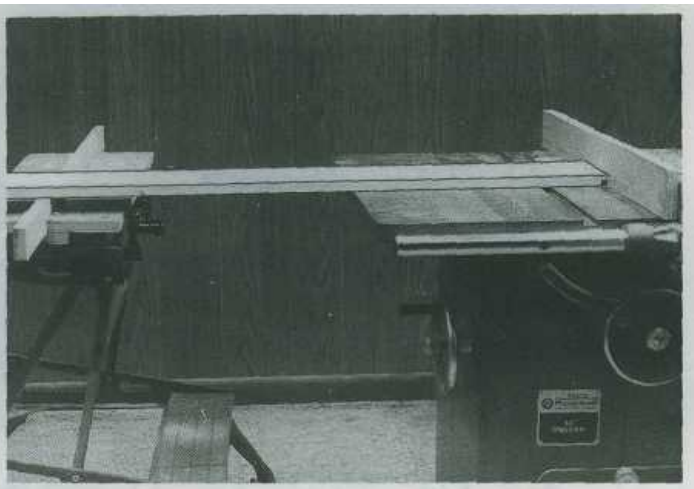


Fig. 25-2. Support is needed for long sides when you are rabbeting them on table saw. Workmate is used here. Wax on the saw table allows the work to slide easily.

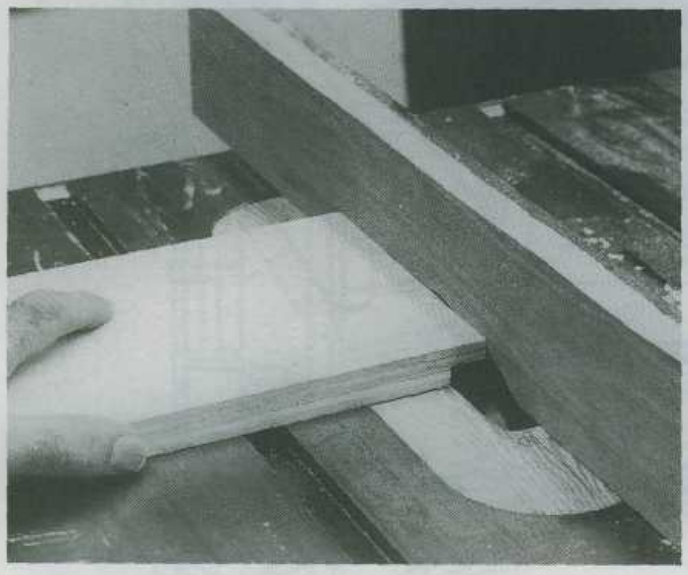


Fig. 25-3. Auxiliary wood fence and the regular saw blade are used to rabbet vertical members (cabinet and door sides). Note arc cut in fence so that it clears saw blade.

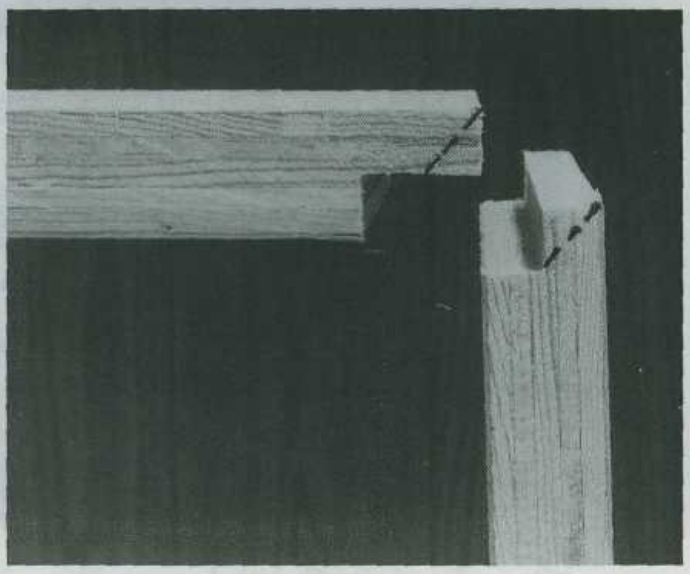


Fig. 25-4. Saw blade at 45 degrees is used to make the angle cuts; broken lines indicate the miters here. This joint offers good gluing surface, and keeps corners square.

consists of a miter with a rabbet, but two other methods are shown in the detail: the lock miter and the spline joint. The lock miter should be done with a shaper or router using a matched set of cutters. The spline can be done on the table saw.

To make the offset miter, cut a ⅜- × -¾ -inch rabbet across the ends of the top and bottom panels and the four top and bottom door panels (two tops, two bottoms), using a dado head. Use a Rockwell wobble head for a very accurate cut.

When the tops and bottoms are rabbeted, reset the blade or fence, then proceed to make a ⅜- × -⅜-inch rabbet at the ends of the six vertical members (two cabinet sides and four door sides). Now remove the dado blade and replace it with the regular saw blade, set to an angle of 45 degrees. For this operation, an auxiliary

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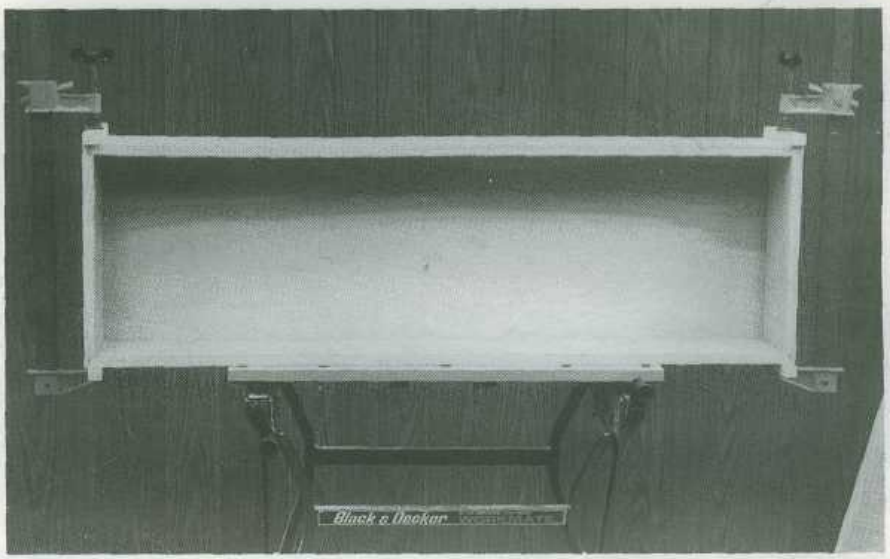


Fig. 25-5. After ¼-inch slot has been cut for rear panel, the panel is installed and cabinet is clamped up on short ends until glue sets. Rear panel floats free in slots.

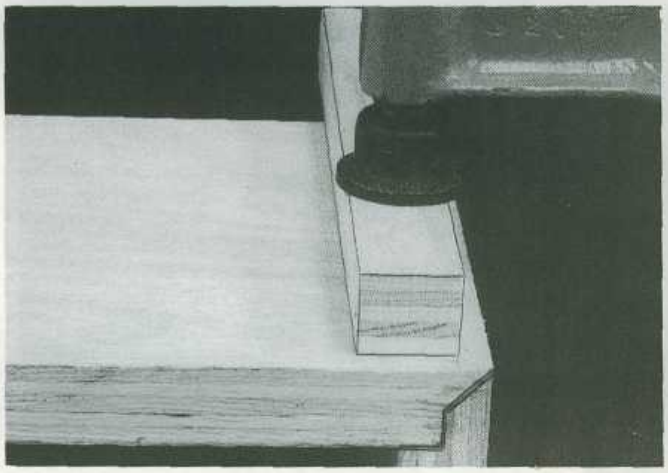


Fig. 25-6. Closeup of mitered corner; miters should close flush with no space at the joint. In this photo, a wood scrap protects the work from clamp damage while glue sets.

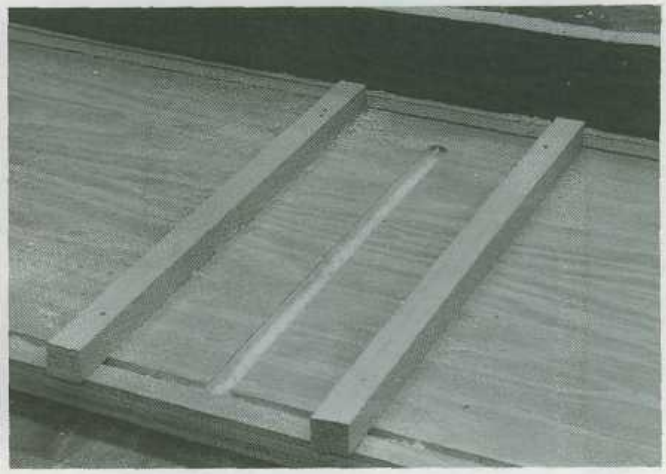


Fig. 25-7. Stopped dado, which will accept the desk top, is cut with a router. Side glides, for accuracy with the router, will be removed later. Study drawings carefully.

wood fence must be fastened to the metal saw fence (most fences are provided with holes for this purpose); simply screw it to the fence as shown in the detail. Before mounting the wood fence, cut an arc out of the piece to clear the saw blade. With the blade set at 45 degrees, adjust the fence to make the angle cuts—and be sure to make them accurately. (See detail.)

The advantage of this joint is that it provides plenty of gluing surface and it helps keep the corners square.

After all miters have been made, cut the stopped dado for the desk piece and the ¼- x -¼-inch groove at the rear of the cabinet members and at the front of the door members. The groove is placed ⅝-inch from the edges. The ¼-inch plywood panels are placed in the grooves and the ends, top and bottom are assembled dry to check the fit: miters should close flush with no space at the joints. If the fit's okay, install the desk piece and other members, apply glue to the miters and clamp

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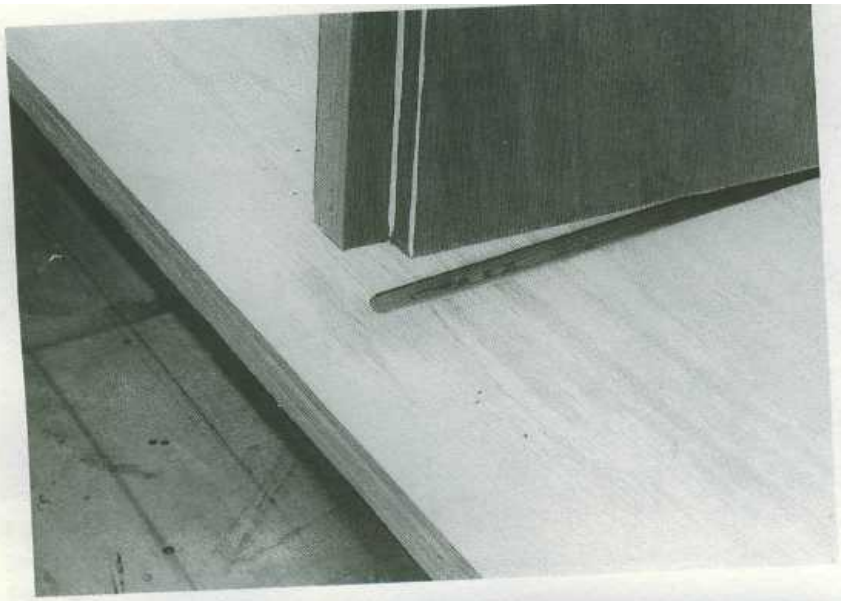


Fig. 25-8. With router guides removed, fit of rabbeted desk top to stopped dado is tested by designer in this photograph. For professional job, fit should be precise.

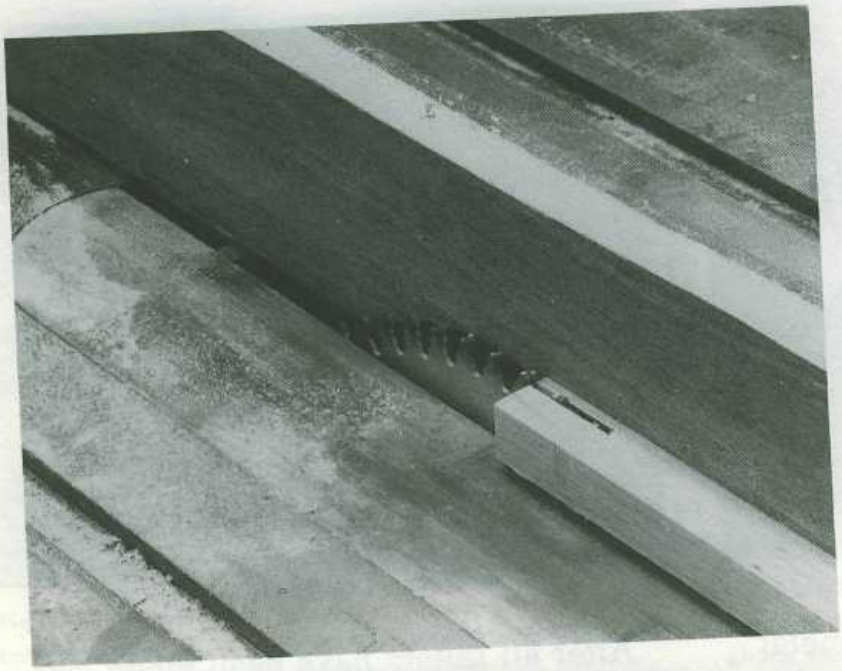


Fig. 25-9. Though veneer tape can be used to correct exposed plywood edges, solid strips are recommended. Here they are ripped from solid stock. Each strip is ⅛ inch by ¾ inch.

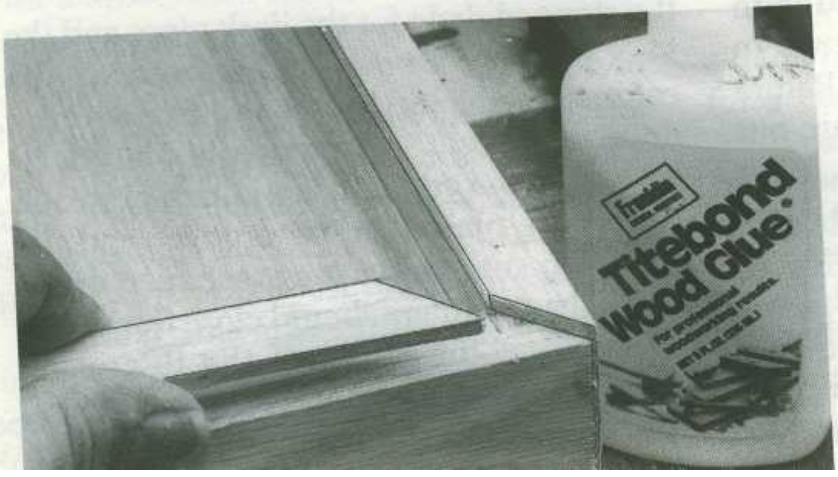


Fig. 25-10. Ends of the strips are mitered and each piece is carefully fitted. Apply glue to the plywood edge and strip and fasten with brads. See text regarding edging brads.

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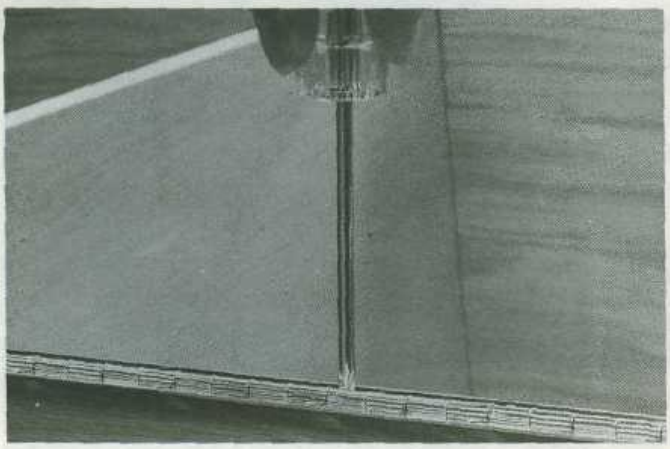


Fig. 25-11. Make pilot holes for hinges slightly under screw size with portable drill; then attach hinge temporarily with end screws for check before proceeding with balance.

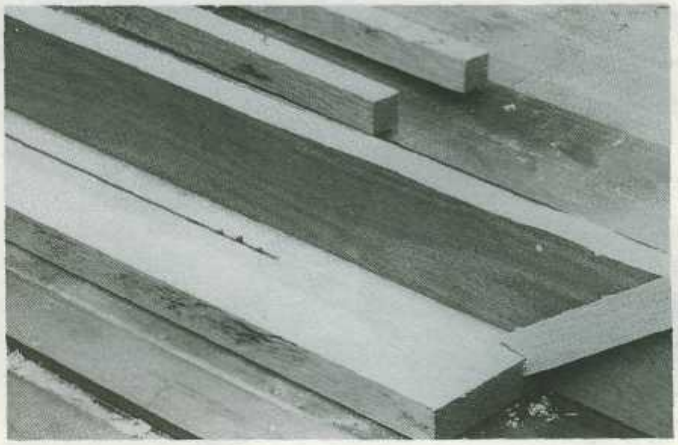


Fig. 25-12. Cutting squares for the handles (refer to drawings). Note push stick in photo.

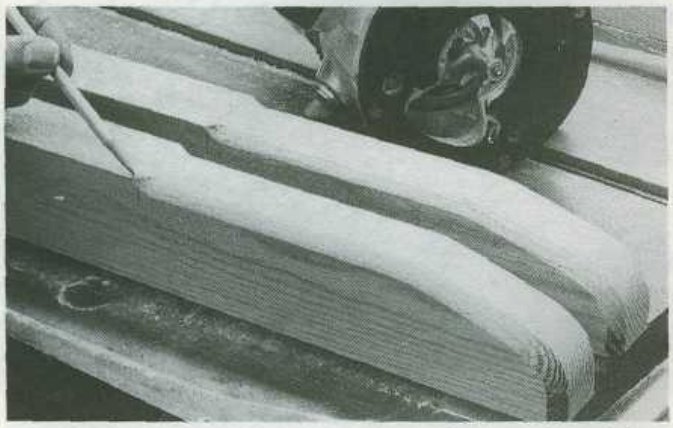


Fig. 25-13. Base pieces are cut from thick stock and then rounded with the router. Round ends where base meets the cabinet, as indicated by pencil in this photograph.

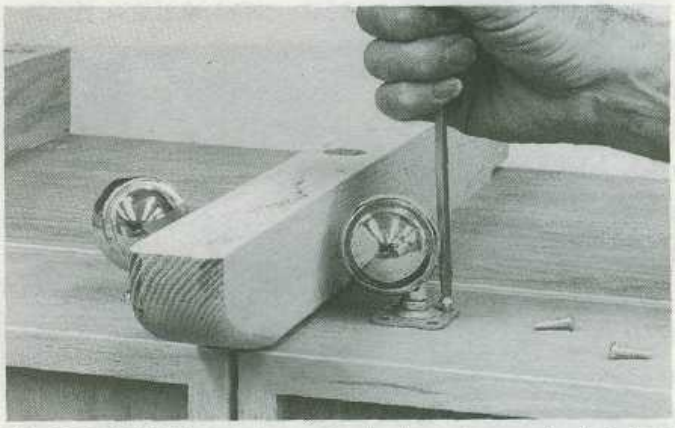


Fig. 25-14. With base pieces attached, casters can be installed with adequate clearance from center base piece. If necessary, you can use shims under caster plates.

securely. *Note*: do not glue in the ¼-inch panel. This should be made to float in the frame or cabinet. The same procedure is followed in making the doors.

Remember when applying clamps to protect the work by using cauls (strips of wood) under the clamps. With the ¼-inch panels in place, the glued-up assembly should be square, but be sure to check for squareness with a large square before the glue sets. Adjust as necessary.

All exposed plywood edges must be concealed. This can be done with veneer tape or with a solid band. The solid band will stand up better and is therefore recommended. Rip the strips from solid stock, making each strip ⅛ × ¾ inches. Let the ends slightly extend the piece to be edged, then measure the pieces carefully and miter the ends. Fit each piece individually, apply glue to the plywood edge and to the back of the band, then fasten with brads.

You can use ordinary brads but "Beauty Brads," especially made for applying molding and edging, are recommended. These very thin brads are made of hardened steel, have no heads, and do not require setting as an ordinary brad does. In use, they are driven into the work

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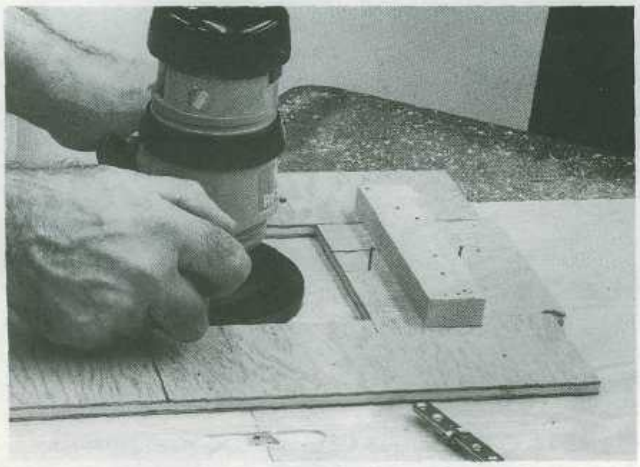


Fig. 25-15. Jig made from ⅜-inch plywood is used to mortise desk top for hinges. Flap and desk top must be butted for this operation. Use a ½-inch straight cutter in router.

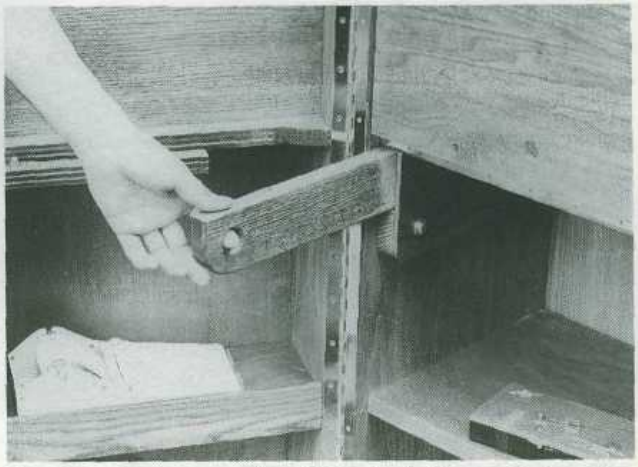


Fig. 25-16. In its retracted position, the desk support clears flap support permitting the door to close. In use, the finger hole is employed to pull out the support for solidity.

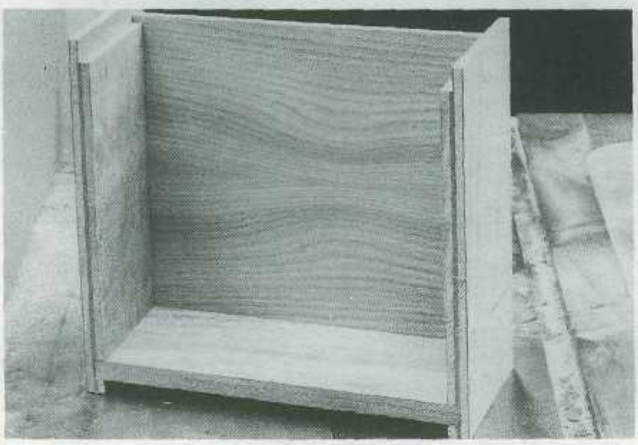


Fig. 25-17. Partially completed drawer. When assembling, insert bottom panel, then glue and brad sides to the subfront and rear. Fronts are fastened in the same way.

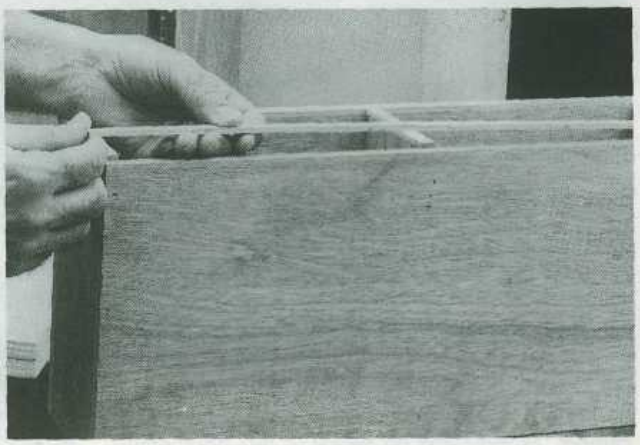


Fig. 25-18. Drawer compartment is constructed of ½-inch plywood with butt joints, as indicated in drawing. Oak edging, ½ inch wide, mitered at ends, is applied to plywood.

leaving about ¼ inch exposed, then are snapped across the grain with a hammer blow to the side. The brad will snap slightly below the surface, thus eliminating the need for setting. Also, the hole left is so small that the finishing materials will usually fill it.

The desktop and flaps are cut as indicated, then the three are placed on a flat surface and the hinge locations are laid out. The hinges used are the flip-top type which permits the flaps to flop 180 degrees. The hinges are ½ inch wide and 2¾ inches long and must be mortised so the tops are flush with the desk top. Use a router fitted with a ½-inch straight cutter.

To ensure accuracy and uniformity, you should use a jig (the one shown is made of ⅜-inch plywood). Make the width of the opening equal to the diameter of the router base and the length of the cutout 2¼ inches longer than the diameter of the router base. Note that the hinge is deeper at the center, thus you will have to mortise this part deeper for clearance.

The flaps and desktop must be aligned

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at the front edge when cutting the mortise. The rear edges of the flaps must match the shelf when the doors are swung open 157 degrees. Because of possible discrepancies, you may have to rework the rear flap edges to obtain a good fit. You can check this after the side doors are hung.

The piano hinges for the doors measure 1½ x 48 inches and the desk hinge measures 1 1/16 x 28½ inches. Install the end and center screws on all hinges and check the fit. If the fit's okay, install the rest of the screws. The plate casters are used under the doors to help take some stress off the door hinges. The casters are installed after the cabinet is mounted onto the base pieces. The base piece height should be the same as the caster height measured from the bottom of the wheel to the top of the plate.

To support the desk flaps, a projection on the door shelves is provided. A locating pin on the shelf prevents the door from swinging away from the flap, which would leave the flap unsupported and place a great strain on the flip-top hinges. Therefore, it is important that whenever the desktop flaps are extended, they must rest on the shelf support provided.

The pins are installed on the shelves as shown. To locate the holes on the underside of the flaps, lower the flaps into place and let the pin point mark the location. A piece of carbon paper placed carbon-side-up on the pin will leave a distinct mark.

The rails near the top of the door fronts serve to break up the monotony of the plain doors and also serve as door pulls. Finger clearance is provided in each piece toward the center. Installed after the staining and finishing operations are completed, they are held firmly by the decorative Tees. No other support is necessary. The finger clearance can be made with a router or shaper. If the proper cutter is not available, you can use a chisel to cut the clearance.

The drawer compartment and drawers are first cut as indicated. The compartment is made of ½-inch plywood with butt joints and oak edging ripped to ½-inch widths is used to conceal the plywood edge. When assembling the drawers, insert the bottom panel, then glue and brad the sides to the subfront and rear. The drawer fronts are fastened to the subfronts with glue and brads. Install the door shelves and large shelf with screws driven through the cleats.

This completes construction. Stain and finish as desired. Try Golden Oak paste wood filler followed by sanding sealer, then clear lacquer. The paste filler stains and fills the open pores of the oak in one operation. In use, the filler is thinned with benzine to the consistency of heavy cream, then is brushed on with the grain. When it starts to set (about 10 minutes) it is rubbed off across the grain using burlap or excelsior. This will work the filler into the pores leaving a smooth surface. Do not do too large an area at one time, for once the filler has set it will be difficult to remove.

Allow the work to dry overnight before applying the sealer coat. Before the sealer is applied, very lightly sand the filled wood then dust with a tac cloth.

When finishing is completed, add the decorative corners and Tees, magnetic catches and brass pulls. The desk supports are also fastened using 1½-inch lag screws.

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MATERIALS LIST

Except as noted, lumber used is ¾" oak plywood. Oak, when specified after the measurement signifies solid oak.

Purpose	Size	Description	Quantity
Side	¾" × 14" × 48"		2
Top	¾" × 14" × 30"		1
Bottom	¾" × 14" × 30"		1
Rear	¼" × 29" × 47"	Oak plywood	1
Desktop rear	¾" × 12¼" × 29"		1
Shelf	½" × 12" × 28½"	Oak plywood	1
Shelf edge	⅛" × ¾" × 28½"	Oak	1
Shelf cleat	¾" × 1½" × 11"	Oak	2
Stop	¼" × ¾" × 3½"	Oak	1
Base	1¾" × 2⅝" × 24"		3
Desktop forward	¾" × 20½" × 28¼"		1
Flap	¾" × 14" × 19¼"		2
Support, movable	¾" × 2½" × 18"	Oak	2
Support, fixed	¾" × 2 7/16" × 12¼"	Oak	2
Support, side	¼" × 5" × 12¼"	Plywood	2
Drawer box top	½" × 9" × 28½"	Oak plywood	1
Drawer box bottom	½" × 9" × 28½"	Oak plywood	1
Drawer box side	½" × 4¼" × 9"	Oak plywood	4
Drawer rear	½" × 4" × 8 3/16"	Oak plywood	3
Drawer subfront	½" × 4" × 8 3/16"	Oak plywood	3
Drawer front	¾" × 4⅛" × 8 11/16"	Oak plywood	3
Drawer side	½" × 4" × 8¼"	Oak plywood	6
Drawer bottom	¼" × 7 7/16" × 8 3/16"	Oak plywood	3
Door side	¾" × 6" × 48"		4
Door top	¾" × 6" × 15"		2
Door bottom	¾" × 6" × 15"		2
Door front	¼" × 14" × 47"		2
Door handle	¾" × ¾" × 13½"		2
Door shelf	¾" × 5¼" × 13½"		2
Separator front	¼" × 7⅜" × 13 7/16"	Oak plywood	2
Separator rear	¼" × 10" × 13 7/16"	Oak plywood	2
Flap support	¾" × 5½" × 8½"		2
Pin	5/16" × 1"	Dowel	2
Shelf lower	½" × 4¾" × 13½"		2
Shelf edge	¼" × 2¼" × 13½"	Oak plywood	2
Shelf cleat	¾" × 1½" × 4¾"		4
Plywood edging	⅛" × ¾"	Oak	65'
Hinge door	1½" × 48"		2
Hinge desk	1 1/16" × 28½"		1
Hinge, flip-top	½" × 2¾" (FTT)		6
Corner	(AC)		8
Tee	(AT)		4
Knob	(Knob)		5
Magnetic catch	(PM)		2
Caster, plate	2½"		2
Screw	1½" × 8 RH		20
Screw	1" × 8 FH		8
Lag screw	5/16" × 1"		2
Lag screw	5/16" × 1½"		4
Beauty Brads	(BBDS)		1 pk.
Brads	1"		12

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Lightweight Desk



BUILDING THIS handsome desk is a project that any good craftsman can undertake with confidence. The design could be modified, if so desired, by substituting drawers for a cabinet on the pier.

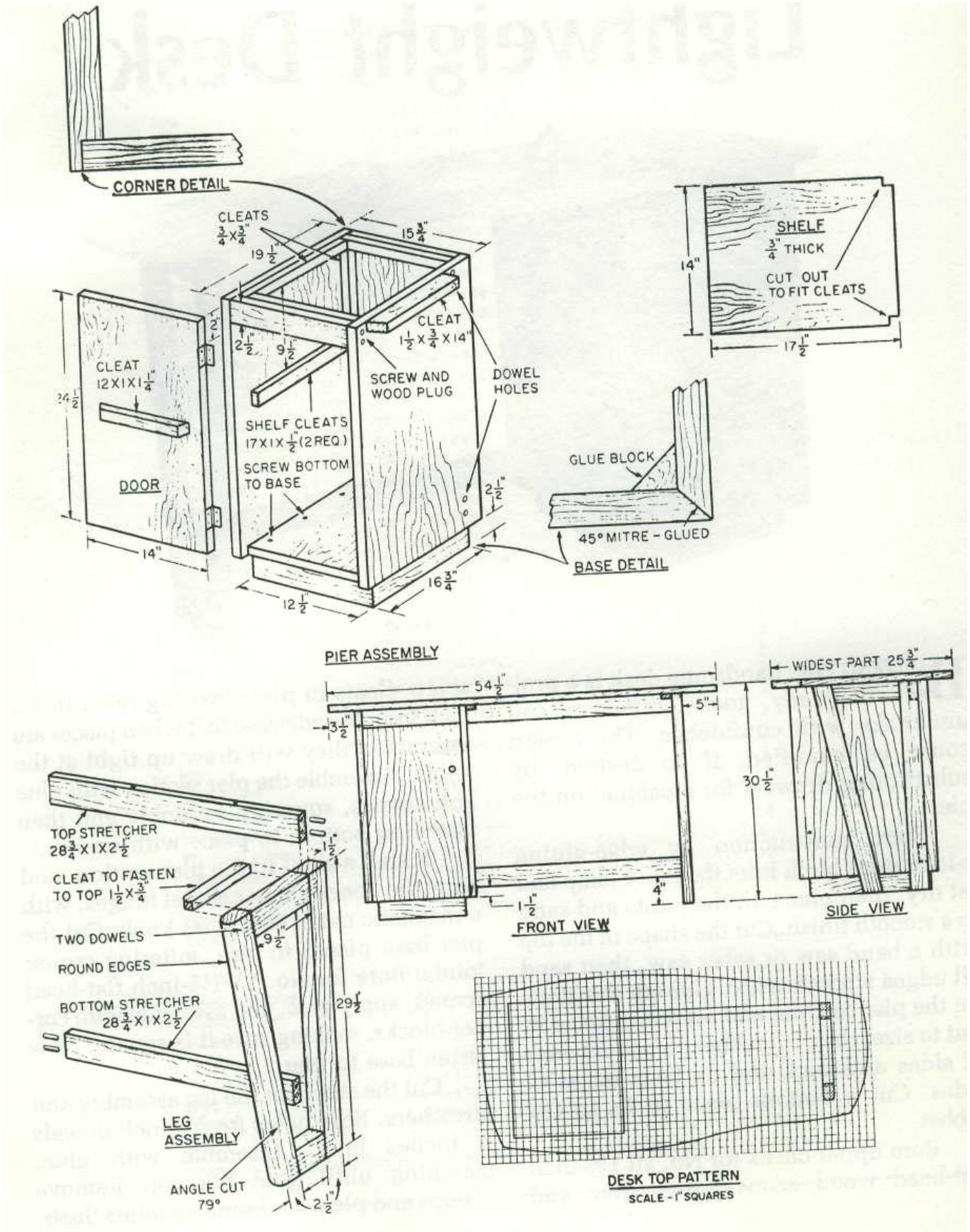
Start construction by edge-gluing 1-inch stock birch from the top. Clamp and let dry, then plane all the joints and sand to a smooth finish. Cut the shape of the top with a band saw or saber saw, then sand all edges smooth. Next glue-up the stock for the pier section, and sand and plane it. Cut to size, then cut rabbet on bottom edge of sides and back and on back edges of sides. Cut a bottom piece to fit in the rabbet.

Bore upper cleats for No. 10 1½-inch flat-head wood screws, then glue and screw cleats in place, setting them in 1/16 inch from the edges so that when pieces are assembled they will draw up tight at the joints. Assemble the pier section with glue and screws, squaring assembly and then fastening bottom in place with screws.

Install a shelf in the pier section, and hang the door on butt cabinet hinges, with a magnetic catch and brass knob. Cut the pier base pieces to size, mitering corner joints. Bore for No. 11 1½-inch flat-head screws, apply glue, and assemble with corner blocks, making sure it is square. Now fasten base to pier.

Cut the stock for the leg assembly and stretchers. Bore holes for 7/16-inch dowels 2 inches long. Assemble with glue, clamping until glue has set. Remove clamps and plane and sand all joints flush,

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MATERIALS LIST

Purpose	Size	Description	Quantity
Top	1″ × 12″ × 12′	Birch stock	1
Pier and shelf	¾″ × 12″ × 10′	Birch stock	1
Stretchers	1″ × 2½″ × 60′	Birch	1
Support	1½″ × 2½″ × 80″	Birch	1
Dowels	2″ × 7/16″		16
Wood screws	1¼″	No. 10 FH	as needed
Wood screws	1½″	No. 11 FH	as needed
Wood screws	2½″	No. 10 FH	as needed

then round the front edge of the leg. Fasten a cleat to the top piece of the leg for fastening to the top.

Bore two holes through the top stretcher for No. 10 2½-inch flat-head screws. Plane and sand stretchers. Bore holes for 7/16-inch dowels in stretchers, pier, and leg, place glue in holes and assemble pier, leg, and stretchers. Clamp square in all directions.

Place the top upside down, then place the leg and pier assembly on the top. Square and fasten all cleats and the upper stretcher to top, then sand again. Stain to the desired shade, apply a coat of sealer, sand lightly, and apply a finish coat of lacquer.

The trim, modern appearance of this desk will make it a welcome piece of furniture as well as a useful accessory in the living room, bedroom, or den.

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Magazine Table

YOU DON'T NEED any fancy equipment to build this fine magazine end table. The Italian provincial legs look difficult to build but indeed they are not. A glance at the drawing reveals that they are built up using a technique called post blocking. This eliminates the almost impossible task of accurately cutting the narrow section between posts with conventional home shop equipment. A simple method of fluting the legs is also utilized to further enhance the project.

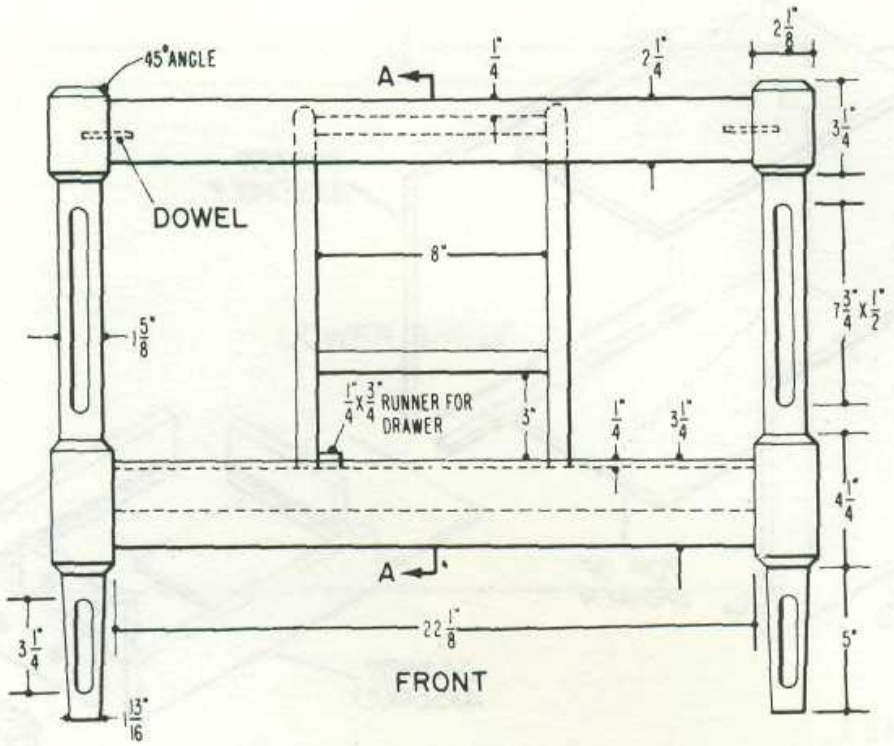
Lumber used was pine, but any suitable wood will do. For a stained or natural finish, you may want to try mahogany, cherry or maple. Walnut may also be used—if you can get it. This fine cabinet wood is becoming rare.

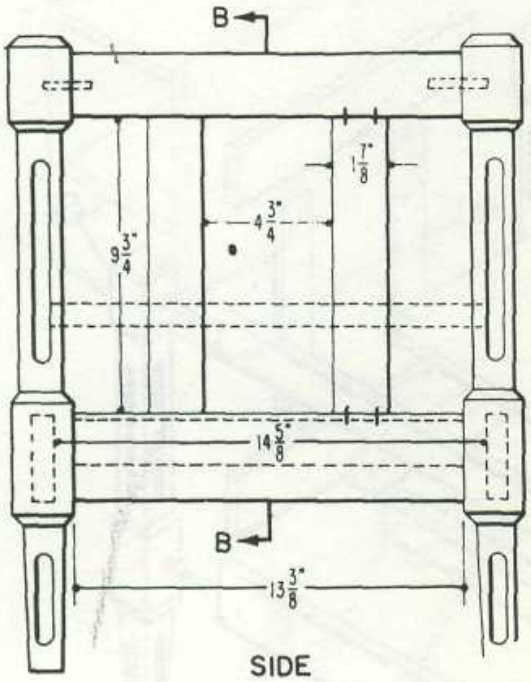
Start construction with the legs. These are cut from 2-inch stock. Set the table saw fence for a 1⅝-inch cut then rip the stock to produce a block 1⅝ inches square. After cutting, sand the surfaces or, if you have a jointer, run a pass on each surface to eliminate the kerf marks of the saw. If the jointer is to be used, make the saw cut a trifle more than 1⅝ inches to allow for stock removal on the jointer. After ripping and smoothing the surface, cut the legs to size and taper the lower ends.

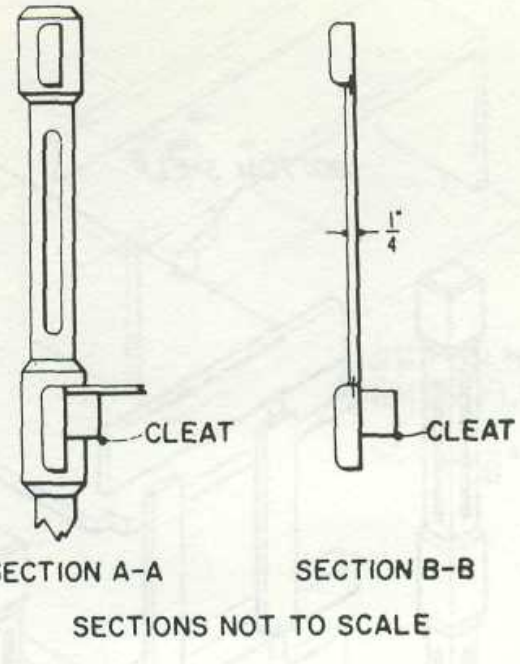
The best way to taper the legs is to use a jig on the table saw. The jig consists of a piece of plywood notched out to hold a leg. The notch is positioned at an angle so that when the jig with a leg in place is fed through the saw, a thin wedge section is ripped off the end of the leg. Repeat this operation on all four sides to produce the tapered leg. The angle of the notch determines the amount of taper. This setup can be used for other projects where numerous tapered cuts are required.

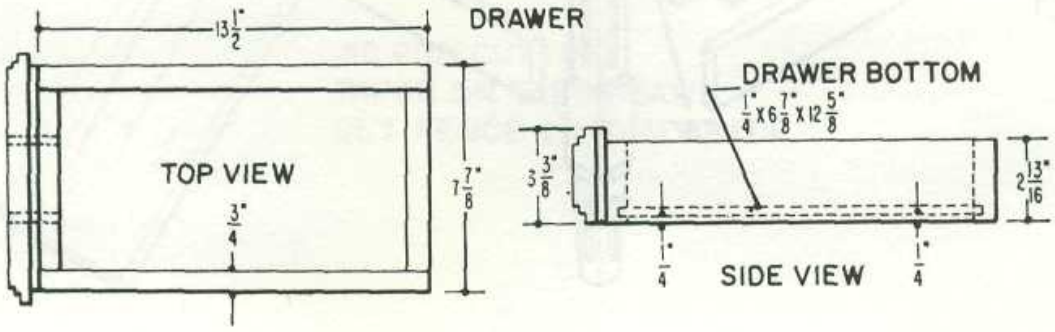
The next step is the fluting of the legs. Here again a jig is used for both accuracy and simplicity. The router is mounted to a wooden platform which converts it to a mini shaper. The cutter is made to protrude through the top of the platform to which a fence has been attached. The work is simply held against the fence and fed through

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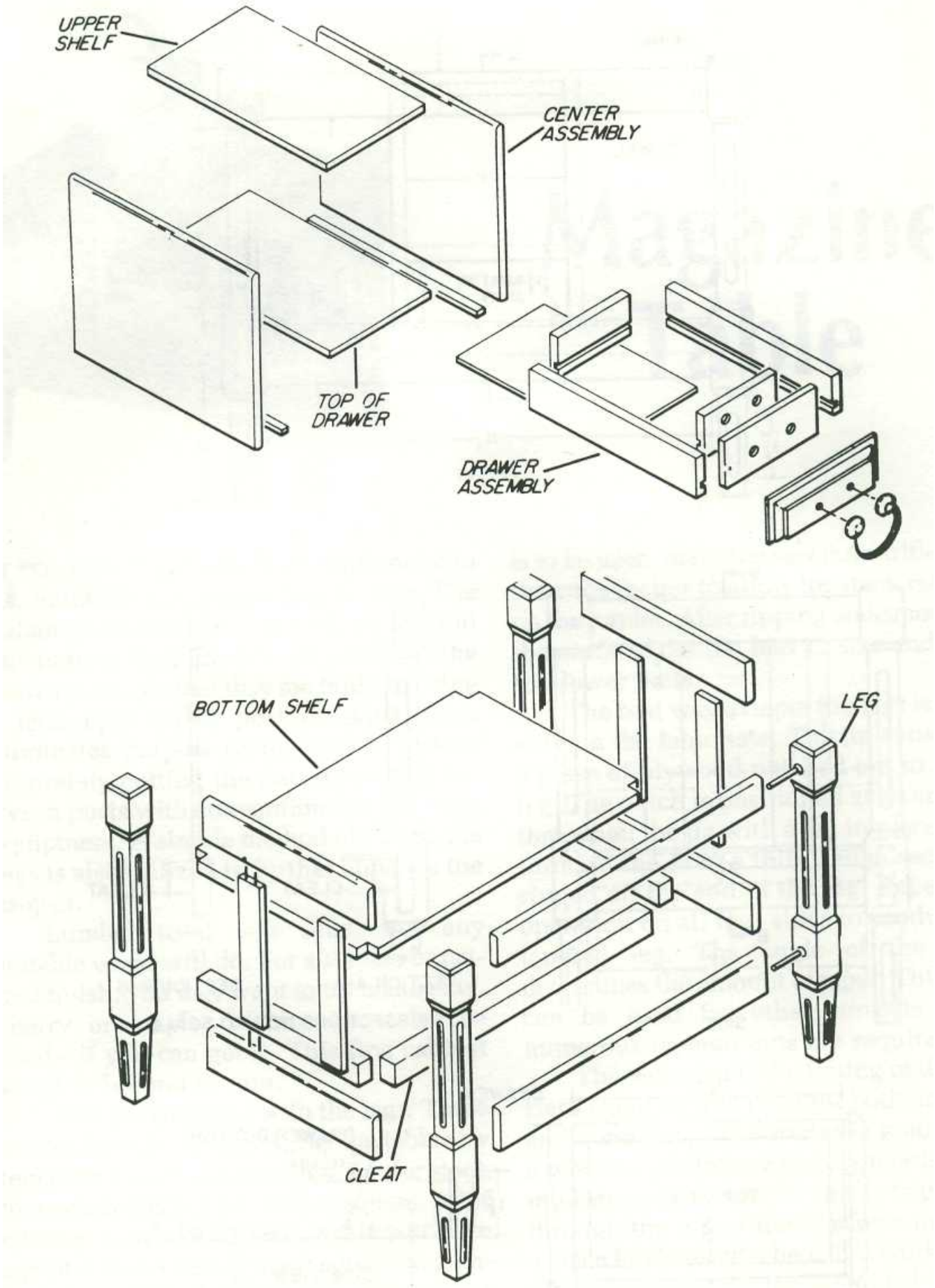




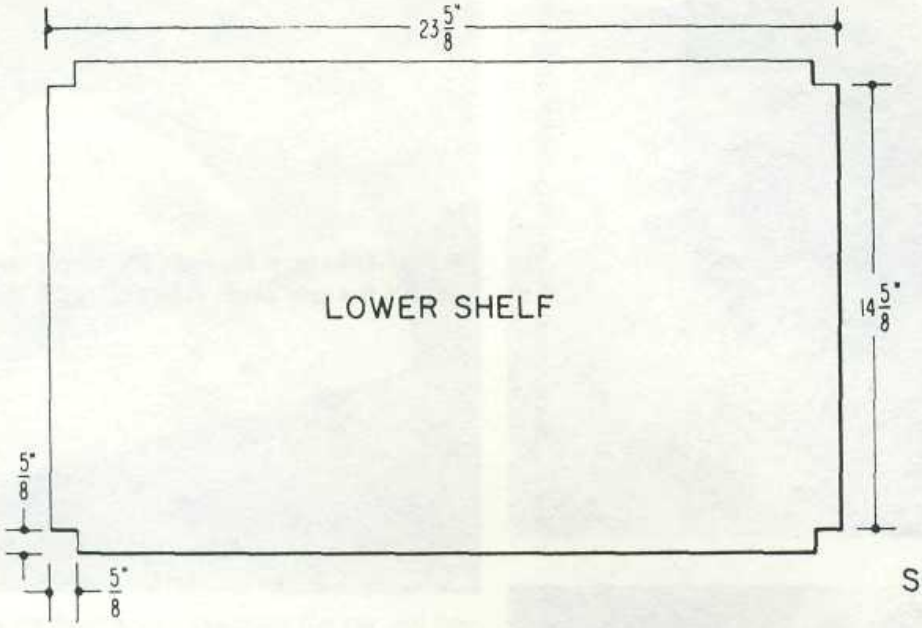




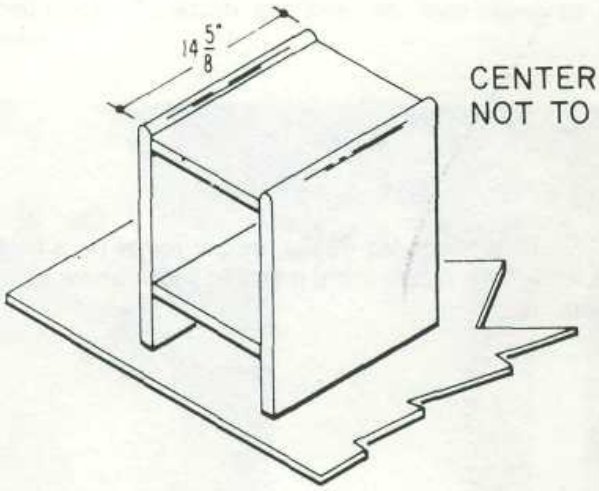
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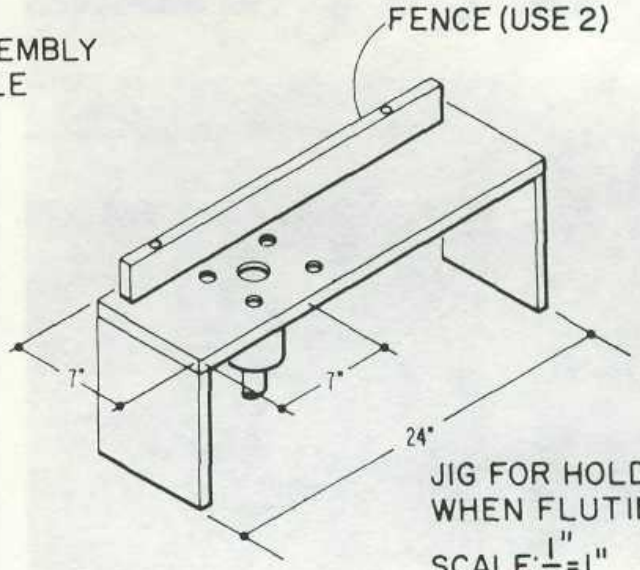
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SCALE: 1" = 1"

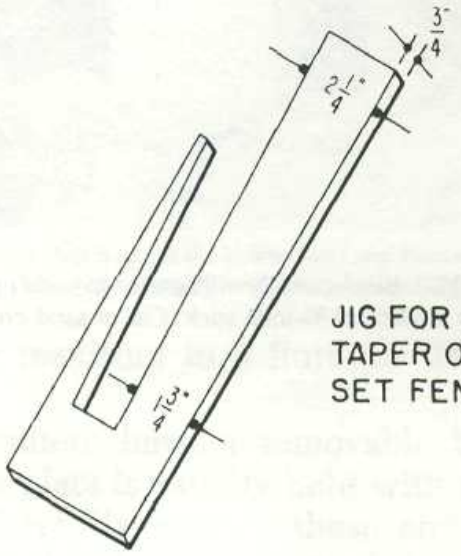


CENTER ASSEMBLY
NOT TO SCALE



JIG FOR HOLDING
WHEN FLUTING

SCALE: 1" = 1"



JIG FOR CUTTING
TAPER ON TABLE SAW
SET FENCE 4" FROM BLADE

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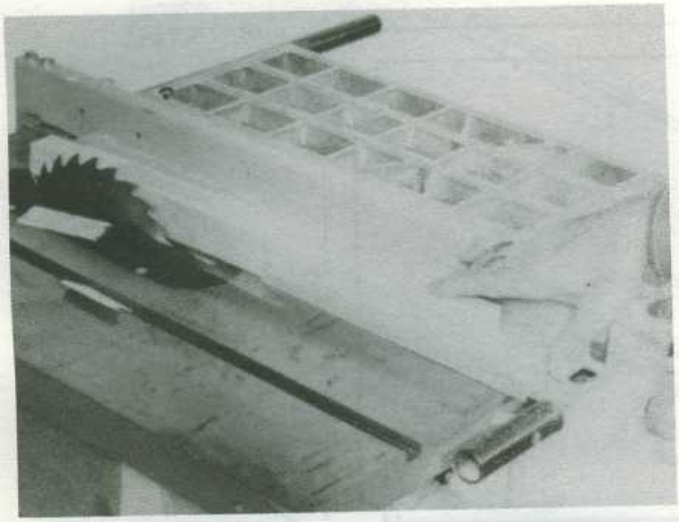


Fig. 27-1. To taper leg ends, use a table saw jig. Jig is positioned so that the saw blade cuts the leg block at a slight angle.

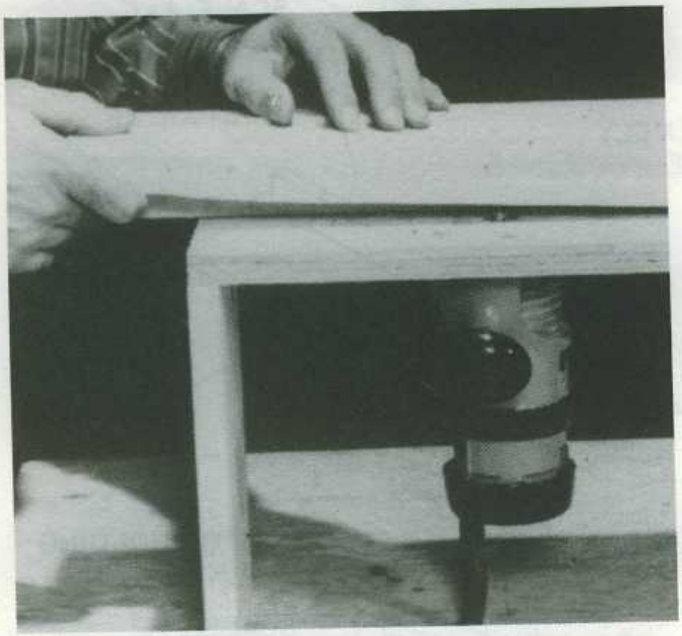


Fig. 27-2. To produce leg fluting, mount router on a frame. Lower work onto cutter, using marks to show where to start and stop.

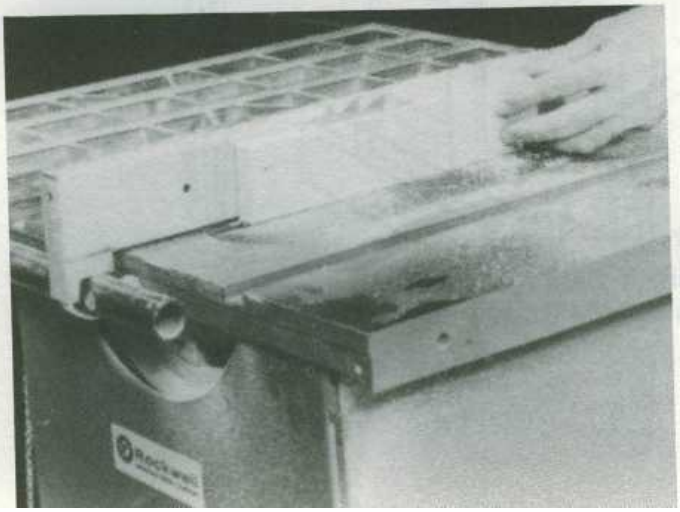


Fig. 27-3. Blocks which will be used to build up legs are ripped from a piece of ¾-inch stick. Cut or sand ends to 45-degree angle.

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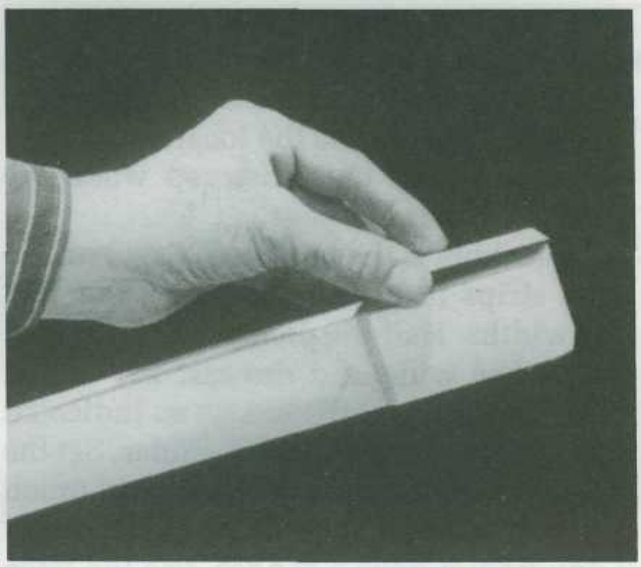


Fig. 27-4. The legs are built up by attaching the cut and beveled pieces. To attach, use glue, and then clamp for a good bond.

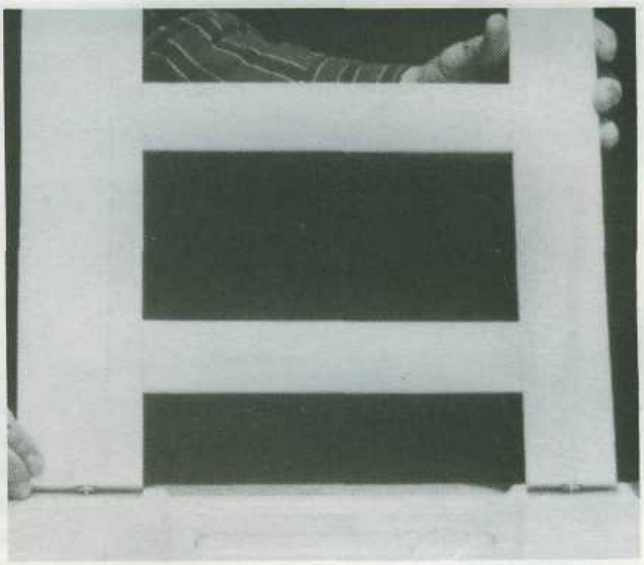


Fig. 27-5. The apron pieces are joined to the legs with dowels. Use dowel locating pins to accurately transfer the hole positions.

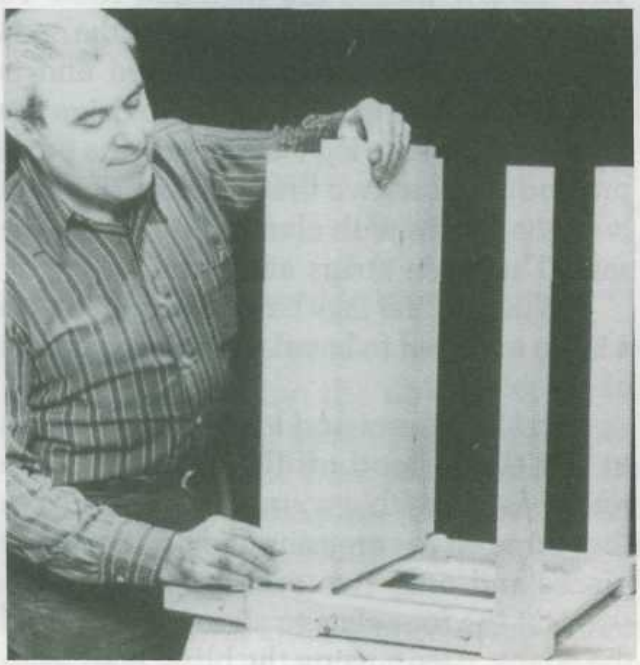


Fig. 27-6. The next step is to cut the lower shelf and then install using cleats on underside. Attach it with dowels to legs.



Fig. 27-7. Drawer and top shelf section is built as a unit and installed separately. Assemble with nails, sinking the heads.

the cutter resulting in a flute (or flutes) being cut.

All routers have a removable base plate. The plate is usually held with four screws. Carefully remove these and set aside. Place the plate on a piece of plywood and use a pencil to locate the mounting holes as well as the center opening. Drill the holes for the screws countersinking the heads. The center hole should be large enough to clear the cutter being used. See the drawing for clarification. Make the legs

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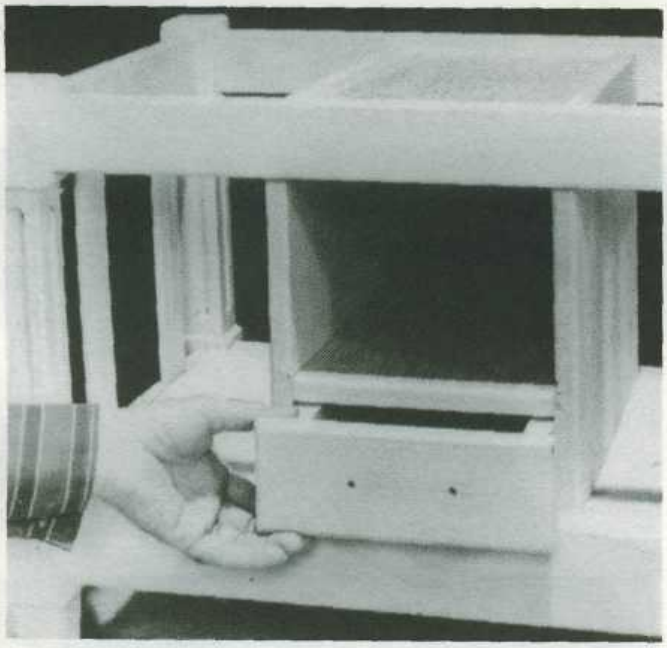


Fig. 27-8. Make drawer with a double front and be sure to make screw clearance holes in subfront so hardware can be installed.

of the platform tall enough so that the bottom of the router will clear the workbench.

Mount the flute cutter in the router, then, using the four screws removed from the router base previously, mount the router in place. Position the fence so that the flute will fall exactly in the center of the leg. Although only one fence is shown for clarity in the photograph, a double fence is recommended to keep the workpiece from swaying.

Some routers are not made with lock-on switches—especially the pistol-grip type. If you have one of these, you will have to have an assistant turn on the power as needed, or you can improvise by taping the switch "on" with masking tape. You can then operate the machine by using the plug as a switch. If you use this method, be sure to remove the tape as soon as the job is done.

Since the flutes are "blind" (they do not run off the edge of the work), you will have to lower the work onto the cutter and likewise lift it off at the end of the cut. Do this by placing "start" and "stop" marks on the jig. Determine the location of these by making trial cuts in scrap wood the same length as the legs.

Blocking is the next step. Saw ¼-inch-wide strips from suitable stock, then rip two widths. Half the pieces will be ripped 1⅝ inches wide and the rest 2⅛ inches wide. Cut the lengths to size as indicated then bevel the edges on the sander. Set the table for a 45-degree bevel then just touch the work to the disc to produce the bevel. If you do not have a sander, use the table saw to make the bevel.

Glue the strips to the legs as shown. The narrow pieces are installed first. To keep the pieces from shifting, snip the ends of 18 gauge brads so the pointed end is about ¼ inch long. Use a plier to drive the blunt end into the leg leaving just the point protruding. Use two brads per section and hold the pieces with clamps while the glue sets. The wide strips are installed last.

When all the legs have been glued, use a knife or chisel to bevel the square corners of the blocks.

Cut the upper and lower apron pieces to size then round off the edges with the router fitted with a rounding cutter. Note that three edges are rounded on the upper pieces and only two on the lower.

Cut the four slats to size and round off the edges. Again using the blind brad technique, install the slats to the upper and lower apron ends. This time make the brads longer (about ½ inch) and allow them to protrude about ¼ inch. Apply glue and working on a flat surface, bring the parts together. Clamp until the glue sets.

The apron pieces are joined to the legs with dowels. One dowel in each section

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MATERIALS LIST

All lumber used is pine (except where noted).

Purpose	Size	Quantity
Lower shelf	3/4" × 14 5/8" × 23 3/8"	1
Cleats	3/4" × 1" × 12"	2
Cleats	3/4" × 1" × 21"	2
Apron (lower)	3/4" × 3 1/4" × 22 1/8"	2
End apron (lower)	3/4" × 3 1/4" × 13 3/8"	2
Apron (upper)	3/4" × 2 1/4" × 22 1/8"	2
End apron (upper)	3/4" × 2 1/4" × 13 3/8"	2
Legs	1 5/8" × 1 5/8" × 21 1/2"	4
Blocks	1/4" × 1 5/8" × 3 1/4"	8
Blocks	1/4" × 2 1/8" × 3 1/4"	8
Blocks	1/4" × 1 5/8" × 4 1/4"	8
Blocks	1/4" × 2 1/8" × 4 1/4"	8
Slats	1/4" × 1 7/8" × 9 3/4"	4
Compartment slides	3/4" × 12" × 14 5/8"	2
Upper shelf	3/4" × 8" × 14 5/8"	1
Drawer roof	3/4" × 8" × 14 5/8"	1
Drawer sides	3/4" × 2 13/16" × 13 1/2"	2
Drawer ends	3/4" × 2 13/16" × 6 3/8"	2
Drawer front	3/4" × 3 3/8" × 8 3/4"	1
Drawer bottom	1/4" × 6 7/8" × 12 5/8"	Plywood
Dowels	3/8" × 2"	16
Pull	3" centers	

will suffice. Use dowel-locating pins to accurately position the dowels. A dowel drilling jig is first used on the apron ends. Hole positions are then transferred to the legs by means of the pins. (See photo.) Next cut the shelf and install it using cleats on the underside.

The drawer and top shelf compartment is made as a unit and installed separately. Set the lower shelf down about 1/4 inch and likewise the upper shelf is set down from the top the same amount.

Make the drawer with a double front as shown and be sure to make screw clearance holes on the subfront so that the hardware can be installed after the finishing operation is completed.

The front edge of the drawer is shaped with a beading cutter.

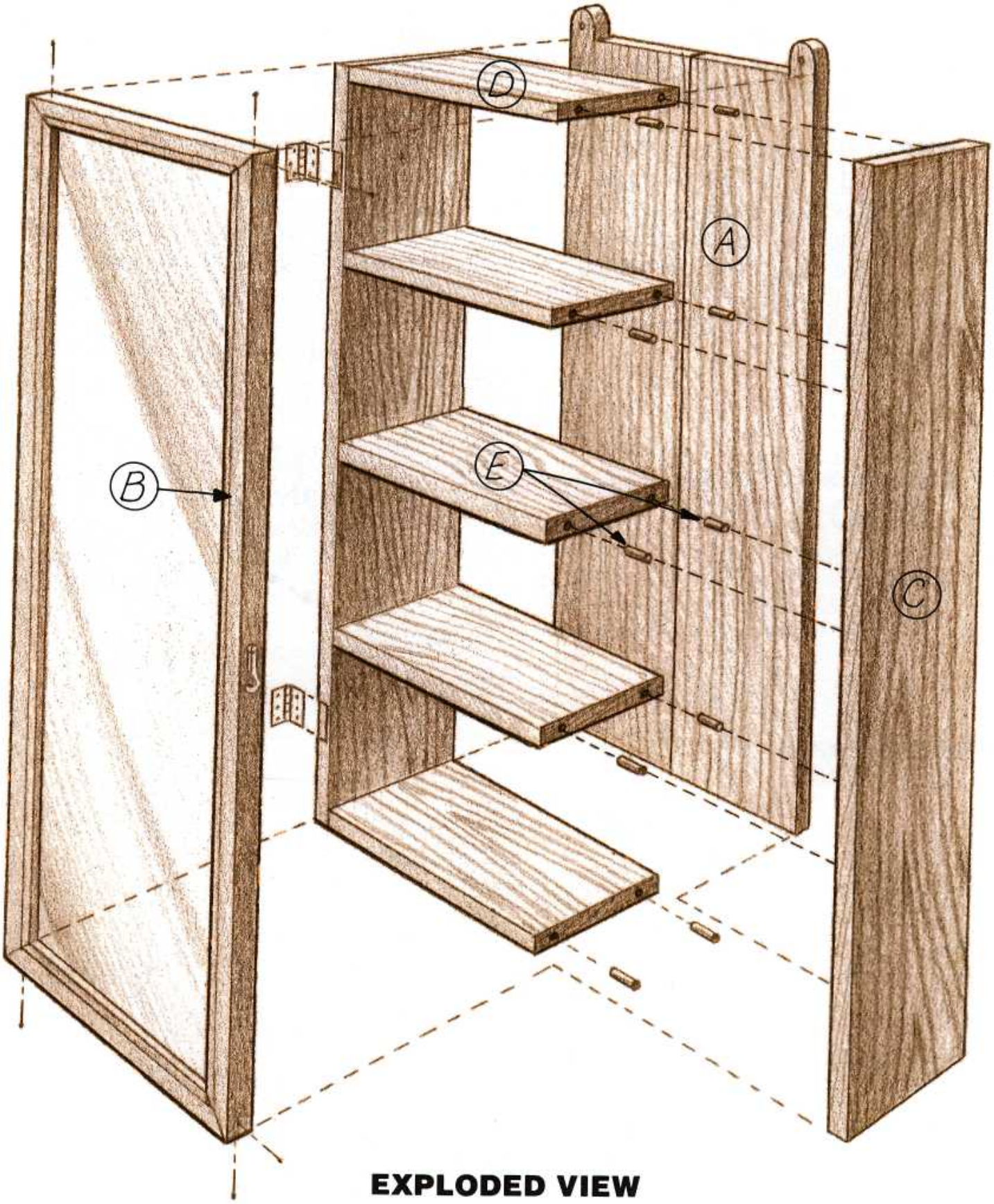
Sanding and finishing operations complete the project. To facilitate the finishing, the compartment may be lifted out and installed after the finishing is completed.

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TEA CABINET



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EXPLODED VIEW

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1 Select the stock and cut the parts. Choose straight, flat stock. Joint, plane, rip, and cut the parts to the sizes given in the Cutting List.

2 Cut the hangers in the back boards. The back is longer than the cabinet sides and is cut away to create the hangers shown in the *Front View.* Lay out and cut the hangers to the profile shown. When you have cut the hangers, drill a ¼-inch-diameter hole through them, as shown.

SHOP TIP: To get two identical hangers, cut both at once. First stack the pieces together and secure by putting double-sided tape between them. Then cut both hangers in one operation.

3 Rabbet the backs, door stock, and sides. Put a rabbeting bit in your router. Secure the router in a router table. Put a fence on the table and adjust the setup to rout a ¼ × ¼-inch rabbet. Cut a rabbet in one edge of each back board positioned so that the rabbets will overlap as shown in the *Top View.*

With the router still set up for the ¼ × ¼-inch rabbet, rabbet one edge of the door stock to hold the door glass.

After you cut rabbets in the back boards and door stock, set the router table to rabbet each side to accept the back. Rout the ⅜ × ¼-inch rabbet as shown in the *Top View.*

4 Drill the dowel-pin holes. Lay out the sides for the dowel-pin holes following the dimensions shown in the *Side View.* Drill the ¼-inch-diameter by ¼-inch-deep dowel-pin holes on your drill press.

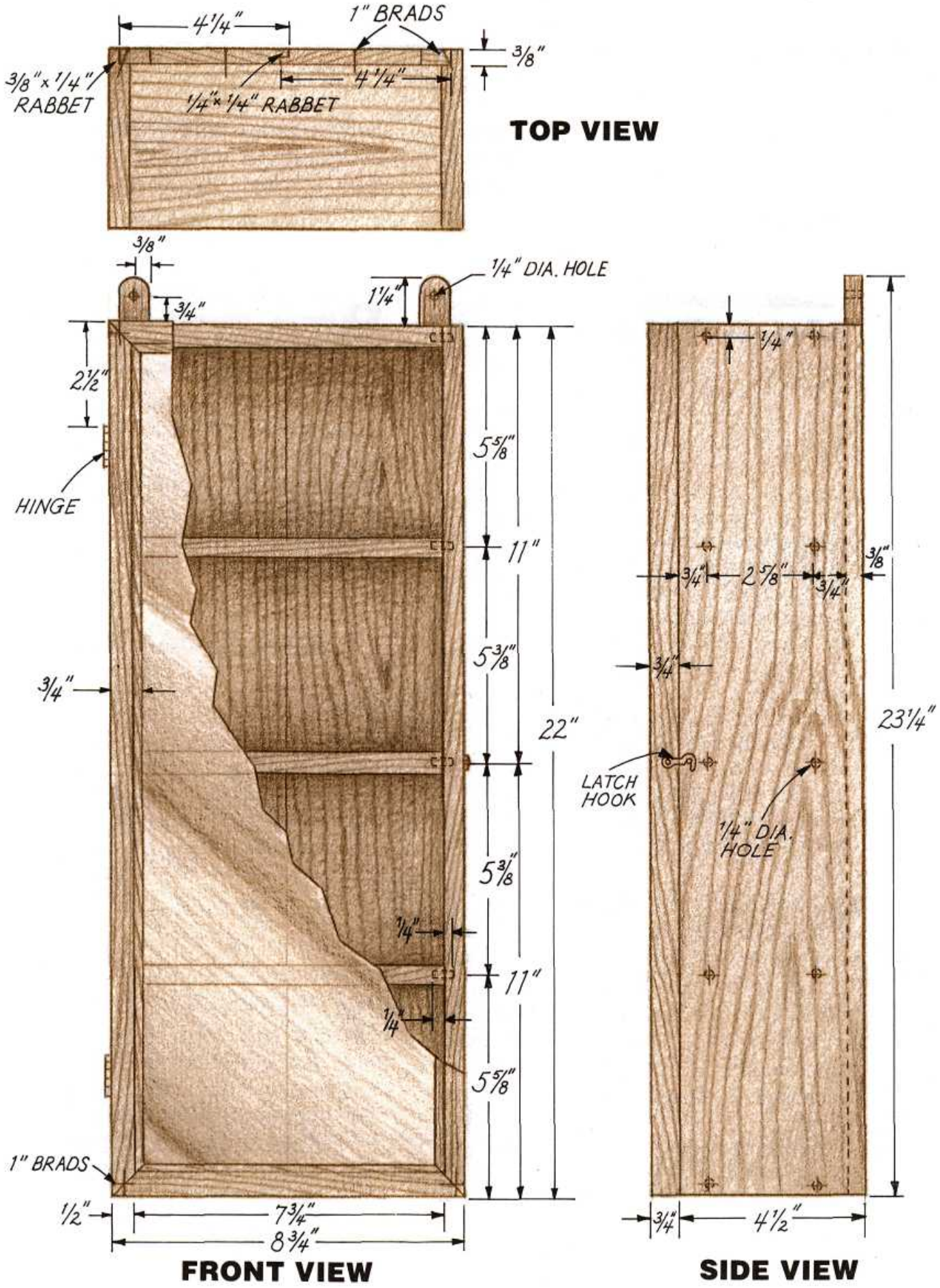
CUTTING LIST

Part	Quantity	Dimension	Comment
A. Back boards	2	⅜" × 4¼" × 23¼"	
B. Door stock	1	¾" × ¾" × 64"	Miter to fit.
C. Side	2	½" × 4½" × 22"	
D. Shelves	5	½" × 4⅛" × 7¾"	
E. Dowel pin stock	1	¼" dia. × 15"	Makes 20 7/16" pegs

Hardware

2 1-in. butt hinges
1 latch hook. Available from Meisel Hardware Specialties, P.O. Box 70, Mound, MN 55364. Part #309.
1 ⅛-in. × 7 11/16-in. × 20 15/16-in. piece of glass
As needed, 1" brads
As needed, pushpins (to hold glass in place)

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Locate the exact dowel-pin hole positions on the ends of the shelves with dowel centers. Put the shelves upright in a vise and carefully drill the dowel-pin holes.

SHOP TIP: Drill the dowel holes with the help of a template. Make the template from some scrap wood cut to the exact dimension of the sides. Lay out and drill the dowel-pin holes, shown in the *Side View,* on the template. Clamp the template to the cabinet side. Drill through the holes in the template to locate the holes in the sides.

To make an identical set of holes on the second side, mark the front and top edges of the template and make sure these marks line up with the top and front of the second side. Clamp the template in place on the second side and drill the matching dowel-pin holes.

Drill the holes in the shelves using the top set of holes in the template. Put the shelf in the vise, align the top of the template with the top of the shelf, and drill through the template holes.

5 Assemble the cabinet. Cut ¼-inch-diameter dowel stock into 7/16-inch-long dowel pins with a dovetail saw. Glue the dowel pins into the holes in the shelf ends. While the glue is still wet, glue the shelves and dowels into the sides. Clamp the sides to the shelves, make sure the cabinet is square, and allow the glue to dry.

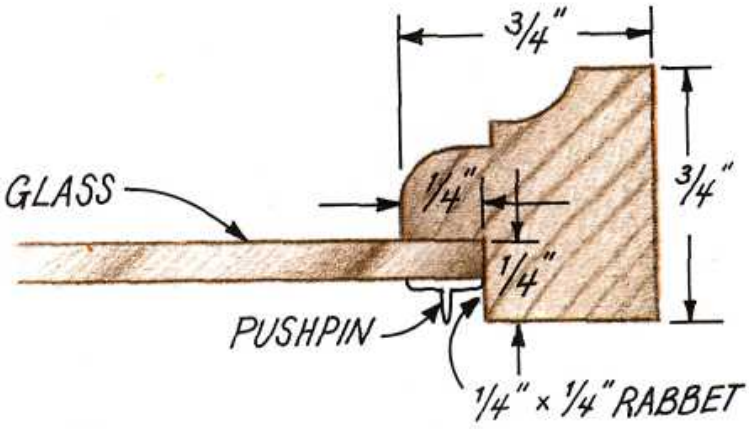
When the glue has dried, remove the clamps and test fit the back boards. The back boards should have approximately 1/16 inch of play from side to side. Trim if necessary.

When the back boards fit properly, apply glue to the rabbets cut for the backs. Put the back boards in place and nail them to the cabinet with 1-inch brads. Nail, but do not glue, the back boards to the shelves.

Allow the glue to dry.

6 Cut the profile in the door stock. Put a 1 5/16-inch-diameter cove and bead bit in the router. Secure the router in a router table. Before you cut the door stock, cut a test profile in some scrap wood. Cut the scrap to the thickness and width of the door stock. Adjust the height of the bit to approximate the profile shown in the *Door Stock Detail.* When you are satisfied with the scrap profile, rout the profile in the door stock.

DOOR STOCK DETAIL



7 Miter the door stock and assemble the door. When you miter the door stock to make the door, cut the miters one at a time and compare them to the front edge of the cabinet for accuracy.

When you've cut all four sides of the door frame, apply glue on the mitered ends and clamp the door together in a corner clamp. With the door frame still in the clamp, tack the miters together with 1-inch brads.

Allow the glue to dry.

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SHOP TIP: To get accurate miters, check your setup on some pieces of scrap. Set your table saw blade to the 45-degree position. Set a miter gauge to 90 degrees and use it to cut miters in two pieces of scrap wood. Put the miters together and make sure that the resulting angle equals 90 degrees. Adjust the blade as necessary.

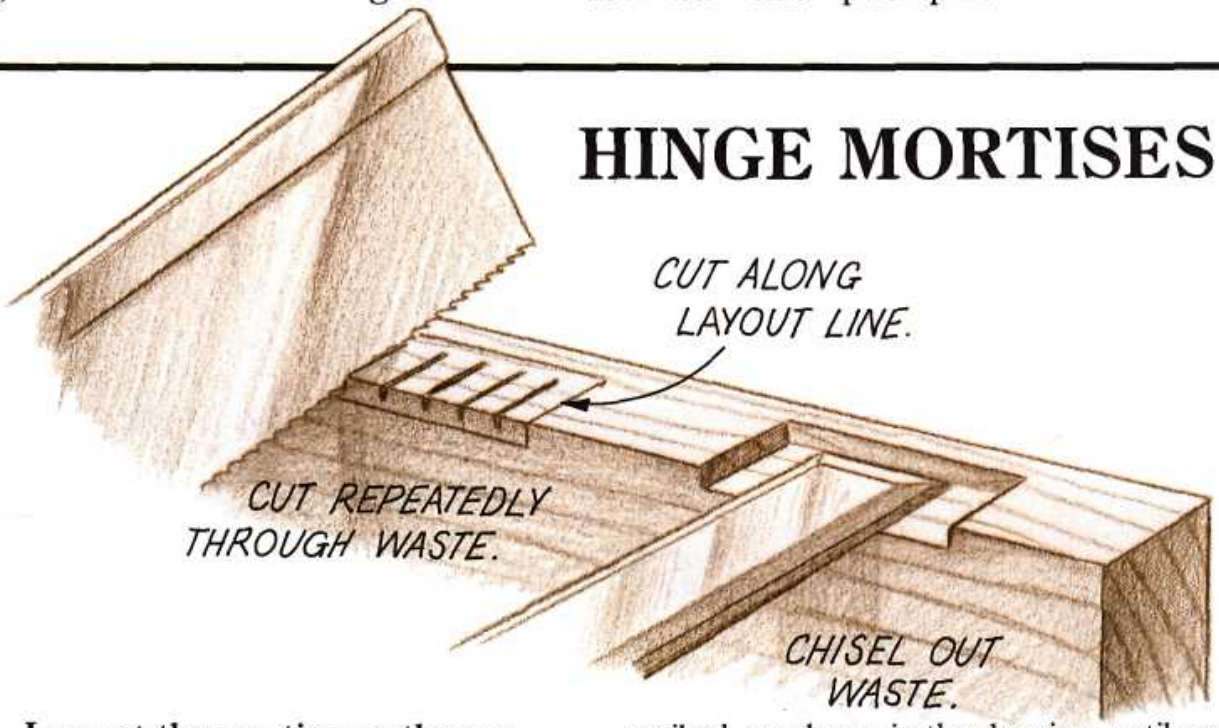
8 Cut the hinge mortises and hang the door. With the hinge as your guide, mark and cut the hinge mortises in the front edge of the cabinet and the back of the door as shown in the *Front View.* Rout the mortises or cut by hand.

Mark and predrill holes for the hinge screws, then hang the door.

9 Apply finish. Set the brads and fill any brad holes with wood putty. Finish sand all the surfaces.

The tea cabinet shown has an oil finish. Finish your cabinet as you choose. After the finish has dried, screw the latch hook in place and install the glass in the door with small push pins.

HINGE MORTISES



1 Lay out the mortise on the carcase. To cut accurate mortises, lay them out directly from the hinge. Put the hinges in place on the cabinet and trace around one of the leaves with a knife.

The mortise depth should equal half the thickness of the hinge barrel. Scribe a line with a marking gauge to mark the depth of the mortise.

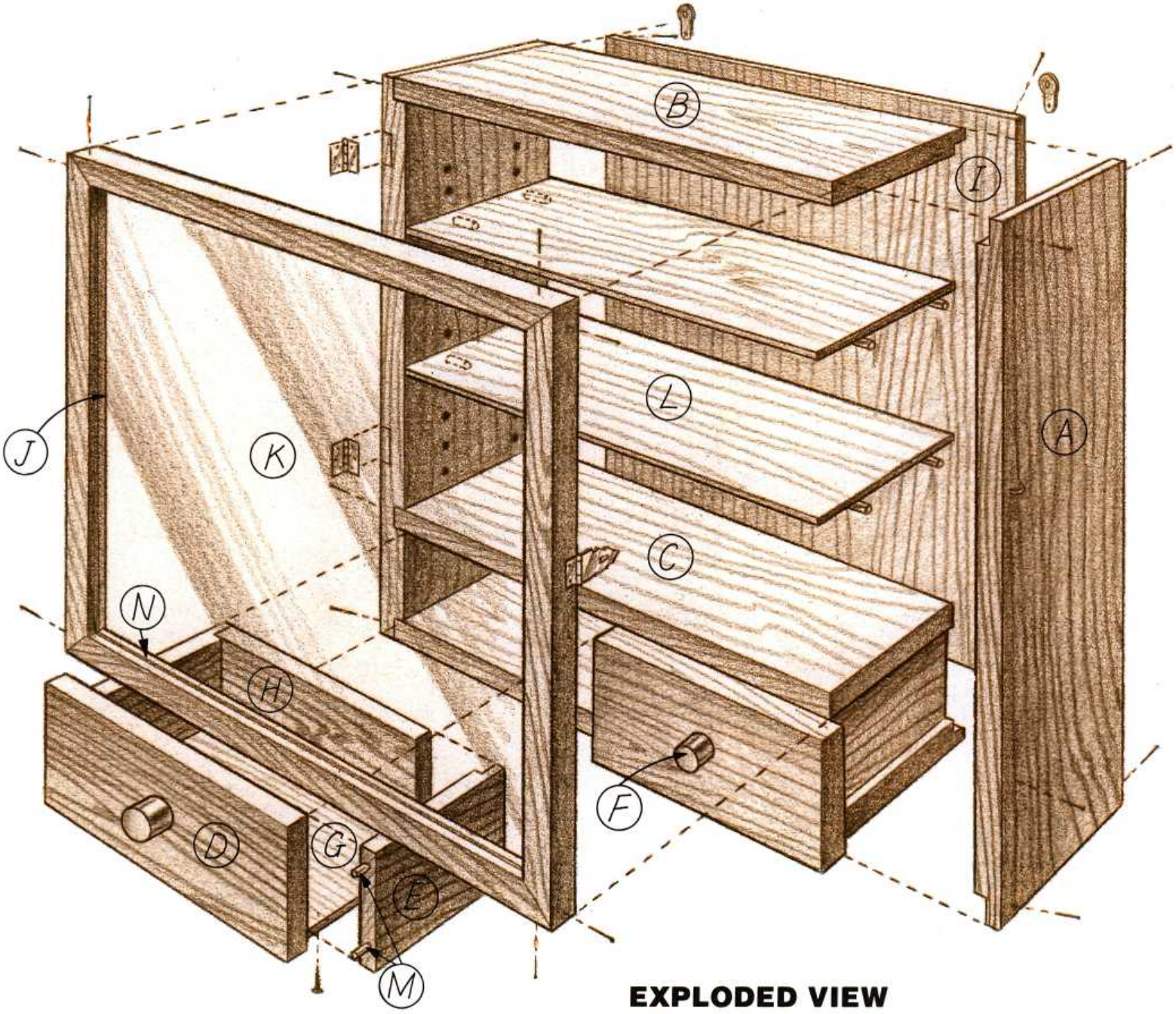
2 Remove the waste. With a backsaw or dovetail saw, cut along the first line you scribed, as shown in the drawing, until you reach the scribe line indicating the mortise depth. Make a series of cuts in the mortise, as shown, and chisel out the waste.

3 Lay out the mortise on the door. Put the hinge in the mortise and position the door on the cabinet. Mark where the hinge barrel meets the door. Remove the door from the cabinet; align the hinge with the barrel marks on the door. Trace around the hinge and remove the waste as before.

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DISPLAY CABINET





EXPLODED VIEW

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1 Select the stock and cut the parts. Choose straight, flat stock. Select a cabinet-grade plywood for the back that will match the cabinet's solid wood. Cut the plywood back so that its grain runs parallel with the cabinet sides.

Joint, plane, rip, and cut the parts to the sizes given in the Cutting List.

2 Cut the dadoes and rabbets in the sides. Put a ¾-inch straight bit in your router and rout the dadoes and rabbets shown in the *Front View* and *Side View.*

SHOP TIP: To rout a dado or rabbet, clamp a straightedge to the stock and guide the router against it. This will produce a perfectly straight groove and will also give you more control over the router.

3 Rout a rabbet for the back. Set up a router table and fence to cut a ⅜ × ¼-inch rabbet. Cut a rabbet in the back edge of the sides, top, and bottom.

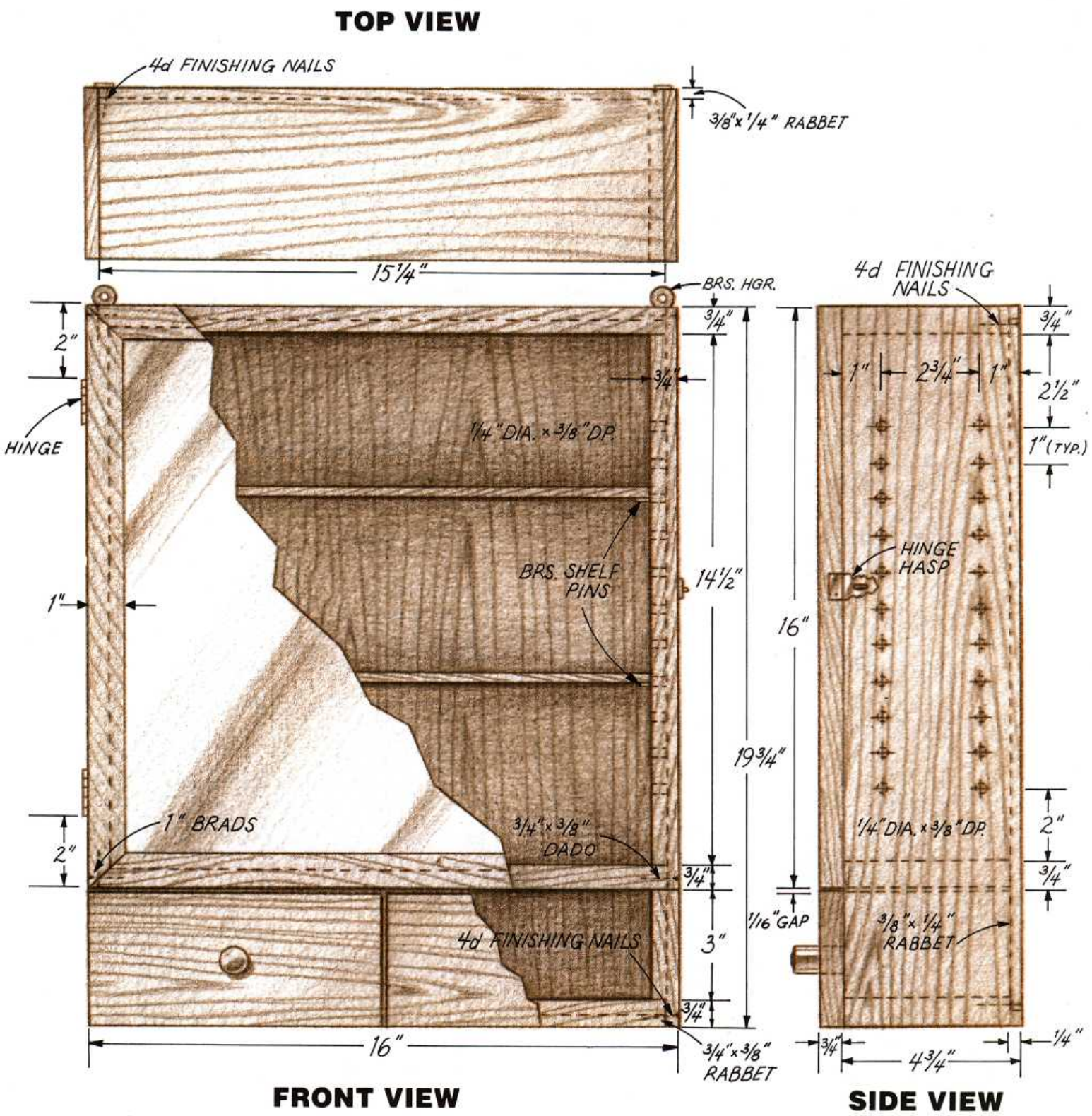
CUTTING LIST

Part	Quantity	Dimension	Comment
A. Sides	2	¾″ × 4¾″ × 19¾″	
B. Top and bottom	2	¾″ × 4¾″ × 15¼″	
C. Drawer shelf	1	¾″ × 4½″ × 15¼″	
D. Drawer fronts	2	¾″ × 3$^{11}/_{16}$″ × 7$^{15}/_{16}$″	
E. Drawer sides	4	½″ × 2$^{11}/_{16}$″ × 4½″	
F. Drawer pulls	2	¾″ dia. dowel × 1¼″	
G. Drawer bottoms	2	¼″ × 4½″ × 7$^{3}/_{16}$″	Plywood
H. Drawer backs	2	½″ × 2$^{11}/_{16}$″ × 6$^{11}/_{16}$″	
I. Cabinet back	1	¼″ × 15¼″ × 19″	Plywood
J. Door stock	1	¾″ × 1″ × 70″	Miter to fit.
K. Door glass	1	⅛″ × 14⅝″ × 14⅝″	Cut to fit.
L. Glass shelves	2	¼″ × 4½″ × 14$^{7}/_{16}$″	Cut to fit.
M. Dowel pin stock	1	¼″ dia. × 4″	Cut to size.
N. Glass bead	1	¼″ quarter round × 65″	Miter to fit.

Hardware

2 1½ × 1¼-in., open dia. hinges
As needed, 4d finishing nails
8 #4 × ⅝-in. flathead wood screws
As needed, 1-in. brads
1 1¾-in. brass hinge hasp. Available from The Woodworkers' Store, 21801 Industrial Boulevard, Rogers, MN 55374. Part #D3042.
8 ¼-in.-dia. brass shelf pins. Available from the Woodworkers' Store. Part #D5736.
As needed, ½-in. brads
2 2-in. brass hangers. Available from The Woodworkers' Store. Part #D3008.

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4 Drill the shelf-pin holes. Set up and drill the shelf-pin holes in the sides as shown in the *Side View.* Note that the holes do not go all the way through the sides.

SHOP TIP: Drill the holes for the adjustable shelf pins with the help of a template. Make the template from some scrap wood cut to the exact dimension of the sides. Lay out and drill the shelf-pin holes, shown in the *Side View, on the template.* Clamp the template to the cabinet side. Drill through the holes in the template to locate the holes in the side.

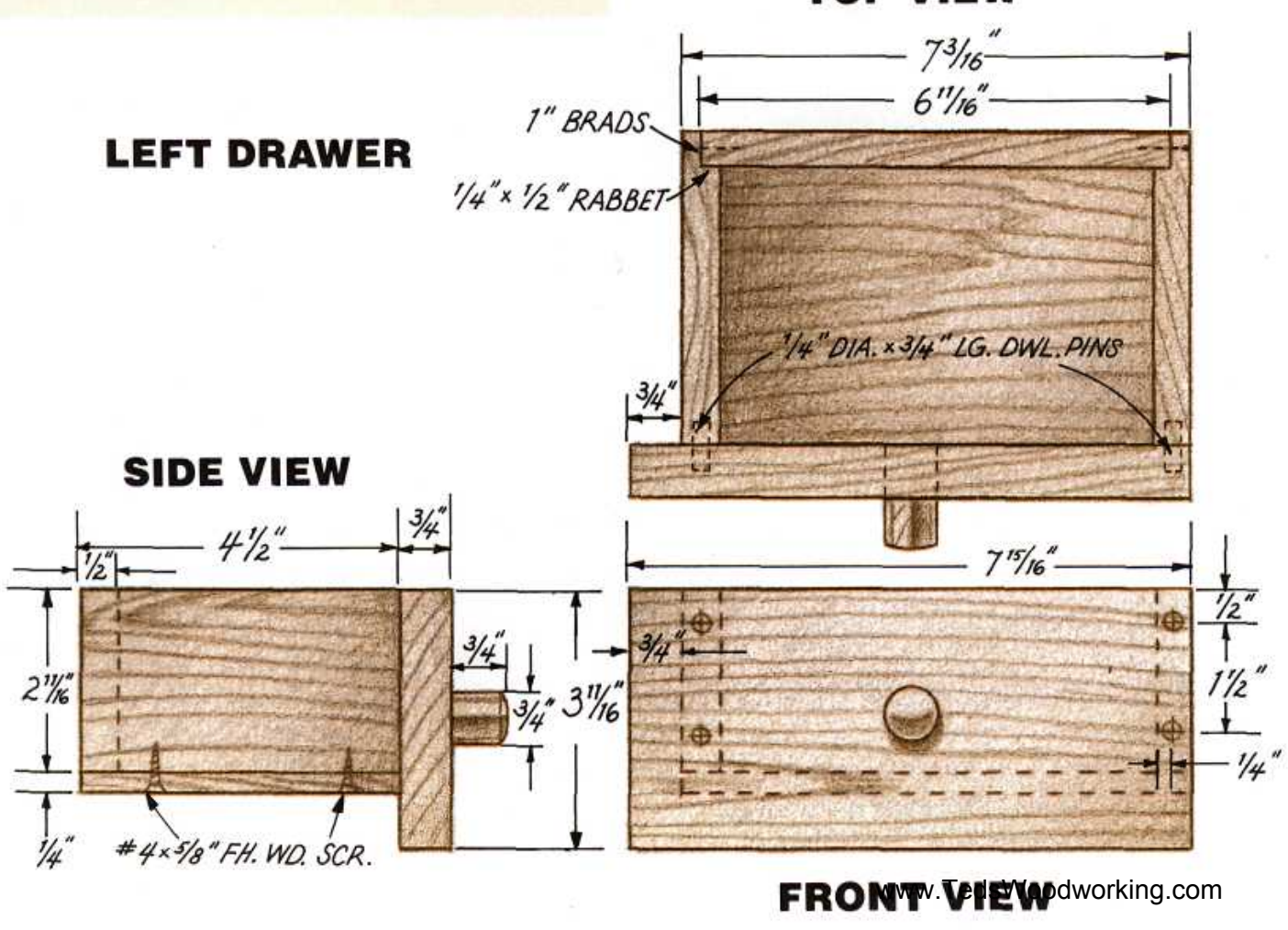
To make an identical set of holes on the second side, mark the front and top edges of the template and make sure the marks line up with the top and front of the second side.

5 Assemble the case. Glue and nail the drawer shelf into the side dadoes and glue and nail the top and bottom into the appropriate rabbets. Make sure that the front edge of the drawer shelf is flush with the front edge of the sides.

Before the glue dries, make sure the cabinet is square. Drop the back in place and secure with 4d finishing nails.

6 Make the drawers. The two drawers are not identical. They are mirror images: The left drawer front overhangs the left side of the drawer cabinet, and the right drawer overhangs the right side.

The drawers are simply built. The sides are attached to the drawer front with dowel pins and rabbeted to accept the back. The drawer bottom is screwed in place below the sides and back.



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To make the drawer, first drill dowel-pin holes in the front edge of the drawer sides as shown in the *Left Drawer, Front View.*

On the table saw, rabbet the sides to accept the back, using a dado blade. When rabbeting, guide the drawer over the blade by using the miter gauge, set at 90 degrees.

Drill the hole for the drawer pull in the center of each drawer front. Insert the drawer pull made from a ¾-inch dowel in the hole and glue in place.

Assemble the drawer. First, attach the sides to the front with dowel pins and glue. Next, glue and nail the back into the rabbets in the sides. Finally, position the bottom, as shown, and screw it to the sides and back.

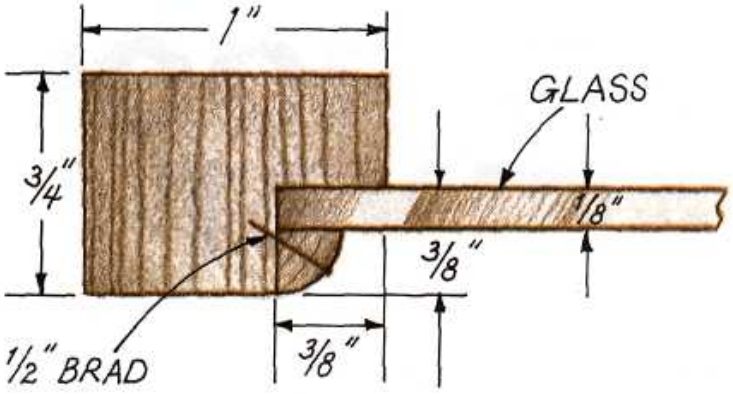
7 Rabbet and miter the door stock to make the door. The door glass sits in a rabbet in the back of the door frame. To cut the rabbet in the door stock, put a ⅜-inch rabbeting bit in the router. Secure the router in a router table and set it to cut a rabbet as shown in the *Door Stock Detail.*

Miter the door stock to make the door. Cut the miters in the stock one piece at a time and check their size against the front edge of the cabinet. Cut all four sides of the door frame.

Apply glue on the mitered ends and then clamp the door together with corner clamps. With the door frame still in the clamps, tack the miters together with 1-inch brads and allow the glue to dry.

The door glass is held in place by a ¼-inch quarter-round molding. Quarter-round molding can be bought from most lumber and hardware stores, or you can make it yourself with a ¼-inch roundover bit and router. Rout the edge of a wide

DOOR STOCK DETAIL



board, then rip the molding from it. To avoid kickback, set up the cut so the molding is on the side of the blade farthest from the fence. Miter the molding to fit the rabbeted back of the door.

8 Hang the door. With the hinge as your guide, mark and cut the hinge mortises in the front edge of the cabinet and the back of the door as shown in the *Front View.* You can cut the mortises with a chisel or a router and straight bit. Each mortise should take up an equal amount of the closed thickness of the hinge. Make sure that with the hinge in place the door sits flush against the cabinet.

Mark and predrill holes for the hinge screws, then hang the door.

For more information on mortising, see "Hinge Mortises" on page 7.

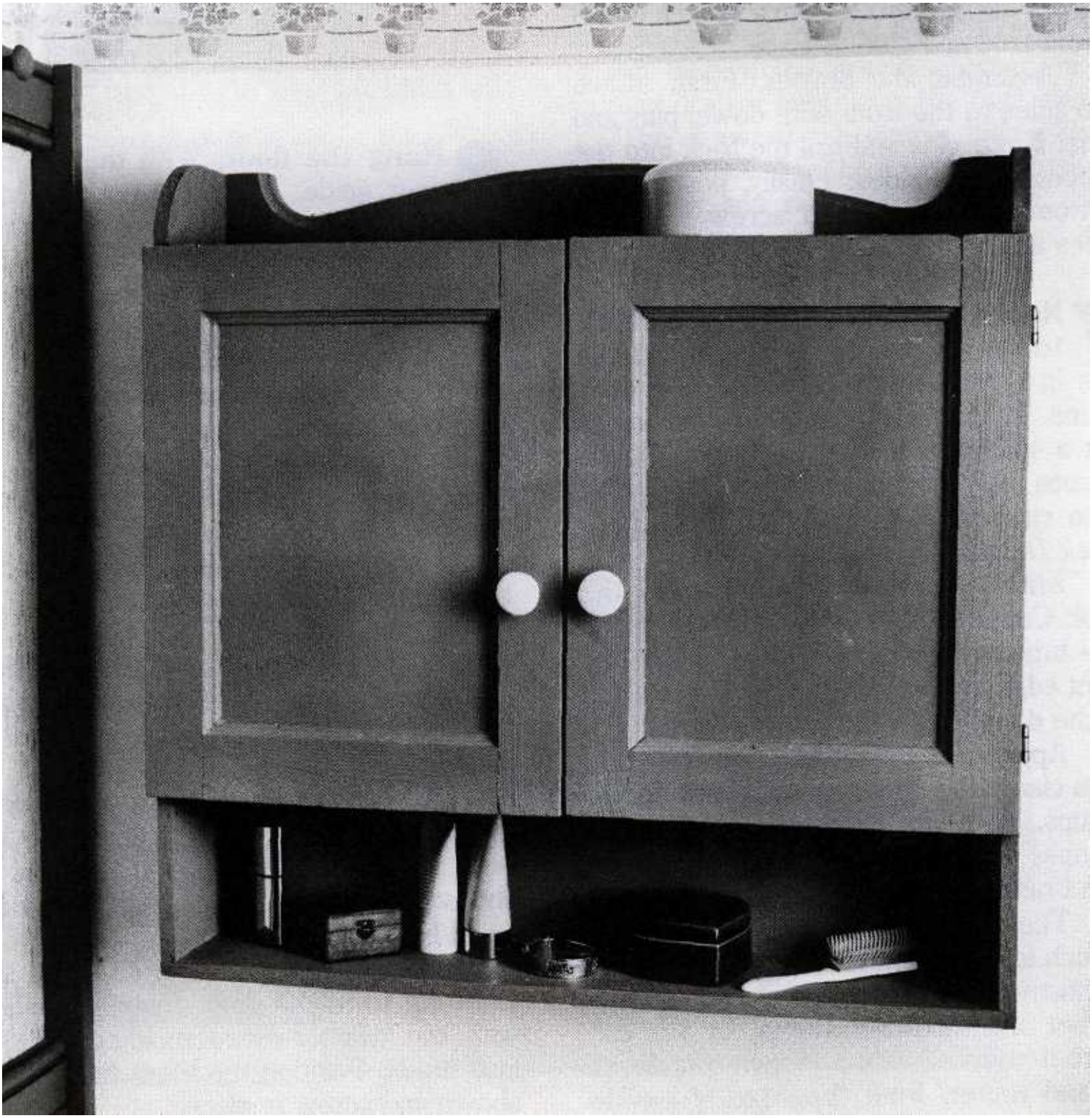
9 Apply the finish and install the glass. Finish sand the cabinet and soften the sharp edges. Round the door pulls with sandpaper.

The cabinet shown has a clear finish, but you can finish yours in any way that best fits your decor. You may want to choose a finish that will accent the objects you'll be displaying.

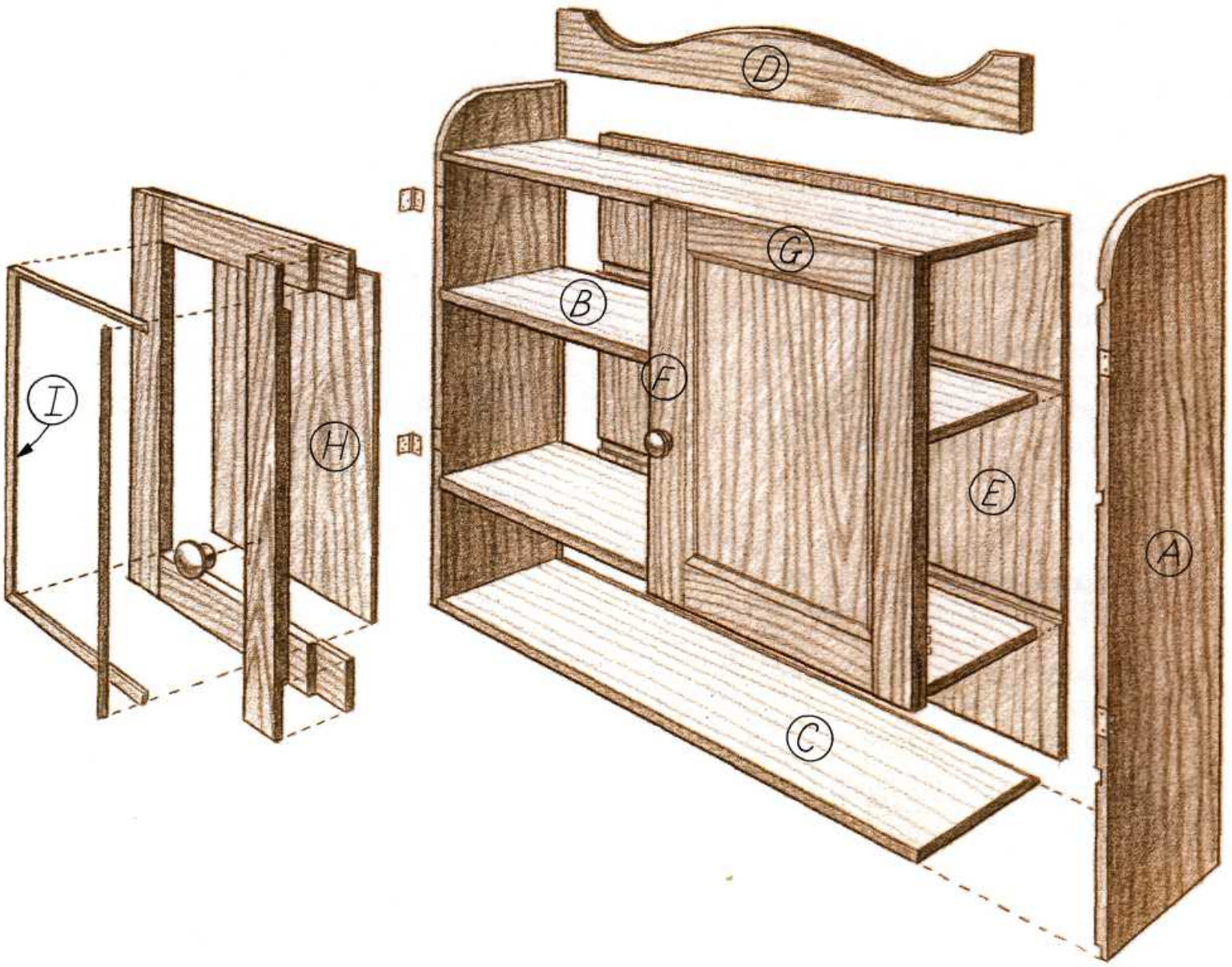
When the finish has dried, have the glass cut to fit the door. Install the glass with the quarter-round molding and ½-inch brads. Position the brass hangers as shown and screw in place.

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BATHROOM CABINET



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EXPLODED VIEW

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1 Select the stock and cut the carcase parts. Joint, plane, rip, and cut the sides, shelves, and bottom to the sizes given in the Cutting List. Cut a 3-inch radius on the top front of each side on the band saw as shown in the *Side View.* Sand the sawed surfaces smooth. Lay out the sides as shown in the *Side View.*

2 Dado the sides. Cut the dadoes with the dado cutter on your table saw or radial arm saw. On the radial arm saw, align the bottoms of the two sides and dado both in one pass. On the table saw, dado one side at a time. Guide the cuts with the miter gauge, using the fence as a stop. Cut a dado on each side before readjusting the fence. On either saw, rabbet for the bottom using the same dado blade setup. Clamp a wooden auxiliary fence to the table saw fence to protect it from the cutter.

SHOP TIP: Cut sample dadoes in a piece of scrap. Adjust the width of the dado cutter by slipping washers made of paper over the saw arbor between the saw blades.

3 Rabbet for the back and hanging rail. The sides are rabbeted in back for the hanging rail and the back. Because the rail is thicker than the back, the rabbet changes from ¾ inch at top to ¼ inch below.

Cut a ¼-inch rabbet along the entire length of the back first. Then rout a ¾-inch rabbet to house the hanging rail. Make both cuts with the same setup on the router table: Put a ¾-inch straight bit in the router and set it to cut a groove ¼ inch deep. Adjust the fence to adjust the width of cut.

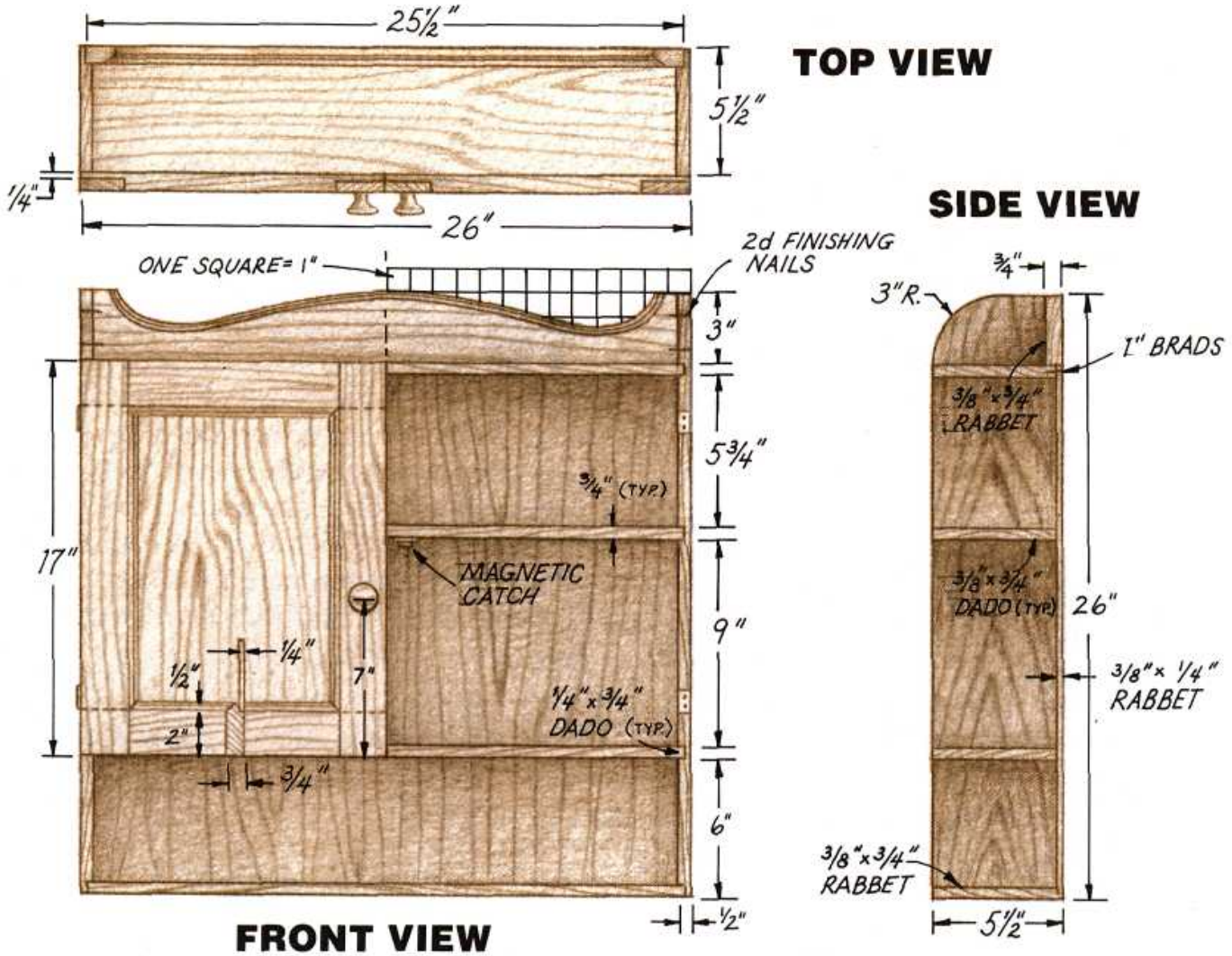
CUTTING LIST

Part	Quantity	Dimension	Comment
A. Sides	2	½″ × 5½″ × 26″	
B. Shelves	3	½″ × 5¼″ × 25½″	
C. Bottom	1	½″ × 5½″ × 25½″	
D. Hanging rail	1	¾″ × 3″ × 25½″	
E. Back	1	¼″ × 23″ × 26″	
F. Door stiles	4	¾″ × 2″ × 17¼″	Cut to fit.
G. Door rails	4	¾″ × 2″ × 13¼″	Cut to fit.
H. Door panels	2	¼″ × 10″ × 14″	Cut to fit.
I. Door trim	1	¼″ × ¼″ × 90″	Miter to fit.

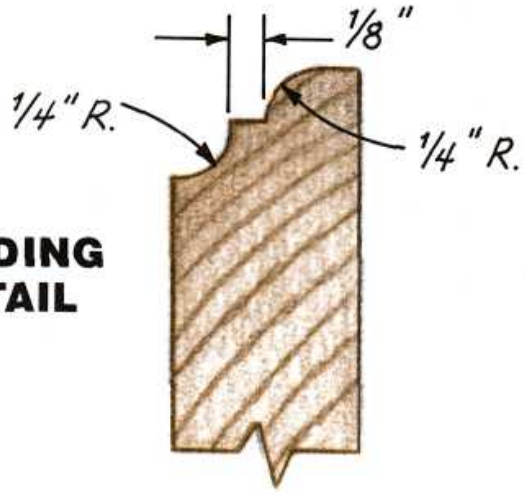
Hardware

4 1 × 1-in. butt hinges
2 1¼-in. porcelain knobs
6 2d finishing nails
12 1-in. brads.
2 small magnetic door catches

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4 Shape the hanging rail. Draw a 1-inch grid on a piece of paper and draw the hanging rail pattern onto it. Transfer the pattern to one end of the rail, flip it over, and transfer it to the other. Cut the curves. Sand out any saw marks. Rout the molding to the profile shown in the *Molding Detail* with a cove and bead bit with a ball bearing pilot.



MOLDING DETAIL

5 Assemble the cabinet. Test fit the cabinet parts and check for square and snug-fitting joints. Make any necessary adjustments.

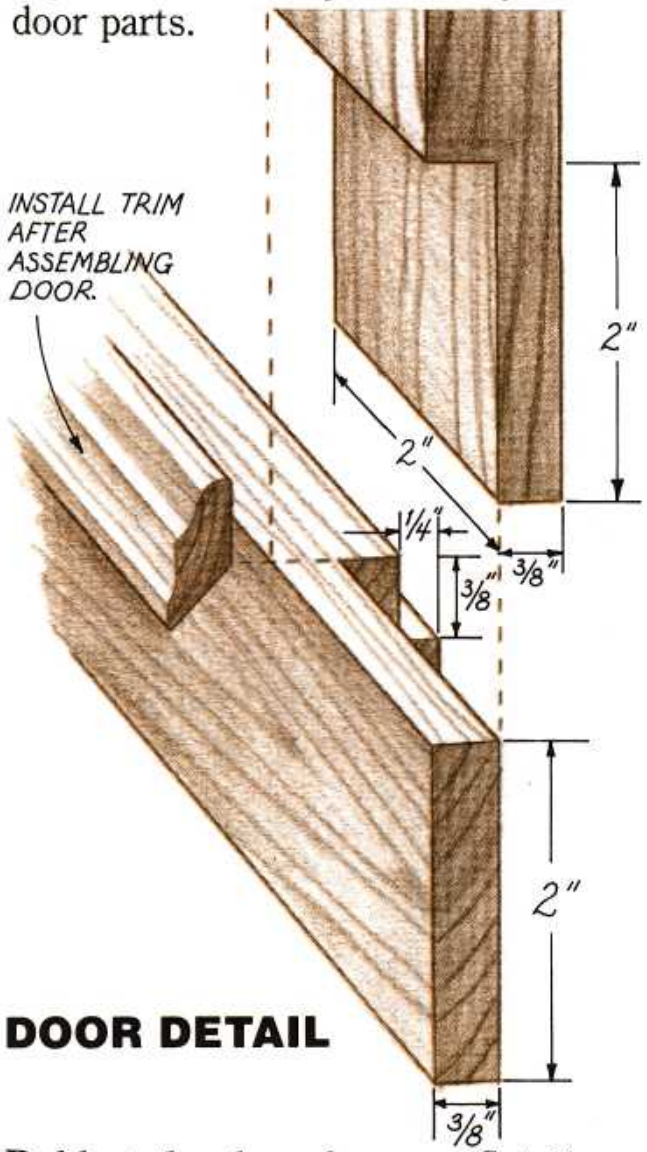
Put glue in the dadoes and bottom rabbets. Make sure the top of the hanging rail is flush with the sides and clamp the cabinet together. Check to make sure the cabinet is square. When the glue is dry, nail the hanging rail to the sides with 2d finishing nails.

6 Install the back. Measure the opening for the back and cut the back to fit. Apply glue to the back rabbet. Put the back in position and nail it in place with 1-inch brads on each side.

7 Make the door stiles and rails. Cut the rails and stiles to fit the cabinet. Each rail is half as long as the cabinet

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is wide. The stiles must be long enough to cover the bottom and top shelves as shown in the *Front View.* Set the dado blade on the table saw or radial arm saw to cut a half-lap joint on each piece as shown in the *Door Detail.* Test the depth and width of the cut on a piece of scrap and adjust as necessary. Cut the joints on the door parts.

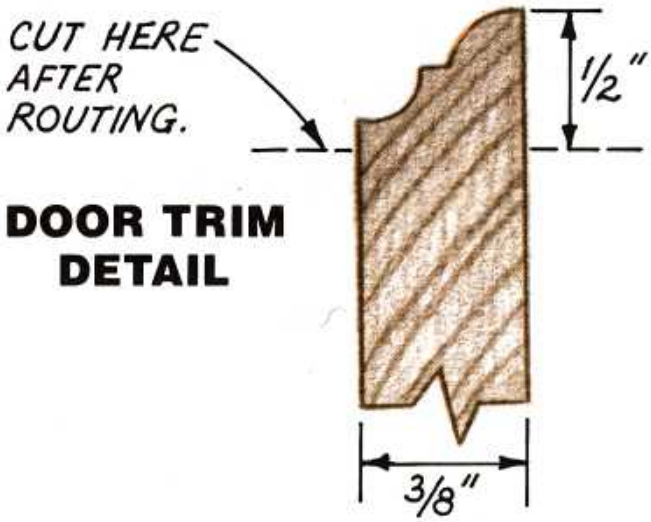


DOOR DETAIL

8 Rabbet the door frames. Cut ¼ × ⅜-inch rabbets for the plywood panels as shown in the *Door Detail.* To cut the rabbets, put a straight bit in the router. Secure the router in a router table and adjust the fence to get the appropriate size cut.

9 Assemble the door frames. Glue and clamp the doors together. Make sure the doors are square before the glue sets. Cut the panels to fit snugly in the frames. Glue and clamp them into place.

10 Install the door trim. Rout a piece of scrap to the profile shown in the *Door Trim Detail.* Rip the molded edge from the scrap on the table saw to produce the door trim. When you rip the scrap, adjust the fence so that the trim is to the left of the saw blade rather than between the fence and the blade. Miter the trim to fit inside the door frame and glue it to the front of the door.



DOOR TRIM DETAIL

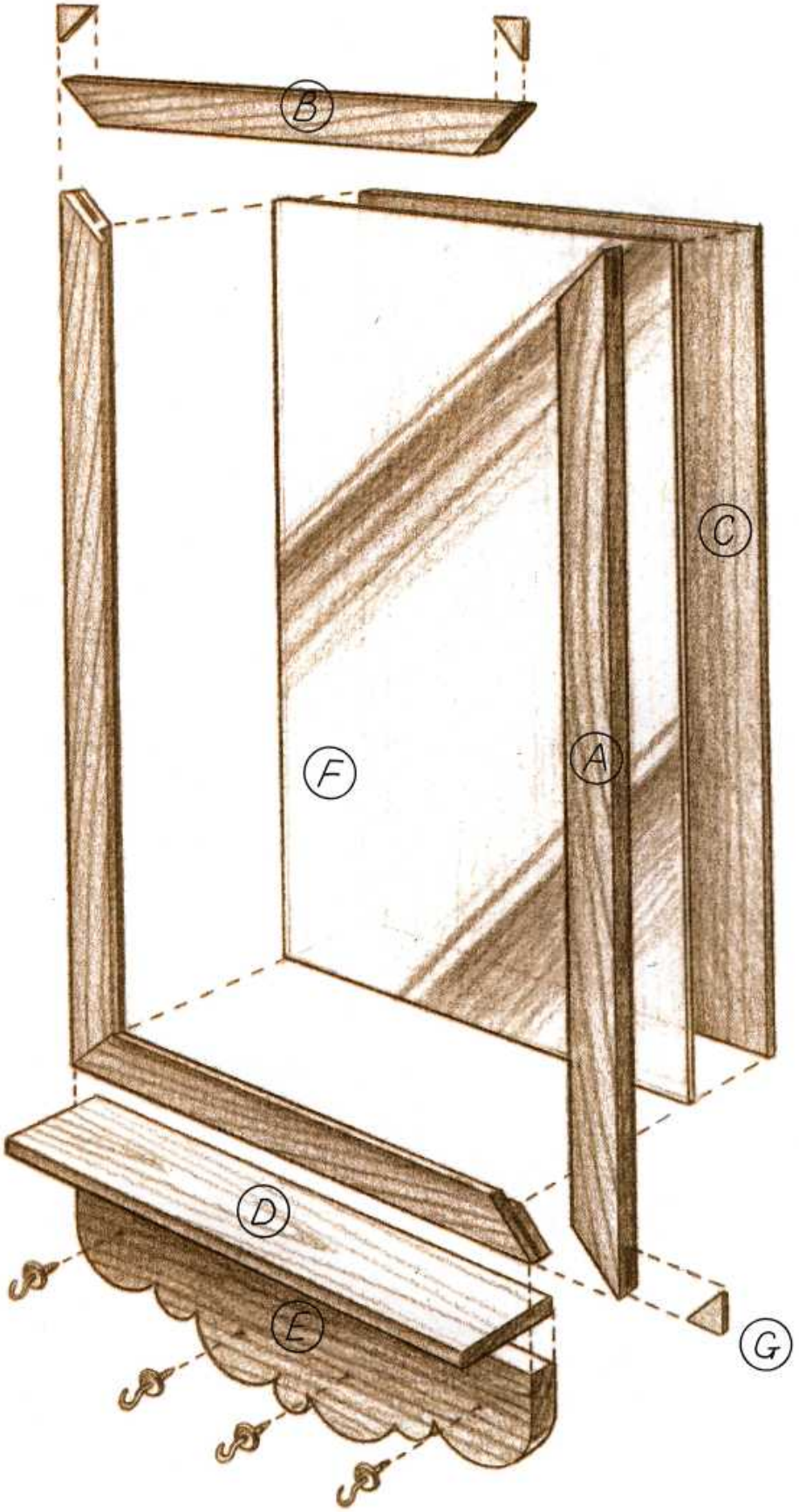
11 Hang the doors and install the knobs. Mortise each door for the butt hinges and hang the door, as explained in "Hinge Mortises" on page 7. Drill holes for the knobs and screw them in place.

12 Apply finish. Finish sand the entire piece. Apply stain, if you wish. For a finish that will resist moisture, apply spar varnish. When the finish is dry, attach the magnetic door catches below the middle shelf.

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HALL MIRROR





EXPLODED VIEW

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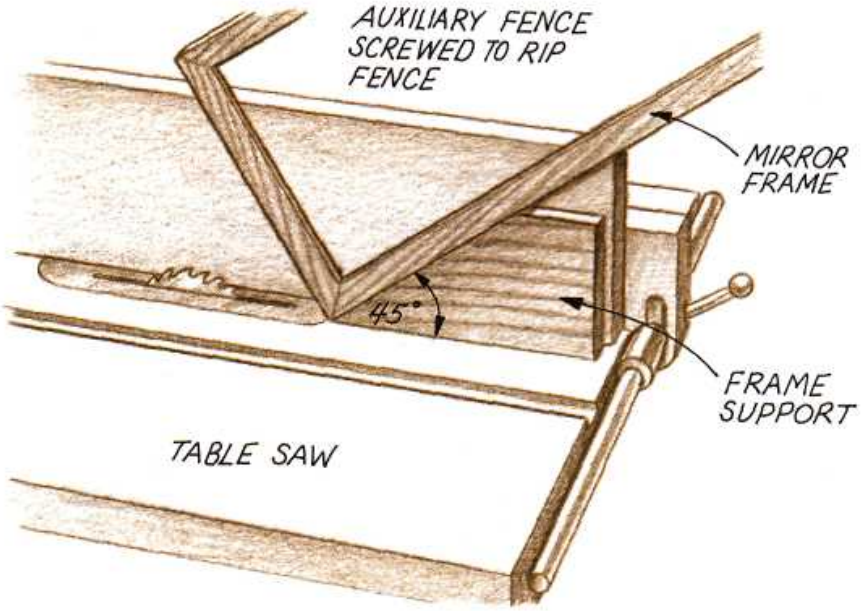
1 Select the stock and cut the parts. The mirror shown is made from pine. You can build your hall mirror from any wood you may have on hand. Choose straight, flat stock. Joint, plane, rip, and cut the parts to the sizes given in the Cutting List.

2 Cut a rabbet in the frame stock. The mirror glass sets in a ⅜ × ⅜-inch rabbet in the back of the frame. Put a ⅜-inch straight bit or a ⅜-inch rabbeting bit in your router. Secue the router in a router table and cut the rabbet.

3 Miter the frame. Cut the frame miters on your table saw. Guide the frame stock as you miter with your miter gauge set at 45 degrees. Cut the sides, top, and bottom to length as you cut the miters on each end.

4 Assemble the frame. On a flat surface, glue and clamp the mirror frame together and make sure that the frame is square. The frame is square if the diagonal corner-to-corner measurements are equal. To strengthen the miters, predrill and brad the miters together as shown in the *Front View.*

SPLINED MITER DETAIL

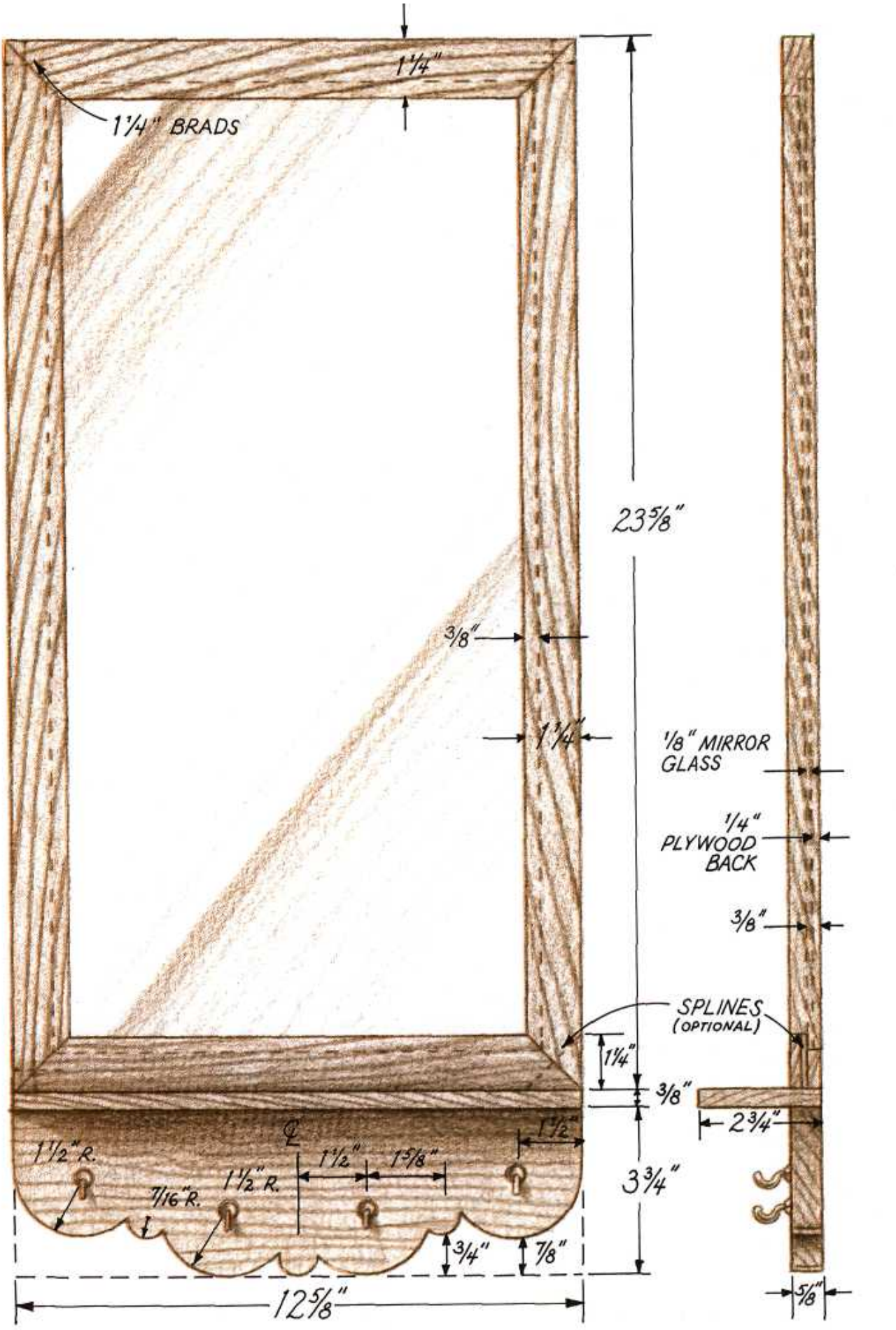


SHOP TIP: For extra-strong miter joints, glue splines in the corners instead of using nails. Cut the spline joints on the table saw after the frame has been glued and is completely dry.

First, lay out a spline on one corner of the frame as shown in the *Front View* and *Side View.* With the table saw miter gauge, cut a 45-degree angle on the end of a ¾ × 8 × 12-inch scrap of plywood. This is your frame support. Screw or clamp an auxiliary 12 × 24-inch plywood fence on the table saw fence. Raise the saw blade the depth of the spline cut. Put the frame support block against the auxiliary fence and put the mirror frame against the support block as shown in the *Splined Miter Detail.* Adjust the saw fence until the spline layout aligns with the blade and lock the fence. Hold the frame firmly and push the frame and frame support piece completely through the blade to cut the spline slot. Turn the frame and cut the spline slot on each corner.

Next, rip a spline from some scrap wood to the thickness of the spline slot. The spline should slip snugly into the slot cut for it. Glue each spline in its slot and squeeze the frame against the spline with a C-clamp. When the glue has dried, trim the spline flush with the mirror frame with a sharp chisel or hand plane.

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FRONT VIEW

SIDE VIEW

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5 Attach the shelf to the frame. Glue and clamp the shelf to the bottom of the frame. Clean up any excess glue.

6 Cut the hanging board to shape. With a compass, lay out the pattern on the bottom of the hanging board as shown in the *Front View.* Cut out the shape on the band saw. Clean up the sawed edge with files and sandpaper.

7 Drill holes for the hanging hooks. Lay out the hooks and drill holes for them that are slightly smaller than their threaded shank.

8 Attach the hanging board. Glue and clamp the hanging board to the bottom of the mirror shelf. Sand the mirror frame, frame back, shelf, and hanging board.

9 Apply the finish and add the mirror glass and hooks. After sanding, stain and varnish or paint the assembly to complement your decor. When the finish is dry, install the mirror glass. Cut your own mirror glass, or have a local glass shop cut it to size for you. Glue or nail the plywood backing in place. Screw four brass cup hooks into the predrilled holes.

10 Hang your hall mirror. Your local hardware store will have several options for hanging hardware. One of the simplest ways to hang the mirror is to screw two #8 × ¾-inch roundhead wood screws into the back of the frame, and stretch a stout wire between them. Then hang the mirror as you would a picture.

CUTTING LIST

Part	Quantity	Dimension	Comment
A. Sides	2	⅝″ × 1¼″ × 23⅝″	Cut top, bottom, and sides from one 80″ piece.
B. Top/bottom	2	⅝″ × 1¼″ × 12⅝″	
C. Mirror back	1	¼″ × 10⅞″ × 21⅞″	Plywood
D. Shelf	1	⅜″ × 2¾″ × 12⅝″	
E. Hanging board	1	⅝″ × 3¾″ × 12⅝″	
F. Mirror glass	1	⅛″ × 10¾″ × 21¾″	
G. Splines	4	⅛″ × 1¼″ × 1¼″	Optional

Hardware

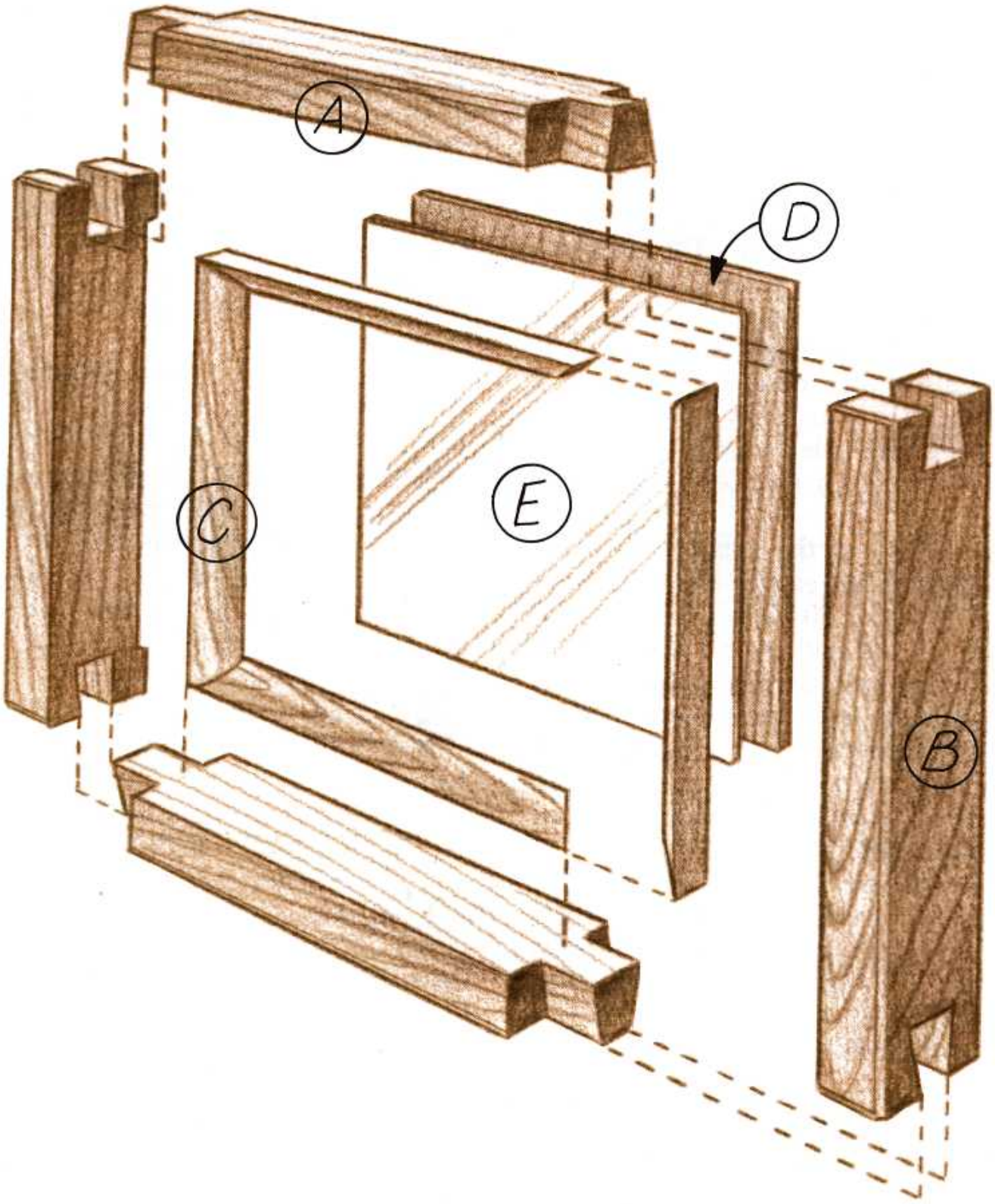
4 ⅞-in.-long brass cup hooks
8 1¼-in. brads

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DOVETAIL MIRROR



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EXPLODED VIEW

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1 Select the stock and cut the parts. Make your frame from any knot-free hardwood or softwood stock. Quarter-round molding is available from most lumber suppliers, but another ¾-inch molding could be substituted. Joint, plane, rip, and cut the parts to the sizes given in the Cutting List.

2 Cut the dovetail joints. Dovetail joints are made up of pins and tails. In the case of this frame, there is a single pin on each end of the rails. The pin slides between two tails on the stiles. If you are inexperienced at cutting dovetails, cut some practice dovetails before cutting them in the mirror frame.

First, set a marking gauge to the thickness of the rails and stiles and scribe a line around each end of the rails and stiles.

Next, lay out the pins, as shown in the *Side View,* on each end of the rails. Set a T-bevel to 80 degrees and lay out the pins on the end grain. Transfer the lines to the faces of the board with a square. Clearly mark the waste and cut it away with a dovetail saw or band saw.

When the pins have been cut, lay out the tails directly from the pins. Put the rails and stiles together as if to form a corner of the mirror. Trace around the pins to lay out one face of the tails. To lay out the second face, first transfer the lines across the end grain with a square and a sharp knife. Transfer the lines onto the second face with a sliding T-bevel set to the angles on the first face.

Put the stiles in a vise and cut down along the layout lines to the scribe lines with a dovetail saw. Stay to the outside of the layout lines. Chisel out the waste. Test fit the joints and pare the pins to fit, if necessary.

For more on cutting dovetails, see "Dovetailing" on page 42.

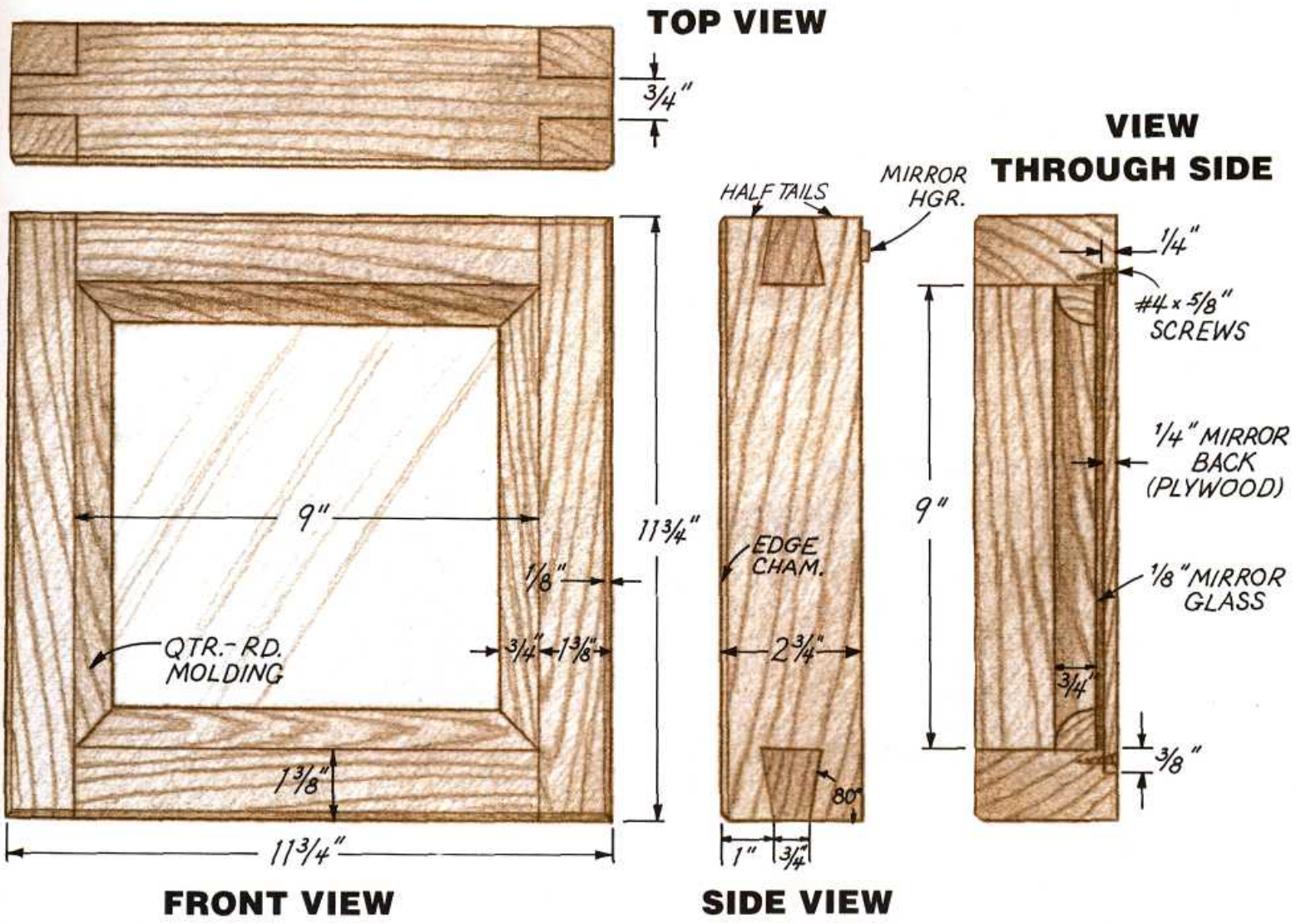
3 Glue the frame together. Glue and clamp the dovetail joints of the frame together on a flat surface. Measure across the corners to make sure the frame is square. Clean up any excess glue and allow the joints to dry.

4 Cut the rabbet. The mirror back fits within a rabbet routed in the back

CUTTING LIST

Part	Quantity	Dimension	Comment
A. Frame rails	2	1⅜" × 2¾" × 11¾"	
B. Frame stiles	2	1⅜" × 2¾" × 11¾"	
C. Quarter-round stock	1	¾" × ¾" × 40"	Miter to fit.
D. Mirror back	1	¼" × 9¾" × 9¾"	Plywood
E. Mirror glass	1	⅛" × 8⅞" × 8⅞"	
Hardware			
8 #4 × ⅝-in. screws			
1 mirror hanger			

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inside edge of the frame as shown in the *View through Side*. Put a ⅜-inch rabbeting bit with a ball bearing guide in your router. Secure the router in a router table and adjust it to cut a ¼-inch-deep rabbet. Lay the frame flat on the router table over the bit and cut the rabbet by guiding the inside edge of the frame against the bit's bearing. Use a push stick and keep your hands well away from the cutter. Square the corners with a chisel.

5 Chamfer the outside edges. Put a chamfering bit in the router. Secure router in the router table and cut a ⅛-inch-wide chamfer on the outside edges of the mirror frame.

6 Miter the quarter-round stock. If you're not using ready-made quarter-round stock, you can make your own with a router and a router table. Guide the cut along a fence and shape the edge of a wide piece of stock with a ¾-inch-radius roundover bit. On the table saw, rip off the roundover stock. Set up the fence so the roundover edge is to the left of the blade rather than between the blade and the fence.

Once you have the stock, cut some test miters. Set your table saw blade to 45 degrees and cut the miters in some scrap. Put the test miters together and make sure that the resulting angle equals 90 degrees. Adjust the blade angle as nec-

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essary and miter the quarter-round stock to fit inside the mirror frame as shown in the *Front View.*

7 Glue the quarter-round stock to the frame. Adjust a marking gauge to scribe a line ⅛ inch from the rabbet on the inside of the frame. Scribe the line and glue and clamp the quarter-round stock just above the line. Clean up any excess glue with a damp cloth.

SHOP TIP: If you need to glue a small molding to an awkward spot, try clamping it with spring clamps. Spring clamps—which look something like large clothes pins—are available at most hardware stores and are an excellent help in an awkward situation. Open the clamp with one hand and set it in place. A plastic coating on the clamp helps protect the wood.

8 Fit the back. Depending on the accuracy of your dovetails, the back may need some adjustment. Test fit the back and trim it, if necessary, on the table saw.

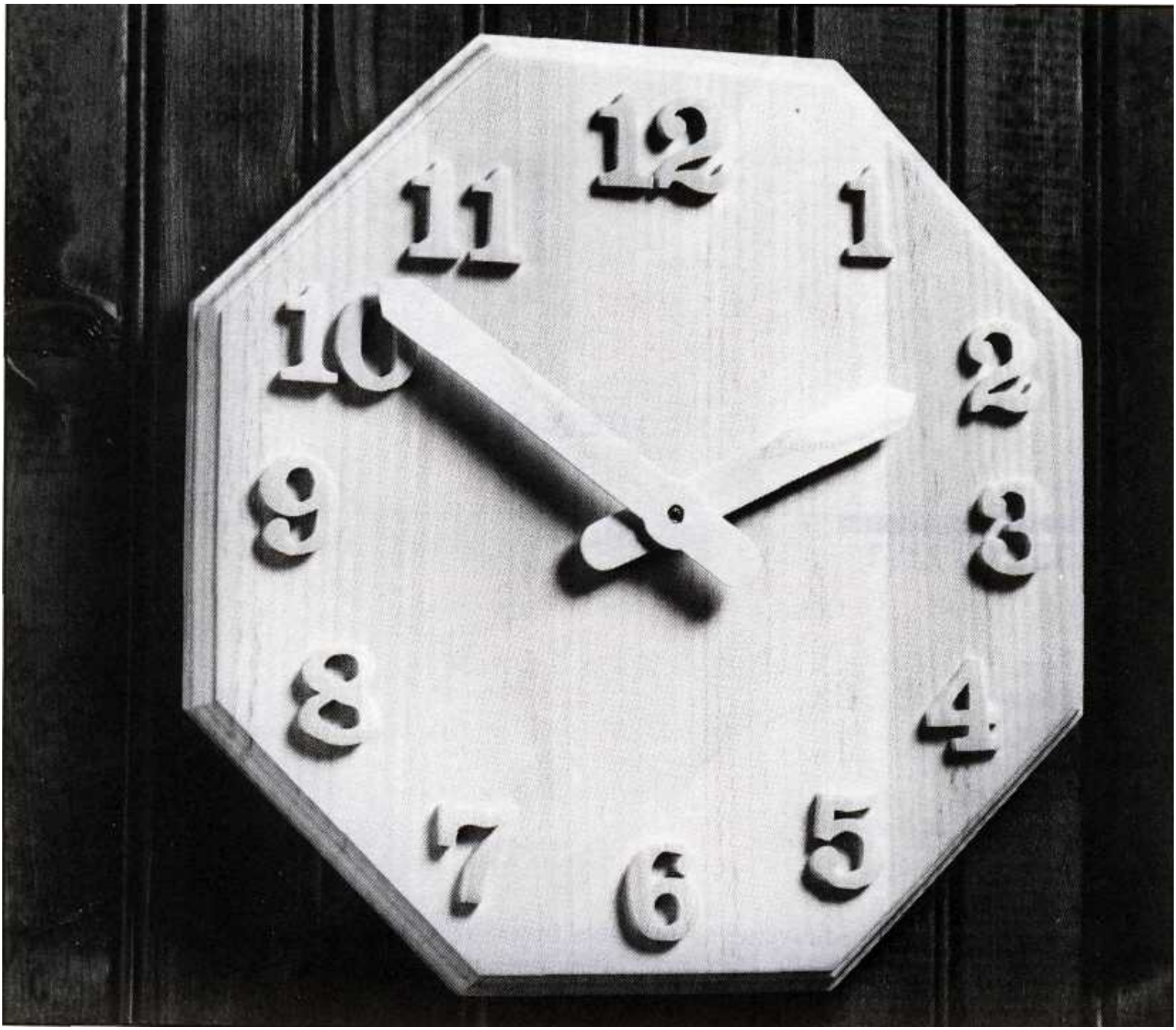
9 Apply the finish and install the mirror glass. Finish sand the mirror frame. Stain and varnish or paint it to match your decor.

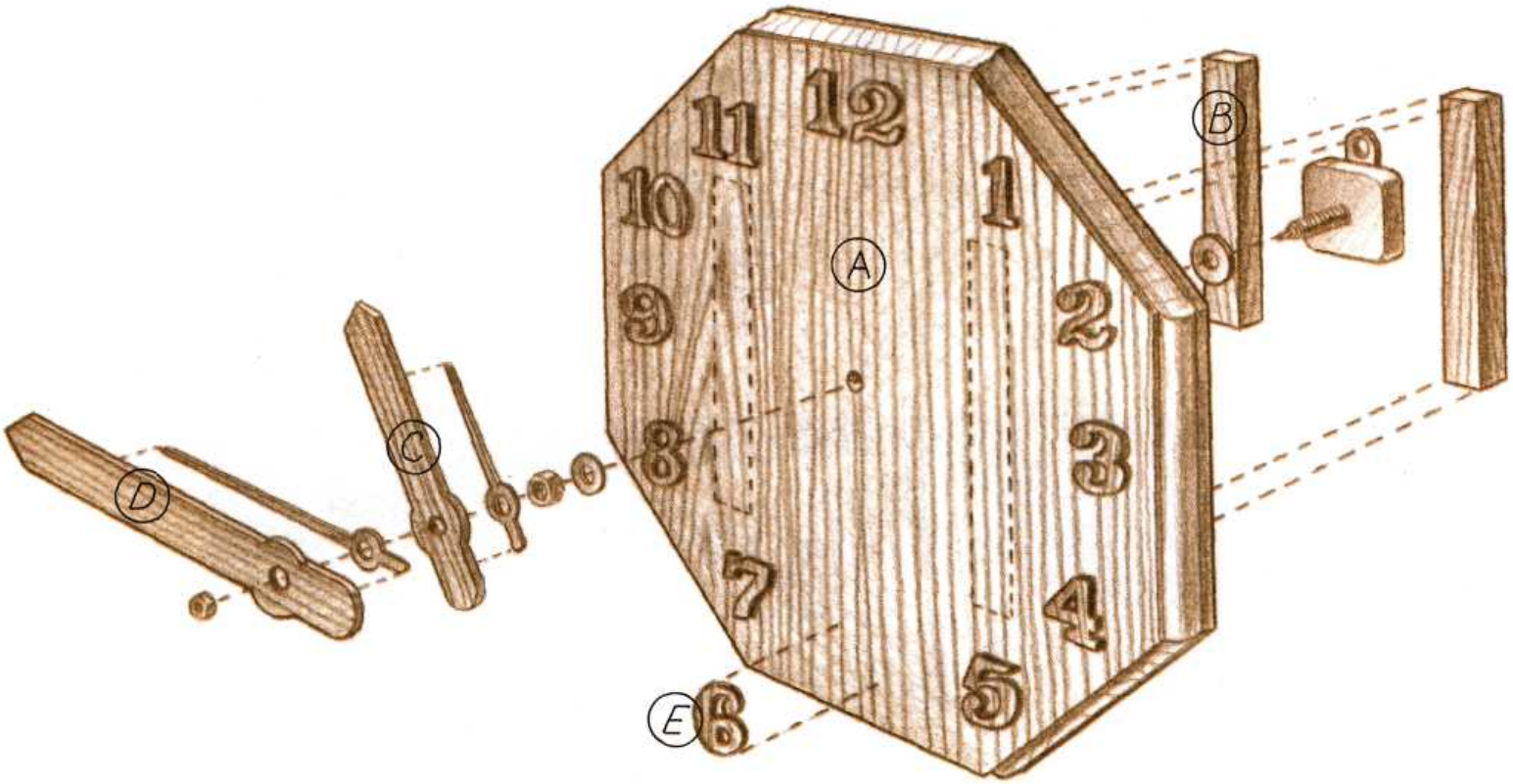
When the finish is dry, put the mirror glass in place in the back of the mirror frame. Set the back in its rabbet and screw it in place with #4 × ⅝-inch screws.

Attach a mirror hanger, which is available at most hardware stores, to the back of the mirror frame and hang your dovetail mirror.

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WALL CLOCK





EXPLODED VIEW

CUTTING LIST

Part	Quantity	Dimension
A. Face	1	¾″ × 14″ × 14″
B. Spacers	2	¾″ × 11/16″ × 7″
C. Hour hand	1	3/32″ × ¾″ × 5¾″
D. Minute hand	1	3/32″ × ¾″ × 7″
E. Numerals	15	⅛″ × 1¼″ × 1¼″

Hardware

6 1¼-in. brads
1 5/8 × 2⅛ × 2⅛-in. movement. Available from Precision Movements, 2024 Chestnut Street, Emmaus, PA 18049. Part #QC24US, extralong shaft.

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1 Select the stock and cut the parts. Choose straight, flat stock for the face. Joint, plane, rip, and cut the parts to the sizes given in the Cutting List. If necessary, glue up stock to get a board wide enough for the face.

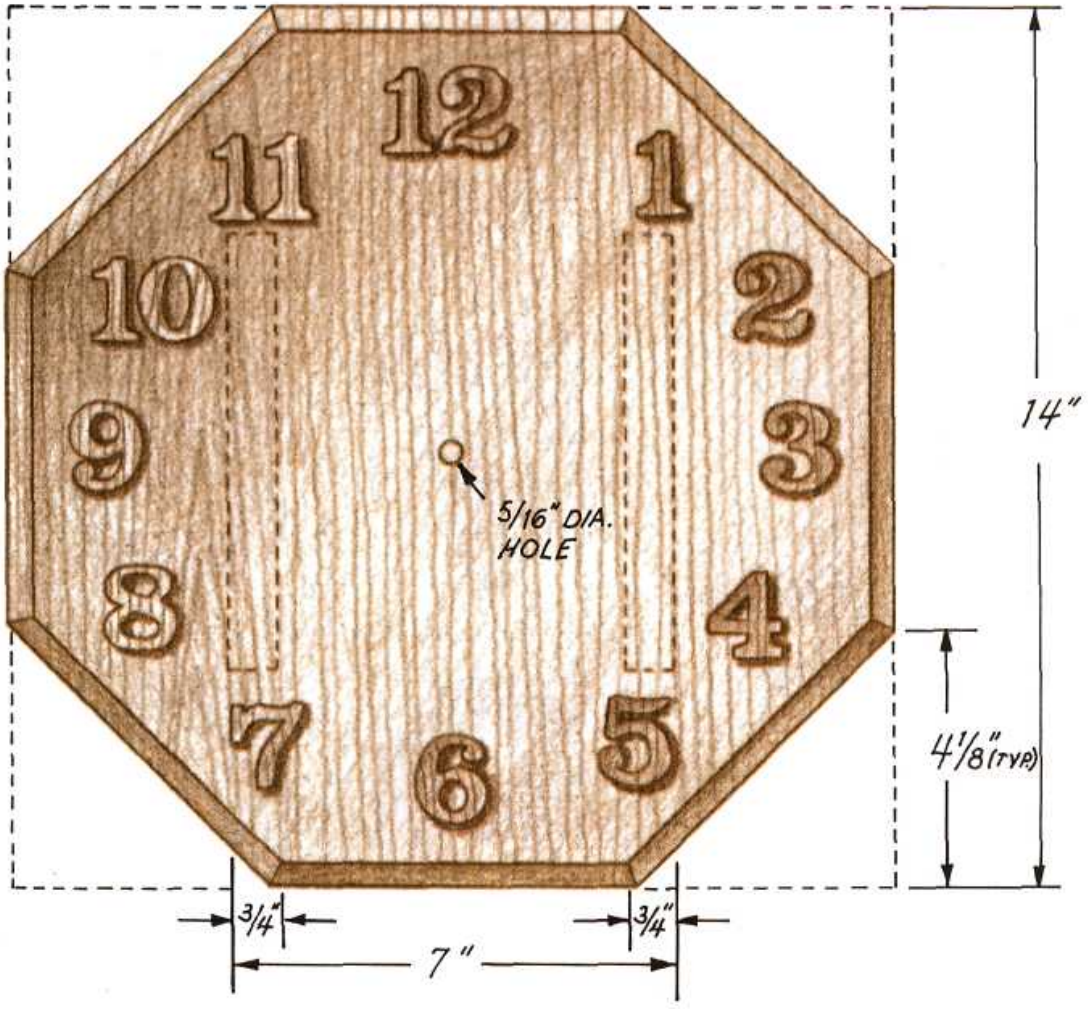
2 Cut the corners off the face to form an octagon. Mark and cut off the corners of the face on your band saw as shown in the *Front View.* Even up the cuts with a block plane or belt sander.

3 Rout the profile on the edge of the face. Put a 5/32-inch-radius Roman ogee bit in your router. Secure the router in a router table and adjust the fence and router height to cut the profile shown in the *Side View.*

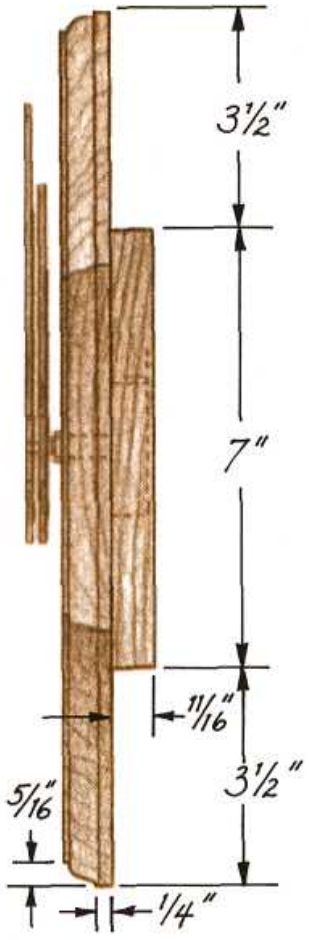
4 Attach the spacers to the back. Glue the spacers to the back of the face as shown. Nail them in place with 1¼-inch brads.

5 Drill the movement shaft hole. Lay out and drill a 5/16-inch-diameter hole for the clock shaft in the center of the face. This hole must be drilled at exactly 90 degrees to the surface for the movement to seat correctly.

FRONT VIEW



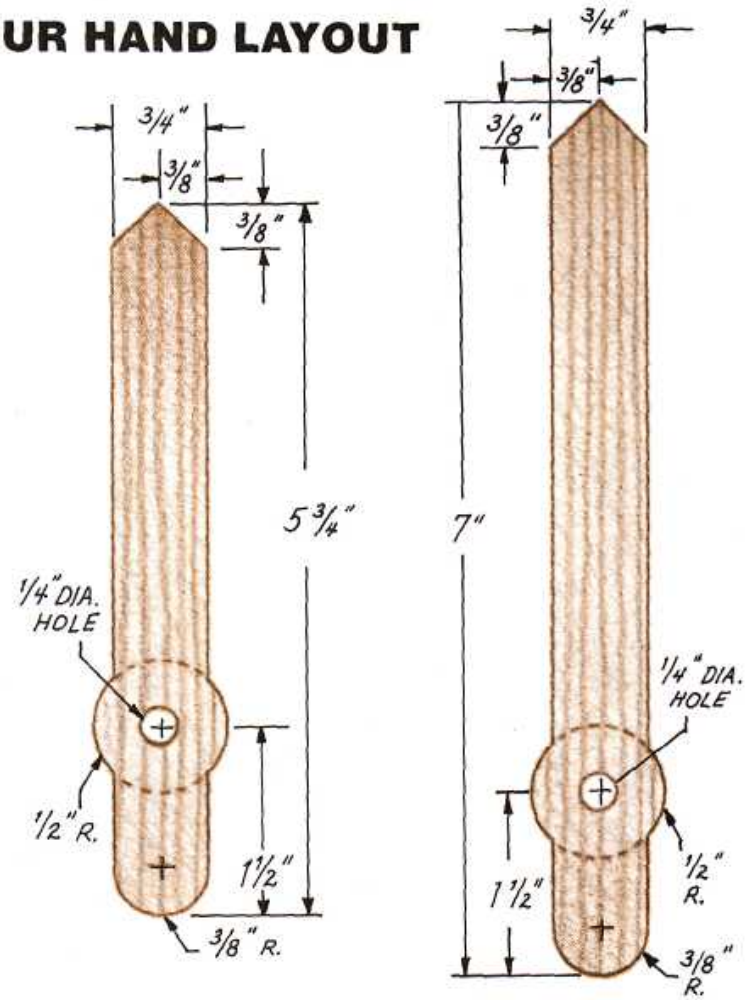
SIDE VIEW



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6 Cut the hands to shape and fasten them to the metal hands. Cut the hour and minute hands on the band saw to the dimensions shown. Sand the sawed edges and drill a ¼-inch-diameter hole in each, as shown. Epoxy the metal hands included with the movement to the back of the wooden hands. Make sure that the shaft holes on the metal hands align with the holes in the wooden hands.

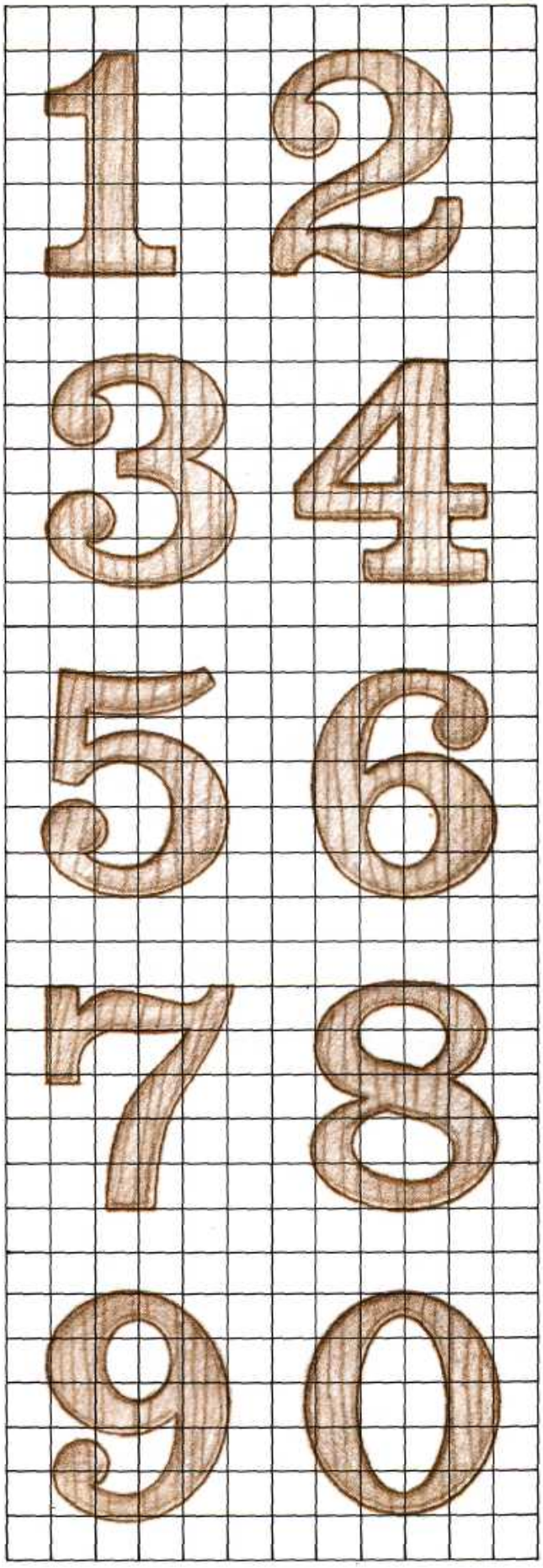
HOUR HAND LAYOUT



MINUTE HAND LAYOUT

7 Cut the numeral shapes and glue them to the face. Draw a ¼-inch grid on a piece of paper and draw the numeral patterns onto it. Transfer the patterns to the wood. Note that you will need five "ones" and two "twos" for a complete set. Cut the numerals on a scroll saw, or by hand with a coping saw.

ONE SQUARE = 1/4" (ACT. SIZE)



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NUMERAL LAYOUT

Sand the sawed edges smooth and glue the numerals in place as shown in the *Front View.*

8 Apply the finish. Finish sand the clock. Because a completely wooden face makes this clock unique, give your clock a clear finish. An oil or a clear lacquer finish would work well.

9 Install the movement. Put the rubber washer over the movement shaft and insert the movement shaft through the shaft hole in the face. The shaft should protrude through the clock face. Put the brass washer over the shaft and lock it in place with the hex nut.

Slip the hour hand onto its shaft. The hour hand is held in place by friction.

Put the minute hand in place on its shaft and lock it in place with the nut provided. Because this nut drops below the surface of the wooden minute hand, you may have to do final tightening with tweezers or needle-nose pliers.

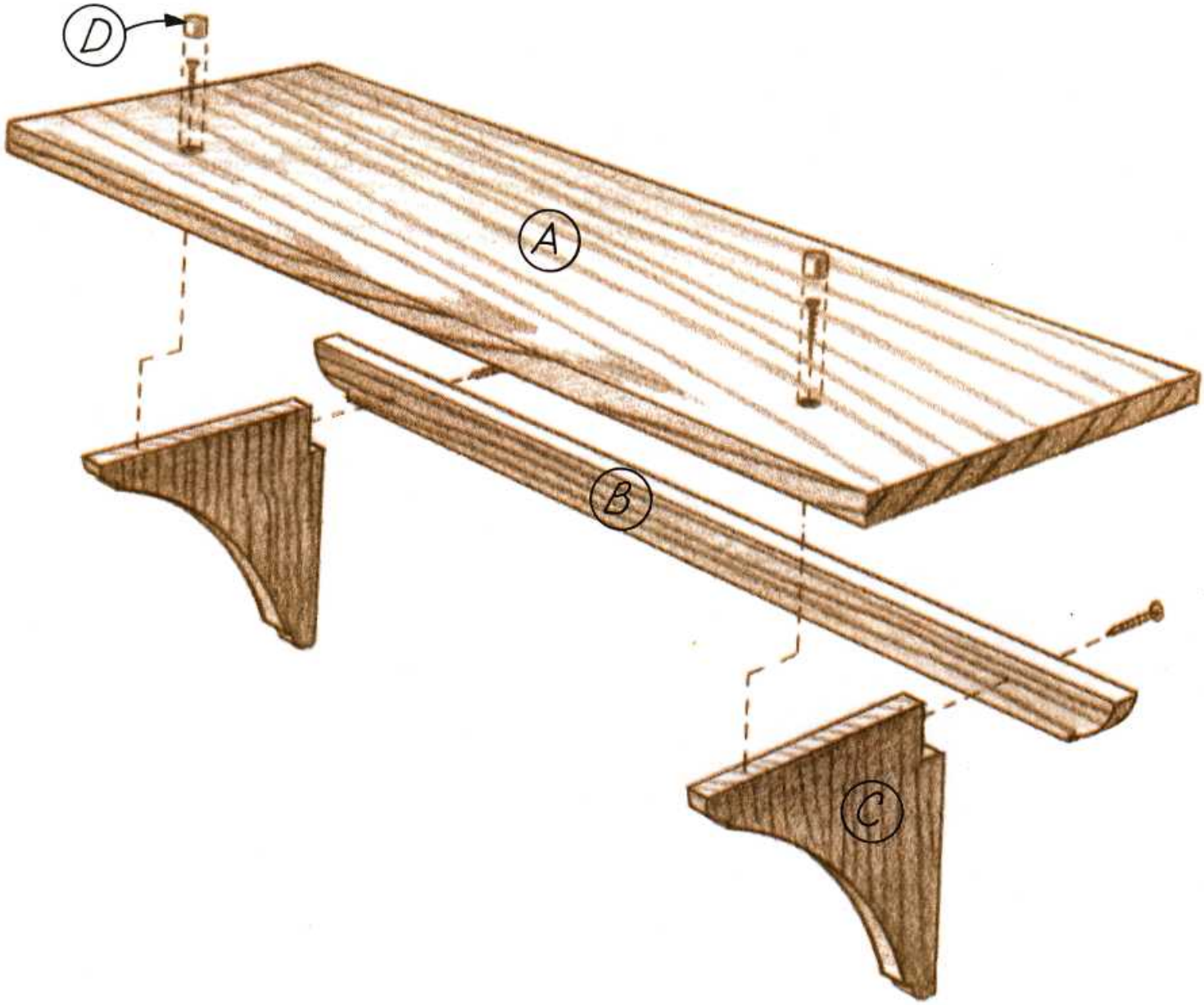
Install the battery, adjust the hands, and hang your clock on the wall.

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BRACKET SHELF



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CUTTING LIST

Part	Quantity	Dimension
A. Shelf	1	¾″ × 9¼″ × 24″
B. Cleat	1	¾″ × 1½″ × 21½″
C. Brackets	2	1⅛″ × 8″ × 8″
D. Plugs	6	⅜″ dia.

Hardware

2 #6 × 1½-in. flathead screws
2 #6 × 1-in. flathead screws
2 #8 × 2-in. flathead screws

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1 Select the stock and cut the parts. Choose straight, flat stock. Joint, plane, rip, and cut the parts to the sizes given in the Cutting List. If you plan to make a longer-than-specified shelf, add an additional bracket for every 24 inches of additional length.

2 Notch the brackets. Cut a notch for the cleat in the corner of each bracket, as shown in the *Side View,* with a backsaw or dovetail saw.

3 Cut the shape in the cleat ends and brackets. Draw a ½-inch grid on a piece of paper and draw the cleat end and bracket patterns on to it. Transfer the patterns to the stock and cut the parts to shape with a band saw or jigsaw. Sand off the kerf marks left by the saw.

SHOP TIP: Because the brackets should have identical profiles, cut both at once. First stack the pieces together and secure by putting double-sided tape between them. Then cut both brackets in one operation.

4 Glue the cleat to the bottom of the shelf. Glue the top edge of the cleat to the bottom of the shelf. Secure with clamps and allow the glue to dry.

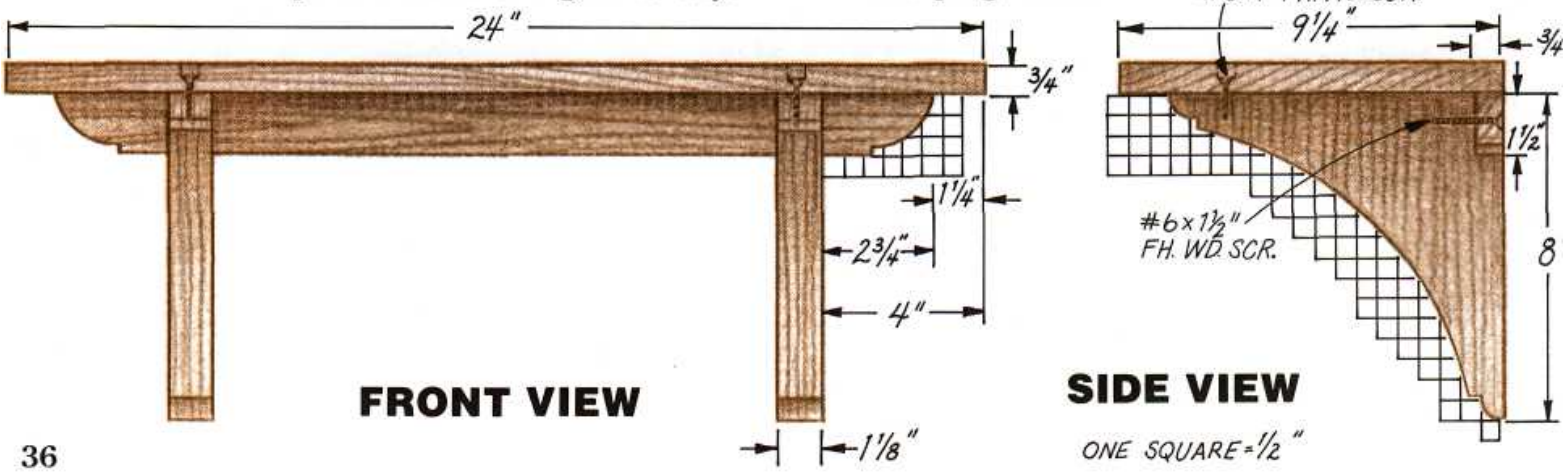
5 Attach the brackets to the cleats and shelf. Glue and screw the brackets to the cleat. Screw, but do not glue, the brackets to the shelf.

SHOP TIP: Test fit the shelf and drill the screw holes with a combination pilot hole bit. These bits drill a hole for the plug, a clearance hole for the screw shank, and a slightly smaller pilot hole for the screw threads all in one operation. Pilot hole bits are available at most hardware stores and are sold according to the screw size.

6 Sand and finish the bracket shelf. Plug the screw holes. Sand the shelf and remove excess glue. Sand the plugs flush. You can round the edges of the brackets and shelf with sandpaper to give the shelf an aged appearance.

Apply a finish that will complement your decor.

7 Hang your bracket shelf. Drill clearance and plug holes in the cleat so that you can drive screws through it and into the studs in your wall. (Normally studs are on 16- or 24-inch centers.) Screw the shelf in place. To cover the screws, tap some prefinished plugs into the plug holes.

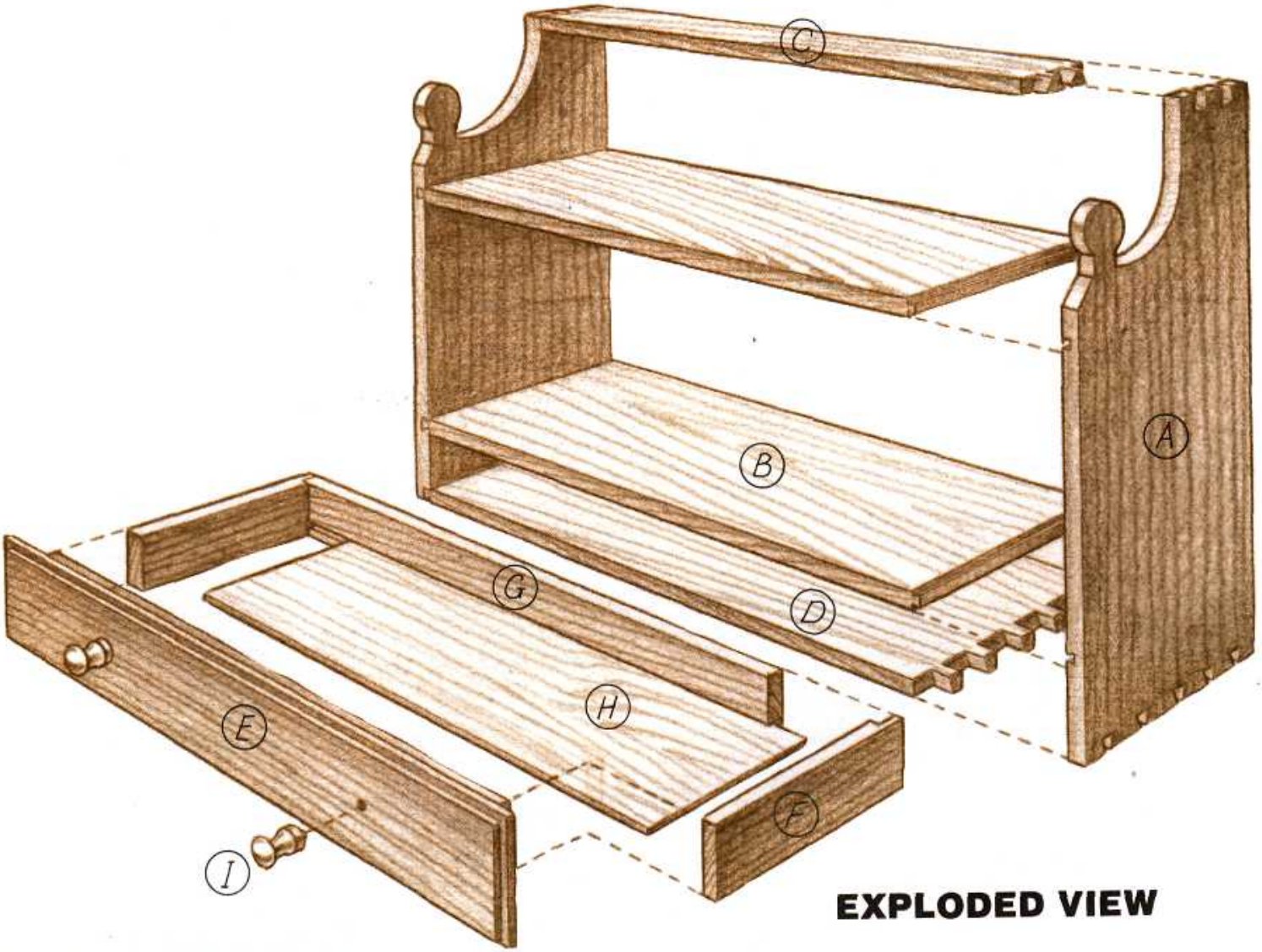


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BOOK-SHELF



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EXPLODED VIEW

CUTTING LIST

Part	Quantity	Dimension	Comment
A. Sides	2	¾″ × 9½″ × 25″	
B. Shelves	2	⅞″ × 9½″ × 26″	
C. Top	1	⅞″ × 3¼″ × 26¾″	
D. Bottom	1	⅞″ × 9½″ × 26¾″	
E. Drawer front	1	1″ × 4½″ × 26¾″	
F. Drawer sides	2	⅝″ × 2 11/16″ × 9″	
G. Drawer back	1	⅝″ × 2 11/16″ × 24⅝″	
H. Drawer bottom	1	¼″ × 8⅜″ × 24⅜″	Plywood
I. Drawer pulls	2	2¾″ × 13/16″ × 13/16″	Cut to length after turning.

Hardware

As needed, 4d coated nails
2 ½ × 2-in. hangers. Available from The Woodworkers' Store, 21801 Industrial Boulevard, Rogers, MN 55374. Part #D3008.

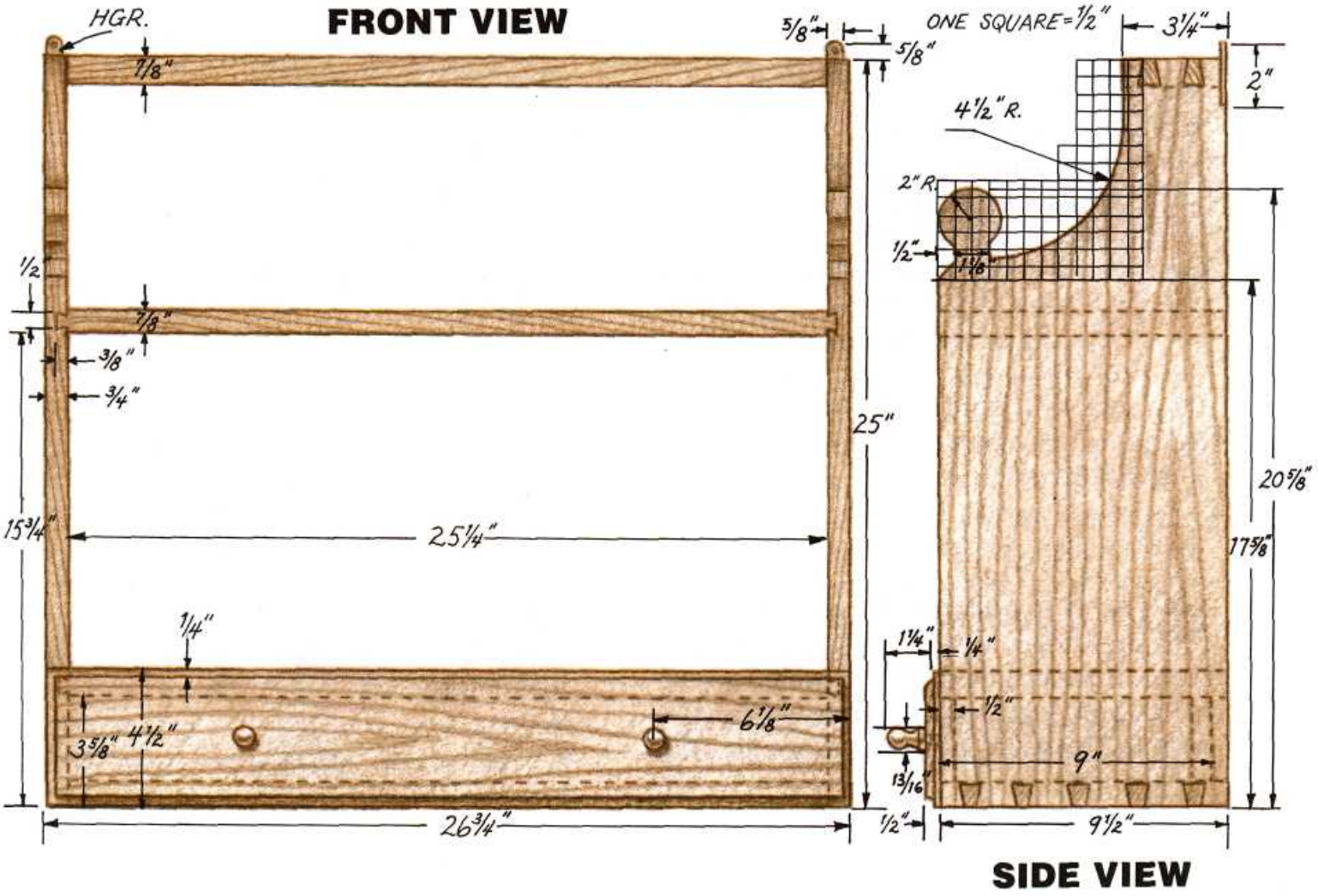
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1 Select the stock and cut the parts. You can build these shelves out of almost any wood. Softwoods such as pine or fir are fine. If you choose to build the bookcase out of hardwood, good choices are red or white oak, cherry, maple, walnut, or mahogany. Choose lumber that is relatively free of knots. If you wish, select a less-expensive wood such as poplar for the drawer sides and back.

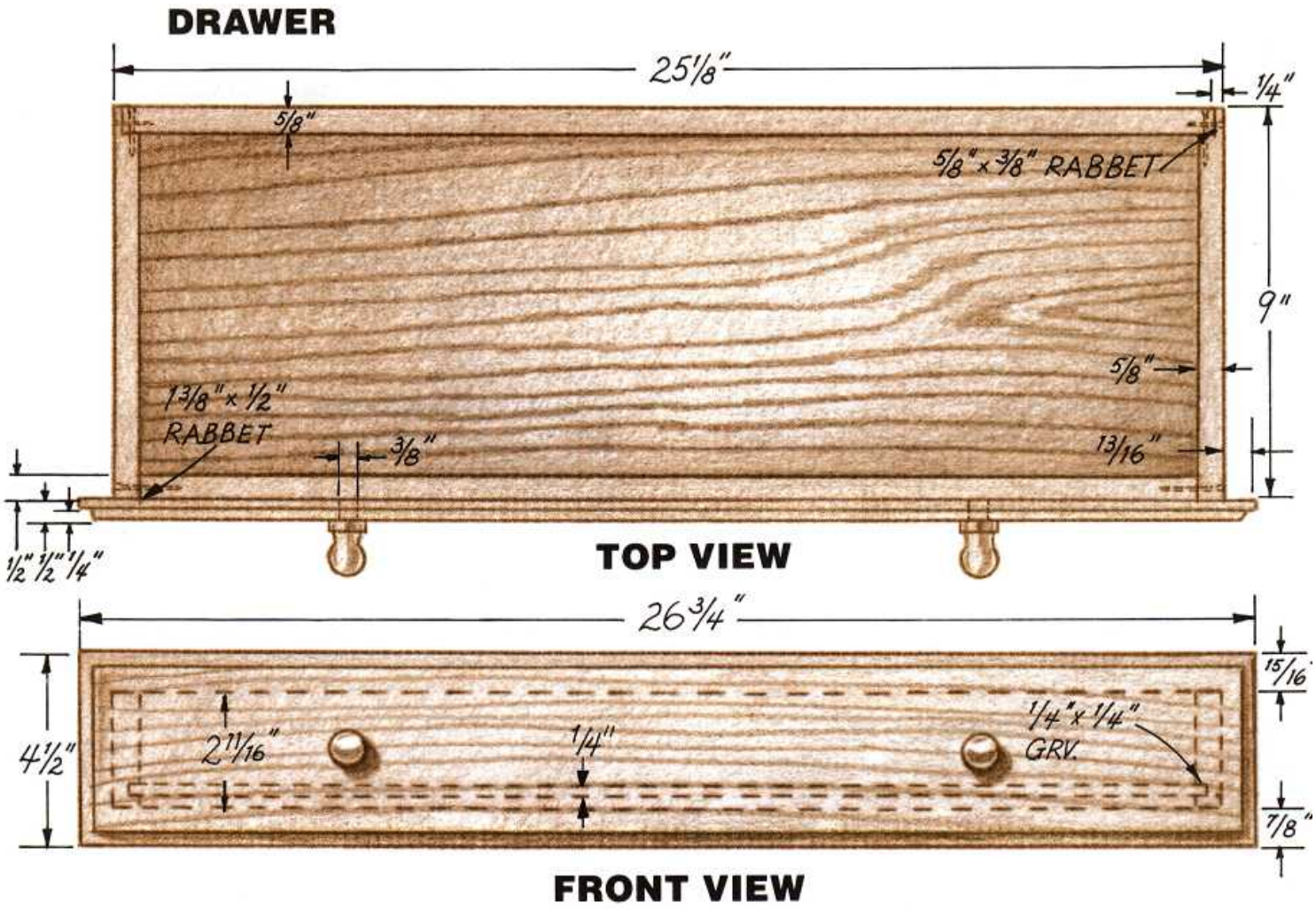
Joint, plane, rip, and cut the parts to the sizes given in the Cutting List. If necessary, glue up boards to get the wider parts.

2 Rout sliding dovetail slots in the sides. The shelves are joined to the sides with sliding dovetails. Lay out the dovetail groove on the bookshelf sides. Put a ½-inch dovetail bit in your router. Clamp a straightedge across the side and rout the dovetail groove to the depth indicated. Repeat for each shelf groove.

SHOP TIP: Dovetail grooves must be routed in one pass, and this can strain the router and leave a ragged cut. Avoid this by first routing a narrow *dado* along the path of the dovetail. Rout the dado to slightly less than the full depth with a double-fluted straight bit no wider than the top of the dovetail bit's cut (about ⅜ inch). This removes most of the waste. Follow up the dado by routing with the dovetail bit.



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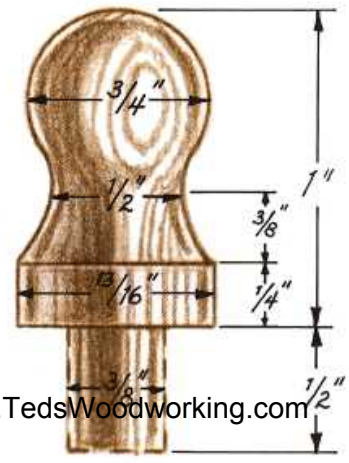


3 Cut the sliding dovetails in the shelves. Put a ½-inch dovetail bit in the router. Secure the router in your router table. Measure the depth of the dovetail groove in the bookshelf sides. Raise the router bit this amount above the table. Set the router table fence so most of the bit is partially buried in the fence. Stand the shelves upright on the table against the fence. Make one pass on each end of each shelf; flip the boards over and repeat. Test the fit in the grooves of the sides.

SHOP TIP: Test your router setup on a piece of scrap *exactly* the same thickness as the shelves. Many cabinetmakers mill an extra shelf for just this purpose. First, cut the sliding dovetail on the test piece. Adjust the router table fence to get a tail that slips in snugly, then cut the tail on the actual shelves.

4 Lay out and cut the profile in the sides. Draw a ½-inch grid on a piece of paper and draw the profile shown in the *Side View* onto it. Transfer the pattern to the wood and cut the profile with a band saw, jigsaw, or coping saw. Clean up the cut with files and sandpaper.

DRAWER PULL DETAIL



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SHOP TIP: When cutting the profile on the band saw, do not try to cut the pattern in one pass. Make several relief cuts to remove the bulk of the waste material before making the final cuts to your line.

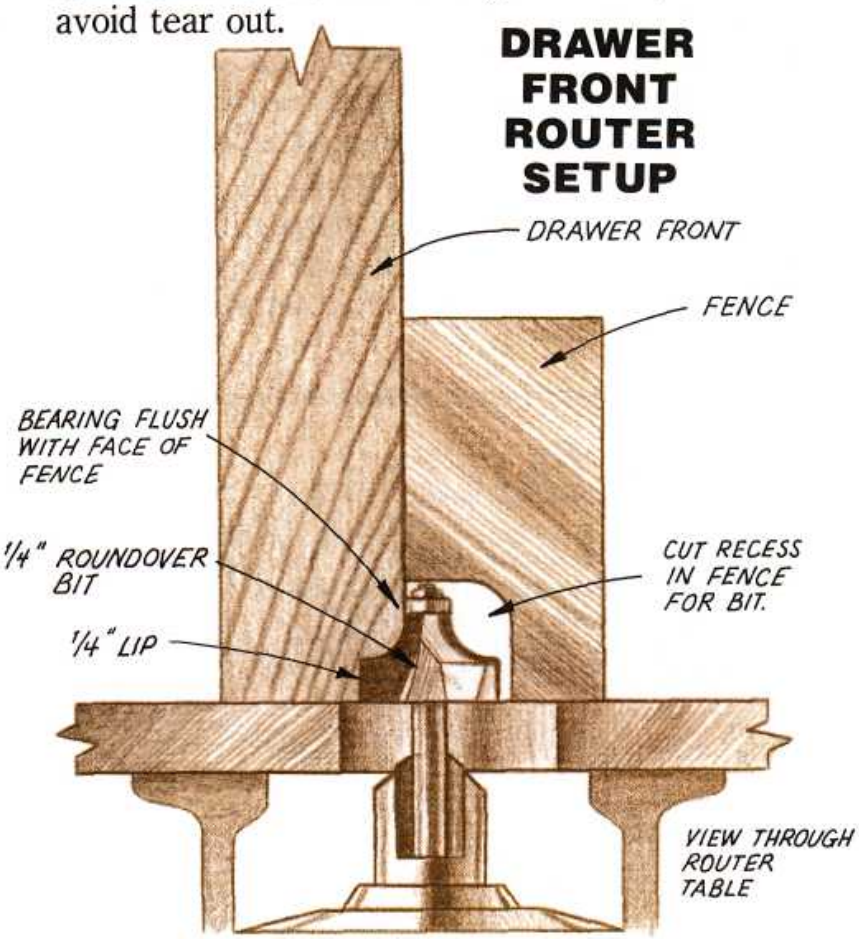
5 Lay out and cut the dovetails. The sides are connected to the top and bottom with dovetails. The joint is made up of tails and pins. Lay out the tails on the sides as shown in the *Side View.* After the tails have been cut, lay out and cut the pins on the top and bottom. If you haven't cut a lot of dovetails, practice on a piece of scrap. "Dovetailing" on page 42 shows you exactly how to cut the joint.

6 Assemble the sides to the top, bottom, and shelves. Be sure to glue up on a flat surface. Presand the interior of the bookcase. Put glue on the mating surfaces of the dovetails and clamp them together. Put glue in the sliding dovetail grooves and on the shelf dovetails. Push them together by hand. If they stick, pull them together with clamps. Put one shelf in at a time, until the front edges are flush with the bookcase sides.

Measure the bookcase across both diagonals, from corner to corner. If the bookcase is square, the measurements will be equal. If they aren't, run a clamp from corner to corner across the longer diagonal. Tighten it gently until the measurements are equal.

Sight across the front of the shelves to make sure the bookcase is not twisted. The front edges of the shelves should be parallel. If one corner of a shelf appears higher than the others, the cabinet is twisted. Push down gently on the high corner until it aligns with the others.

7 Rout the drawer front. Put a ¼-inch roundover bit in the router. Secure the router in the router table and adjust it as shown in the *Drawer Front Router Setup.* Stand the drawer front on edge and rout the detail on all four sides as shown. Rout the end grain first, to avoid tear out.



8 Lay out the rabbets for the drawer sides. Clamp the drawer front in place over the drawer opening on the bookcase and set the drawer sides in place on either side of the compartment. Reach into the drawer compartment from the rear and mark the outline of the opening on the back of the drawer front with a pencil.

9 Rabbet for the drawer sides. Put a ½-inch straight bit in the router. Secure the router in the router table. Raise the bit to a height of ½ inch and

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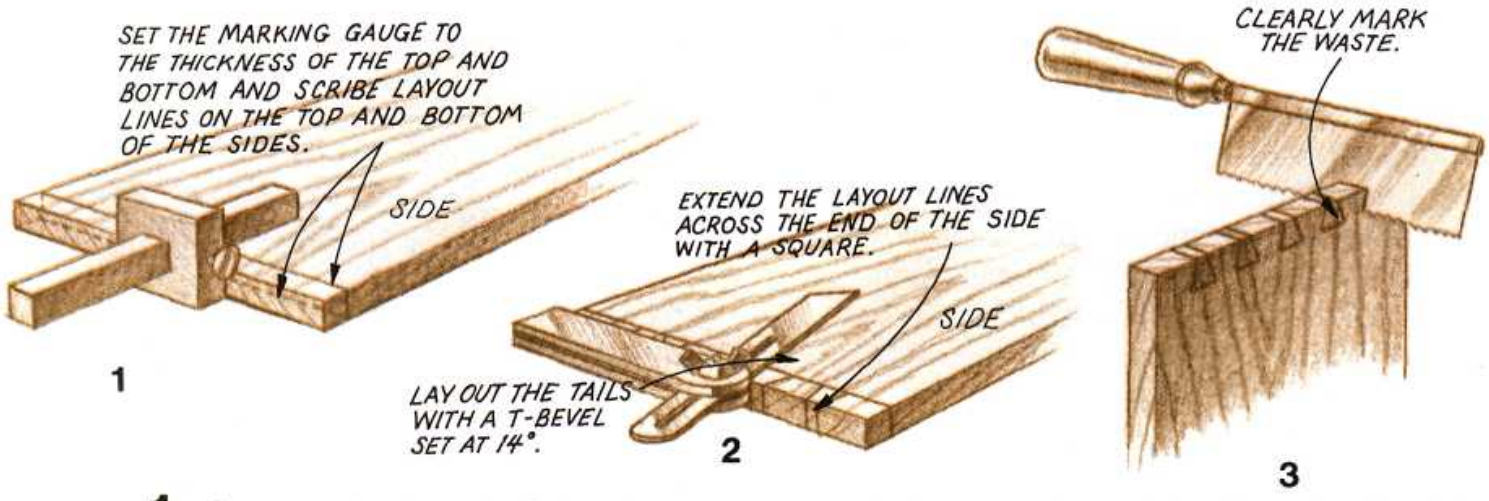
rout to the layout lines in several passes, adjusting the fence with each pass. Steady the drawer face with a miter gauge, if your router table has one, or with a 12 × 12 × ¾-inch scrap of plywood riding against the fence behind the drawer face.

10 Cut the rabbets in the drawer sides. Put a ¾-inch straight bit in the router. Secure the router in a router table and adjust the bit height and the fence to cut the rabbet on the back edge of the drawer sides. Support the drawer sides with a miter gauge or a scrap of plywood as before.

11 Rout the groove for the drawer bottom. Put a ¼-inch straight bit in the router. Secure the router in the router table. Rout a groove for the bottom ¼ inch from the bottom edge of the drawer sides and back, as shown in the *Drawer Front View.* Rout a groove in the drawer front to align with the groove in the drawer sides.

12 Make the drawer pulls. Turn the drawer pulls on your lathe to the profile shown in the *Drawer Pull Detail.* If you don't have a lathe, substitute ready-made pulls. Lay out and drill holes

DOVETAILING



1 Lay out the length of the pins and tails. Set a marking gauge to the thickness of the top and bottom—⅞ inch, in this case. Scribe a line around the top and bottom of the sides. Then set the marking gauge to the thickness of the sides—¾ inch—and scribe a line around both ends of the top and bottom.

2 Lay out the tails. First, lay out the tails as shown in the *Side View* with a sliding T-bevel set at 14 degrees in this case. Then, extend the layout lines across the end grain of the side with a square. Next, lay out the angle of the tails on the back face of the board, so that they meet the lines you drew on the end grain.

3 Cut out the tails. Saw down to the scribe line, cutting on the waste side of the layout lines. A Japanese Dozuki saw, like the one shown here, is easy to control and cuts crisp lines. Watch your layout lines carefully: Follow the angle of tails and make sure you don't cut

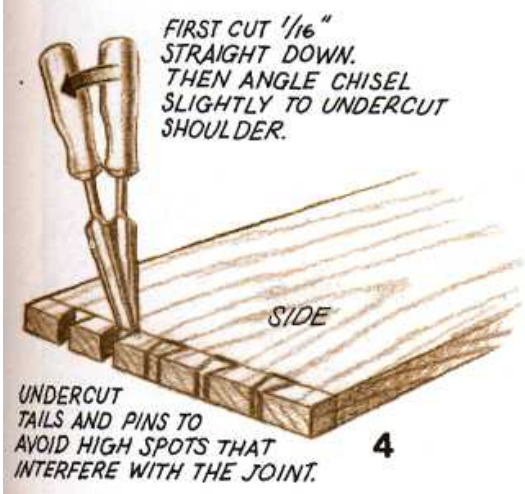
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for the pulls in the drawer front as shown in the *Front View.*

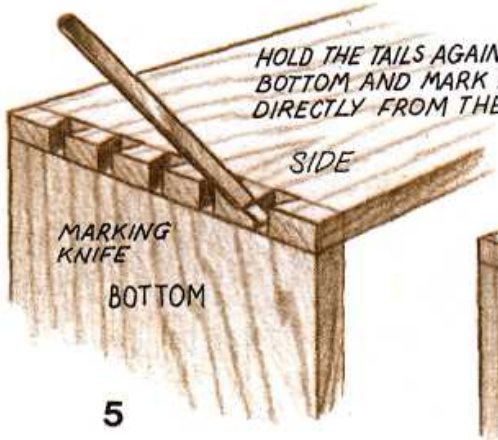
13 Assemble the drawer. Presand the drawer interior and assemble the drawer on a flat surface. Glue and nail the sides into the rabbet you routed in the drawer face. Slip the drawer bottom into the grooves. Nail and glue the drawer back into the rabbets in the drawer sides. If you are making your drawer from hardwood, predrill all of the nail holes to avoid splitting. Make sure that the drawer is square.

14 Apply the finish and attach the hangers. Finish sand the bookshelf. Stain and varnish or paint your bookshelf to match your decor.

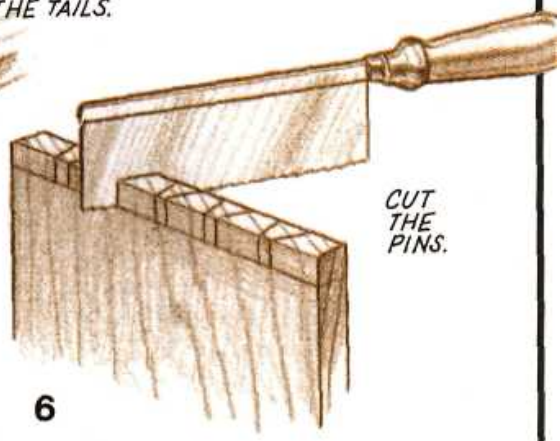
When the finish is dry, attach the hangers to the back of the bookshelf. You can buy hangers similar to the ones shown from most hardware stores, or you can order them from the source given in the Cutting List. Position the hangers as shown in the *Front View.* Trace around the hangers and rout recesses for the hangers. Screw the hangers in place.



4



5



6

through either one of the scribe lines.

4 Remove the waste between the tails. Chisel halfway through the board from one side; turn the board over and chisel from the other side. Undercut slightly as shown to ease assembly of the joint.

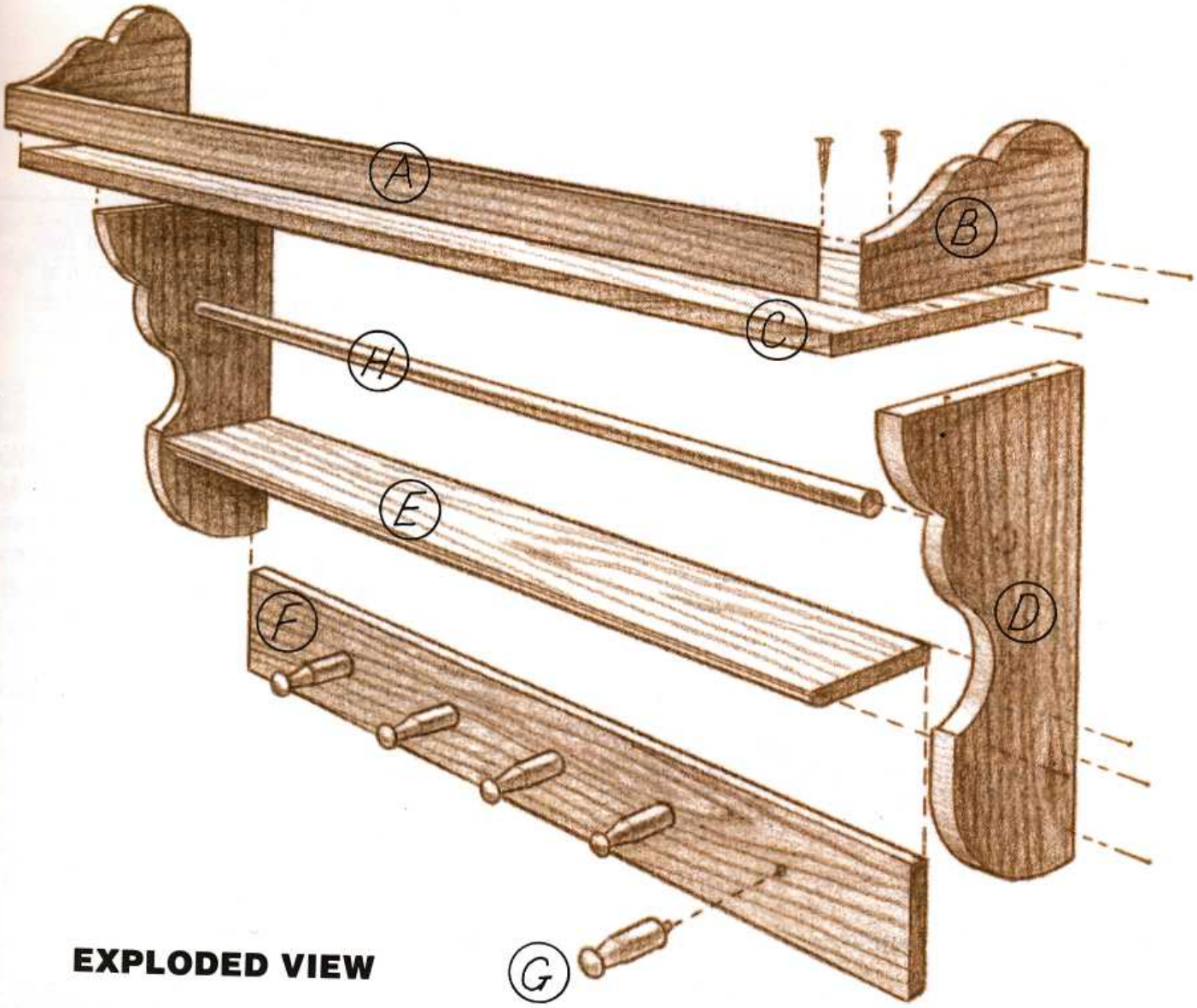
5 Lay out the pins. For best results, lay out the pins by tracing around the tails. Hold the tails against the end grain of the top and bottom and trace around the tails with a marking knife. Carry your layout lines down to the scribe lines and clearly mark the waste with a pencil.

6 Cut out the pins. Saw along the layout lines to the scribe lines, and chisel away the waste as before. Test fit the dovetails. Pare the pins to fit the tails if necessary. Do not glue them in place until you have finished the rest of the cabinet.

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PEG SHELF





EXPLODED VIEW

CUTTING LIST

Part	Quantity	Dimension	Comment
A. Front rail	1	½″ × 2″ × 48″	Miter to fit.
B. Side rails	2	½″ × 5″ × 9″	Miter to fit.
C. Upper shelf	1	¾″ × 8″ × 45¾″	
D. Brackets	2	¾″ × 7″ × 17″	
E. Lower shelf	1	¾″ × 4″ × 37″	
F. Peg support	1	¾″ × 5″ × 37″	
G. Mug pegs*	5	¾″ dia. × 3⅜″	Overall dimension
H. Dowel	1	¾″ dia. × 37¾″	

*Mug pegs are available from Cherry Tree Toys, Inc., P.O. Box 369, Belmont, OH 43718. Part #143 (maple, oak, cherry, or walnut).

Hardware

As needed, 4d finishing nails
4 #8 × 1¼-in. flathead wood screws
2 brass hangers. Available from Cherry Tree Toys, Inc. Part #2710-A.

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1 Select the stock and cut the parts. The shelf pictured is made from pine, but you can make yours from whatever wood you have. Choose straight, flat stock. Joint, plane, rip, and cut the parts to the sizes given in the Cutting List.

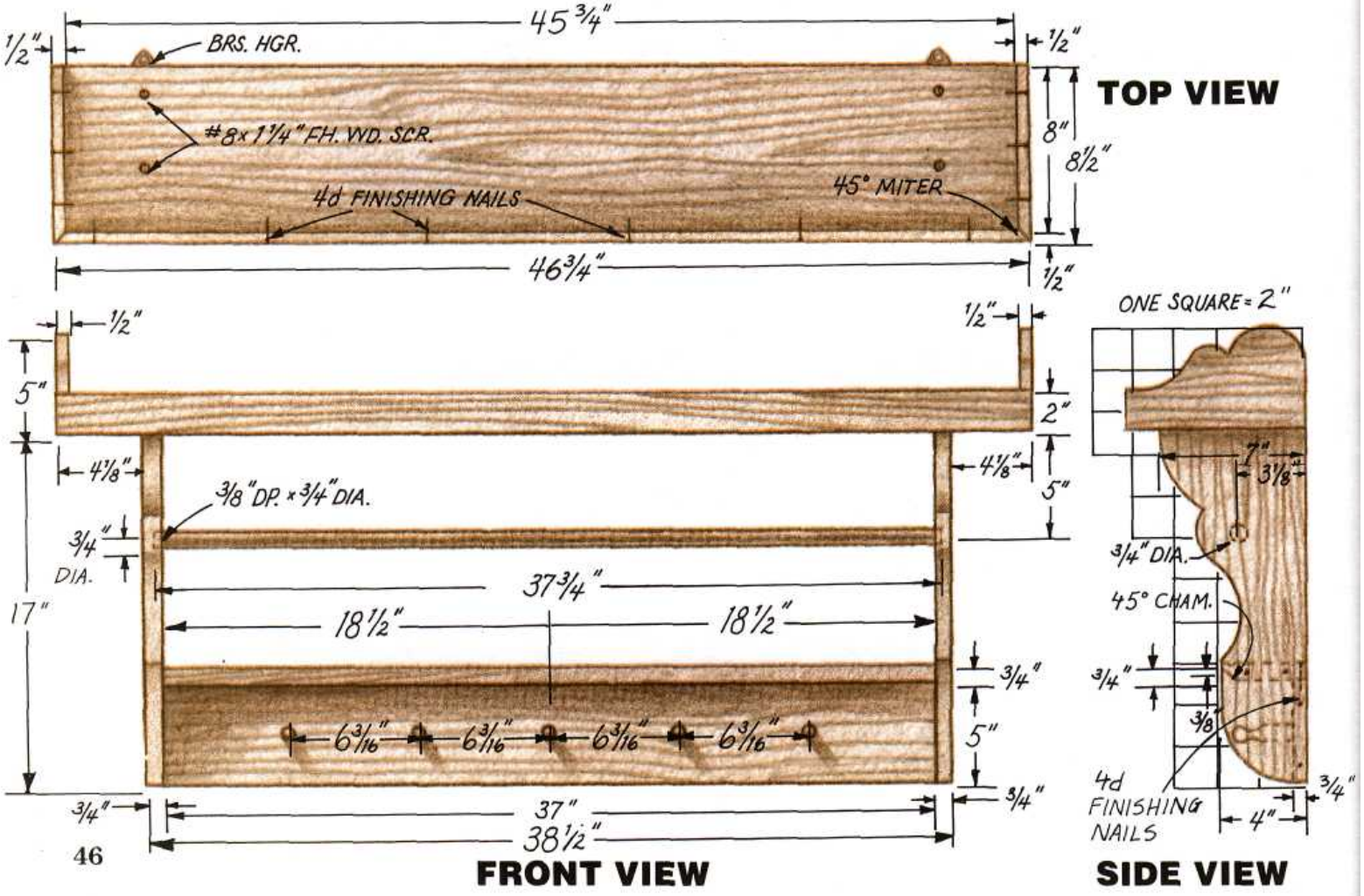
2 Cut the miters. Cut miters in the front rail and side rails to fit around the upper shelf. Test fit the rails.

3 Make a paper pattern and cut the parts to shape. Draw a 1-inch grid on a large sheet of paper and draw the bracket and side rail patterns onto it. Transfer the patterns to the wood. Cut the shapes using a band saw or jigsaw.

SHOP TIP: To get two pieces with identical curves, cut both at once. First stack the pieces together and secure by putting double-sided tape between them. Then cut both brackets in one operation.

4 Assemble the upper shelf. Glue and nail the front rail to the front edge of the top shelf. Make sure that the mitered ends are even with the corners of the upper shelf. Nail, but do not glue, the side rails to the upper shelf.

5 Chamfer the front edge of the lower shelf. Set your table saw blade to 45 degrees. Place the table saw



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fence to the left of the blade and position the fence to cut the chamfer on the front edge of the lower shelf. Make sure that you leave a 3/8-inch unchamfered edge as shown in the *Side View.*

6 Drill the peg holes and attach the lower shelf to the peg support. The mug pegs for this shelf are commercially made, and the diameter of the shank sometimes varies slightly. To make sure the pegs will fit in the holes drilled for them, drill a sample ½-inch hole in a piece of scrap wood. The peg should fit snugly. If not, change drill bits as necessary. When you have found the proper drill bit, lay out and drill the peg holes in the peg support as shown in the *Front View.* Nail and glue the lower shelf to the top edge of the peg support as shown in the *Side View,* but don't attach the mug pegs yet.

7 Mark and drill the dowel holes. Mark the brackets for the dowel holes as shown in the *Side View.* Before you drill, make sure that your markings are both on the *inside* edge of the brackets. Drill a 3/8-inch-deep by 3/4-inch-diameter hole into each bracket.

8 Assemble the peg shelf. On a flat surface, test fit the peg shelf and make any necessary adjustments. Put the dowel in place and glue and nail the lower shelf and peg support assembly to the brackets.

When you have assembled the lower section of the peg shelf, center the upper shelf on the brackets. Make sure that the back of the upper shelf is even with the back of the brackets. Screw and glue the upper shelf to the brackets.

SHOP TIP: Mark and drill recess and pilot holes through the top shelf and into the brackets with a combination pilot hole bit. These bits drill a hole for the plug, a clearance hole for the screw shank, and a slightly smaller pilot hole for the screw threads. Combination pilot hole bits are available at most hardware stores and are sold according to the screw size.

9 Attach the mug pegs. Apply a small amount of glue to the base of the mug pegs and insert them into the peg holes.

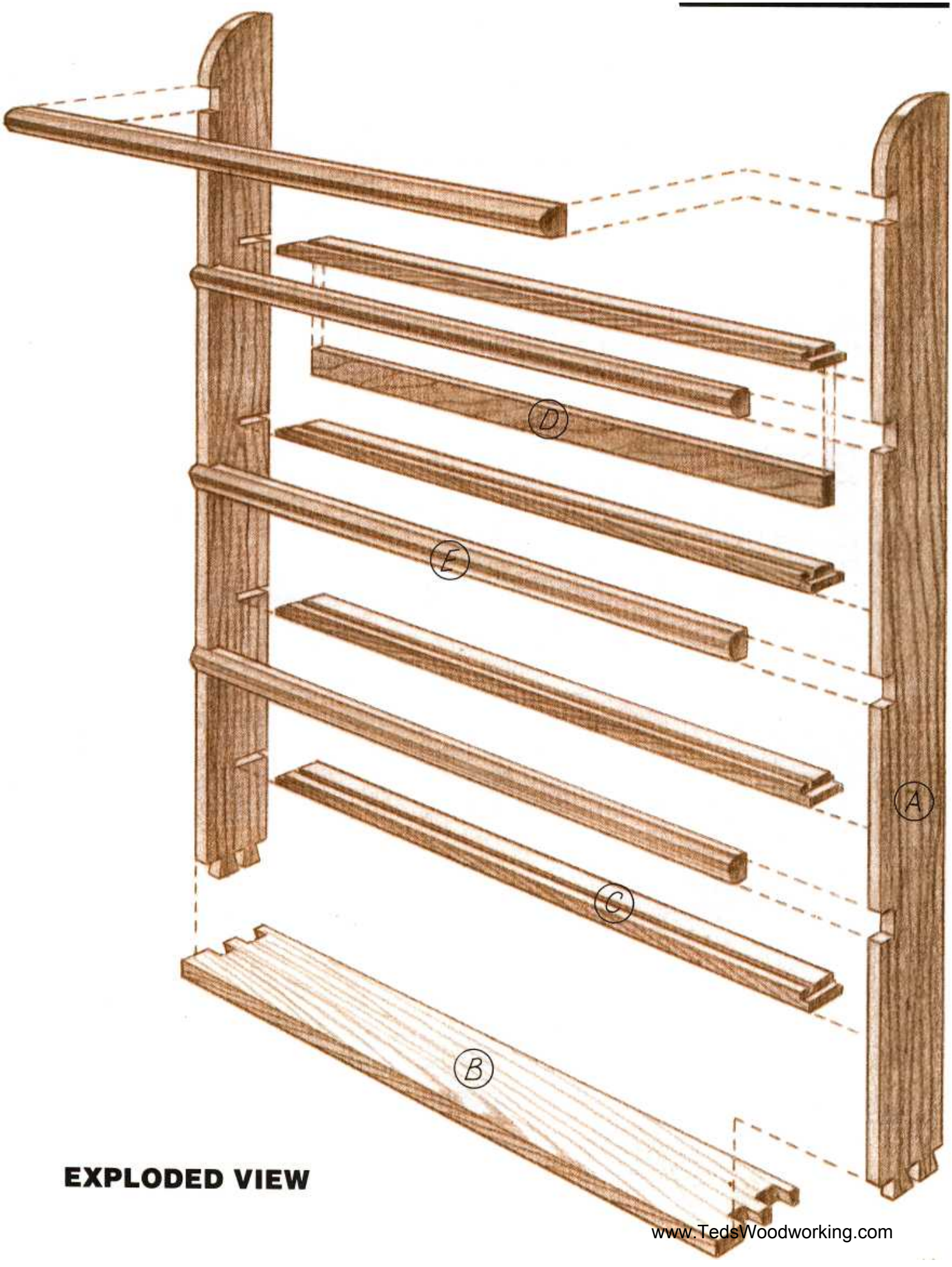
10 Apply finish. Countersink the nails and fill the nail holes with wood putty. Finish sand the peg shelf, rounding the edges slightly as you sand. Finish the peg shelf in any way you choose. The one pictured has a natural finish, which allows the wood grain to show through.

When the finish has dried, attach the brass hangers to the back edge of the top shelf.

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PLATE RACK





EXPLODED VIEW

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1 Select the stock and cut the parts. Choose straight, flat stock without knots. Joint, plane, rip, and cut the parts to the sizes given in the Cutting List.

2 Lay out and rout the dadoes in the sides. Lay out the dadoes for the shelves on the sides as shown in the *Side View Joinery Detail.* Put a ½-inch straight bit in your router and set it up to cut a ⅜-inch-deep dado, as explained in "Routed Dadoes" on page 52.

3 Rabbet the shelves. The end of each shelf is rabbeted to fit the dadoes. Rout the rabbets in the shelf ends with the router and bit you used to rout the dadoes in the sides. Secure the router in a router table and adjust the bit and fence to cut a ¼ × ⅜-inch rabbet in the shelf ends as shown in the *Shelf Detail.* Check the fit by routing the rabbet in a scrap piece and fitting it into one of the dadoes in the sides. Guide the cut with a miter gauge, if your router table has one, or with a 12 × 12 × ¾-inch scrap of plywood riding against the fence and behind the shelf.

4 Rout the plate groove in the shelves. To rout a plate groove in each shelf, put a 45-degree "V" grooving bit in the router. Secure the router in a router table and set it up to cut a ¼-inch-deep groove as shown in the *Groove Detail.* Set up a fence and guide the shelves against it as you rout the plate groove shown in the *Groove Detail.*

5 Notch the sides for the shelf rails. Lay out ⅝-inch-deep by 1¼-inch-wide notches for the shelf rail as shown in the *Side View Joinery Detail.* Cut the notches with a dado blade in your table saw. Put the side on the table with the front edge down and guide the cut with a miter gauge set at 90 degrees.

SHOP TIP: To get two identical notches, cut both at once. Stack the pieces together with the shelf dadoes facing in and the front edges aligned with each other and secure by putting double-sided tape between them. Then cut both notches in one operation to ensure perfect notch alignment.

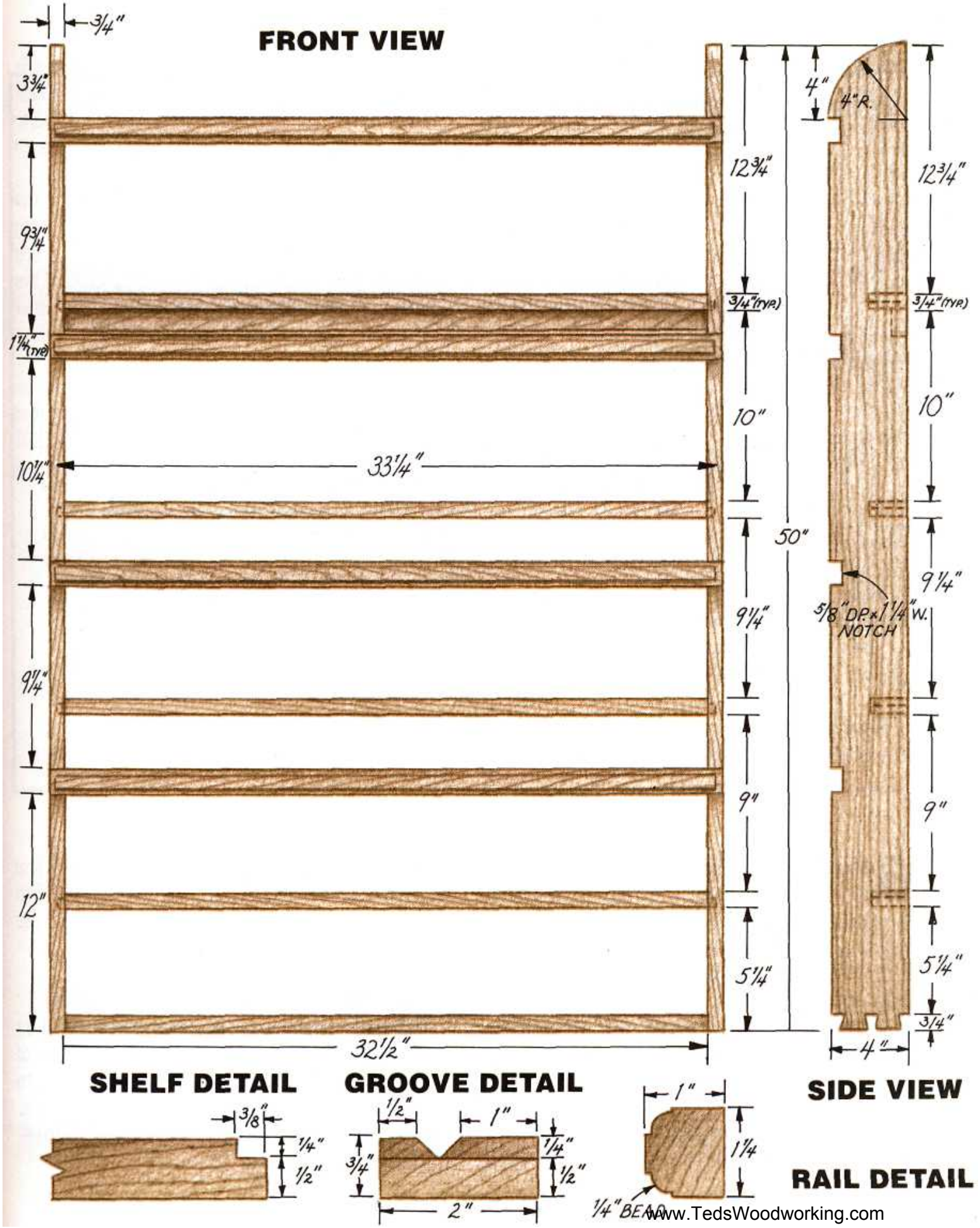
CUTTING LIST

Part	Quantity	Dimension
A. Sides	2	¾" × 4" × 50"
B. Bottom	1	¾" × 5" × 32½"
C. Shelves	4	¾" × 2" × 33¼"
D. Hanging strip	1	¾" × 1¼" × 32½"
E. Shelf rails	3	1" × 1¼" × 34"

Hardware

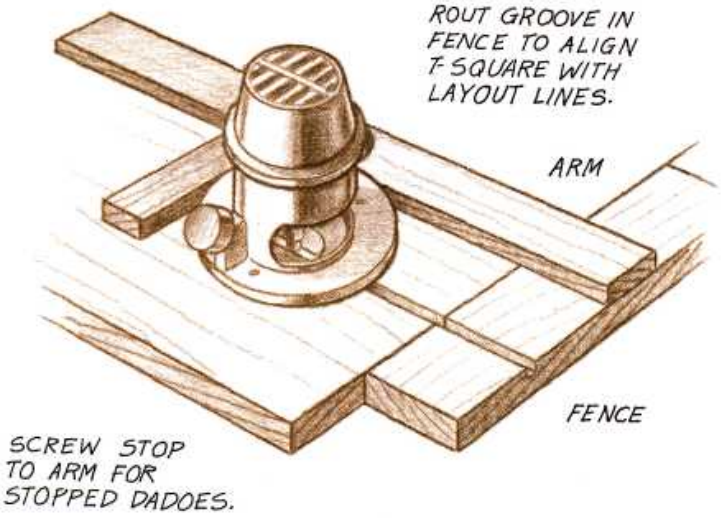
8 4d finishing nails

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ROUTED DADOES



1 Make a T-square. Screw together two pieces of hardwood at right angles, as shown. Make the square out of a durable hardwood.

2 Rout an index groove. To determine exactly where the router will cut, put the bit you plan to use in it and rout a shallow groove in the head of the T-square.

3 Lay out dadoes on the stock. Lay out the dadoes with a sharp pencil and align the index groove with the layout lines. Clamp the T-square in place.

4 Rout the dadoes. Set the router to cut a groove about ⅛ inch deep. Rout the dado by guiding the router along the arm of the T-square. Rout the dado in a series of passes, each about ⅛ inch deeper than the last.

If the dadoes stop at one end, as those on the plate rack do, attach a stop block to the fence so that each dado will be exactly the same length. Lay out and rout a test dado in a piece of scrap wood. When you have determined the length of the dado, screw a block to the T-square arm to keep the router from traveling any farther.

6 Rout the front edges of the shelf rails. Rout the rails to the profile shown in the *Rail Detail.* Put a ¼-inch beading bit in a router. Secure the router in a router table and rout all around the front edge, starting with the end grain to eliminate tear out. Guide the end grain cuts with a miter gauge or plywood scrap.

7 Cut the curve on the top of the sides. Lay out the curve on the top of the sides as shown in the *Side View Joinery Detail.* Cut the sides to shape with a jigsaw or band saw and sand away the saw marks.

8 Cut the dovetails in the sides and the pins in the bottom. Lay out and cut the dovetails on the side of the rack. Use the tails as a template to lay out the pins on the bottom of the rack. For more on cutting dovetails, see "Dovetailing" on page 42.

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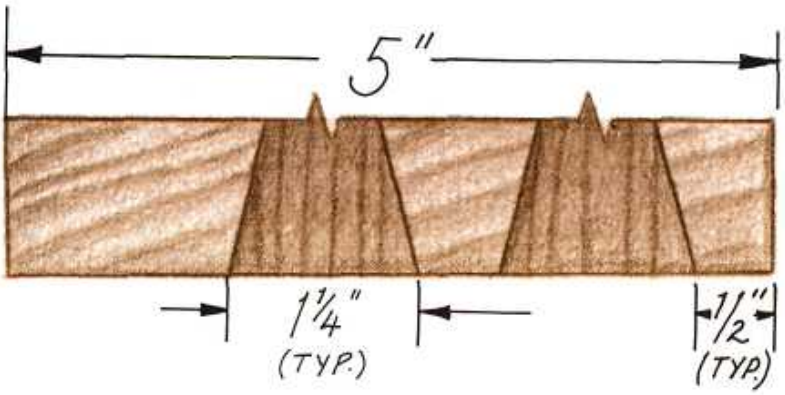
9 **Assemble the plate rack.** Sand any surfaces that will be difficult to reach once the rack is assembled. Be careful not to sand any of the joinery.

Assemble the plate rack beginning with the bottom. Coat the inside of the pins with glue and press the bottom into the sides. Put a small amount of glue in each dado and slide the shelves into place. Glue and clamp the hanging strip to the underside of the top shelf.

Next, put a little glue in the shelf rail dadoes in the sides, position the rails, and nail them in place with 4d finishing nails. If necessary, clamp across the sides to hold the dovetails tight while the glue sets.

10 **Finish the plate rack.** When the glue is dry, remove any excess glue and finish sand the plate rack. As you sand, round-over the edges of the plate rack slightly to give it a softer look. The plate rack shown has a clear varnish finish. You can do the same, but feel free to finish your plate rack in a way that will best fit your decor.

11 **Hang plate rack.** Select a spot on the wall for the rack and locate the studs in the wall. Drill clearance holes in the hanging strip that will align with the studs. Screw the shelf to the studs.

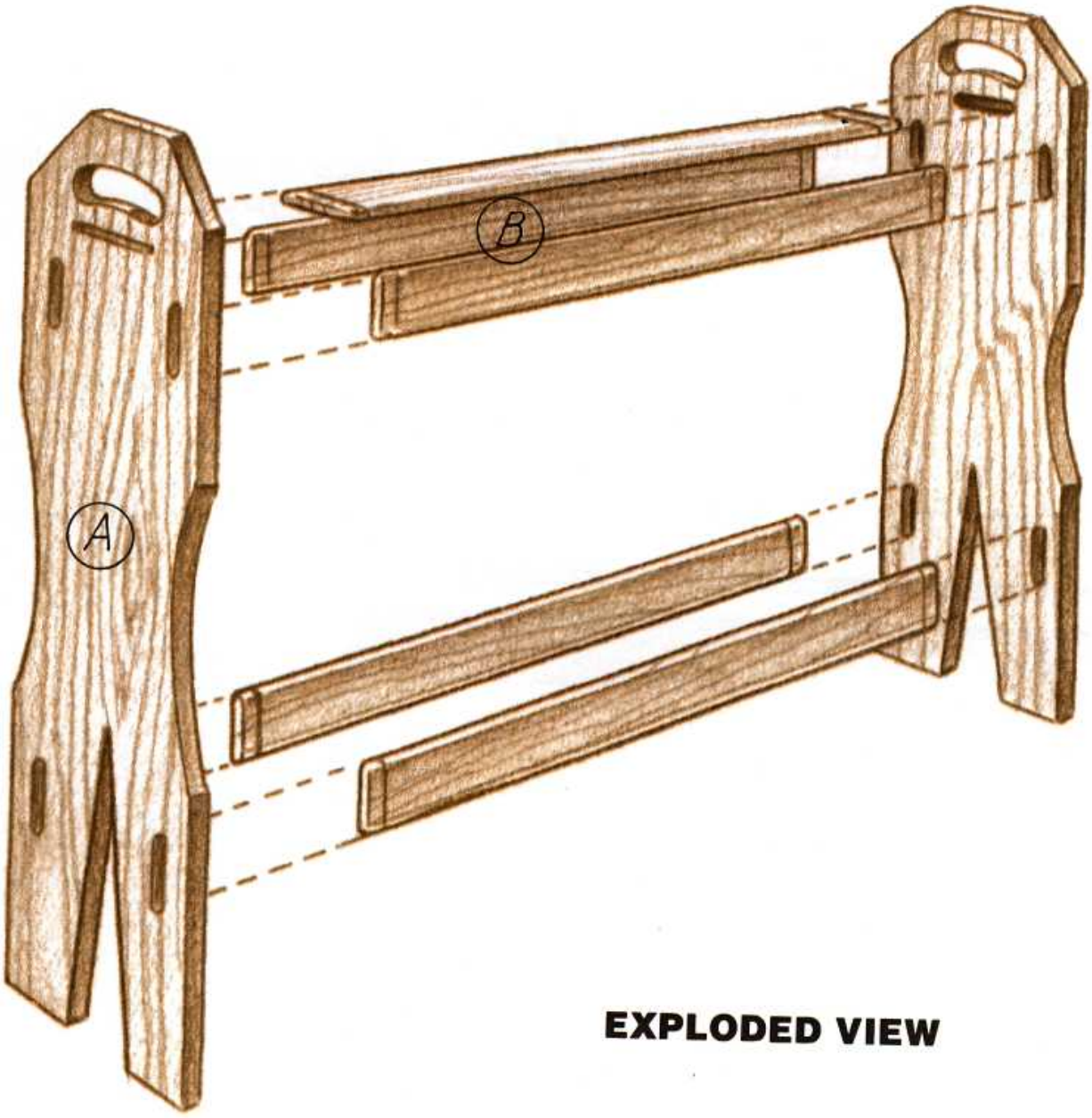


JOINERY DETAIL

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QUILT RACK





EXPLODED VIEW

CUTTING LIST

Part	Quantity	Dimension	Comment
A. Sides	2	¾″ × 9″ × 34″	Final length is 33″.
B. Slats	5	½″ × 2½″ × 29¾″	

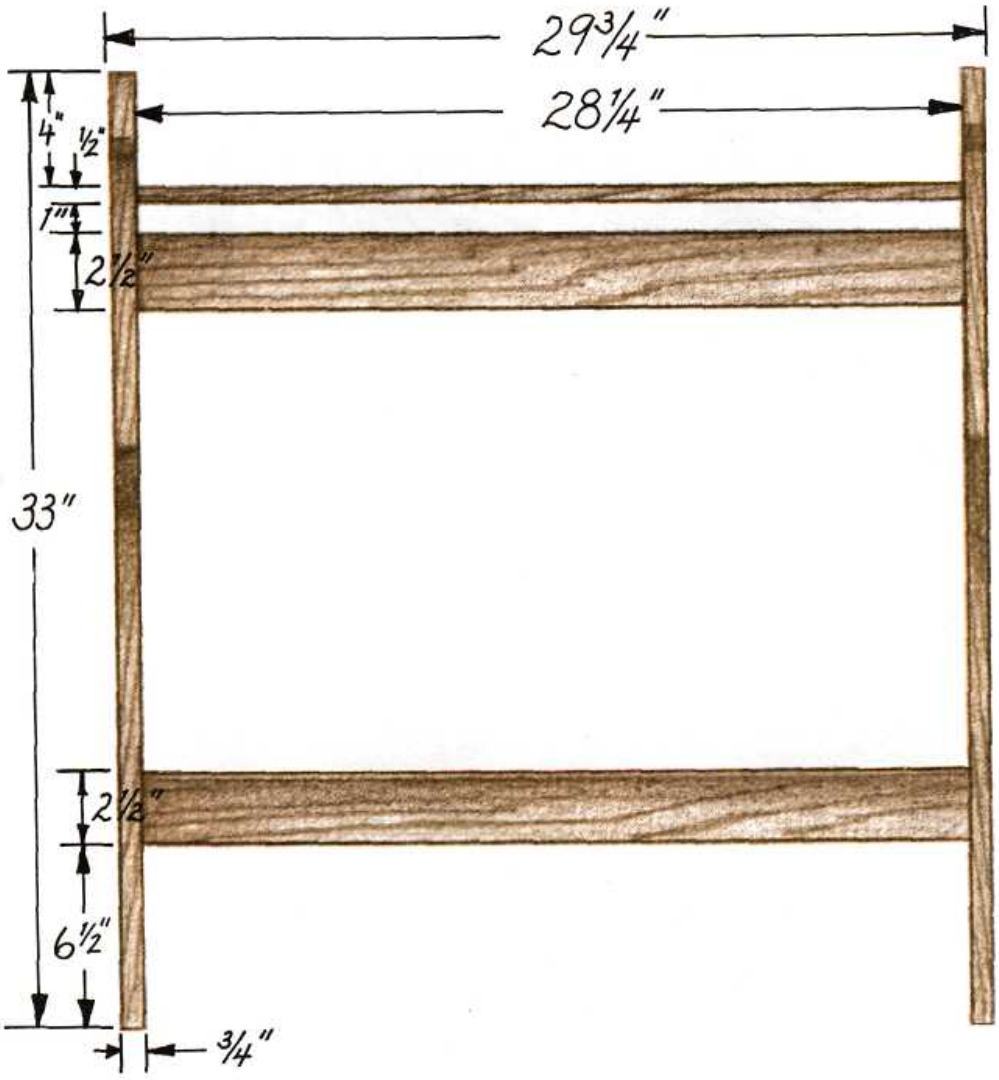
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1 Select the stock and cut the parts. Joint, plane, rip, and cut the parts to the sizes given in the Cutting List. You can cut the sides from 1 × 10s and the slats from ½-inch-thick stock that's usually used for doorjambs. The dimension given in the Cutting List for the sides is longer than necessary to make routing the mortises easier. You will cut the legs to the exact length later.

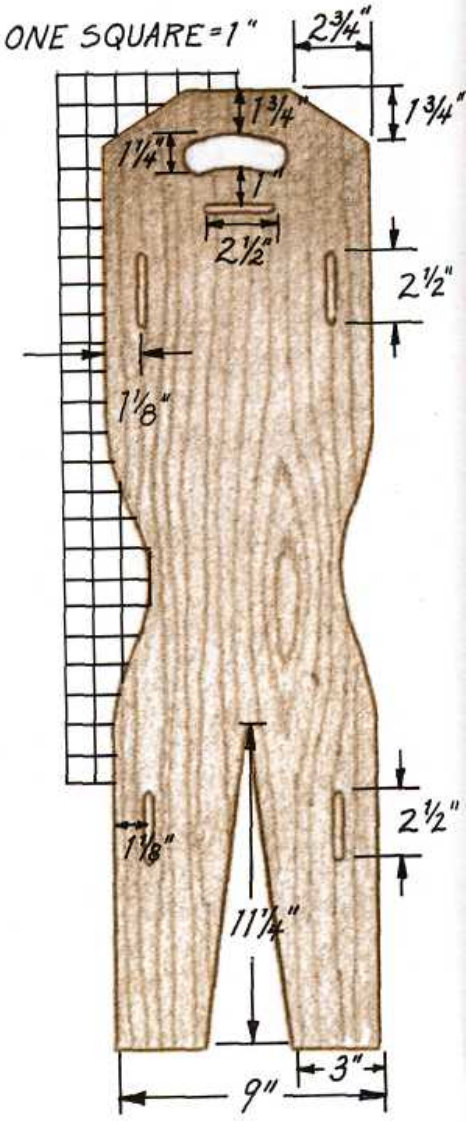
2 Cut vertical mortises in the sides. The eight vertical mortises are cut on a single router table setup. Put a ¼-inch straight bit in your router. Secure the router in a router table and adjust it to cut ¼ inch deep. Position the fence 1⅛ inches from the bit. Clamp stops to the fence at the positions illustrated in *Routing the Vertical Mortises.*

To rout the mortises, put a side

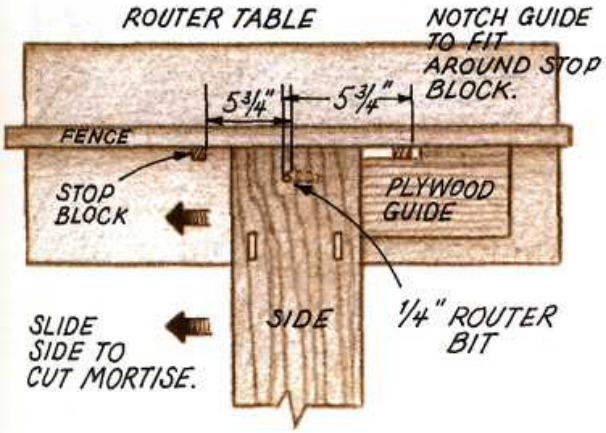
FRONT VIEW



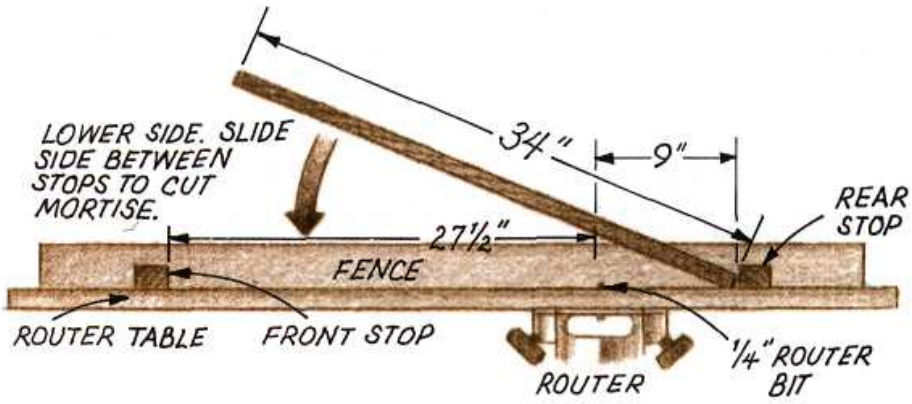
SIDE VIEW



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ROUTING THE HORIZONTAL MORTISES



ROUTING THE VERTICAL MORTISES

against the rear stop and lower the it into the bit, as shown in *Routing the Vertical Mortises*. Move the side forward until it hits the other stop. Raise one end of the side to remove it from the router table. Repeat for the remaining vertical mortises. Raise the bit another ¼ inch or so, repeat the process, and then raise the bit to a little over ¾ inch so it cuts through the side on the third round of cuts.

3 Cut horizontal mortises in the sides. Cut the extra length off one end of the sides. Rout the mortises with a two-stop router-table setup as before. This time, set the fence 4 inches from the router bit and set the blocks at the dimensions shown in *Routing the Horizontal Mortises*. Guide the freshly cut end along the fence with a miter gauge. Square the edges of each mortise with a ¼-inch chisel.

SHOP TIP: If your router table doesn't have a slot for a miter gauge, use a piece of plywood, as illustrated, to guide the stock along the fence. Cut a notch in the plywood to fit around the stop block.

4 Shape the sides. Draw a ½-inch grid on a piece of paper and draw the curve in the sides onto it. Transfer the pattern to the wood. Lay out the angled cuts on the top of one side as shown in the *Side View*. Clamp the sides together, align them carefully. Cut the curves on a band saw or jigsaw. Cut the angles with a jigsaw or circular saw. Sand the sawed edges.

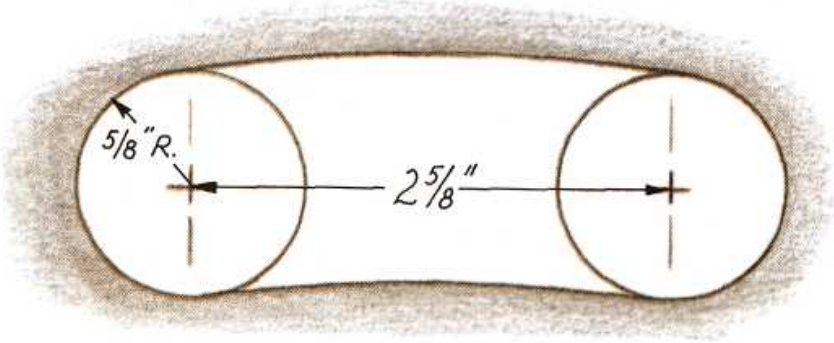
5 Cut the handholds. With the sides still clamped together, lay out the handholds as shown in the *Handhold De-*

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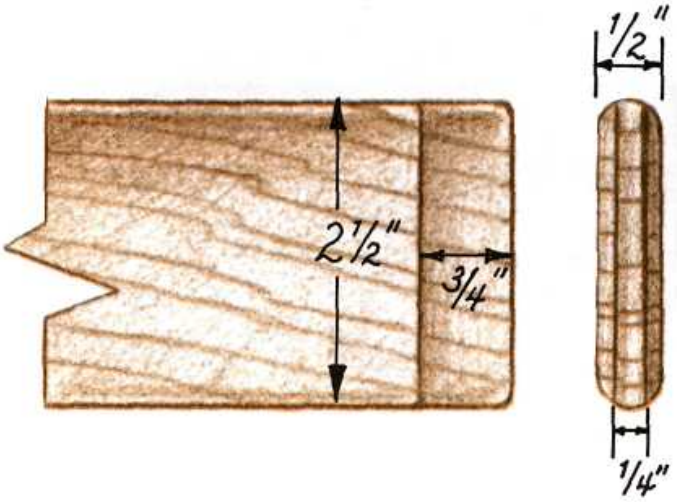
tail. Use a compass to draw two 5/8-inch-radius circles with their centers 2 5/8 inches apart. Connect the circles with lines at top and bottom, both curving slightly upward. Drill out the circles with a 1 1/4-inch bit and complete the cuts with a jigsaw.

6 Make the slats. To round-over the slats to the profile shown in the *Tenon Detail* put a 1/4-inch roundover bit in the router. Secure the router in the router table and make the cut, guiding the slat against a fence.

Set up a dado blade in your table saw to cut the tenons in the end of the slats. Test the cut on a piece of scrap and adjust the height of the blade to get a tenon that fits snugly in the mortise. Cut tenons on both ends of each slat.



HANDHOLD DETAIL



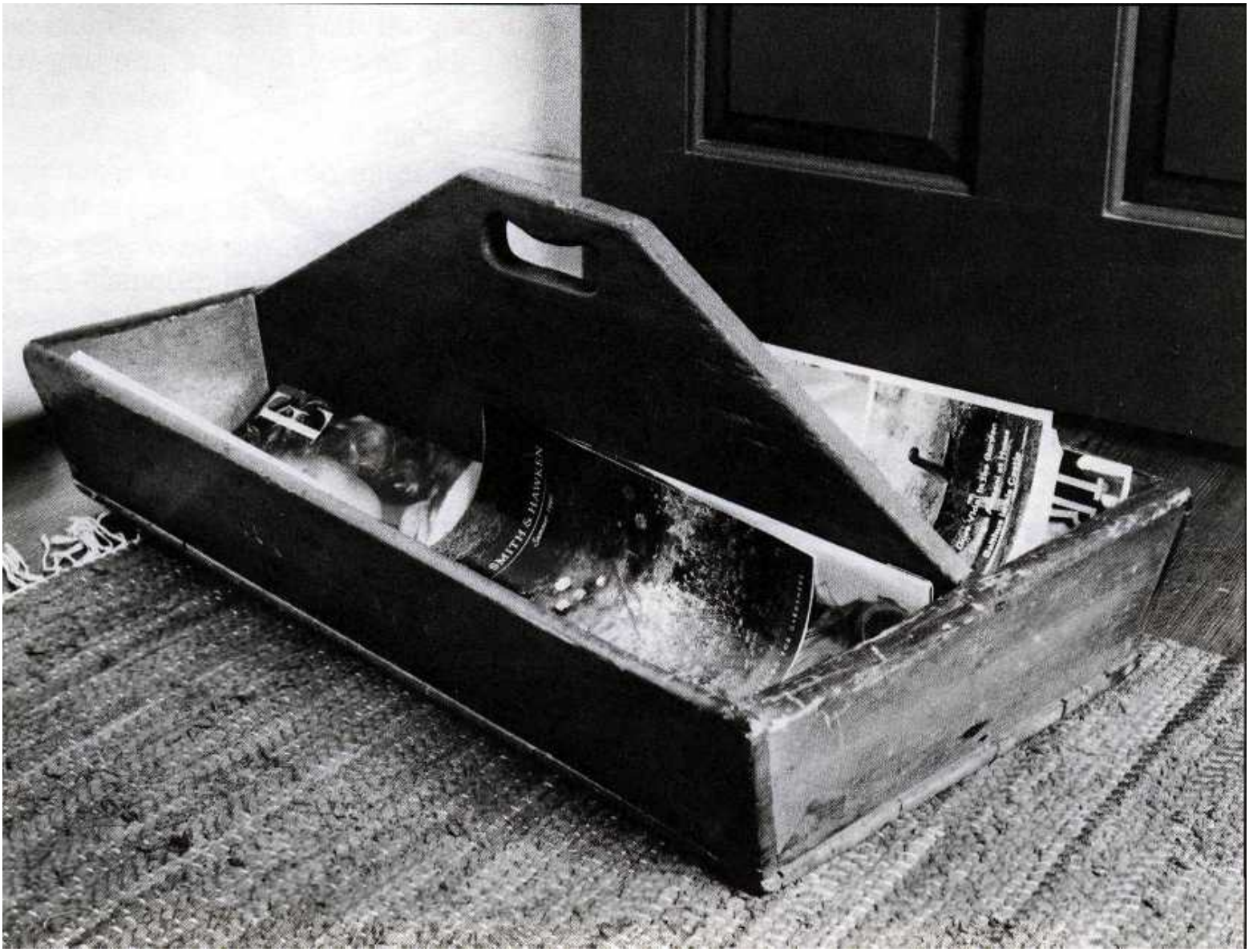
TENON DETAIL

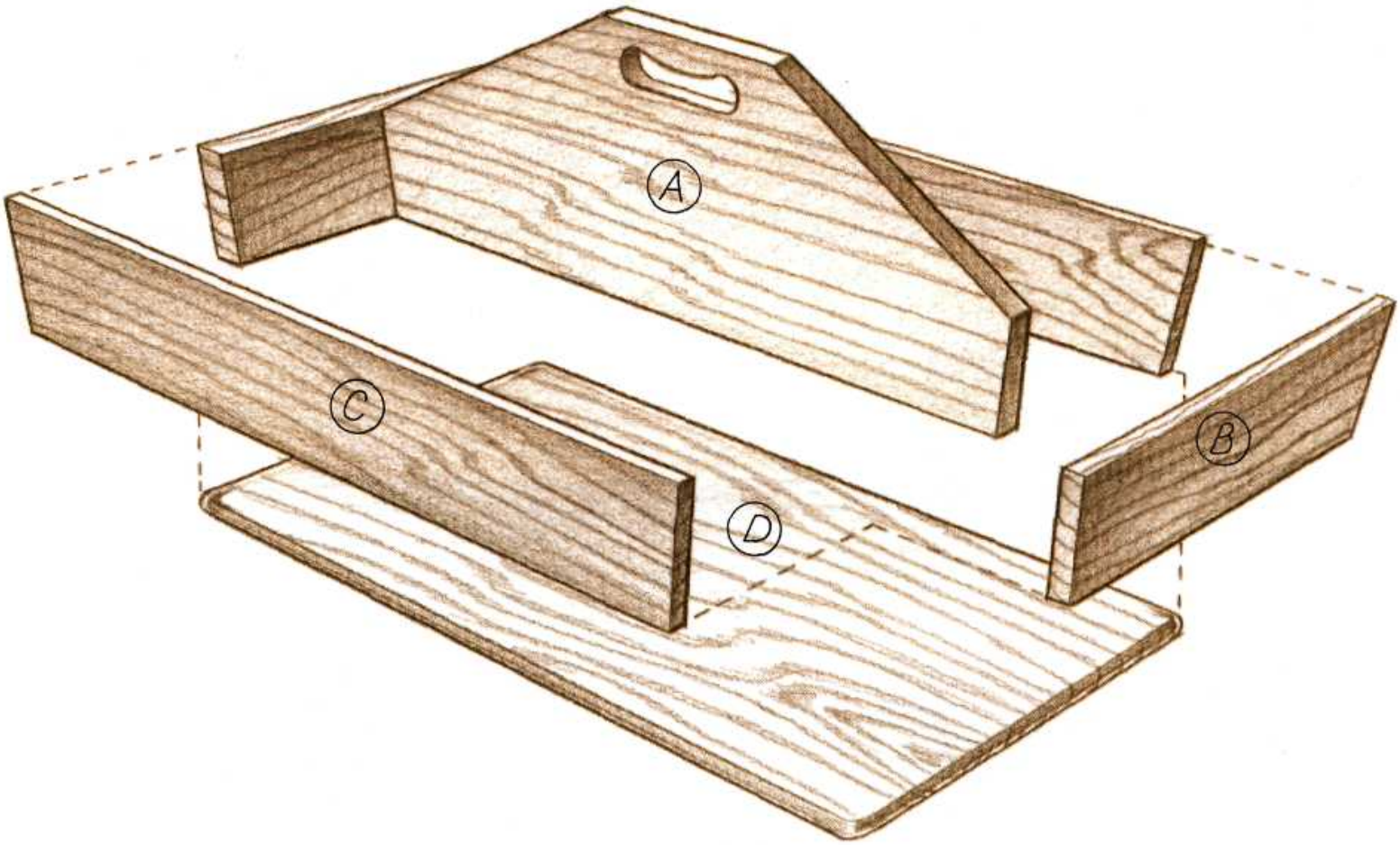
SHOP TIP: To get perfectly aligned shoulders on the tenons, guide the cut against the table saw fence. First, screw a straight, surfaced length of wood to the fence to protect it. Set the fence so the 3/4-inch-wide dado blade just touches it. Guide the stock over the cutter with the miter gauge. Turn the stock over and repeat.

7 Apply finish. Finish sand the parts. The quilt rack shown has a light brown stain and is finished with shellac.

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MAGAZINE RACK





EXPLODED VIEW

CUTTING LIST

Part	Quantity	Dimension	Comment
A. Divider	1	¾″ × 9⅝″ × 27″	Cut to pattern.
B. Ends	2	¾″ × 4½″ × 15″	Cut to pattern.
C. Sides	2	½″ × 4½″ × 27″	Cut to fit.
D. Bottom	3	½″ × 12⅝″ × 26″	

Hardware

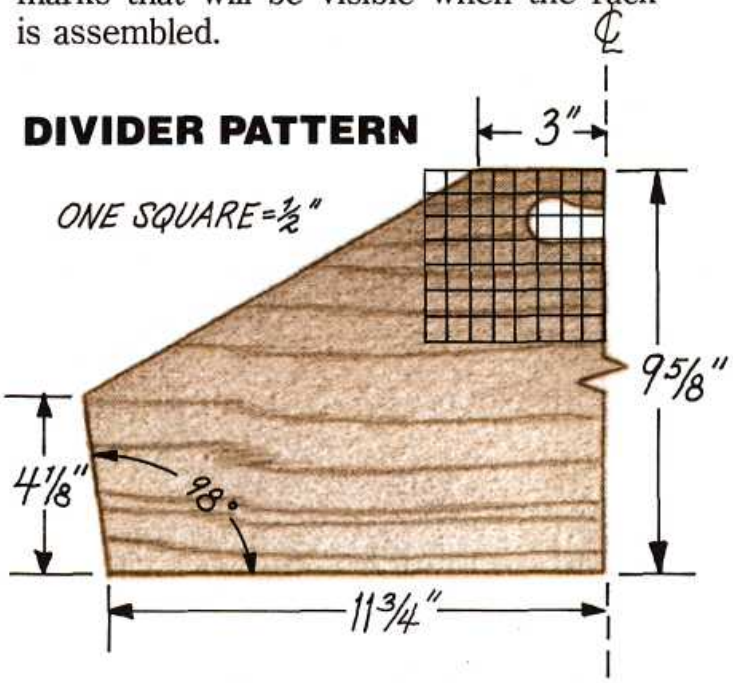
As needed, 4d square-cut nails

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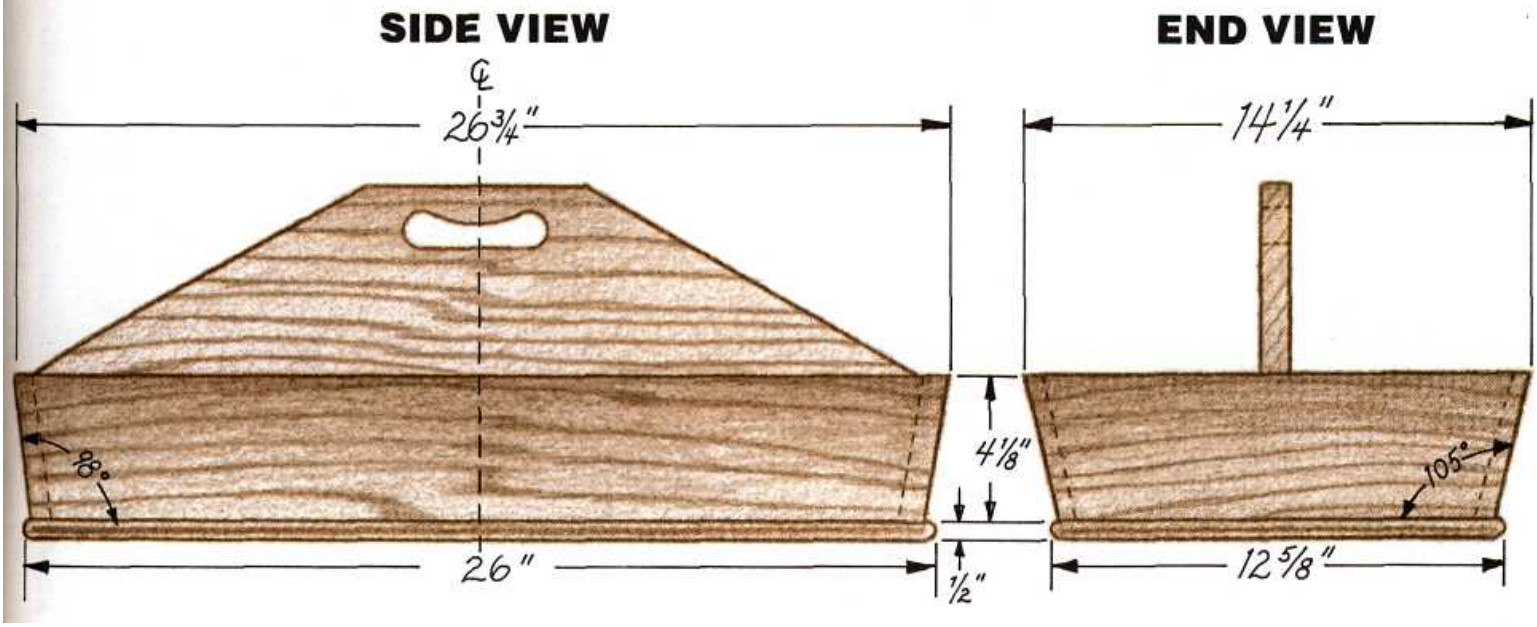
1 Select the stock and cut the parts. The tote is made up of four basic parts: divider, ends, sides, and bottom. Joint, plane, rip, and cut the parts to the sizes given in the Cutting List. The dimensions for the divider, end, and sides are all slightly long. You will cut them to size as you make the rack.

2 Cut out the divider. Lay out the shape of the divider directly on the wood. First, draw a 23½-inch-long line along the bottom. Draw 98-degree angles on each end of the line, as shown in the *Divider Pattern*. Mark where they end on the board. Draw the 6-inch straight section along the top of the divider. Connect the end of the angles with the end of the straight section to lay out the long slope of the divider.

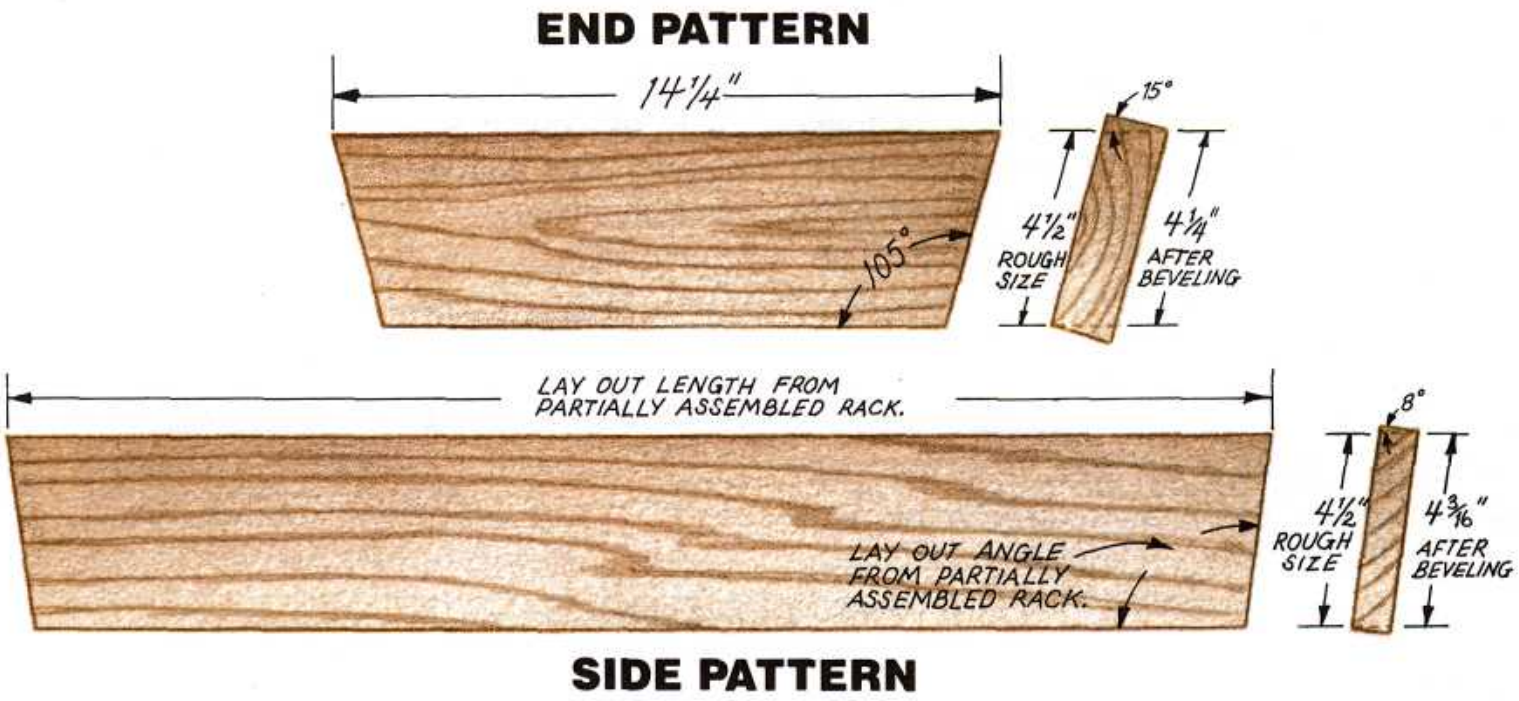
Cut out the ends of the divider on your table saw with the miter gauge set to 8 degrees. Cut the long slope with a saber saw, hand saw, or circular saw. Drill 1-inch-diameter holes for the handle, as shown in the pattern. Sketch a curve that approximates that shown on the grid. Cut out the rest of the handle with a saber saw or coping saw. Sand away any saw marks that will be visible when the rack is assembled.



3 Bevel the ends and sides. Rip the end and side pieces to the profile shown in the *End Pattern, End View* and *Side Pattern, End View.* Cut two 105-degree angles on each end, as shown in the *Front View,* cutting the ends to length in the process.



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4 Nail the ends to the divider. Mark a centerline on the end grain of the divider and the inside face of each end. Put the divider in a vise, align the centerlines, and nail the ends in place.

5 Cut the sides to fit. Butt the sides in place against the ends and trace the angle of the ends on them. Set the miter gauge on the table saw to cut along the lines, then nail the sides in place. With a file or coarse sandpaper, round the top edges of the frame and the outer edge of the corners of the tote to simulate wear. There may be a slight gap at the seam between the sides and end. Don't worry; the gap's on the original, too.

6 Attach the bottom. The bottom is made of three boards nailed in place. Before you nail the boards in place, roundover what will be the exposed edges of the bottom. Put a ¼-inch-radius roundover bit in your router. Secure the router in a router table. Adjust the height of the bit and position the fence to rout the profile shown. Rout the appropriate edges. Nail the boards in place with a single nail at each end; allow a ⅛-inch gap between the boards. The gap isn't mere country sloppiness; it allows the bottom to expand and contract without pushing the sides apart.

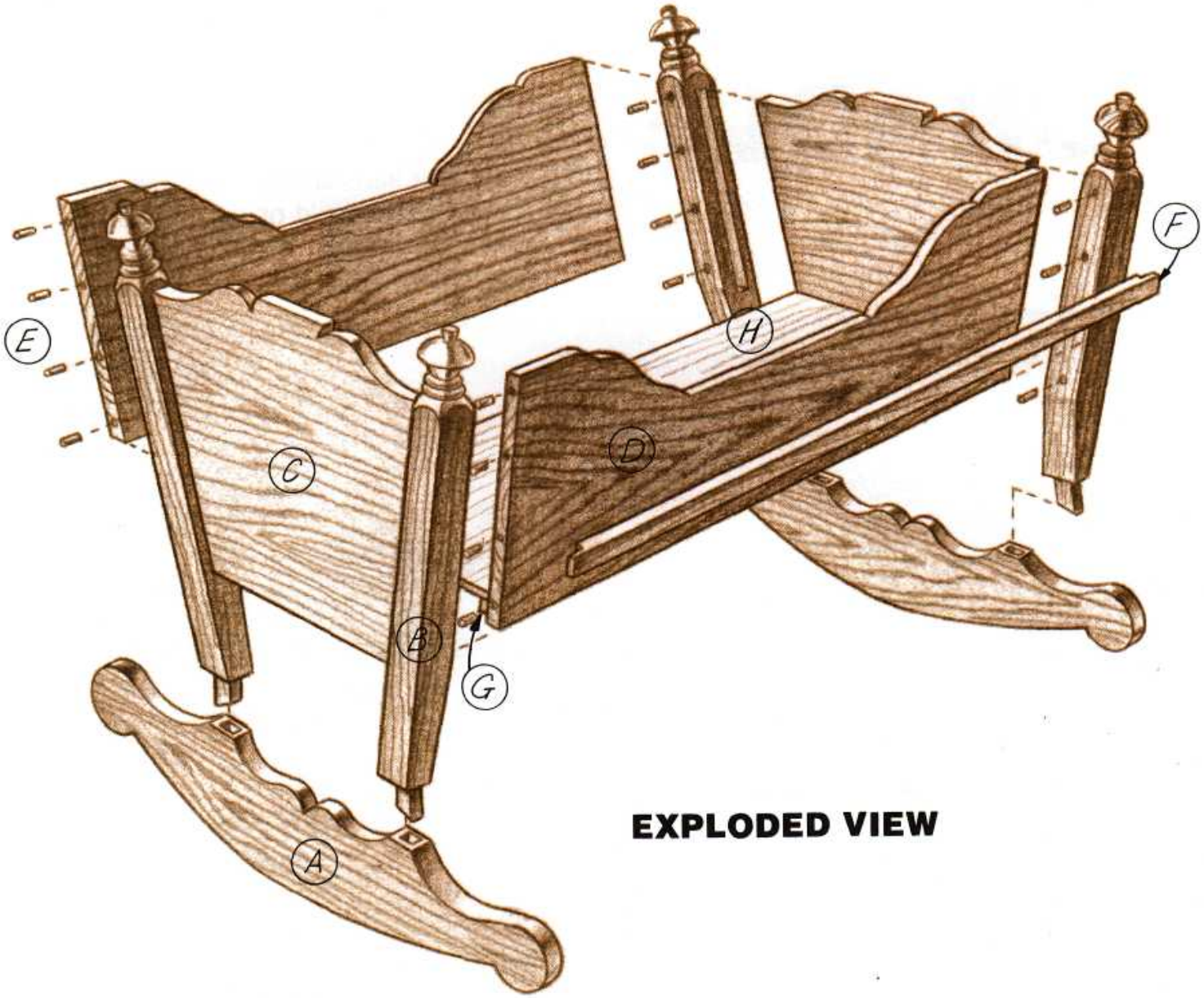
SHOP TIP: End grain tends to splinter when routed. To prevent this, guide the cut with a square piece of plywood that measures at least 12 × 12 inches. Put one edge of the plywood against the board and an adjoining edge against the fence. Keep the end of the board against the fence as you rout. The plywood will support the edge of the board and keep it from splintering.

7 Apply finish. The original magazine rack has a painted interior and a varnished exterior. After sanding the whole piece, finish your rack however you desire.

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CRADLE





EXPLODED VIEW

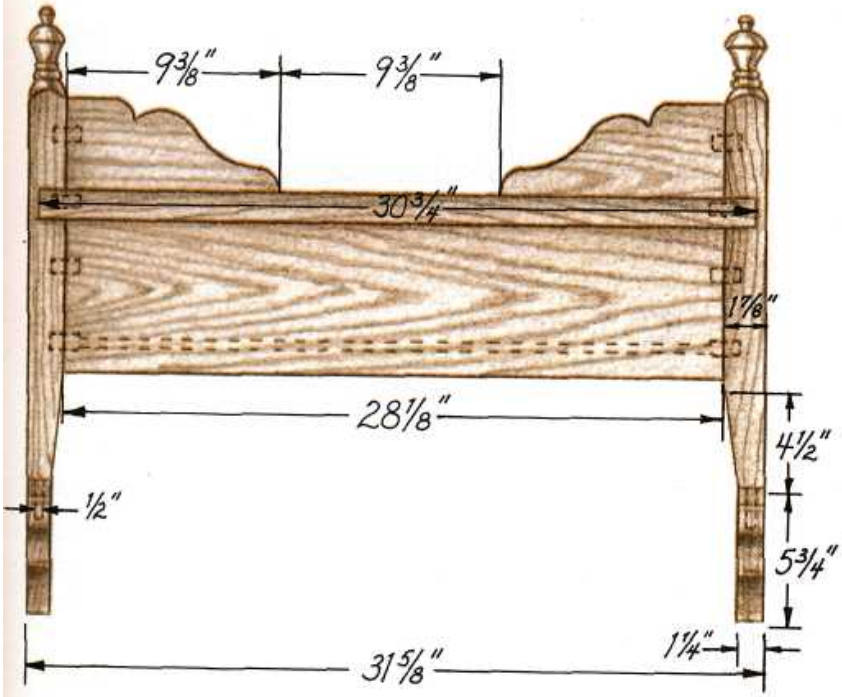
CUTTING LIST

Part	Quantity	Dimension	Comment
A. Rockers	2	1¼" × 5¾" × 28¼"	
B. Corner posts	4	1¾" × 1¾" × 24"	Cut to 22" after turning.
C. End panels	2	⅞" × 13⅜" × 16⅝"	
D. Sides	2	⅞" × 11⅝" × 28⅛"	
E. Dowel stock	1	½" dia. × 20"	Cut to fit.
F. Side strips	2	⅝" × 1¼" × 30¾"	
G. Floor support	2	7/16" × ⅞" × 28⅛"	
H. Floor boards	9	⅜" × 3 3/16" × 13⅝"	Cut to fit.

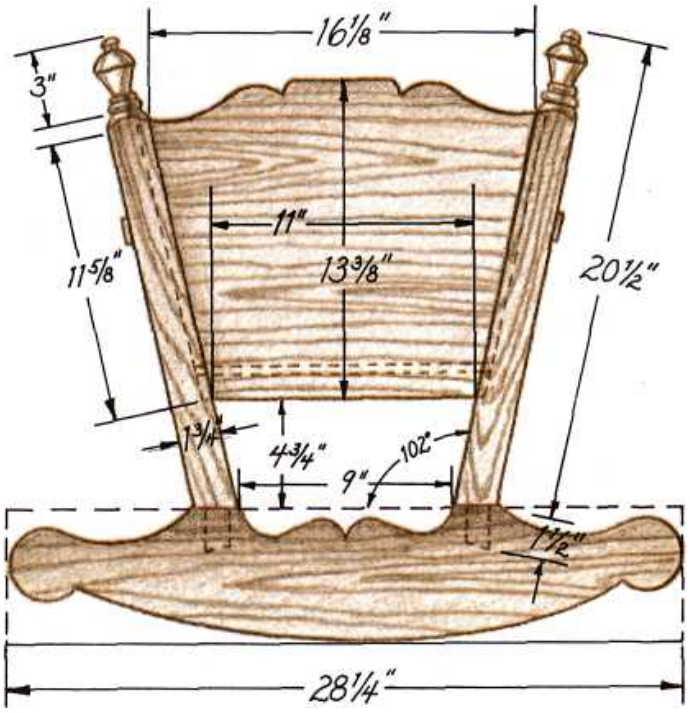
Hardware

As needed, #4 × ¾-in. flathead wood screws

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SIDE VIEW



END VIEW

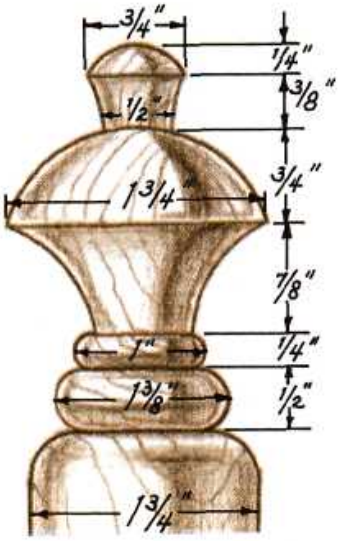
1 Select the stock and cut the parts. You can build this cradle out of pine, but an heirloom like this really deserves a hardwood like mahogany, walnut, or cherry. Choose straight, flat stock. Joint, plane, rip, and cut the parts to the sizes given in the Cutting List. If necessary, glue up stock to make the sides and end panels.

2 Drill the mortises in the rockers. Lay out the mortises on the rocker blanks as shown in the *End View* and *Side View.* Put a ½-inch drill bit in the drill press and set the depth stop to drill a hole 1½ inches deep. Drill a series of holes inside the layout lines. Then cut up to the layout lines with a sharp chisel.

3 Turn the knobs on the corner posts. Put a corner post in your lathe and turn the "knob" on its end to the dimensions shown in the *Corner Post Detail.* Remove the corner post from the lathe and trim off the waste. Turn the remaining posts, then crosscut the corner posts to the finished length.

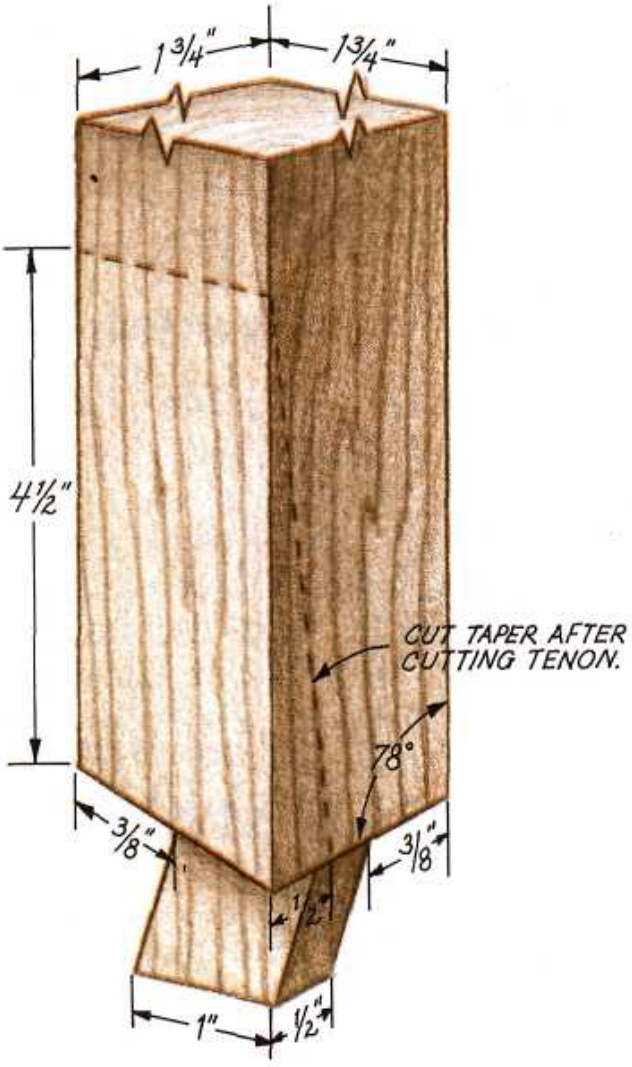
If you don't have a lathe, you can either purchase knobs or finials separately and attach them, or make decorative top details with the table saw or band saw as shown in the *Alternate Table Saw/Band Saw Corner Post Detail.*

CORNER POST DETAIL



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4 Cut the corner post tenons. The tenons at the bottom of the corner posts are angled as shown in the *End View.* Lay out tenons according to the dimensions shown in the *Tenon Detail.* Cut the tenons by hand with a dovetail saw or backsaw, constantly checking the tenons for proper fit in their mortises. For step-by-step directions on cutting angled tenons, refer to "Angled Tenons" on page 138.



TENON DETAIL

5 Rout grooves for the end panels. The end panels are housed in grooves in the corner posts. Put a ⅜-inch straight bit in your router. Secure the router in a router table and adjust the height to cut a groove ¼ inch deep and adjust the fence to cut the groove down the middle of the corner post. Rout an 11⅝-inch-long groove, beginning just below the finial. Square off the ends of the groove with a chisel.

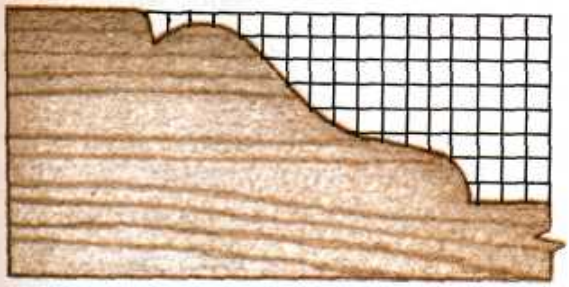
6 Taper the corner posts. Lay out the taper shown in the *Side View* on the bottom of the corner posts. The taper begins 4½ inches from the shoulder of the tenon. Cut the taper on the band saw, staying 1/16 inch to the waste side of the layout lines. Complete the taper on each post by sanding down to the layout lines.

7 Cut the end panels to size. Lay out the angle on the ends of the panels to the dimensions shown in the *End View.* Cut along the layout lines with a band saw or jigsaw.

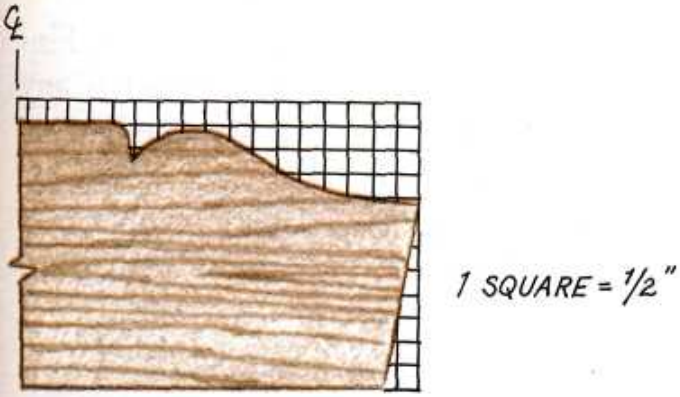
Both ends of the panels are rabbeted on both sides, creating a tongue that fits in the corner post groove. Cut the rabbets on the table saw or router so that they leave a tongue ⅜ inch thick. If necessary, put a wooden auxiliary fence over the tool's fence to protect it from the cutter. Guide the cut along the auxiliary fence.

8 Cut the curves on the end panels, rockers, and sides. To cut the curves on the end panels, first draw a ½-inch grid on a piece of paper and draw the *End Panel Detail* onto it. Transfer the pattern to the stock. To ensure that the panel fits snugly in the groove, cut 1/16 inch wide of the layout lines. Shave the excess away with a round-bottom spokeshave or file until the panel fits in the groove. Smooth the rest of the curve with the spokeshave or file and sandpaper.

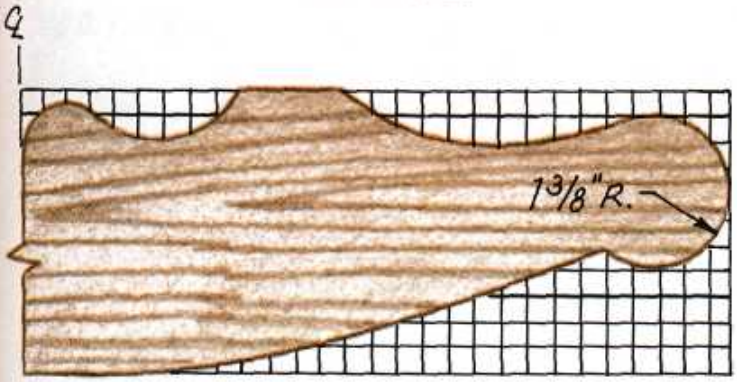
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SIDE DETAIL



END PANEL DETAIL



ROCKER DETAIL

Lay out and cut the curves on the sides and rockers following the patterns shown in the *Side Detail* and *Rocker Detail.* Smooth the curves as before.

9 Assemble the cradle ends. Assemble the ends one at a time. Put glue in the corner post grooves and rocker mortises. Slip the panel in its grooves and the corner post tenons in the rocker mortises. Clamp the assembly together and allow it to dry.

SHOP TIP: Clamping nonparallel surfaces, like those of the corner posts, can be tricky. To provide parallel surfaces, cut 3-inch blocks from a scrap 2 × 4. Cut one long face of the wedge at 78 degrees to the short face. Put the wedges between the clamp heads and the corner posts when clamping to provide parallel surfaces.

10 Glue the sides to the end units. Lay out the dowel holes shown in the *Side View* along the center of the corner posts. The holes should be evenly spaced, but their exact locations aren't critical. Drill the holes. To transfer their locations to the cradle sides, put dowel centers in the holes and press the cradle lightly together. The points on the dowel centers will mark the cradle sides, showing you exactly where to drill the dowel holes. Drill the holes, then glue, dowel, and clamp the cradle sides to the assembled end units. After you've clamped the sides in place, measure diagonally from corner to corner to make sure the cradle is square. If one diagonal is longer, clamp gently across it until the diagonals are equal.

SHOP TIP: When you rock a rocking cradle or a rocking chair, it will scoot across the floor if it was twisted when it was assembled. To ensure that this cradle is assembled properly, glue the sides with the cradle upside down on a flat surface. The tops of the four corner posts should touch evenly to ensure a true assembly.

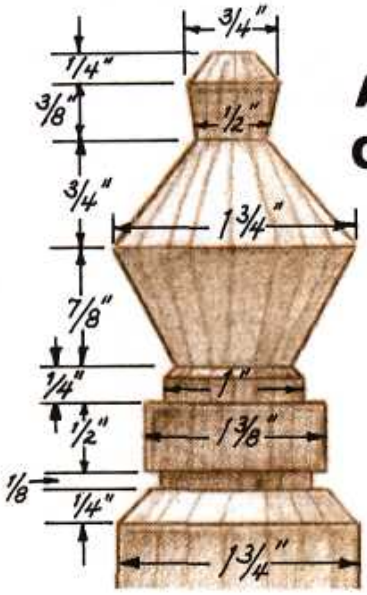
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11 **Attach the side strips.** Set the side strips in place against the side of the cradle and mark the position of the corner posts. On the band saw, notch each end of the side strips to fit around the posts. Lightly clean up the rough-sawed surface with a chisel. Thin and slightly round-over the end of each side strip on the stationary belt sander, then glue and clamp them onto the sides of the cradle.

12 **Make the floor support strips.** Set the table saw blade to 12 degrees and rip this angle on one edge of each of the floor support strips. Lightly joint the strips, then glue and clamp them to the inside bottom edge of the cradle sides as shown in the *End View.*

13 **Cut the floorboards to fit into the cradle.** With the table saw blade set at 12 degrees, crosscut the ends of each floorboard so the board just fits within the sides. Cut notches in the appropriate floorboards to fit around the corner posts. Sand the floorboards and attach them to the floor supports with #4 × ¾-inch flathead wood screws.

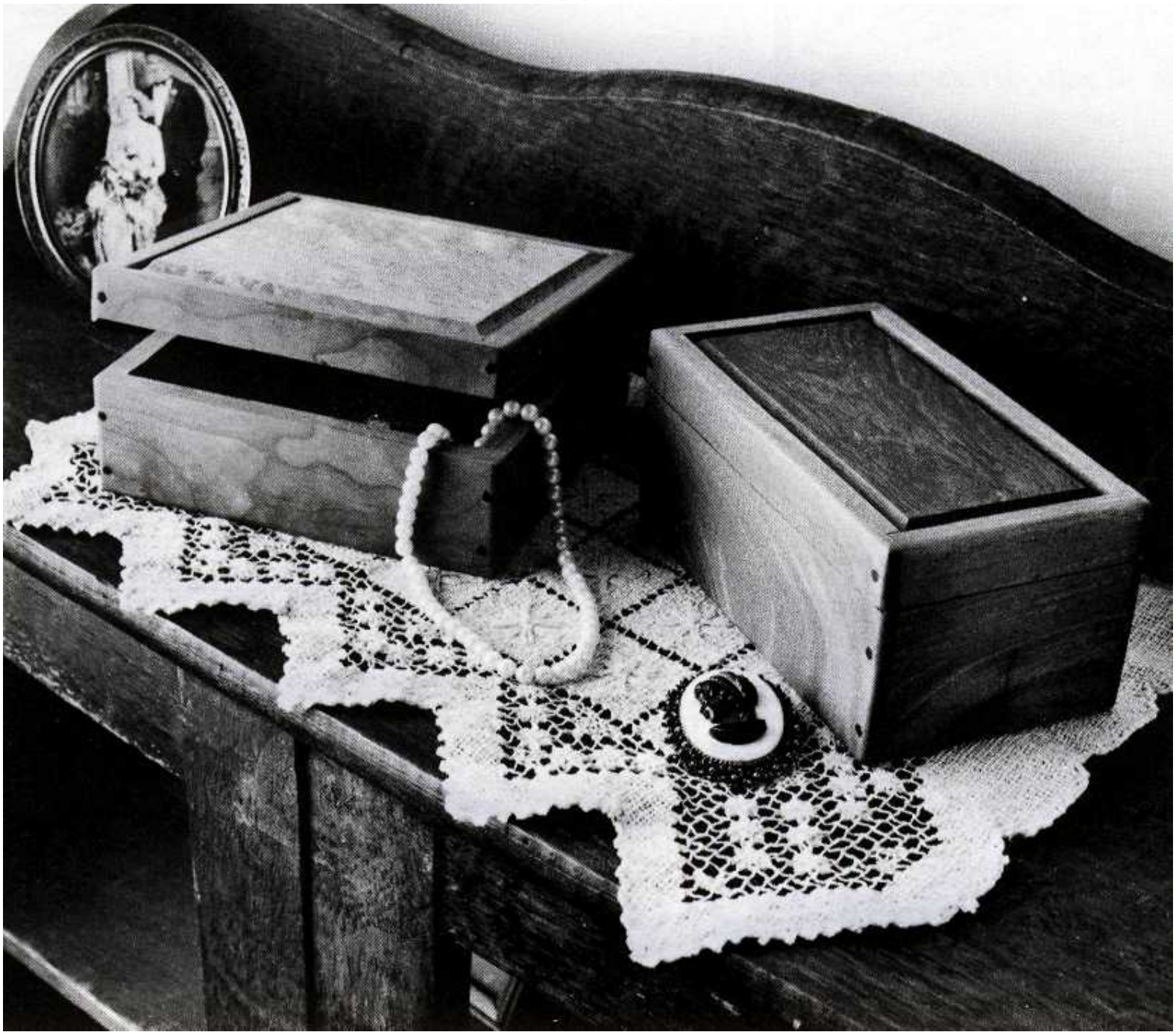
14 **Sand and apply the finish.** Finish sand the cradle. Remove any excess glue and round the sharp edges as you sand. When choosing the finish for your cradle, make sure that you choose a nontoxic formula. Stain and varnish or paint the cradle, and add the baby.



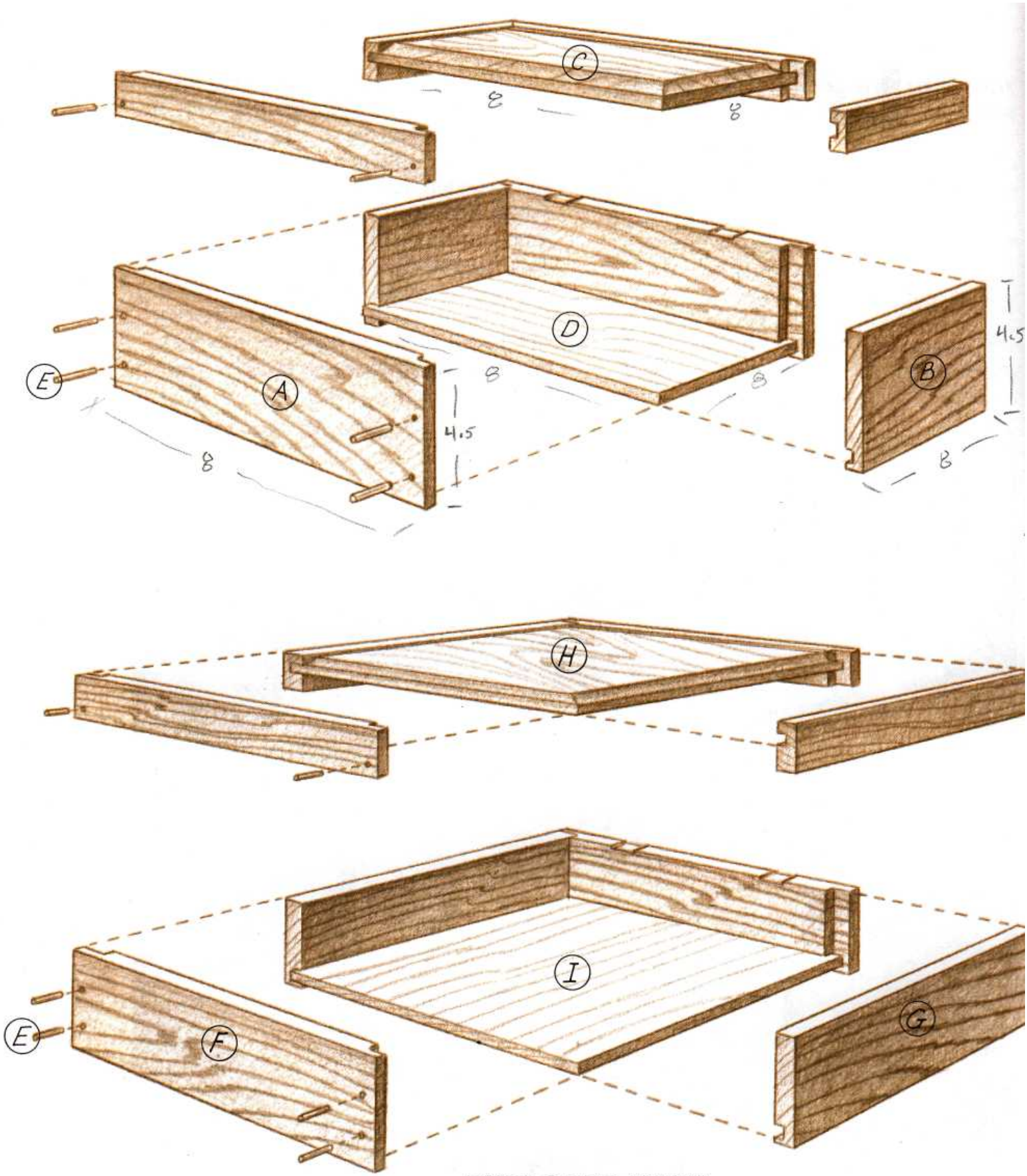
ALTERNATIVE TABLE SAW/BAND SAW CORNER POST DETAIL

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LITTLE BOXES



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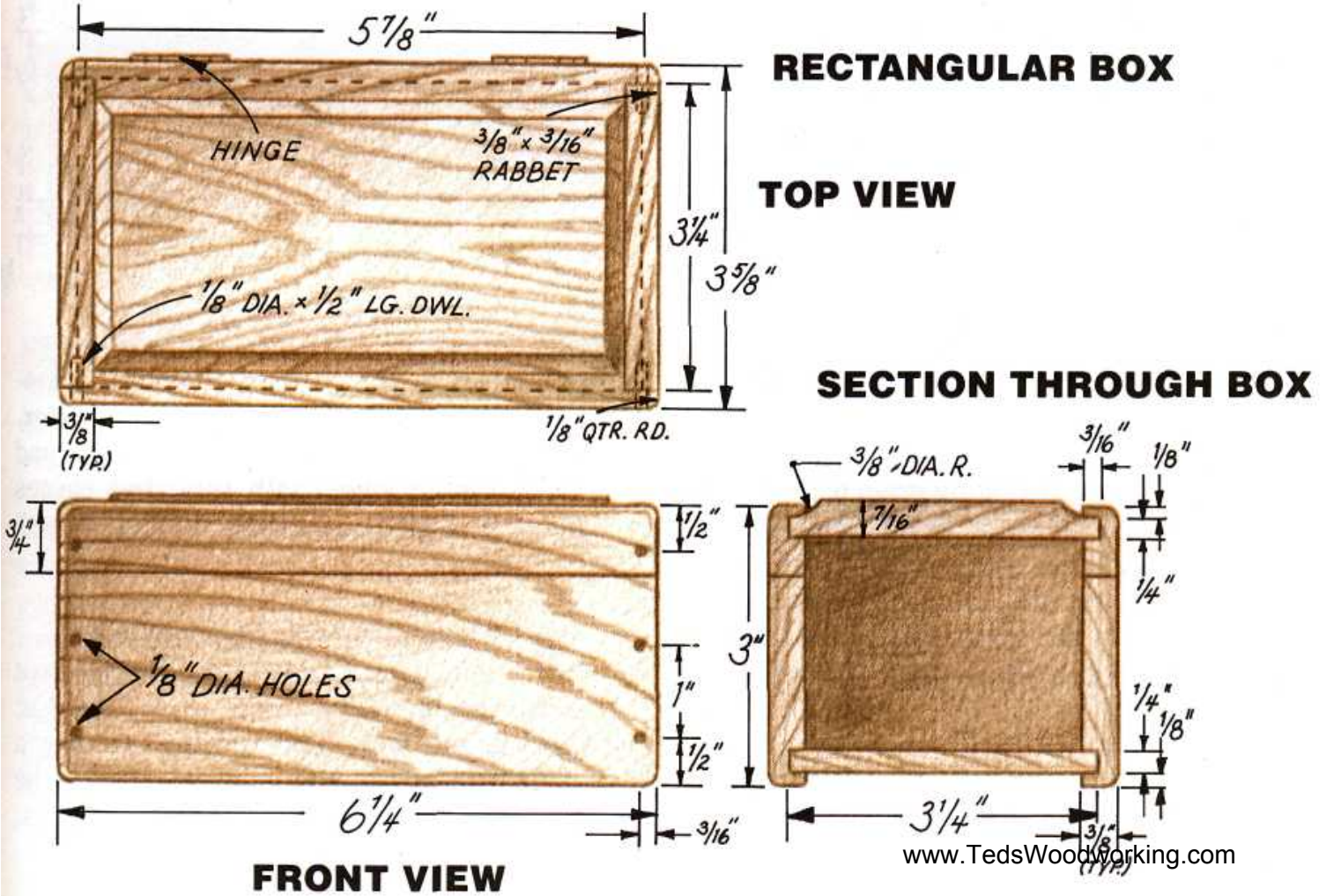
EXPLODED VIEW

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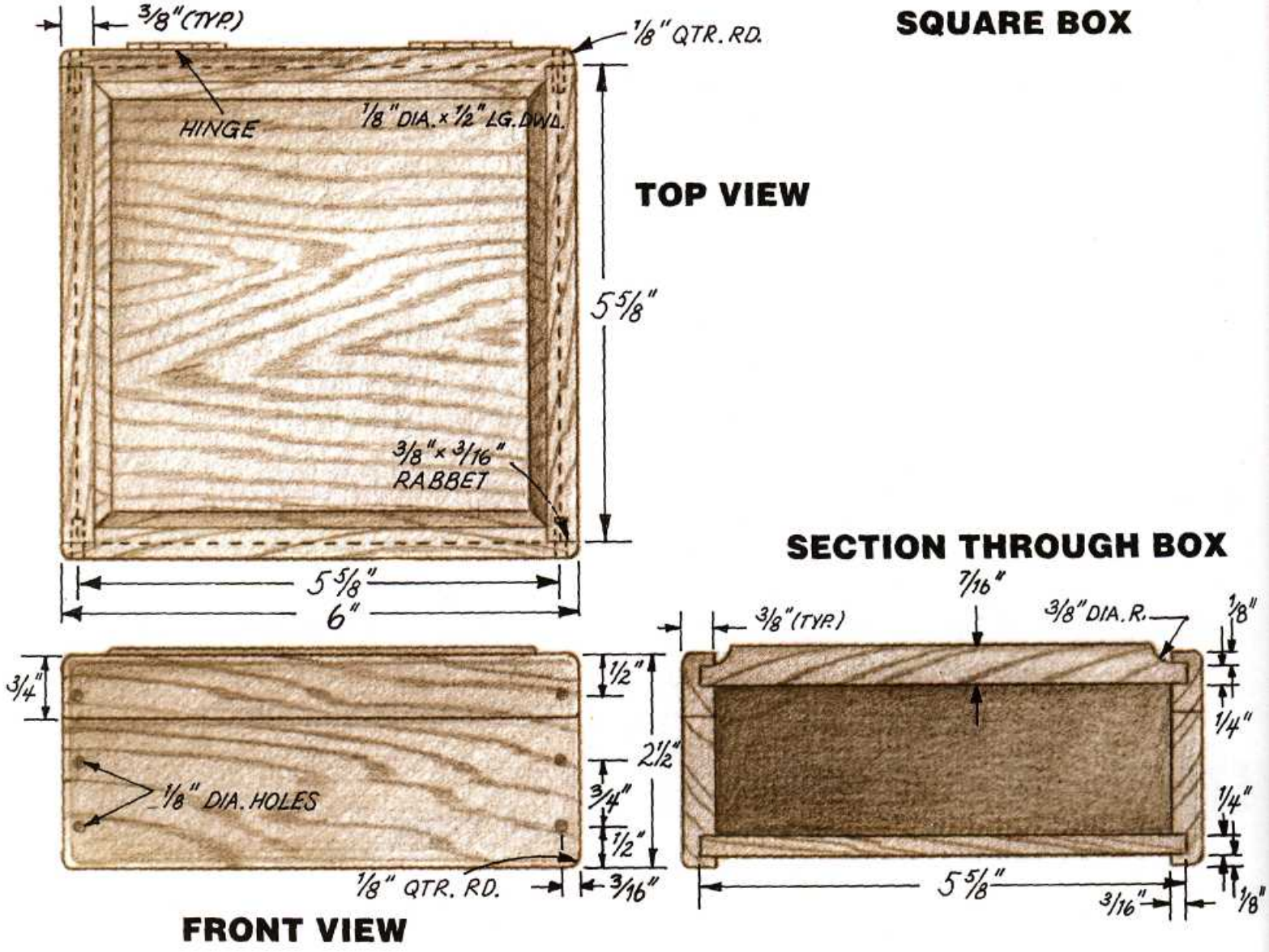
CUTTING LIST

Part	Quantity	Dimension	Comment
Rectangular Box			
A. Front/back	2	3/8" × 3 1/16" × 6 1/4"	Removing lid makes box 1/16" narrower.
B. Sides	2	3/8" × 3 1/16" × 3 1/4"	Removing lid makes box 1/16" narrower.
C. Top	1	7/16" × 3 1/4" × 5 7/8"	Trim to allow for expansion.
D. Bottom	1	1/4" × 3 1/4" × 5 7/8"	Trim to allow for expansion.
E. Pegs	12	1/8" dia. × 3/4"	
Square Box			
F. Front/back	2	3/8" × 2 9/16" × 6"	Removing lid makes box 1/16" narrower.
G. Sides	2	3/8" × 2 9/16" × 5 5/8"	Removing lid makes box 1/16" narrower.
H. Top	1	7/16" × 5 5/8" × 5 5/8"	Trim to allow for expansion.
I. Bottom	1	1/4" × 5 5/8" × 5 5/8"	Trim to allow for expansion.
E. Pegs	12	1/8" dia. × 3/4"	
Hardware			

2 13/16 × 1 3/16-in. hinges per box. Available from Meisel Hardware Specialties, P.O. Box 70, Mound, MN 55364. Part #1632.



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1 Select the stock and cut the parts. Look for straight, flat hardwood stock without knots. Try to find scraps with interesting grain patterns. Mix and match different wood types. Choose a tight-grained wood like walnut, maple, or rosewood for the pegs. Joint, plane, rip, and cut the parts, except for the pegs, to the sizes given in the Cutting List.

2 Cut grooves to receive the top and bottom. On your table saw, cut the grooves in the front, back, and sides as shown in the *Section through Rectangular Box* and *Section through Square Box*. Guide the stock against the fence and make the grooves with repeated passes over the blade, adjusting the fence with each cut.

3 Cut rabbets in the front and back. Cut the rabbets in the front and back as shown in the *Top View*. Cut the rabbets with repeated passes over a standard blade on the table saw. Guide the cuts with a miter gauge set at 90 degrees.

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4 Shape the top. To shape the raised-panel top put a 3/8-inch-radius cove bit in your router. Remove the bearing from the bit so that you can make a cut wider than normal. Secure the router in a router table. Cut a notch in a wooden fence that fits around the bit. Adjust the fence and bit height to cut the profile shown in the *Top View.*

SHOP TIP: When routing a profile around all four sides of the face of a piece of wood, rout the end grain first. Because of the nature of end grain, the wood tends to splinter at the corner when routing across the end of a board. You can't really avoid this splintering, but if you rout the end grain first, any splintering is cut away when you rout the sides.

5 Trim the top and bottom for expansion. When fitting a lid like this into a box, always leave room for the wood to expand. On the table saw, trim 1/32 inch from an edge parallel to the grain on the top and bottom panels to allow for this expansion.

6 Assemble the box. Test fit the sides, front, back, top, and bottom. Make sure that everything fits correctly and adjust as necessary.

When everything fits properly, lay the back on a flat surface and glue the sides into the rabbets. Then slide the top and bottom in place *without glue.* The bottom and top must be free to float in their grooves. Apply glue to the rabbets in the front of the box and put the front in place. Clamp the box together. Make sure that the sides are seated snugly in the rabbets.

Allow the glue to dry.

7 Drill and peg the rabbet joints. When the glue has dried, lay out and drill the 1/8-inch-diameter peg holes in the front and back as shown in the *Front View.*

With a block plane or spokeshave, shape the pegs to the size given in the Cutting List from 3/16-inch square stock. Tap the pegs into the peg holes and cut off any excess.

8 Round-over the edges and sand the box. Even up all the joints with sandpaper. Put a 1/8-inch roundover bit in the router. Secure the router in a router table and round all the edges of the box.

Finish sand the box.

9 Cut and hinge the top. To cut the lid from the rest of the box, set the box on edge on your band saw. Clamp a straightedge to the band saw to guide the cut, then cut slowly and carefully. Use push sticks to keep your hands away from the blade.

Sand away the kerf marks by rubbing the box lid and body over a piece of 180-grit sandpaper taped to a flat surface. Sand the cut edge as little as possible. Oversanding will produce an uneven fit.

The top is hinged to the body. The hinge is mortised between the back and top. With the hinge as your guide, mark and cut the hinge mortises. Cut the mortises by hand as explained in "Hinge Mortises" on page 7.

Mark and predrill holes for the hinge screws and attach the top to the back.

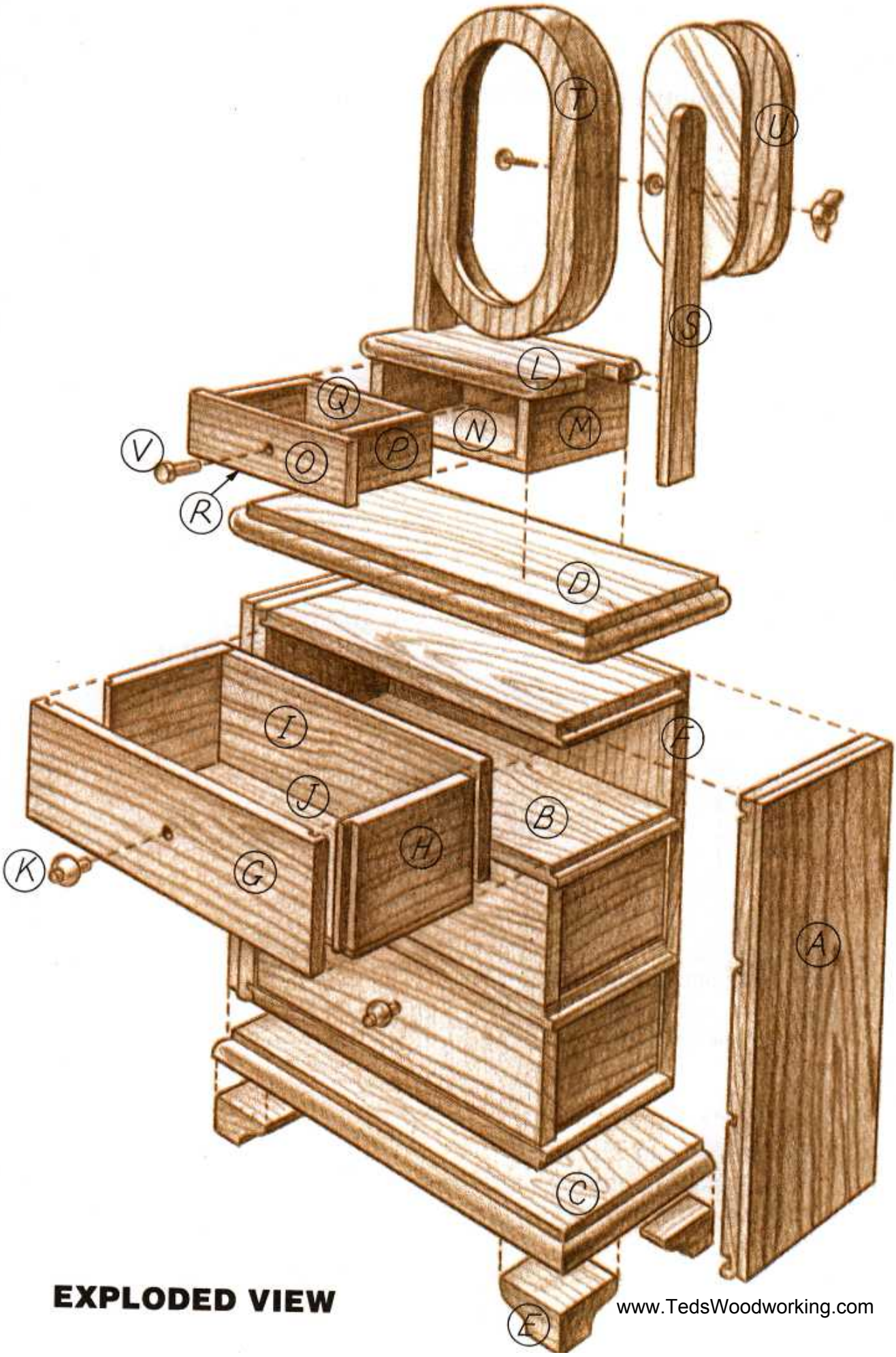
10 Finish the box. The boxes shown have an oil finish. If you have chosen a nice mix of hardwoods, you should show off the wood with an oil finish that brings out the grain and color.

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JEWELRY CABINET



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EXPLODED VIEW

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CUTTING LIST

Part	Quantity	Dimension	Comment
Lower Cabinet			
A. Cabinet sides	2	5/8" × 3 3/8" × 8 5/8"	
B. Drawer shelves	4	3/8" × 3" × 7 1/4"	
C. Cabinet bottom	1	13/16" × 3 1/2" × 8 5/8"	
D. Cabinet top	1	13/16" × 4" × 8 5/8"	
E. Foot stock	1	1 1/2" × 1 1/2" × 20"	Shape and cut to length.
F. Back	1	1/4" × 7 1/4" × 8 1/2"	Cut to fit.
G. Drawer faces	3	1/4" × 2 3/8" × 7 1/4"	Cut to fit.
H. Drawer sides	6	1/4" × 2 3/8" × 3"	Cut to fit.
I. Drawer backs	3	1/4" × 2 3/8" × 7 1/4"	Cut to fit.
J. Drawer bottoms	3	1/8" × 3" × 7 1/4"	Cut to fit.
K. Drawer knobs	3	5/8" × 5/8" × 3"	Cut after turning.
Upper Cabinet and Mirror			
L. Top	1	3/8" × 3 1/8" × 4 3/4"	
M. Sides	2	3/8" × 2 3/4" × 1 1/2"	
N. Bottom	1	1/4" × 2 3/4" × 3 1/4"	
O. Drawer face	1	1/4" × 1 3/4" × 4"	Cut to fit.
P. Drawer sides	2	1/4" × 1 1/4" × 3 1/8"	Cut to fit.
Q. Drawer back	1	1/4" × 1 1/4" × 3"	Cut to fit.
R. Drawer bottom	1	1/8" × 3" × 3"	Cut to fit.
S. Mirror supports	2	1/4" × 3/4" × 7 1/2"	
T. Mirror frame	1	1" × 3 7/8" × 7 1/4"	
U. Mirror back	1	1/4" × 3 7/8" × 7 1/4"	Cut to fit.
V. Drawer knob	1	5/8" × 5/8" × 3"	Cut after turning.

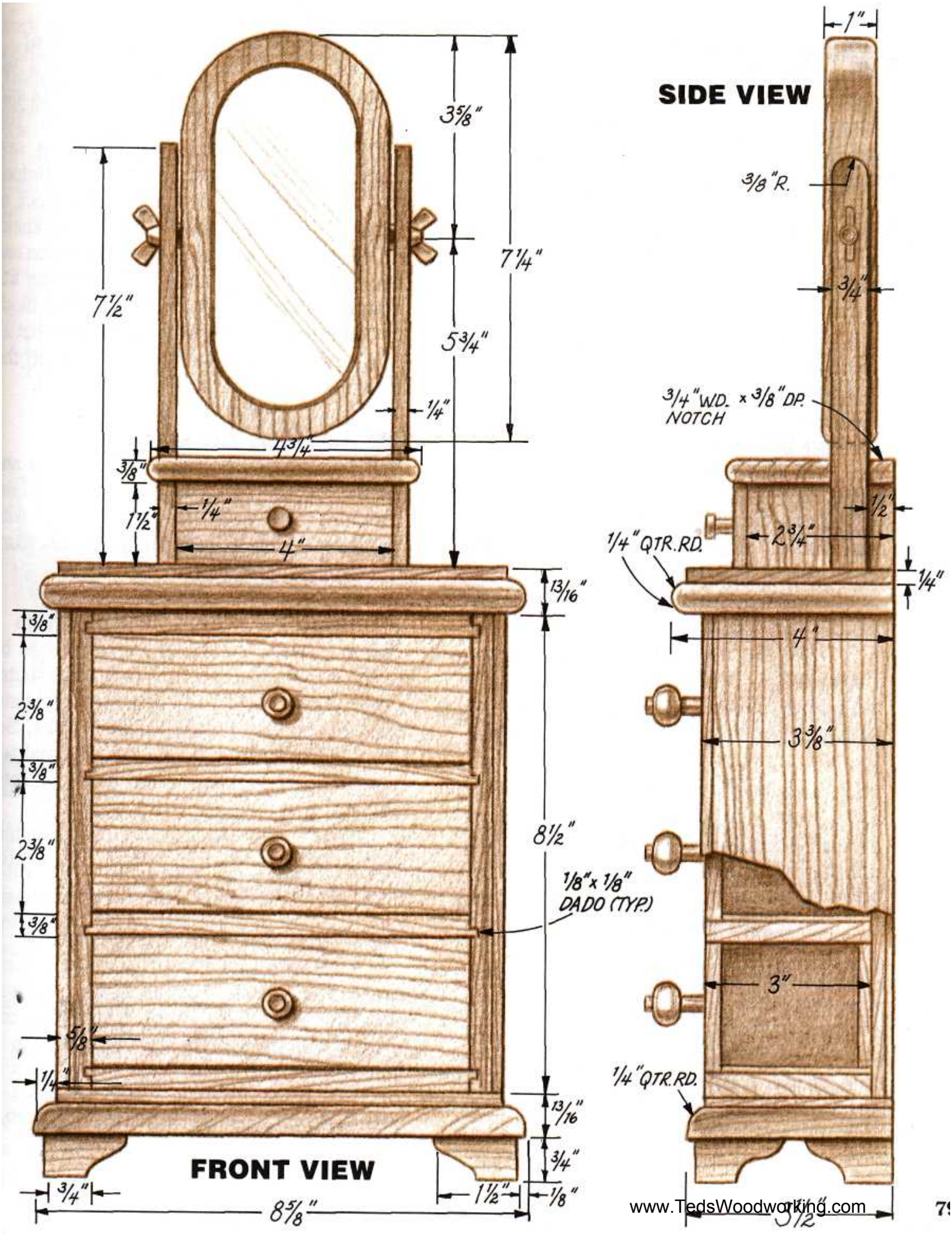
Hardware

As needed, 3/4-in. brads
2 1/8 × 2-in. bolts with wing nuts and washers
As needed, 1/2-in. brads
1 1/8 × 3 3/8 × 6 5/8-in. oval mirror glass
6 pushpins

1 Select the stock and cut the parts. Choose a close-grained wood such as cherry for this cabinet. The open grain of a wood such as oak would seem coarse in a project this size. One board should provide all the material you need.

Because this project requires thin pieces of stock, resaw thicker material on your band saw or table saw where necessary. Joint, plane, rip, and cut the parts to the sizes given in the Cutting List.

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2 Cut the shelf dadoes in the sides. The shelves fit into the sides with dado joints the width of the table saw blade. Adjust the height of the blade to cut a ⅛-inch-deep dado. Lay out the dado spacing on one of the sides.

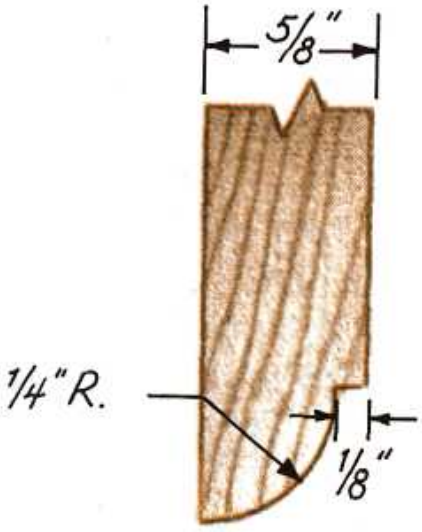
Screw a long wooden extension to your miter gauge. Position the cabinet side against the extension to cut one of the dadoes. Clamp a stop block to the fence at the end of the side farthest from the blade.

Cut the first dado. Put the other cabinet side against the stop block and cut a dado on the second side. The stop block ensures perfectly matching dadoes.

Cut all the dadoes in both sides.

3 Rout the front edge of the sides. This detail is easily made. Put a ¼-inch roundover bit in your router. Secure the router in a router table and adjust the height of the bit so there is a step with the roundover as shown in the *Edge Detail.* Set up a fence to guide the side as you rout. If you don't use a fence, the bit's bearing will fall into the dadoes.

EDGE DETAIL



4 Cut the tongue in the ends of the shelves. Each shelf has a ⅛-inch-long tongue on each end that fits into the dadoes cut in the cabinet sides. You can cut these tongues on the table saw with the miter gauge as a guide. Before you do, cut a sample tongue in a piece of scrap. The scrap should be the thickness of the actual shelves. Adjust the fence and the blade height, until the sample fits snugly in the dadoes. Clamp a stop block to the miter gauge fence to ensure that all tongues are the same length. Cut the tongues. Sand the shelves and sides.

5 Assemble the sides and shelves. On a flat surface, glue and clamp the shelves into the dadoes. Make sure the front of the shelves are flush with the front of the sides. Check to make sure the cabinet is square.

6 Rout the profile in the bottom and top. Put a ¼-inch roundover bit in the router. Secure the router in a router table. Raise the bit to cut a step the same size as the one on the cabinet sides. Set up a fence and guide the bottom and top against it as you cut. Rout the front and sides of each piece.

After you cut the stepped profile, lower the bit to round-over the bottom edge of the top.

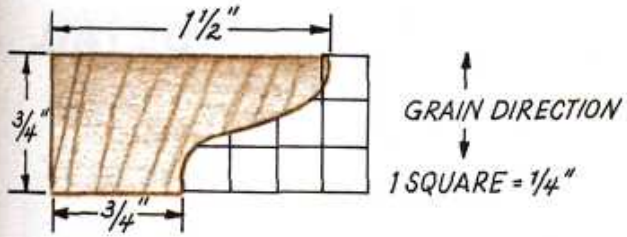
7 Attach the top and bottom to the side and shelf assembly. Sand the top and bottom cabinet pieces. Position them as shown in the *Front View* and *Side View,* then glue and clamp them in place.

8 Shape and attach the feet. Because the feet are small, the Cutting List calls for extra-long stock so you can

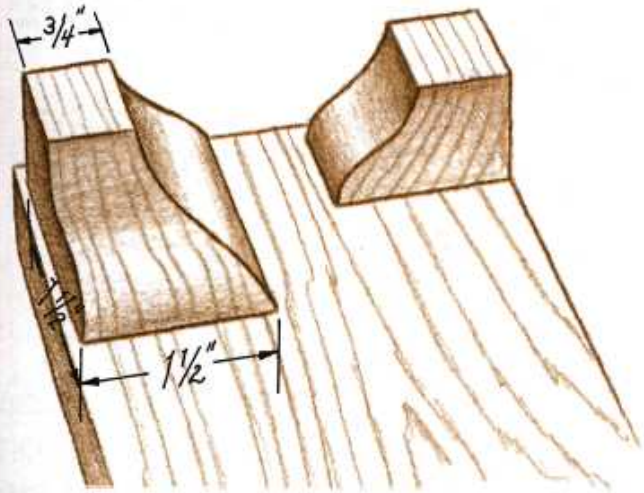
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work safely. Cut the end of the stock on a band saw to the shape shown in the *Foot Detail.* Sand or file the cut smooth. Cut the foot to its finished length on the table saw.

Repeat the process with each foot. Then glue and clamp the feet in place to the cabinet bottom.



FOOT DETAIL



9 Attach the cabinet back. The cabinet back is attached to the cabinet with ½-inch brads. Measure the opening for the back and cut the back to fit. Predrill holes for the brads through the back pieces and into the shelves. Drill the holes with a bit that matches the size of your brads and then tap the brads in place.

SHOP TIP: Predrill brad holes by putting a brad in your drill instead of a regular drill bit. Drill the holes as you normally would for a hole the exact diameter of the brad.

10 Notch the upper cabinet top. Round-over the front and sides of the upper cabinet top to the profile shown with a 3/16-inch-radius roundover bit. Lay out the ⅜-inch-deep notch on each side of the top for the mirror support and cut the notches on a band saw.

11 Assemble the upper cabinet. Sand the top, sides, and bottom of the upper cabinet. Assemble the upper cabinet with glue and ¾-inch brads. First, set the sides against the bottom and drill brad holes through the sides into the bottom. Apply glue to the mating surfaces and tap the brads in place. Next, center the top over the sides, as shown in the *Front View* and *Side View,* and drill brad holes through the top and into the sides. Again, apply some glue and tap in the brads.

When the glue has dried, glue and clamp the upper cabinet in position on the top of the lower cabinet and clean up any excess glue.

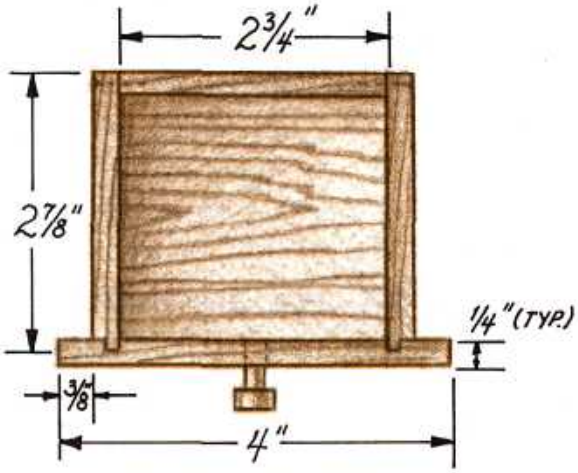
12 Cut and assemble the drawers. Whenever you build a cabinet with drawers, it's a good idea to fit the drawer parts to the actual cabinet. The dimensions in the Cutting List yield parts about ¼ inch larger than needed. Measure the opening for the drawers and cut the parts to make drawers that are 1/16 inch smaller than the actual openings.

The upper drawer face overlaps the cabinet sides, while the lower drawers do not. Although this means the joints are spaced differently, construction of the joints is identical. The sides of the drawers are attached to the drawer fronts with small tongue-and-groove joints. Cut the joints on the table saw, the same way you cut the joints for the shelves.

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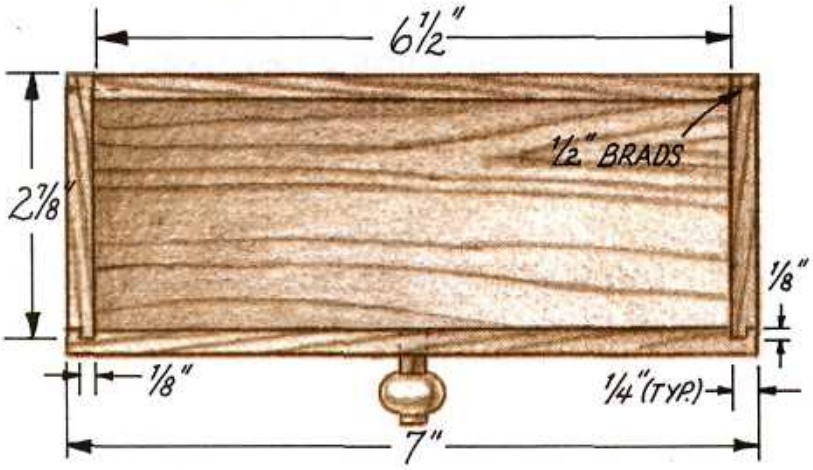
Sand all the drawer parts. Attach the sides to the back with glue and ½-inch brads as shown in the *Upper Cabinet Drawer, Top View* and *Lower Cabinet Drawer, Top View.* Predrill through the sides into the back for the brads, then glue and brad the sides to the back. Glue and clamp the side tongues into the dadoes in the drawer face. Glue and clamp the drawer bottom to the underside of each drawer. Keep each drawer flat and square.

UPPER CABINET DRAWER



TOP VIEW

LOWER CABINET DRAWER

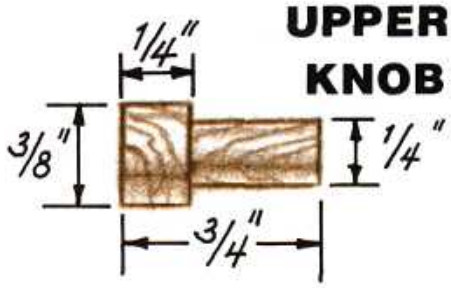


TOP VIEW

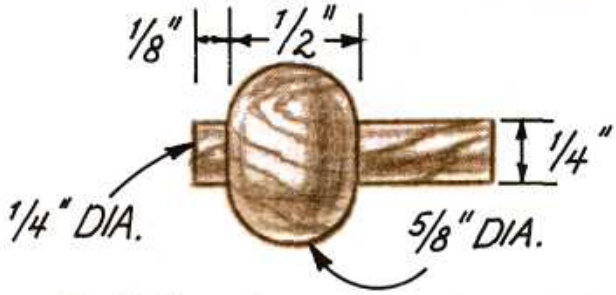
13 Turn or purchase the drawer knobs. Turn the knobs to the profile shown in the *Upper Drawer Knob Detail* and *Lower Drawer Knob Detail* or purchase similar knobs at a hardware store.

Drill a hole in each drawer face for the knob shaft and glue the knobs in place.

UPPER DRAWER KNOB DETAIL



LOWER DRAWER KNOB DETAIL



14 Cut the mirror supports to shape. Lay out the ⅜-inch-radius curve at the top of each mirror support. Cut the curve on the band saw and sand away the saw marks.

Lay out and drill holes for the bolts and wing nuts shown in the *Front View.* Sand the supports, then attach them to the upper cabinet sides with glue and ½-inch brads.

15 Make the mirror frame. First, draw a ¼-inch grid on a piece of paper and draw the *Mirror Frame Detail* onto it. Transfer the pattern to the stock, drill a ⅜-inch hole in the center section, and cut out the center shape with a jigsaw or scroll saw. Sand the sawed edge smooth.

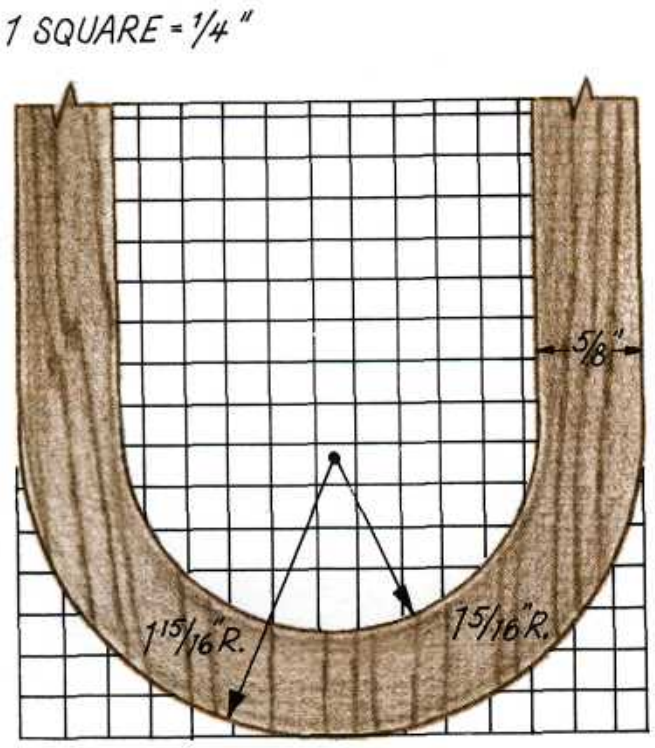
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Put ¼-inch roundover bit in a router. Secure the router in a router table and adjust the bit to cut the profile shown in the *View through Mirror Frame.*

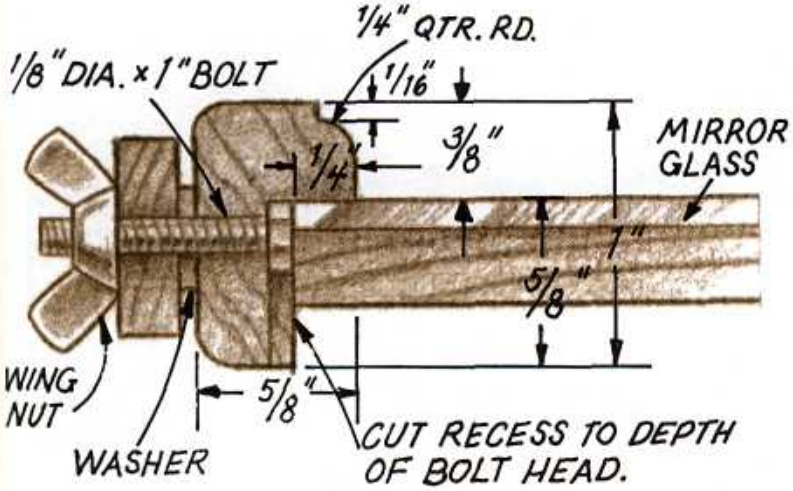
Next, rout a ¼ × ⅝-inch rabbet in the back of the mirror frame to accept the mirror glass and back. You can rout this rabbet with a normal ⅜-inch rabbeting bit, but you must first add a larger bearing. Replace the bearing on your ⅜-inch rabbeting bit so that you can cut a ¼-inch-wide rabbet. Cut the ⅝-inch-deep rabbet in two passes. Cut the back to fit in the rabbet.

After you've rabbeted for the back, cut the outside of the mirror frame to shape with a jigsaw or band saw and sand the sawed edge smooth. Round-over the outside edges of the mirror frame with a ¼-inch roundover bit.

MIRROR FRAME DETAIL



VIEW THROUGH MIRROR FRAME



16 Attach the mirror frame to the mirror supports. The mirror frame attaches to the mirror supports with ⅛-inch bolts and wing nuts. Drill ⅛-inch-diameter holes for the bolts centered in each side of the mirror frame as shown in the *Front View.*

Next, chisel out a recess in the mirror frame rabbet for the bolt head as shown in the *View through Mirror Frame.* Cut the recess deep enough so that the bolt head is flush with the surface of the wood.

Finally, put the mirror frame between the mirror supports and insert the bolts into their holes. Put small washers between the mirror frame and support and turn the wing nuts in place.

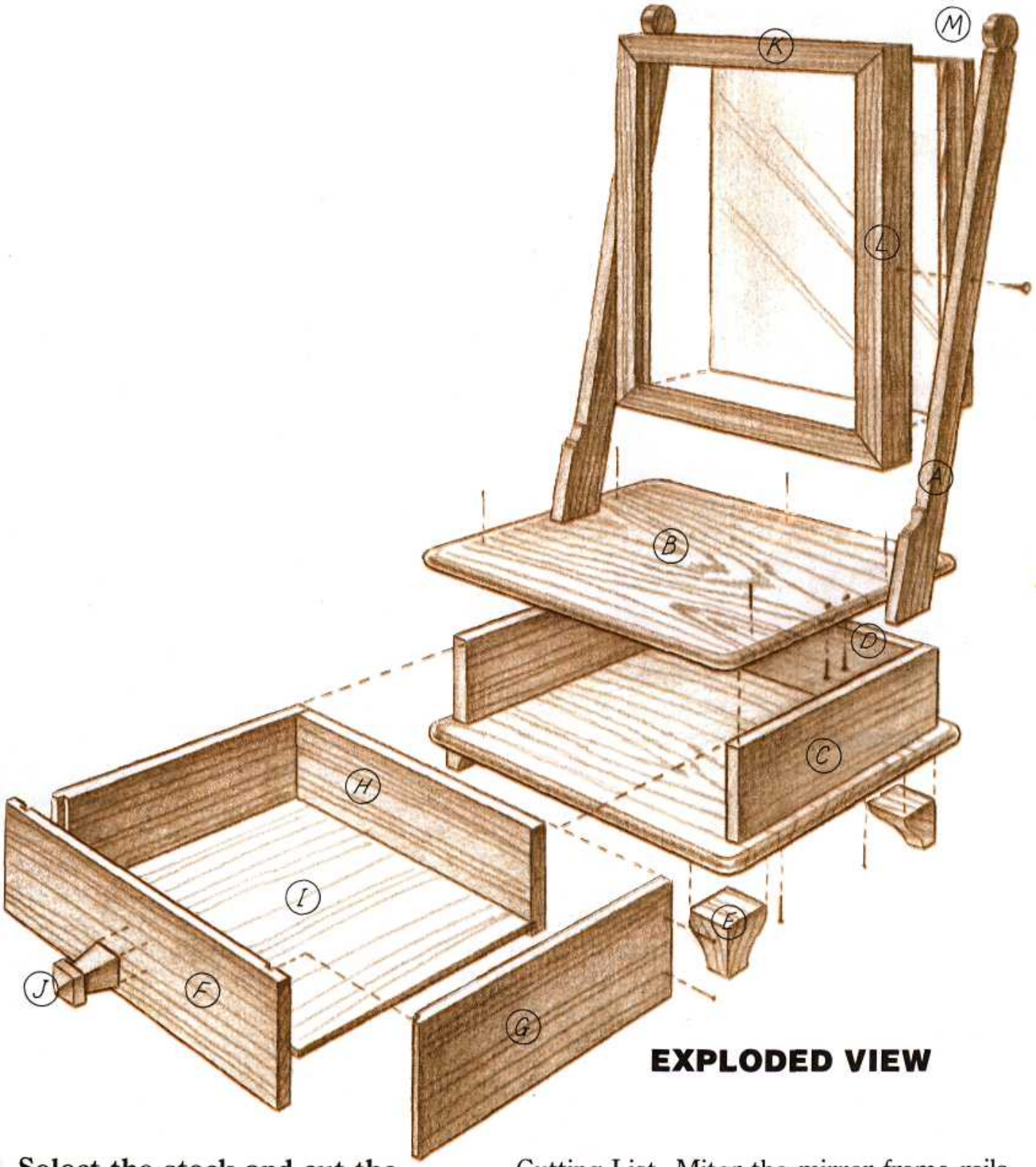
17 Apply the finish. Remove the mirror frame from its supports and finish sand the jewelry cabinet. The cabinet shown has an oil finish. Heavy varnishes could interfere with the movement of the little drawers. When the finish is dry, put the mirror frame back in its supports and install the mirror glass and back. Hold the mirror glass and back in place with push pins.

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DRESSING MIRROR



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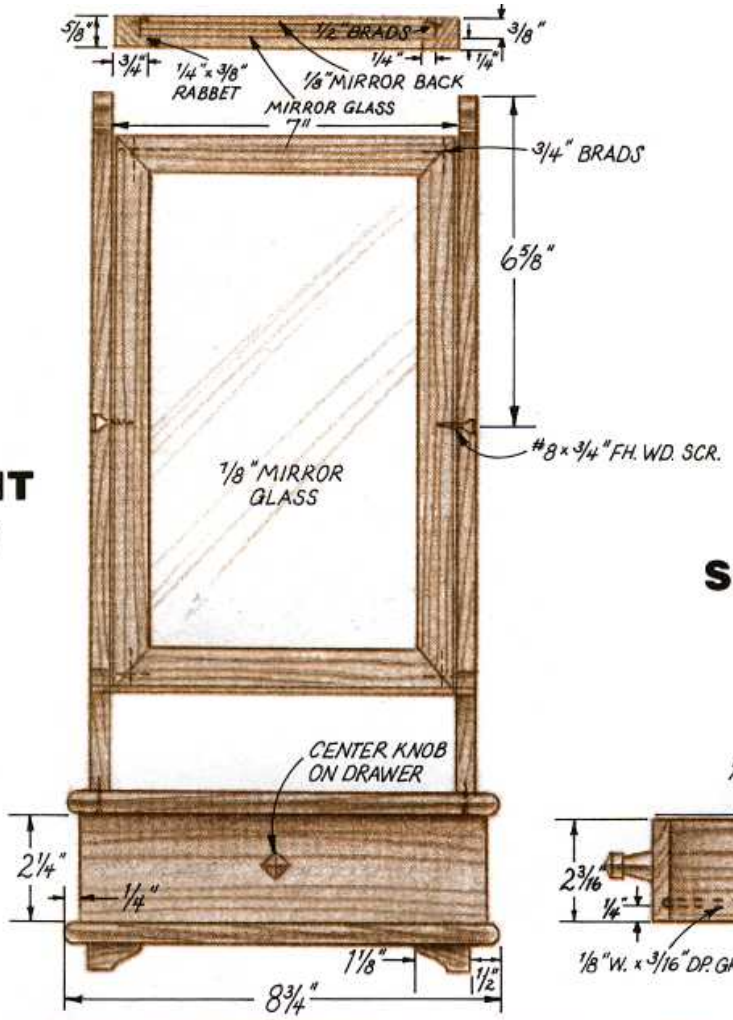


EXPLODED VIEW

1 Select the stock and cut the parts. The dressing mirror shown is made from pine, but a project this size could also be made inexpensively from a fine hardwood. Because people tend to get close to mirrors, they'll see any defects in the wood. Take extra care to select wood free of knots or defects. Joint, plane, rip, and cut the parts to the sizes given in the Cutting List. Miter the mirror frame rails and stiles as you cut them to length.

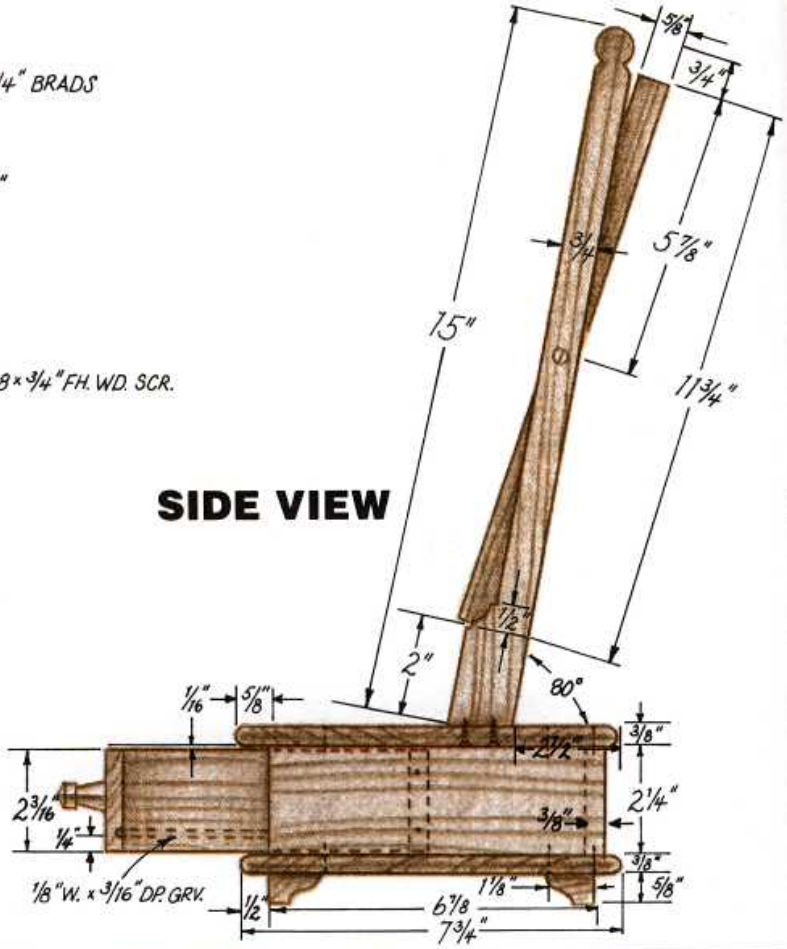
2 Cut the mirror supports to shape. Lay out the mirror supports, as shown in the *Mirror Support Detail.* Cut the bottom bevel on the table saw and cut the rest of the support on the band saw. Sand away any saw marks.

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FRONT VIEW

SIDE VIEW



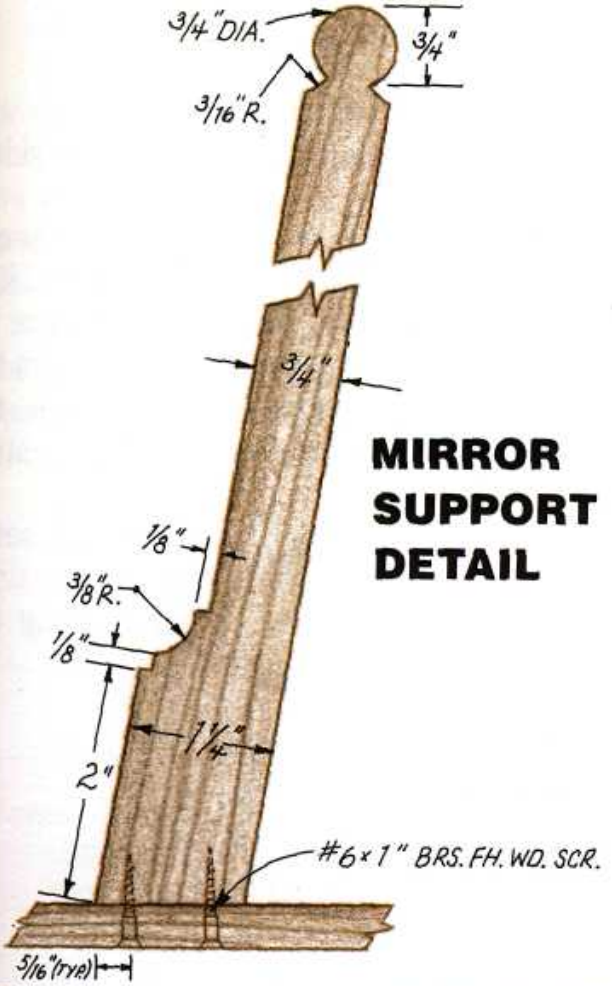
CUTTING LIST

Part	Quantity	Dimension	Comment
A. Mirror support	2	3/8" × 1 1/4" × 15"	Bevel one end 80 degrees.
B. Top/bottom	2	3/8" × 7 3/4" × 8 3/4"	
C. Sides	2	3/8" × 2 1/4" × 6 7/8"	Miter to fit.
D. Back	1	3/8" × 2 1/4" × 8 1/4"	Miter to fit.
E. Feet	1	1 1/8" × 1 1/8" × 8"	Makes 4
F. Drawer face	1	3/8" × 2 3/16" × 8 1/4"	
G. Drawer sides	2	3/8" × 2 3/16" × 6 3/8"	
H. Drawer back	1	3/8" × 2 3/16" × 7"	Cut to fit.
I. Drawer bottom	1	1/8" × 6 3/16" × 7 1/16"	Plywood or Masonite
J. Drawer knob	1	9/16" × 9/16" × 6"	Cut to length after shaping.
K. Mirror rails	2	5/8" × 3/4" × 7"	Miter to fit.
L. Mirror stiles	2	5/8" × 3/4" × 11 3/4"	Miter to fit.
M. Mirror back	1	1/8" × 6" × 10 3/4"	

Hardware

1 1/8 × 6 × 10 3/4-in. mirror glass
1 #8 × 1-in. brass flathead wood screw
4 #6 × 1-in. brass flathead wood screws
2 #8 × 3/4-in. brass flathead wood screws
As needed, 3/4-in. brads
10 1/2-in. brads

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MIRROR SUPPORT DETAIL

3 Round-over the edges of the top and bottom. Put a 3/16-inch round-over bit in your router. Secure the router in a router table and adjust it to rout the top and bottom to the profile shown in the *Front View.* Set up a fence on the router table and guide the top and bottom against it as you rout.

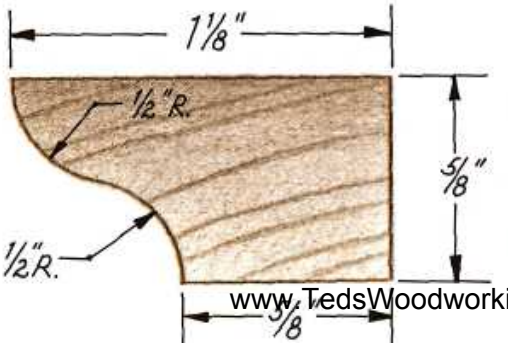
4 Lay out and drill the screw holes for the mirror support. Lay out holes for the screws that attach the mirror support to the top. Drill the 1/8-inch clearance holes perpendicular to the top, as shown in the *Mirror Support Detail.* Put the mirror supports in place on the top and push an awl up through the screw holes to mark the location of the screw holes on the bottom of the supports. Drill 3/32-inch-diameter pilot holes for the #6 × 1-inch brass flathead wood screws at the marks left by the awl and screw the supports to the top.

5 Miter the sides and back. Miter the back edge of the sides and both ends of the back. Put glue on the miters and clamp them together with corner clamps. When the glue is dry, reinforce the miters with 1/2-inch brads.

SHOP TIP: To get accurate miters, check your setup on some pieces of scrap. Set the table saw blade to the 45-degree position. Set the miter gauge to 90 degrees and use it to cut miters in two pieces of scrap wood. Put the miters together and make sure that the resulting angle equals 90 degrees. Adjust the blade as necessary.

6 Glue the top and bottom to the sides and back. Attach the top and bottom to the sides with glue and 3/4-inch brads. Make sure that the top overhangs the sides and back by 1/4 inch and that it overhangs the front of the sides by 5/8 inch, as shown in the *Side View.*

7 Shape the feet. Because the feet are small, it's best to cut them on an oversize piece of stock and then cut the stock to length. Begin with a piece the size given in the Cutting List. On the band saw, cut the profile shown in the *Foot Detail* on one side of the stock. Rotate the stock and cut the profile on an adjoining face. Sand or file the saw cut smooth and then cut the feet to their finished lengths.



FOOT DETAIL

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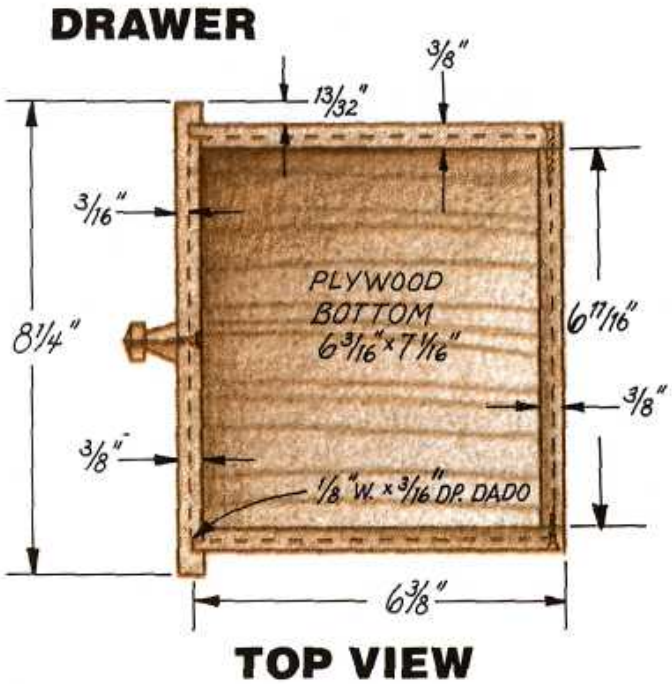
8 Cut the drawer joints. The drawer sides have tongues that fit into dadoes in the drawer face. Measure the front of the cabinet from edge to edge and cut the drawer face to this length. Lay out the dadoes on the drawer face, as shown in the *Drawer, Top View.* The distance between the outside of the dadoes should be 1/16 inch less than the opening for the drawer.

Both the dadoes and the tongues can be cut on a table saw with the normal blade—the dado is a single saw kerf wide. Adjust the height of the blade to cut a 1/8-inch-deep dado. Guide the stock with a miter gauge as you cut the dadoes.

Lay out the 1/8-inch-long tongue on the front end of the sides, as shown in the *Drawer, Top View.*

Before you cut the joint, cut a few samples on a piece of scrap the exact thickness as the drawer side. Lay the scrap flat on the table saw and guide it over the blade with the miter gauge. Adjust the blade height so the tongue fits snugly in the dadoes in the drawer face. Cut the tongues on the drawer sides.

Cut the back to fit between the sides.



9 Rout the groove for the drawer bottom. Put a 1/8-inch straight bit in your router. Adjust the router's fence attachment to cut a groove 1/4 inch from the drawer face's bottom edge. Rout the groove, beginning at one dado and stopping at the other.

Rout a groove with the same setup 1/4 inch from the bottom edges of the sides and back. Rout these grooves along the entire piece.

SHOP TIP: Small pieces can be difficult to clamp in place while routing. Hold them to the bench with doubled-sided tape or buy a commercially available foam rubber mat designed to hold pieces while routing.

10 Drill for the drawer knob hole. Measure and mark the drawer face for the drawer knob screw. Drill and countersink a 1/8-inch hole for the screw.

11 Assemble the drawer. Glue the tongues on the drawer sides into the dadoes in the drawer face. Trim the plywood bottom to fit, if necessary, and slide it in place. Attach the sides to the back with glue and 1/2-inch brads. Clamp the drawer face tightly against the sides and check to make sure the drawer is square.

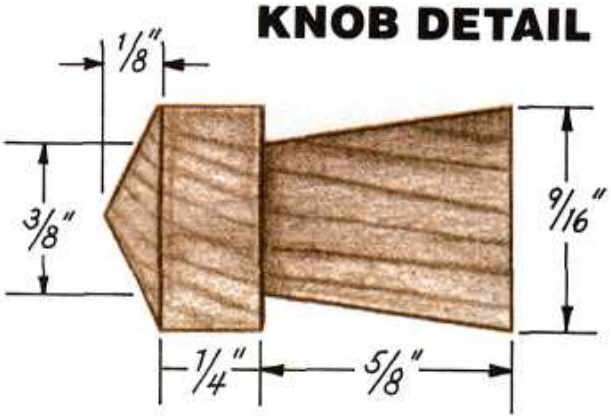
12 Shape the drawer knob. The knob, like the feet, should be cut on a piece of long stock and then cut to length. Begin with a piece the size given in the Cutting List. On the band saw, cut

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the profile shown in the *Knob Detail* on one side of the stock. Rotate the stock and cut the profile on an adjoining face. Sand or file the saw cut smooth and then cut the knob to its finished length.

Drill a hole for the screw in the knob and use a #8 × 1-inch brass flathead wood screw to secure the knob to the drawer face.

KNOB DETAIL



13 Rabbet and assemble the mirror frame. To rabbet the parts of the mirror frame to the profile shown, put a ¼-inch rabbeting bit in a router. Secure the router in a router table and use a fence while cutting the rabbets.

Put glue on all the miters and clamp the mirror frame together with corner clamps. When the glue dries, reinforce the mitered corners with ¾-inch brads, as shown in the *Front View.* If your dressing mirror is made from hardwood, predrill holes for the brads before you drive them in place.

14 Attach the mirror frame to the supports. Lay out and drill a pilot hole in each side of the mirror frame for the #8 × ¾-inch supporting screws. Screw the mirror frame to the mirror supports.

15 Apply the finish. Remove the mirror frame from the supports and finish sand all of the parts. Stain and varnish or paint the dressing mirror to match your decor. Don't apply a thick finish to the drawer sides and the box interior, because the drawer may bind.

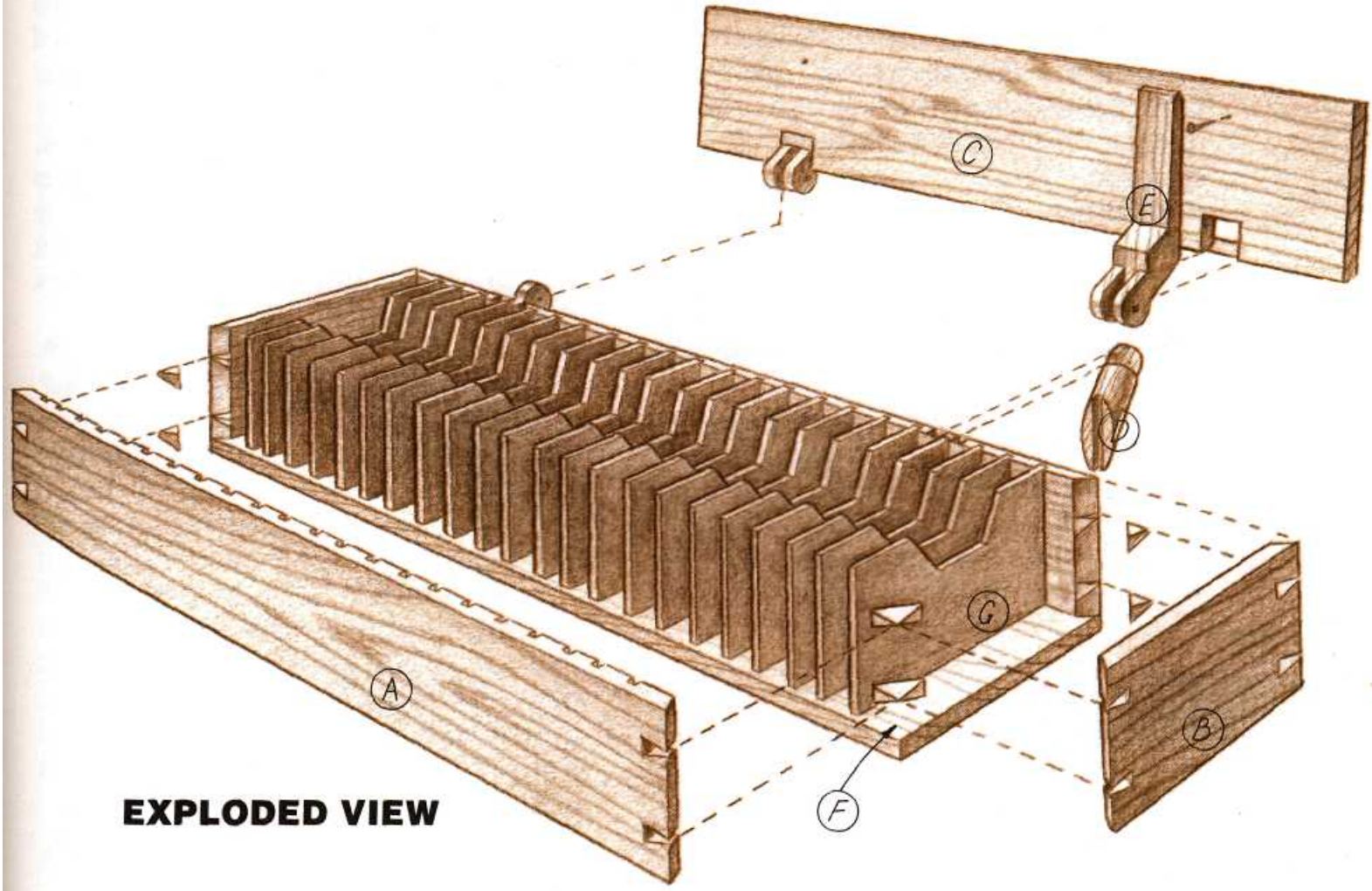
When the finish is dry, install the mirror glass and back, and hold them in place with ½-inch brads. Reattach the mirror frame to the supports.

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CASSETTE BOX



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EXPLODED VIEW

CUTTING LIST

Part	Quantity	Dimension	Comment
A. Front/back	2	⅜" × 3" × 21¾"	Miter to 20¾".
B. Sides	2	⅜" × 3" × 6¼"	Miter to 5¼".
C. Top/bottom	2	⅜" × 5¼" × 20¾"	
D. Hinge dowels	2	⅝" dia. × 2½"	
E. Hinge leaves	2	¾" × 1¼" × 6"	Shape to length.
F. Insert stock	1	½" × ½" × 15"	Makes 8
G. Dividers	21	⅛" × 3" × 4¾"	

Hardware

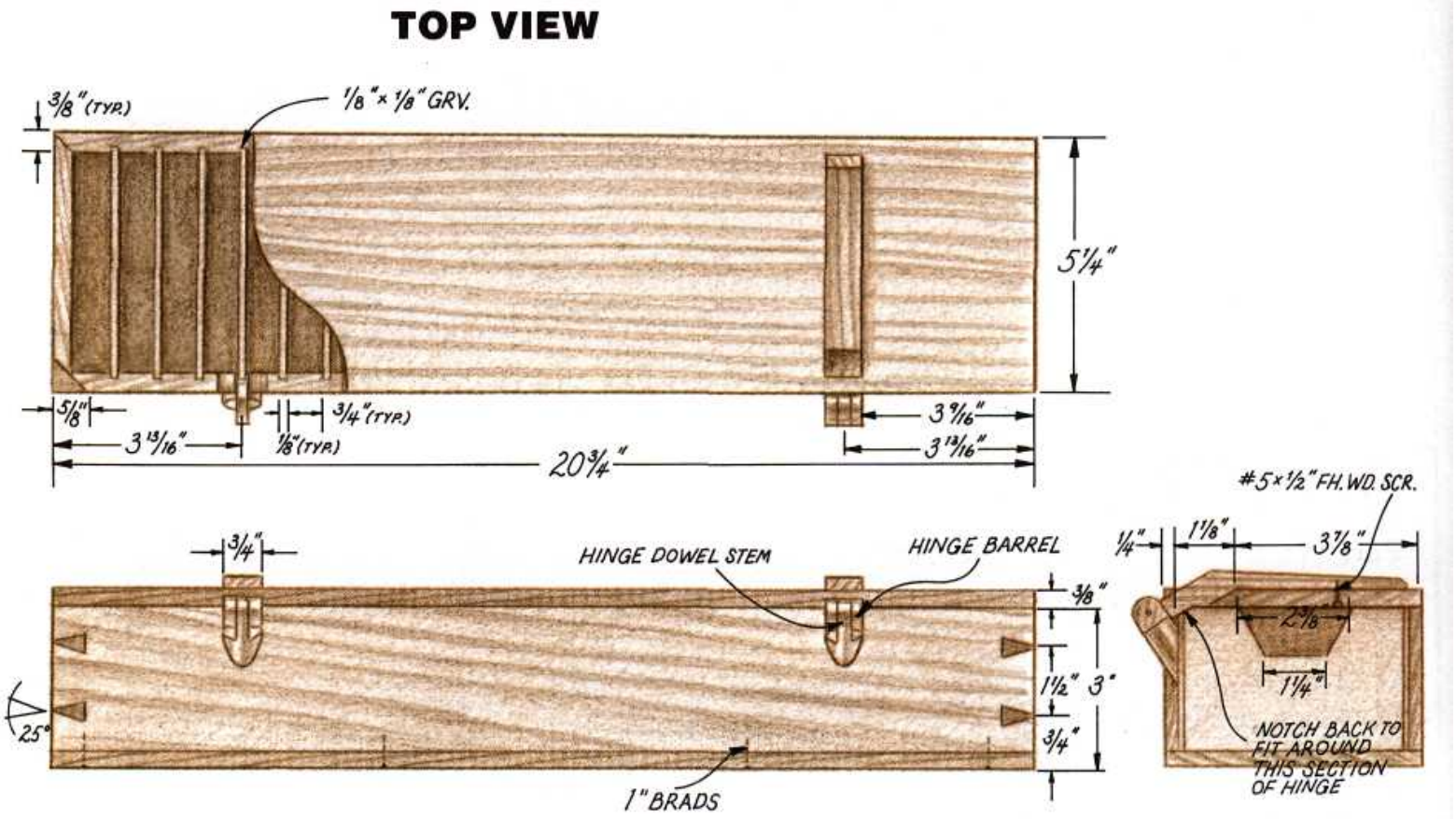
As needed, 1-in. brads
2 #5 × ½-in. flathead wood screws
1 1⁄16-in. dia. brass braising rod

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1 Select the stock and cut the parts. The cassette box shown has a poplar body, cedar top and bottom, and purpleheart dovetail inserts. For your box, mix and match woods that complement each other and highlight the construction. Choose straight, flat stock. Joint, plane, rip, and cut the parts to the sizes given in the Cutting List.

2 Miter the front, back, and sides. Set your table saw blade to 45 degrees. Set your table saw miter gauge to 90 degrees and guide the miter cuts with it. Because the sides are short, you'll need to screw an extension fence to the miter gauge.

Miter one end each of the front, back, and sides. When these miters have been cut, clamp a stop block to the miter gauge extension fence. Position the stop block so that when you cut the second miters the parts will also be cut to length.



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SHOP TIP: To get accurate miters, check your setup on some pieces of scrap. Set the table saw blade to 45 degrees. Set the miter gauge to 90 degrees and use it to cut miters in two pieces of scrap wood. Put the miters together and make sure that the resulting angle equals 90 degrees. Adjust the blade as necessary.

3 Drill the hinge-dowel holes. Lay out the location of hinge dowel on the back of the box. Put a 5/8-inch drill bit in your drill press and adjust the table to drill the 30-degree holes in the back. Sandwich the back between two pieces of scrap to prevent the back from splintering as the drill enters and exits. Clamp a fence to the drill press table to support the back and adjust it so that when drilling, the edge of the hole just meets the top edge of the back as shown in the *Cross Section through Box.*

4 Cut the divider grooves. Stack the front and back together with inside surfaces touching. Make sure that the ends are even and secure with clamps. Lay out for the dividers across the top edges of the front and back. Remove the clamps.

Cut 1/8 × 1/8-inch grooves to hold the dividers. Most table saw blades cut a 1/8-inch kerf. Guide the cuts with a miter gauge at set 90 degrees.

5 Assemble the sides to the front and back. When the grooves have been cut, spread glue on the mitered ends of the front, back, and sides. Clamp them together with corner clamps and make sure the box is square. Allow glue to dry.

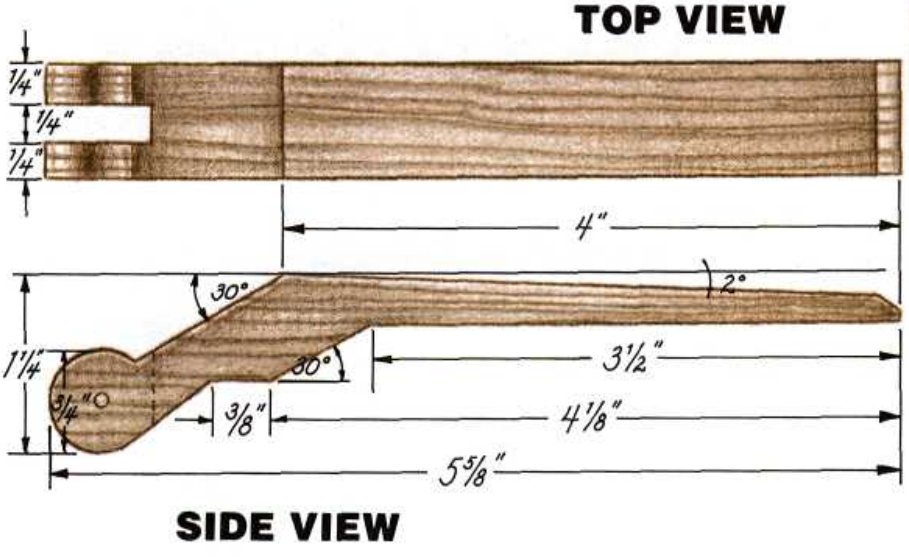
6 Attach the bottom. Glue the bottom to the underside of the front, back, and side assembly. Secure with 1-inch brads. When the glue has dried, plane or sand the edges of the bottom even with the front, back, and sides.

7 Glue the hinge dowels in place. The hinges are made from two pieces: a dowel mounted in the back of the box and a hinge leaf, which slips through a hole in the box lid.

Mount the hinge dowels before cutting them to the profile shown. To mount the dowels, spread glue in the hinge-dowel holes and slide the dowels in place. Slide each dowel in until its base is completely through the hole. When the glue has dried, saw and sand the dowel flush with the inside of the box.

8 Cut the hinge leaves to shape. Carefully lay out the hinge leaves, as shown in the *Hinge Leaf Detail,* on the hinge leaf stock. With a band saw, cut the wood to the shape shown. Cut the slot in the hinge barrel as shown.

HINGE LEAF DETAIL



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9 Attach the hinge leaves to the top. The hinge leaves fit through a slot in the lid. Lay out the slot, as shown in the *Cross Section through Box*. Use a ¼-inch drill bit to drill a hole through the lid that follows the angle of the slot.

Next, slip your coping saw blade through the hole and carefully cut the slot. Try to approximate the angle of the front and back of the slot as you cut.

Finally, test fit the hinge leaves and trim the slot as necessary with a sharp chisel. Screw the hinge leaves to the top with #5 × ½-inch screws as shown.

10 Complete the hinge assembly. With a backsaw or dovetail saw, cut stems on the hinge dowels that fit in the hinge barrel. As you cut the stems, you must also cut small notches in the box on either side of the stems. These notches, shown in the *Cross Section through Box*, provide clearance for the hinge barrel. Without the notches, the lid will not close.

When the top sits flat on the box, cut the hinge-dowel stem flush with the top edge of the hinge leaves. Round the corners of the stems with sandpaper.

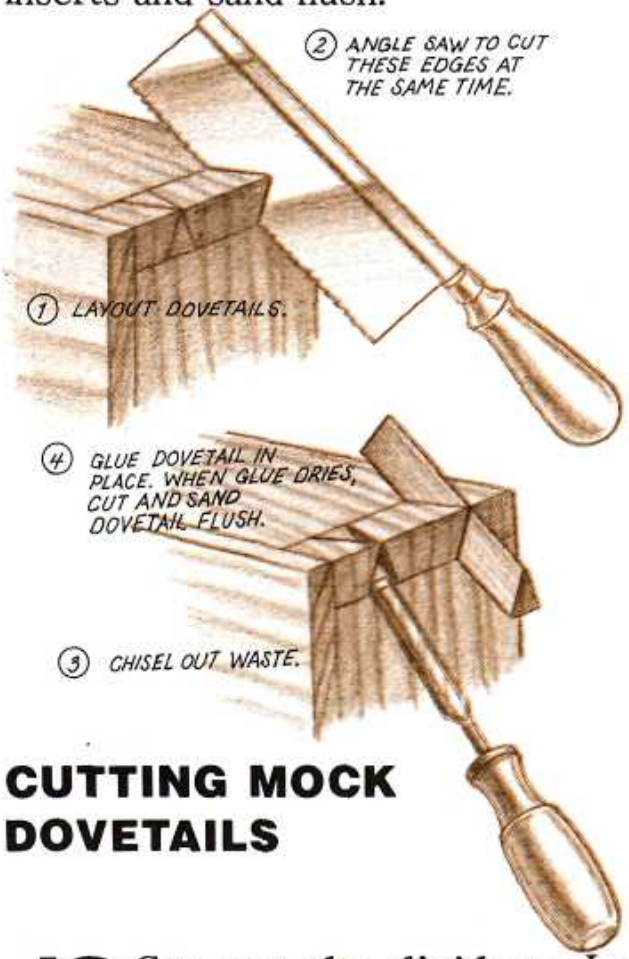
Make hinge pins from 1/16-inch brass braising rod. With the lid in place, use a 1/16-inch drill bit to drill through the hinge barrel and dowel. Remove the top and redrill the hole in the hinge dowel with a 3/32-inch drill bit to provide clearance. Put the top back in place and tap the hinge pins into their holes. Cut the hinge pins even with the hinge leaf sides.

11 Cut the mock dovetails. Scribe lines ⅝ inch from each corner. Lay out the dovetails, as shown in the *Back View*. Cut and chisel them out, as shown in *Cutting Mock Dovetails*.

Cut the dovetail inserts on the table saw. Set the blade to approximately 30 degrees. Guide some scrap stock against the fence to make a number of sample inserts, adjusting the blade angle until one of the samples fits the cutout. Cut the inserts with that same setup.

Glue the dovetail inserts in place and allow to dry.

When the glue has dried, trim the inserts and sand flush.



CUTTING MOCK DOVETAILS

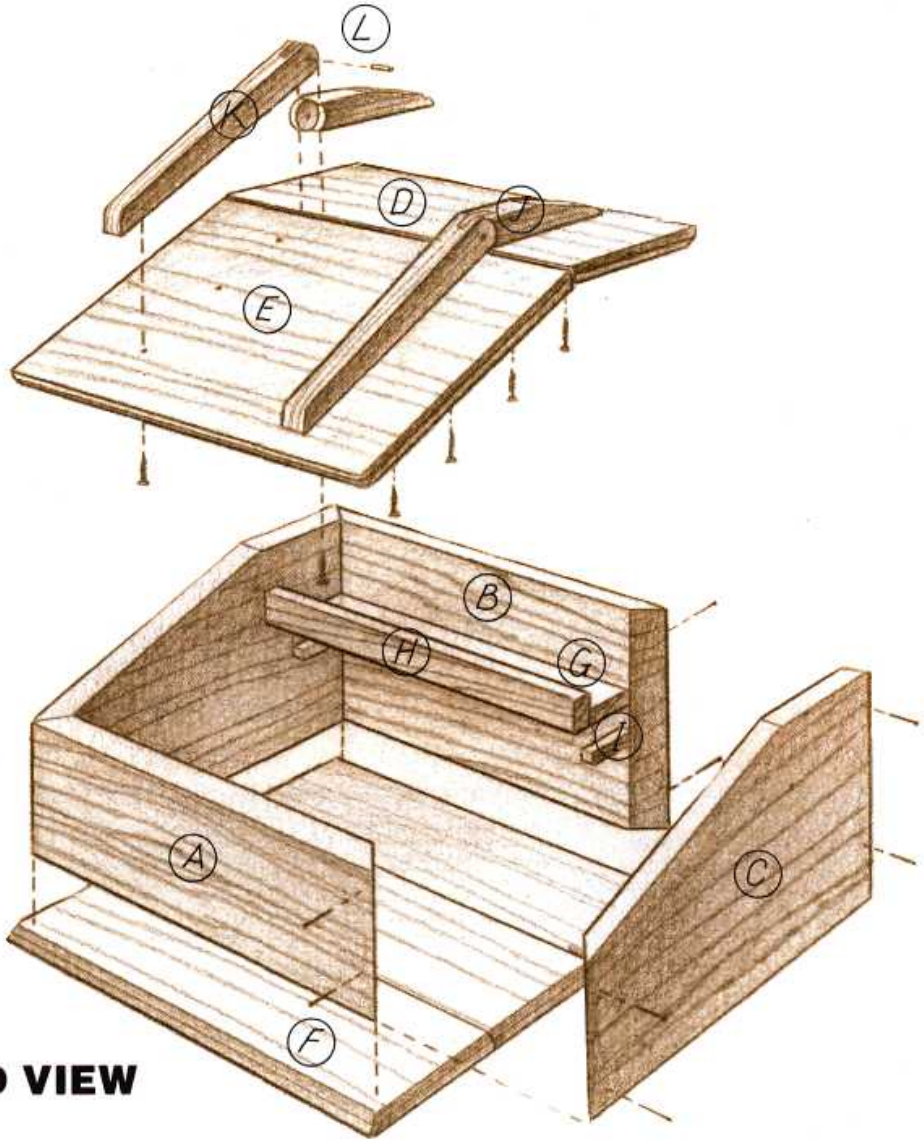
12 Cut out the dividers. Lay out the notch shown in the *Cross Section through Box*. Cut out the notch on the band saw and sand the sawed edges smooth.

13 Apply finish. Finish sand the assembled cassette box. The cassette box shown has an oil finish, which highlights the grain and shows off the mock dovetails. When the finish is dry, slip the dividers into their grooves.

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SEWING BOX





EXPLODED VIEW

CUTTING LIST

Part	Quantity	Dimension	Comment
A. Front	1	5/8″ × 3¾″ × 10¼″	
B. Back	1	5/8″ × 6½″ × 10¼″	
C. Sides	2	5/8″ × 6½″ × 10¼″	
D. Top	1	5/8″ × 3¾″ × 11¼″	
E. Lid	1	5/8″ × 8⅜″ × 11¼″	
F. Bottom	1	5/8″ × 11¼″ × 11¼″	
G. Shelf	1	⅜″ × 1¾″ × 10″	Cut to fit.
H. Shelf front	1	⅜″ × ⅞″ × 10″	Cut to fit.
I. Shelf supports	2	¼″ × ¼″ × 1¾″	
J. Top hinges	2	5/8″ × ⅞″ × 4¼″	
K. Lid hinges	2	5/8″ × ⅞″ × 8⅝″	
L. Hinge pins	2	¼″ dia. × 2″	Dowel

Hardware

10 #6 × 1-in. brass flathead wood screws
As needed, 3d finishing nails

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1 Select the stock and cut the parts. Choose wood free of knots or defects. Almost any kind of wood is appropriate. Small-size projects like this encourage a fine quality hardwood since the cost of the material is not great. Joint, plane, rip, and cut the parts to the sizes given in the Cutting List. If necessary, glue up boards to make the wider parts.

Bevel the top edge of the front and lid 21 degrees as you rip them to the sizes given.

2 Miter the ends of the front, back, and sides. Set your table saw blade to 45 degrees and cut a couple of test miters in some scrap. Put the test miters together and make sure that the resulting angle equals 90 degrees. Adjust the blade angle as necessary and miter the ends of the front, back, and sides. Guide the stock with a miter gauge set at 90 degrees as you cut the miters.

3 Cut the angle in the sides. Set the box sides, front, and back upright together on a flat surface. Trace the bevel of the front onto the sides. Continue the line to lay out the angle of the sides.

When you have laid out the angle, tape the sides together and cut the angle in both sides in one operation on the band saw. Sand or hand plane any saw marks smooth.

4 Assemble the front, back, and sides. Sand the front, back, and sides. Put glue on the mitered corners and clamp the parts together. A commercially available band clamp works best for a mitered box like this one, because it produces clamping pressure from all directions. Make sure that the box is square.

SHOP TIP: Gluing a mitered box can be a nightmare, because the parts keep slipping around. Prevent this slippage with good old-fashioned masking tape. First, stretch masking tape with the sticky side up across your workbench and put the mitered pieces on the tape end to end (front-side-back-side) with the miters touching. Next, simply fold the miters closed so that the box forms a square. Then, clamp the box with a band clamp, and the tape will keep the miters from sliding around.

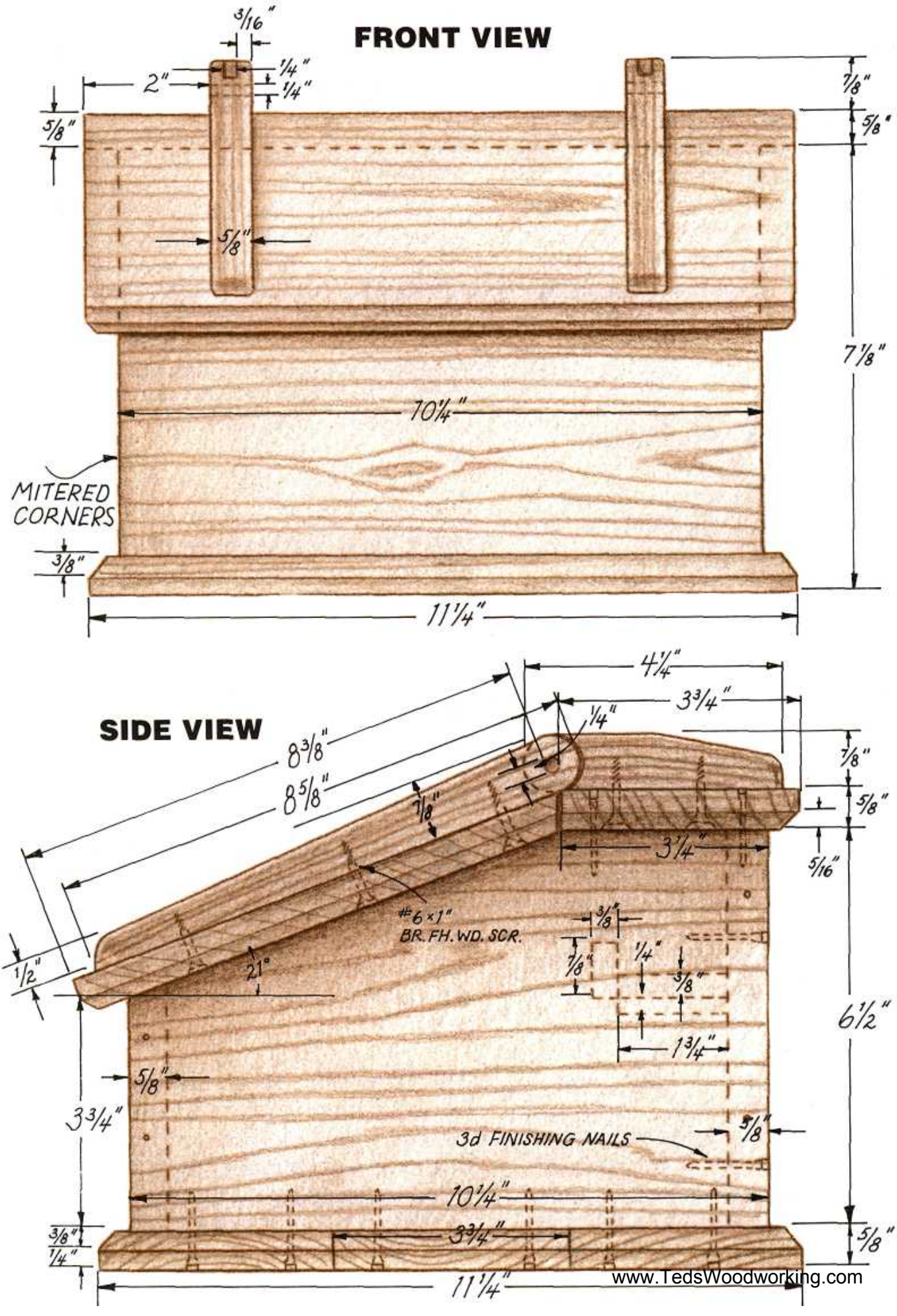
5 Chamfer the edges of the top, lid, and bottom boards. Put a chamfering bit in your router. Secure the router in a router table and rout a chamfer on the top, lid, and bottom, as shown in the *Front View* and *Side View.* Guide the stock against a fence as you rout. Note that only three edges of the lid and top are chamfered. Chamfer all four edges of the bottom board.

6 Attach the bottom to the box frame. Position the bottom as shown in the *Front View* and *Side View* and attach it with 3d finishing nails. If you are working with hardwood, predrill holes for the nails. Set the nails and fill the holes with wood putty.

7 Attach the shelf. Glue the shelf and shelf front together to form an *L,* as shown in the *Side View.* Lay out the shelf support positions in the box, then glue and clamp the supports to the box sides.

When the glue dries on both assemblies, glue and clamp the shelf to the shelf supports and to the back of the box.

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8 Cut the hinge joint. Draw a ¼-inch grid on a piece of paper and draw the lid hinge and top hinge patterns onto it. Transfer the patterns to the stock and cut the lid hinges and top hinges to shape on a band saw. Sand smooth any saw marks.

Next, cut the notch shown in the *Lid Hinge, Top View* and the tongue shown in the *Top Hinge, Top View* on the band saw. Cut the notch first, and then cut the tongue to fit the notch.

Lay out and carve the curves shown on both sides of the tongue in the *Top Hinge, Side View.* Do not cut into the tongue. Check the fit and trim any excess.

9 Drill the hinge-pin holes through the lid hinges and top hinges. Lay out the hinge-pin holes on the lid hinges, as shown. Put the hinge tongue into the hinge notch and clamp them to the bench. Drill a ¼-inch dowel hole through both for the hinge pin. Drill both hinges.

Chamfer one end of the each hinge pin in a pencil sharpener and insert the dowel into the hinge-pin hole. Check to see that the assembly can move freely and make any necessary adjustments. Repeat the test with the other hinge assembly.

When both hinge assemblies work properly, tap the hinge dowels into their holes until they are about ⅛ inch from coming through the opposite side. Put a drop of glue in the dowel-pin hole and then tap the dowel in the rest of the way. Trim the dowel flush with the sides of the lid hinge.

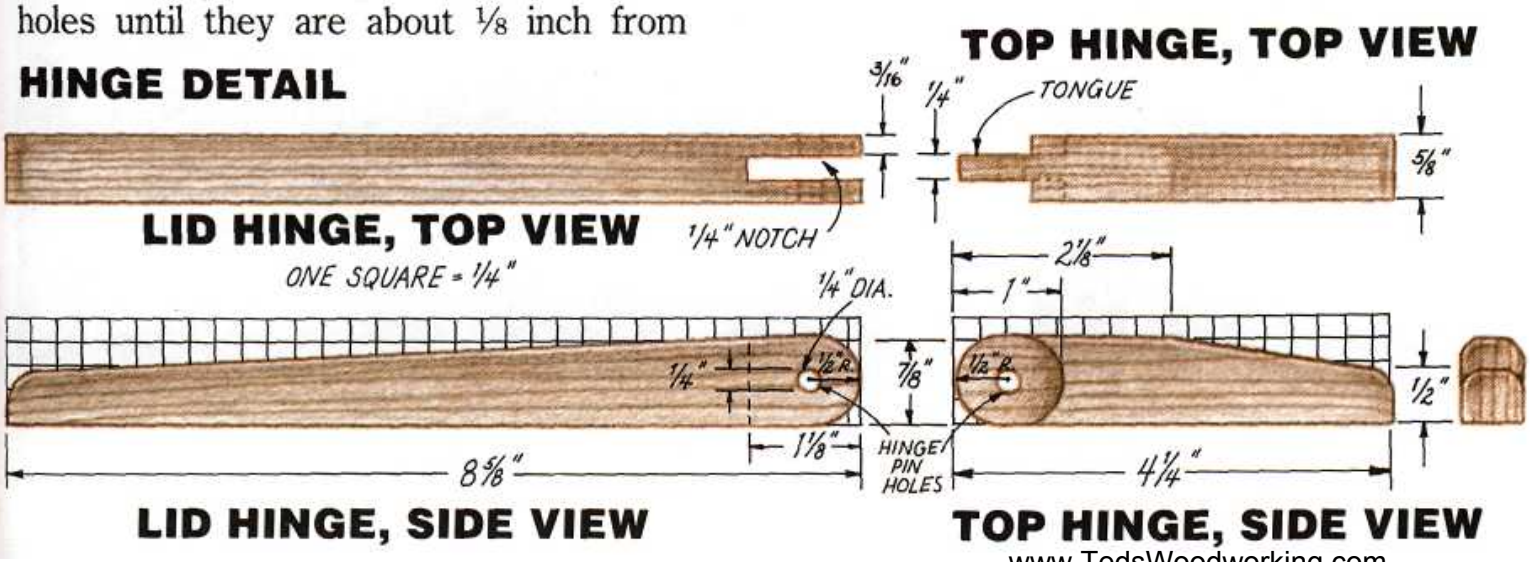
10 Attach the hinge assemblies to the top and lid. Temporarily hinge the box top and lid with masking tape and set them in place on the box. Position the hinges on the box and mark their location. Make sure the lid opens freely.

Drill pilot, clearance, and countersink holes for brass screws through the top and lid into the hinges, as shown in the *Side View.* Remove the masking tape and screw the hinges to the top and lid. Do not glue the hinges.

11 Attach the top to the box. Glue and clamp the box top to the sides and back of the box. Drive 3d finishing nails through the top and into the sides. Predrill for the nails if your box is made from hardwood. Set the nails and fill the nail holes with putty. Clean up any excess glue.

12 Sand and apply the finish. Finish sand the sewing box. Stain and varnish or paint to match your decor.

HINGE DETAIL

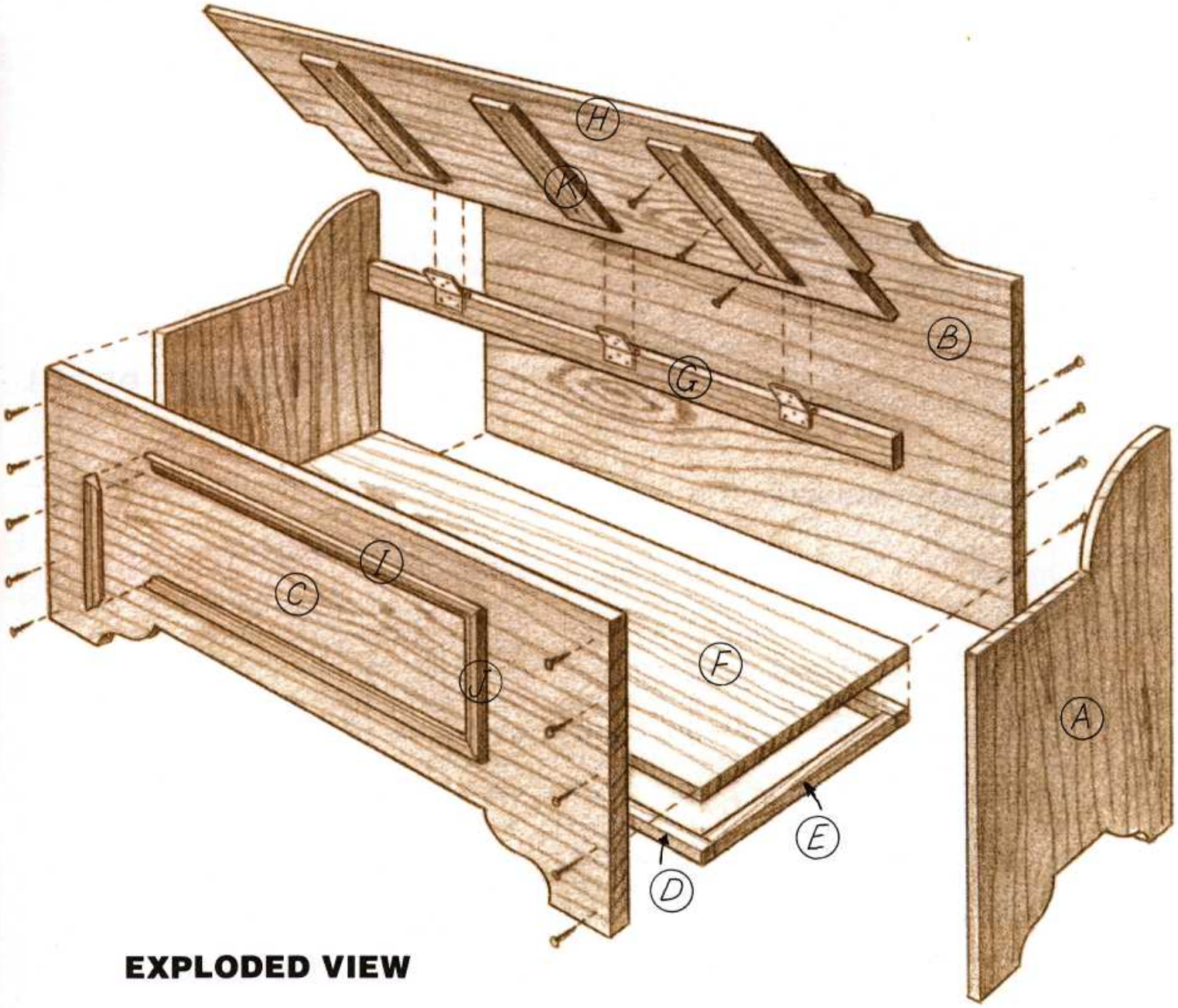


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BLANKET CHEST



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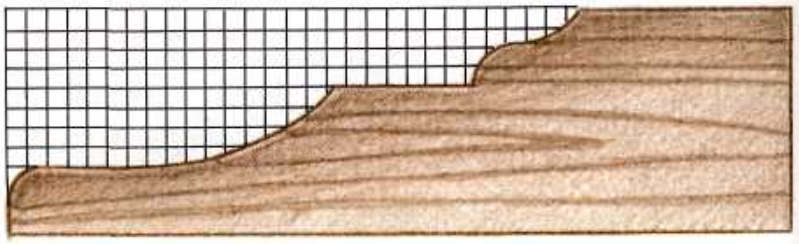
EXPLODED VIEW

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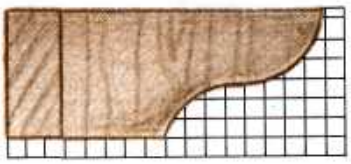
1 Select the stock and cut the parts. The blanket chest shown is made from pine, but various hardwoods will also work fine. You will have to glue several boards together to make up the width of the sides, front, back, bottom, and lid. Choosing flat and straight stock will make assembly easier and more precise. Joint, plane, rip, and cut all of the parts except for the molding to the sizes given in the Cutting List.

2 Cut the sides, back, and feet to shape. First, lay out the radius on each side, as shown in the *Side View.* Next, draw a ½-inch grid on a piece of

BACK DETAIL



ONE SQUARE = ½"



FOOT DETAIL

SHOP TIP: The bottom of this blanket chest could be made of aromatic cedar. Not only will the cedar make the chest smell good, it will also repel fabric-eating moths.

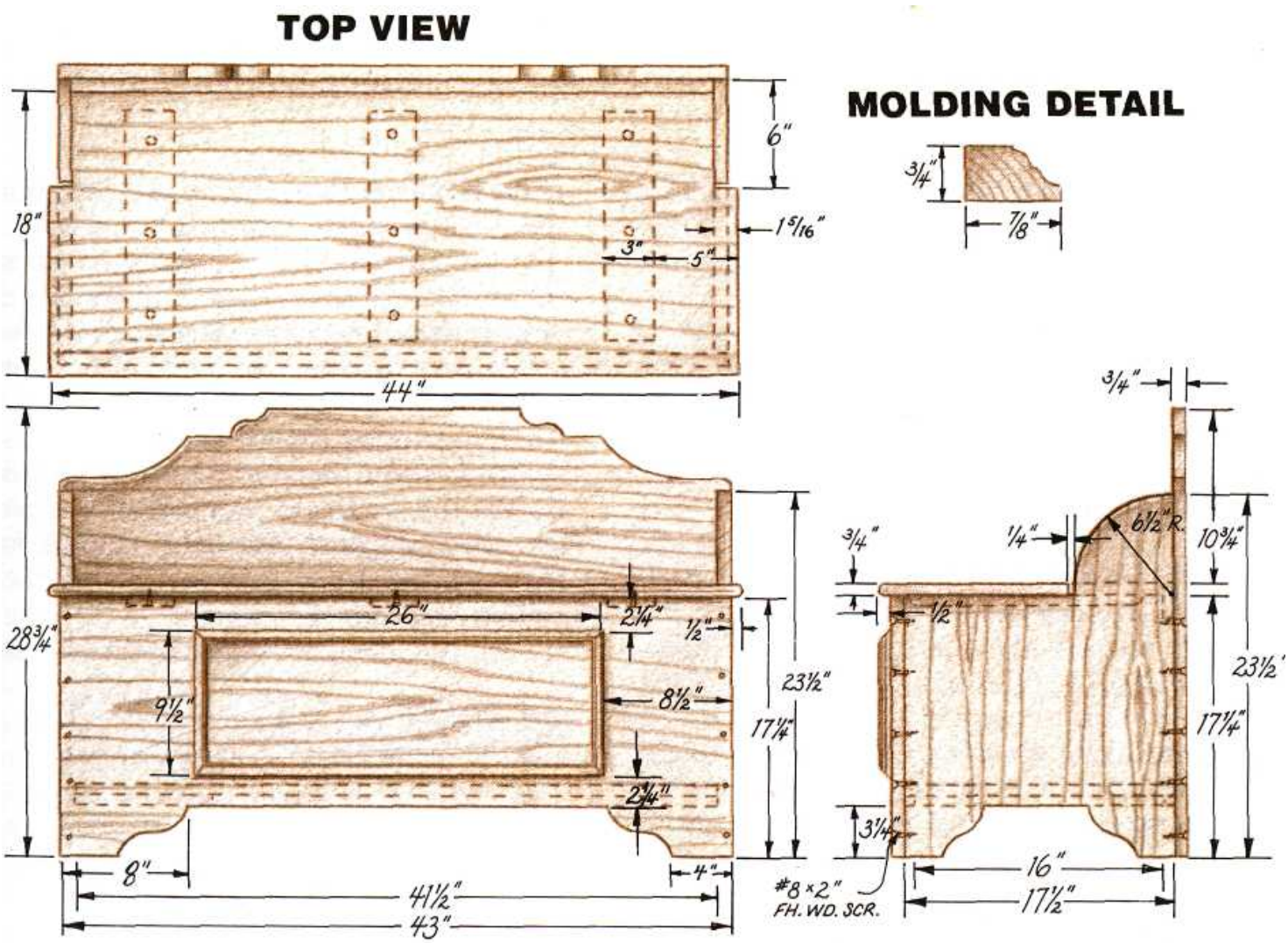
CUTTING LIST

Part	Quantity	Dimension
A. Sides	2	¾" × 17½" × 23½"
B. Back	1	¾" × 28¾" × 43"
C. Front	1	¾" × 17¼" × 43"
D. Long supports	2	¾" × ¾" × 41½"
E. Short supports	2	¾" × ¾" × 16"
F. Bottom	1	¾" × 17½" × 41½"
G. Hinge cleat	1	¾" × 1" × 41½"
H. Lid	1	¾" × 18" × 44"
I. Horizontal moldings	2	¾" × ⅞" × 26"
J. Vertical moldings	2	¾" × ⅞" × 9½"
K. Lid battens	3	¾" × 3" × 15"

Hardware

As needed, #8 × 2-in. flathead wood screws
As needed, #8 × 1¼-in. flathead wood screws
3 2 × 1½-in. hinges (approx. size)
As needed, ⅜-in.-dia. plugs
As needed, 3d finishing nails
2 self-balanced lid supports. Available from The Woodworker's Store, 21801 Industrial Boulevard, Rogers, MN 55374. Part #D7611.

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paper and draw the *Back Detail* and *Foot Detail* onto it. Transfer the patterns to the stock. Notice that the side feet are narrower than the front and back feet.

When you've drawn the radii and shapes on the stock, cut the parts to shape with a jigsaw or band saw. Sand the sawed edges smooth.

3 Assemble the sides, front, and back. The sides are butted to the front and back, then screwed in place. Although this joinery is simple, it can be quite a trick holding everything in position while you drill for and drive the screws. The best way to position the parts is by getting someone to help you clamp the sides between the front and back. Make sure your parts are set up on a flat surface, or the assembly may twist. The surface of the sides should be even with the ends of the front and back.

When everything is clamped up properly, lay out and drill evenly spaced plug, clearance, and pilot holes for #8 × 2-inch flathead wood screws, as shown in the *Front View.* Drill the holes with a hand held drill and a combination pilot hole bit. A combination pilot hole bit drills a hole for the plug, a clearance hole for the screw shank, and a slightly smaller pilot hole for the screw threads all in one operation. Combination pilot hole bits are available at most hardware stores and are sold according to the screw size. Drill for five screws along each front corner and six screws along each back corner.

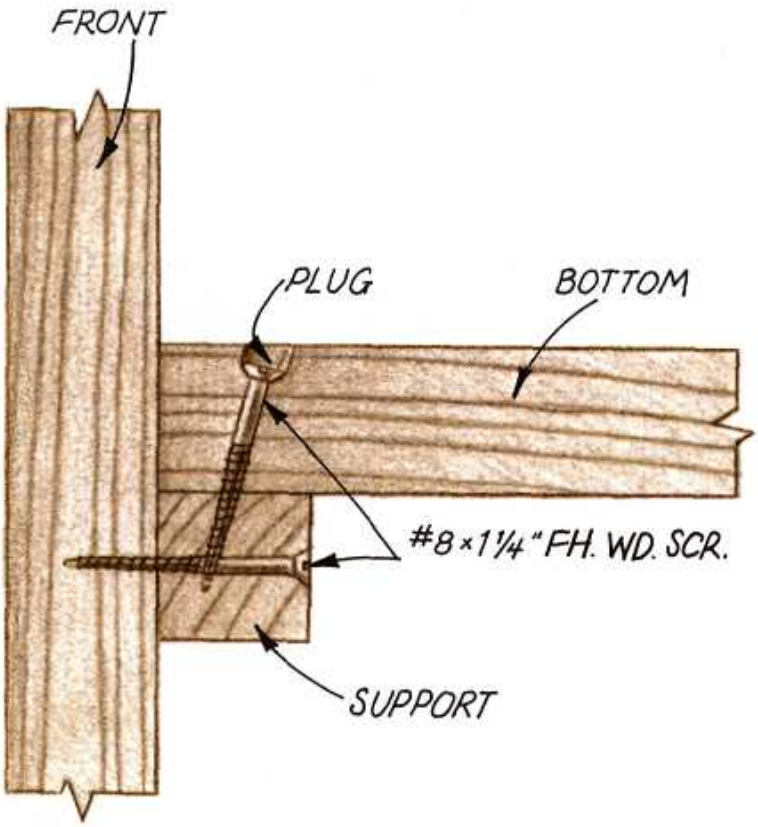
When the holes have been drilled, drive the screws and glue the plugs in place.

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SHOP TIP: Align the sides to the front and back with a power tool called a biscuit joiner. If you have a biscuit joiner or know someone who has one, it's the ideal tool for lining up the sides to the front. The glued-in biscuits will also add structural integrity to this simple butt joint.

4 Attach the bottom. First, attach the long and short supports along the top of the foot cutouts on the front, back, and sides, as shown in the *Front View* and *Side View.* Clamp the long supports in place along the front and back, as shown. Next, drill pilot and clearance holes for #8 × 1¼-inch flathead wood screws along the length of the long supports. Remove the clamps and glue and screw the long supports in place, as shown in the *Bottom Joinery Detail.* Repeat the process with the short supports, but omit the glue.

BOTTOM JOINERY DETAIL



Next, measure the opening and check these measurements against those of the bottom. You may have to remove a little stock from the edges of the bottom for it to fit easily in the opening. Drop the bottom in place on top of the supports, as shown in the *Front View, Side View,* and *Bottom Joinery Detail,* and drill several pilot, clearance, and plug holes for #8 × 1¼" flathead wood screws through the bottom and into the supports. Drive the screws and glue the plugs in place.

5 Attach the hinge cleat. Position the hinge cleat, as shown in the *Side View,* and drill pilot, clearance, and recess holes for #8 × 1¼-inch flathead wood screws at 6-inch centers along its length. Glue and screw the hinge cleat in place.

6 Cut the notches in the lid. Lay out and cut the side clearance notches in the ends of the lid, as shown in the *Top View.* Cut the notch with a jigsaw or band saw and sand the sawed edges smooth.

When the notches have been cut, attach the battens to the underside of the lid with #8 × 1¼-inch flathead wood screws as shown in the *Top View.*

7 Hinge the lid. Put the lid in position over the opening. Make sure that the notches in the lid provide enough clearance, both from side to side and when the lid will swing up on its hinges. Make any necessary adjustments by widening the lid notches or by sanding the side radii.

After making any necessary adjustments, lay out the hinge placement on the back of the lid. Center one hinge along the back of the lid and place the remaining two

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hinges 4 inches from each end, as shown in the *Top View.* Carry your hinge layout lines across to the hinge cleat. Lay out the hinge mortises directly from the hinges and cut them with a dovetail saw and chisel. For more information on hinging, see "Hinge Mortises" on page 7.

Once you've cut the hinge mortises, screw the hinges in place on the back of the lid. Have a helper hold the lid open while you screw the hinges to the hinge cleat.

SHOP TIP: Predrill the hinge screw holes with a special bit called a Vix bit. The Vix bit uses the hinge as a template and automatically centers the screw hole. A stop on the bit lets you set it to drill any depth hole.

8 Mill and attach the molding. Make or buy an 84-inch long piece of molding. The profile of the molding really isn't that important, so it's your choice. The profile shown in the *Molding Detail* is the molding that was chosen for the blanket chest pictured here. The profile shown can be cut with a Bosch classical bit (number 85581M). Put the bit of your choice in your router. Secure the router in a router table and adjust it to cut your desired profile.

When the profile has been cut, miter the horizontal and vertical moldings as you cut them to length. Cut the horizontal and vertical pieces to the lengths given in the Cutting List.

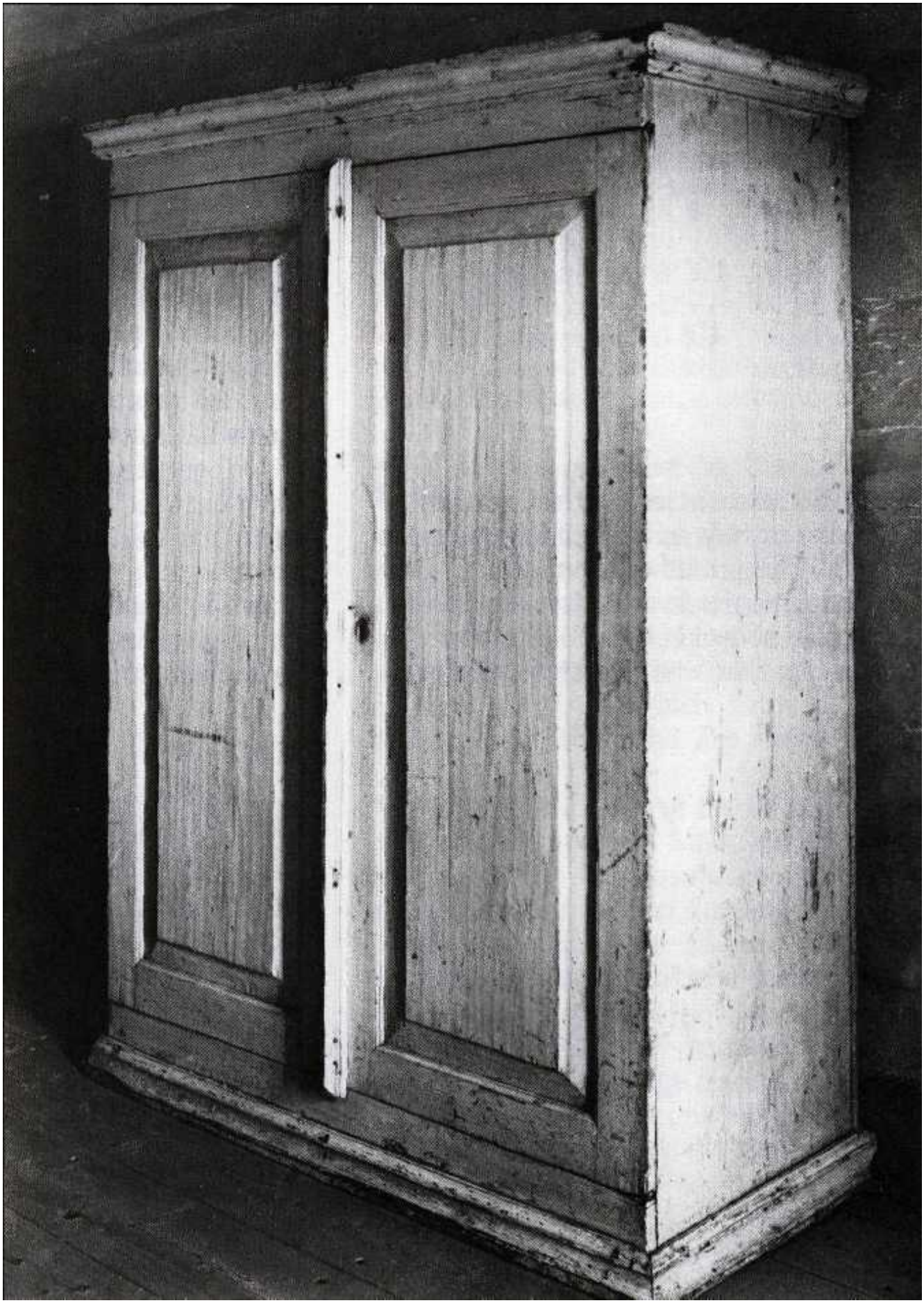
Attach the molding to the front, as shown in the *Front View,* with 3d finishing nails. Set the nails and fill the holes with wood putty.

9 Sand and apply the finish. Sand the plugs even with the surface of the wood and sand away any excess glue. Paint or stain and varnish your blanket chest. If you wish, add some stenciled ornaments to the chest.

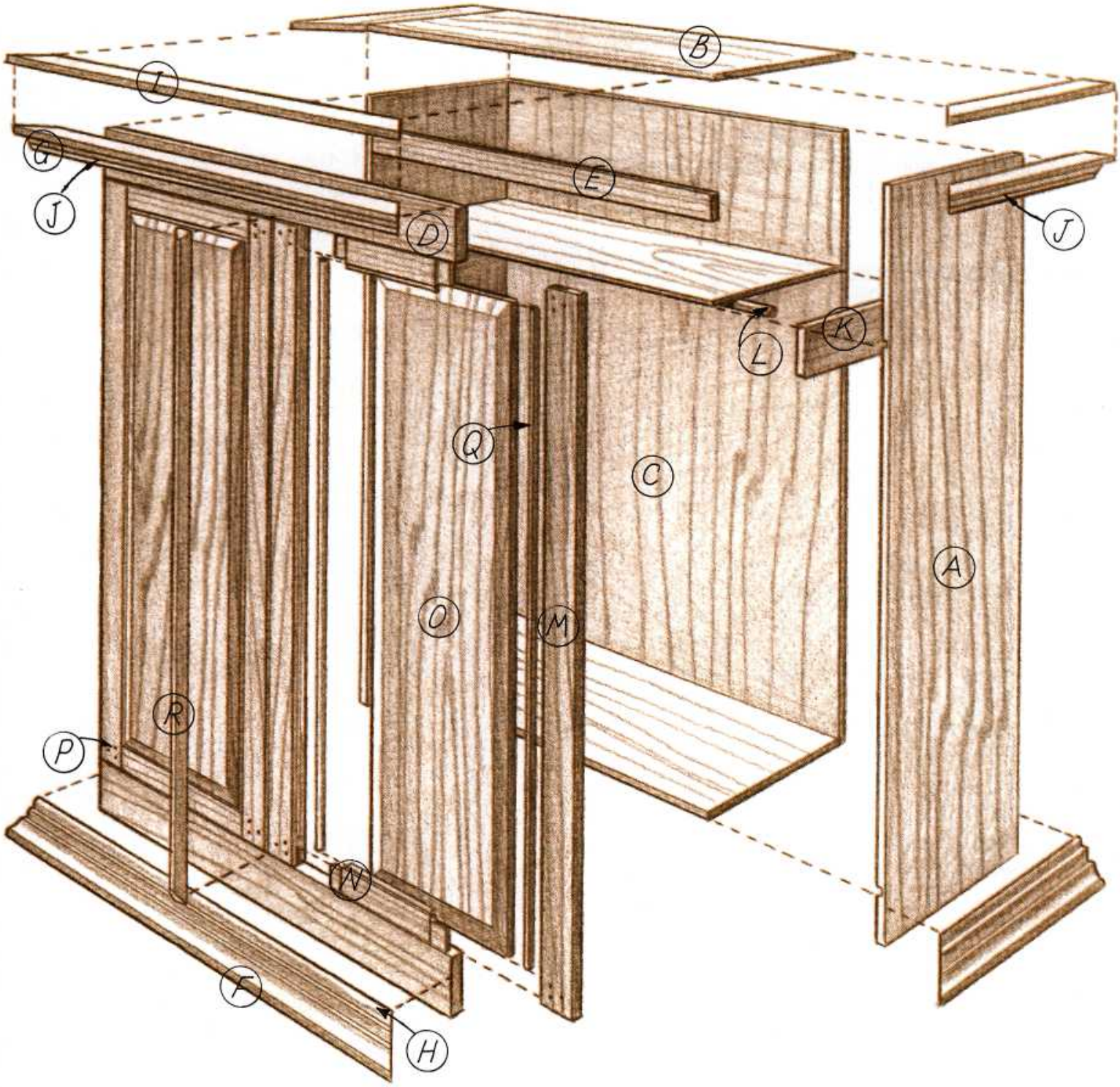
When the finish is dry, add a pair of heavy-duty lid supports to the blanket chest. You can usually find a variety of lid supports at a hardware store. Self-balanced lid supports, available from the source given in the Cutting List, help keep the lid from crashing down unexpectedly.

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ARMOIRE



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EXPLODED VIEW

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1 Select the stock and cut the parts. Joint, plane, rip, and cut the parts to the sizes given in the Cutting List. If necessary, glue up boards to make the wider parts.

If you have access to a shaper, you can make the moldings yourself. Otherwise, purchase the moldings through a local lumber yard. Because the the types of wood available in ready-made moldings are usually limited, you may have to stain the stock to match the rest of the armoire. The plywood back is a modern addition. If you wish to be true to the original, nail random-width boards across the back instead.

2 Dado the sides. Lay out the dadoes, as shown in the *Front View* and *Side View.* Rout the dadoes as explained in "Routed Dadoes" on page 52.

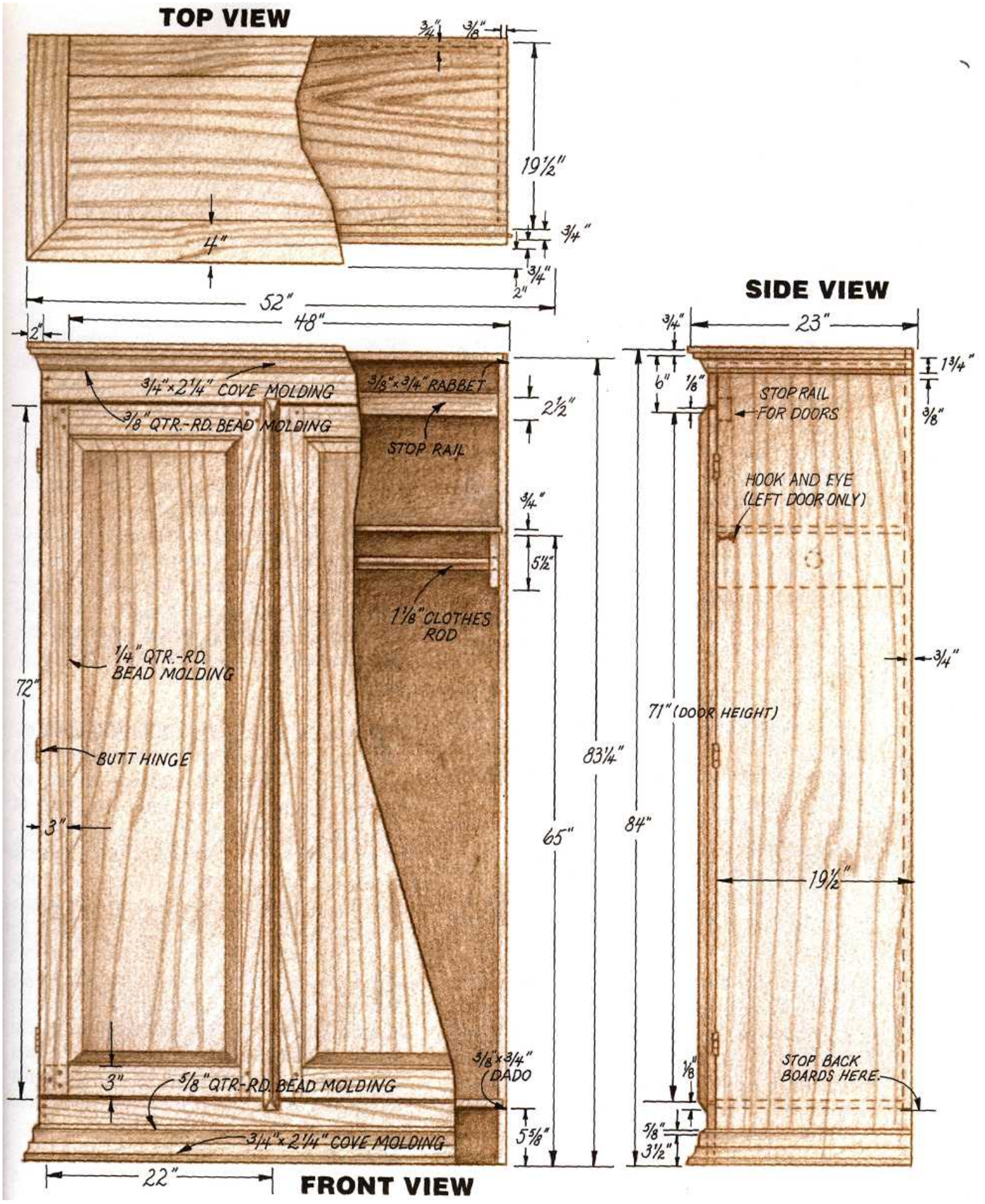
CUTTING LIST

Part	Quantity	Dimension	Comment
A. Sides	2	¾" × 19½" × 83¼"	
B. Top/bottom/shelf	3	¾" × 18¾" × 47¼"	
C. Back	1	¾" × 48" × 78"	Plywood; cut to fit.
D. Front rails	2	¾" × 6" × 49"	Cut to fit.
E. Stop rail	1	¾" × 2½" × 48"	Cut to fit.
F. Baseboard	1	¾" × 3½" × 96"	Cut to fit.
G. Cove molding	1	¾" × 2¼" × 17'	Cut to fit.
H. Quarter-round lower bead molding	1	⅝" × ⅝" × 96"	Cut to fit.
I. Top frame	1	¾" × 4" × 120"	Miter to fit.
J. Quarter-round upper bead molding	1	⅜" × ⅜" × 96"	Cut to fit.
K. Clothes rod supports	2	¾" × 5½" × 18½"	
L. Clothes rod	1	1⅛" dia. × 48"	Cut to fit.
M. Door stiles	4	¾" × 3" × 72"	Cut to fit.
N. Door rails	4	¾" × 3" × 22"	Cut to fit.
O. Raised panels	2	¾" × 18¾" × 65$^{11}/_{16}$"	
P. Door pegs	24	¼" × ¼" × 1"	
Q. Door bead	1	¼" × ¼" × 32'	Cut to fit.
R. Door lip	1	⅞" × 1⅜" × 72"	Flat astragal molding; cut to fit.

Hardware

As needed, #8 × 1¾-in. flathead wood screws
As needed, ⅜-in.-dia. wooden plugs
As needed, #8 × 1¼-in. flathead wood screws
6 ¾ × ½-in. butt hinges

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3 Rabbet the sides for the back. To rout the rabbet for the back, put a ¾-inch straight bit in your router. Set the router and router fence attachment to cut a ⅜ × ¾-inch rabbet.

4 Assemble the carcase. On a flat surface, clamp the carcase together without glue, so that the rabbet faces up. Predrill through the cabinet sides into the shelf, top, and bottom for #8 × 1¾-inch flathead wood screws. Use a commercially available combination pilot hole bit when drilling. This bit drills a hole for the plug, a clearance hole for the screw shank, and a slightly smaller pilot hole for the screw threads all in one operation. Pilot hole bits are available at most hardware stores and are sold according to the screw size. Screw the cabinet together. Plug the holes with wooden plugs, which you can either cut with a plug cutter or buy at the lumberyard.

Once the case is assembled, check to make sure it is square. Measure diagonally from corner to corner. The cabinet is square when the measurements are equal. If they are not equal, push the corners of the long diagonal gently together until the measurements match.

When the cabinet is square, cut the back to fit and put it in place. Predrill, as before, for #8 × 1¼-inch flathead wood screws.

5 Attach the rails on the front. With a helper, turn the case onto its back. Cut the front rails to fit across the top and bottom of the case. Position the top and bottom rails on the case. Drill through the rails into the top and sides, but not into the bottom shelf. Attach the rails with glue and #8 × 1-¼-inch flathead wood screws. Moldings, attached later, will cover the screws. Glue and screw the door stop to the back of the top rail, from inside the cabinet. Leave these screws exposed—they're in the cabinet where no one will see them.

6 Attach the moldings. The moldings on the top and bottom are built up from several moldings, as shown in the *Front View.* As you work, miter each piece to fit the cabinet.

Work from the bottom up. Miter the baseboard to fit and nail it in place. Cut the cove molding to fit over it and nail it in place. Miter and attach the quarter-round lower bead molding.

To install the top moldings, first miter and attach the top frame, as shown in the *Top View.* Miter the cove molding to fit around the front and sides of the cabinet and nail it in place. Miter and nail the quarter-round upper bead molding in place.

7 Install the rod. Drill a 1¼-inch diameter hole in each rod support with a hole saw. Snug a support board up against the shelf, even with the front of the case. Predrill for #8 × 1¼-inch flathead wood screws and screw the supports in place. Put the clothes rod in place, slip the other support in place, and screw the support to the side.

8 Cut the door parts to fit. The stiles and rails in the Cutting List are 1 inch longer than necessary. Cut them to fit the actual cabinet. Cut the stiles to ¼ inch less than the actual opening. Cut the rails to leave a ¼-inch gap between the doors.

9 Cut a groove for the raised panels. Put a ¼-inch dado cutter in

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the table saw and cut a groove ⅜ inch deep along the middle of one edge of the rails and stiles. Guide the cut along the rip fence. To ensure that the grooves will align on assembly, keep the outside face of the door against the fence for each cut.

10 Mortise and tenon the rails and stiles. Lay out the mortises and tenons, as shown in the *Joinery Detail.*

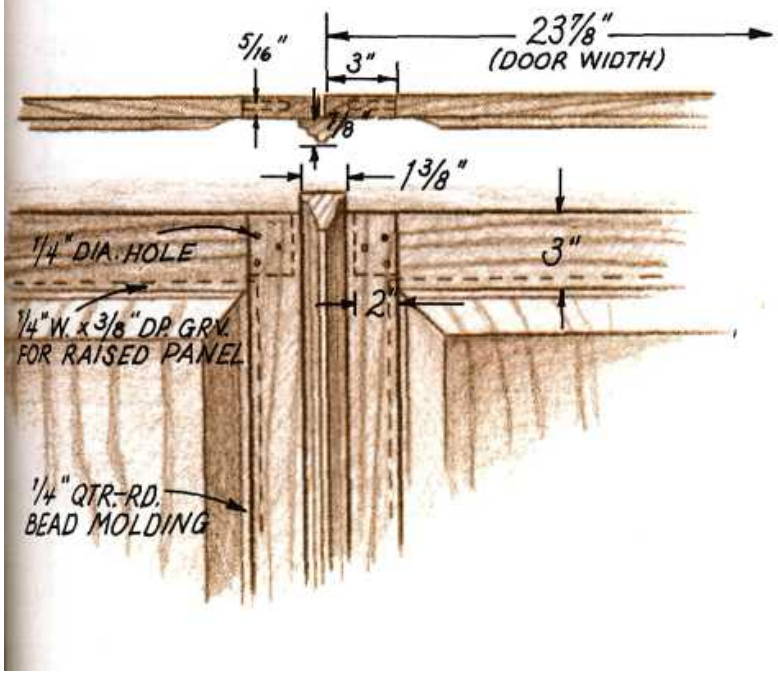
To cut the mortises, drill a series of adjoining ¼-inch-diameter holes, 2 inches deep, inside the layout lines. Cut out the remaining waste with a sharp chisel.

Lay out the tenons, as shown. Cut the tenons by repeatedly passing the stock over a dado blade. Set up the cut with a test piece of scrap the exact thickness of the rail. Raise the blade to remove ¼ inch of wood. Guide the test piece over the blade with the miter gauge; turn the board over and repeat. Check to see how the resulting tenon fits in the mortise. Adjust the height of the blade, as necessary, for a snug-fitting joint.

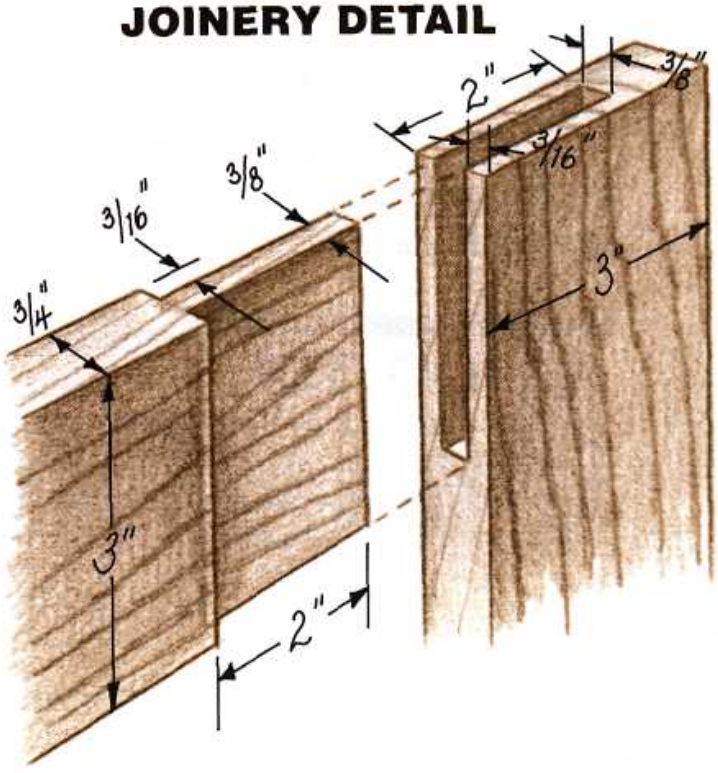
Use the fence to control the length of the tenon. Position the fence so that when you guide the end of the stock along it, the blade cuts a shoulder 2 inches from the end of the board. Remove the rest of the wood by repositioning the stock in the miter gauge. Leave the fence where it is to help with subsequent tenons.

SHOP TIP: Lay out the joinery so that any bow in the stock faces what will be the front of the door. Closing the doors on the finished cabinet will temporarily flatten the bow, and the doors will close tightly against the cabinet.

DOOR DETAIL



JOINERY DETAIL



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11 **Raise the panels.** Raise the panels on the shaper, if you have one. If not, cut them on the table saw, as explained in "Raised Panels" on the opposite page.

SHOP TIP: Sand the panels and put a coat of finish or stain on the panels so that any subsequent movement once the panel is framed will not reveal unfinished wood.

12 **Assemble the doors.** First, test fit the rails and stiles around the raised panels and make sure all the joints close snugly when lightly clamped. Make any necessary adjustments. Apply glue sparingly to the cheeks of the mortise and tenons, and clamp the door together. Check to make sure the door is square by measuring across the diagonals. If one diagonal is long, loosen the clamps. Angle the clamps in the direction of the long diagonal and gently retighten. Check again to make sure the door is square and readjust the clamps, if necessary.

Do not glue the panel in place. It must be allowed to expand and contract with changes in humidity.

SHOP TIP: Rub paraffin on the corners of the panel before assembling the door. The paraffin will keep any glue that squeezes out of the mortise from sticking to the panel.

13 **Peg the joints.** Drill three ¼-inch holes through each mortise and tenon, as shown in the *Front View* and *Door Detail.* The exact spacing of the holes isn't critical. Clamp a piece of scrap behind the joint before you drill to prevent the bit from tearing out wood when it exits the stock. Drive square door pegs through the holes. Square pins are traditional on pegged mortises.

14 **Install the door molding.** Miter the bead molding to fit around the inside of the door frame and glue it to the edge of the door.

Test fit the doors. Plane the doors to create an equal reveal top and bottom. When satisfied with the fit, lay out and cut the hinge mortises and hang the door, as explained in "Hinge Mortises" on page 7.

Cut the door lip to fit across the gap between the doors. Attach it to the right-hand door.

15 **Apply the finish and install the remaining hardware.** Remove the doors and apply your favorite finish, being sure to apply equal amounts on all the surfaces. When completed, make sure the case is standing plumb and level and rehang the doors. When the doors are back in place, add handles, a hook and eye set, and a wardrobe lock of your choice.

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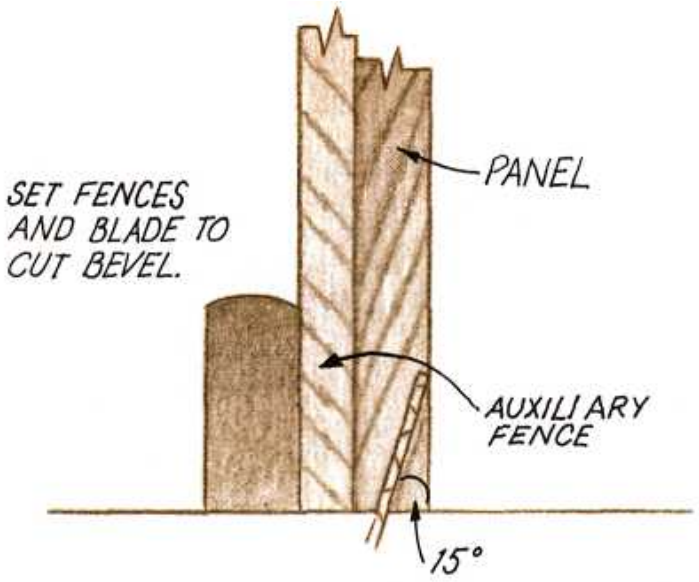
RAISED PANELS

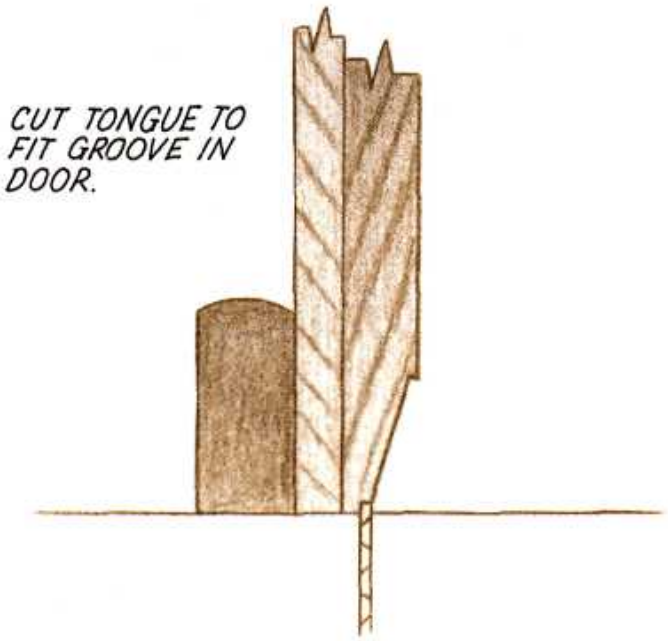
1 Cut the bevels. Raising panels on the saw requires running stock through the saw on edge. To keep the panel from wobbling, screw or clamp a tall auxiliary fence to your table saw fence, as shown. Hold the panel against the auxiliary fence as you cut.

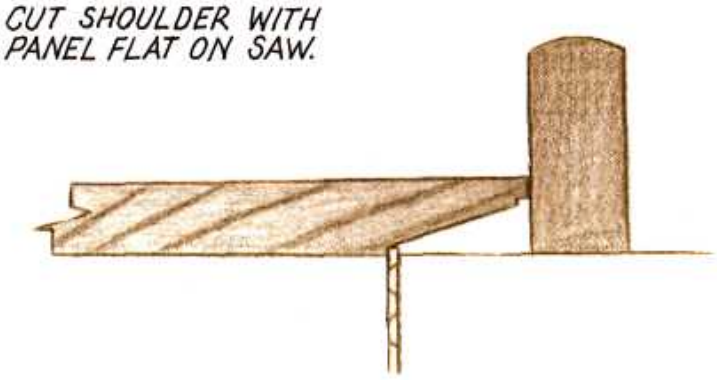
To set up the cut, put the table saw fence with the attached tall auxiliary fence to the left of the blade, and set the saw blade to 15 degrees. The saw blade should tilt away from the fence. Adjust the rip fence to cut a bevel that at its narrowest is as wide as the groove for the panel—⅜ inch in this case. Raise the blade until it just cuts through the face of the panel as shown. Cut a bevel on all four edges of the panel.

2 Cut the tongue. Set the blade to 90 degrees. Adjust the blade height and fences to cut a tongue that fits snugly in the door groove.

3 Cut the shoulder. This cut creates a step between the bevel and the face or "field" of the panel. Remove the tall auxiliary fence and adjust the height of the blade to cut a ⅛-inch step between the field and the bevel. Cut the step with the field flat on the table saw, as shown.



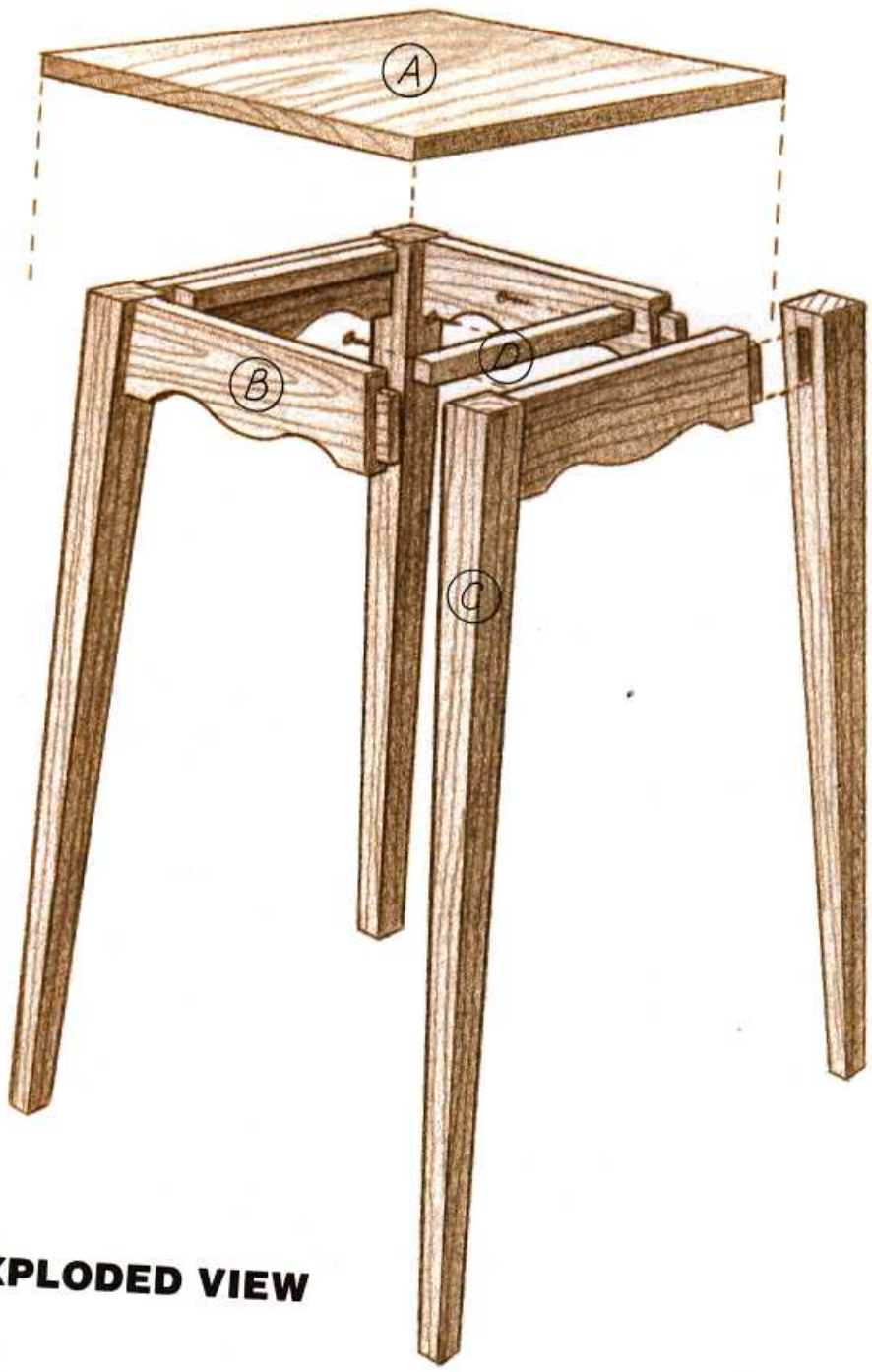




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LAMP STAND





EXPLODED VIEW

CUTTING LIST

Part	Quantity	Dimension
A. Top	1	¾″ × 14″ × 14″
B. Aprons	4	¾″ × 3″ × 10½″
C. Legs	4	1¼″ × 1¼″ × 28¼″
D. Cleats	2	¾″ × ¾″ × 9″

Hardware

12 #8 × 1¼-in. roundhead wood screws and washers

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1 Select the stock and cut the parts. The lamp stand shown is made of pine. You might consider making yours out of a hardwood like cherry, which was often used in the construction of small, thin-legged tables. Maple, walnut, or mahogany would also be suited to this project. Joint, plane, rip, and cut the parts to the sizes given in the Cutting List. If necessary, glue up boards to make the top.

2 Bevel the aprons. Because legs on this table angle outward, the ends of the apron are also angled. Set your miter gauge to 2 degrees. Put an apron flat on the table saw with the top edge against the miter gauge. Miter both ends of each apron.

3 Cut the tenons in the aprons. To set up the cut, put a dado blade in the table saw and clamp a wooden fence along the length of the saw's rip fence. Position the fence so that you can slowly crank the dado blade into it and leave ½ inch of blade exposed. Be careful not to hit the permanent fence.

With the miter gauge still set at 2 degrees, guide the aprons along the fence and over the blade to cut the cheeks of the tenon.

Cut ½ inch off the top and bottom of each tenon with a dovetail saw or other precision-cut hand saw. Take care not to damage the outside face of the apron.

4 Cut the shape in the aprons. Draw a ¼-inch grid on a piece of paper and draw the apron pattern onto it. Transfer the pattern to the wood and cut the shape with a band saw or jigsaw.

To get aprons with identical curves, cut them all at once. First stack the pieces together and secure by putting double-sided tape between them. Then cut the aprons in one operation.

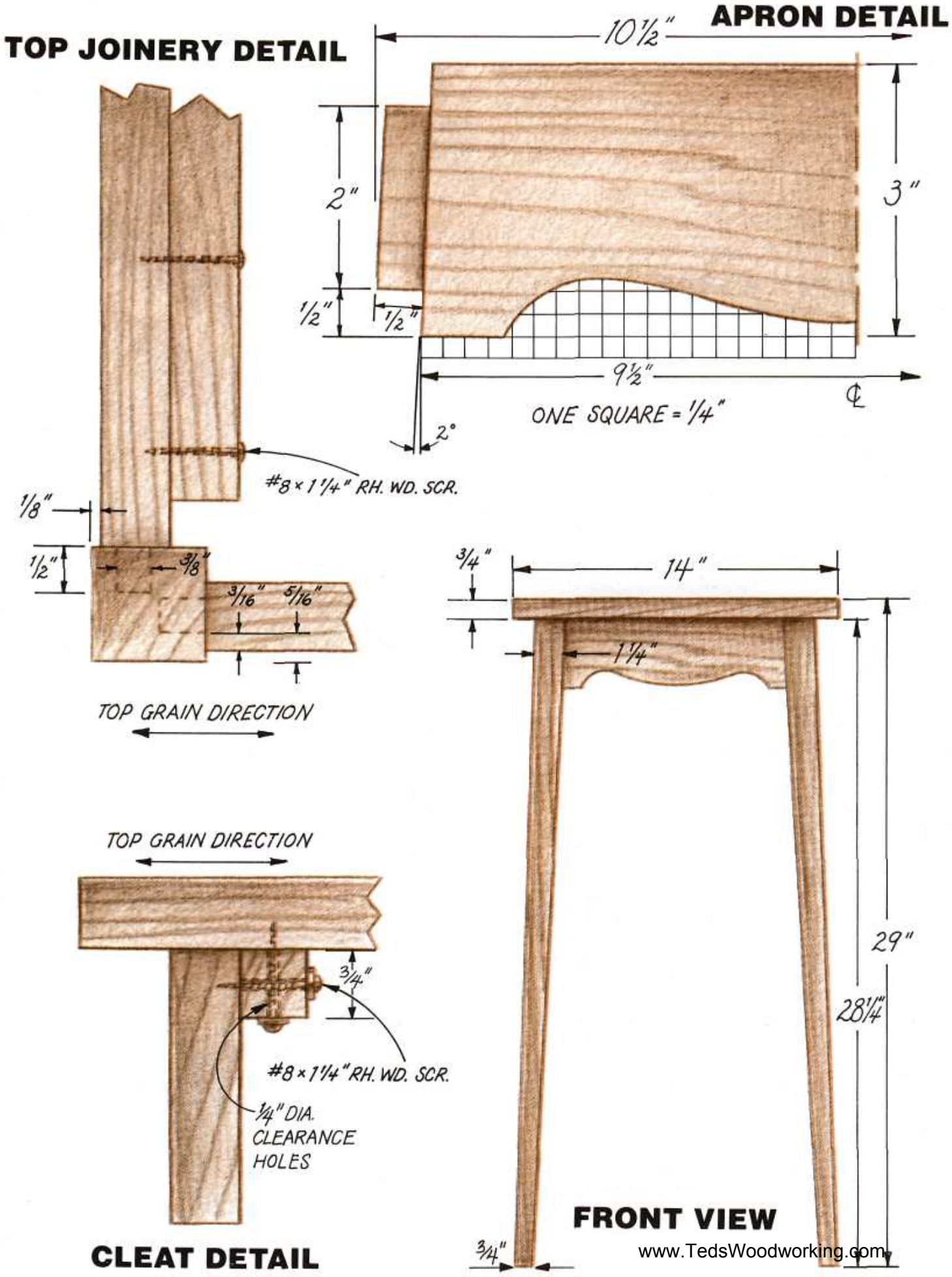
5 Taper the legs. Lay out and cut the leg tapers, as shown in the *Leg Taper Detail.* Mark the tapers on two adjacent edges of the legs. Cut the tapers on the band saw. Make the cuts about 1/16 inch to the outside of the taper lines. Cut away the last 1/16 inch with a hand plane or jointer.

SHOP TIP: You can also cut tapers on a table saw with a commercially available taper jig. These jigs allow you to cut a taper that requires much less cleanup. The taper jig should be adjusted so that when guided against the table saw fence, the taper layout lines on the leg are parallel to the table saw blade. Adjust the fence to cut the taper along the layout lines.

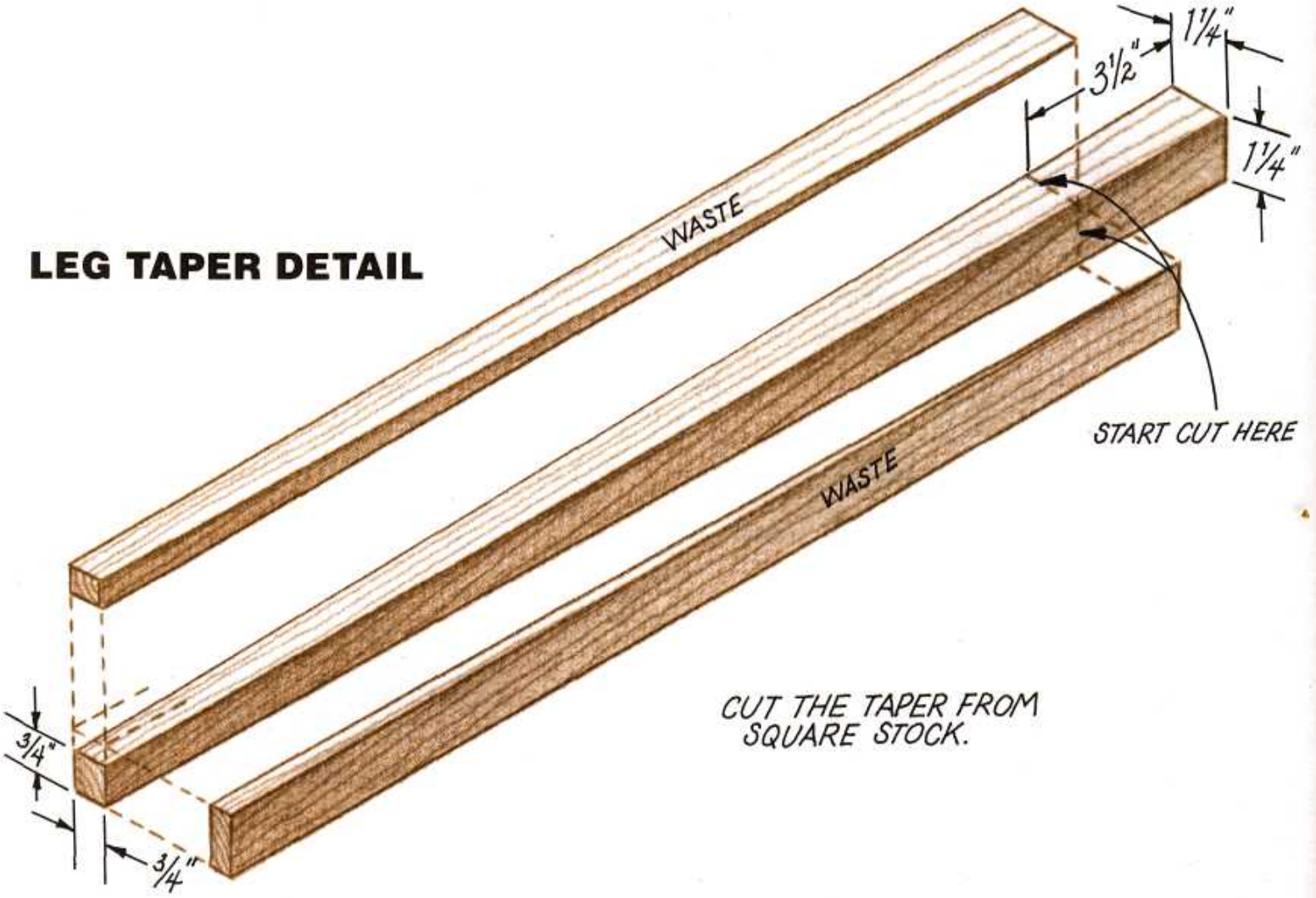
6 Cut the mortises. Cut mortises on the inside faces (tapered edges) of the legs to accept the apron tenons. Lay out 2-inch-long mortises on the legs beginning ½ inch from the top, as shown in the *Top Joinery Detail.* To cut the mortises, first drill out a series of ⅜-inch holes inside the layout lines. Then cut up to the layout lines with a sharp chisel. Test fit the tenons and make sure that the top edges of the aprons are even with the top of the legs. Make adjustments as necessary.

7 Assemble the base. Glue the apron tenons into the leg mortises. The top edge of the aprons should be even with the top of the legs. Clamp the table base

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together. Make sure that the base is square by measuring diagonally from corner to corner. If the measurements are equal, the table is square. If the measurements are unequal, clamp lightly across the long diagonal until the diagonals are the same length.

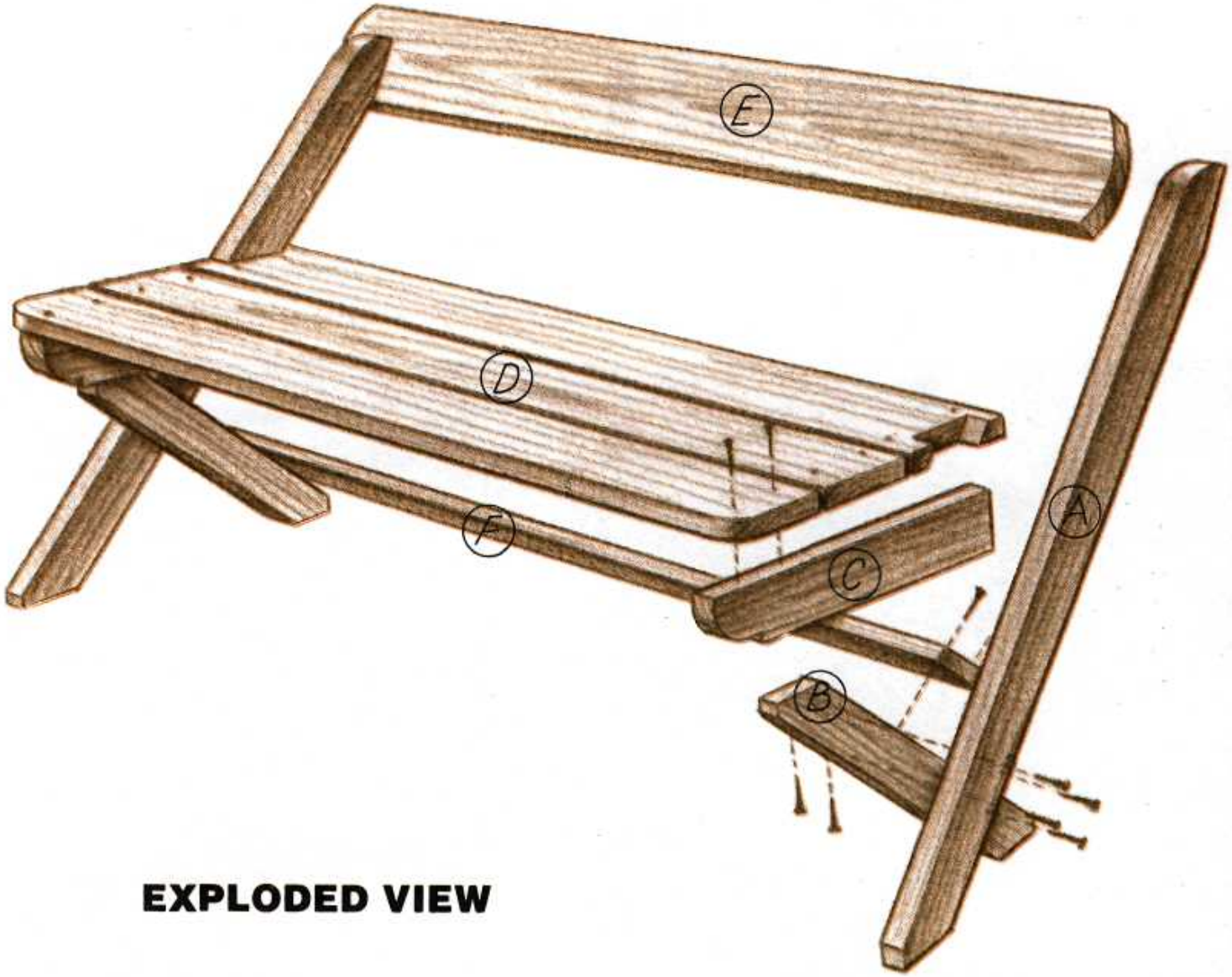
8 Attach the top. Drill three evenly spaced holes in two adjacent faces of the cleats, as shown in the *Cleat Detail.* Glue and screw the cleats to two parallel aprons. Center the top on the legs, so that the grain runs perpendicular to the cleats. Screw, but do not glue, the top to the cleats. The oversize holes in the cleats will allow the top to expand and contract with changes in humidity.

9 Apply finish. Sand the table and slightly round all of the edges. The table shown has been stained, but you can finish your table in a way that best fits your decor. If your table is made from cherry or other hardwood, you may want to highlight the grain with an oil finish.

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LIAR'S BENCH





EXPLODED VIEW

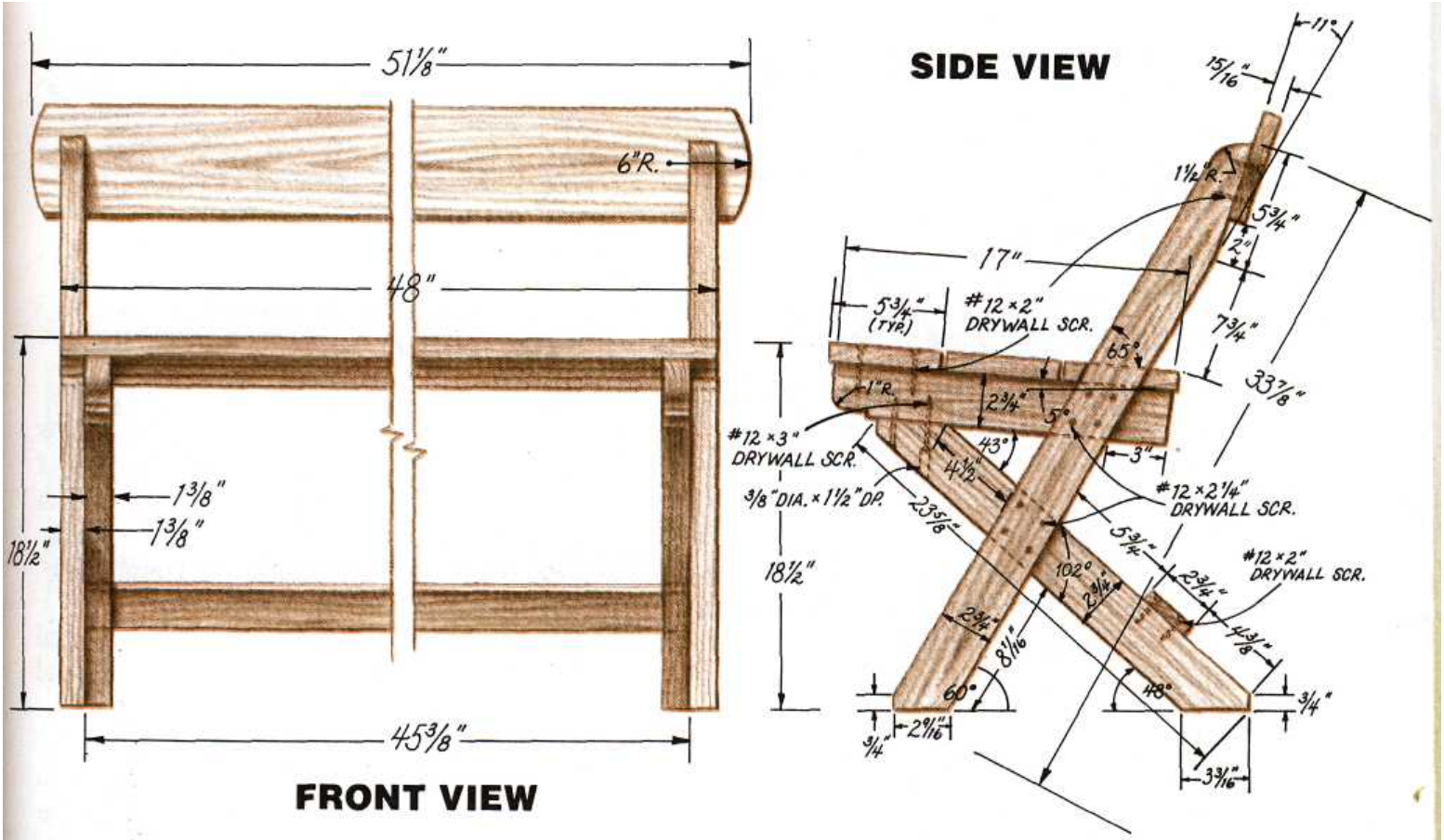
CUTTING LIST

Part	Quantity	Dimension
A. Long legs	2	1⅜" × 2¾" × 33⅞"
B. Short legs	2	1⅜" × 2¾" × 23⅝"
C. Seat supports	2	1⅜" × 2¾" × 17"
D. Seat boards	3	15/16" × 5¾" × 48"
E. Back	1	15/16" × 5¾" × 51⅛"
F. Bottom support	1	¾" × 2¾" × 45⅜"

Hardware

4 #12 × 3-in. drywall screws
16 #12 × 2¼-in. drywall screws
20 #12 × 2-in. drywall screws

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1 Select the stock and cut the parts. Almost any clear hardwood or softwood is suitable for this bench. If you plan to use this outdoors, cedar or mahogany would be good choices. Choose straight, flat stock. A few small knots are acceptable in this piece. Joint, plane, rip, and cut the parts to the sizes given in the Cutting List.

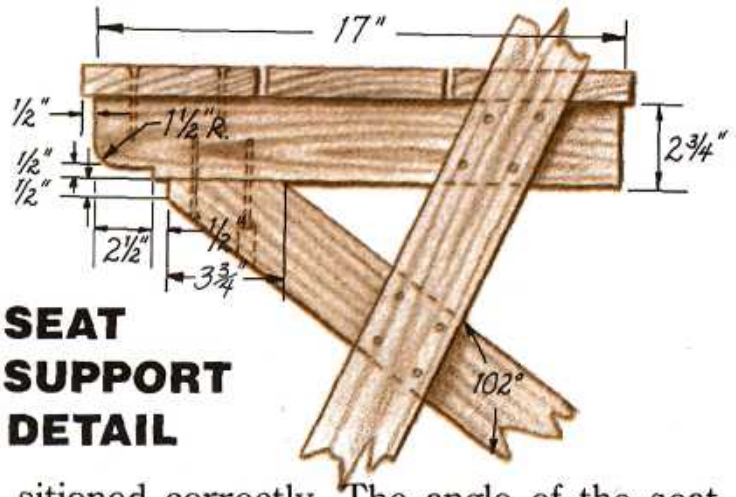
2 Cut the long and short legs and the seat supports to shape. Lay out the angles on the leg, as shown in the *Side View.* The easiest way to cut the sharp angles in the legs is with a good old-fashioned, muscle-powered crosscut saw. Hold the stock down on some sawhorses or a low bench and make the cut to the waste side of your layout lines. Sand away any saw marks.

Cut the curve in the front edge of seat supports and top of the long legs with a jigsaw or band saw, as shown in the *Seat Support Detail* and the *Side View.* Stay to the waste side of your layout lines as you cut. Clean up the sawed edges with sandpaper.

3 Lay out and assemble the legs and seat supports. Arrange the legs and seat supports on top of each other as they will be when assembled. Use a protractor to set a sliding T-bevel to the angles shown in the *Side View* and align the parts with it.

Clamp the legs and seat supports in position with C-clamps. Compare the two end assemblies by standing them next to each other with their seat supports side by side. Make sure that everything is po-

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SEAT SUPPORT DETAIL

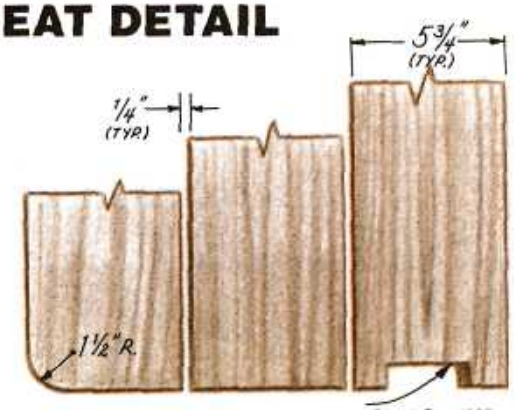
sitioned correctly. The angle of the seat supports and legs should match, and the long legs should be on the opposite sides of their seat supports. Make any necessary adjustments.

With the legs and seat supports still clamped, predrill and screw together each end assembly. Attach the long legs to the short legs and seat supports with four #12 × 2¼-inch drywall screws, as shown in the *Side View.* Attach the short legs to the seat supports with two #12 × 3-inch drywall screws angled up through the short legs and into the seat supports, as shown. Because of the angles involved, you must counterbore 1½ inches in each short leg for one of the screws, as shown.

4 Notch the rear seat board. The rear seat board is notched to fit around the long legs, as shown in the *Seat Detail, Top View.* To lay out the notch, put the seat board on one of the seat supports so that the end grain is against the long leg. Trace the location of the leg onto the end grain. Set a marking gauge to the thickness of the leg and lay out the depth of the notch on the top and bottom of the seat board. Repeat on the other end of the board.

Cut along the angled lines with a dovetail saw or back saw, until you reach the scribe line. Cut along the scribe line with a jigsaw to remove the waste.

SEAT DETAIL



TOP VIEW

CUT NOTCH TO FIT AROUND LONG LEG.

5 Cut curves in the back board and front seat board. With a jigsaw cut the front seat board and the ends of the back board to the profiles shown in the *Front View* and *Seat Detail, Top View.* Sand away any saw marks or roughness.

6 Assemble the bench. Sand the end assemblies, seat boards, back, and bottom support.

On a flat surface, position the seat boards on the end assemblies, as shown in *Side View* and *Front View.* Clamp the seat in place. Next, clamp the back to the long legs. Clamp the bottom support to the short legs, as shown in the *Side View.* When everything is positioned correctly, predrill and countersink holes for #12 × 2-inch screws, as shown in the *Side View.* Drive the screws and remove the clamps.

SHOP TIP: To keep the ends from falling over while you position the other parts, clamp two 51-inch lengths of scrap between them. Position the ends the proper distance apart and begin assembly.

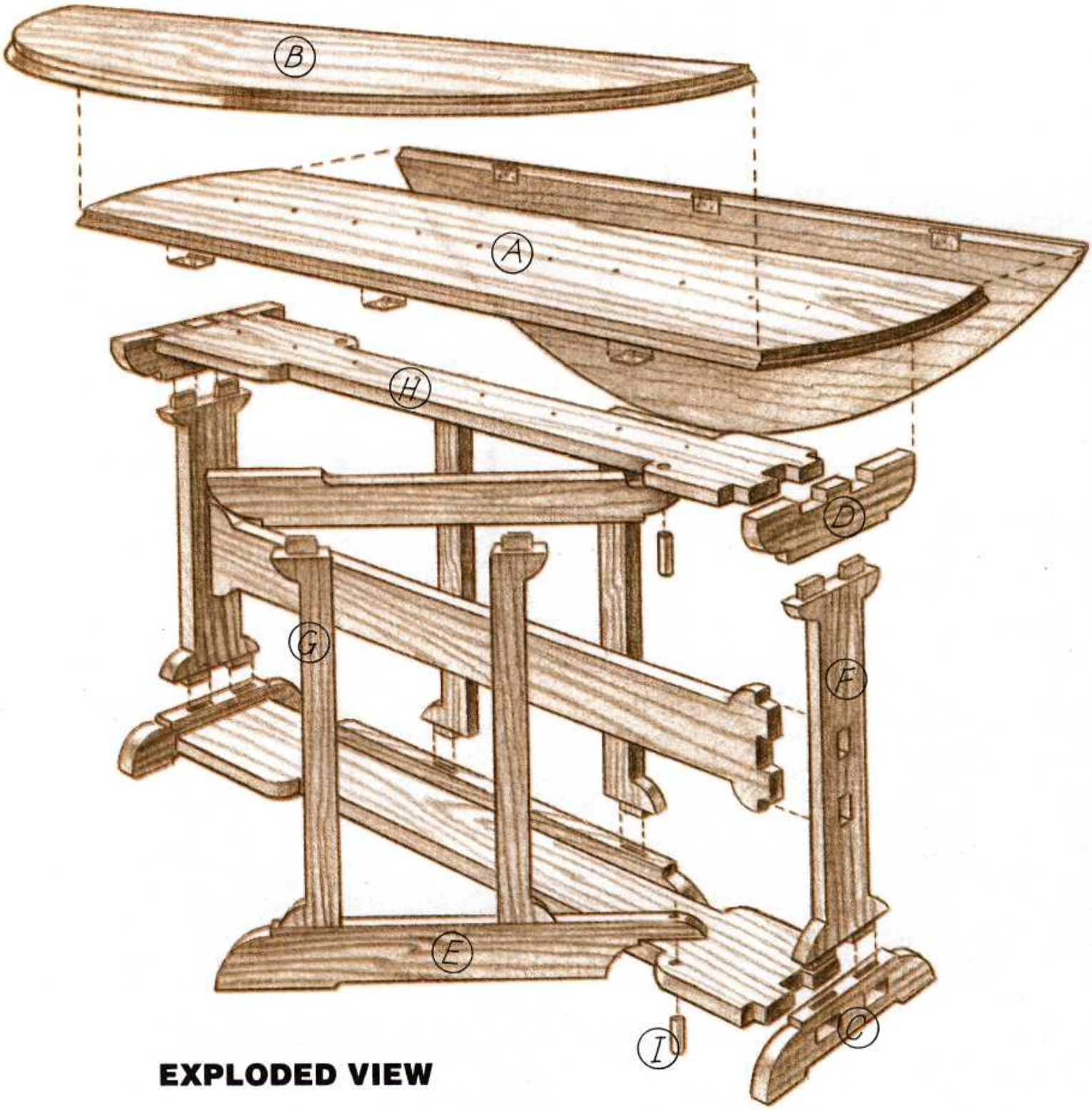
7 Sand and apply the finish. Give the assembled bench a final sanding. If your bench will be outside, protect it with a weather-resistant finish like spar varnish.

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GATELEG TABLE



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EXPLODED VIEW

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1 Select the stock and cut the parts. The gateleg table shown is made from pine, but it can be made from almost any kind of wood. Choose straight, flat stock. Joint, plane, rip, and cut the stock to the sizes given in the Cutting List.

You'll have to glue several boards together to create the top and leaves. When the leaves and top are glued, hand plane or sand the glue joints even.

SHOP TIP: When you need to create a wide, flat surface, it is better to glue together several narrow boards than to create the width with a few wide boards. Wide boards often cup, warp, or split as humidity changes. If you want the appearance of wide boards, rip wide boards down the middle, then carefully joint and glue them back together.

2 Lay out and rout the rule joint between the top and leaves. A rule joint is made by routing a roundover in the long edges of the tabletop and a cove in the adjoining edge of each leaf.

Start by making the roundover to the dimensions shown in the *Rule Joint Detail.* Clamp the top, with its bottom down, to a workbench or other stable work surface. Let one of the long edges of the top hang over the edge of the work surface and cut the roundover in a series of passes with a router and ½-inch-radius roundover bit. Lower the bit with each pass until you match the profile shown. Then rotate the tabletop and rout the remaining edge.

Next, rout the cove in the leaves. Clamp one of the leaves face down on a stable work surface with one of the long edges hanging over the side. Rout the cove in the leaf with a few passes of a router and ½-inch-radius cove bit. Again,

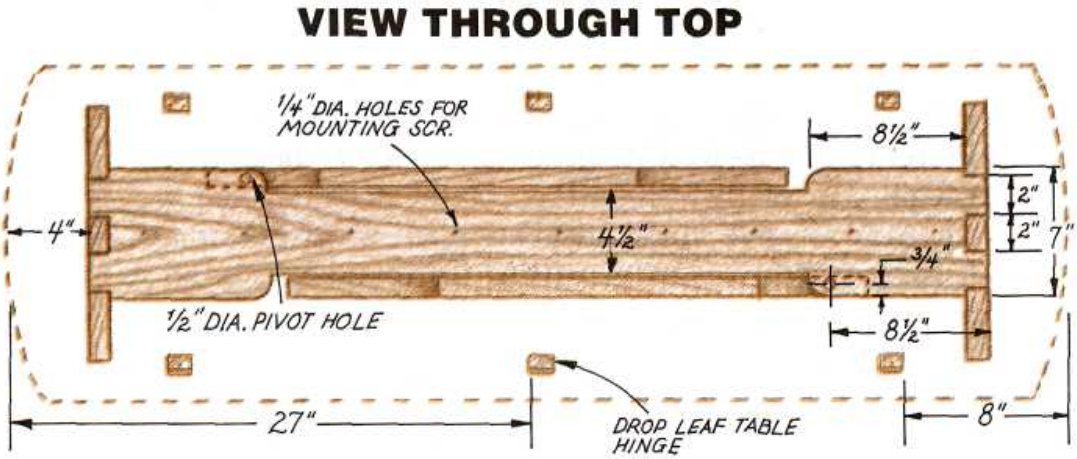
CUTTING LIST

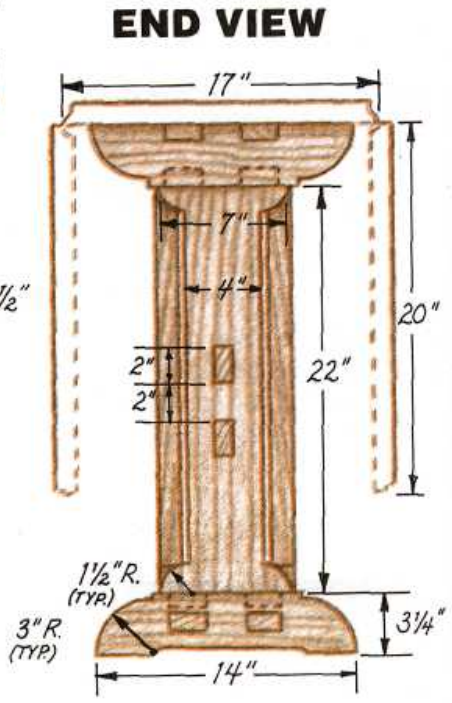
Part	Quantity	Dimension
A. Top	1	1⅛" × 17" × 56"
B. Leaves	2	1⅛" × 20" × 56"
C. Feet	2	1⅛" × 3¼" × 14"
D. Top supports	2	1⅛" × 3¼" × 14"
E. Gate rails	4	1⅛" × 3¼" × 29¾"
F. Legs	2	1⅛" × 7" × 24"
G. Gate stiles	4	1⅛" × 3½" × 24"
H. Top/middle/bottom crosspieces	3	1⅛" × 7" × 48"
I. Pivot dowels	4	½" dia. × 2⅛"

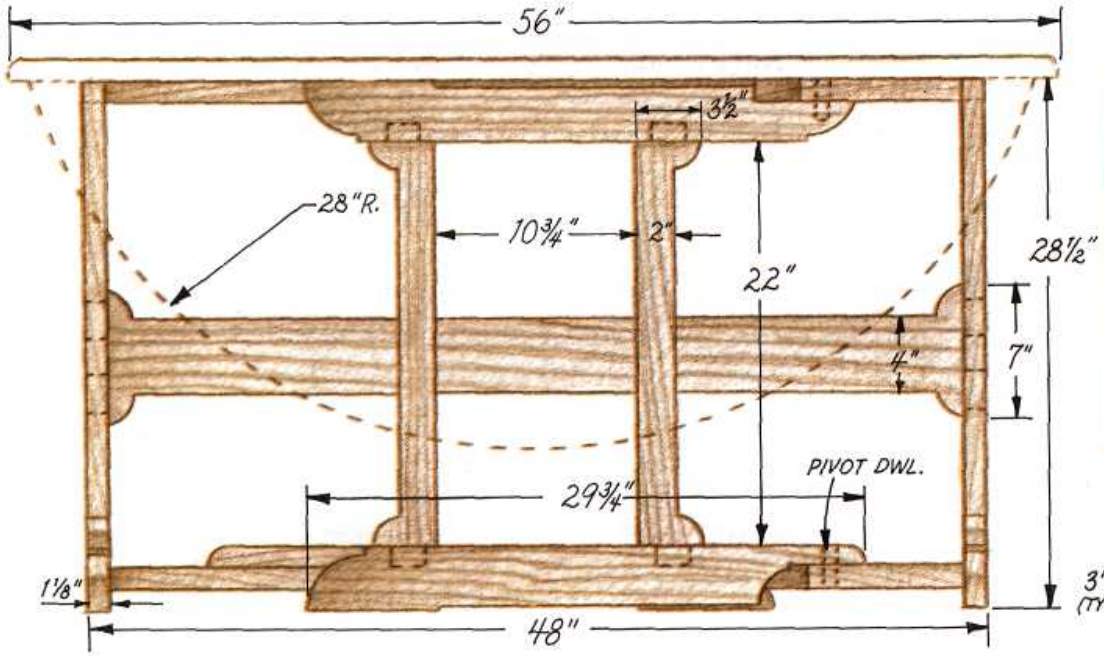
Hardware

4 #8 × 2-in. flathead wood screws
As needed, #10 × 2-in. roundhead wood screws
6 drop leaf table hinges

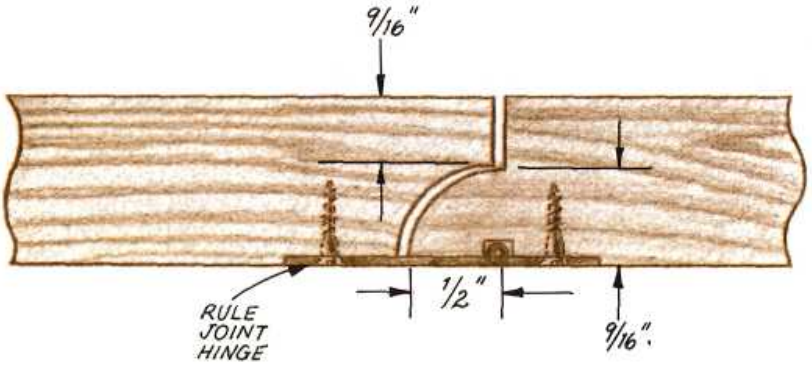
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VIEW THROUGH LEAF



RULE JOINT DETAIL

lower the bit with each pass until you match the profile shown in the *Rule Joint Detail*. Repeat the process with the second leaf.

3 Hinge the leaves to the top. The leaves are hinged to the top with drop leaf table hinges. There are three hinges for each leaf, and mortises need to be cut for each. Each mortise also has a recess cut in it for the hinge barrels.

First, lay the top and leaves face down on a flat surface with the rule joints together. Separate the leaves from the top along the rule joint by 1/16 inch.

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Next, lay out the hinges along each rule joint, as shown in the *View through Top*. Position the hinges across the joint with the hinge barrel underneath the top, as shown in the *Rule Joint Detail.*

When all the hinges are in position, trace around each one with a marking knife and mark the position of the hinge barrel. Cut a mortise for each hinge to the depth of the hinge leaf. Remove most of the wood with a router and straight bit; clean up to the layout lines with a chisel.

After you cut the mortises, use a ¼-inch gouge to cut deeper mortises for the hinge barrels. The cuts need not be perfect: They will be hidden by the hinges.

When all of the hinge mortises have been cut, hinge the leaves to the top.

4 Lay out and cut the circular top. Plot the center point on the underside of the tabletop by drawing diagonal lines from corner to corner. The point at which the lines intersect should be the exact center of the tabletop. Lay out the 28-inch-radius circle on the top and leaves from the center point. Cut out the top with a jigsaw and sand the edge smooth.

SHOP TIP: Lay out the top with the help of a circle-marking stick. Make the stick from a 29-inch-long piece of scrap. Drill a ¼-inch hole at one end and a ⅛-inch hole 28 inches from the first hole at the other end. Drive a 6d finishing nail about ½ inch into the center point that you plotted on the underside of the table. Put the ⅛-inch hole at the end of the stick over the finishing nail and put a pencil in the ¼-inch hole at the other end. Swing the stick in an arc to make a perfect 28-inch-radius circle.

5 Cut out and mortise the feet, top supports, and gate rails. When you build the base of this table, you first build a trestle, and then add the gates that support the leaves. It's more efficient, however, to cut the joints for both trestle and gate at the same time.

First, lay out the foot, top support, and gate rail shapes on the stock, as shown in the *Foot Detail, Side View; Top Support Detail, Side View;* and *Gate Detail,* with a compass and straightedge. Notice that the rails on the top and bottom of the gate do not have the same shape.

Lay out the leg mortises on the top supports and feet. To cut the mortises, drill a series of adjoining holes inside the layout lines with a ½-inch drill bit. Cut up to the layout lines and square the mortise corners with a chisel.

Next, lay out and cut the through mortises in the feet for the crosspiece. Cut the mortises as before. When you clean up to the layout lines, work from both sides of the feet.

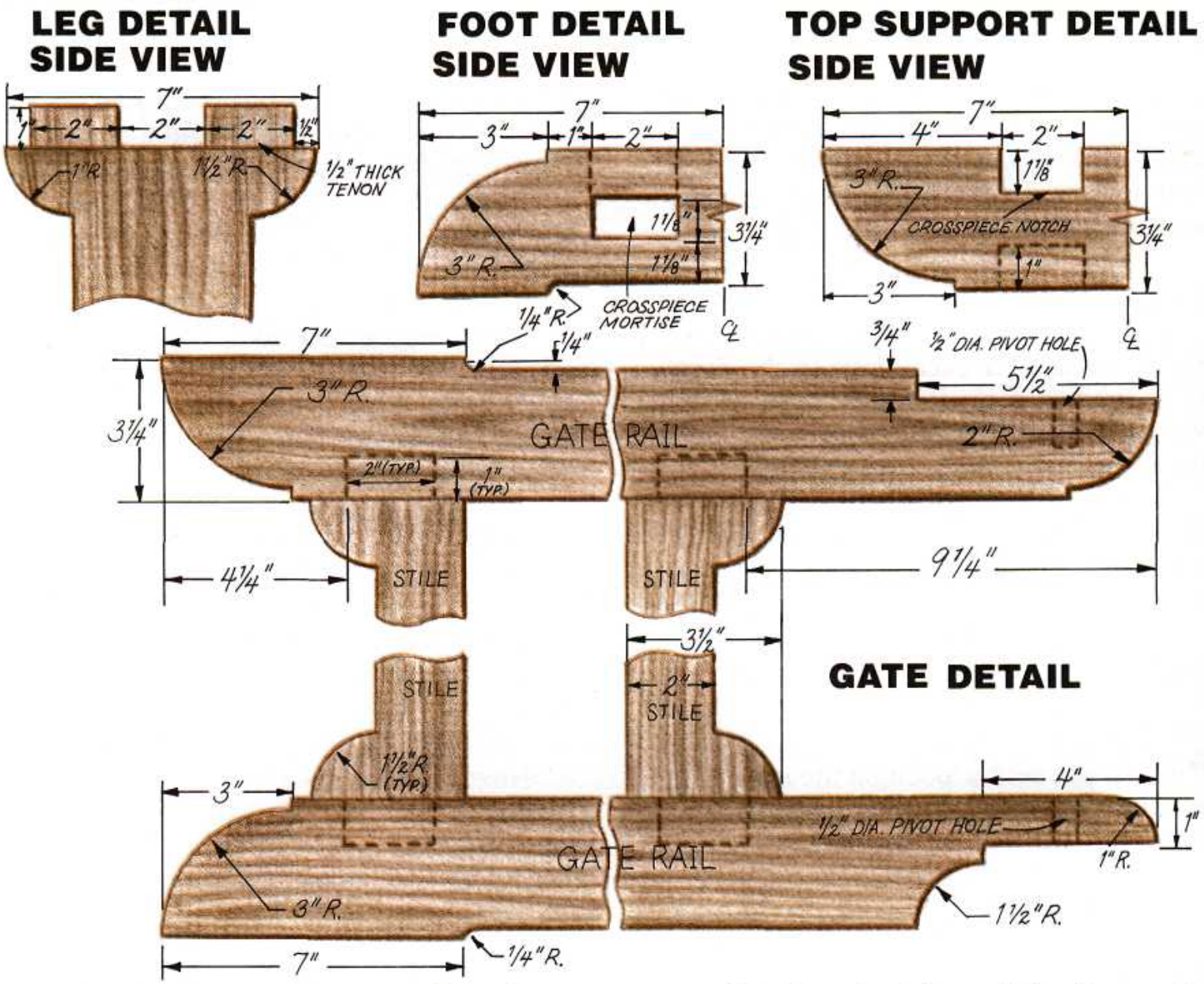
Notch the top supports to hold the top crosspiece. Lay out the notches and cut them in a series of cuts on the table saw.

Cut the foot, top support, and gate rail to shape with a band saw or jigsaw and sand off the marks left by the saw.

6 Tenon the legs and gate stiles and cut them to shape. Lay out the tenons on the legs and gate stiles, as shown in the *Tenon Details.*

Before you cut the tenons, set up the cut by putting a dado blade in the table saw. Adjust the dado blade so that it protrudes about ¼ inch above the surface of the table saw. Clamp a stop block to the fence to set the length of the tenons and

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make the cut, as shown in *Tenoning on the Table Saw.* Test the setup on a piece of scrap the same thickness as the actual stock. Because the tenon is 1 inch long, you will have to cut each side of the tenon in two passes.

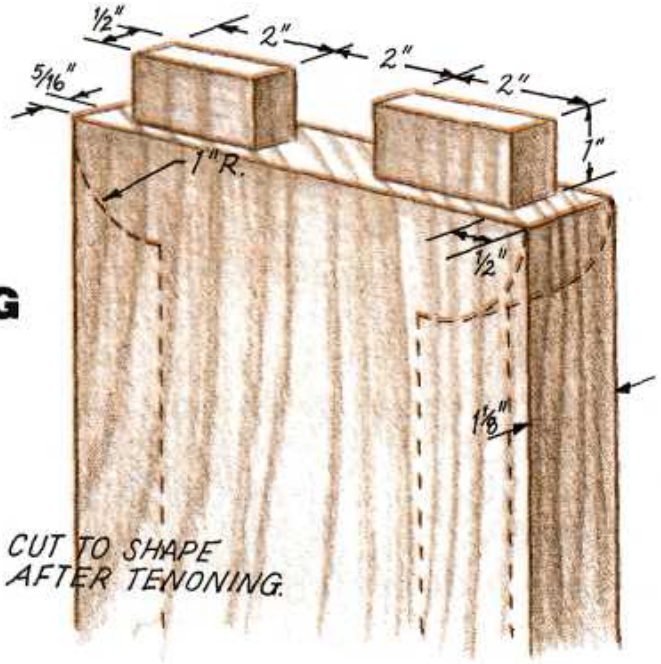
When you have cut one side of the tenon, flip the test piece over and make the cut on the other side. Then turn off the saw and test fit a corner of the tenon into a mortise. If it is too tight, raise the dado blade slightly and remove a little more stock from both sides of the tenon. When the test piece fits snugly, cut the thickness of the tenons in the legs and gate stiles with the same setup.

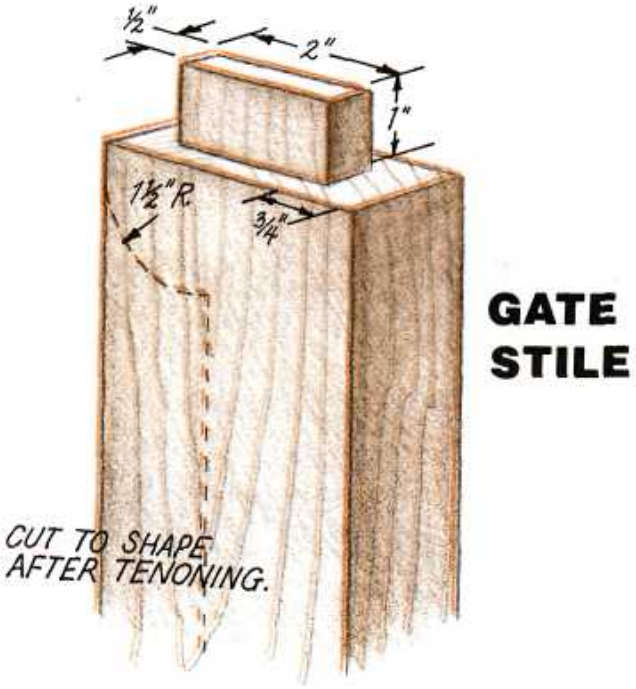
Cut the short face of the tenons by raising the dado blade ½ inch above the table and putting the stock on edge. Make the cuts as before.

Each leg has twin tenons on the top and bottom. Cut away a 2-inch section in the middle of the tenon you just cut, to create the twin tenons shown in the *Tenon Details.* Make the cuts that go with the grain with a backsaw. Cut across the grain with a coping saw. Keep the coping saw about 1/16 inch on the waste side of the layout line. Cut up to the line with a chisel.

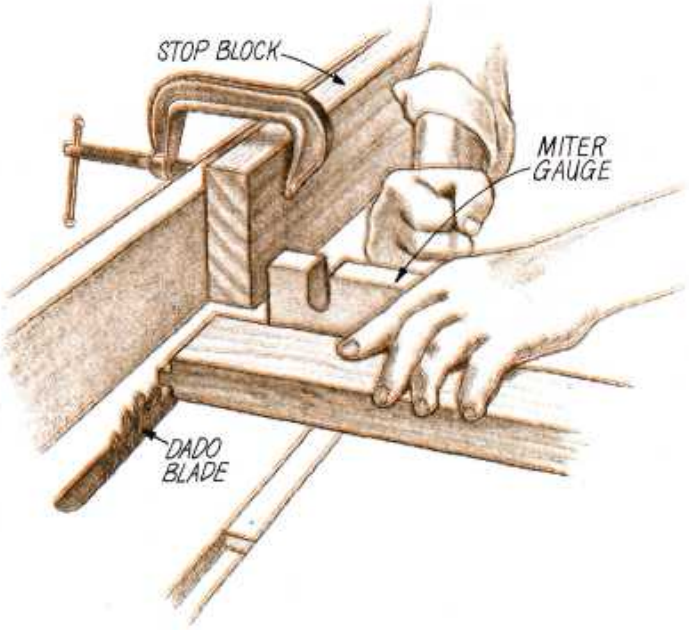
When the tenons have been cut, cut the legs and gate stiles to shape. Sand away any saw marks.

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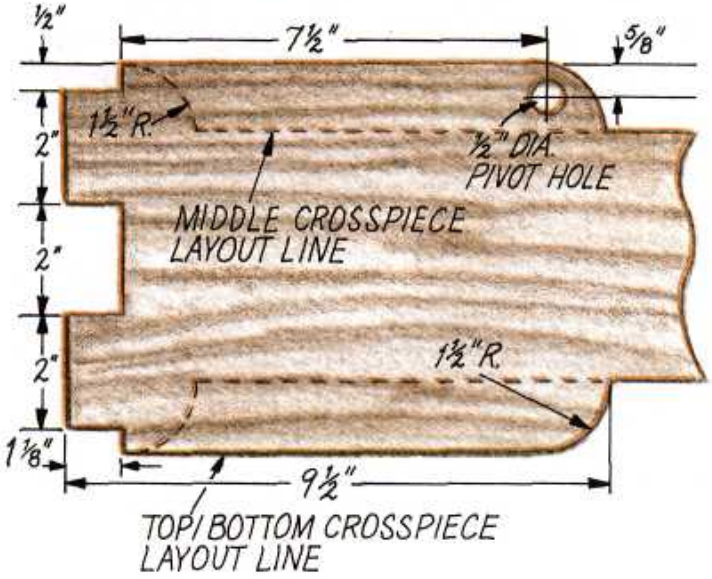
TENONING ON THE TABLE SAW



7 Tenon the crosspieces and cut them to shape. Lay out the crosspiece tenons, as shown in the *Crosspiece Detail*. Cut the tenons with a backsaw and remove the waste between them with a coping saw. Cut about 1/16 inch on the waste side of the layout lines with the coping saw as before. Clean up the cut with a chisel. Test the fit of the tenons in their mortises and make any necessary adjustments.

Cut the crosspieces to shape after you cut the tenons. Sand away any saw marks.

CROSSPIECE DETAIL



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8 Drill pivot holes in the gate rails and crosspieces. Lay out the pivot holes in the crosspieces, as shown in the *View through Top*. To ensure that the holes align, clamp the top and bottom crosspieces together and drill the holes in one operation.

Drill the holes in the gate rails, as shown in the *Gate Detail*.

9 Assemble the trestle. Coat the leg tenons with glue and put them in their mortises in the feet and top supports. Clamp the assemblies together and make sure that the assemblies are square. Allow the glue to dry.

When the glue is dry, add the crosspieces. Spread some glue on the crosspiece tenons and put them in their mortises. Make sure that you position the crosspieces so that the pivot holes are positioned as shown in the *View through Leaf*. Reinforce the joint in the top crosspiece by driving #8 × 2-inch screws through the tenons and into the top supports.

Clamp the crosspieces in place and allow the glue to dry.

10 Assemble the gates and attach them to the top and bottom supports. First, spread glue on the gate tenons and insert them into their mortises. Make sure the curves on the legs are positioned as shown in the *Gate Detail*. Clamp the gates together and make sure that they are square. Make any necessary adjustments and allow the glue to dry.

Next, position the gates on the base so that the pivot holes in the gates line up with those in the base. Insert the pivot dowels into the top crosspiece and tap them down into the top gate rails with a mallet.

Tap the remaining pivot dowels through the bottom gate rails and about halfway into the bottom crosspieces. This should leave about ½ inch of the pivot dowels exposed above the bottom gate rails. Spread a little glue on the exposed portion of the pivot dowels and tap them the rest of the way into the bottom crosspiece. Clean up any excess glue.

11 Attach the top to the completed base. Drill a series of evenly spaced holes in the crosspiece, as shown in the *View through Top*. Center the top on the base. Attach the top to the base by driving #10 × 2-inch roundhead wood screws through the holes and into the top.

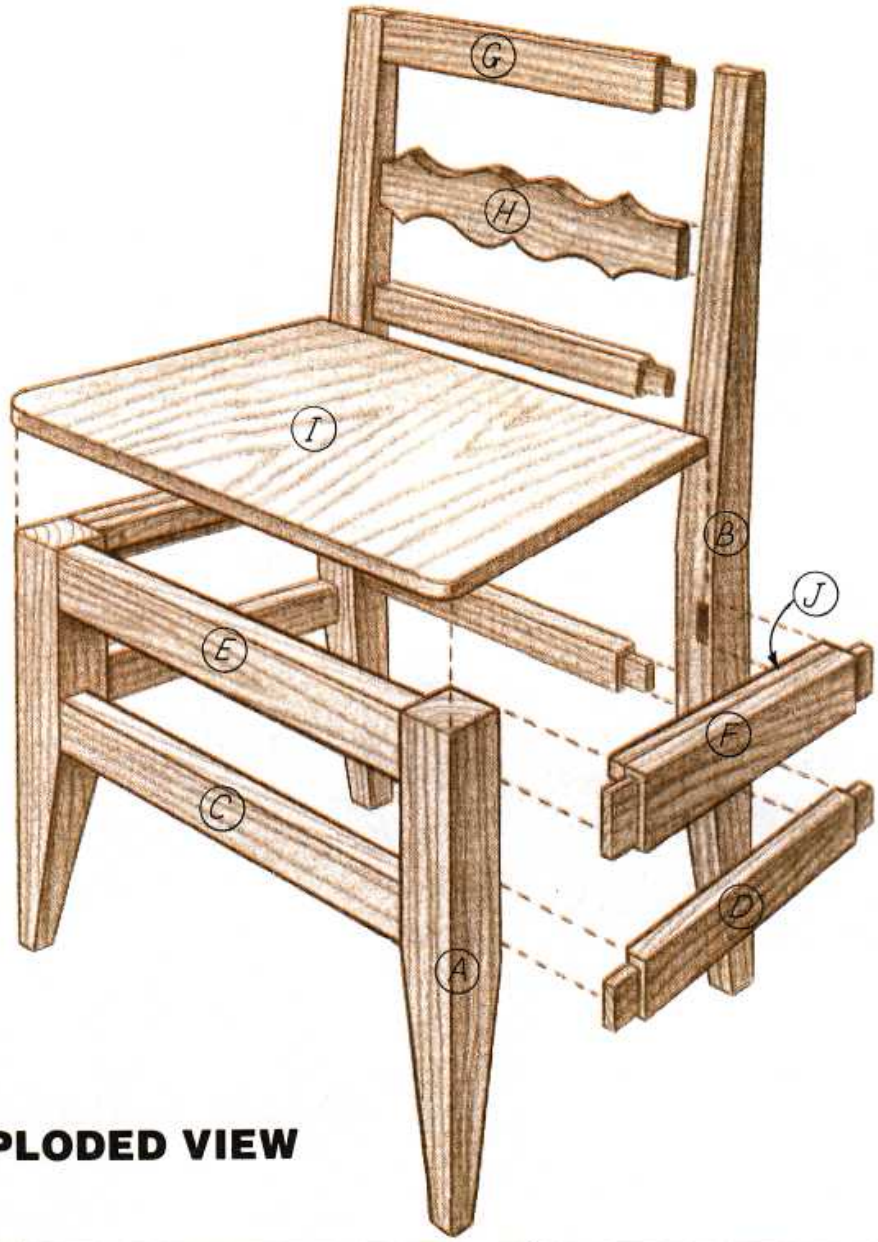
12 Rout the profile around the top. When the top has been screwed to the base, pull up the leaves and swing out the gates to hold them. Rout the profile around the full circle of the top with a router and a ½-inch-radius roundover bit. As you cross the rule joint, be careful not to let the router bit bearing fall into the joint. Float from one edge of the joint to the other.

13 Apply the finish. Finish sand your gateleg table. Apply stain or a clear wood finishing oil to your table to bring out the beauty of the wood grain. Follow the stain or oil with a tough polyurethane to protect your table from everyday wear.

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COUNTRY CHAIR





EXPLODED VIEW

CUTTING LIST

Part	Quantity	Dimension	Comment
A. Front legs	2	1⅞" × 1⅞" × 15"	
B. Back legs	2	1¾" × 3" × 33½"	Cut to shape.
C. Front rail	1	⅞" × 1⅜" × 13³⁄₁₆"	
D. Side/back rails	3	⅞" × 1⅜" × 12⅞"	
E. Front support	1	⅞" × 1¾" × 13³⁄₁₆"	
F. Side supports	2	⅞" × 1¾" × 12⅞"	
G. Top rail	1	⅞" × 2" × 12⅞"	
H. Shaped rail	1	½" × 2½" × 12⅞"	
I. Seat	1	⁹⁄₁₆" × 16½" × 13¼"	
J. Cleats	2	¾" × ¾" × 10¾"	

Hardware

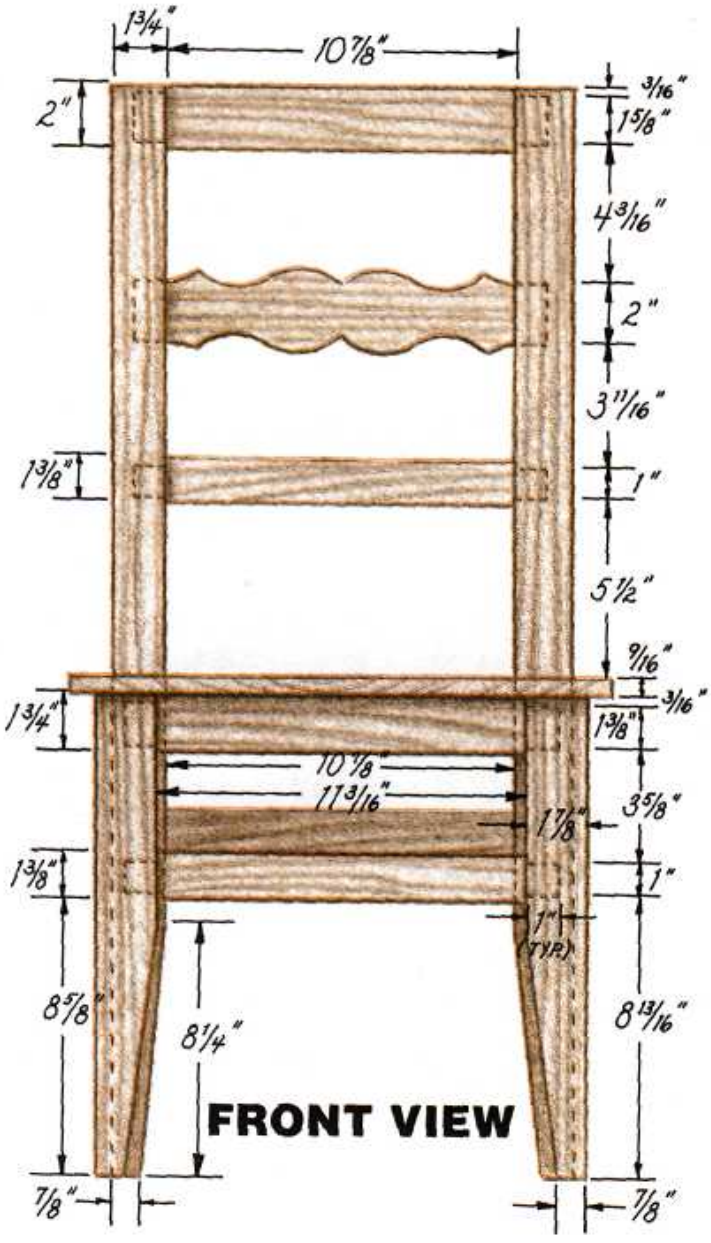
6 #8 × 1-in. flathead wood screws

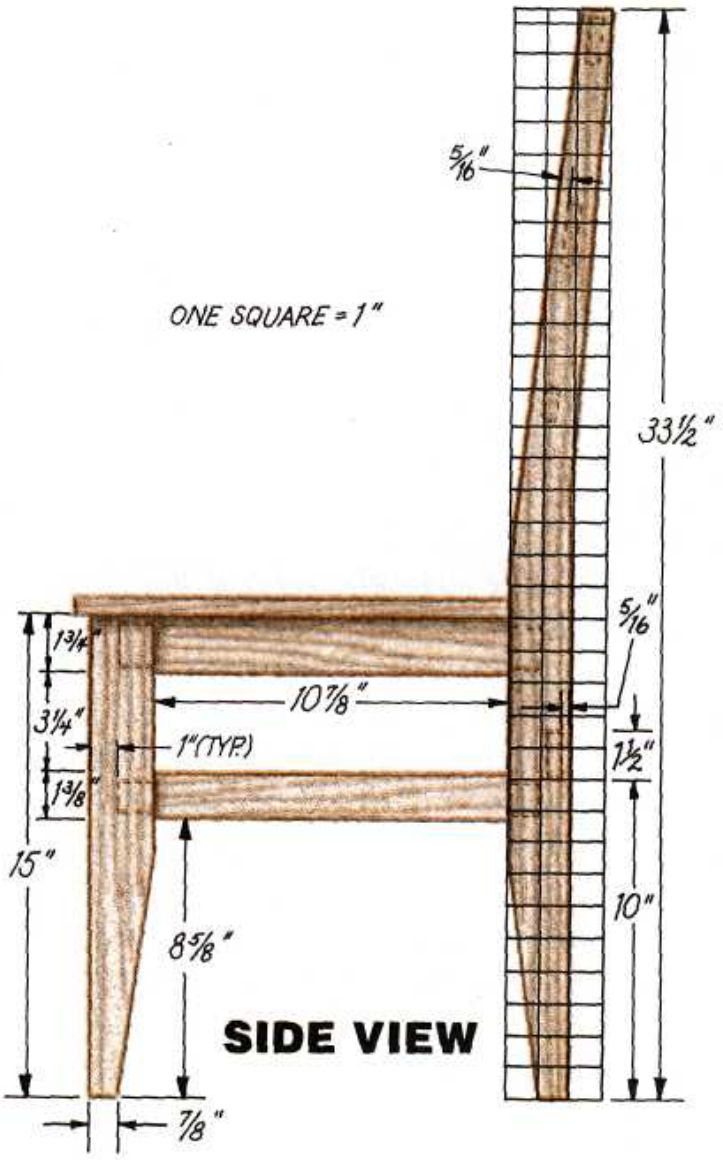
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1 Select the stock and cut the parts. The chair shown is made from poplar. You could make your chair from other hardwoods like maple, cherry, or oak. Choose good straight stock that is free of knots and cut the parts to the sizes given in the Cutting List.

2 Cut the legs to shape. Draw a ½-inch grid on a 36-inch-long piece of paper and draw the back leg pattern onto it. Transfer the pattern to the stock and cut the back legs to shape on a band saw. Sand away any saw marks.

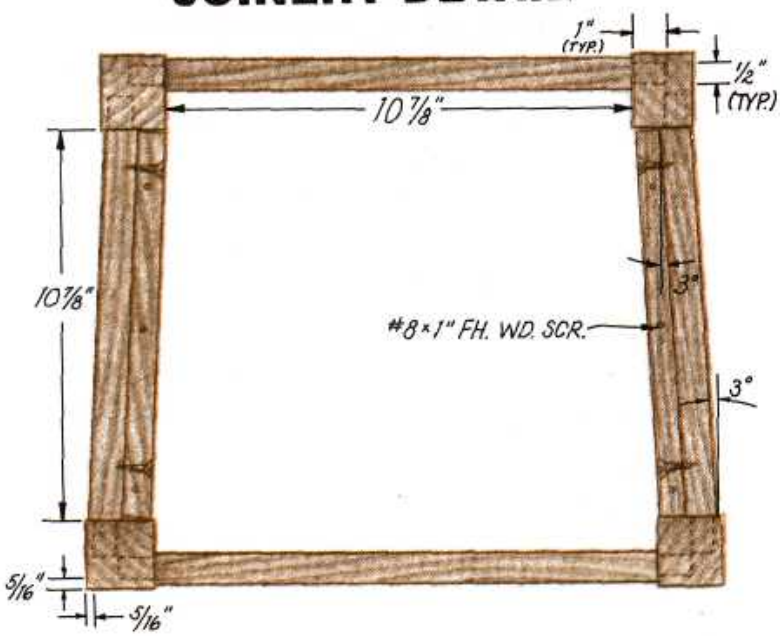
Each of the legs is tapered on two adjacent sides, as shown in the *Front View* and *Side View.* Cutting the back legs created one of the back leg's two tapers. Lay out the remaining taper on the back legs and lay out the tapers on the front legs. Cut the tapers on the band saw. Stay about 1/16 inch to the waste side of the layout lines as you cut and then trim down to the layout lines on a jointer or with a hand plane. Use a push stick on the jointer and keep your hands well away from the cutter.





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JOINERY DETAIL



3 Cut the mortises in the legs. All of the legs are mortised to accept the tenons in the rails and supports. Lay out the mortises shown in the *Joinery Detail, Front View,* and *Side View.* Cut the mortises by drilling a series of adjacent ½-inch holes between the layout lines. Cut the mortise sides and corners square with a chisel.

4 Cut the tenons. Making this chair requires both straight and angled tenons. Cut the straight tenons first.

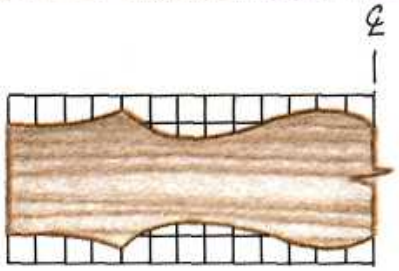
All of the straight tenons are 1 inch long and have 3/16-inch shoulders. Cut the tenons in repeated passes over the dado blade. To set up the cut, raise the dado blade 3/16 inch above the table. Test the setup on a piece of scrap the exact thickness of the rail. Cut one face of the test piece. Turn it over and cut the other face. Test fit the resulting tenon in the mortise. Adjust the blade height as necessary.

Adjust the fence so that guiding the end of the rail along it with the miter gauge cuts the tenon shoulder 1 inch from the end of the rail. To remove the remaining waste, reposition the rail in the miter gauge. Do not reset the fence. Cut the straight tenons.

5 Cut the angled tenons. Because the back of the chair frame is narrower than the front of the frame, the side rails and side supports run from front to back at an angle. To do this, you cut angled tenons on the pieces.

Lay out the tenons as shown in the *Joinery Detail.* Cut them as explained in "Angled Tenons" on page 138.

SHAPED RAIL PATTERN



ONE SQUARE = 1/2"



SEAT PATTERN

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6 Cut the shaped rail. The full thickness of this rail fits into the mortises you cut earlier. Slip a corner of the stock into the mortise to check the fit. Plane the stock to fit, if necessary. Draw a ¼-inch grid on a piece of paper and draw the *Shaped Rail Pattern* onto it. Transfer the pattern to the wood and cut out the shaped rail on a band saw. Sand away any saw marks.

7 Assemble the chair frame. First, assemble the two sides. Put some glue in the mortises for the side supports and side rails. Apply enough glue to coat the sides of the mortises, but don't apply so much that it squeezes out when you put the tenon in place. Put the rails and supports in the mortises, as shown in the *Exploded View.* Clamp each side together.

When the glue dries, test fit the rest of the chair and clamp it lightly together. If there are gaps between the front or back parts and the legs, you can correct them by trimming the rails and supports.

If the gaps are in front, correct them by trimming the rear rails and supports. If they are in the back, trim the front rails and supports. Trim the shoulders of one end of the appropriate rail and support by the amount of the gap.

To trim the shoulder on the table saw, put the piece in the miter gauge. Adjust the fence so that when you run the end of the stock against it, the blade will trim the necessary amount. Adjust the blade so that it won't cut into the tenon.

After you've done any necessary trimming, put glue in the remaining mortises, assemble the chair, and clamp it gently together.

8 Cut the seat to shape. Draw a ¼-inch grid on a piece of paper and draw the seat shape onto it, as grid in the *Seat Pattern.* Transfer the pattern to the wood and cut the seat to shape with a jigsaw or band saw. Sand the sawed edges smooth.

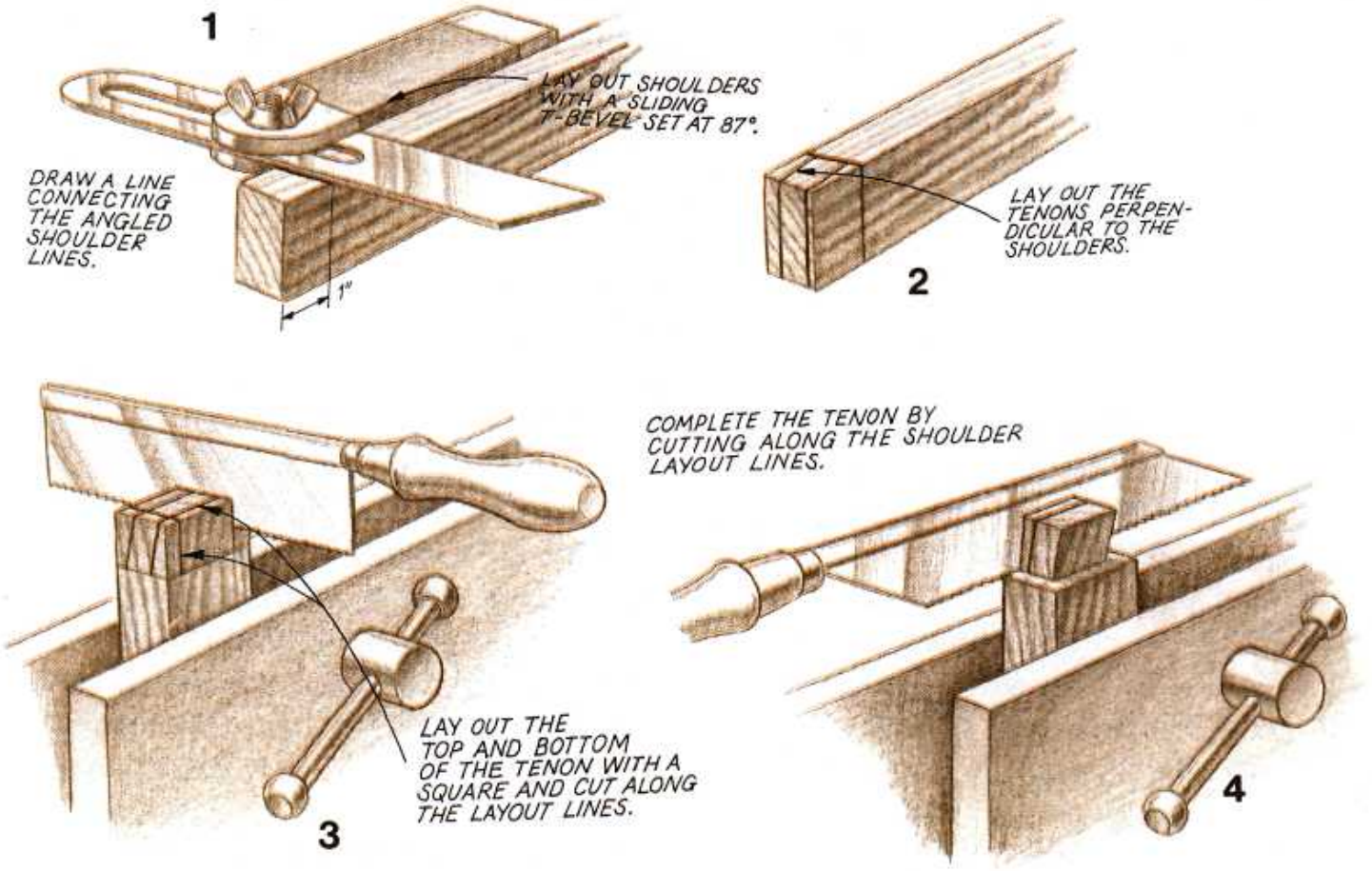
9 Attach the seat to the chair frame. The chair is attached to the frame with wooden cleats, as shown in the *Joinery Detail.* First, predrill clearance holes in the cleats that are slightly larger than the screw shank. Spacing of the holes isn't critical. Countersink the clearance holes. Screw and glue the cleats to the side supports, as shown. Then, center the seat on the frame and screw it in place. Do not glue the seat to the cleats or frame.

SHOP TIP: Drill the holes through the cleats with a combination pilot hole bit. These bits drill a countersink hole, a clearance hole for the screw shank, and a pilot hole for the screw threads in one operation. Pilot hole bits are available at most hardware stores and are sold according to the screw size.

10 Sand and apply the finish. Finish sand your chair. Paint or stain and varnish your chair to match your decor. Tack a colorful quilted pad to the seat for a homey, country look.

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ANGLED TENONS



1 Lay out the shoulders. Set a sliding T-bevel to the angle of the tenon shoulders—87 degrees in this case. Guide a pencil along the blade of the T-bevel to mark the shoulders on the top and bottom of the stock. These lines are directly above one another and parallel. With a square as a guide, draw lines connecting the shoulder lines.

2 Lay out the angled tenons. With the T-bevel still set at 87 degrees, lay out the tenon. First mark the base of the tenon along the shoulder lines—3/16 inch from the edges in this case. Use the T-bevel to draw lines from the base of the tenon to the end of the rail, as shown. The tenons are perpendicular to the angled shoulder lines.

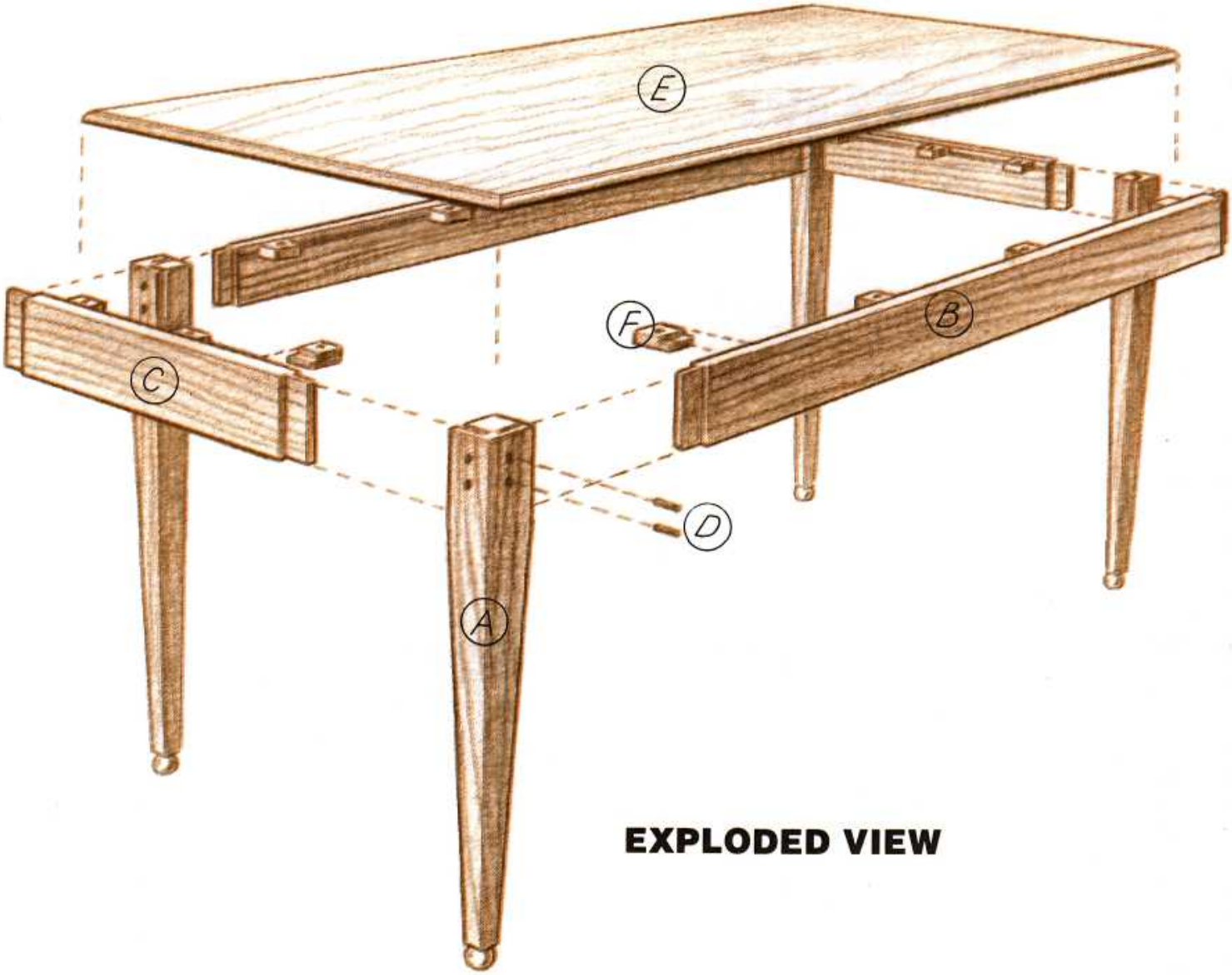
3 Lay out the top and bottom of the tenon and cut along the layout lines. Lay out the top and bottom of the tenon—3/16 inch from the top and bottom edges of the board in this case. Cut along the layout lines down to the shoulder lines on all four sides of the tenon. A backsaw or dovetail saw will work best for these precise cuts. Be careful to follow the angles while cutting.

4 Complete the tenon. Cut carefully along the shoulder lines and remove the waste. Test fit the tenon and adjust the tenon width and thickness with a chisel if necessary.

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FARM TABLE





EXPLODED VIEW

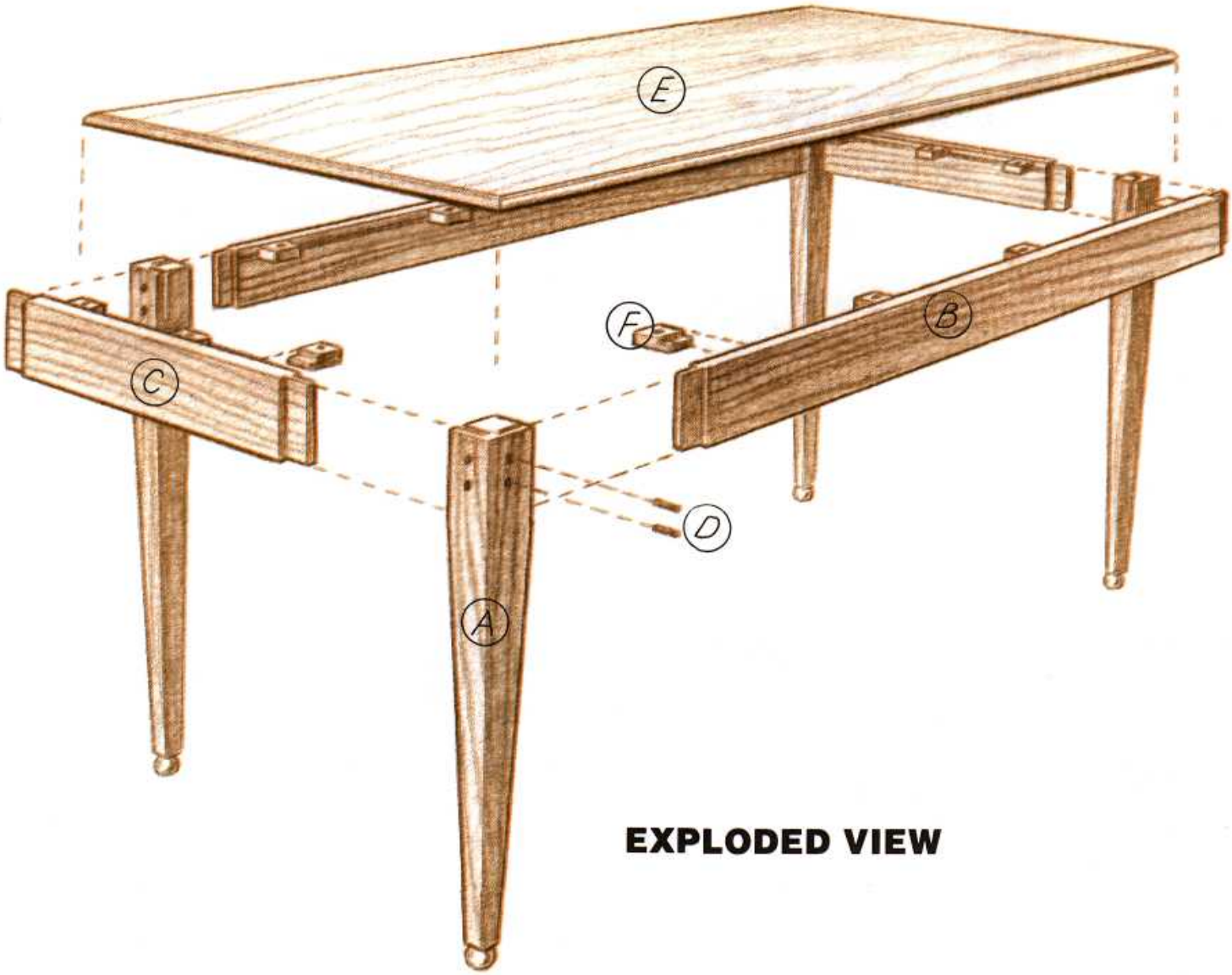
CUTTING LIST

Part	Quantity	Dimension	Comment
A. Legs	4	1½″ × 1½″ × 29″	
B. Side aprons	2	¾″ × 4½″ × 46½″	
C. End aprons	2	¾″ × 4½″ × 22″	
D. Dowel pins	16	¼″ dia. × ¾″	
E. Tabletop	1	¾″ × 27″ × 51½″	Glue up from narrower boards.
F. Clip	1	¾″ × 2″ × 25″	Makes 14

Hardware

14 #10 × 1¼-in. flathead wood screws

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EXPLODED VIEW

CUTTING LIST

Part	Quantity	Dimension	Comment
A. Legs	4	1½″ × 1½″ × 29″	
B. Side aprons	2	¾″ × 4½″ × 46½″	
C. End aprons	2	¾″ × 4½″ × 22″	
D. Dowel pins	16	¼″ dia. × ¾″	
E. Tabletop	1	¾″ × 27″ × 51½″	Glue up from narrower boards.
F. Clip	1	¾″ × 2″ × 25″	Makes 14

Hardware

14 #10 × 1¼-in. flathead wood screws

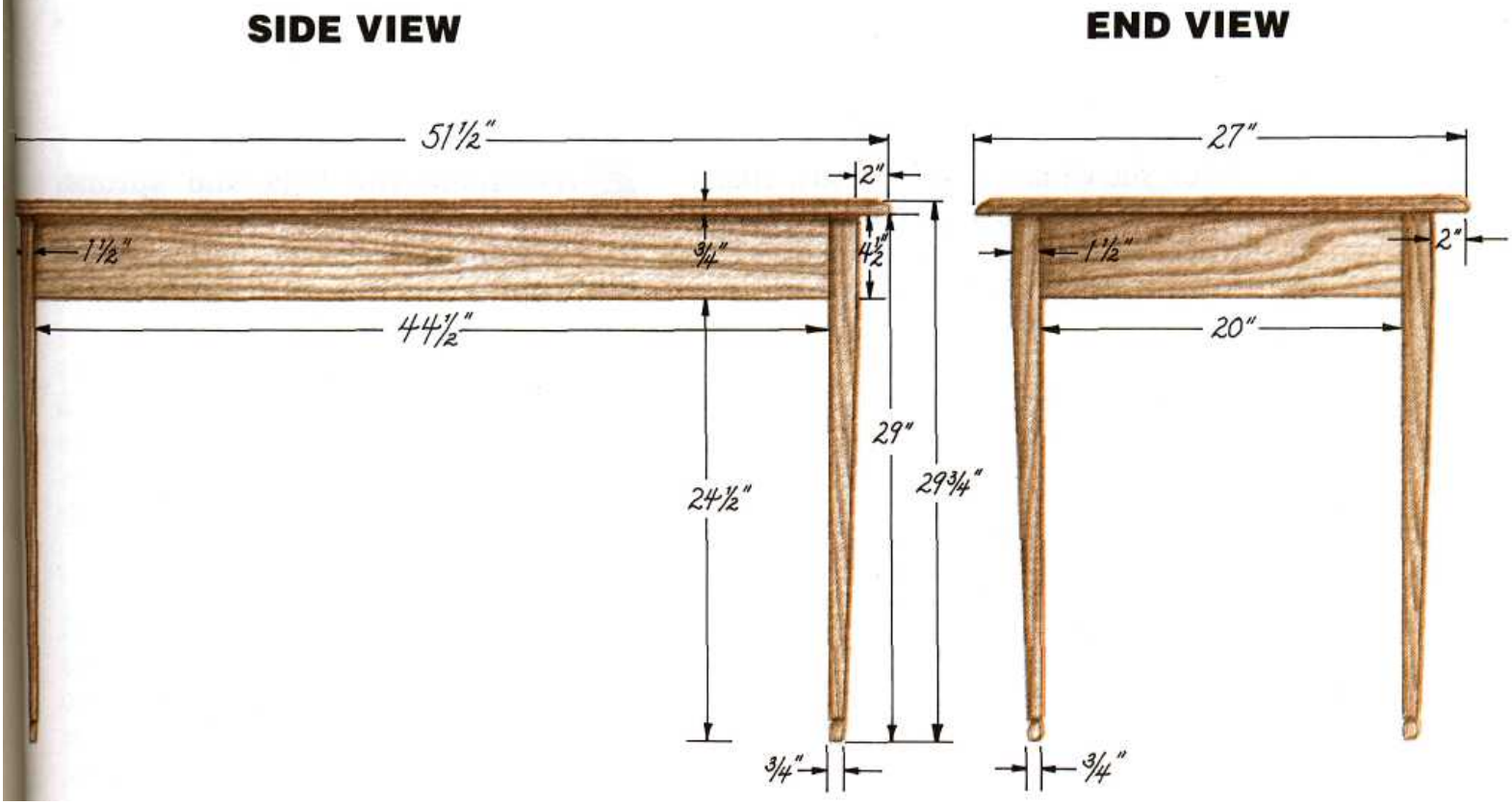
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1 Select the stock and cut the parts. Look for straight, flat hardwood stock, without knots. Try to find lengths with interesting grain patterns. Joint, plane, rip, and cut the legs and aprons to the sizes given in the Cutting List.

2 Cut the mortises in the legs. The legs and aprons are joined by mortise and tenons, as shown in the *Joinery Detail.* One end of the mortise is open—it comes through the top of the leg. You can make these mortises with a table-mounted router. If you use a router, make sure your bit is long enough to cut a 1-inch-deep groove.

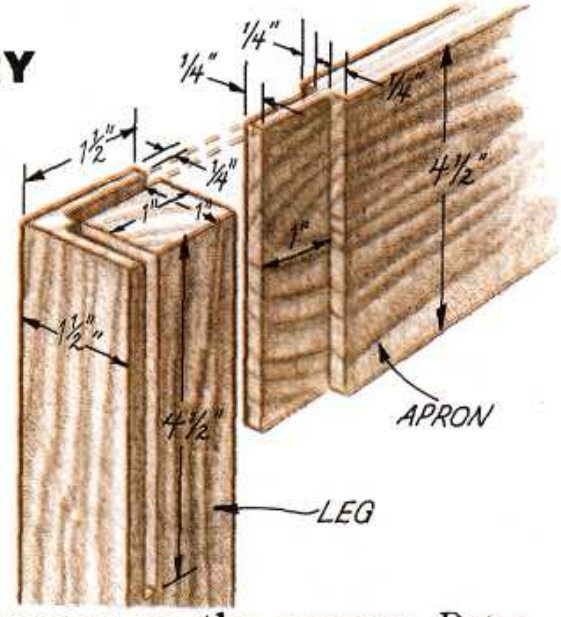
To cut the mortises, you must use two different fence settings. First, put a ¼-inch straight bit in the router. Set up the router to cut a 1-inch-deep groove, ¼ inch from the fence. Cut one mortise in each leg. Then reset the fence so it is 1 inch from the bit. Cut the second mortise on each leg.

SHOP TIP: Clamp a block of wood to the fence 4¼ inches beyond the cutter. When the leg hits the block, the mortise is the correct length.



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JOINERY DETAIL



3 Cut tenons on the aprons. Put a dado blade, set to cut ¾ inch wide, in the table saw. Position the fence ¼ inch away from the cutter and adjust the blade to make a cut ¼ inch deep.

Cut each side of the tenon in two passes. First, use the miter gauge to guide the cut along the fence. On the second pass, adjust the position of the board against the miter gauge so that the cut removes the rest of waste. Turn the board over and repeat.

After you've cut all the tenons, rout a ⅜ × ⅜-inch groove in the inside face, ⅜ inch below the top edge, as shown in the *Fastener Detail.* The wooden clips that attach the tabletop will fit into these grooves.

SHOP TIP: If the shoulders of your tenons don't align with each other, check the setup on the saw. Measure to make sure the fence is parallel to the blade. Check the miter gauge to make sure it really is set at 90 degrees. Cut a few test tenons on some scrap, until you're sure of your setup.

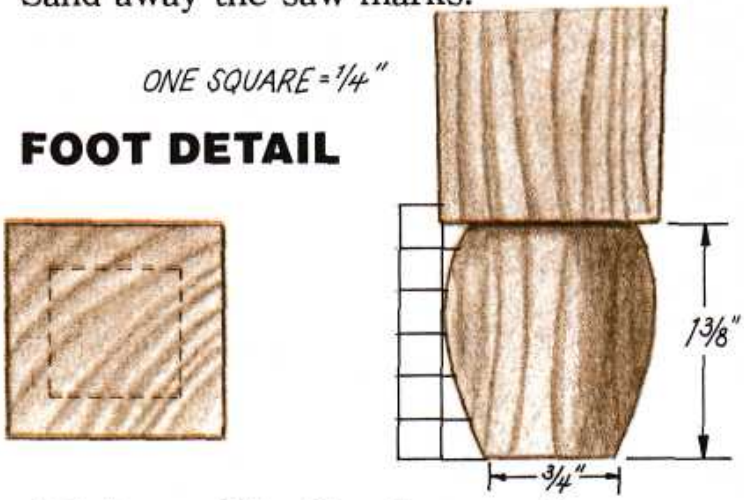
4 Taper the legs. After you have cut and fitted all of the mortises and tenons, lay out the taper of the legs. You can cut out the tapers on the band saw or cut them on the table saw, as explained in "Table Saw Tapers" on opposite page.

After you've tapered the legs, lay out and chamfer the edges of the tapers. Put a chamfer bit in a router. Secure the router in a router table and cut the chamfers. Stop the chamfers 4½ inches from the top of the legs to allow for the aprons.

When the chamfers have been cut, use a band saw to cut the shape shown in the *Foot Detail* in the ends of the legs. Sand away the saw marks.

ONE SQUARE = 1/4"

FOOT DETAIL



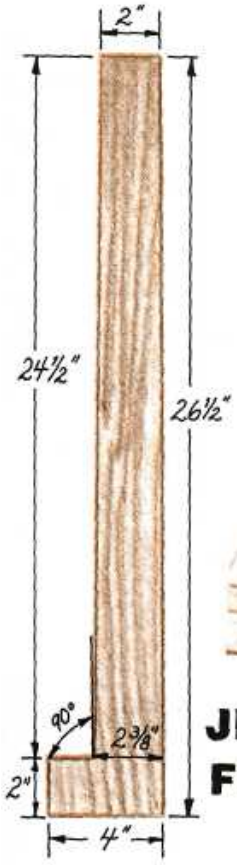
5 Assemble the legs and aprons. Sand the legs and aprons and test the fit of the joints. Make any necessary adjustments. Apply glue and clamp the legs and aprons.

After the glue has set and the clamps are removed, cut two dowel pins for each mortise. Drill ¾-inch-deep stopped holes in the legs and tenons. Drive a glue-coated dowel into each hole. Sand the dowels flush.

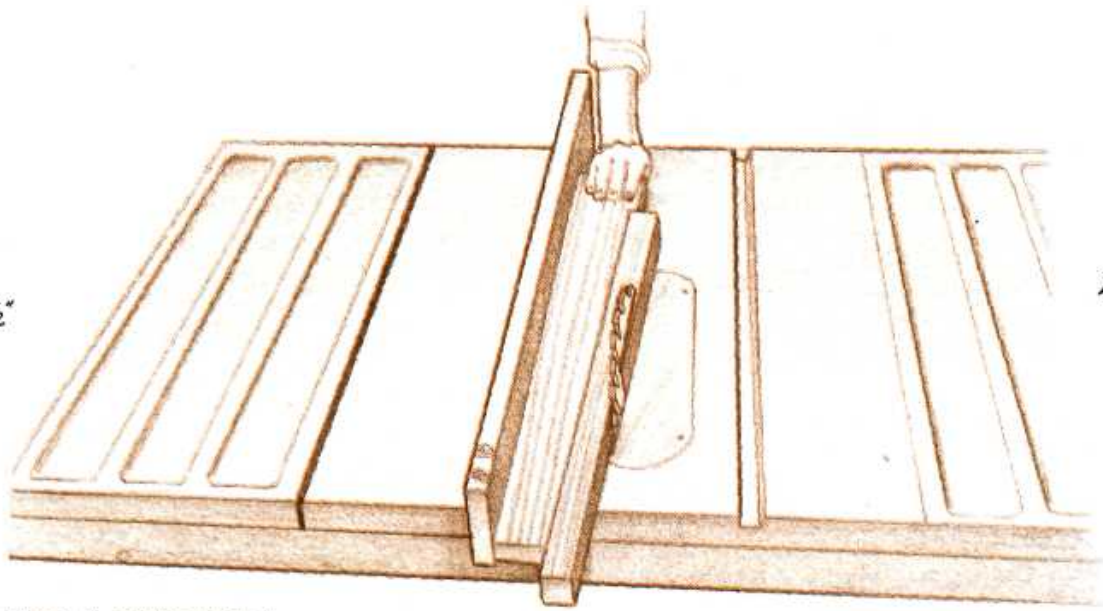
6 Glue up the tabletop. Joint, plane, rip, and cut boards to make up the tabletop stock. How many boards you need to cut depends, of course, on their widths; simply cut enough pieces to form the size given in the Cutting List.

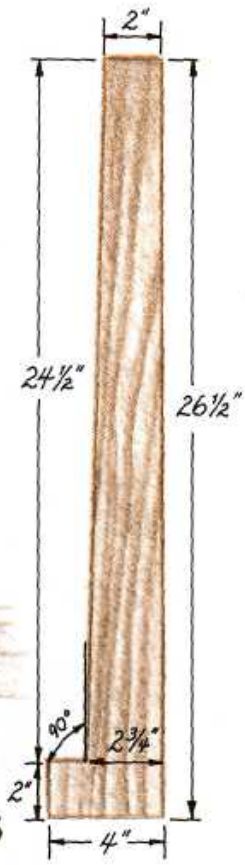
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TABLE SAW TAPERS



JIG LAYOUT, FIRST TAPERS





JIG LAYOUT, SECOND TAPERS

1 Lay out the jig. A shop-made jig makes quick work of tapering legs on the table saw. Lay out the jig, as shown, on a piece of ¾-inch plywood. Cut it to shape with a band saw or jigsaw. Because the legs for this project are tapered on all four sides, you need to make two jigs. The first jig cuts a taper on two adjoining sides. The second jig cuts the taper on the remaining sides.

To lay out a taper other than the one shown here, draw the leg full size on a piece of plywood. Draw it so that a long edge of the leg is along the long edge of the plywood. Cut out the profile of the leg to make the jig.

2 Set the rip fence. Fit the leg into the first jig with the bottom of the leg against the foot of the jig. With the saw off, slide the straight side of the jig along the rip fence. Adjust the fence so that the saw blade first meets the leg at the beginning of the taper.

3 Cut the first taper. Guide the jig along the fence to cut the first taper. Then turn the leg a quarter turn and cut the adjacent face. Set the leg aside and make the same two cuts on the remaining legs.

4 Cut the second taper. Switch to the second jig and repeat the process, cutting the untapered faces.

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Arrange the pieces with their most attractive faces up and in a sequence that yields the best appearance, then glue them together. After the glue sets, remove the clamps and sand the top.

Finally, put a ½-inch roundover bit in a router and rout the edges of top to the profile shown.

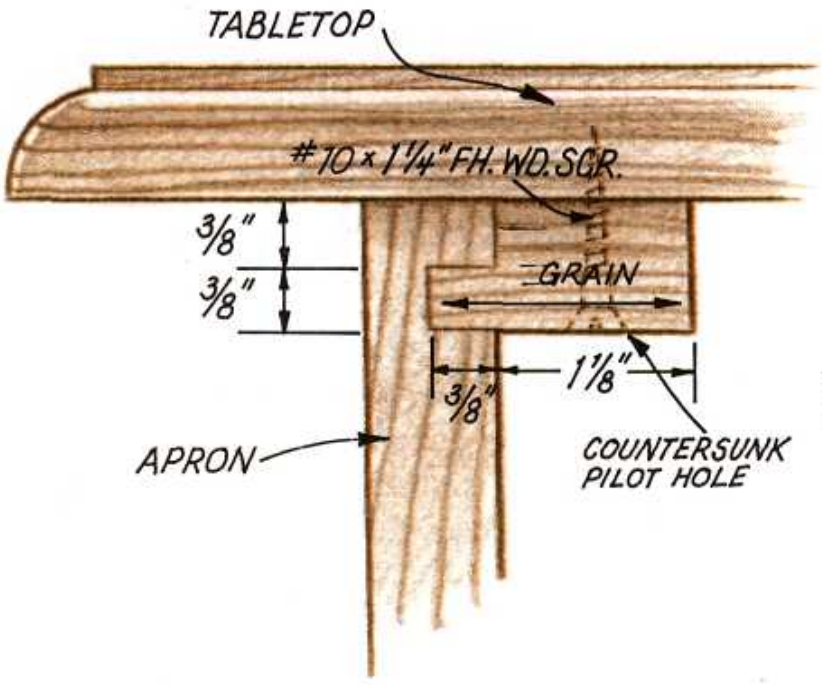
7 Attach the tabletop to the frame. The tabletop is attached to the aprons with wooden clips, as shown in the *Fastener Detail.* As the tabletop expands and contracts with changes in humidity, the fasteners slide in their grooves.

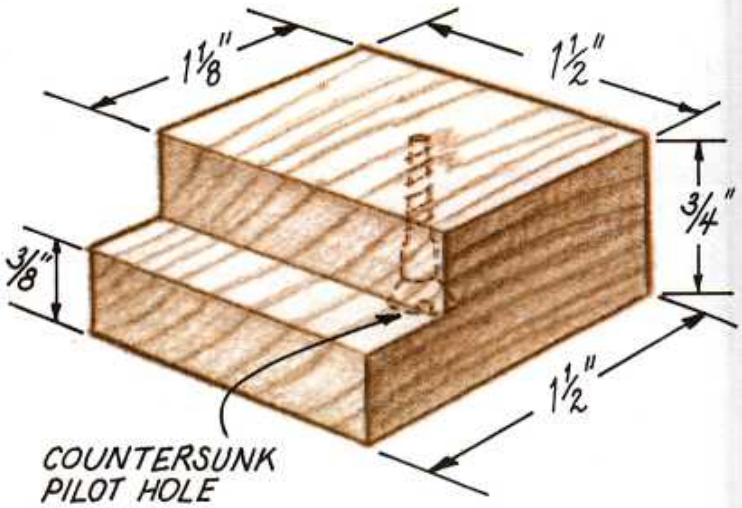
To make the clips, cut a ⅜ × ⅜-inch rabbet in a ¾-inch-thick board. Note the grain direction in the *Fastener Detail.* Rip a 1½-inch-wide strip from the board, then crosscut the board into 1½-inch squares.

Attach the top to the leg and apron assembly with the clips and flathead wood screws. Evenly space three clips along each end and four along each side.

8 Apply finish. Do any necessary touch up sanding, then apply a finish to the table. To help keep the tabletop from warping, be sure you finish the bottom as well as the top.

FASTENER DETAIL



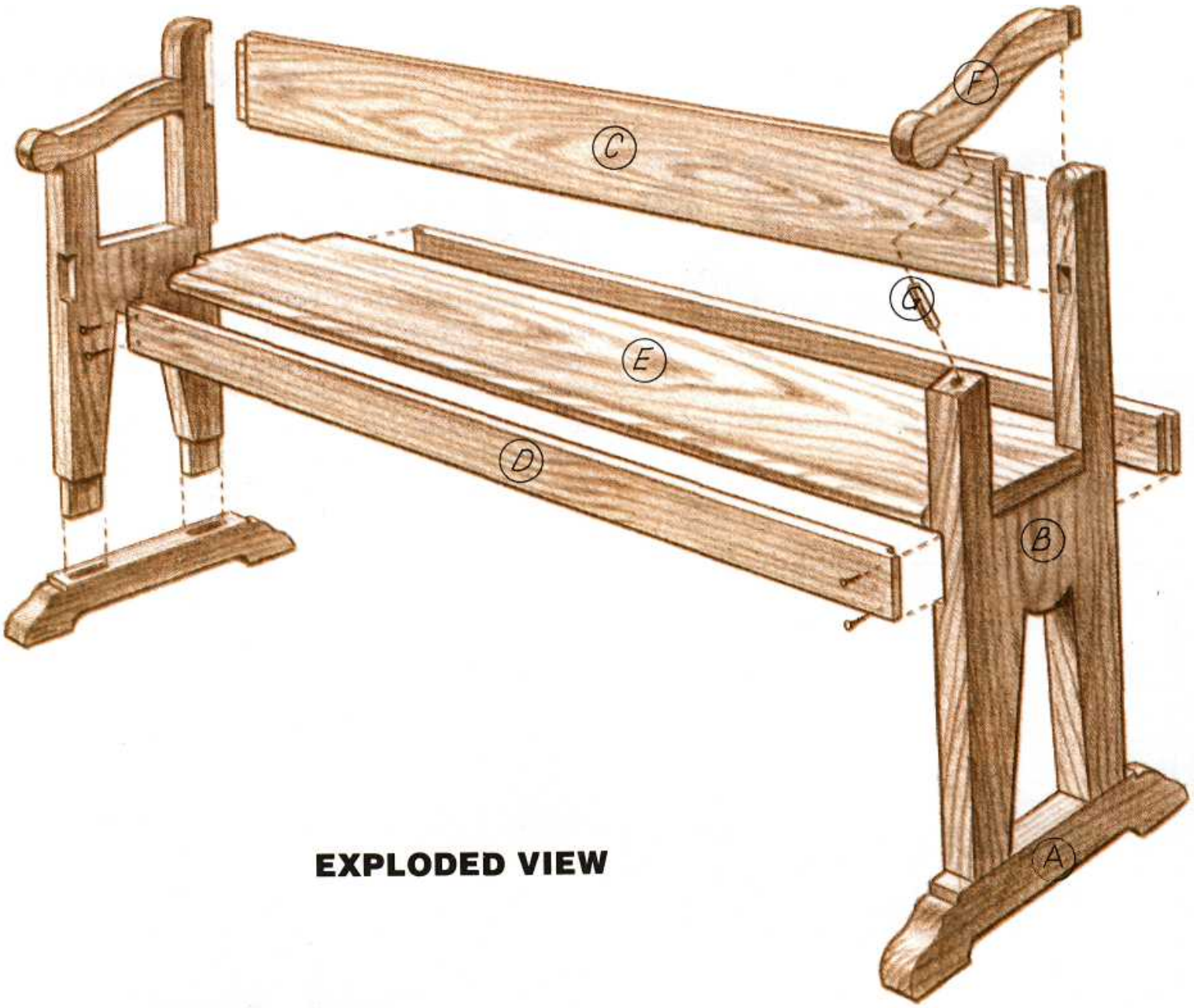


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CHILD'S BENCH



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EXPLODED VIEW

CUTTING LIST

Part	Quantity	Dimension
A. Feet	2	1 9/16" × 2 3/4" × 15"
B. Bench ends	2	1 3/8" × 7 3/4" × 26 3/4"
C. Back	1	7/8" × 5 3/4" × 40 5/8"
D. Seat supports	2	7/8" × 2 3/4" × 40 5/8"
E. Seat	1	7/8" × 9" × 43"
F. Arms	2	1 3/8" × 2" × 9 5/8"
G. Dowels	2	1/2" dia. × 1 3/4"

Hardware

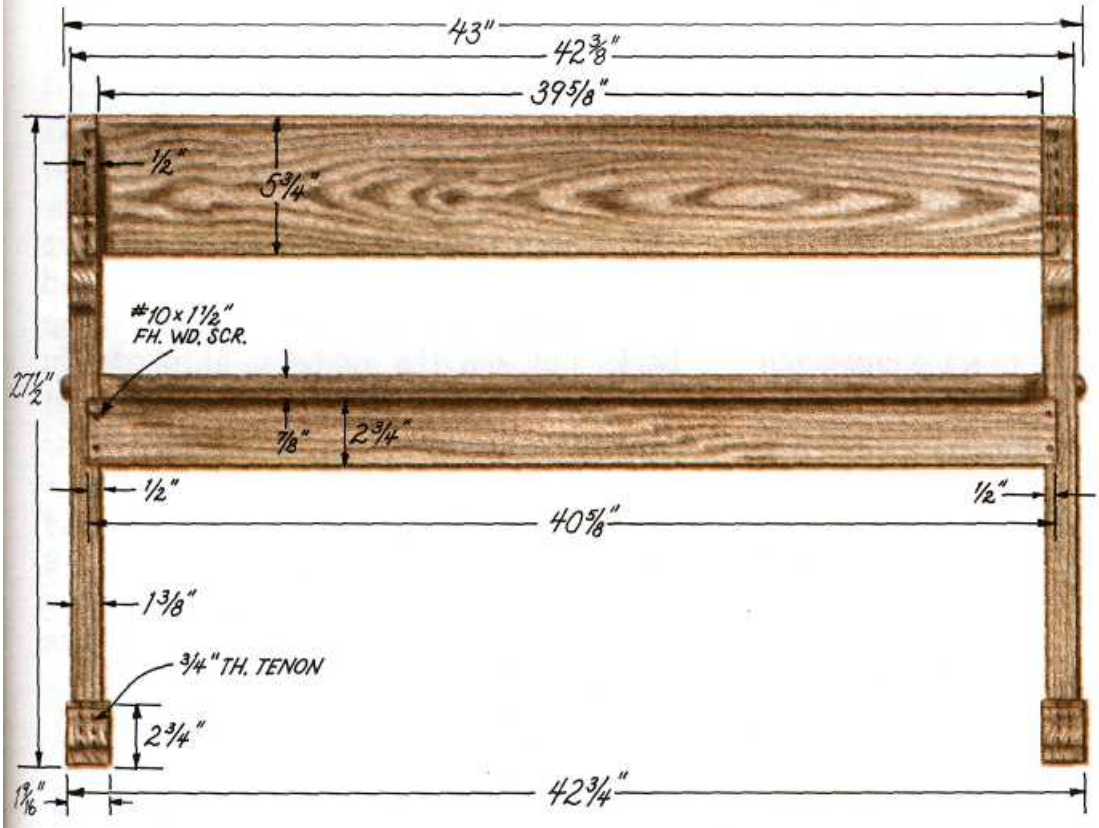
2 #10 × 1¾-in. flathead wood screws
12 #10 × 1½-in. flathead wood screws

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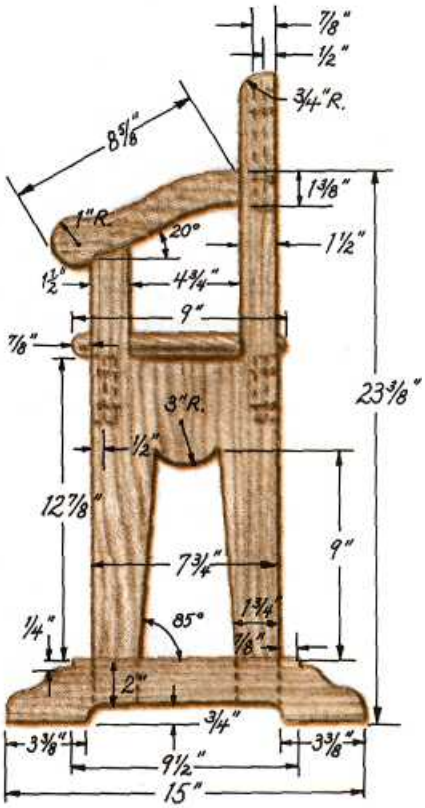
1 Select the stock and cut the parts. Joint, plane, rip, and cut the parts to the sizes given in the Cutting List. If necessary, glue up boards to get the wider pieces.

2 Mortise the feet. Lay out the foot mortises with a sharp pencil. A plunge router with a ¾-inch straight bit and fence can cut theses mortises easily and cleanly. Clamp both foot blanks side by side in a vise with the tops flush. The two feet provide plenty of bearing surface for your router base. Adjust the fence so the bit is centered over the mortise. Rout the mortise in several passes, lowering the bit about ¼ inch with each pass. If you do not have a plunge router, drill a series of adjacent ½-inch holes inside the layout lines. Cut along the layout lines with a sharp chisel to create the mortise.

3 Shape the foot. Draw a ¼-inch grid on a piece of paper and enlarge the *Foot Pattern* onto it. Transfer the pattern to the foot stock and cut out the shape on the band saw. Remove the band saw marks with a small-diameter sanding sleeve chucked in the drill press and by hand with files and sandpaper.



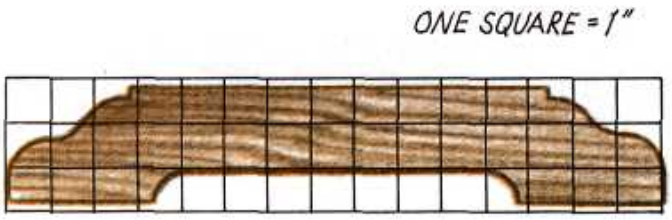
FRONT VIEW



SIDE VIEW

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FOOT PATTERN



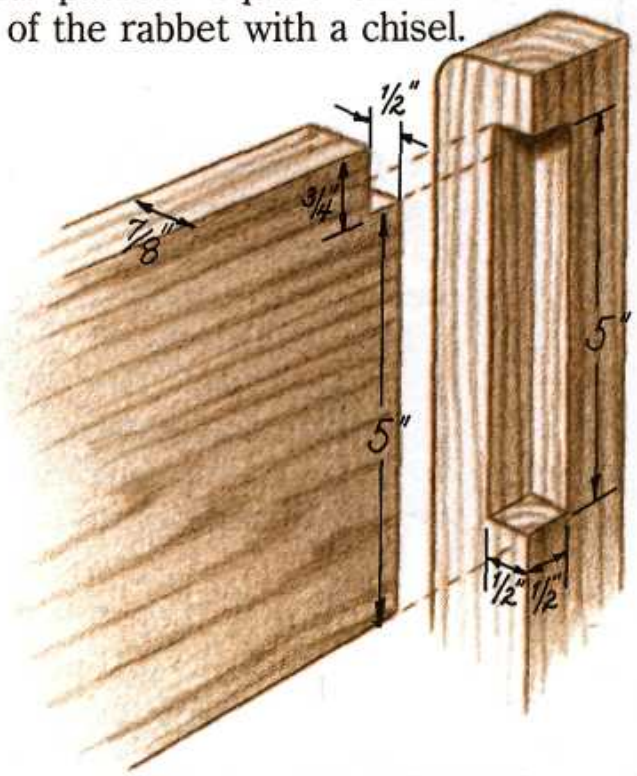
4 Tenon the bench end. Cut all the joints in the bench end *before* you shape it. First, cut one long tenon across the bottom of the side. Put a dado blade in the table saw and raise the blade to make a 5/16-inch cut. Set the rip fence so that when you run the end of the board against it, it cuts a shoulder 2 inches from the end.

Check the setup by cutting a tenon on a sample piece 1 3/8 inches thick. Put the scrap in the miter gauge, with the end of the scrap against the fence. Guide the sample across the saw blade with the miter gauge. Make several cuts, repositioning the sample in the miter gauge each time, until you've removed all the waste between the shoulder and the end of the sample.

Flip the board over and repeat. Test the fit of the tenon in the foot mortise and make any necessary adjustments to the setup.

Cut a tenon along the entire bottom of the bench ends.

5 Rabbet for the back. A tongue on the back fits into a rabbet in the bench end, as shown in the *Back Joinery Detail.* Mark what will be the two inside surfaces of the ends and lay out the rabbets on these surfaces. Put a 1/2-inch rabbeting bit in the router and adjust the router to cut a 1/2 × 1/2-inch rabbet. Rout the rabbet in several passes. Square off the rounded ends of the rabbet with a chisel.



BACK JOINERY DETAIL

6 Rabbet for the seat supports. The seat supports also have tongues and fit in rabbets similar to the ones for the back. Lay out the rabbets, as shown in the *Front View* and *Side View,* and rout them as before.

7 Cut the bench end to shape. Lay out the legs, arm supports, and back supports on the bench ends, following the dimensions in the *Side View.* Cut the ends to shape with a jigsaw or band saw. Plane, scrape, and sand away the saw marks.

8 Attach the feet. Test fit the bench ends and feet. Make any necessary adjustments and glue them together.

9 Cut tongues on the back and seat supports. Set up the table saw,

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dado blade, and rip fence to cut tenons. Raise the dado blade to remove ⅜ inch of stock; set the rip fence so that guiding the end of the board along it will cut away ½ inch of stock. Cut a tongue on the end of each piece, as shown in the *Back Joinery Detail.* With a backsaw, cut away part of the tongue on the back board, as seen in the *Front View.*

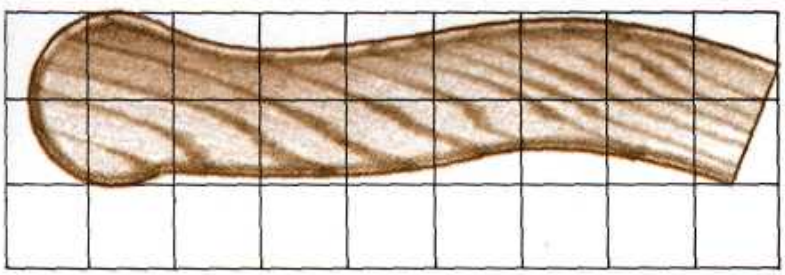
Clamp the seat supports and back in place with C-clamps. With a pilot hole bit, predrill two evenly spaced holes through the end of each part for #10 × 1½-inch screws. Screw the back and seat supports in place.

10 **Shape the seat.** Notch the front and back of the seat so that it will fit between the arm support and the back rest. With a compass, lay out a ⅞-inch radius on the front corners. Cut the radius on the band saw and sand any saw marks smooth. Rout a ⅜-inch roundover on the front and back of the seat.

11 **Make the arm.** Draw a ½-inch grid on a piece of paper and draw the *Arm Pattern* onto it. Transfer the pattern to the stock and cut the arm to shape on the band saw. Clean up the curved edges on a stationary belt sander or sanding sleeve in the drill press.

ARM PATTERN

ONE SQUARE = 1"



12 **Attach the arms.** The arms are attached to the arm supports with ½-inch-diameter dowels. First, drill the holes in the arm supports with the help of a doweling jig. For holes that are properly angled, position the jig so that there are no gaps between the jig and the end grain.

Put ½-inch dowel centers in the holes you've just drilled and position the arms on the bench. Push the arms firmly into the dowel centers; the points will make marks at the center of the dowel holes in the arms. Drill the holes with the help of a doweling jig as before.

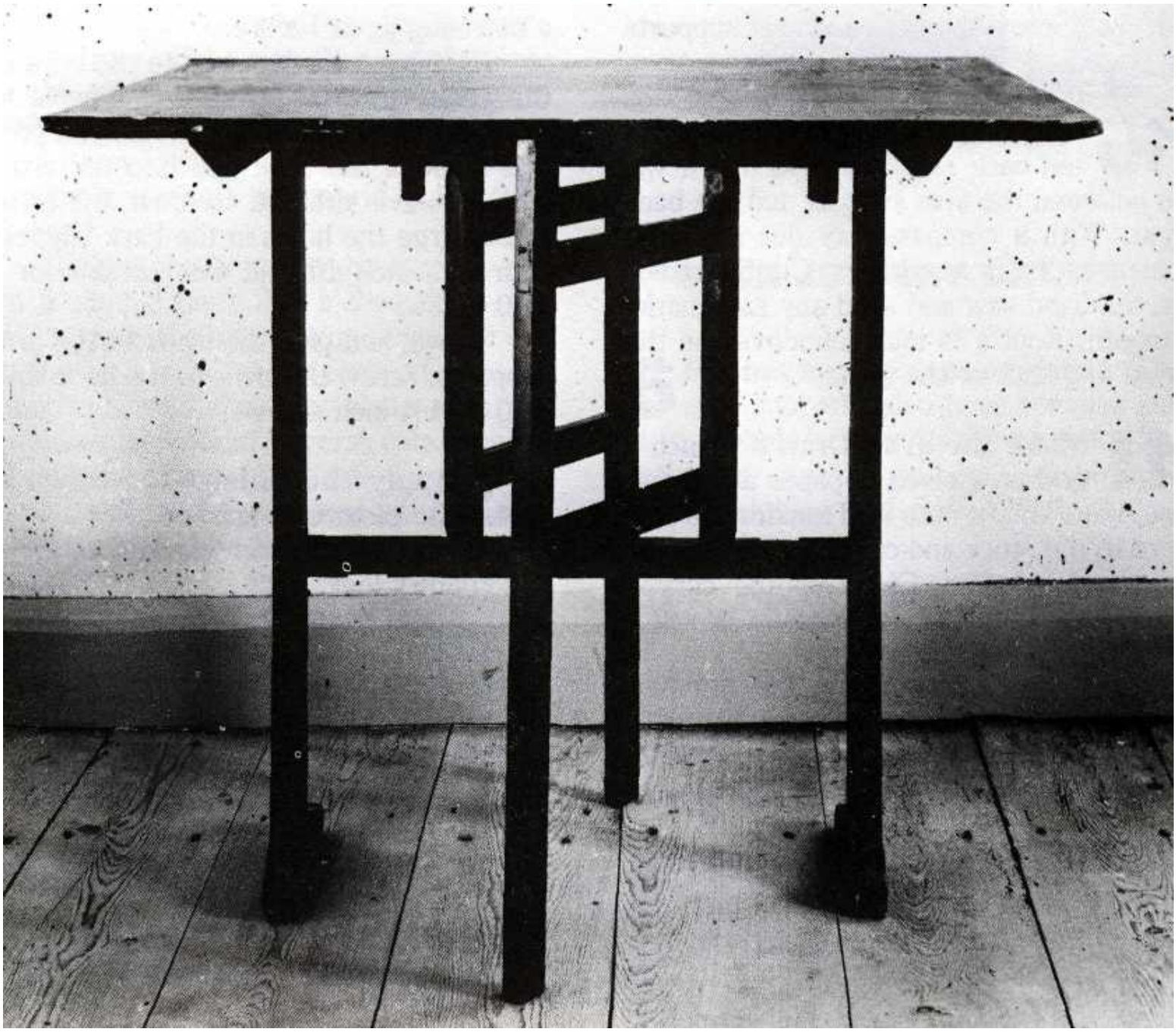
The arms are screwed to the back of the chair. Put the arms and dowels in place. Hold the arms in place as you predrill through the back and into the arms with a ⅛-inch drill bit. Remove the arms and enlarge the holes in the back support with a 3/16-inch drill bit. Countersink for a #10 screw.

Dowel and glue the arms to the arm supports; screw the arms to the back with #10 × 1¾-inch screws.

13 **Apply the finish.** The bench in the picture is finished with a spar varnish. A painted bench would have more of a country look.

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TILT TOP TABLE



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EXPLODED VIEW

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CUTTING LIST

Part	Quantity	Dimension	Comment
A. Top	1	¾″ × 35″ × 35″	
B. Legs	2	¾″ × 1½″ × 29¾″	
C. Pivot posts	2	¾″ × 1½″ × 14″	
D. Feet	2	1¼″ × 2″ × 11″	
E. Posts	2	1¼″ × 2″ × 28 11/16″	
F. Bottom trestle	1	1¼″ × 2″ × 23″	
G. Stretchers	4	¾″ × 1½″ × 13½″	
H. Top trestle	1	1¼″ × 2″ × 23″	
I. Pivot dowel stock	1	½″ dia. × 10″	Makes 6
J. Pivot support	1	1 1/16″ × 2½″ × 23″	
K. Battens	2	1¼″ × 1½″ × 32″	

Hardware

As needed, #10 × 2-in. roundhead wood screws
As needed, ⅜-in.-dia. flat washers

1 Select the stock and cut the parts. While you can make the tilt top table from an attractive hardwood, this is a country piece at heart. Keep the table utilitarian and economical by building it of pine and giving it a colorful paint job. Look for straight, flat stock, without knots. If you plan to apply a stain or clear finish, try to find boards with interesting grain patterns to make up the tabletop. Joint, plane, rip, and cut the parts to the sizes given in the Cutting List. Don't cut the feet to shape until after you have mortised them.

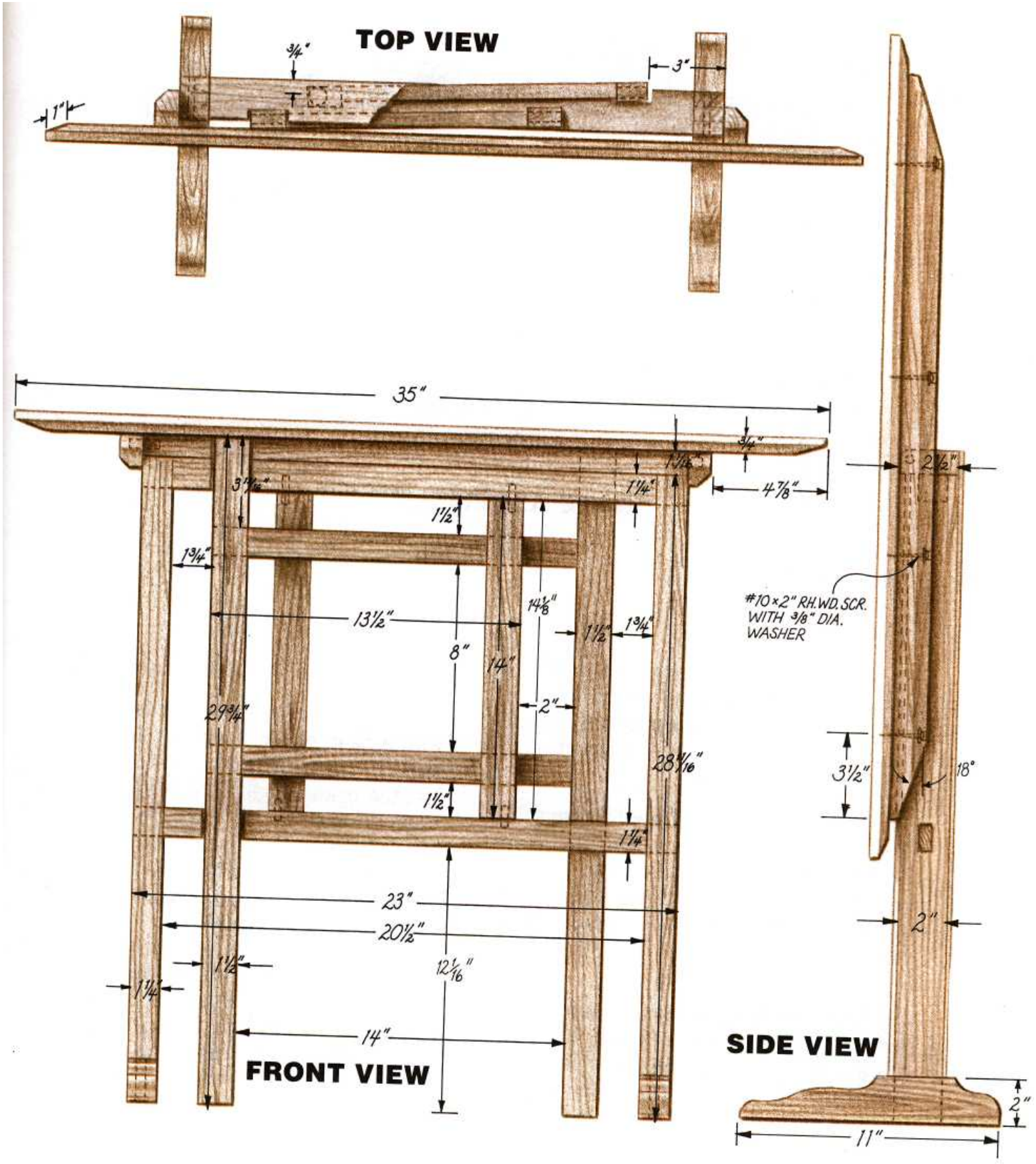
2 Glue up the tabletop. Lay out the boards that will make up the tabletop, choosing (and marking) the best face of each. Glue up the boards and set the piece aside while the glue dries.

3 Cut the mortises in the legs and pivot posts, feet, and posts. While the glue in the tabletop is drying, work on the rest of the table. Cut all the mortises at one time. All are through mortises.

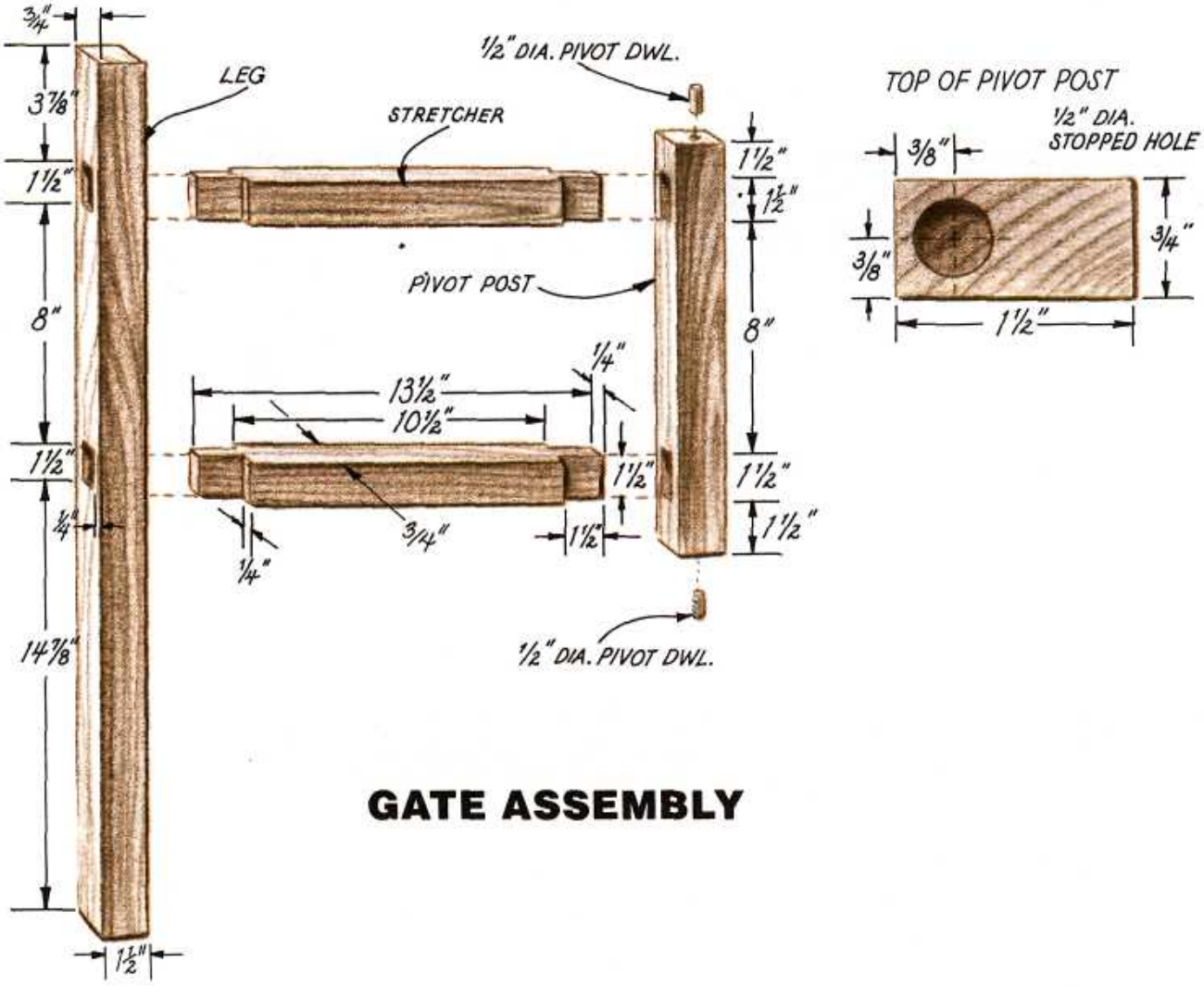
Lay out each mortise carefully, as shown in the *Gate Assembly* and the *Post and Trestle Layout.* To cut the mortises, drill a series of adjacent holes between the layout lines with a bit as wide as the mortise. Before you drill, clamp a piece of scrap to the stock on the back side of the mortise. Drill completely through the stock and into the scrap. The scrap prevents the bit from splintering the wood as it exits. Square up the cavity with a chisel.

While you are cutting the mortises, also cut the dovetail slot at the top of each post. For more information on laying out

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GATE ASSEMBLY

the joint see "Dovetailing" on page 42. Cut along the layout lines with a backsaw. Cut away most of the waste with a band saw. Remove the rest with a chisel.

4 Cut the foot to shape. Draw a ¼-inch grid on a piece of paper and draw the *Foot Pattern* onto it. Transfer the pattern to the stock and cut out the foot on the band saw. Sand the sawed edge smooth.

5 Cut the tenons on the posts, stretchers, and trestles. The tenons are not uniform: The posts have one size tenon; the stretchers, a second size; and the bottom trestle, a third. Lay out the tenons on the stock, as shown in the *Post and Trestle Layout* and the *Gate Assembly.*

Cut all these tenons on the table saw with a dado blade. First, set up the dado blade to cut its maximum width. Then adjust the blade height so that a cut on both sides of the board leaves a tenon the proper thickness. Adjust the fence so that when you guide the end of a board along it with the miter gauge, it cuts the tenon shoulder in the right place.

Test your setup on a piece of scrap the exact thickness of the piece you will be tenoning. Butt one end against the fence and use the miter gauge to guide it over the dado blade. Slide the stock away from the fence and make another pass. Repeat until the first cheek is completed, then flip the work piece and repeat the full

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process to cut the tenon's second cheek.

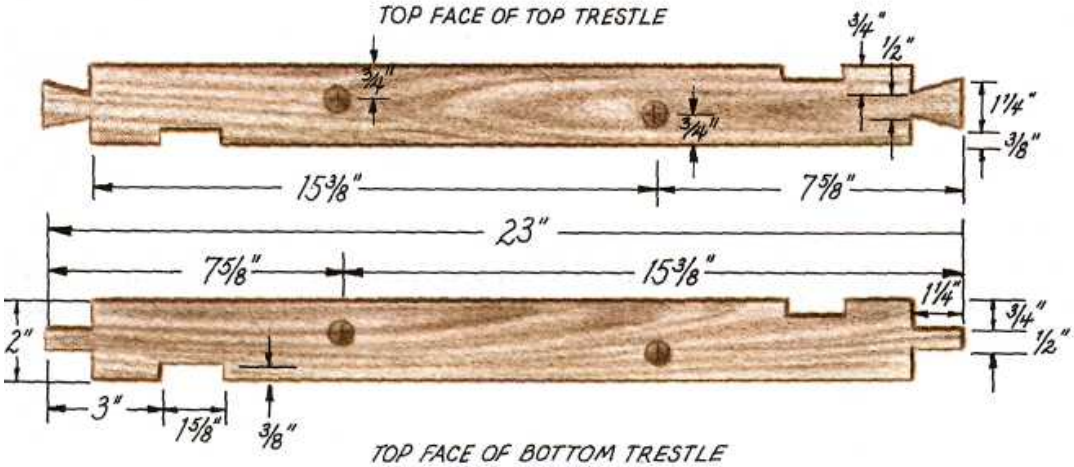
Cut all the tenons.

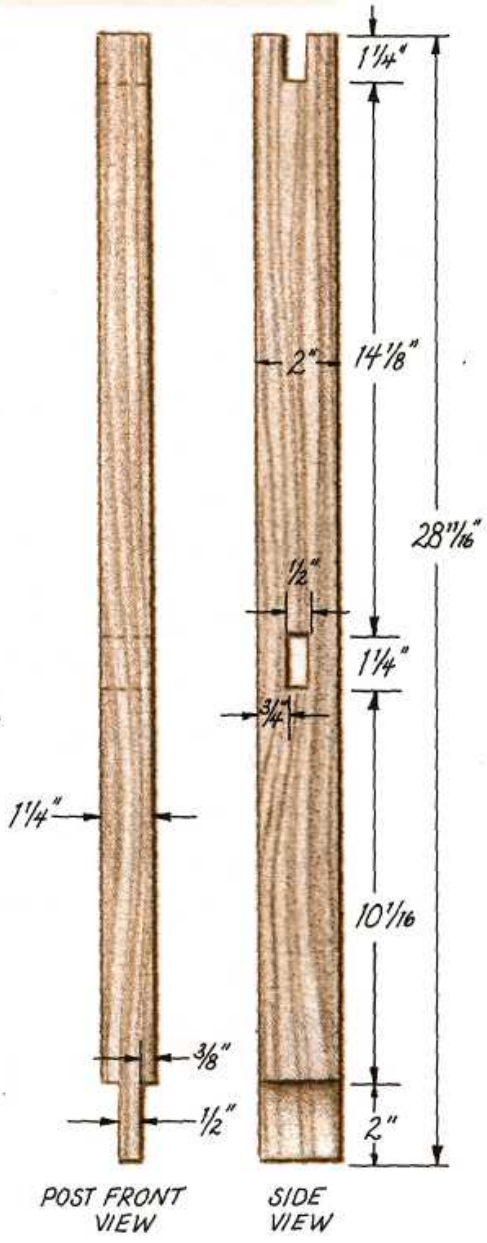
With the dado blade still in the saw, cut two notches in each trestle, as shown in the *Post and Trestle Layout.* When the table is tilted up, the gatelegs fold up against the trestle and into these notches, as shown in the *Top View.*

After cutting all the tenons, cut the dovetail on each end of the top trestle. Use a backsaw to rough out the tail, then refine the fit by paring with a sharp chisel.

SHOP TIP: Set up your table saw using the mortised piece as a guide. Put the mortise next to the blade with its long edges parallel to the table. Raise the blade until it aligns with the bottom edge of the mortise. Next, position the rip fence to establish the length of the tenon. Line up the fence so that when you have one edge of the mortised piece butted against the fence, its opposite edge is aligned with the edge of the blade farthest from the fence.

POST AND TRESTLE LAYOUT





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6 Assemble the gates. The gates swing back and forth under the table to support it. Before gluing up the two gates, drill holes in the ends of the pivot posts for the pivot dowels that will link the gates to the trestle assembly. Position the holes as shown in the *Post and Trestle Layout.* Bore the ½-inch-diameter by ¾-inch-deep holes to accommodate the 1½-inch-long pivot dowels. Do *not* glue the pivot dowels to the gates.

SHOP TIP: A Forstner bit is the best bit to use for boring the pivot dowel holes. The bit cuts a precise and flat-bottomed hole. The absence of a protruding spur means you won't inadvertently penetrate the work piece before achieving the necessary depth for the pivot dowel.

Test fit each gate. If the joints fit properly, glue the gate together.

7 Assemble the table base. Test fit the table base. Insert the posts in the mortises in the feet, then connect them with the bottom trestle. Drop 1½-inch-long pivot dowels into their holes in the bottom trestle and fit the gate assemblies onto them. Put pivot dowels into the holes in the pivot posts, then top the unit with the top trestle.

Make any necessary adjustments and glue the trestle together.

8 Complete the tabletop. Remove the clamps from the tabletop, and sand or hand plane the glue joints smooth. On a table saw, cut a 10-degree chamfer around the bottom edge. Guide the tabletop against the rip fence as you cut.

To help steady the tabletop as you cut the chamfer, attach a plywood face to the rip fence. It should be as long as the fence and about 18 inches high. On most saws, you'll have to make the cut with the rip fence to the left of the blade. After cutting the chamfer, sand the tabletop smooth.

9 Make the battens and pivot support. Chamfer the battens on the table saw with the blade set at 45 degrees, as shown in the *Pivot Detail.* When the chamfer has been cut along the length of the battens, cut a 72-degree angle in the ends of the battens, as shown in the *Side View.* Lay out the angle with a protractor and straightedge and cut the angle with a jigsaw or band saw. Sand the sawed edge smooth.

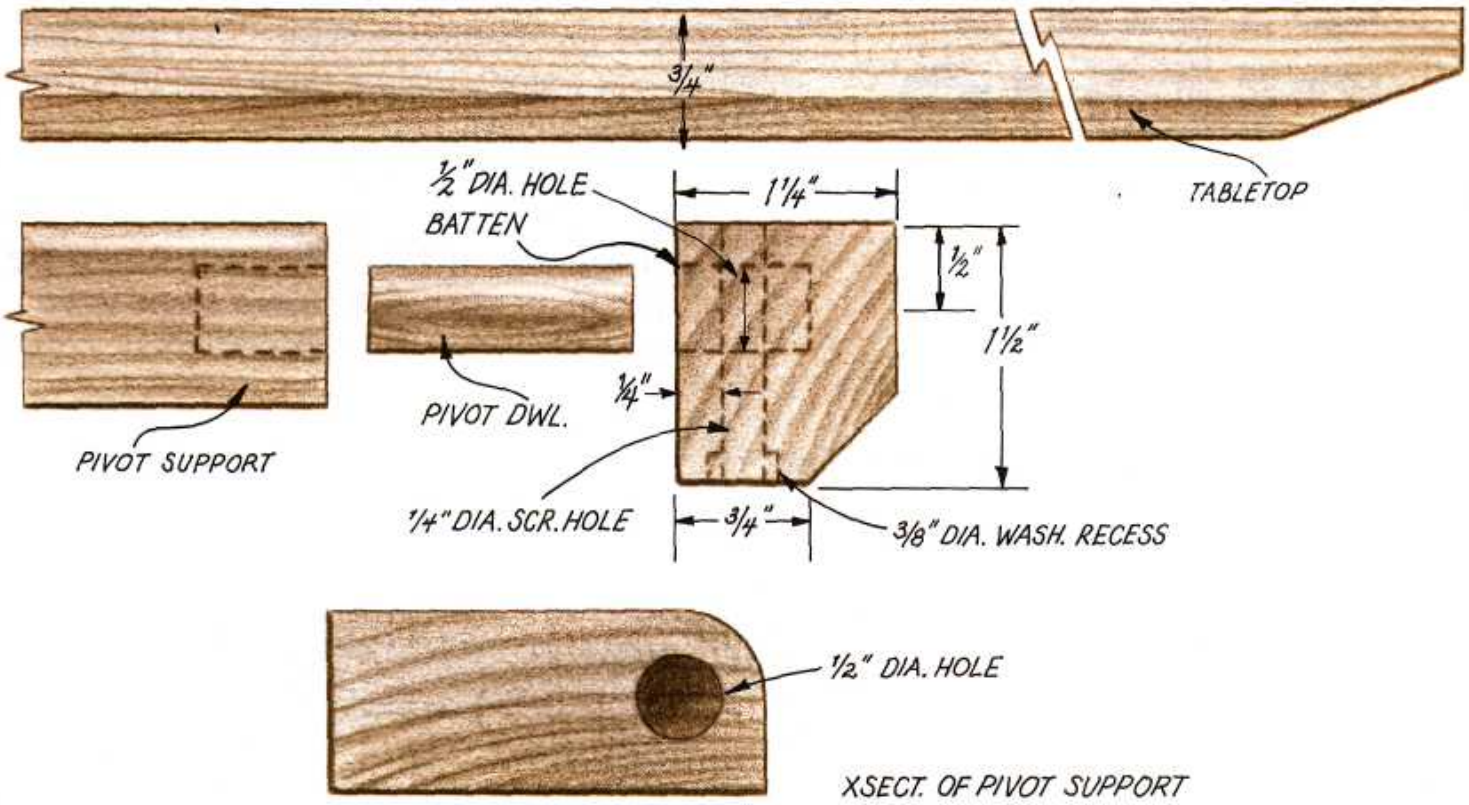
The battens pivot when the top flips up. Drill a pivot dowel hole in each batten, as shown in the *Pivot Detail.*

The battens are screwed to the underside of the tabletop with #10 × 2-inch roundhead wood screws. Because the battens run perpendicular to the grain of the tabletop, allowance must be made for the top to expand and contract. To do this, drill ¼-inch-diameter screw pilot holes on 8-inch centers through the battens, as shown in the *Pivot Detail.* Then drill ⅜-inch-diameter by 3/16-inch-deep washer recess holes as shown. Put washers between the screw and the wood to keep the screw from slipping through the hole. As the tabletop expands and contracts, the screws will move back and forth in the holes.

Turn to the pivot support next. Drill a pivot dowel hole in each end of this piece, as shown. Rout a ½-inch roundover in what will be the top of the pivot support, as shown in the *Pivot Detail.*

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PIVOT DETAIL



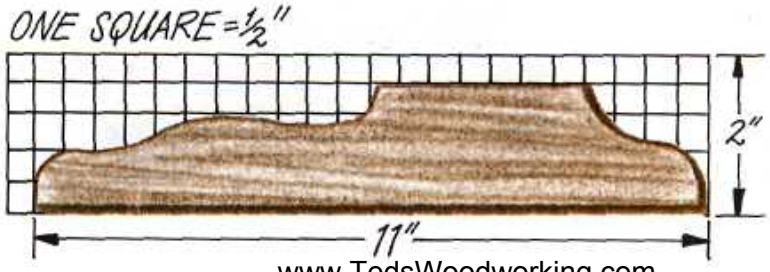
10 Assemble and install the tabletop. Turn the tabletop upside down on the bench and test fit the battens, pivot support, and pivot dowels on it. Poke an awl through the screw holes in the battens to lay out the screw holes in the top. Drill ⅛-inch-diameter pilot holes in the tabletop. Be careful not to drill all the way through the tabletop.

Check the pivoting action by rotating the pivot support. Make any necessary adjustments. Epoxy the pivot dowels in place and screw the battens to the tabletop.

Finally, set the table assembly—tilted—in place on the base assembly and clamp it. Drill screw holes through the pivot support into the trestle with a combination pilot hole bit. This bit drills a countersink hole, a clearance hole for the screw shank, and a slightly smaller pilot hole for the screw threads all in one operation. Combination pilot hole bits are available at most hardware stores and are sold according to the screw size.

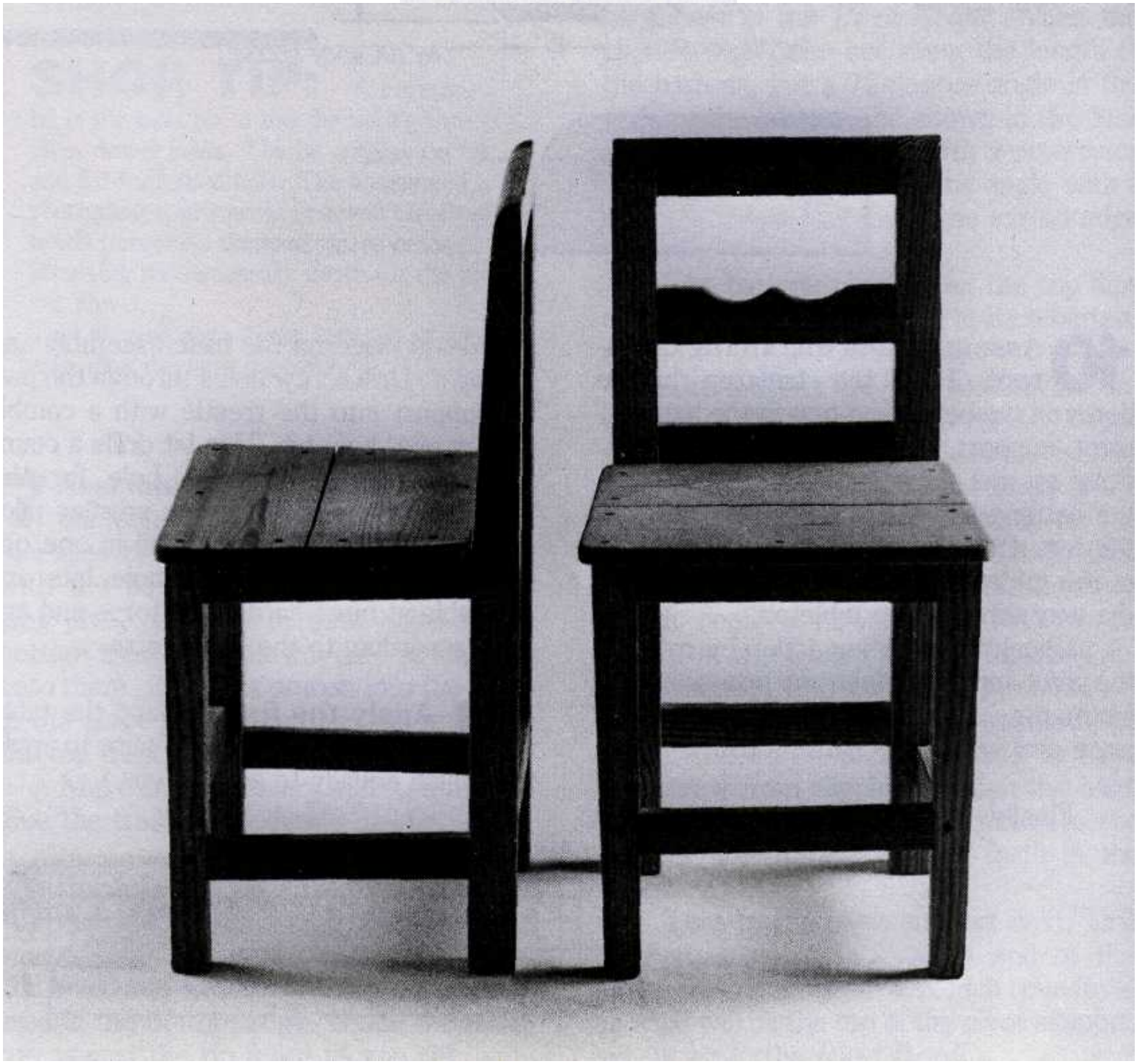
11 Apply the finish. Sand the table and apply a finish. Be sure to apply the finish equally to all surfaces.

FOOT PATTERN



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CHILD'S CHAIR



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EXPLODED VIEW

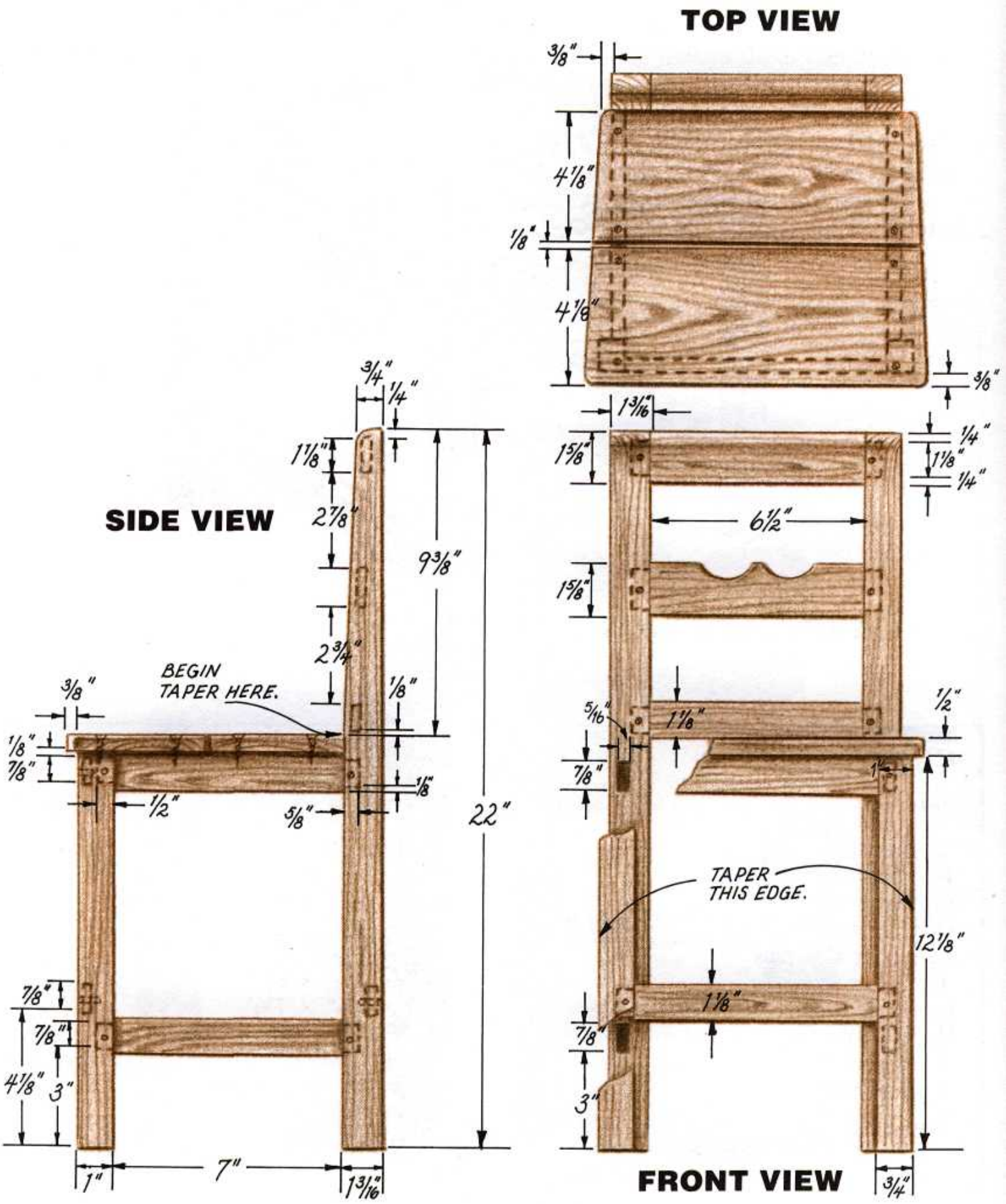
CUTTING LIST

Part	Quantity	Dimension	Comment
A. Back legs	2	1 3/16" × 1 3/16" × 22"	
B. Front legs	2	1" × 1" × 12 1/8"	
C. Front rails	2	9/16" × 1 1/8" × 9"	
D. Back rails	2	9/16" × 1 1/8" × 7 3/4"	
E. Upper side rails	2	9/16" × 1 1/8" × 8 1/4"	
F. Lower side rails	2	9/16" × 1 1/8" × 8 1/4"	
G. Shaped rail	1	9/16" × 1 5/8" × 7 3/4"	
H. Top rail	1	13/16" × 1 5/8" × 7 3/4"	
I. Peg stock	1	1/8" dia. × 25"	Dowel, makes 20
J. Seat boards	2	1/2" × 4 1/8" × 10 1/2"	

Hardware

8 #8 × 1¼-in. flathead wood screws

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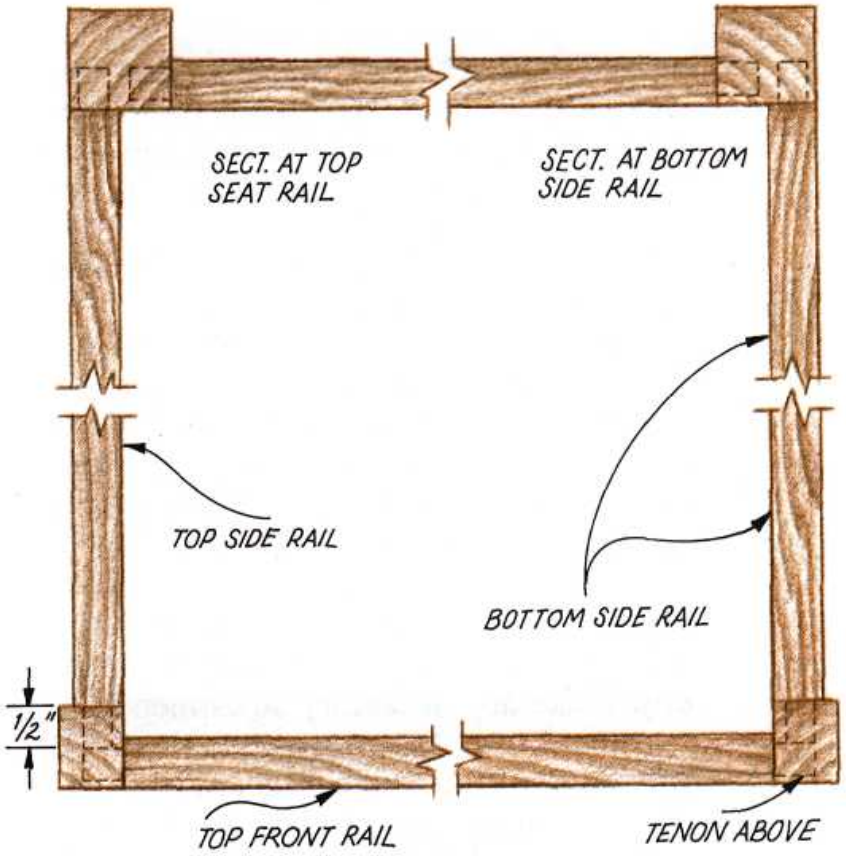
1 Select the stock and cut the parts. Make this chair from a user-friendly wood like pine. Hardwood isn't really necessary for a little chair like this one, and since pine is lightweight, a child will be able to move the chair easily. Joint, plane, rip, and cut the parts to the sizes given in the Cutting List.

2 Taper the back legs. The back legs are tapered above the seat. Lay out the taper, as shown in the *Side View,* directly on the stock and cut along the layout lines on the band saw. Stay about 1/16 inch to the waste side of your layout lines as you cut and clean up the surfaces with a hand plane or on the jointer.

3 Lay out and drill the mortises. Lay out the mortises, as shown in the *Front View* and *Side View* and the *Joinery Detail,* with a sharp pencil and straightedge.

Drill out the mortises with a series of adjacent 5/16-inch holes. Because all of the mortises are 1/8 inch from the edge of the legs, it's easiest to do this on a drill press. Clamp a fence to your drill press table and position it 1/8 inch from the bit. Hold the legs against the fence as you drill the mortises. Adjust the drill press to drill 11/16-inch-deep holes.

When you've drilled out all of the mortises, cut along the layout lines with a sharp chisel.



JOINERY DETAIL

SHOP TIP: When laying out matching parts, such as the front legs and back legs on this chair, measure and mark one piece, then use that piece to lay out its partner. If you're making a number of chairs, you might want to mark the critical measurements on a piece of scrap wood and use that to lay out all the matching parts. Chairmakers often put every measurement for an entire chair on one of these layout aids, which they call a chair "stick" or "rod."

4 Cut the tenons. All the tenons, except for those on the top rail, are 5/16 inch thick and have 1/8-inch shoulders. They can be cut with one setup on the table saw.

Put a 5/8-inch dado blade in your table saw and raise it to cut a groove 1/8 inch deep. Clamp a wooden auxiliary fence to the table saw fence and adjust it so that the wooden fence just touches the edge of the dado blade.

Cut a test tenon in a piece of 9/16-inch scrap. Guide the scrap as you cut with a

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miter gauge set at 90 degrees. Test the width and length of the tenon in one of the mortises. Adjust the dado blade height and fence position, as necessary, and cut the actual chair tenons.

Trim the front tenon on each upper side rail so it is ½ inch long.

Reset the blade to tenon the top rail. Raise the dado blade to ¼ inch above the surface of the table to cut a 5/16-inch-thick by 1⅛-inch-wide tenon on each end of the top rail. Test the setup on a piece of scrap and cut the tenons on the top rail.

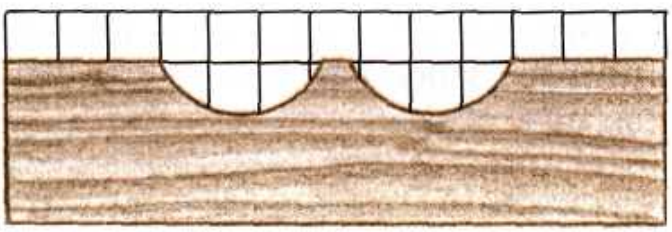
5 Test fit the chair. Test fit the chair and check that all the joints fit properly. Make any necessary adjustments.

6 Taper the front legs. The front legs taper from 1 inch down to ¾ inch, as seen from the front. Lay out the taper, as shown in the *Front View,* on both front legs. Cut the taper down to the layout line with a sharp hand plane or cut away the waste on the band saw; clean up the saw marks with a hand plane or sander.

7 Cut out the shaped rail. Make a ¼-inch grid on a piece of paper and draw the *Shaped Rail Pattern* onto it.

SHAPED RAIL PATTERN

ONE SQUARE = ½"



Transfer the pattern to the rail and cut it to shape on a band saw. Clean up the saw marks with files and sandpaper.

8 Assemble the chair frame. Assemble the chair in stages. First, glue the front rails between the front legs. Apply glue to the surfaces of the mortises and tenons. Pull the joints together with pipe or bar clamps with the assembly laying on a flat surface to ensure that the frames won't be twisted.

Then glue the rear rails between the rear legs. When the glue is dry, glue the front and back together.

With the front and back assemblies still in the clamps, drill ⅛-inch-diameter by 9/16-inch-deep peg holes through the legs and into the tenons, as shown in the *Front View* and *Side View.* When the holes are drilled, cut the peg stock into 1-inch-long pieces, dip the pieces in some glue, and tap them into the holes. Because the holes don't go all of the way through the legs, you will have to trim the pegs flush with the surface of the legs.

When the glue is dry, remove the clamps and glue and clamp the side rails to the front and back of the frame. Set the chair upright on a flat surface, check to make sure the chair sits flat, and make any necessary adjustments.

With the chair still clamped, drill peg holes through the sides of the legs and into the side rail tenons, and then tap them in place.

Allow the glue to dry and remove the clamps.

9 Attach and angle the seat boards. First, center the seat boards across the top of the completed frame and leave a ⅛-inch gap between them, as shown in

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the *Top View.* Clamp the seat boards in place.

Next, drill holes for #8 × 1¼-inch flathead wood screws, as shown in the *Top View.* The best way to drill these holes is with an combustion pilot hole bit. Drill through the seat and into the rails. The combination pilot hole bit will drill a countersink hole, a clearance hole in the seat for the the screw shank, and a slightly smaller pilot hole in the rail for the screw threads all in one operation. Combination pilot hole bits are available in most hardware stores and are sold according to screw size.

Once you've drilled the pilot holes, put a ⅜-inch-thick piece of stock under the ledge created by the seat boards and guide a pencil against it to mark the ⅜-inch overhang on the bottom of the seat boards. Mark the ledge on both sides and remove the clamps.

Cut along the layout lines with a jigsaw or band saw and sand the sawed edges smooth. Reposition the seat boards on the frame and screw them in place.

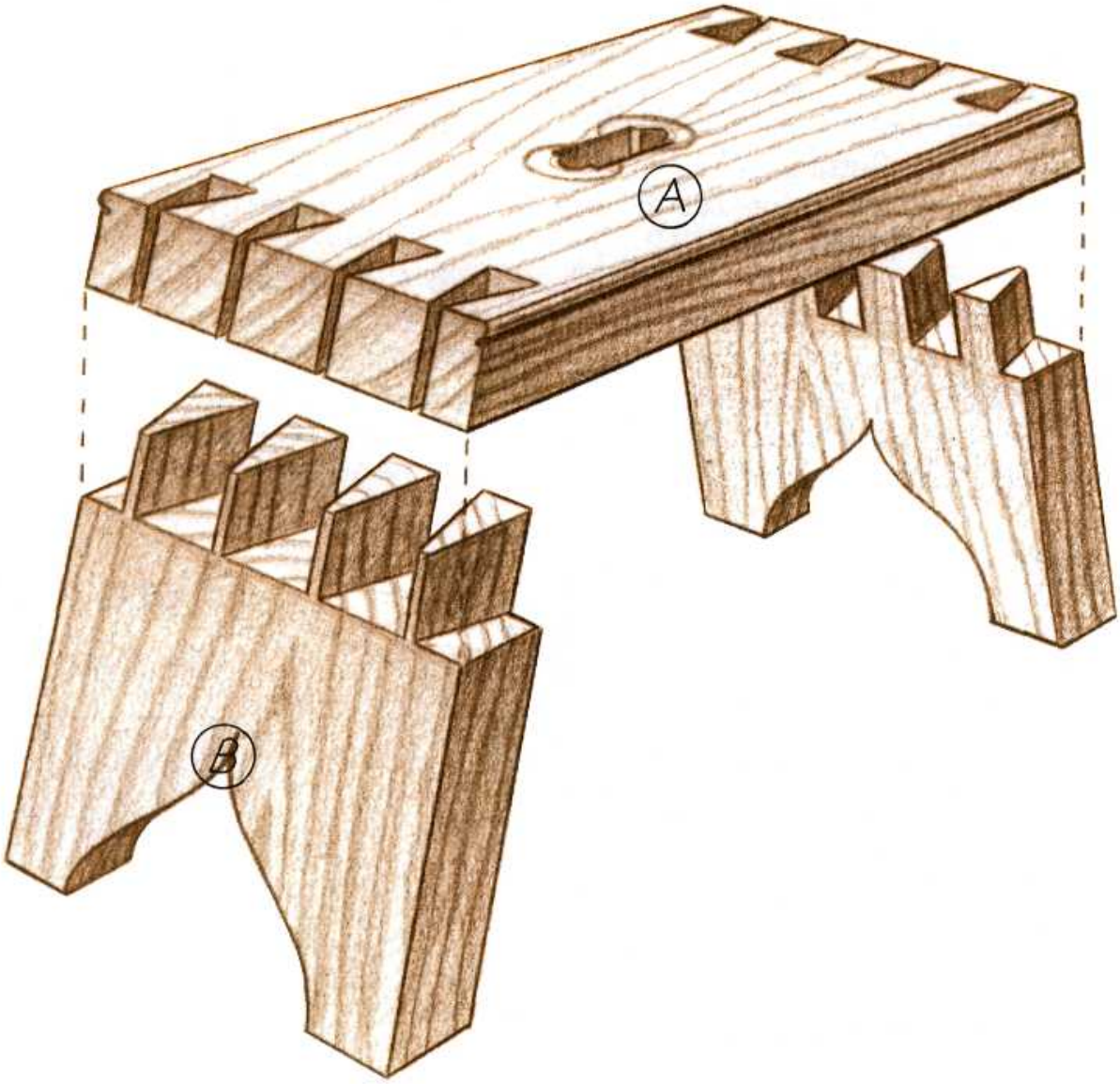
10 Sand and apply the finish. Finish sand the chair. As you are sanding the chair, round-over any sharp corners. Round-over the top of the chair, as shown in the *Side View,* with files, a spokeshave, or a belt sander.

It might be a good idea to choose this chair's finish with the child for whom it's intended. But, of course, you might end up painting it hot pink or olive green.

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FOOT-STOOL





EXPLODED VIEW

CUTTING LIST

Part	Quantity	Dimension	Comment
A. Top	1	1 5/16″ × 6 3/8″ × 12″	Cut to size when beveling.
B. Legs	2	1 5/16″ × 6 3/8″ × 7″	Cut to size when beveling.

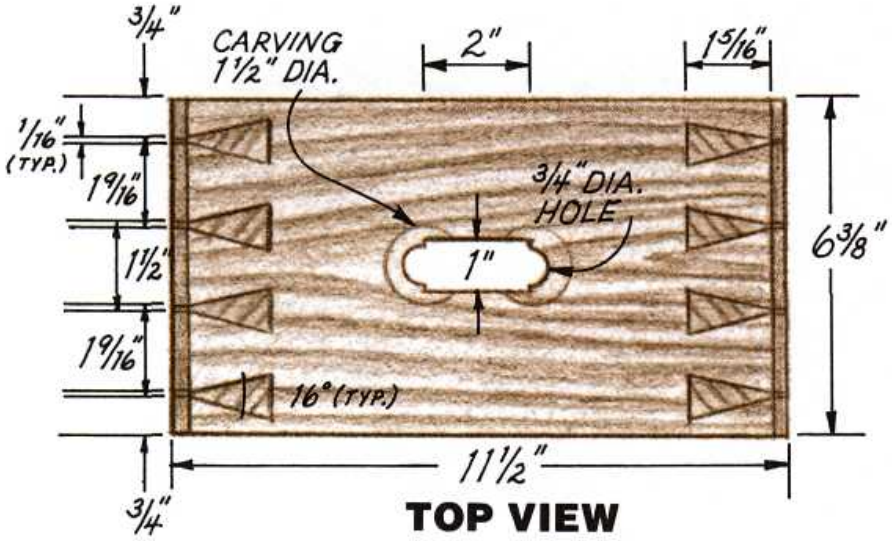
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1 Select the stock and cut the parts. If you are not an experienced dovetailer, consider an easily workable wood like pine for your first attempt. If you've done some dovetailing, choose a more durable wood like walnut or cherry. Joint, plane, rip, and cut the stock to the sizes given in the Cutting List. For uniform grain pattern and color, cut the top and legs from a single board.

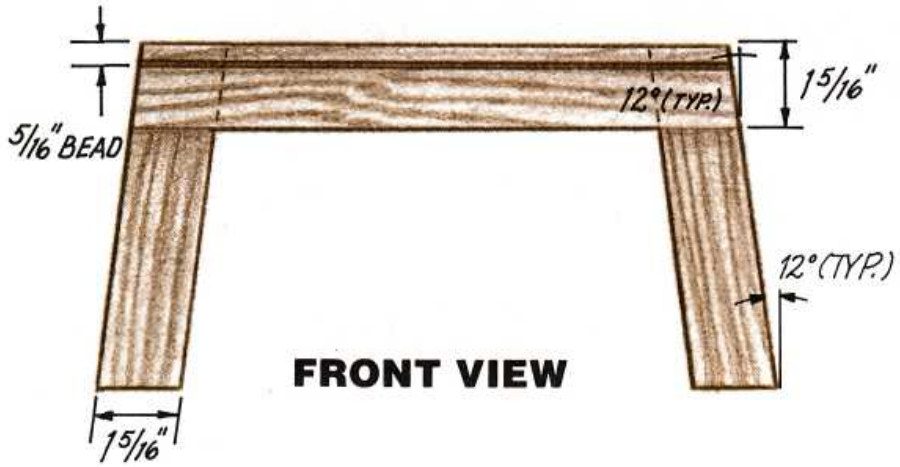
2 Cut the bevels. All the parts are beveled on both ends. Note that the bevels are parallel on the legs, but not on the top. Set the table saw blade to 12 degrees and, with the miter gauge as a guide, cut the miters shown in the *Front View.*

3 Cut the dovetails. Cutting an angled dovetail is made much like cutting a regular dovetail. If you haven't cut a lot of dovetails, practice on a piece of scrap. "Angled Dovetails" on page 168 shows you exactly how to cut the joint.

4 Cut out the leg shape. Draw a ½-inch grid on a piece of paper and draw the *Leg Pattern* onto it. With the legs removed from the top, transfer the pattern to the legs. Cut out the shape with a band saw or jigsaw.

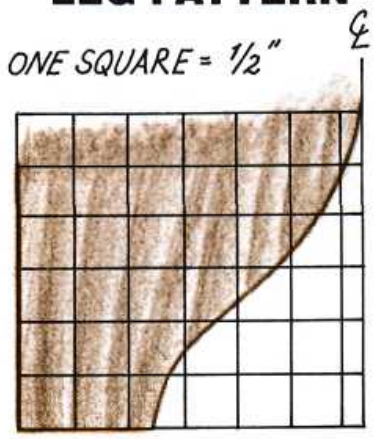


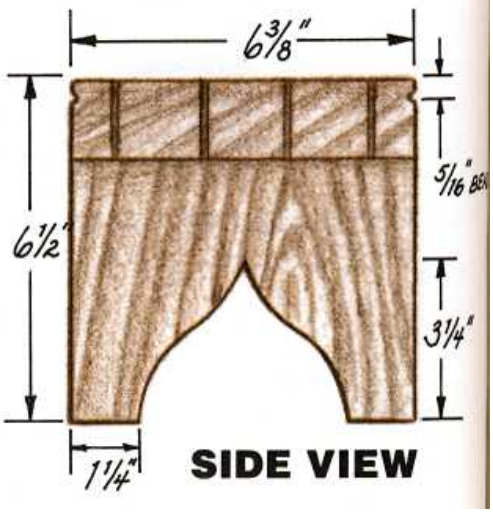
TOP VIEW



FRONT VIEW

LEG PATTERN





SIDE VIEW

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SHOP TIP: To get two identical legs, cut both at once. First stack the pieces together and secure by putting double-sided tape between them. Then cut both legs in one operation.

5 Cut the handhold in the top. Lay out and drill the holes in the top, as shown in the *Top View.* When the holes have been drilled, lay out and connect them by cutting away the wood between them with a jigsaw.

If you wish, carve around the handhold, as shown, with a V-shaped chisel called a parting tool.

6 Rout the bead in the top. Put a 5/16-inch beading bit in your router. Secure the router in a router table. Guide the top along the fence to cut a bead in the top, as shown in the *Front View.*

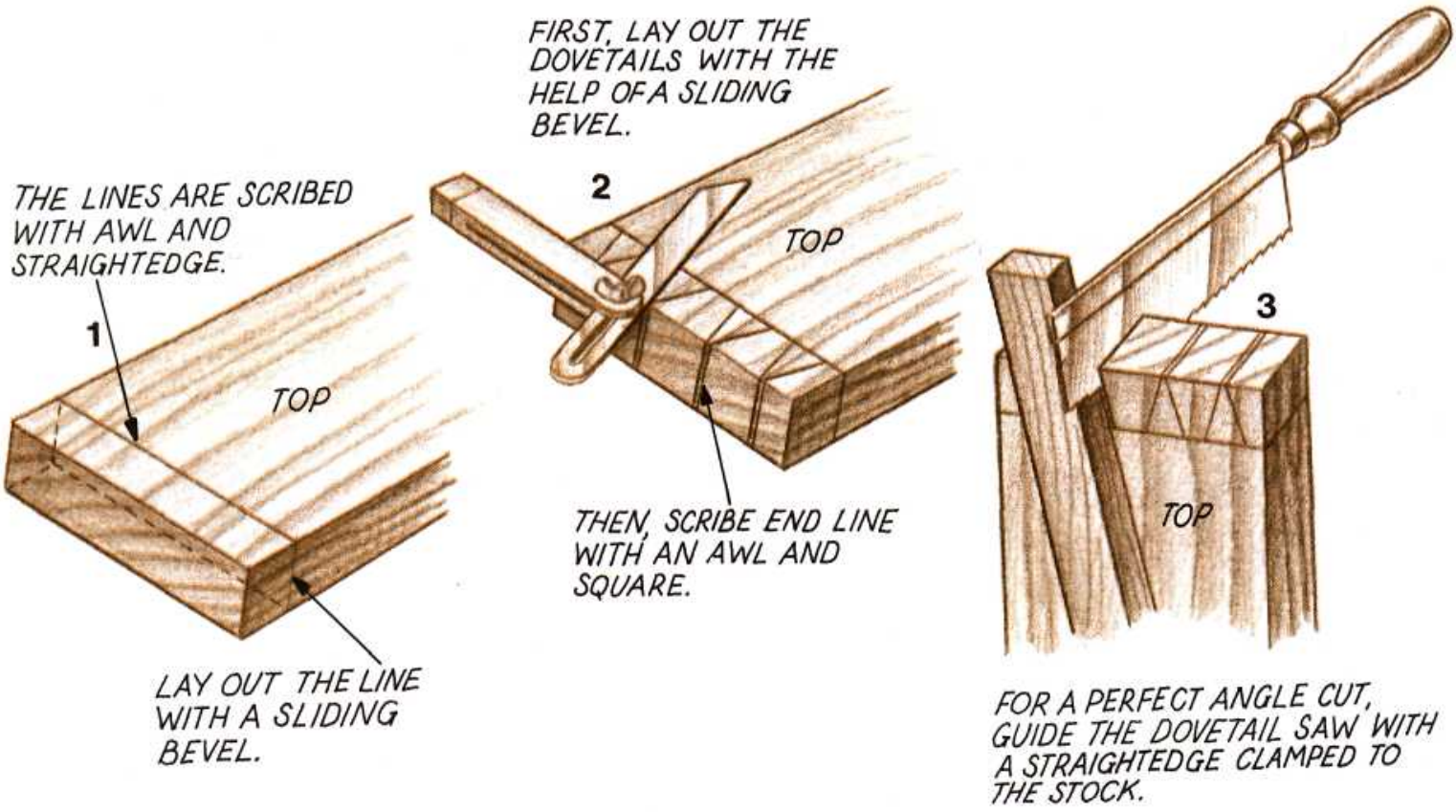
7 Assemble the stool. Spread glue on the tails and pins and clamp the legs to the top.

When the glue has dried, sand the dovetail joints even and scrape away any excess glue on the stool bottom.

8 Apply the finish. Finish sand the stool, removing all scribe marks. Stain and varnish, or paint the stool.

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ANGLED DOVETAILS

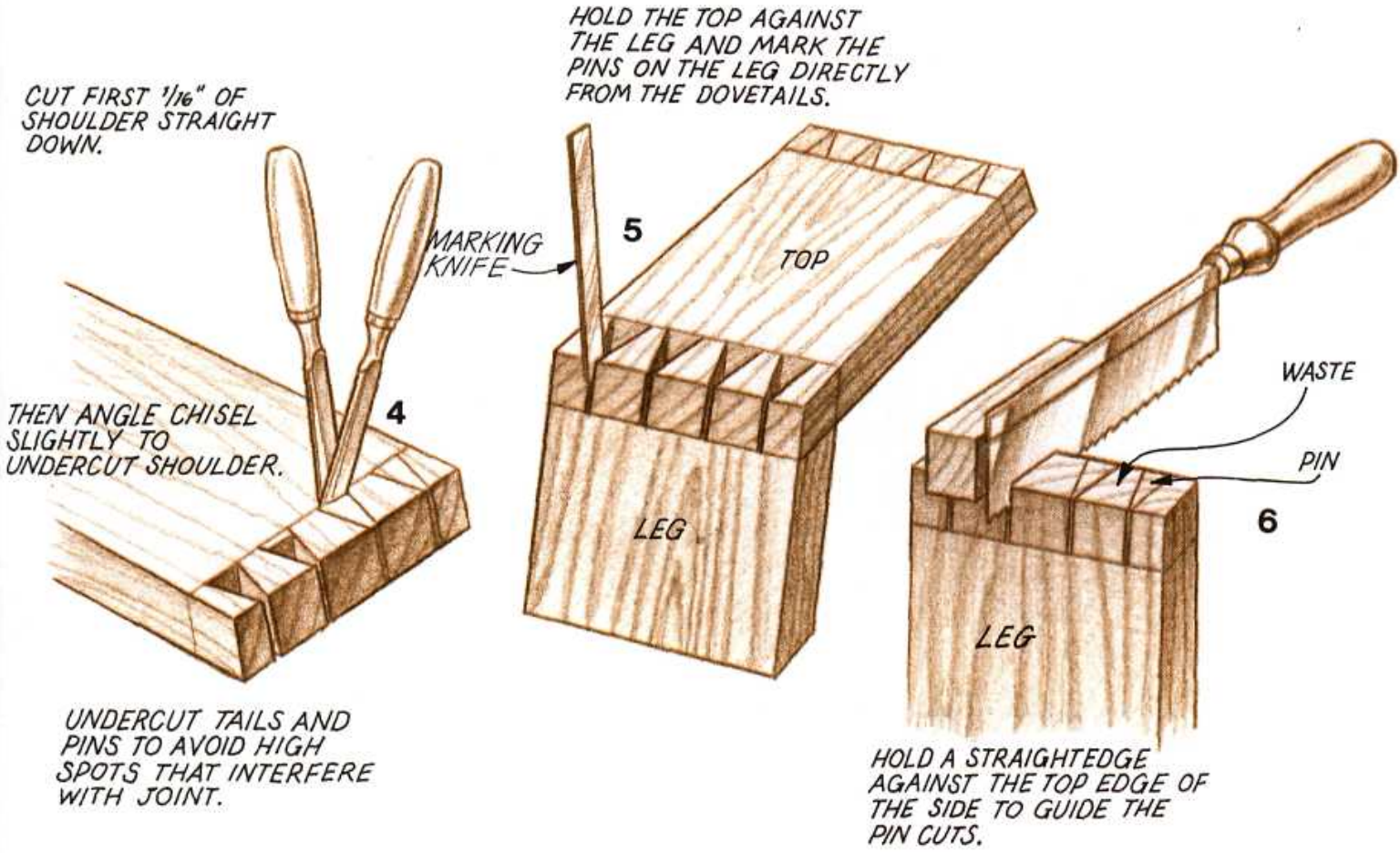


1 Lay out the length of the pins and tails. Angled dovetails are much like regular dovetails in that they are made of pins and tails. The tails are on the top of the stool; the pins are on the legs. You may notice that these dovetails are unique: The outside edge of the joint ends in half *tails* to make routing the bead easier. On most dovetail joints, the edges end in half *pins*.

The angled end of the stool makes it impossible to lay out the base of the tails with a marking gauge. Scribe the line with an awl and straightedge instead. Scribe the line 1 5/16 inches from the end of the board, as shown.

2 Lay out the tails. The *Top View* shows the exact location and shape of the tails. Lay out the tails with a sliding T-bevel on the tip face of the board. Then, lay out the angle of the tails on the back face of the board, so that they meet the lines you have just drawn.

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3 Cut out the tails. Saw down to the scribe line, cutting on the waste side of the layout lines. A Japanese Dozuki saw, like the one shown here, is easy to control and cuts crisp lines. Watch your layout lines carefully: Follow the angle of the pins and make sure you don't cut through either one of the scribe lines.

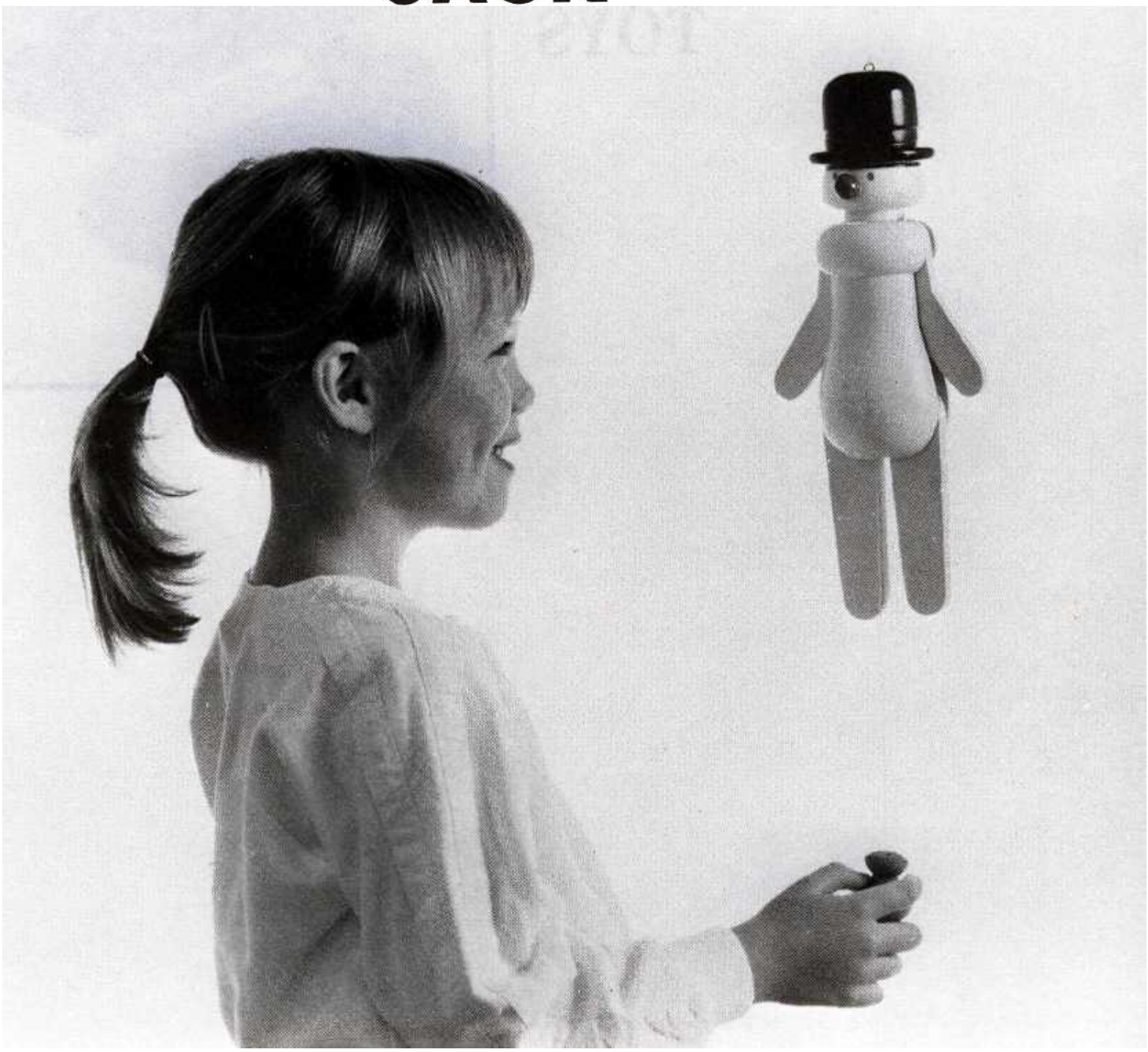
4 Chisel out the waste between the tails. Chisel halfway through the board from one side; turn the board over and chisel from the other side. Undercut slightly, as shown, to ease assembly of the joint.

5 Lay out the pins. For best results, lay out the pins by tracing around the tails. Hold the top and one leg together and lay out the pins with a marking knife directly from the tails. Carry your layout lines down to the scribe lines and clearly mark the waste with a pencil.

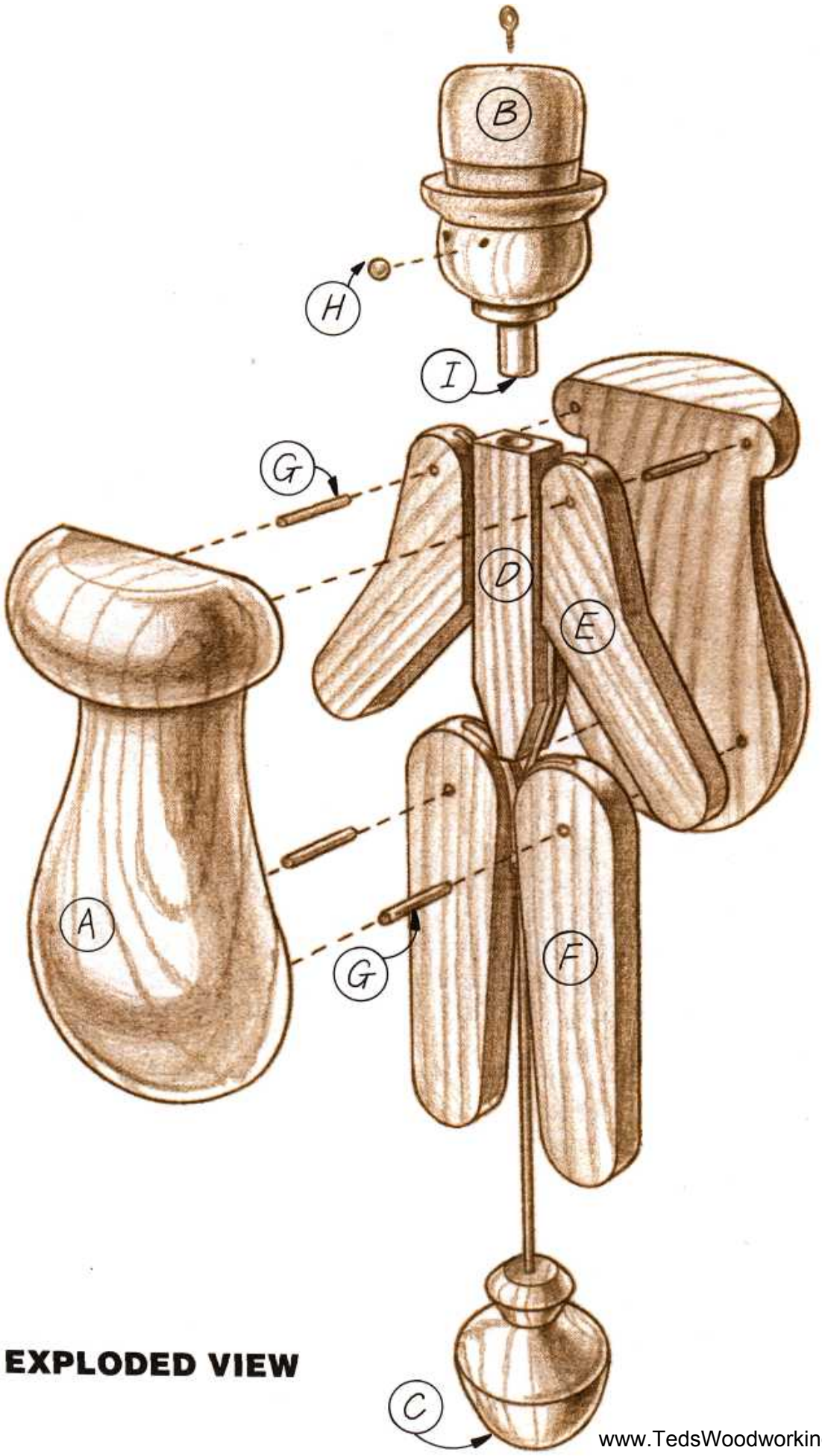
6 Cut out the pins. Saw along the layout lines to the scribe lines and chisel away the waste as before. Test fit the dovetails. Pare the pins to fit the tails if necessary. Do not glue them in place yet.

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JUMPING JACK



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EXPLODED VIEW

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SHOP TIP: To get accurate turned profiles, make templates from ¼-inch plywood. Cut the plywood to the shapes of the grids shown in the *Body, Side View; Head, Front View;* and *String Pull Detail.* As you turn each part on the lathe, hold the template against it to help gauge the proper shape. Each template allows for ¾-inch-diameter waste on each end of the turnings.

4 Cut the angle in the end of the divider. Mark and cut the angle, as shown in the *Body, Front View,* with the band saw or coping saw. When the angles have been cut, sand the divider edges. Round the corners well because the pull string will rub against them.

5 Cut the arm and leg shapes. Draw a ¼-inch grid on a piece of paper and draw the *Arm Pattern* onto it. Transfer the pattern to the wood. Be sure to follow the grain direction shown. Cut the arms with a band saw or coping saw.

Lay out the legs on the stock by drawing the circles shown in the *Body, Front View* and connecting them. Cut the legs with a band saw or jigsaw.

Sand the rough edges smooth.

6 Drill the pivot holes in the arms and legs. Drill 3/16-inch pivot holes in the top joint of the arms and legs, as shown in the *Body, Front View* and the *Arm Pattern.*

7 Drill the joint dowel holes and test fit the body. Position the divider, arms, and legs on one half of the body, as shown in the *Body, Front View.* Make sure that the arms and legs can swing freely. Mark through the pivot hole with an awl. Drill ⅛-inch-diameter by ¼-inch-deep holes at each mark.

To locate the holes on the other body half, slip #4 × ½-inch flathead screws into the existing dowel holes *head first.* Position the two body halves on top of each other and press gently. The points of the screws will mark the center of the second set of dowel holes. Drill the second set of holes, but don't glue the pieces together yet.

Glue the dowels into the holes in one side of the body and put the arms and legs in place over the dowels. Position the divider so that it will not interfere with the arm or leg movement. Mark the divider's position with a pencil and glue it to that half of the body. Wipe away any excess glue.

Test fit the body and make any necessary adjustments. Don't glue the rest of the body together yet.

8 Drill the string holes and attach the string. With the arms and legs hanging down, mark them for the string holes shown in the *Body, Front View.* Insert one end of a 15-inch-long piece of durable string into each hole. Apply a drop of glue to the top of each hole and wedge the string in the hole with a toothpick. Trim the toothpick flush.

Run the arm strings down along the divider and between the legs. Run the leg strings down between the legs. With the arms and legs still hanging down, tie the four strings together just above the bottom edge of the body.

Cut off three of the strings at the knot. Thread the remaining string through the hole in the pull and knot it to keep the string from slipping through the hole. If

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the string is strung correctly, the arms and legs should swing up when the string is pulled.

9 **Attach the nose to the head.** The nose is a wooden ball, which is attached to the head with epoxy. Position the nose, as shown in the *Head, Front View.*

10 **Apply the finish.** Because the body has moving parts, it will be easier to apply the finish before assembly. Prepare for the finish by covering any parts that will be glued with masking tape. Cover the exposed dowels, dowel holes, and divider surface. Also cover the area on the one body half that will be glued to the divider. The jumping jack shown was painted. It has a white body, bright red nose, blue eyes, and blue hat.

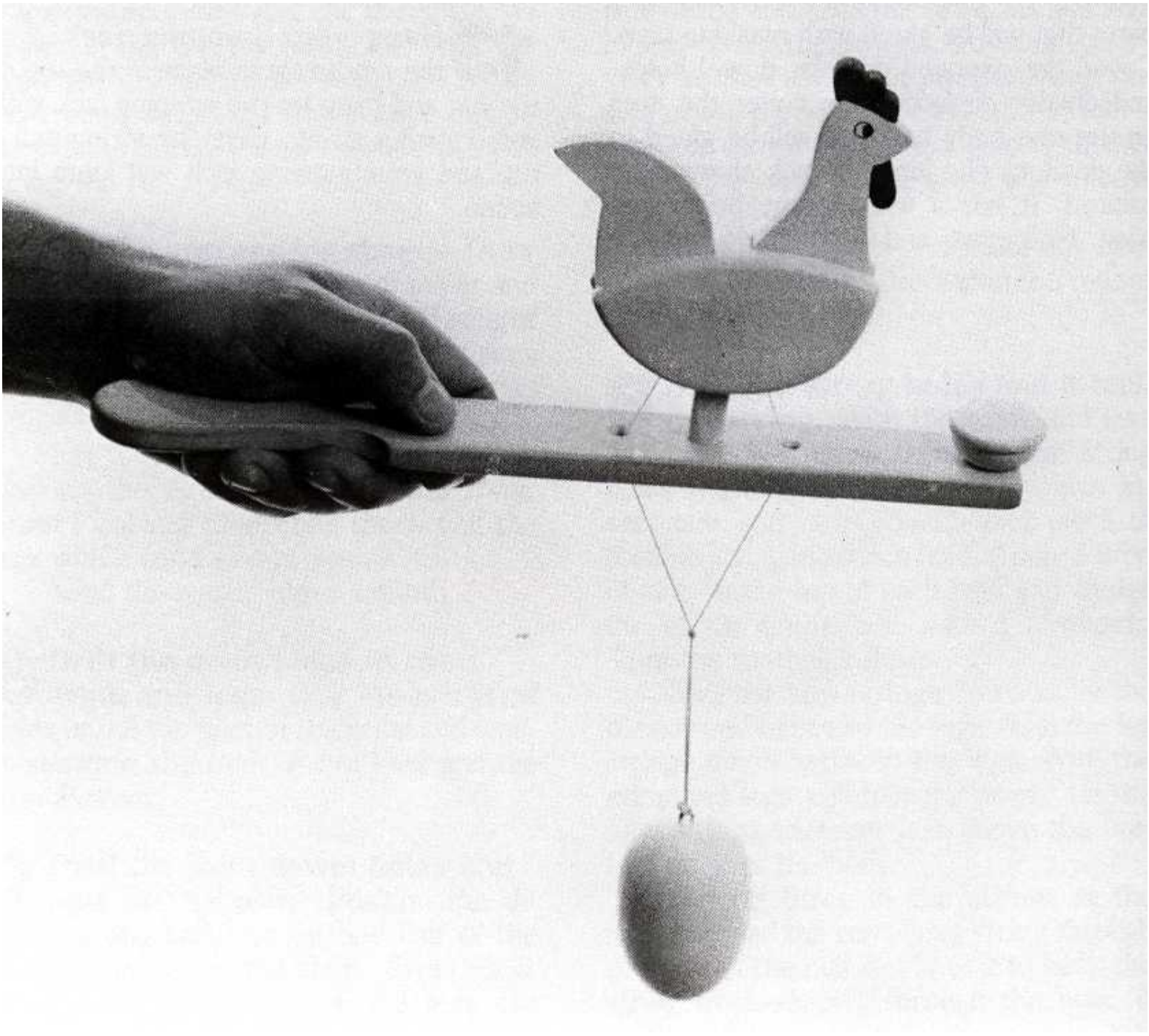
11 **Assemble the body.** When the finish has dried, place the arms and legs over their joint dowels. Make sure that the string is following its appropriate path and glue the two body halves together.

12 **Attach the head to the body.** Drill neck dowel holes in the head and body, as shown in the *Body, Front View* and the *Head, Side View.* Assemble the head to the body with the neck dowel and glue.

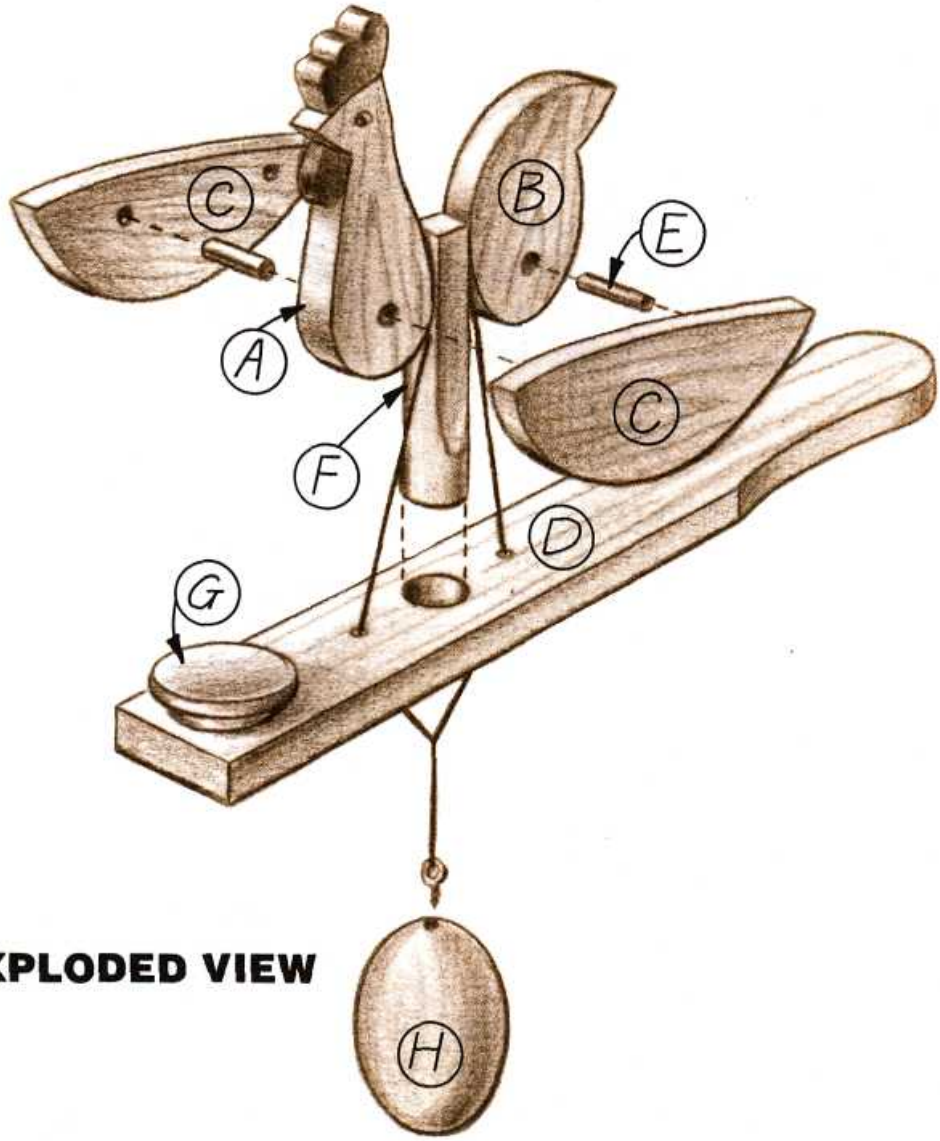
13 **Hang your jumping jack.** Put the eyescrew in place in the top of the hat and hang up the jumping jack with some strong string. Give the string pull a tug and your jumping jack will jump into action.

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PICKIN' CHICKEN



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EXPLODED VIEW

CUTTING LIST

Part	Quantity	Dimension	Comment
A. Head	1	3/8" × 2" × 4 1/2"	
B. Tail	1	3/8" × 2 1/4" × 3 3/4"	
C. Sides	2	3/8" × 2 1/2" × 4 1/2"	
D. Handle	1	1/2" × 1 3/8" × 12 1/2"	
E. Pivot dowels	2	1/4" dia. × 15/16"	
F. Center post	1	7/16" × 7/16" × 3 3/8"	
G. Bowl	1	1 5/16" dia. × 1/2"	
H. Egg*	1	1 3/4" dia. × 3 3/4" long	Cut to size after turning.

*Wooden eggs are available from Trendlines, 375 Beacham Street, Chelsea, MA 02150. Specify Grade A, extra large.

Hardware

1 18-in. string
1 1 1/4-in. dia. × 1/2-in. long eyescrew
2 standard toothpicks
As needed, 1-in. brads

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1 Select the stock and cut the parts. Because this project has moving parts, make your chicken from a durable hardwood like poplar or maple. Joint, plane, rip, and cut the stock to the sizes given in the Cutting List.

2 Cut the head, tail, sides, and handle to shape. Draw a ¼-inch grid on a piece of paper and draw the head, tail, side, and handle patterns on it. Transfer the patterns to the wood and cut the parts to shape with a band saw or jigsaw.

To get two identical sides, cut both at once. First stack the pieces together and secure by putting double-sided tape between them. Then cut both sides in one operation.

3 Drill pivot and string holes in the head and tail. Lay out and drill the 5/16-inch-diameter pivot holes in the head and tail, as shown in the *Head Layout* and *Tail Layout.*

Mark the approximate position of the string holes shown in *Head Layout* and *Tail Layout.* The location isn't critical. An error of up to ⅛ inch won't affect the chicken's performance.

Put the head and tail in a vise and drill a hole 1/16 inch in diameter and ⅜ inch deep.

4 Round the edges of the sides. Put a ¼-inch roundover bit in your router. Secure the router in a router table and round-over the outer edges of the sides.

SHOP TIP: Always keep your hands well away from spinning cutters. Use two awls or ice picks as push sticks when routing small pieces like these.

5 Lay out and drill the dowel holes in the sides. Lay out the dowel holes on one side of the chicken, as shown in the *Side Layout.* Set up your drill press to drill ¼-inch-diameter by ¼-inch-deep holes on the inside surface of the sides. Be careful not to drill through the side.

Put a dowel center—available at most hardware stores—in each of the holes. Put the two halves of the chicken together. The dowel centers will mark the center of the holes in the second side. Drill the holes as before.

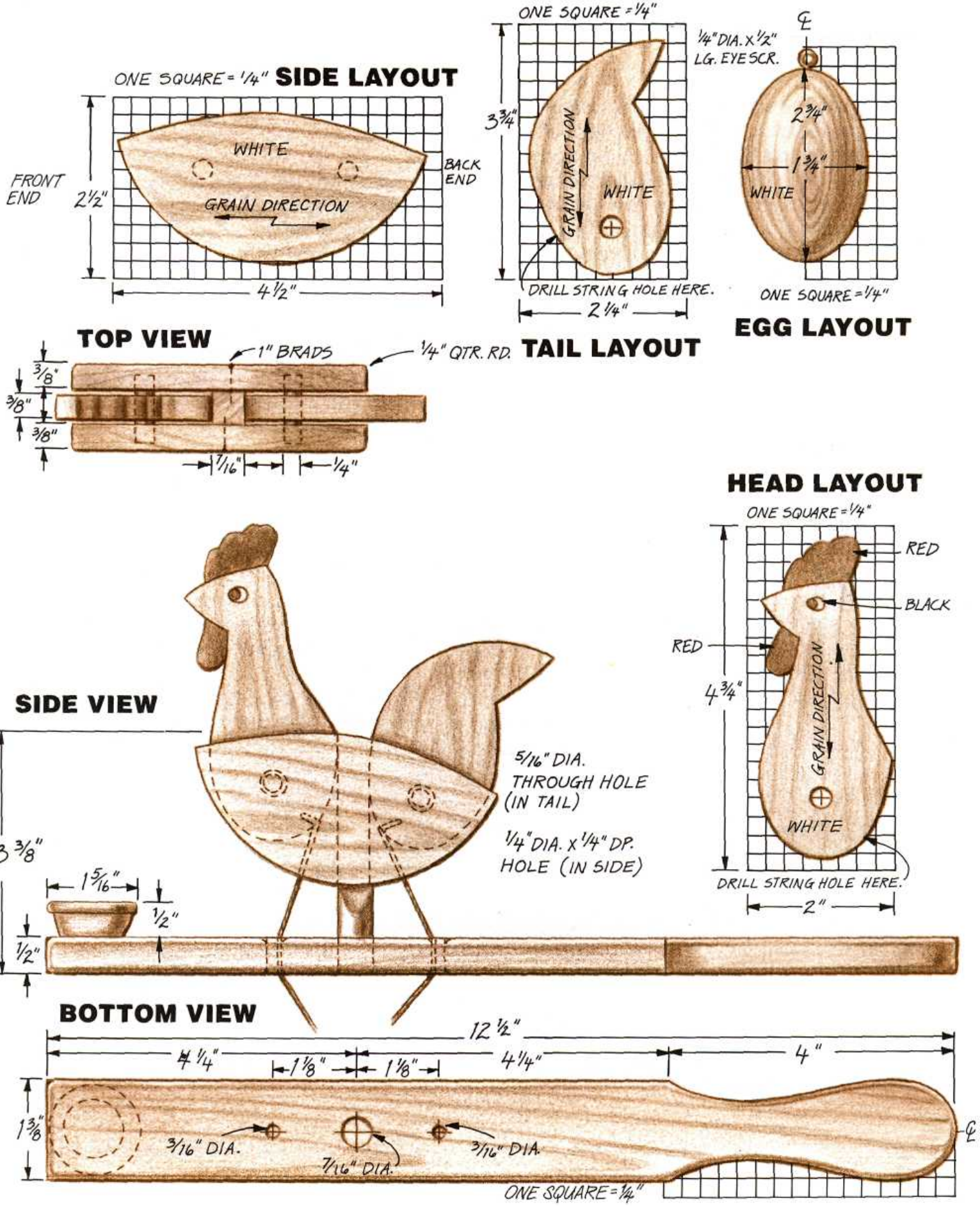
6 Mark the location of the center post. Once you've drilled the dowel holes, test fit the dowels in one of the sides and put the head and tail in position over them. With the head and tail in place, position the center post so that the head and tail pivot freely. Mark the location of the post.

7 Drill the holes in the handle. Lay out and drill the holes in the handle, as shown in the *Bottom View.* The two 3/16-inch holes are for the string that holds the egg. To prevent the string from wearing thin and breaking, chamfer the top and bottom edges of these holes with a countersink bit.

8 Turn or carve the bowl. Turn or carve the bowl to the approximate profile shown in the *Side View.* Don't worry if it doesn't look exactly like the one shown. The chicken won't notice.

9 Turn or purchase the egg. To get an accurate profile, make a template from ¼-inch plywood. Cut the plywood to the shape shown in the *Egg Layout.* When you turn the egg on the lathe, hold the

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template against the egg to help gauge the proper shape. Sand the egg while it is turning on the lathe.

You can also purchase wooden eggs from many craft stores, or from the source given in the Cutting List.

10 Sand and paint the parts. Finish sand all of the parts except for the center post. Take special care in sanding the edges of the string holes in the handle. The smoother these holes, the longer the string will last.

Paint all of the parts except for the bottom ½ inch of the center post. Be careful not to get paint into the dowel holes in the sides or the center-post hole in the handle.

11 Assemble the pickin' chicken. Cut an 18-inch piece of string into two equal lengths, one for the head and one for the tail. Glue the strings into their appropriate holes and wedge with slivers of wood or toothpicks.

Put a small bit of glue in the pivot-dowel holes. Don't apply too much glue. Clean up any glue that squeezes out. If glue gets on the head or tail of the chicken, the chicken won't work.

Put the head and tail in place, position the center post, and clamp the chicken together. With the chicken still in the clamps, drive two 1-inch brads through each side and into the center post. Allow the glue to dry.

When the glue is dry, cut and sand the top of the post even with top edge of the sides. With a knife or spokeshave, round the bottom of the center post until it fits into the center-post hole in the handle. Glue the center post into the handle.

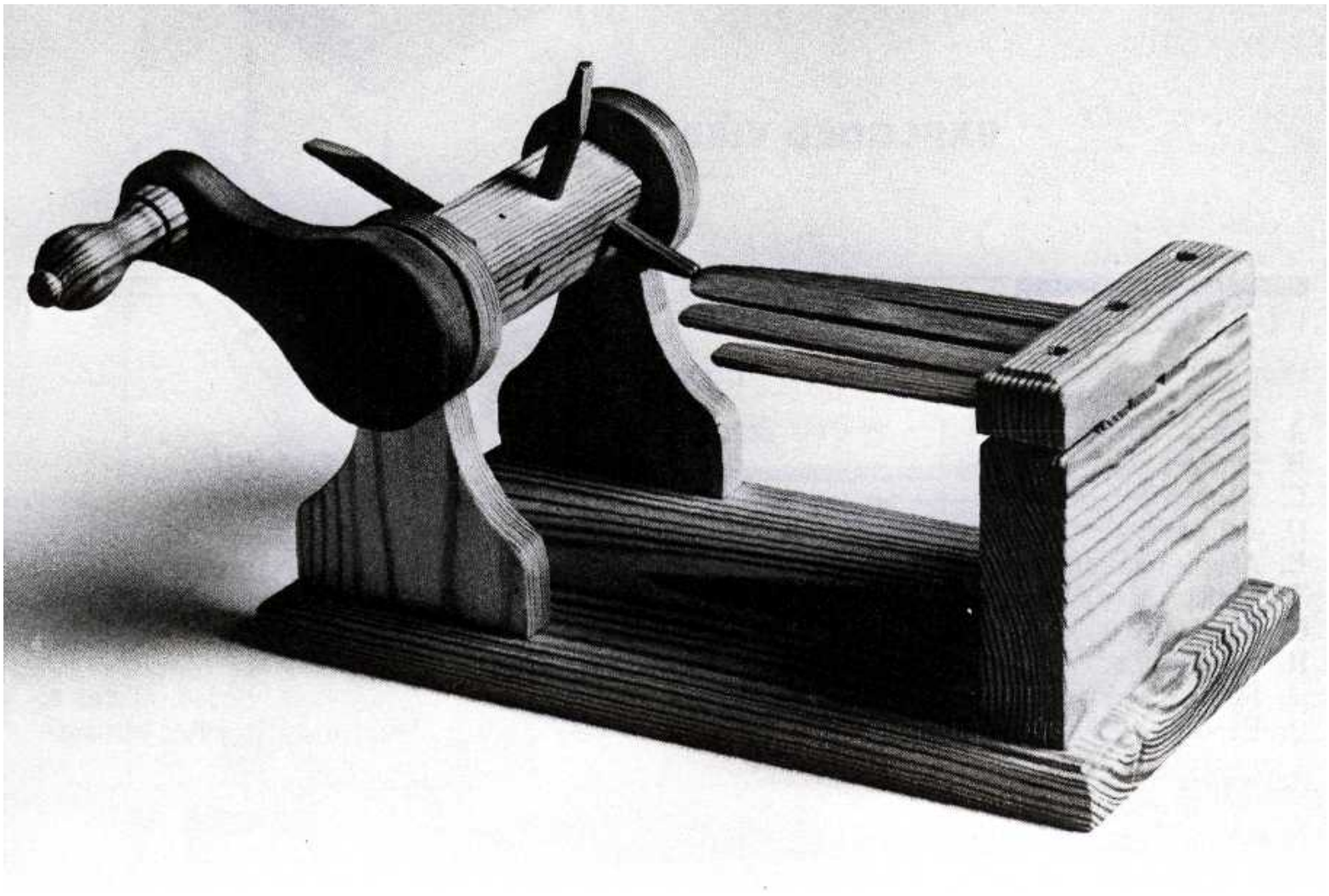
Brad and glue the bowl onto the handle so that the chicken's beak will hit its center.

Run the strings through the holes in the handle, as shown in the *Side View.* Knot the strings together 2 to 2½ inches below the handle, and then attach them to an eyescrew driven into the top of the egg 5 to 6 inches below the handle.

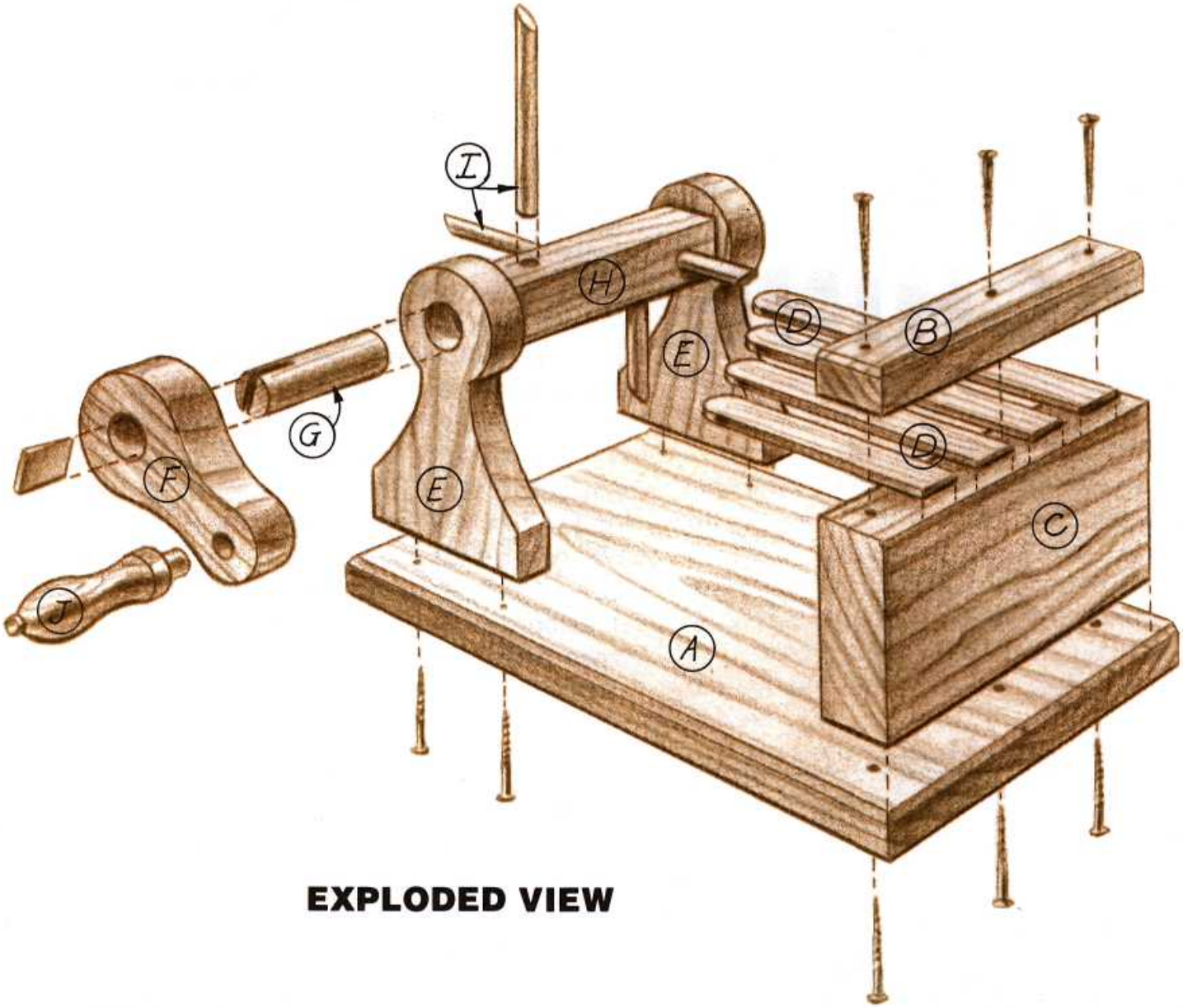
Do any necessary touch-up painting. When the paint is dry, swing the egg back and forth, and watch the chicken bob into action.

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NOISE MACHINE



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EXPLODED VIEW

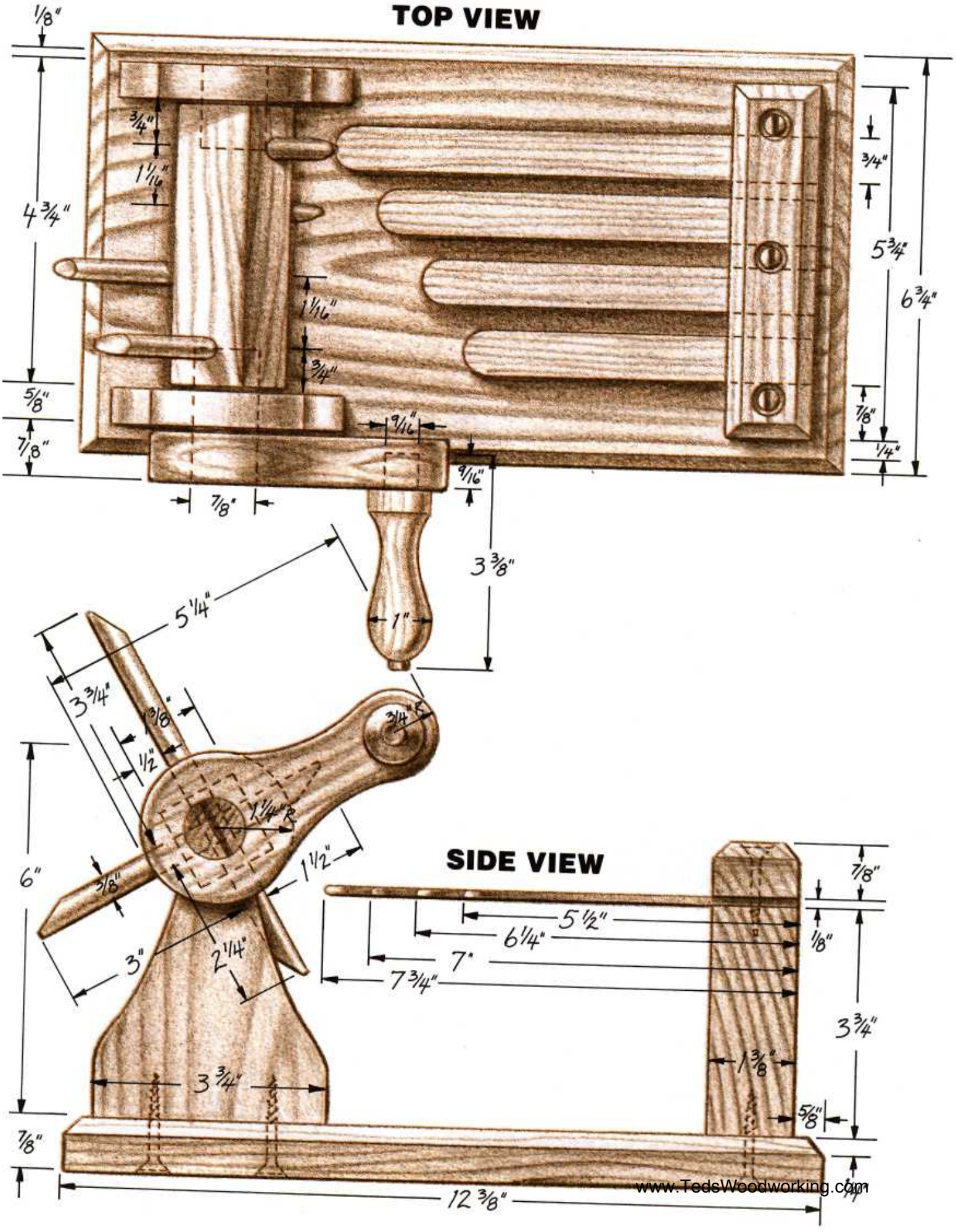
CUTTING LIST

Part	Quantity	Dimension	Comment
A. Base	1	7/8" × 6¾" × 12⅜"	
B. Support cap	1	7/8" × 1⅜" × 5¾"	
C. Tongue support	1	1⅜" × 3¾" × 5¾"	
D. Tongues	4	⅛" × ¾" × 10"	Trim to fit.
E. Axle supports	2	⅝" × 3¾" × 6"	
F. Crank	1	7/8" × 2½" × 5¼"	
G. Axle dowel stock	1	7/8" dia. × 5"	Cut to fit.
H. Peg block	1	1⅜" × 1⅜" × 4¾"	
I. Striking peg stock	1	⅜" dia. × 12"	Adjust as needed. Makes 4.
J. Handle	1	1" × 1" × 4⅜"	Cut to length after turning.

Hardware

10 #8 × 1¾-in. flathead wood screws

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1 Select the stock and cut the parts. Most hardwoods and softwoods are suitable for this project. Because the parts for this project are small, you can make them from scraps. Joint, plane, rip, and cut the parts to the sizes given in the Cutting List.

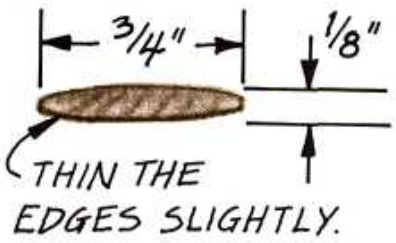
2 Chamfer the edges of the base and tongue support cap. Put a chamfer bit in your router. Secure the router in a router table and cut a chamfer all around the top edges of the base. Cut a matching chamfer on the support cap with a block plane.

3 Drill screw holes in the tongue support cap and tongue support. Clamp the tongue support cap on top of the tongue support and lay out the position of the three #8 × 1¾-inch flathead wood screws that hold the tongue support cap to the tongue support, as shown in the *Top View.* First, drill 7/64-inch-diameter pilot holes down into the tongue support. Next, drill a 5/32-inch-diameter clearance hole in the tongue support cap. Then countersink holes for the screw heads.

A combination pilot hole bit drills a countersink hole, a clearance hole for the screw shank, and a slightly smaller pilot hole for the screw threads all in one operation. These bits are available from most hardware stores and are sold according to the screw size.

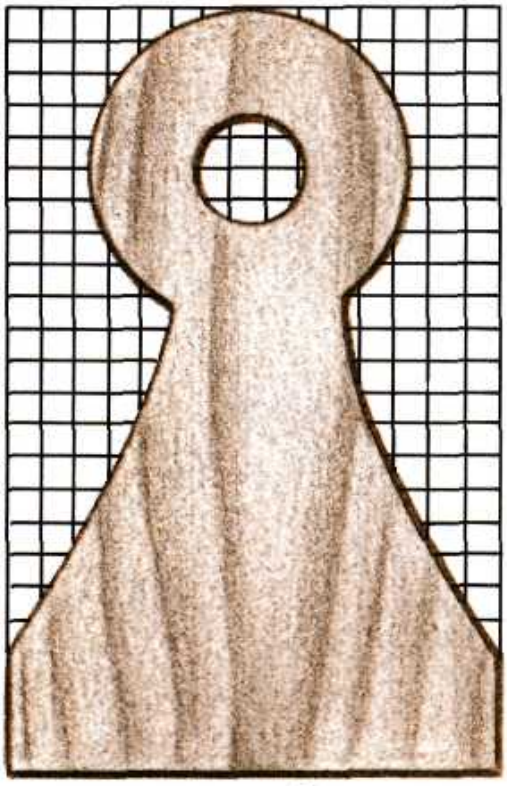
4 Shape the tongues. Lay out a 3/8-inch-radius curve on the end of each tongue and cut them to shape on a band saw.

The noise machine's tongues become thinner near the edges. As you sand the tongues to remove the saw marks, thin the edges slightly, as shown in the *Tongue End View.* Do not cut the tongues to their final lengths yet.



TONGUE END VIEW

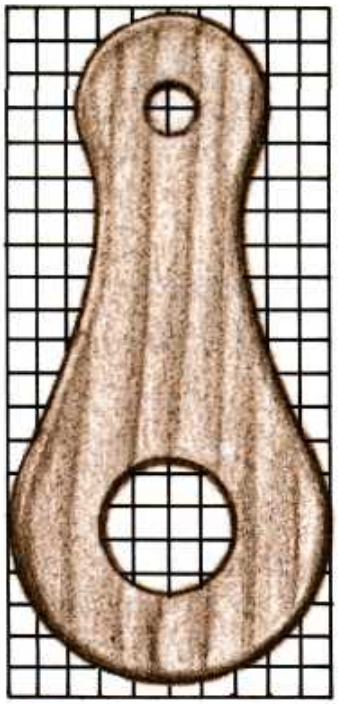
5 Cut the axle supports and crank to shape. Draw a ¼-inch grid on a piece of paper and draw the *Axle Support Pattern* and the *Crank Pattern* onto it. Transfer the patterns to the wood and cut the parts to shape on a band saw. If you wish, first tape the stock for the two axle supports together with double-sided tape and cut out both pieces simultaneously. Sand away any saw marks.



AXLE SUPPORT PATTERN

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CRANK PATTERN



ONE SQUARE = 1/4"

6 Drill the holes in the axle supports and crank. On one axle support, mark the center of the top circular section. Align this support on top of the other and drill 15/16-inch axle holes in both supports at the same time.

Lay out the holes on each circular section of the crank. Drill a 7/8-inch-diameter hole in the large circle for the axle dowel. Drill a 9/16-inch-diameter by 9/16-inch-deep hole for the handle.

7 Assemble the axle. The axle is made up of a peg block and two axle dowels.

First, cut two axle dowels from the axle dowel stock. Cut one 2 3/8 inches long and one 1 3/8 inches long.

Next, drill a 7/8-inch-diameter by 3/4-inch-deep hole in each end of the peg block. Put a little glue in each hole, and insert an axle dowel.

When the glue is dry, cut a slot in the long axle dowel for a tightening wedge. To lay out the slot, slip the long axle dowel through the hole in one of the axle supports. Mark the axle dowel at the point where it protrudes. With a backsaw, cut a slot for a tightening wedge from the end of the axle dowel to the axle support mark.

Cut a thin 7/8-inch square tightening wedge from some hardwood scrap and sand the edges smooth.

8 Attach the striking pegs to the peg block. Lay out the position of the striking pegs on the peg block, as shown in the *Top View.* Drill 3/8-inch-diameter by 1/2-inch-deep holes for the pegs.

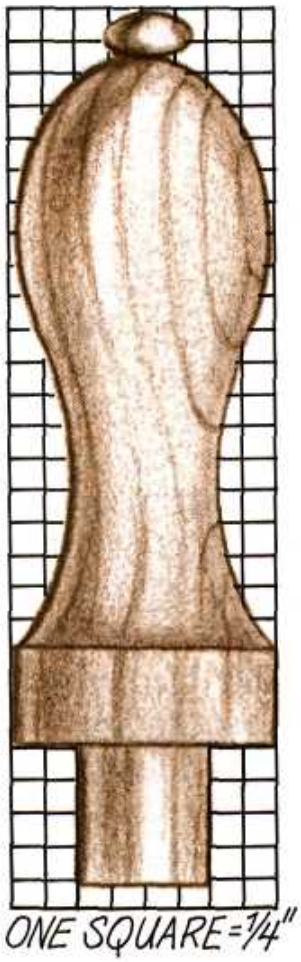
Cut the four different length pegs shown in the *Side View* from the striking peg stock. Round and bevel the striking ends of the pegs, as shown, with sandpaper and glue them into their corresponding holes. The longest peg will strike the shortest tongue shown, and the shortest peg will strike the longest tongue. Allow the glue to dry.

9 Turn the crank handle. Turn the handle to the profile shown in the *Handle Pattern.* Sand the handle while it is still on the lathe, remove it from the lathe, and cut off the waste with a backsaw. If you are unfamiliar with turning, *Creative Woodturning* by Dale L. Nish is a good introduction. If you don't have access to a lathe, purchase a small drawer handle at a hardware store.

10 Assemble the noise machine. First, clamp the tongue support in

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HANDLE PATTERN



position on the base. From the bottom, drill three holes with a combination pilot hole bit for #8 × 1¾-inch screws, as shown in the *Side View.* Space the holes evenly. Drive the screws in place.

Next, slip the axle supports onto the axle and then clamp the axle supports in position on the base. Drill holes for #8 × 1¾-inch screws as before and drive the screws in place.

With the axle supports screwed in place, spread a little glue in the axle dowel hole in the crank. Push the crank over the slotted axle dowel until you have about a 1/32-inch gap between the crank and the axle support. Position the crank on the axle so the slot is perpendicular to the crank's grain. Spread glue on the tightening wedge and carefully tap it into its slot.

When the glue dries, trim the wedge flush with the axle dowel. If the axles overhang the supports, trim them flush, too.

SHOP TIP: When fitting or gluing the axle and axle supports, place several folds of waxed paper between the parts. Once the glue has set, remove the paper for a free-spinning mechanism. You may also want to apply wax to the axle pins to prevent them from sticking. Be careful not to wax the slotted section of the dowel that is glued to the crank.

11 Adjust the tongues. Position the tongues on top of the tongue support and lightly screw on the tongue support cap. Notice that the screws do not go through the tongues.

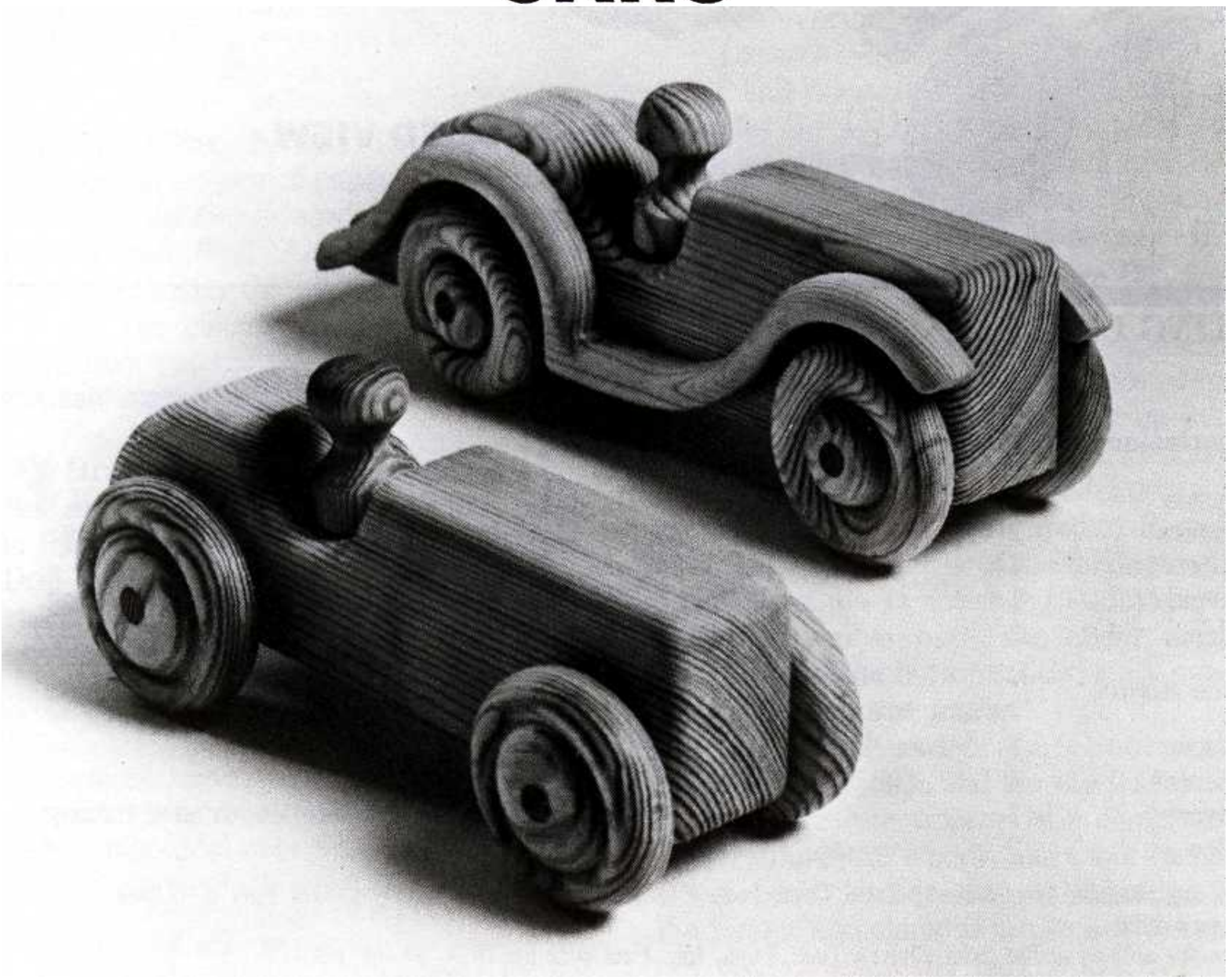
Position the tongues, as shown in the *Top View.* Adjust the tongues so that as you turn the crank, the pegs just catch the ends of the tongues, causing them to sound. When the tongues are all adjusted, tighten the screws on the tongue support cap and trim the back ends of the tongues even with the tongue support.

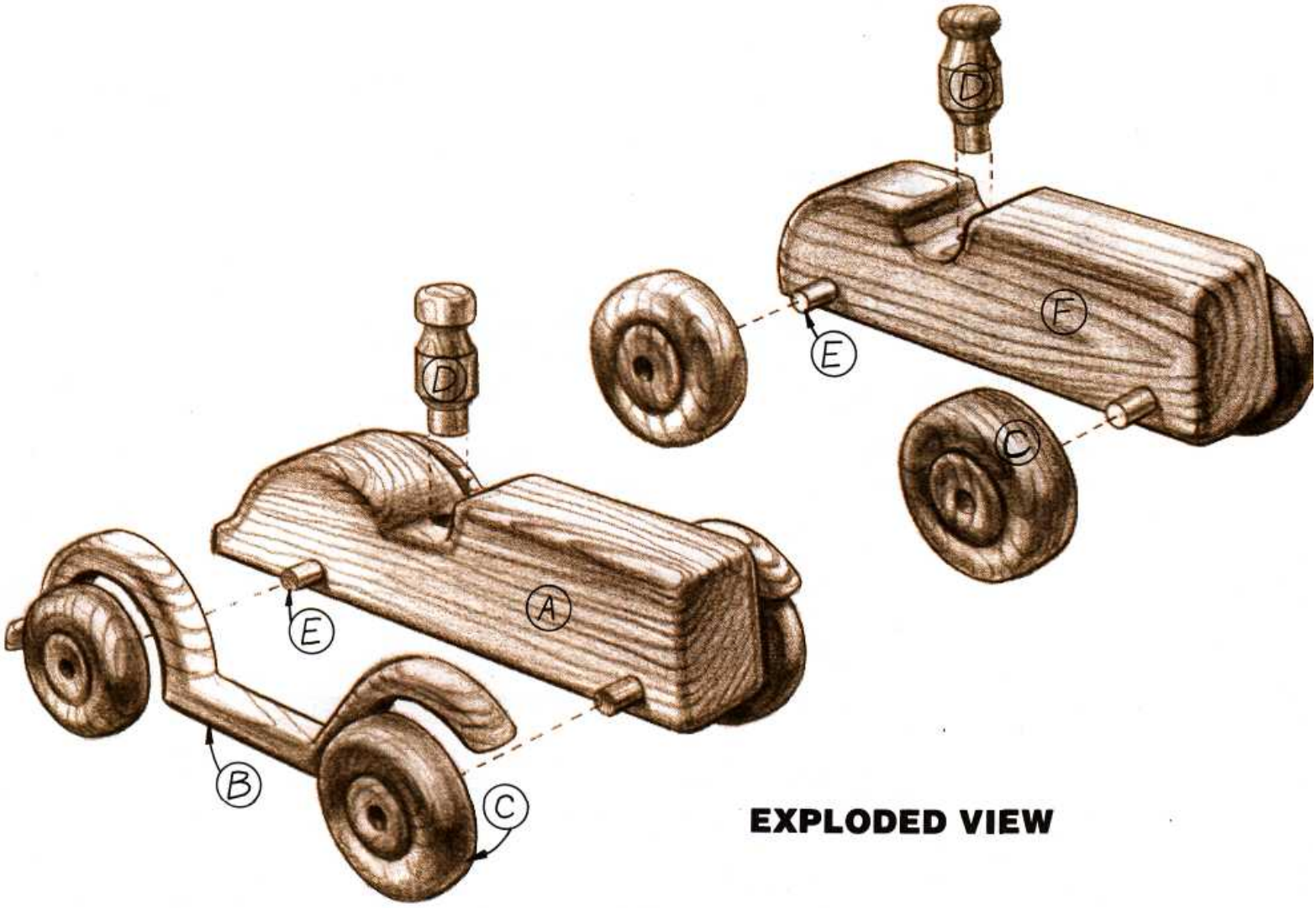
12 Apply the finish. Give the noise machine a final sanding. A simple toy like this should have a simple finish, so rub on a one-step oil finish.

When the finish is dry, go make some noise.

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RACE CARS





EXPLODED VIEW

CUTTING LIST

Part	Quantity	Dimension	Comment
#1 Gentleman's Roadster			
A. Chassis	1	1¾″ × 2¾″ × 11″	
B. Fenders	2	¾″ × 3½″ × 11½″	Cut to size when shaping.
C. Wheels*	4	¾″ × 2½″ dia.	
D. Driver†	1	1″ dia. × 3½″	Cut to length after turning.
E. Axles	2	⅜″ dia. × 3⅜″	
#2 Race About			
F. Chassis	1	1¾″ × 2¾″ × 9¾″	
C. Wheels*	4	¾″ × 2½″ dia.	
D. Driver†	1	1″ dia. × 3½″	Cut to length after turning.
E. Axles	2	⅜″ dia. × 3⅜″	

*Wheels are available from Cherry Tree Toys, Inc., P.O. Box 369, Belmont, OH 43718. Part #16 (oak, cherry, or walnut).
†Drivers are also available from Cherry Tree Toys, Inc. Part #22 for ⅞ × 2⅜-in. person.

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1 Select the stock and cut the parts. The race cars shown are made of pine, but you can make yours out of almost any kind of wood. To add color and variety to the race cars, use various wood species for the different parts. Because these cars are basically the same, why not make both at once? Choose enough straight, flat stock to make both cars. Joint, plane, rip, and cut the stock to the sizes given in the Cutting List.

SHOP TIP: If you glue up stock for the chassis, consider gluing together different types of wood to get racing stripes. This project, like any other, takes on a whole new look with different types of wood.

2 Shape the chassis. Draw a ½-inch grid on a piece of paper and draw the chassis of the *Gentleman's Roadster Shape Pattern* and *Race About Shape Pattern* onto it. Transfer the patterns to the stock and cut the chassis to shape on a band saw. After you cut the chassis, sand away the saw marks.

3 Drill the axle holes in the chassis. Mark and drill 7/16-inch axle holes in the chassis, as shown in the patterns. Drill the holes all the way through the stock.

SHOP TIP: When drilling a hole completely through a piece of wood, the wood often splinters where the bit exits the stock. To prevent this from happening, put a flat piece of scrap under the stock you are drilling. As the drill comes through the stock, the piece of scrap will support the edges of the hole and prevent it from splintering.

4 Round the edges of the chassis. Put a ¼-inch roundover bit in your router. Secure the router in a router table and round-over all of the edges of the chassis except where noted otherwise in the *Shape Pattern*. Use a push stick when routing and keep your fingers well away from the cutters.

5 Cut out and glue the fenders to the Gentleman's Roadster. Note that only the Roadster has fenders. While both of the Roadster's fenders are made from the same pattern, they are not identical. The right fender is rounded over on the right side; the left fender is rounded over on the left side.

Draw a ½-inch grid on a piece of paper and draw the fender shape onto it. Transfer the pattern to the two pieces of stock as called for in the Cutting List.

Start by cutting along the "first cut" line of the fender shapes, as noted in the *Shape Pattern,* and sand away the saw marks.

When the first cuts have been sanded smooth, round-over the appropriate edges with a ½-inch roundover bit set up in a table-mounted router. Remember: Round-over the left side of the left fender and the right side of the right fender. Round-over the square corner of the fenders with a chisel and file as noted in the drawing.

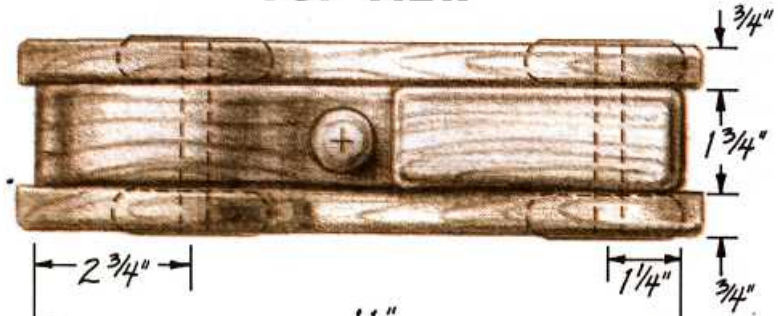
After you've routed the fender, make the cut along the bottom of the fender and sand away the saw marks.

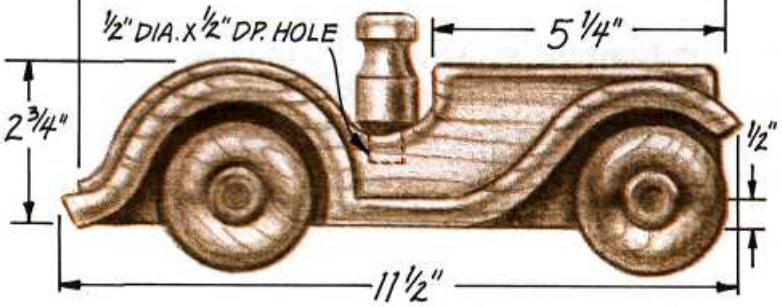
Lay the chassis of the Gentleman's Roadster on its side and set the wheels in place. Place the appropriate completed fender above the wheels and mark its position. Spread some glue on the edge of the fender and clamp it in place with rubber bands. When the glue is dry, repeat the process with the second fender.

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GENTLEMAN'S ROADSTER

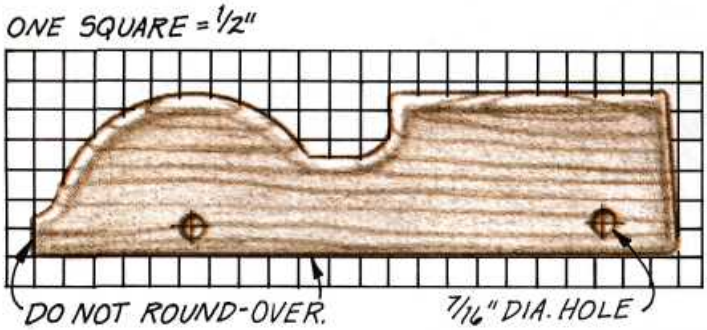
TOP VIEW

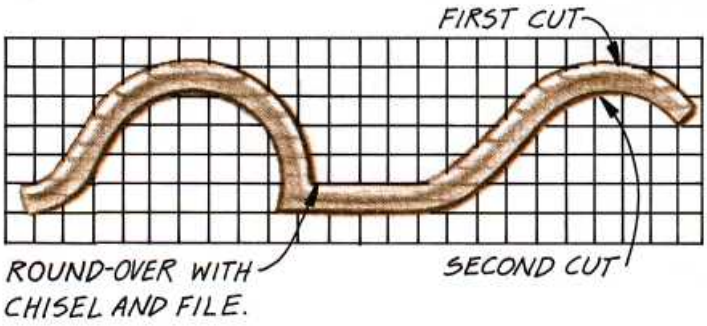




SIDE VIEW

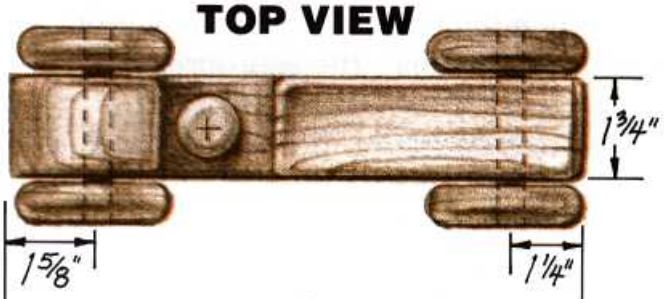
SHAPE PATTERN



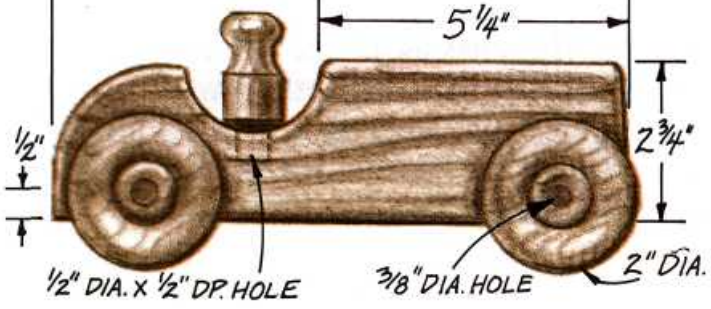


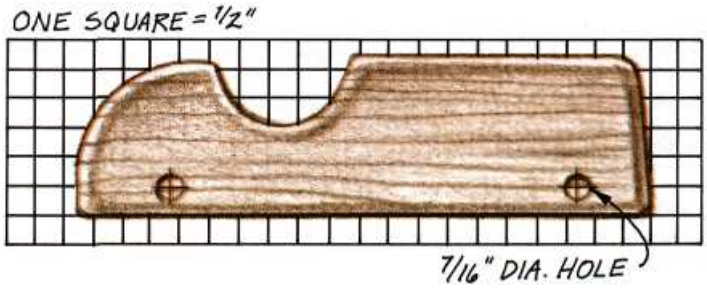
RACE ABOUT

TOP VIEW

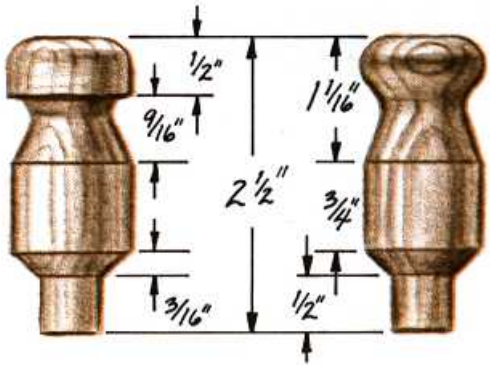


SIDE VIEW





DRIVER DETAIL



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6 Purchase the drivers or turn them on the lathe. You can purchase drivers from the source listed in the Cutting List or turn them yourself on the lathe. If you decide to turn them yourself, turn the drivers to the dimensions shown in the *Driver Detail.* Sand the drivers while still on the lathe. When the drivers are turned and sanded, turn off the lathe, remove the drivers, cut off the tail stock with a backsaw, and sand the ends smooth.

If you are new to turning and want to give it a try, a good reference guide is *Creative Woodturning* by Dale L. Nish.

7 Drill the holes for the drivers in the chassis. If you turned the drivers to the specifications given, drill holes for your drivers in the chassis, as shown in the *Gentleman's Roadster, Side View* and *Race About, Side View.*

If you purchased the drivers from the source listed, drill a ⅞-inch-diameter hole, instead of the ½-inch-diameter hole indicated.

If you want to fasten the drivers to the chassis, simply glue them in place.

8 Sand and finish the chassis and drivers. Finish sand the chassis and drivers and remove any excess glue from the surface of the wood. As you sand, slightly round-over any sharp edges.

Give the chassis a coat of varnish and let the wood grain show through or paint them with stripes and racing numbers.

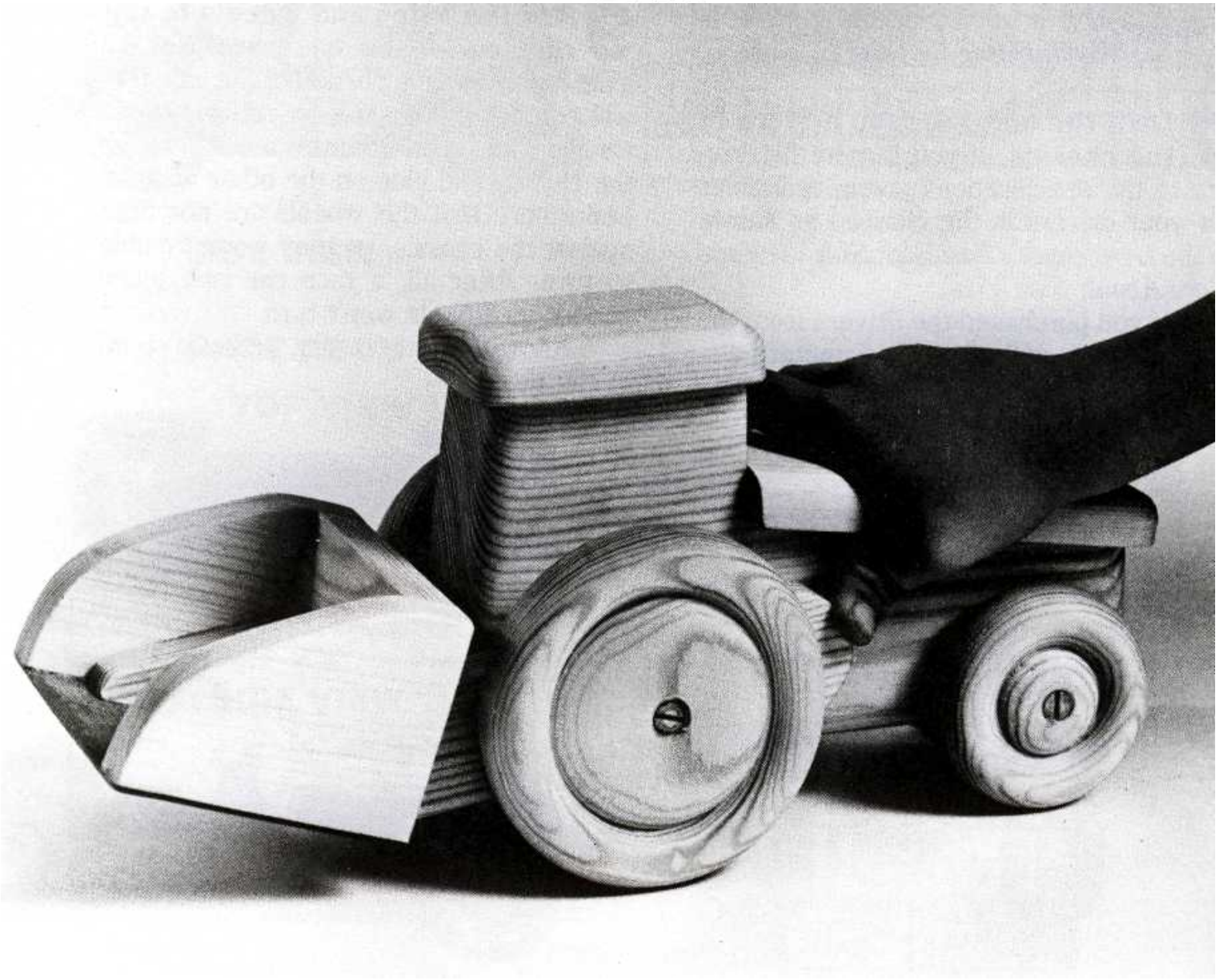
Allow the finish to dry.

9 Add the axles and wheels to the race cars. Glue one wheel to each axle. Lubricate the portion of the axle that will contact the chassis by rubbing some candle wax on it. Put the axles through the chassis and glue on the other wheels. Make sure that the wheels are not tight against the chassis, or they won't be able to turn. After all, a race car isn't much good if its wheels won't turn.

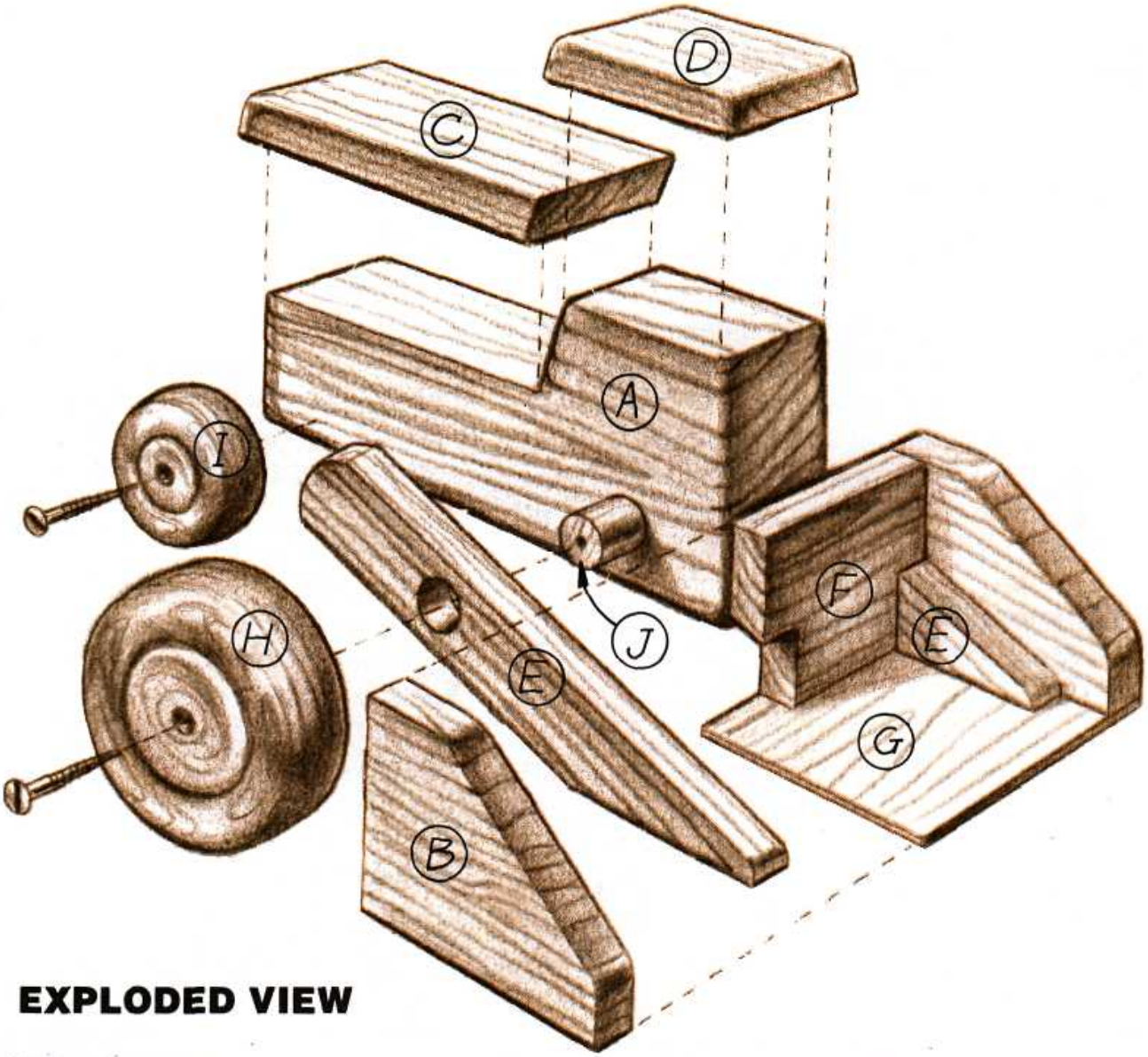
Allow the glue to dry, and you're off to the races.

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FRONT-END LOADER



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EXPLODED VIEW

CUTTING LIST

Part	Quantity	Dimension	Comment
A. Body	1	1¾″ × 3¾″ × 7½″	
B. Bucket sides	2	⅝″ × 2⅝″ × 3⅛″	
C. Engine cover	1	⅝″ × 2¼″ × 4¾″	
D. Cab roof	1	⅝″ × 2¼″ × 3⅛″	
E. Bucket arms	2	⅝″ × 1⅜″ × 7⅛″	
F. Bucket back	1	⅝″ × 2⅝″ × 3 1⁄16″	
G. Bucket bottom	1	1⁄16″ × 3⅛″ × 4 5⁄16″	Plastic laminate
H. Front wheels	2	1″ × 3⅜″ dia.	
I. Rear wheels	2	⅞″ × 2⅜″ dia.	
J. Axle	1	¾″ dia. × 3 1⁄16″	

Hardware

4 #12 × 1½-in. flathead wood screws
As needed, 4d finishing nails

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1 Select the stock and cut the parts. The loader can be made of softwood, as shown in the photo, or hardwood—perhaps making different parts with hardwood scraps of different colors. For durability, the bottom of the bucket is made of a plastic laminate. If you don't have a scrap laying around, substitute ⅛-inch tempered hardboard. Joint, plane, rip, and cut all the parts except the wheels to the sizes given in the Cutting List.

SHOP TIP: When you're making a project with lots of small parts, do as much work as possible on larger pieces of stock, then cut the smaller ones from it. On this project, cut all the ⅝-inch-thick parts for the loader from a single board 3 × 36 inches. Planing one long board to correct thickness is easier—and safer—than planing lots of short pieces.

2 Shape the body and bucket sides. Draw a ¼-inch grid on a piece of paper and draw the *Body Detail* and *Bucket Side Detail* onto it. Transfer the patterns to the stock and cut the parts to shape on a band saw.

3 Bore the hole for the axle. Lay out and drill a 13/16-inch-diameter axle hole in the body, as shown in the *Body Detail.* Put a flat piece of scrap under the stock you are drilling. As the drill comes through the stock, the piece of scrap will support the edges of the hole and prevent it from splintering.

4 Bevel the engine cover. Bevel the end of the engine cover to fit against the back of the cab. Set your table saw blade to 13 degrees and guide the cut with the miter gauge set at 90 degrees. Test fit the engine cover to the body and adjust the bevel if necessary.

5 Round-over the edges of the body, cab roof, and engine cover. Put a ¼-inch roundover bit in your router. Secure the router in a router table and rout the appropriate edges of the body, cab roof, and engine cover. Edges to be routed are shown in the *Side View* and *Bottom View.*

6 Assemble the chassis. Glue the cab roof and engine cover to the body. Clamp them securely and allow the glue to dry.

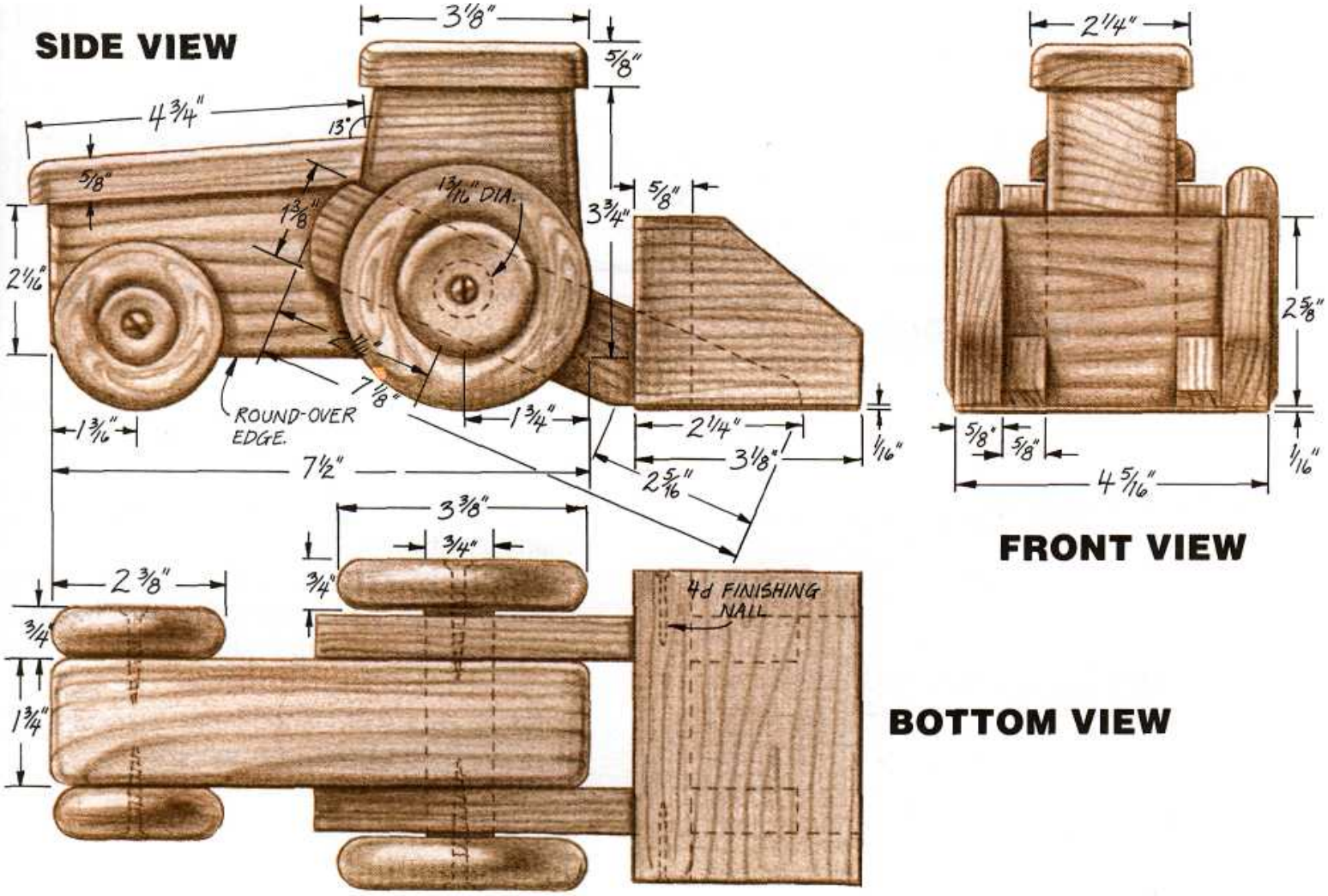
Sand and finish the chassis.

SHOP TIP: Pieces assembled with glue only often slip around when you use clamps. To prevent this, position the pieces exactly, drive thin brads into the body, and clip them off ⅛ inch or so above the surface. Press the mating surface onto the brads with clamps: The brads keep the parts from slipping.

7 Make the bucket arms. Lay out and drill 13/16-inch axle holes in the bucket arms. Then lay out and cut the angle on the end of the arms with the band saw, as shown in the *Side View.* Cut the radius shown in the opposite end on the band saw and sand any saw marks or roughness smooth.

8 Cut the bucket arm notches. The bucket arms run through the bucket back. Lay out and notch the bucket back for the arms, as shown in the *Side View*

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and *Front View.* Note that the top of the notch is angled. It's quicker to cut the notch with a backsaw or dovetail saw than to set up a machine to cut them. Make sure both notches are the same size and angle.

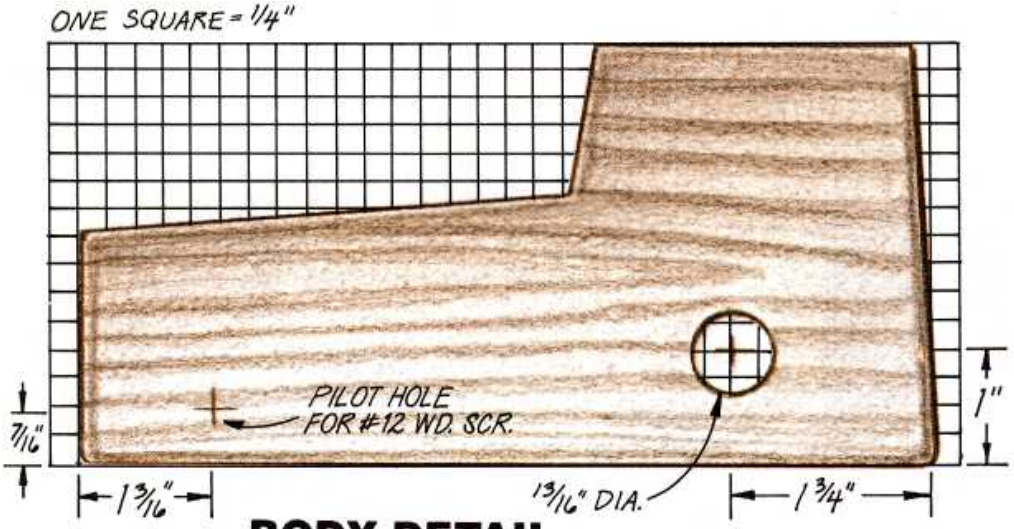
9 Assemble the bucket. Glue and clamp the bucket sides, back, and bottom together. For wood-to-wood joints, white or yellow glue is fine, but epoxy the bottom of the bucket in place if you are using plastic laminate.

When the glue has dried, slip the bucket arms into the notches in the bucket back. If there's any difference between the notches, you'll notice it now. Remove the bucket and trim the notches with a chisel until they fit correctly. Then apply glue to the mating surfaces of the arm and bucket and clamp them together. Secure the sides and back to the bucket arms by driving 4d finishing nails through the sides and bucket arms and into the back. Sand and finish the bucket.

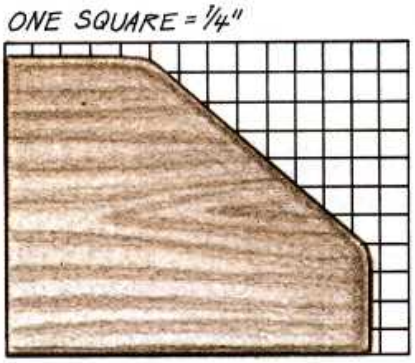
10 Make the wheels. If you have a lathe, you can turn the wheels. Mount band-sawn blanks onto a small faceplate and shape them as indicated in the *Cross Section through Wheels.*

The wheels are attached to the body by #12 × 1½-inch flathead wood screws. Drill ¼-inch axle screw holes in the center of each of the wheels and countersink the holes.

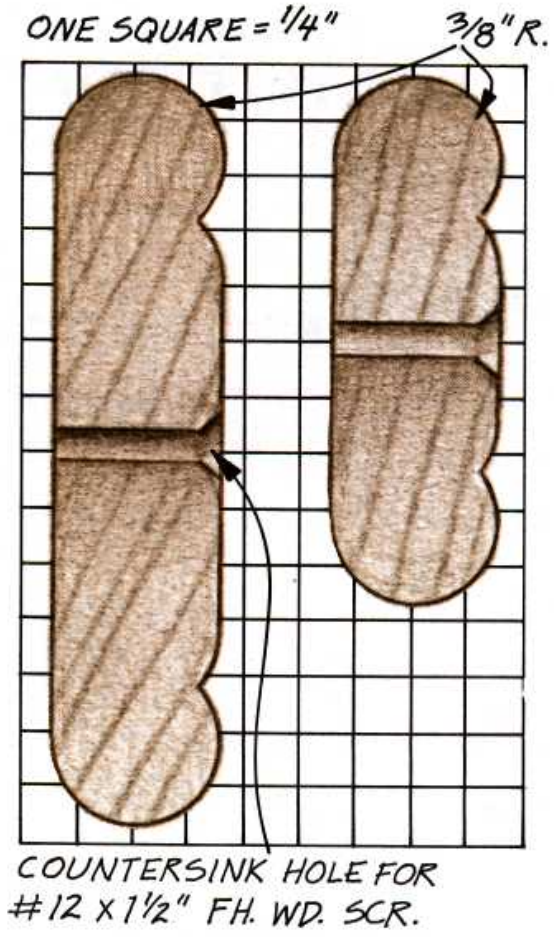
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BODY DETAIL



BUCKET SIDE DETAIL



CROSS SECTION THROUGH WHEELS

If you don't have a lathe, consider buying a wheel and circle cutter for your drill press. This special cutter can cut wheels from 1 to 6 inches in diameter. Wheel and circle cutters are available from Woodcraft, 210 Wood County Industrial Park, P.O. Box 1686, Parkersburg, WV 26102. You can also find these cutters in many hardware stores.

Still another option is to purchase wooden wheels from a craft store, but the dimensions may differ slightly. If you do purchase the wheels, adjust the dimensions of your front-end loader accordingly.

Sand and finish the wheels.

11 Assemble the front-end loader. First, drill 9/64-inch-diameter pilot holes for the axle screws. Drill a pilot hole for the front wheels centered on each end of the axle. Drill a hole for the rear wheels in each side of the body, as shown in the *Body Detail.*

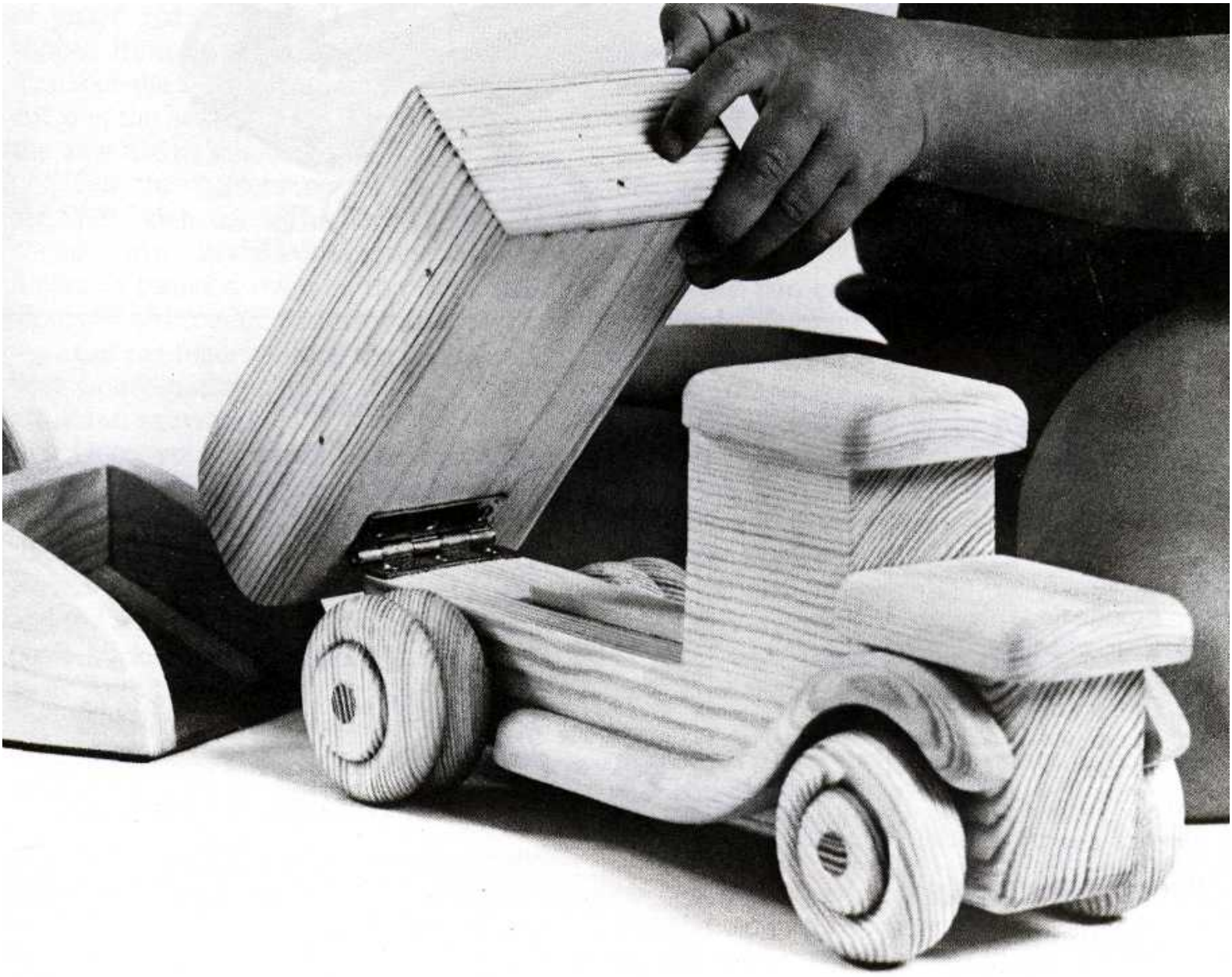
Next, wax the axle with paste wax and screw one of the front wheels securely to it. Then, put the bucket arms in place on either side of the body and slide the axle through the bucket arms and body. Screw the remaining front wheel to the axle.

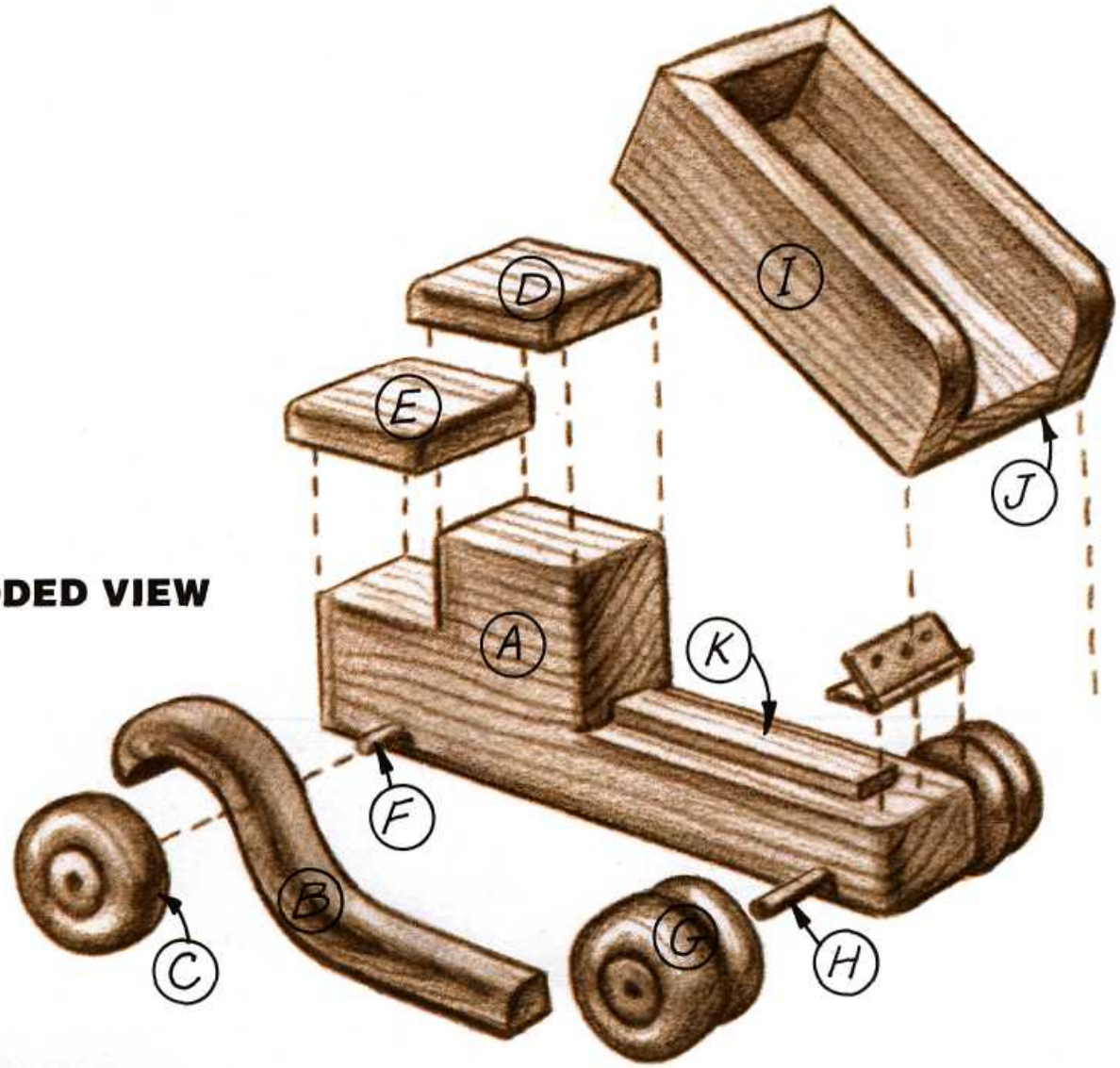
When the front wheels, axle, and bucket are in place, screw the back wheels to the sides of the body. Don't drive these screws in all the way. The back wheels must rotate freely on the screws.

Do any necessary touch up sanding and finishing.

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DUMP TRUCK





EXPLODED VIEW

CUTTING LIST

Part	Quantity	Dimension	Comment
A. Body	1	1¾" × 3¾" × 9¾"	
B. Fenders	2	⅝" × 5" × 6¾"	
C. Front wheels*	2	¾" × 2" dia.	
D. Cap	1	⅝" × 2¼" × 2⅝"	
E. Hood	1	⅝" × 2¼" × 2½"	
F. Front axle	1	⅜" dia. × 3⅜"	
G. Rear wheels*	4	½" × 2" dia.	
H. Rear axle	1	⅜" dia. × 3⅞"	
I. Dump sides/back	1	⅜" × 1¾" × 16"	Makes 3 pieces; miter to fit.
J. Dump bed	1	⅝" × 2¾" × 5¾"	
K. Spacer	1	½" × ¾" × 4"	Rip to thickness of closed hinge.

*Wheels are available from Cherry Tree Toys, Inc., P.O. Box 369, Belmont, OH 43718. Part #14 for front wheels and part #28 for rear wheels.

Hardware

1 1½-in. butt hinge

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1 Select the stock and cut the parts. The dump truck shown here is made of pine, but you can make yours from any wood you have on hand. Choose straight, flat stock. Joint, plane, rip, and cut all of the parts, except the spacer, to the sizes given in the Cutting List. You may need to glue a couple of pieces together for the body. Purchase the wheels from the source given in the Cutting List.

2 Cut the body and fenders to shape. Draw a ¼-inch grid on a piece of paper and draw the body and fender shapes from the *Cutting Pattern* onto it. Transfer the body pattern to the wood and cut out the body on the band saw. Sand the saw marks smooth.

Cut the fenders next. The fenders are not identical: The left fender is rounded over on the left side and the right fender is rounded over on the right side. Transfer the fender pattern to the stock.

Cut the fenders along the line marked "cut first" in the *Cutting Pattern.* Sand away the saw marks.

Once you've sanded the first cuts, round-over the appropriate edge. Put a ½-inch roundover bit in your router. Secure the router in a router table. Remember: Round-over the left edge of the left fender and the right edge of the right fender. Use push sticks and keep your fingers well away from the cutter.

When you've rounded-over the fenders, cut along the bottom of the fenders and sand away any saw marks.

3 Drill the axle holes in the body. Drill 7/16-inch axle holes in the body, as shown in the *Cutting Pattern.* These holes go all the way through the body.

When drilling a hole completely through a piece of wood, the wood often splinters where the bit exits the stock. To prevent this from happening, put a flat piece of scrap under the stock you are drilling. As the drill comes through the stock, the piece of scrap will support the edges of the hole and prevent it from splintering.

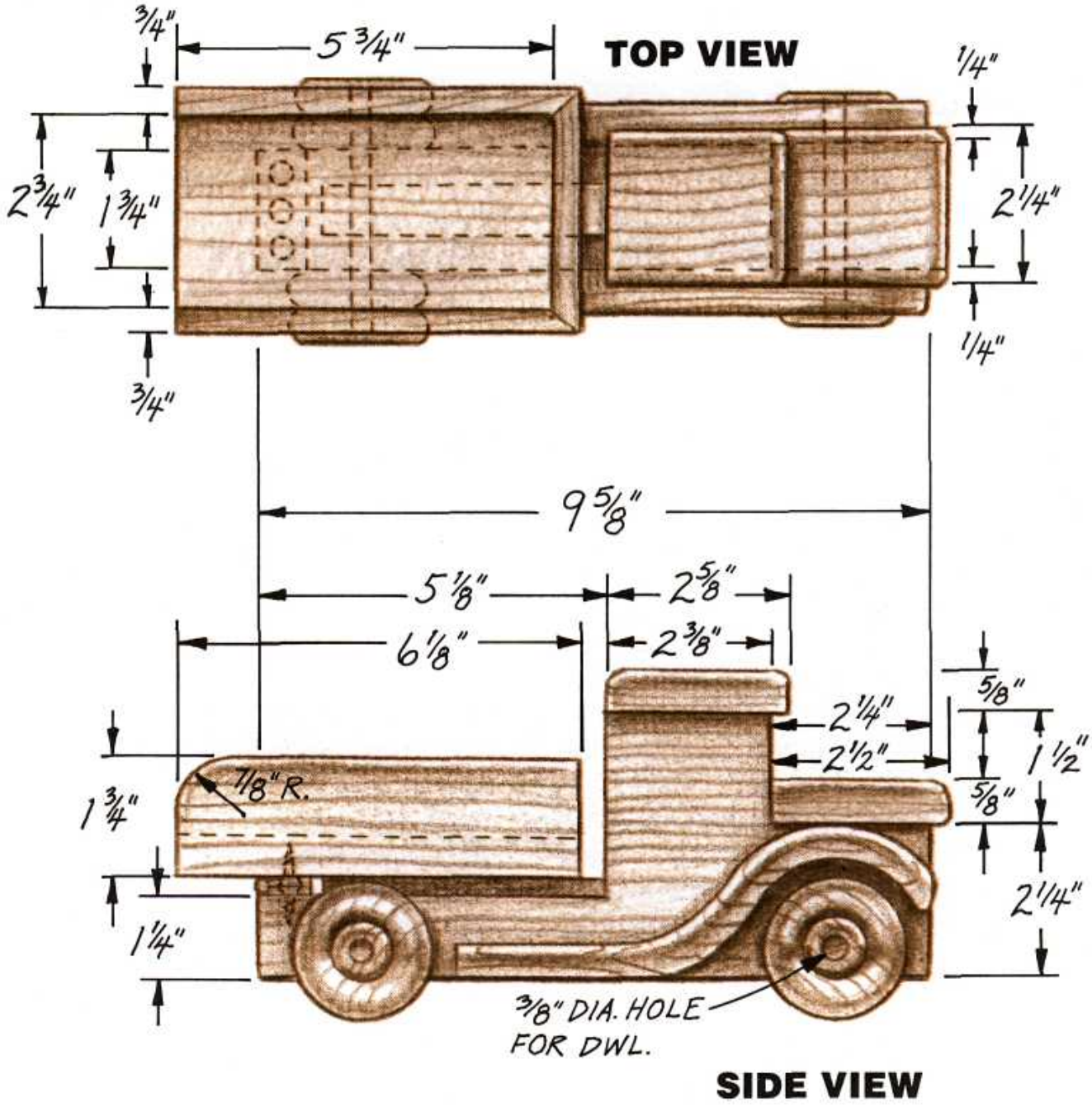
4 Glue the fenders in place. Lay the body of the dump truck on its side and set the front wheels in place. Set the appropriate completed fender in place and make sure that it doesn't interfere with the wheel. Mark the fender's position. Spread some glue on the fender's inside edge, put it on the body, and clamp it in place with rubber bands. When the glue is dry, repeat the process with the second fender.

5 Glue the cap and hood to the body. To round-over the edges of the cap and hood, put a ½-inch roundover bit in your router. Secure the router in a router table. Round-over all the top edges of the cap, but only the front and sides of the hood. Use push sticks and keep your fingers away from the cutter.

Spread glue on the bottom of the cap and hood and position them as shown in the *Top View* and *Side View.* Clamp them in place with some strong rubber bands and allow the glue to dry.

6 Attach the axles and wheels to the body. Glue one ¾-inch-wide wheel to the front axle. Lubricate the portion of the axle that will contact the body by rubbing some candle wax against it. Put the axles through the body and glue on the other ¾-inch-wide wheel. Make sure that the wheels are not tight against

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the body, or they won't turn.

Glue two of the ½-inch-wide wheels side by side on one end of the back axle, as shown in the *Top View.* Rub some candle wax on the axle and put the axle through the body. Glue the two remaining wheels to the axle and make sure that they can turn freely.

Allow the glue to dry.

7 Miter and shape the dump sides and back. Miter the dump sides and back to fit around the dump bed. Set the table saw blade to 45 degrees and guide the cuts with a miter gauge set at 90 degrees. Test fit the dump sides and back as you go.

To get accurate miters, check your mitering setup on some pieces of scrap. Put the miters together and make sure that the resulting angle equals 90 degrees. Adjust the blade as necessary.

Round the corners of back ends of the sides to approximate the shape shown in the *Side View.* Round the corners with

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a band saw or jigsaw and sand the saw marks smooth.

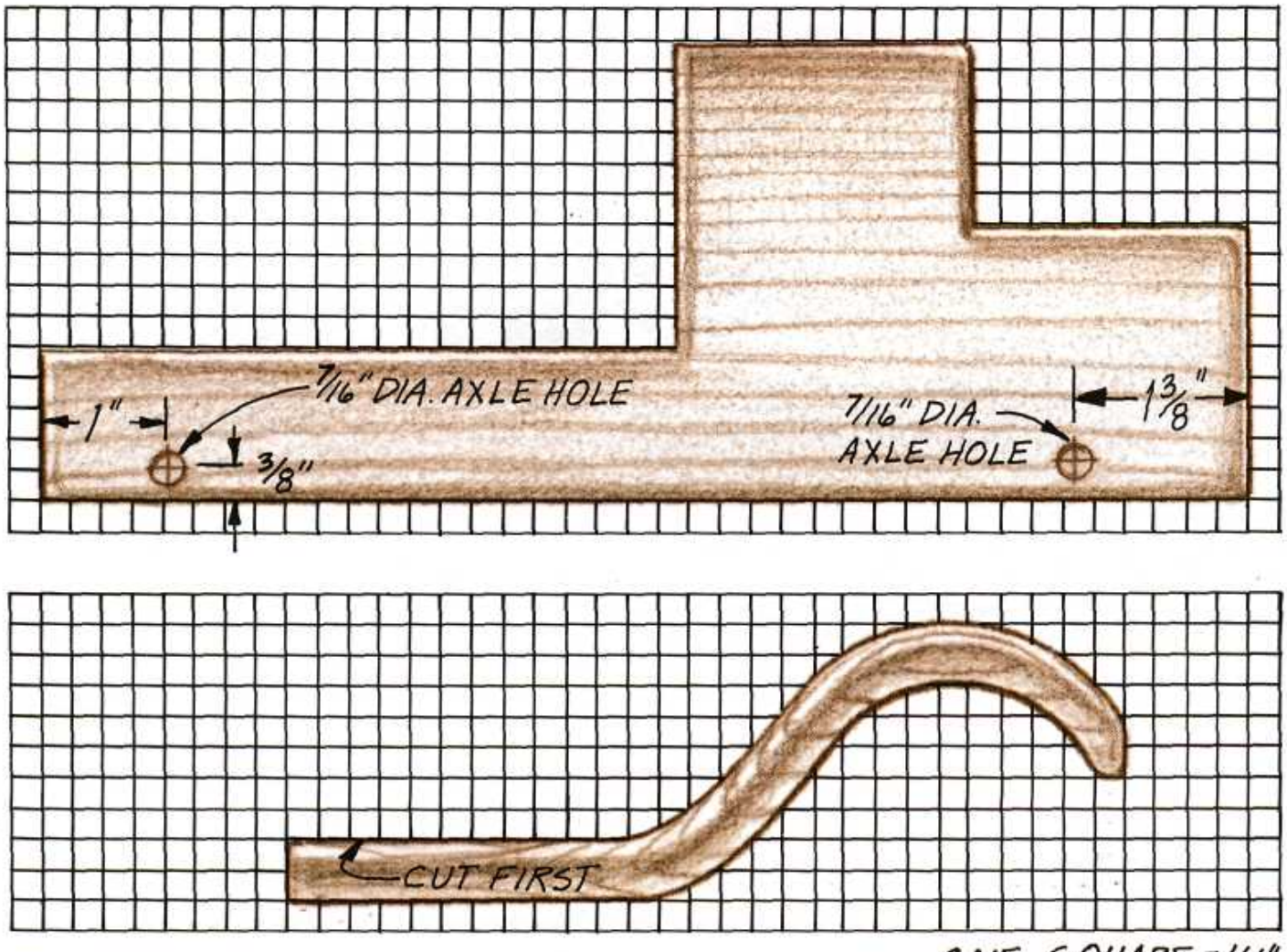
8 Measure, rip, and attach the spacer to the body. A spacer, between the dump and the body, supports the dump. Immediately behind the spacer, the dump and body are hinged together. The thickness of the spacer depends on the thickness of the hinge. Measure the closed thickness of the hinge and rip the spacer to this measurement on a table saw. Glue the spacer in place on the body, as shown in the *Top View.*

9 Hinge the dump to the body. Position the hinge, as shown in the *Top View,* and screw it in place.

10 Apply the finish. Finish sand all of the exposed surfaces of the dump truck.

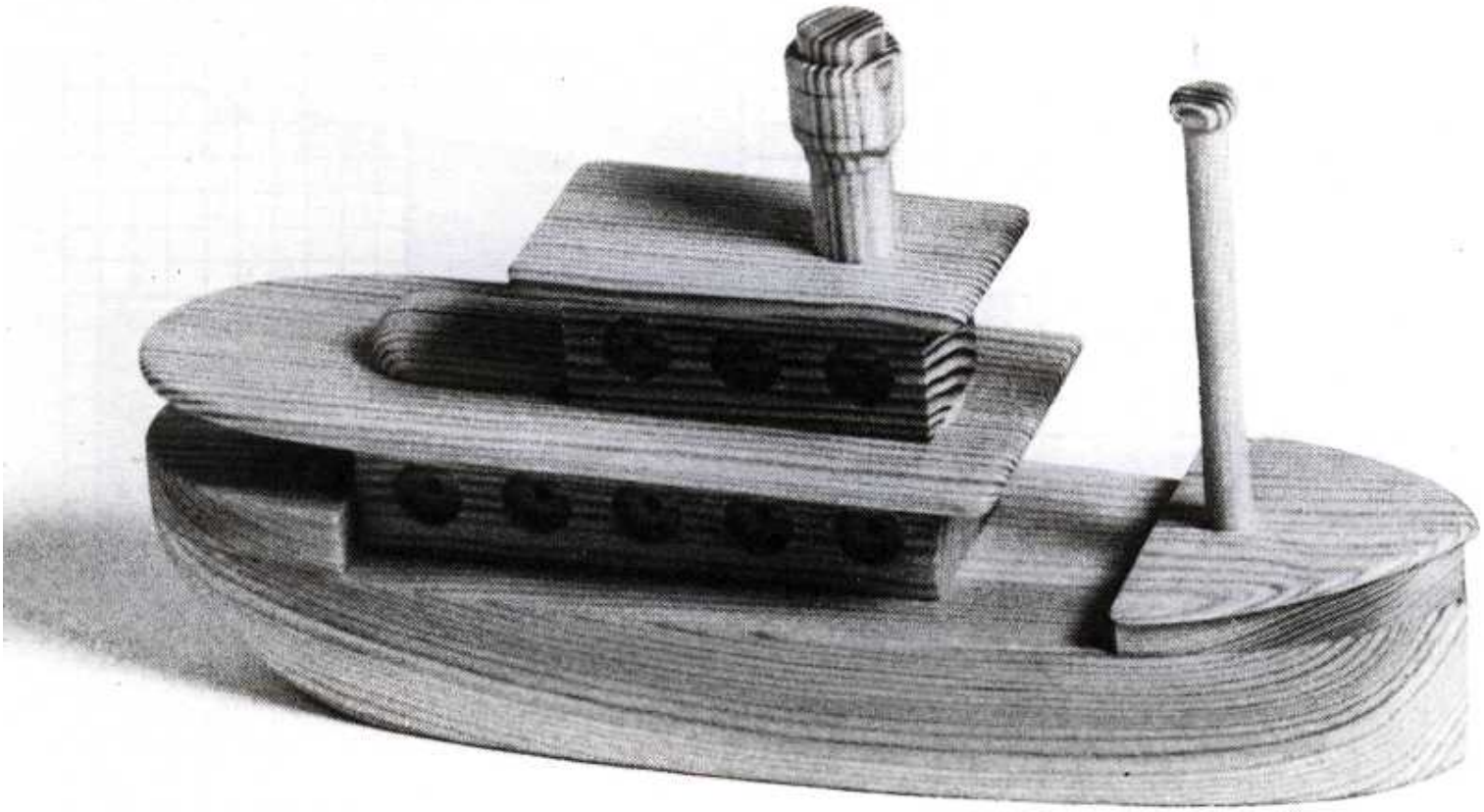
When the dump truck has been sanded, you can give the truck a coat of varnish like the dump truck shown. You could also paint your truck and add details like headlights, windows, and a company logo.

CUTTING PATTERN

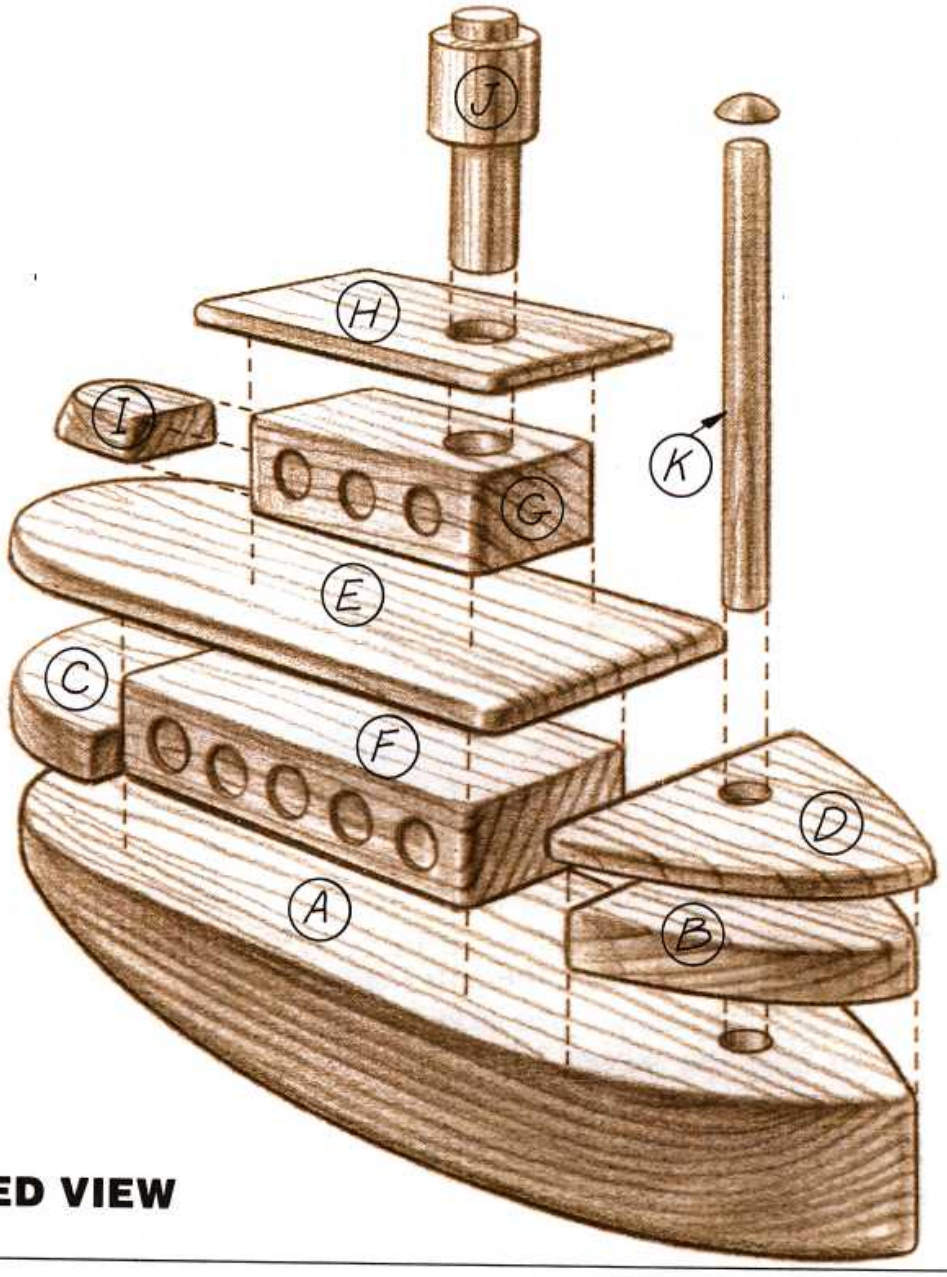


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PLEASURE BOAT



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EXPLODED VIEW

CUTTING LIST

Part	Quantity	Dimension	Comment
A. Hull	1	1 9/16″ × 3½″ × 11½″	
B. Foredeck	1	⅝″ × 3″ × 2½″	
C. Aft deck	1	⅝″ × 2¾″ × 2″	
D. Foredeck cap	1	3/16″ × 3¼″ × 2¾″	Cut to shape and length.
E. Top deck	1	3/16″ × 3½″ × 7⅜″	
F. Cabin	1	1⅛″ × 2⅛″ × 5″	
G. Wheelhouse	1	1⅛″ × 1¾″ × 3¼″	
H. Wheelhouse roof	1	3/16″ × 2⅛″ × 3¾″	
I. Ventilator cap	1	½″ × 1″ × 5″	Cut to length after shaping.
J. Smokestack*	1	⅞″ dia. × 3″	Cut to length after turning.
K. Mast*	1	½″ dia. × 5″	Cut to length after turning.

*Similar parts are available from Cherry Tree Toys, P.O. Box 369, Belmont, OH 43718. Specify smokestack #6 and headlamp #54 for top of mast.

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1 Select the stock and cut the parts. Joint, plane, rip, and cut the parts to the sizes given in the Cutting List. It's safest to work with boards that are at least 15 inches long, particularly as you joint and plane the stock.

Cut small pieces like these on the band saw: You can rip them to width without danger of the saw kicking the piece back at you.

2 Make a pattern for the hull. Draw a ½-inch grid on a piece of paper and draw the hull shape onto it, as shown in the *Top View.* Transfer the pattern to what will be the *bottom* of the boat.

3 Attach the foredeck and aft deck. It's easier to glue these parts together before you've sawn them to shape. If you don't have clamps, use large rubber bands to hold the pieces while the glue dries. If you're planning to sail the boat, use a waterproof glue, like resorcinol.

4 Shape the assembled hull. Draw a ½-inch grid on a piece of paper and draw the stern profile onto it, as shown on the *Side View.* Transfer the stern profile to the hull and cut out the shape. Flip the boat upside down on the band saw and cut along the layout lines you drew there earlier. Remove the saw marks and finish shaping with files and sandpaper.

5 Make the foredeck cap. Position the straight back edge of the cap so it overhangs the foredeck by ⅛ inch. Then trace the shape of the foredeck onto the cap. Hold the side of the pencil flat against the hull and foredeck as you trace. The thickness of the pencil automatically creates the overhang of the cap. Cut to the line on the band saw. Sand to remove any saw marks and glue the cap in place.

6 Make the top deck. Trace around the hull to establish the shape of the top deck. The top deck does not overhang the hull: Draw the deck so that it is the same size as the section of hull below it. Cut to shape as before.

7 Make the portholes. Mark the centerlines for the portholes on the cabin and wheelhouse, as shown in the *Side View.* Bore holes ⅛ inch deep with a ⅝-inch bit.

8 Assemble the superstructure. Glue the cabin, top deck, wheelhouse, and wheelhouse roof in place on the hull. Note that they're all centered across the hull's width.

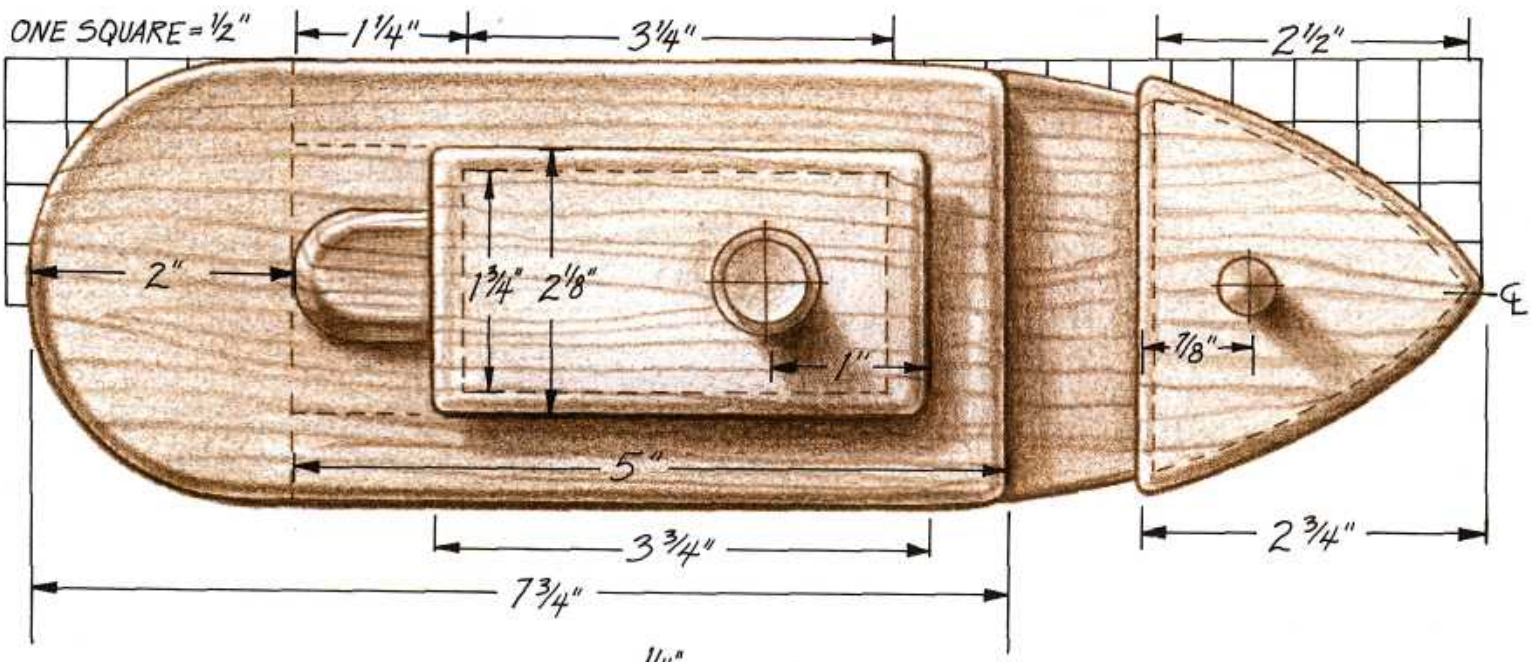
9 Make the ventilator cap. To rout the roundover on both long edges of the ventilator cap stock, put a ½-inch roundover bit in your router. Secure the router in a router table and guide the stock against a fence. Round the end grain on one end to a ½-inch radius with a file and sandpaper. Cut to length. Glue the cap in place on the top deck.

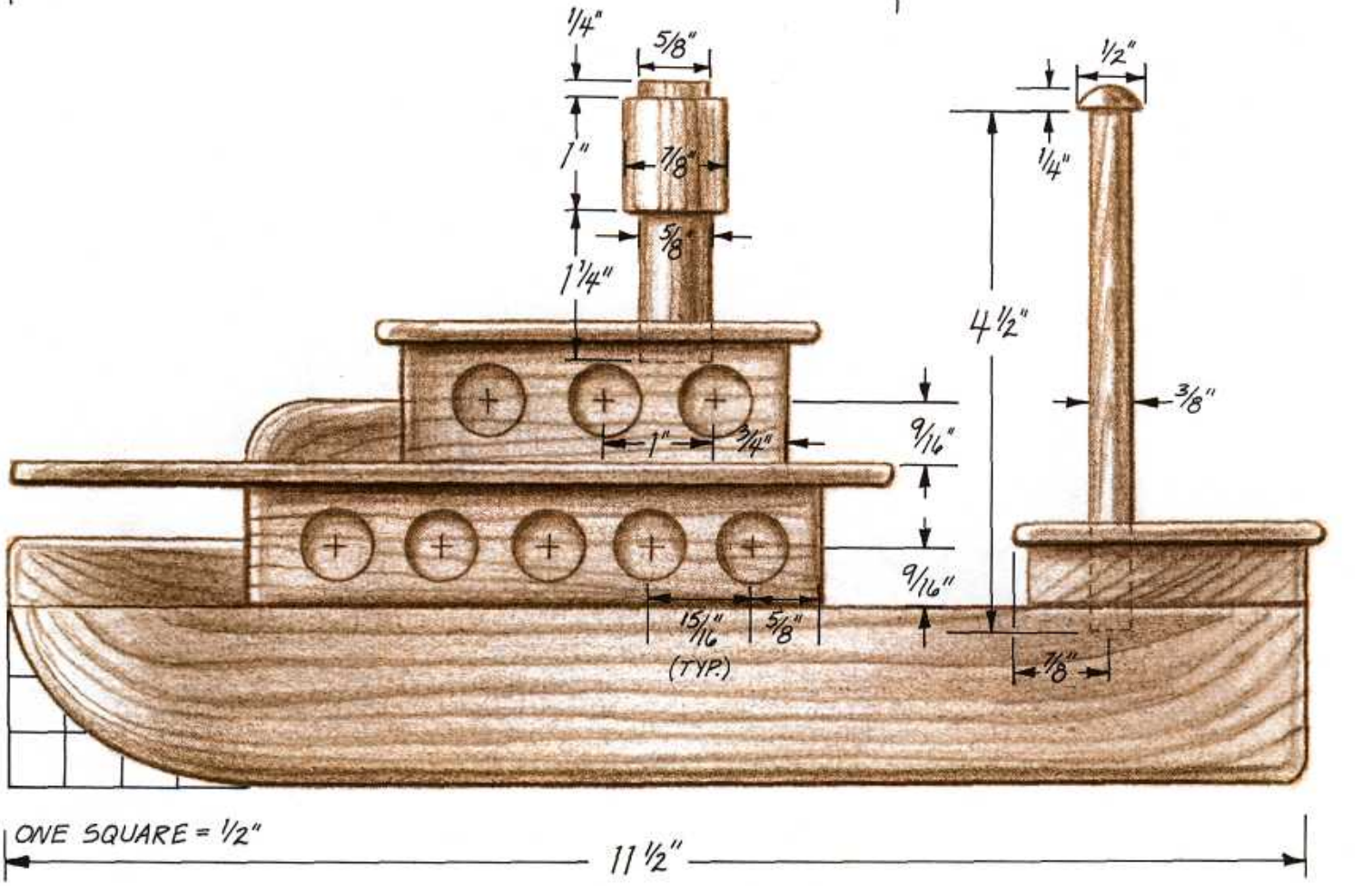
10 Add the smokestack and mast. Turn the mast and smokestack to the profile shown. If you don't have a lathe, substitute a similar chimney, available from the source listed in the Cutting List. To make the mast, epoxy a wooden headlamp, available from the same source, on top of a dowel.

11 Add the finishing touches. Clean off any excess glue with a sharp chisel. Round-over any sharp edges of the boat with sandpaper. You can paint the boat or seal it with a clear finish.

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TOP VIEW



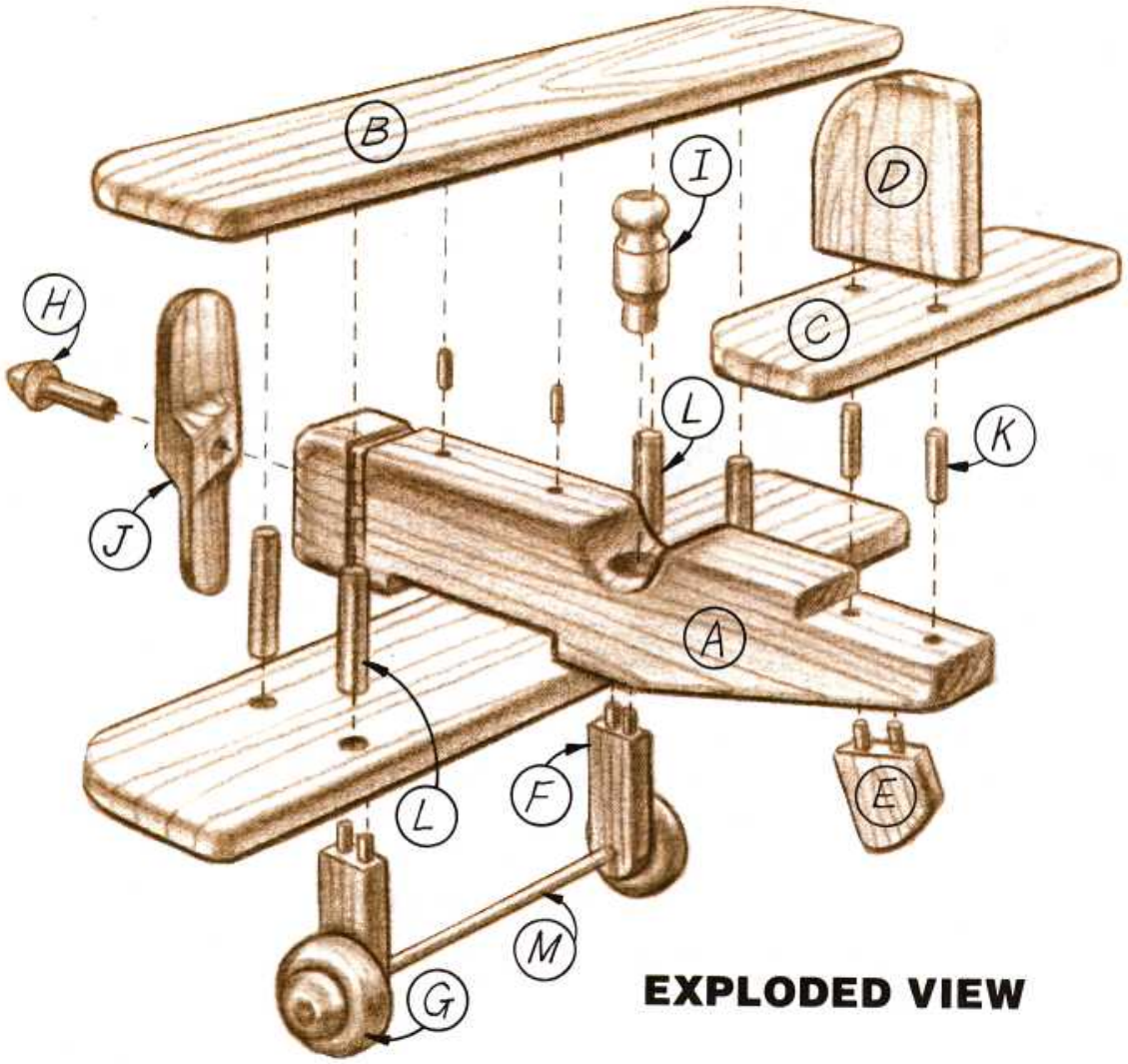


SIDE VIEW

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BIPLANE





EXPLODED VIEW

CUTTING LIST

Part	Quantity	Dimension	Comment
A. Fuselage	1	1⅜″ × 2¾″ × 13½″	
B. Wings	2	9/16″ × 3¾″ × 15″	
C. Tail wing	1	9/16″ × 2¾″ × 6″	
D. Tail fin	1	9/16″ × 2¾″ × 3¼″	
E. Tail support	1	9/16″ × 1½″ × 2″	
F. Axle supports	2	9/16″ × 1 5/16″ × 2⅞″	
G. Wheels*	2	¾″ × 2″ dia.	
H. Prop shaft*	1	1″ × 1″ × 3″	Cut to length after turning.
I. Pilot*	1	1″ × 1″ × 3″	Cut to length after turning.
J. Propeller	1	¾″ × 1 3/16″ × 6½″	
K. Dowel stock	1	¼″ × 12″	For dowel joints
L. Wing struts	4	½″ dia. × 2¾″	Dowel
M. Axle	1	½″ dia. × 7¾″	Dowel

*Available from Cherry Tree Toys, P.O. Box 369, Belmont, OH 43718. Specify person #22 for pilot, multiuse peg #53 for prop shaft, and part #16 for ¾-in.-thick × 2½-in.-dia. wheel (oak, cherry, or walnut).

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1 Select the stock and cut the parts. Choose straight, flat wood without knots. Joint, plane, rip, and cut the parts to the sizes given in the Cutting List.

2 Cut the fuselage, wings, tail wing, tail fin, and tail support to the shapes shown. Draw a ½-inch grid on a large piece of paper and draw the fuselage, wing, tail wing, tail fin, and tail support shapes on it, as shown in the *Cutting Pattern.* Transfer the shapes to the wood and cut the parts to shape with a band saw or jigsaw. Remember to make two wings that are the same shape.

To get two identical wings, cut both at once. First stack the wing stock together and secure by putting double-sided tape between them. Then cut both wings in one operation.

3 Cut the radius in the axle supports and drill the axle holes. Lay out and cut the radius shown in the *Side View* on the band saw or jigsaw. Mark and drill the axle holes.

4 Round the appropriate edges of the fuselage, wings, tail wing, tail fin, tail support, and axle supports. Put a ¼-inch roundover bit in your router. Secure the router in a router table and round all the edges that will be exposed when the plane is assembled. Do not round the sections of the parts that meet other parts. For example, don't round the bottom wing where it meets the fuselage.

Use a push stick when routing and keep your hands well away from the cutter. A pair of scratch awls makes excellent push sticks for small parts.

5 Rout the engine groove in the fuselage. Put a ⅜-inch-diameter round nose bit in your router. Secure the router in a router table and rout the engine groove shown. Guide the fuselage with a miter gauge set at 90 degrees and run the front of the fuselage against a fence to ensure a straight cut.

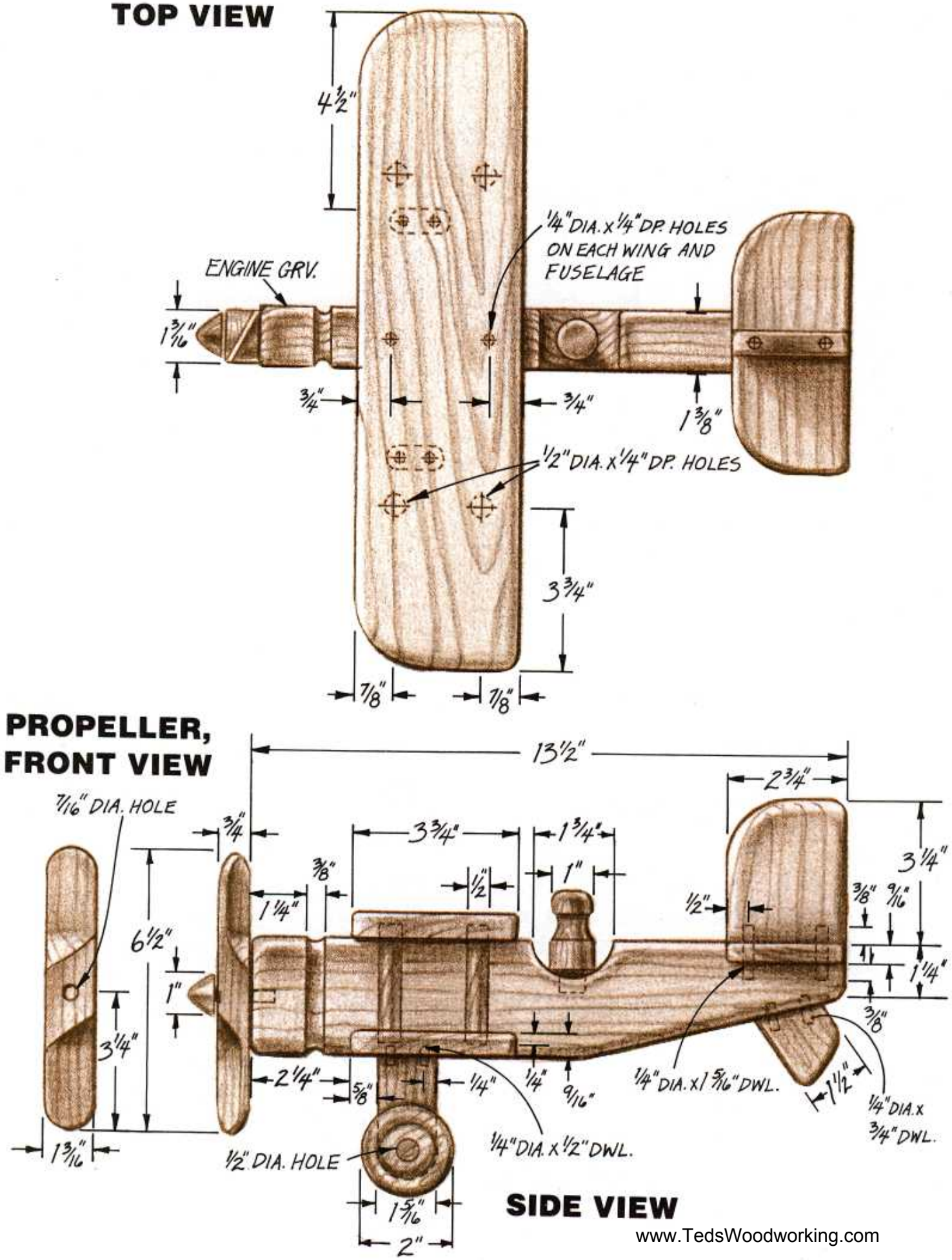
6 Drill the dowel holes in the parts. Set up a drill press to drill the dowel holes for attaching the wings, tail, tail fin, tail support, axle support, and pilot. Make sure that you drill the dowel holes and mortises to the depths shown. Only the tail wing's dowel holes are drilled completely through the piece.

Locate the exact position of matching dowel holes with commercially available dowel centers. For example, drill dowel holes in one of the axle supports, as shown in *Side View.* Put the dowel centers in the holes and position the axle supports on the bottom of the lower wing. Press the points of the dowel centers into the wing to mark the exact position of the matching dowel holes.

SHOP TIP: Substitute drywall screws for dowels for a simpler construction. Drill the holes with a combination pilot hole bit, available at most hardware stores. The bit will also drill a counterbore, which you can fill with a wooden plug. Glue the plug in place and sand it flush—it will be nearly invisible.

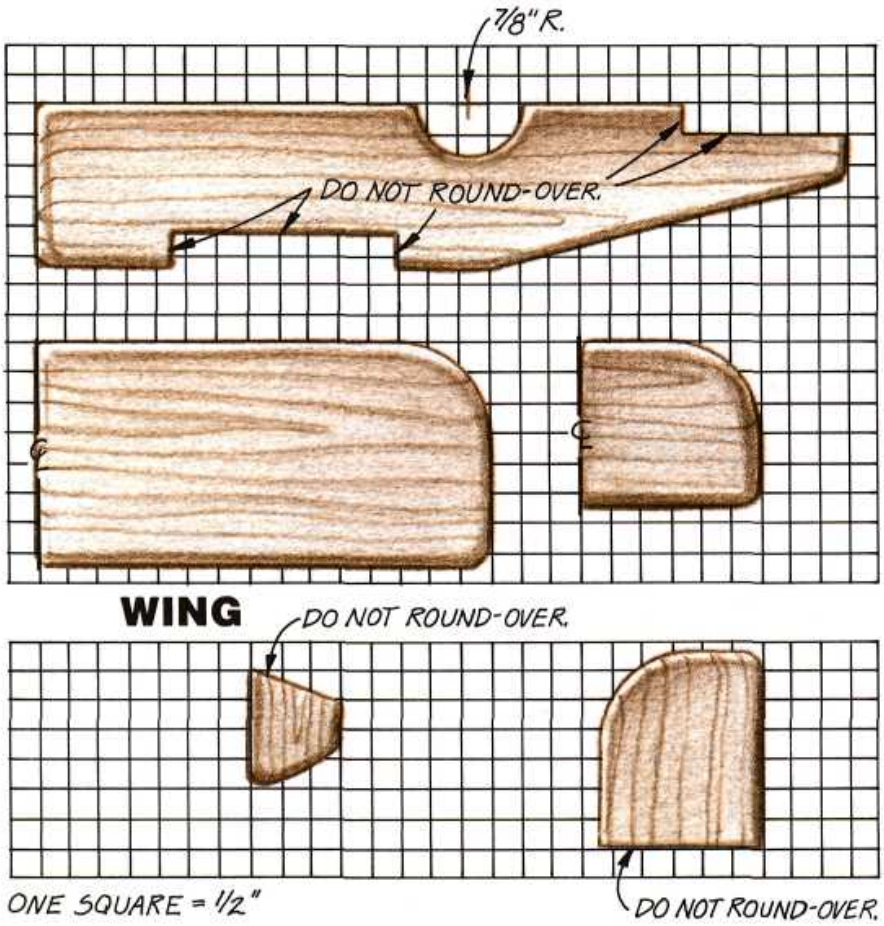
7 Drill the axle holes in the wheels. Most wooden wheels that you can buy will have no larger than a ⅜-inch-diameter axle hole. Drill out the holes in the wheels to a ½-inch diameter.

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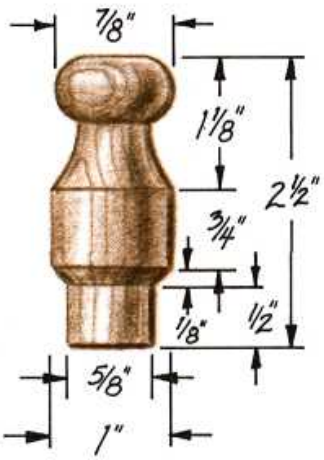


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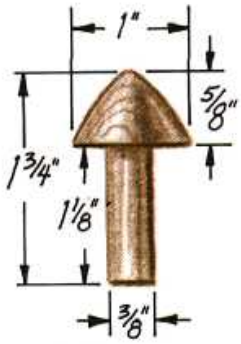
CUTTING PATTERN



PILOT LAYOUT



PROP SHAFT LAYOUT



TAIL SUPPORT

8 Turn the prop shaft and pilot. Set up the stock on a lathe, put on your safety glasses, and turn the parts to the shapes shown in the *Prop Shaft Layout* and *Pilot Layout*. When each part has been turned, sand it while it is still on the lathe. Turn off the lathe, saw off the waste with a backsaw, and sand the ends smooth and even.

If you're not an experienced turner, *Creative Woodturning* by Dale L. Nish is a good beginner's guide.

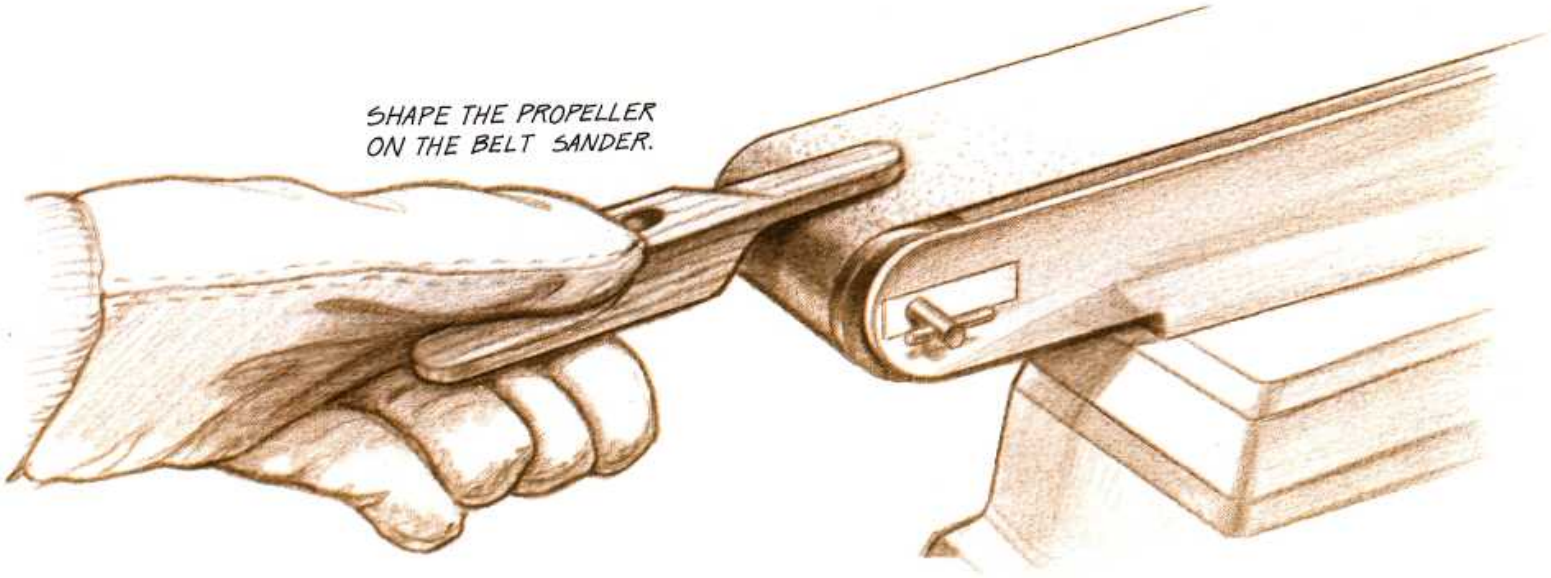
If you don't have access to a lathe, you can order similar parts from the source given in the Cutting List and adjust the size of the necessary holes accordingly.

9 Drill and shape the propeller. Mark and drill the prop shaft hole in the propeller shown in the *Propeller, Front View.*

Lay out and cut the radius on each end of the propeller with a band saw or jigsaw. Shape the blade angle on a stationary belt sander, as shown in the *Propeller Shaping Technique*. Put on some leather gloves to protect your hands. Then hold the propeller at a slight angle, as shown, and slowly sand away stock to form the blades.

Always wear safety glasses when working on the belt sander. The moving belt can grab a piece and throw it at you with surprising force.

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PROPELLER SHAPING TECHNIQUE

10 **Assemble the biplane.** Cut the different lengths of dowel required for the dowel joints. Test fit the biplane to make sure that it goes together well and make any necessary adjustments.

Assemble the wing to the fuselage first. Glue the dowels between the lower wing and the fuselage. Glue the wing struts in place, and then glue and dowel the upper wing above the wing struts and fuselage.

Next, glue the 1 5/16-inch-long dowels through the tail wing leaving equal amounts of the dowels exposed on each surface. Glue the tail fin above the tail wing and glue the entire assembly to the fuselage.

Glue and dowel the tail support below the tail and the axle supports below the wing.

Hold the parts together with small clamps and rubber bands. Wipe away any excess glue with a damp cloth.

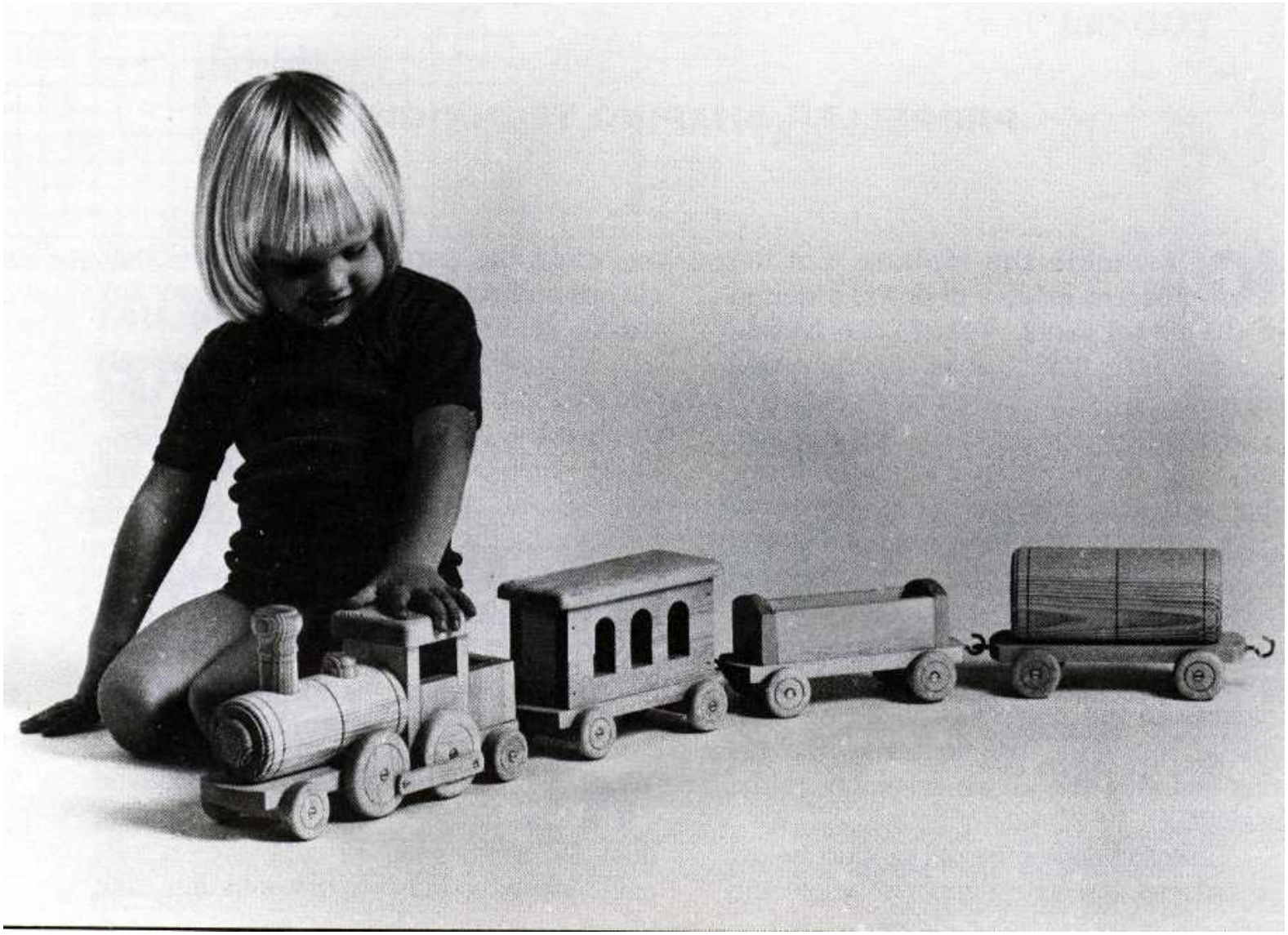
When the glue is dry, glue the wheels and axle in place. Then put the prop shaft through the propeller and glue it in place. Don't apply too much glue or it will squeeze out and the propeller will seize up, causing the biplane to crash in flames.

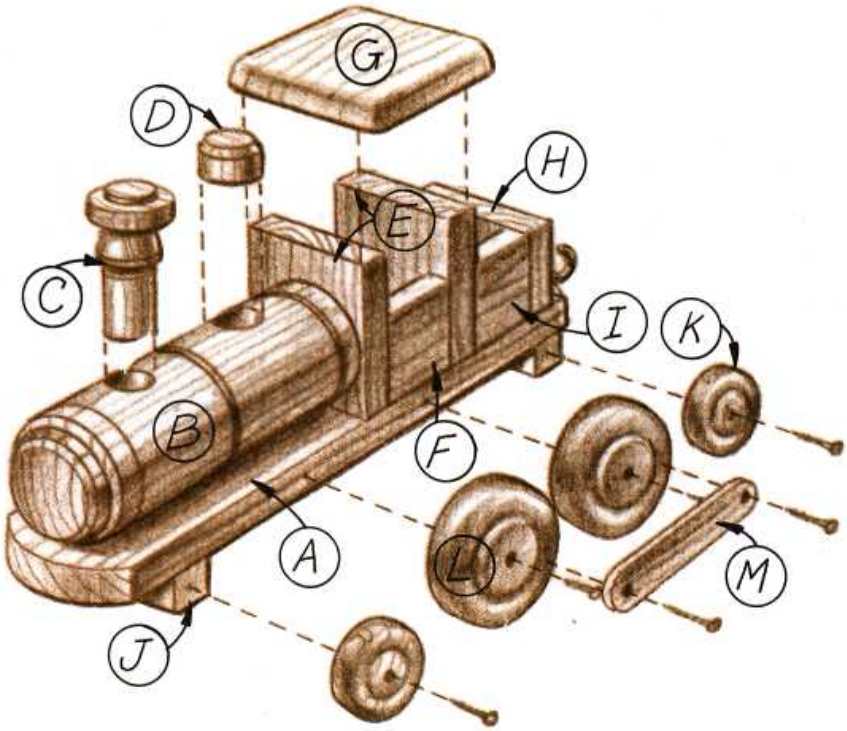
The last thing you need to add is the pilot—somebody has to drive. The pilot can either be glued in place or left removable.

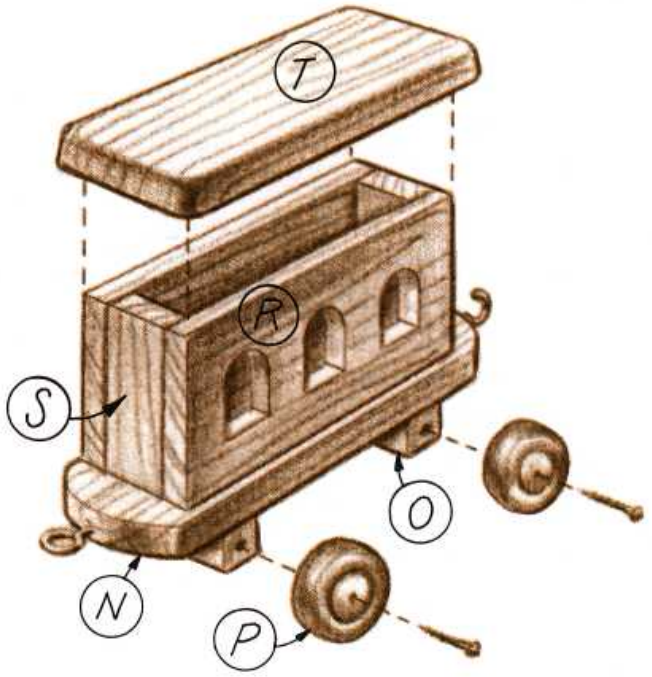
11 **Finish the biplane.** Finish sand the biplane. Wipe off the sanding dust and paint, stain, or apply a clear varnish. Allow the finish to dry, and then take off on an adventure.

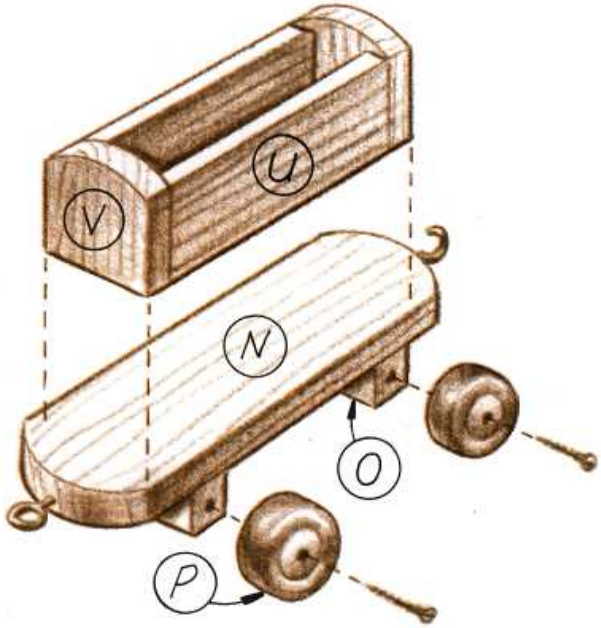
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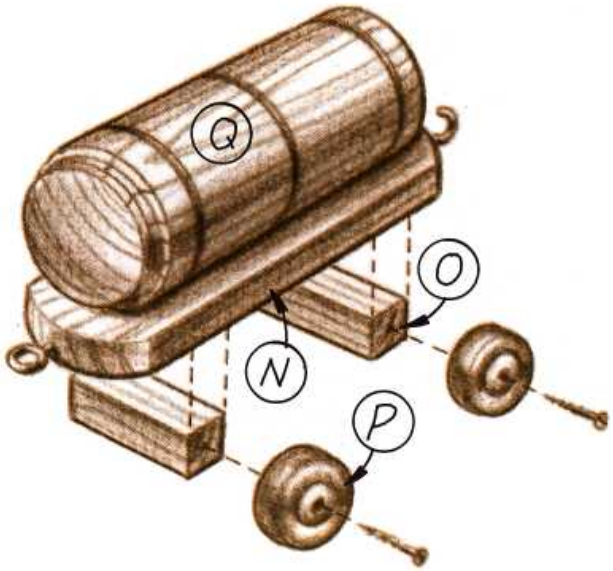
STEAM TRAIN











EXPLODED VIEW

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CUTTING LIST

Part	Quantity	Dimension	Comment
Engine			
A. Chassis	1	5/8" × 2¾" × 12¾"	
B. Boiler	1	2⅝" dia. × 8"	Cut to length after turning.
C. Smoke stack	1	1½" dia. × 3¾"	Cut to length after turning.
D. Steam dome	1	1¼" dia. × 2"	Cut to length after turning.
E. Cabin front/back	2	5/8" × 2¾" × 3⅜"	
F. Cabin sides	2	5/8" × 1¾" × 2"	
G. Cabin roof	1	¾" × 3¼" × 3½"	
H. Coal bin back	1	5/8" × 2¾" × 2"	
I. Coal bin sides	2	5/8" × 1¾" × 2"	
J. Axle beams	2	¾" × ¾" × 2⅞"	
K. Small wheels*	4	½" × 1½" dia.	
L. Large wheels*	4	½" × 2⅞" dia.	
M. Drive rod	2	⅛" × ½" × 3⅞"	
Car Chassis			
N. Chassis	3	5/8" × 2¾" × 8½"	
O. Axle beams	6	¾" × ¾" × 2⅞"	
P. Wheels*	12	½" × 1½" dia.	
Tank Car Body			
Q. Tank	1	3⅜" × 8"	Cut to length after turning.
Passenger Car Body			
R. Sides	2	5/8" × 3⅜" × 7"	
S. Ends	2	5/8" × 3⅜" × 1½"	
T. Roof	1	¾" × 3¼" × 7½"	
Gondola Car Body			
U. Sides	2	5/8" × 2" × 5¾"	
V. Ends	2	5/8" × 2¾" × 2¼"	

*Wheels are available from Woodcraft, 210 Wood County Industrial Park, P.O. Box 1686, Parkersburg, WV 26102. Part #50N21, 1½-in.-dia. wheels and part #50N51, 2⅞-in.-dia. wheels.

Hardware

16 #12 × 1¼-in. flathead wood screws
6 #8 × 1¼-in. flathead wood screws
4 #5 × ½-in. roundhead wood screws
As needed, 1¼-in. brads
4 sets ¾-in.-dia. hook screws and eyescrews

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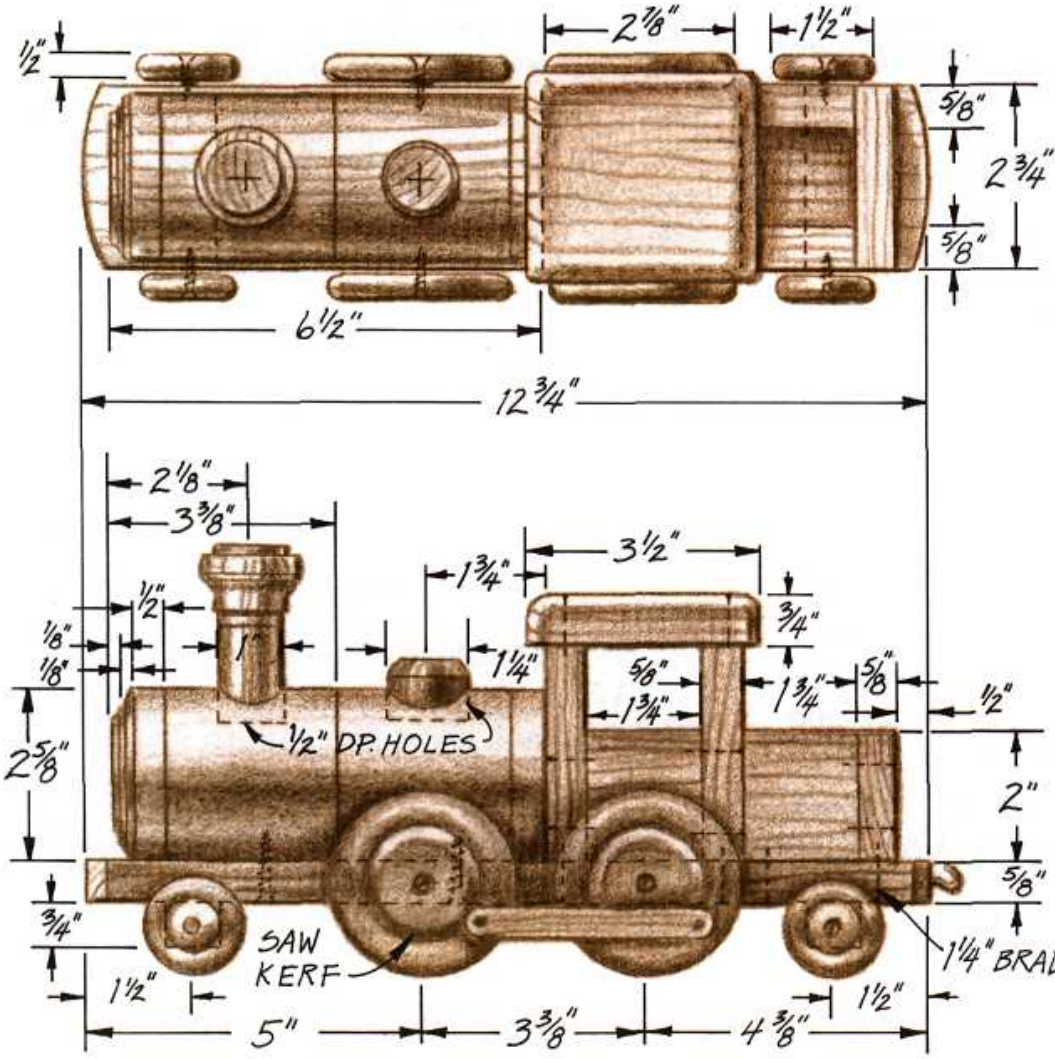
1 Select the stock and cut the parts. The steam train shown is made from pine, but almost any kind of wood will work fine. Choose straight, flat stock. You may find it necessary to glue together two or more pieces for the engine boiler and tank car's tank. Joint, plane, rip, and cut all the parts, except for the wheels, to the sizes given in the Cutting List.

2 Turn the boiler, smokestack, and steam dome for the engine and the tank for the tank car. Set up and turn the parts one by one on the lathe to the shapes shown in the *Smokestack Detail, Steam Dome Detail,* and *Tank Car with Chassis, Side View.* Sand the parts while they are still on the lathe. When the parts are thoroughly sanded, remove them from the lathe. Cut them to length and sand the ends smooth.

If you haven't done much turning, a good reference guide is *Creative Woodturning* by Dale L. Nish.

Next, make slight flat spots along the length of the boiler and tank by rubbing them back and forth over a piece of sandpaper. These flat areas allow you to attach the boiler and tank to their chassis. Sand away about ⅛ inch of wood on each.

3 Drill smokestack and steam dome holes in the boiler. Lay out the hole centers on the boiler, as shown in the *Engine, Top View.* Drill the ½-inch-deep holes, as shown in the *Engine, Side View.*



ENGINE, TOP VIEW

ENGINE, SIDE VIEW

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saw. First, put a ⅞-inch-diameter hole saw in a drill press and cut a 1/16-inch-deep kerf into the wheel stock, as shown. Then, put a 1⅝-inch-diameter hole saw in the drill press and cut completely through the stock to make the wheel. Repeat the process for each of the small wheels.

Most hole saws have ¼-inch pilot hole bits, and this pilot hole will serve as the axle hole in the wheels. Attach the wheels to the axle beams through this hole with #12 × 1¼-inch flathead wood screws. Chamfer the outside edges of the axle holes with a countersink bit to accept the screw heads. Drill a pilot hole in the exact center of the ends of each axle beam and screw the wheels in place. Remember, these are wheels, and wheels must be able to turn freely; so don't screw the wheels too tightly in place.

Wheels can also be purchased from the source given in the Cutting List. The purchased wheels will work fine, but they are ⅜ inch thick as opposed to ½ inch thick. Also, the purchased wheels have 1/8-inch axle holes, so adjust the hole size or axle screw size accordingly.

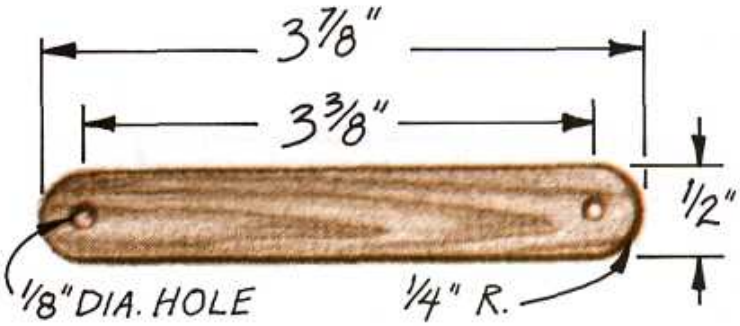
9 Attach the axle beams to the chassis. Position the axle beams under the engine and car chassis, as shown in the *Engine, Side View* and the *Chassis, Bottom View.* Attach them with glue and 1¼-inch brads.

10 Make or purchase the large wheels and attach them to the engine chassis. The large wheels can also be cut with hole saws. First, make the 1/16-inch-deep saw kerfs shown with a 1¾-inch-diameter hole saw. Then cut all the way through the stock with a 3-inch-diameter hole saw. As with the small wheels, chamfer the edges of the axle holes to accept the heads of the axle screws.

Lay out the position of the large wheels on the engine, as shown in the *Engine, Side View.* Make sure that the layout allows all the wheels to touch the ground. Make any necessary adjustments and drill the pilot holes. Screw the large wheels in place.

11 Attach the drive rods to the large wheels. The drive rod is held to the wheels with #5 × ½-inch roundhead wood screws. Drill pilot holes for these screws exactly ⅜ inch from the outside edge of the wheels, as shown in the *Engine, Side View.* Drill the screw clearance holes in the drive rod, as shown in the *Drive Rod Detail,* and screw the drive rod in place. Don't tighten the screws too much; the drive rod must be able to move freely.

DRIVE ROD DETAIL

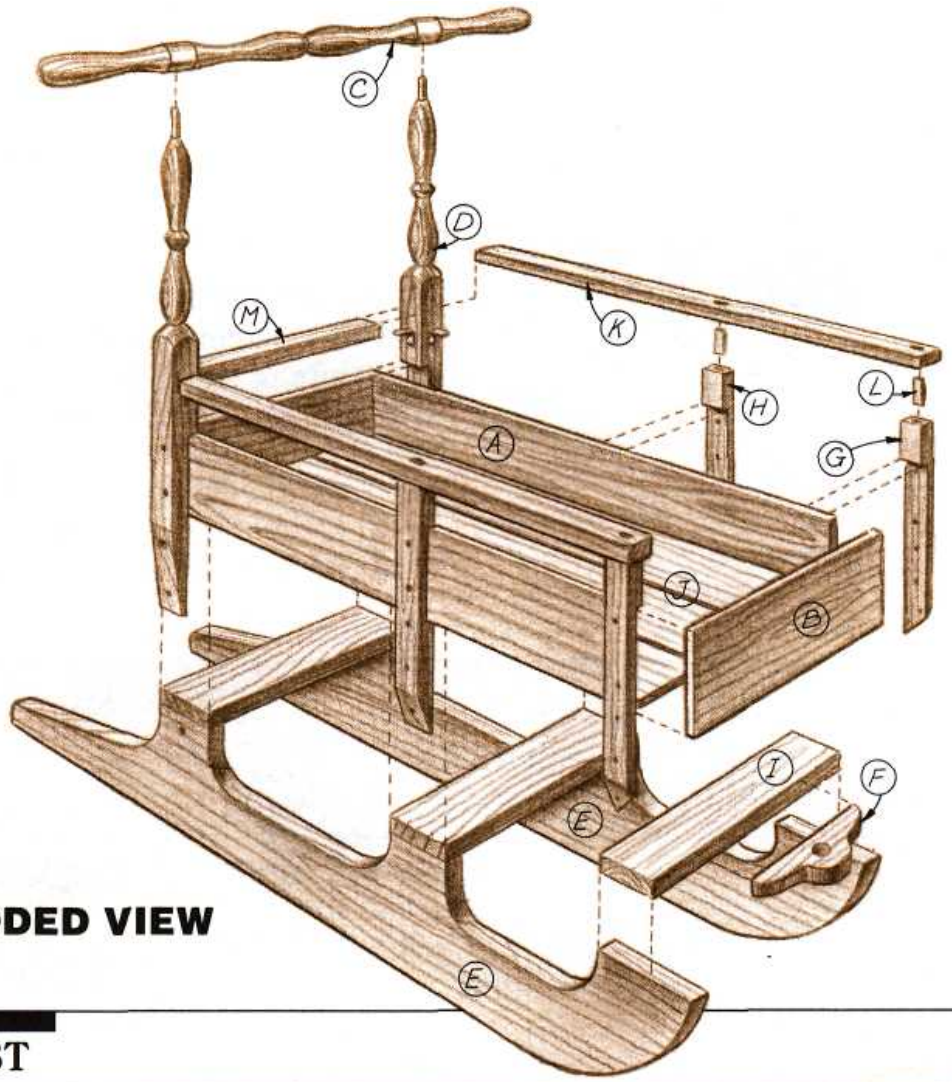


12 Sand, finish, and add the hook screws and eyescrews to the steam train. Sand the train engine and cars and, as you sand, round-over any sharp corners. You can finish the train in any way you choose. The train shown simply has a clear varnish to protect the wood. You could finish your train in the same way or paint it to look like a real train.

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SLED





EXPLODED VIEW

CUTTING LIST

Part	Quantity	Dimension	Comment
A. Sides	2	¾″ × 4¾″ × 31″	
B. Front/back	2	¾″ × 4¾″ × 15½″	
C. Handle	1	1¾″ × 1¾″ × 28¾″	Trim after turning.
D. Handle supports	2	1¾″ × 1¾″ × 31″	Trim after turning.
E. Runners	2	1″ × 6⅝″ × 48″	
F. Nose piece	1	1″ × 2½″ × 8¾″	
G. Front posts	2	¾″ × 1¾″ × 12¼″	
H. Middle posts	2	¾″ × 1¾″ × 13⁷⁄₁₆″	
I. Cross supports	3	1″ × 2¾″ × 16″	Trim to fit.
J. Floor slats	3	¾″ × 4⅜″ × 30¼″	
K. Side rails	2	1″ × 1⅜″ × 31½″	
L. Dowels	4	⅜″ dia. × 2″	
M. Back rail	1	1″ × 1⅜″ × 14½″	Cut to fit.

Hardware

As needed, #8 × 1½-in. flathead wood screws
As needed, #8 × 1¼-in. flathead wood screws
As needed, #8 × 1-in. flathead wood screws
As needed, #8 × 1¾-in. flathead wood screws
2 ¼-in.-dia. × 2½-in. carriage bolt
4 ⅝ × 2-in. metal corner braces

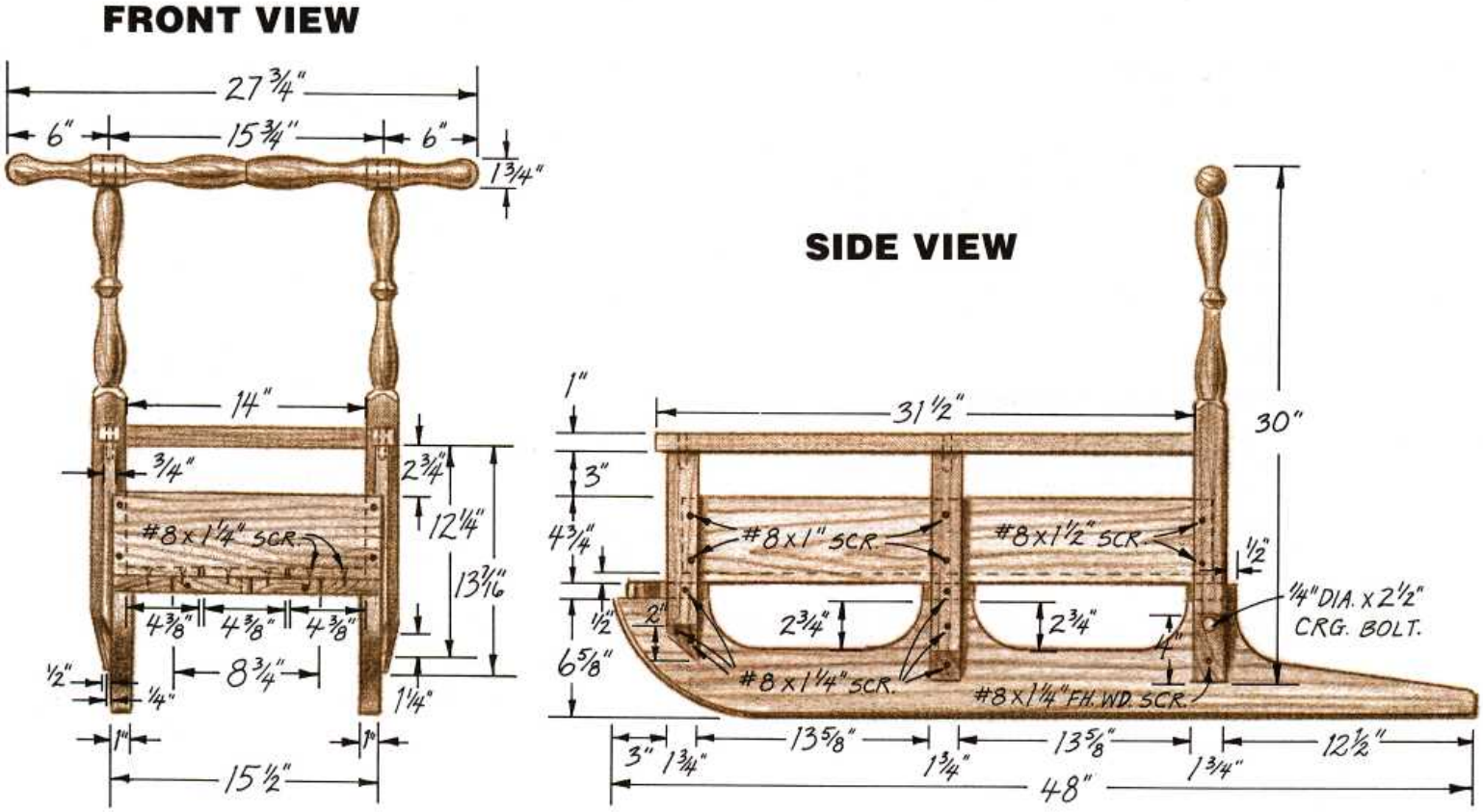
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1 Select the stock and cut the parts. Oak is a good choice of wood for this project, but other hardwoods could also be used. Choose straight, flat stock without knots. Joint, plane, rip, and cut the parts to the sizes given in the Cutting List. Notice that the handle and handle supports are 1 inch longer than their finished dimensions to allow for turning.

2 Assemble the box frame. The box frame is made up of the sides, front, and back. Simply butt the sides between the front and back, and screw through the front and back into the sides, as shown in the *Front View.* Predrill for #8 × 1½-inch flathead wood screws with a commercially available combination pilot hole bit. A combination pilot hole bit drills a countersink hole, a clearance hole for the screw shank, and a slightly smaller pilot hole for the threads all in one operation. Make sure that the top edge of the sides aligns with the top edge of the front and back.

3 Drill holes in the handle and turn the handle and handle supports. Before turning, lay out and drill ¾-inch-diameter handle support holes in the handle.

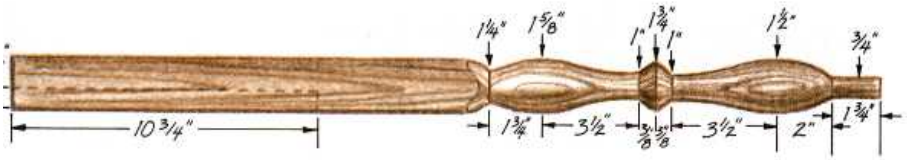
Turn the handle and handle supports on the lathe to the profile shown in the *Handle Detail* and *Handle Support Detail.* Turn the ¾-inch-diameter tenons at the



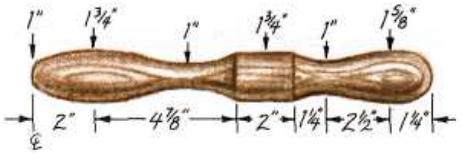
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tops of the handle supports slightly longer than the thickness of the handle so they can be trimmed flush after assembly.

HANDLE SUPPORT DETAIL



HANDLE DETAIL



4 Cut the runners and nose piece to shape. Draw a ½-inch grid on a piece of paper and draw the runner and nose piece patterns onto it, as shown in the *Runner Detail* and *Nose Detail.* Transfer the patterns to the wood and cut the parts to shape with a band saw or jigsaw. Sand the sawed edges smooth.

After you cut the nose piece to shape, lay out and drill the ¾-inch-diameter rope hole, as shown in the *Nose Detail.*

SHOP TIP: After you have cut one runner to shape, use it as a template to lay out the second runner.

5 Fit the front posts, middle posts, and handle supports to the box frame. The front posts, middle posts, and handle supports are all notched to fit around the box frame. Lay out the ¼-inch-deep notches on the front and middle posts starting 2¾ inches from the top, as shown in the *Front View.* Lay out the ¾-inch-deep notch on the handle supports, as shown in the *Handle Support Detail.*

Notch the parts on a band saw. To ensure a straight cut, set up a fence on the band saw table to guide the long cuts.

While you are still at the band saw, cut the 45-degree angles on the bottom ends of the front posts, as shown in the *Side View.*

Taper the bottom ends of the posts and handle supports on a stationary belt sander to the profiles shown in the *Front View.*

6 Fit the cross supports and screw them to the runners. Cut the cross supports to the exact width of the box frame. Predrill with a pilot hole bit and attach the nose piece to the front cross support with glue and #8 × 1¾-inch screws, as shown in the *Front View.* Predrill and attach the cross supports to the tops of the runners.

7 Assemble the posts and handle support to the box frame and runners. First, set the box frame in position on top of the cross supports and runners and then clamp the front and middle posts and handle supports to it. Position the parts as shown in the *Side View.*

Next, lay out and drill pilot holes for #8 × 1-inch, #8 × 1¼ -inch, and #8 × 1½-inch flathead wood screws, as shown in the *Side View.* Also drill a ¼-inch-diameter hole through each handle support and runner for a carriage bolt, as shown.

Drive the appropriate screws into their pilot holes and attach the carriage

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bolts to the handle supports and runners.

Remove the clamps.

8 Attach the floor slats. Drop the floor slats in place, as shown in the *Front View,* spacing them evenly to allow snow to melt through. Drill pilot holes for #8 × 1¼-inch screws through the floor slats and into the cross supports and screw them in place.

9 Attach the side and back rails. The side rails are doweled to the front and middle posts and then fastened to the handle support with metal corner braces. The back rail is attached between the handle supports with metal corner braces. First, position the side rails on top of the front and middle posts and against the handle support, as shown in the *Side View* and *Front View.* Clamp the rails in place and drill ⅜-inch-diameter by 2-inch-deep dowel holes through the side rails and into the front and side posts.

Next, spread glue on the dowels and tap them down into the dowel holes.

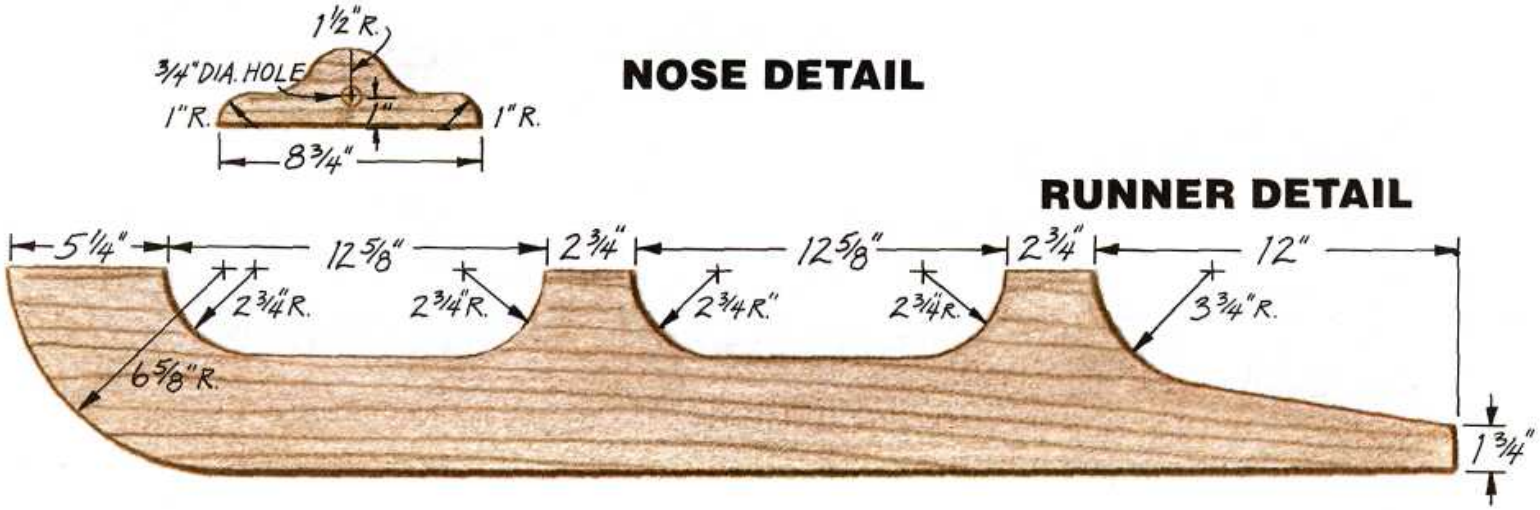
When the dowels are in place, position the metal corner brace, as shown in the *Side View.* Drill screw pilot holes through the existing holes in the brace and into the handle support and side rails. The screw hole diameter in metal corner braces may vary, so choose screws to fit your brace. Drive the screws in place.

Next, cut the back rail to fit between the handle supports and position it as shown in the *Front View.* Attach the back rail to the handle supports with screws and metal corner braces.

10 Attach the handle. The holes in the handle fit over the tenons on the handle supports. Test fit the handle to the handle supports, and if the tenons are too tight, remove some stock from them with sandpaper. When the tenons fit properly, spread glue on them and attach the handle. Allow the glue to dry.

11 Apply the finish. Finish sand the sled and apply a varnish or paint capable of handling lots of moisture.

Mush, you huskies!

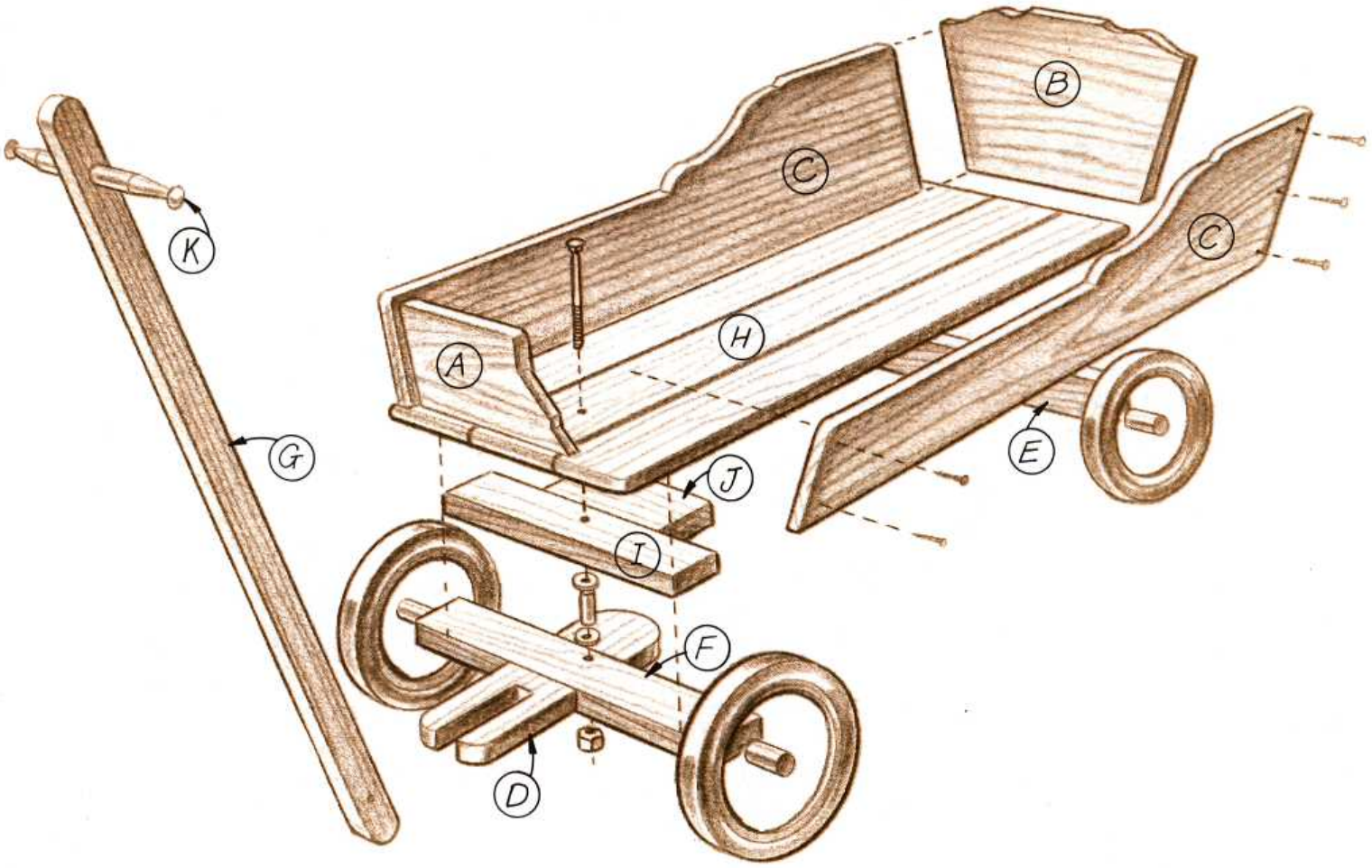


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CHILD'S WAGON



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EXPLODED VIEW

CUTTING LIST

Part	Quantity	Dimension	Comment
A. Front	1	3/4" × 6 1/4" × 15 3/4"	
B. Back	1	3/4" × 10 3/4" × 18 1/2"	
C. Sides	2	3/4" × 10 1/2" × 40"	
D. Yoke	1	1 1/2" × 3 3/4" × 13"	
E. Rear axle support	1	1 1/2" × 2 3/4" × 18 1/2"	
F. Front axle support	1	1 1/2" × 2 3/4" × 19 1/2"	
G. Handle	1	1 1/2" × 1 3/4" × 42"	
H. Bottom boards	3	3/4" × 5" × 41"	
I. Cleat	1	1 1/2" × 2 3/4" × 14 1/2"	
J. Brace	1	1 1/2" × 3 3/4" × 7 1/2"	
K. Handholds*	2	7/8" dia. × 3 3/8"	Shaker pegs

*Available from The Woodworker's Store, 21801 Industrial Boulevard, Rogers, MN 55374. Specify part #B1501 for birch, #B1502 for oak, or #B1503 for walnut.

Hardware

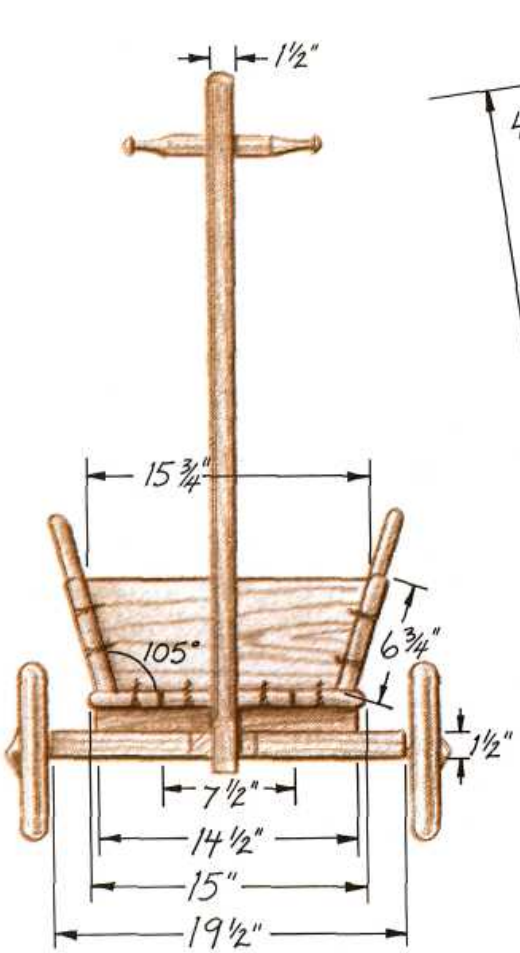
As needed, #8 × 1 1/2-in. flathead wood screws
As needed, #8 × 1 1/4-in. flathead wood screws
As needed, #8 × 1-in. flathead wood screws
1 3/8 × 5-in. carriage bolt with two washers and a stop nut
1 1/4 × 4-in. carriage bolt with a washer and stop nut
4 1/2-in. dia. push nut caps
4 1/2-in.-dia. washers
1 1/2-in.-O.D. × 1-in. bushing (3/8-in. I.D.)
4 5/8 × 2-in. angle brackets
8 1/2 × 2-in. metal mending plates
4 10-in.-dia. ball-bearing wheels with 1/2-in.-dia. axle holes. Available from Youngs, P.O. Box 1, Route 309, Line Lexington, PA 18932. Part #A-WH-9082-SP.
2 1/2-in.-dia. × 36-in. steel rods

1 Select the stock and cut the parts. You can get the wood you need for this wagon preplaned from the lumberyard. Cut the thicker pieces from 2 × 4s and 2 × 6s. Cut the thinner stock from 1 × 6s and 1 × 8s. Glue up stock to make the sides and back.

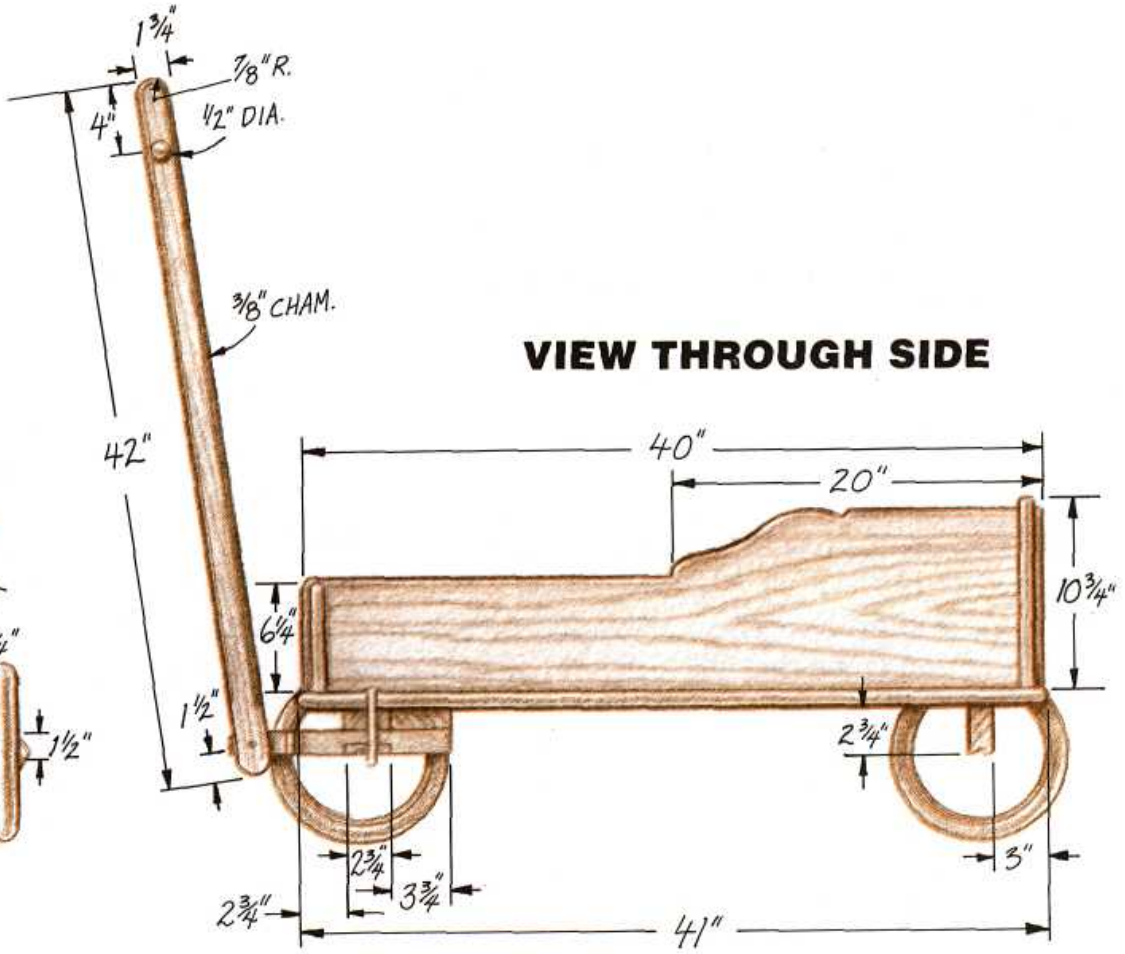
Cut the angles in the front and back as you cut them to the sizes given in the Cutting List. Lay out the angles directly on the stock and cut the angles on the table saw with a miter gauge set at 75 degrees. Rip 15-degree bevels on the bottom edge of the sides, as you cut the parts to width.

Get your hardware before you begin construction, in case you need to make alterations. Sturdy ball-bearing solid wheels replace the wire-spoked wheels of the original wagon; if you prefer to use spoked wheels, you may be able to salvage them from a baby carriage. The axles are made of 1/2-inch-diameter steel rod. The bronze bushings in the yoke can be found in hardware stores or at electrical supply stores.

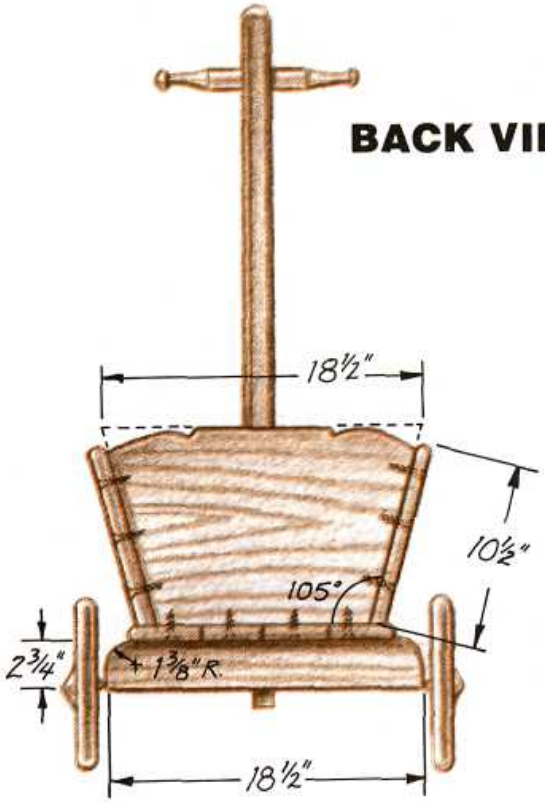
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FRONT VIEW



VIEW THROUGH SIDE



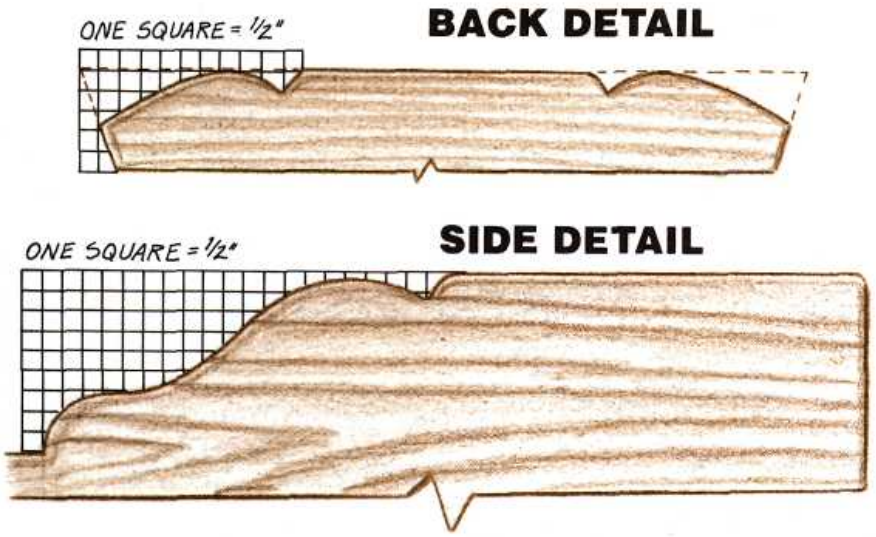
BACK VIEW

2 Cut the parts to shape. With a compass, lay out the radii on the yoke and rear axle support and the handle. Then draw a ½-inch grid on a piece of paper and draw the side and back shapes onto it, as shown in the *Side Detail* and *Back Detail.* Transfer the patterns to the stock and cut the parts to shape on the band saw. Sand any saw marks smooth.

3 Rout for the axles. In the next few steps, you'll make the wagon's chassis. After that, you'll make the box that sits on top of the chassis.

First, lay out and rout ½ × ½-inch axle grooves in the front and rear axle supports. Put a ½-inch straight bit in your

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router. Secure the router in a router table and guide the axle supports against a fence as you rout. Center the groove in each axle support, as shown in the *View through Side* and the *Support Bottom View.*

4 Assemble the bottom. First, place the cleat and the rear axle support on a flat work surface, parallel to one another and 31½ inches apart. Put a shim under the yoke, so that the top of the yoke and the rear axle support are at the same level. Mark the location of the cleat and support in pencil on the bench, so that you'll know if you've nudged them out of place.

Put the bottom boards on top of the cleat and rear axle support, positioning them as shown in the *Front View* and *View through Side.* Make sure that the bottom boards are perpendicular to the cleat and support and then check that the cleat and support haven't strayed from the pencil marks.

Drill screw holes for two #8 × 1½-inch flathead wood screws through both ends of each board and into the cleat and support. A #8 pilot hole bit will drill the appropriate-size holes in each piece and countersink for the screw head in one pass.

Next, put the brace in position behind the front cleat, as shown. Drill holes with the pilot bit through the bottom boards and into the brace. Attach the cleat with #8 × 1½-inch flathead wood screws.

5 Cut the handle notch in the yoke. The yoke houses both the handle and the front axle. Lay out the notch for the handle on the yoke stock to the dimensions shown in the *Support Bottom View.* Cut out the notch on the band saw, then file and sand away any saw marks or irregularities. Lay out and drill a ¼-inch-diameter hole through the tongues of the yoke for the bolt that secures the handle.

6 Cut the lap joint. The front axle support and the yoke are joined by a lap joint. Lay out the ¾-inch-deep lap joints on the axle support and yoke, as shown in the *Support Bottom View.* Cut the joints on the table saw with a dado cutter. To cut the lap, screw a piece of straight scrap to your miter gauge as an extension, set the gauge to 90 degrees, and guide your stock over the dado cutter.

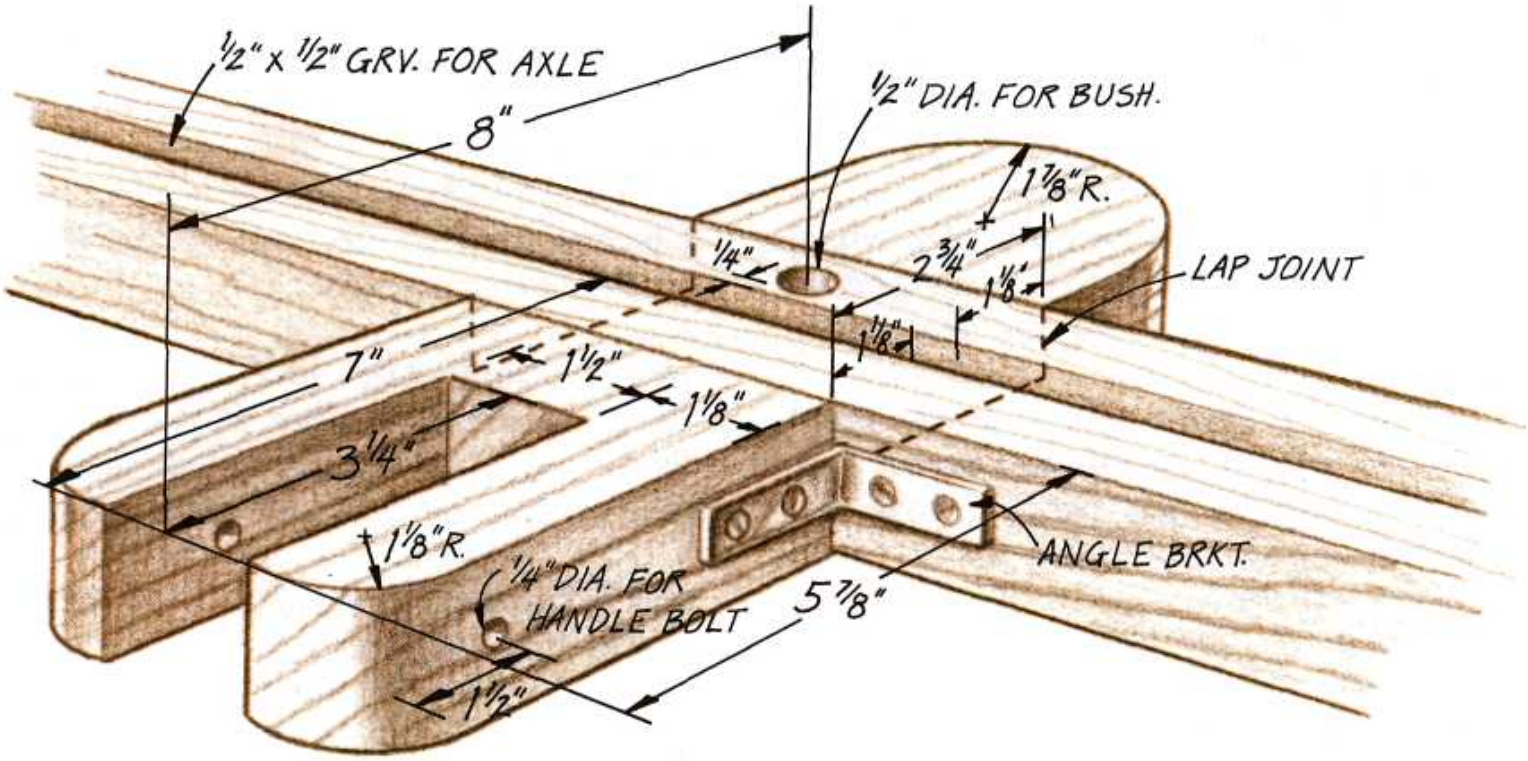
When the laps have been cut, put the yoke and axle support together and make sure that the corners form 90-degree angles. Attach the two parts with glue and four metal angle brackets, as shown.

7 Attach the yoke. Lay out and drill the ½-inch-diameter hole for the steering bushing in the yoke, as shown in the *Support Bottom View.* Tap the bushing in place.

With the wagon body still upside down, position the yoke assembly on the cleat. Put a pencil through the bushing to

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SUPPORT BOTTOM VIEW



mark the position of the steering bolt hole on the cleat and drill a ⅜-inch bolt hole all the way through the cleat and bottom board.

Bolt the yoke in place. As you do, put a nut washer between the yoke and axle and between the stop nut and yoke. Be sure to use a stop nut. Stop nuts have a nylon collar just above the threads that keeps the nut from slipping off. Don't put the nut on too tightly because the yoke should move freely.

8 Assemble the front, sides, and back. Assemble the front, sides, and back independently of the rest of the wagon, then attach them as a unit.

To assemble the front, sides, and back, lay out and drill screw holes in the parts, as shown in the *Front View* and *Back View.* The distance between the screws isn't critical, but each row of screws should be ⅜ inch from the edge of the stock.

To drill the holes, have a helper hold the two parts together. Drill through the side and into the adjoining piece using a pilot hole bit. The bit will drill the appropriate size hole in each piece and countersink for the screw head. Drill all the necessary holes, then screw the parts together.

Center the assembled front, sides, and back on the chassis. With a pencil, mark the position of the sides along the bottom. Remove the box assembly and, on 3-inch centers, drill a series of 1/16-inch-diameter holes between the pencil lines. Clamp the box to the chassis and flip the assembly over. Enlarge each hole with a #8 pilot hole bit. Drill through the chassis and into the box. Screw the chassis to the

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box with #8 × 1½-inch flathead wood screws.

9 Attach the axles and wheels. The ½-inch-diameter steel rod stock used for the axles is typically sold in 3-foot pieces. Cut the axles to length with a hacksaw and allow enough margin on either side of the axle supports for a flat washer, the hub of the particular wheel you've chosen, and a push nut cap. Secure the wheels by hammering the push nut in place.

With the wagon upside down, place the front axle in the groove. Screw four metal mending repair plates across the axle and into the wood with #8 × 1-inch flathead screws.

Place the rear axle in the groove in its support and secure it with four metal mending plates. Put the wheels on the axles and secure them with caps or cotter pins.

10 Chamfer the edges of the handle. Put a chamfering bit in your router. Secure the router in a router table and rout a ⅜-inch stopped chamfer in all four edges of the handle. Stop the chamfer 4 inches from the bottom of the handle on all four edges.

Lay out and drill the bolt hole in the handle, 1½ inches from the handle's bottom end.

Drill a ½-inch-diameter hole centered 4 inches from the top end of the handle for the two handholds.

11 Attach the handle. Glue the handholds in place. Fasten the handle to the yoke with a ¼-inch-diameter bolt, secured by a washer and stop nut.

12 Finish the wagon. Sand the wagon, taking care to round-over any sharp edges for the safety of young passengers. Finish with two coats of either exterior polyurethane or exterior paint.

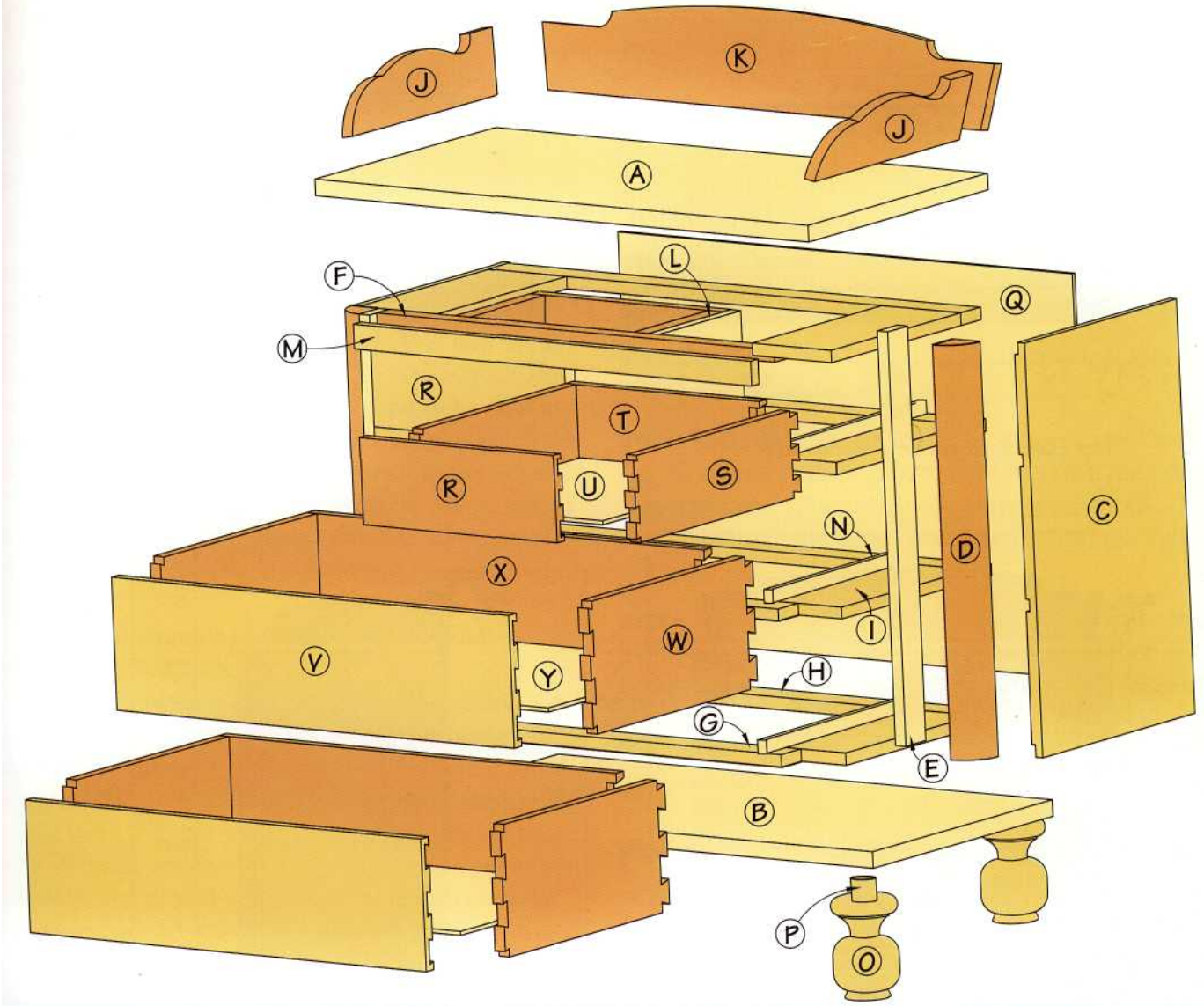
Finally, make a note on your calendar to check all of the wagon's bolts and screws for tightness after a couple of weeks of use.

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Colonial Washstand Circa 1760



I found the original of this piece while on vacation on Jekyll Island in Georgia. It was one of a pair in a conference room at the Jekyll Island Club Hotel, part of the island's historic district, and was probably made during the middle of the eighteenth century. It was, as ours is, made from pine. The patina was a lovely buttery color. Close inspection failed to reveal traces of any finish other than many years of wax polishing. Most



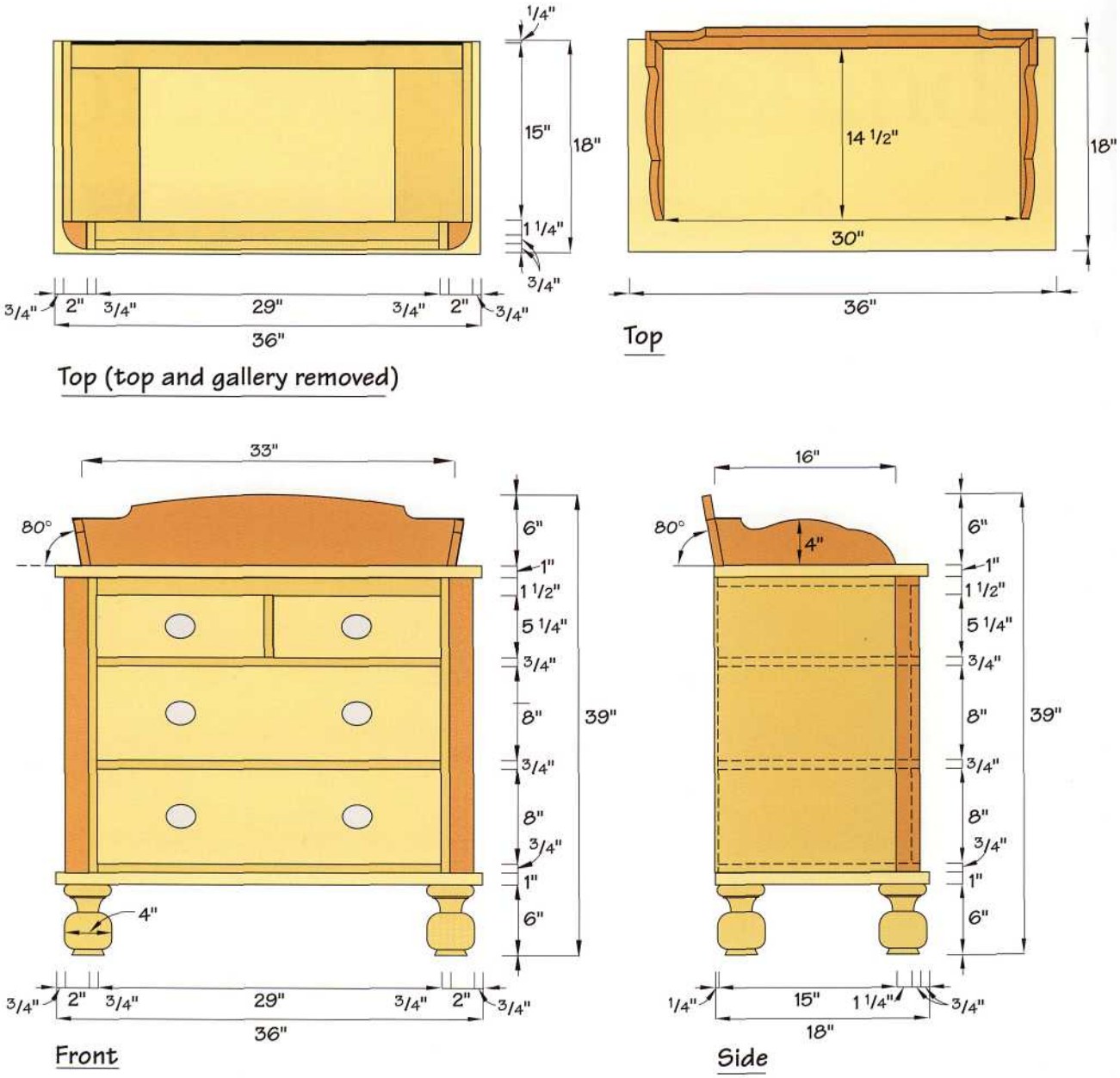
MATERIALS LIST

Colonial Washstand

No.	*Letter*	*Item*	*Dimensions T W L*
1	A	Top	¾″ × 18″ × 36″
1	B	Base	¾″ × 18″ × 36″
2	C	Sides	¾″ × 15¼″ × 25″
2	D	Pilasters	2″ × 2″ × 25″
2	E	Pilaster Fillers	¾″ × 2″ × 25″
1	F	Web Frames	¾″ × 1¼″ × 29″
3	G	Web Frames	¾″ × 2″ × 29″
4	H	Web Frames	¾″ × 2″ × 34½″
9	I	Web Frames	¾″ × 5¾″ × 13″
2	J	Gallery	¾″ × 5″ × 16″
1	K	Gallery	¾″ × 6″ × 33″
1	L	Drawer Partition	¾″ × 6″ × 15½″
1	M	Facing	¾″ × 1½″ × 5¼″

No.	*Letter*	*Item*	*Dimensions T W L*
1	N	Trim	¾″ × 1½″ × 29″
6	O	Drawer Guides	¾″ × 1¾″ × 15″
4	P	Feet	4″ × 4″ × 6″
4	Q	Feet	¾″ × 1¼″ dowels
1	R	Back	¼″ × 24½″ × 33⅛″
2	S	Drawer Front	¾″ × 5¼″ × 14¼″
4	T	Drawer Sides	¾″ × 5¼″ × 16½″
2	U	Drawer Backs	¾″ × 4¾″ × 14¼″
2	V	Drawer Bottoms	¼″ × 16″ × 13¼″
2	W	Drawer Front	¾″ × 8″ × 29″
4	X	Drawer Sides	¾″ × 8″ × 16½″
2	Y	Drawer Backs	¾″ × 7½″ × 29″
2	Z	Drawer Bottoms	¼″ × 16″ × 27″

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pieces like this, however, would have been painted. I've chosen a scrubbed finish, a look I've seen often on such pieces.

Before the advent of hot and cold running water, washstands like this one would have been an essential part of most early and Victorian American bedroom suites. Towels, washcloths and other linens would have been kept in the drawers while the galleried top would have been home to a large ceramic bowl and water jug. It's a look that's often duplicated to good effect today. This washstand is a faithful copy of the one I found on Jekyll Island. I've searched the books but have not been able to find anything quite like it. In other words, it seems to be unique.

CONSTRUCTION OUTLINE

At first glance this is a simple piece, but first glances can often be misleading. To make it you will need to use almost every tool in the shop. When it's finished it will provide you with a unique piece, as well as a real sense of achievement.

Basically, this is a small chest of drawers with turned feet, a nicely shaped gallery and rounded quarter pilasters. The web frames are offset to accommodate the pilaster and attached to the sides with glue and biscuits (dowels would work just as well). The top is made from furniture-grade pine a full 1" thick. The kicker is also a solid piece of stock, nominally 1" thick, upon which the carcass sits. There were no dust panels in the original. The drawers were constructed using lap joints, but, as I felt this was a quality piece, I've taken a liberty and used dovetails. The feet are glued and doweled to the kicker.

There are a couple of tricky areas: the pilasters and the construction of the carcass.

The pilasters are made from two pieces of stock, 25" long X 2" wide X 2" thick. The trick here is how to achieve the quarter-round cross-section. I did it by taking pieces of stock 36 1/2" long X 4" wide X 2" thick and gluing them together—only the first six inches at either end—to make a piece 4" X 4″. I then placed the piece in the lathe and turned off the corners to give me what was essentially an eight-sided piece—four flats and four rounded corners. At that point I removed the stock from the lathe and cut off the first six inches at either end, thus the middle section split into two halves. From there it was simply a matter of cutting one of the two halves down the middle to give me the pilasters. The two six-inch 4" X 4" sections? These I turned on the lathe to make two of the four required feet.

The carcass itself is fairly simple to construct; just take care that the offset web frames are accurately measured, made and dadoed into the sides. **Note:** One web frame is 3/4" narrower than the other three. Attaching the pilasters and fillers to the carcass, however, needs special attention. First you'll glue and screw the spacers, edge on, to the carcass (see top photo page 80), then glue and screw the pilasters to the spacers (see bottom photo page 80). Quite simple really.

The gallery or splash-back, as it's often called, is cut from furniture-grade pine, a full 1" thick, and angled to slope away at 6°. The ends of the galleries are lap-jointed and secured together with glue and cut-steel masonry nails for authenticity. The hardware, which is also faithful to the original washstand, was bought from the Woodworker's Store.

BUILDING THE WASHSTAND

STEP 1. Cut and shape the pilasters (see Shop Tip below).

STEP 2. Cut the rest of the required pieces to size.

STEP 3. Run all the edges through the jointer.

STEP 4. Build the boards that will make the top, kicker (base) and two sides.

STEP 5. Build the four web frames as laid out in the drawing. Be careful to make one 3/4" narrower than the other three; this one will go at the top of the carcass. Also, be careful to make the offsets accurately as laid out in the drawing.

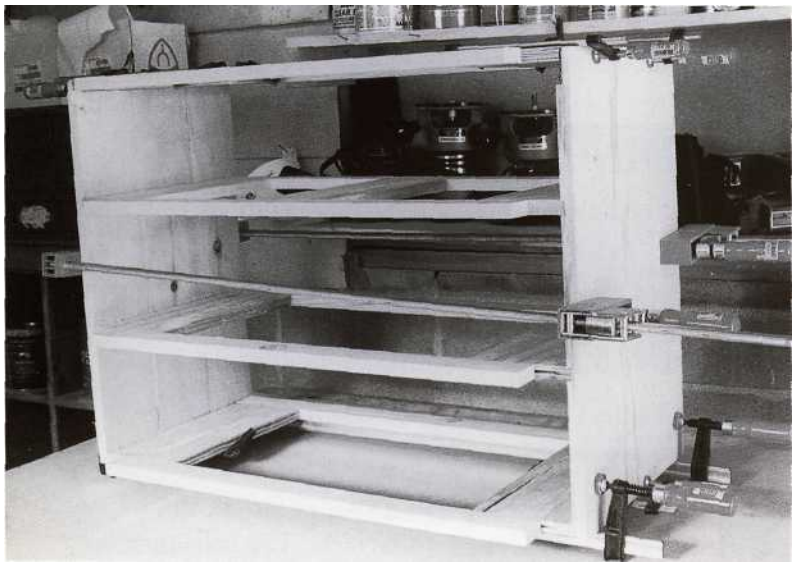
STEP 6. Take the two pieces of stock that will make the sides and cut rabbets 3/4" wide x 1/4" deep at the top and bottom edges to take the top and bottom web frames. Next, cut a rabbet down one long edge of each side 1/4" deep to receive the back—make sure you have a left and right side.

SHOP TIP

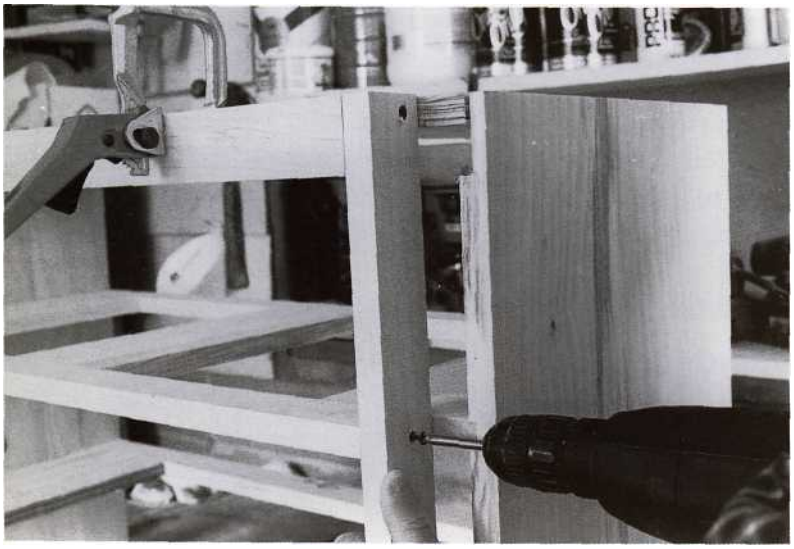
Turning Pilasters



The pilasters are an important feature of this old washstand. You might be tempted to leave them out. Don't. If you have a lathe they are quite simple and fun to make. To make your pilasters you'll need two pieces of stock 36½″ × 4″ × 2″. Apply glue to the first and last six inches of both pieces, put them together, clamp and leave overnight to cure. Find the center at each end and place the piece in the lathe. Turn the piece to round over the corners only leaving flats that measure roughly 1½″ across. While the piece is still in the lathe, sand the rounded corners smooth. Remove the piece from the lathe and cut off the first six inches at both ends; this will cause the center to fall apart into two sections, each with two ¾″ flats and a single 1½″ flat. On your table saw, split one of the pieces down the middle. This will give you two pilasters. The two 6″ sections can be turned into feet.



Glue, assemble and clamp the carcass. Note how the front center clamp is set at an angle to pull the structure square.



Glue and clamp the trim piece in place on the upper web frame, then fasten the two spacers in place on the web offsets using no. 6 screws.

STEP 7. Cut dadoes in the two side pieces as laid out in the drawing 3/4" wide x 1/4" deep to take the two center web frames.

STEP 8. Glue, assemble and clamp the four web frames to the two ends—make sure the narrower web is at the top. Square the structure, then set it aside to cure overnight.

STEP 9. Glue and screw the spacers to the webs as you see in photo above.

STEP 1O. Set the pilasters in place between the spacers and the sides and mark them and the sides for biscuit slots.

STEP 11. Cut the biscuit slots to the pilasters and side panels

STEP 12. Glue, biscuit and clamp the pilasters to the side panels and screw the spacers to the pilasters

STEP 13. Set the piece of stock to be used for the top trim in place against the narrower web frame and mark for biscuits.

STEP 14. Cut the biscuit slots, then glue and clamp it in place.

STEP 15. Build the drawer guide by gluing and clamping the 3/4″ X 3/4″ facing strip to the end grain of the piece that measures *15 3/4 X 6 3/4"*.

STEP 16. Glue and screw the drawer partition in place as laid out in the drawing and top photo page 82. You can screw downward through the upper web and upward through the one below. The partition will also double as the two center drawer guides.

STEP 17. Build the drawer guides

STEP 18. Glue and screw the drawer guides to the carcass.

STEP 19. Turn the feet to the dimensions shown in the drawing.

STEP 20. Bore a 3/4" hole, 1" deep, in the top center of each foot to take the dowel that will secure the foot in place on the bottom of the washstand.

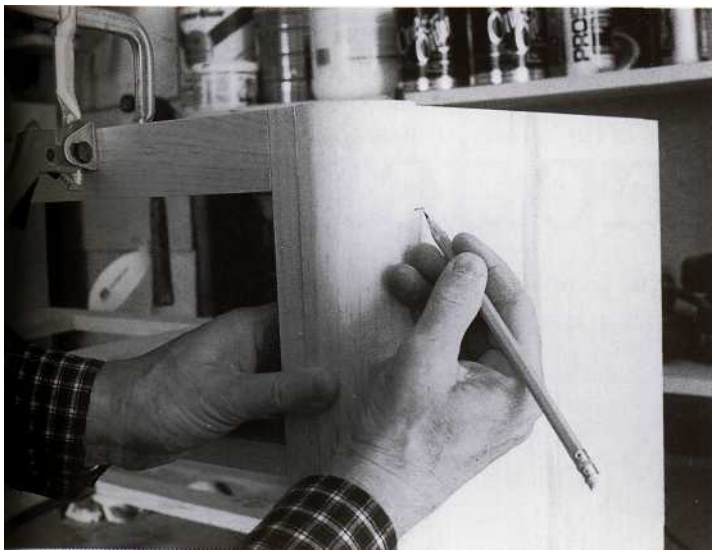
STEP 21. Using a 1/2″ bit in your router, round over the front and side edges of the two boards that will be the top and kicker.

STEP 22. Bore four 3/4" holes at each corner of the kicker as laid out in the drawing.

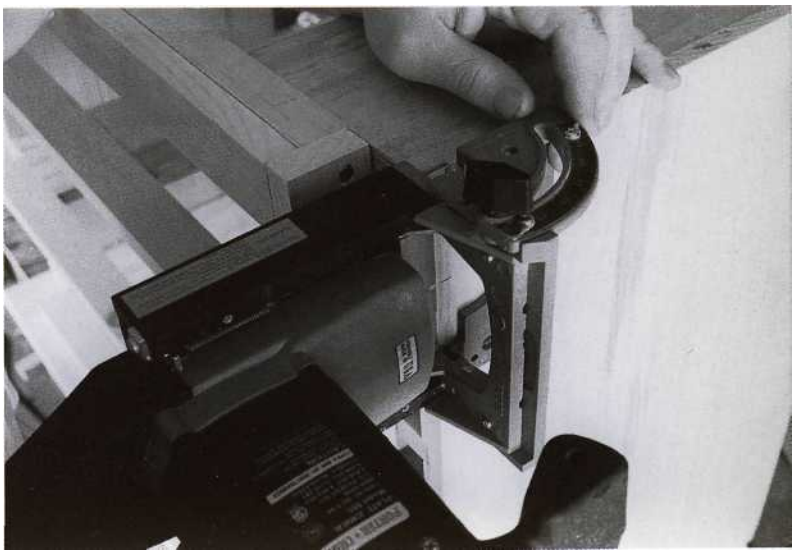
STEP 23. Using one of the new polyurethane glues and four pieces of 3/4" x 1 3/4" dowel, assemble the feet to the kicker. Clamp and set aside overnight to fully cure.

STEP 24. Remove the excess glue from around the feet.

STEP 25. Take the three pieces that will make the gallery and cut one end of both of the short sections and both ends of the long piece to an angle of 10° as laid out in the drawing.



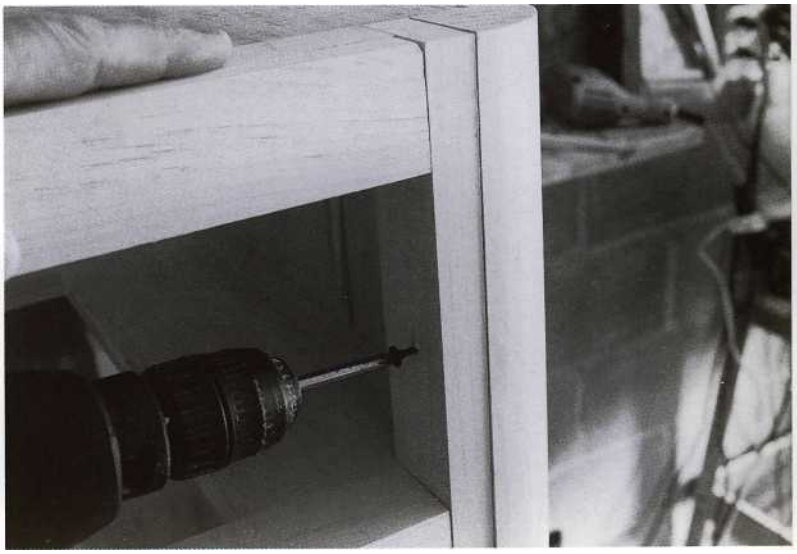
Once the spacers are securely fastened to the carcass, set the pilasters in place and mark them, one side only, and the carcass for biscuit slots.



Cut the biscuit slots to the pilasters and side panels



Take extra care to ensure the plate jointer is square to the work when milling the biscuit slots to the pilasters.



Glue the pilasters in place to the sides of the carcass and, from the inside, using glue and no. 6 screws, secure the pilasters to the spacers already screwed in place.

STEP 26. Using either your jointer or table saw, cut the bottom edges of all three pieces to 10° to give the gallery the desired tilt. Make sure you have a left and right section with the angle at the back.

STEP 27. Using the scale drawings, cut the details to the upper edges of the three gallery sections. The angle should be at the back of both end sections.

STEP 28. Cut rabbets 3/8" deep X 3/4" wide to the ends of the back section of the gallery as you see in the drawing.

STEP 29. Glue, nail with cut-steel nails and clamp the side of the gallery to the back (make sure the assembly is square), and set aside overnight to fully cure.

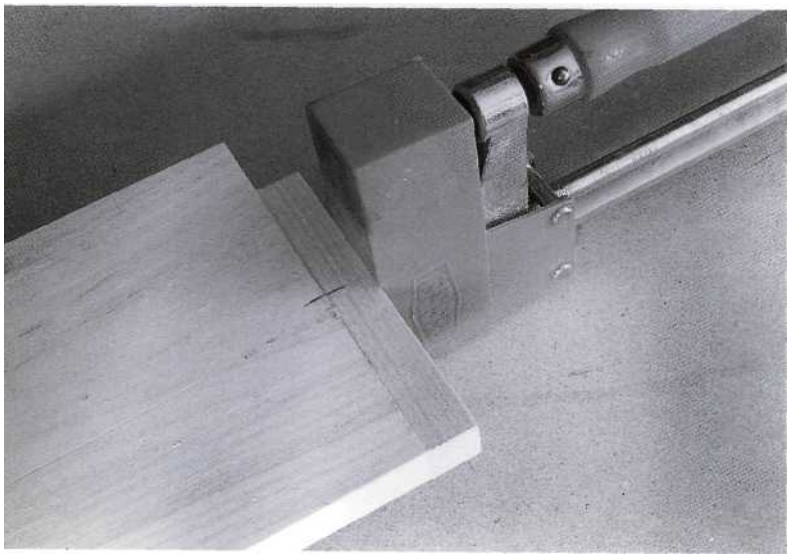
STEP 30. From the inside, screw the kicker (base) to the lower web frame of the carcass. Elongate the holes in the carcass and use small washers under the heads of the screws to allow for movement in the kicker.

STEP 31. Set the gallery in position on the top and mark the outline lightly with a pencil.

STEP 32. Remove the gallery from the top and, using the pencil lines as a guide, bore pilot holes through the top at an angle of 10° to line up with the angle of the tilted gallery.

STEP 33. Replace the gallery and secure it in place with screws from the underside.

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Using a #20 biscuit, fasten the face piece to the front edge of the drawer divider; note the offset.



Use *3/4"* dowel and one of the new polyurethane glues to fasten the feet to the kicker.

STEP 34. Set the top in place on the carcass and secure with screws from the underside of the top web frame. Elongate the holes and put small washers under the heads of the screws to allow the top room to breathe.

STEP 35. Set the back in place inside the rabbets and secure in place with a few brads.

STEP 36. To build the drawers follow the procedure as laid out in the Shop

STEP 37. Go to finishing.

FINISHING

I chose a scrubbed pine look for this piece (see chapter three). First you'll need to finish sand the entire piece, then do a little light distressing and finally apply some stain. I used Minwax's Golden Pecan. It gives the pine a delicate patina that shows through the polyurethane/ paint solution quite nicely for a really authentic look. When you apply the finish, simply wipe it on and then wipe it off again, leaving only the barest film of pigment over the stain.

SHOP TIP

Making Drawer Guides

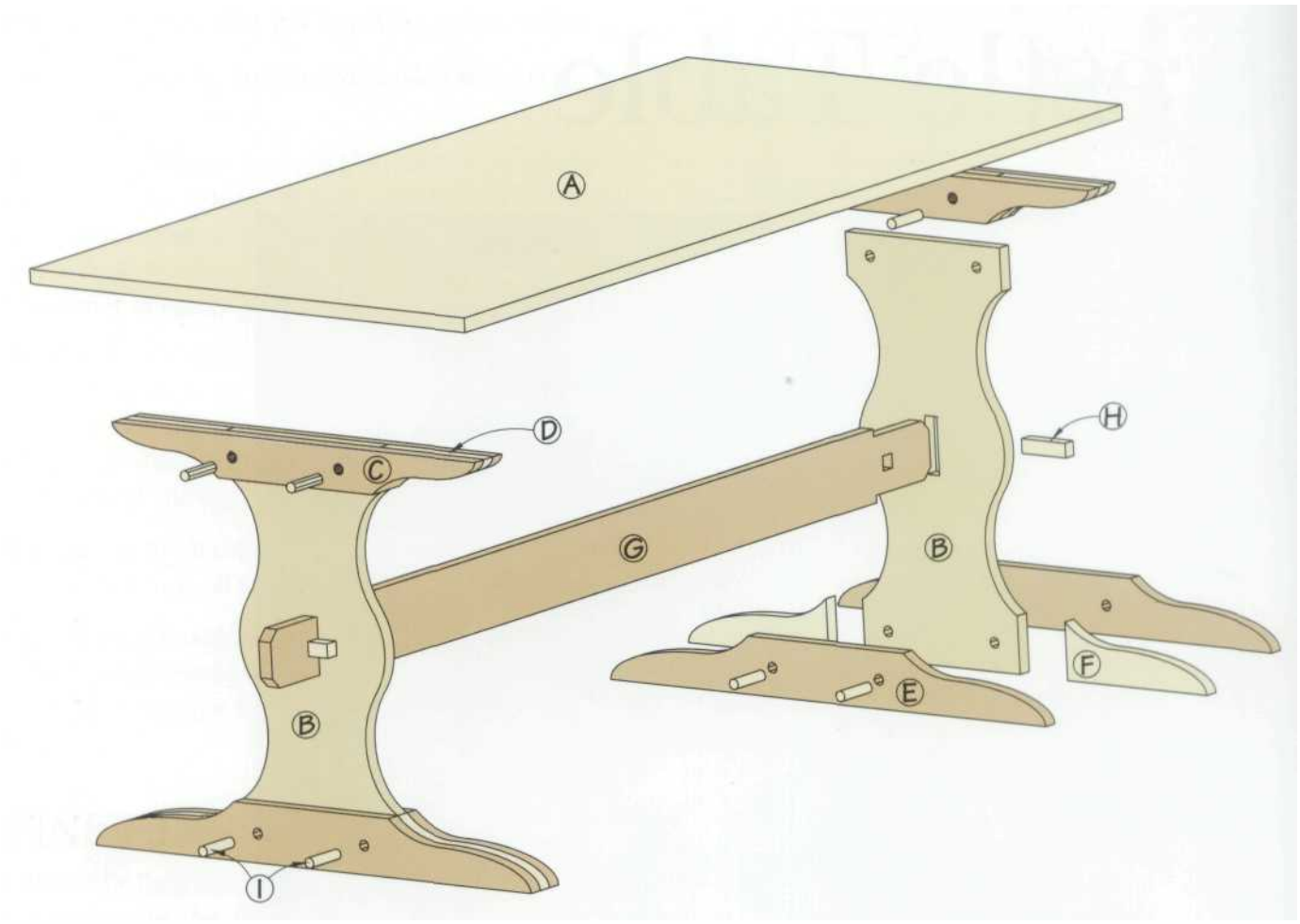


I make almost all of my drawer guides by taking two pieces of stock of the appropriate length and gluing and screwing them together (see the drawing). The guide piece should be made from a stock ¾″ × 1″ and the support from a section ¾″ × 2″—sometimes it will need to be wider. Glue the edge of the guide section, assemble it to the support section and secure the resulting assembly with a couple of screws.

Trestle Table



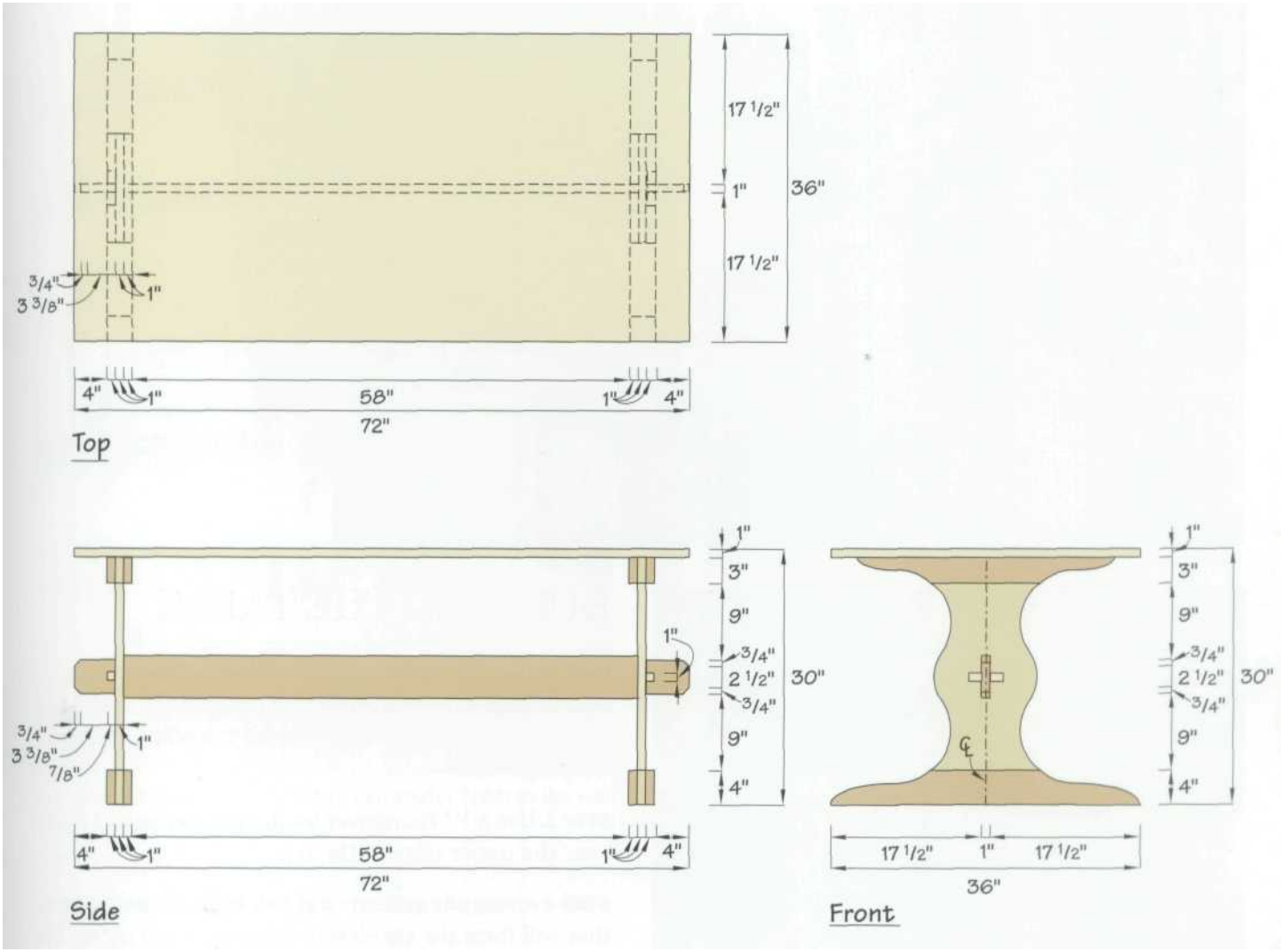
The trestle table as it was in Colonial times was a large, functional piece up to 12' feet long by 24" to 36" wide supported by two or three heavy T-shaped trestles, hence the name. As you can imagine, it was a hefty piece—solid, substantial and probably the focus of whatever room in which it was placed. Each trestle rested on a blocklike foot, beveled from the ends to the upright, known as a shoe foot. Later, with the introduction of the cyma curve, the feet, cleats and legs became things of beauty. The trestles were connected by a single stretcher or rail that passed through mortises midway up from the floor. These were held in place by wooden pegs. Tables like this became popular in the mid-1600s and were used mostly in the kitchens of large houses, in churches as communion tables and in other public buildings. They remain popular today, and the basic design has changed very little. The larger versions were made of oak; the smaller ones usually of pine (some had a pine top and a maple understructure). Smaller versions, often made on farms, measured four to six feet in length. Few originals have survived the centuries. Those that have are found mostly in museums. Ours is the farmhouse version—6' long X 3' wide X 30" high.



CONSTRUCTION OUTLINE

The table is made exclusively from furniture-grade pine. The top is made from three pieces of stock a full 1" thick. The growth rings are alternated to ensure a more stable structure. The trestles and stretcher are made from the same 1" stock. The cleats and feet employ extensive use of the cyma curve. Each is made from four pieces of stock, all 1" thick, sandwiched together to make a solid base.

The method is straightforward and lends itself nicely to simple construction techniques. The construction of the feet and cleats provides ready-made mortises into which the legs tightly fit. The three pieces of stock that form the top are biscuited together, but you can use dowels if you prefer. The legs are cut from a single piece of stock 12" wide x 1" thick x 29" long; again, the design of the legs makes good use of the cyma curve. The legs are set into the feet and cleats and held in place with 3/4″ dowels, which are in turn permanently fixed in place with one of the new polyurethane glues. The top is attached to the legs using no. 10 x 3" wood screws.



MATERIALS LIST

Trestle Table

No.	*Letter*	*Item*	*Dimensions T W L*
1	A	Top	1″×36″×72″
2	B	Legs	1″×12″×29″
4	C	Cleat	1″×4″×30″
4	D	Cleat	1″×4″×9″
4	E	Feet	1″×5″×36″
4	F	Feet	1″×5″×12″
1	G	Rail	1″×5″×72″
2	H	Pegs	1″×1½″×4″
8	I	Pegs	¾″dia.×3″

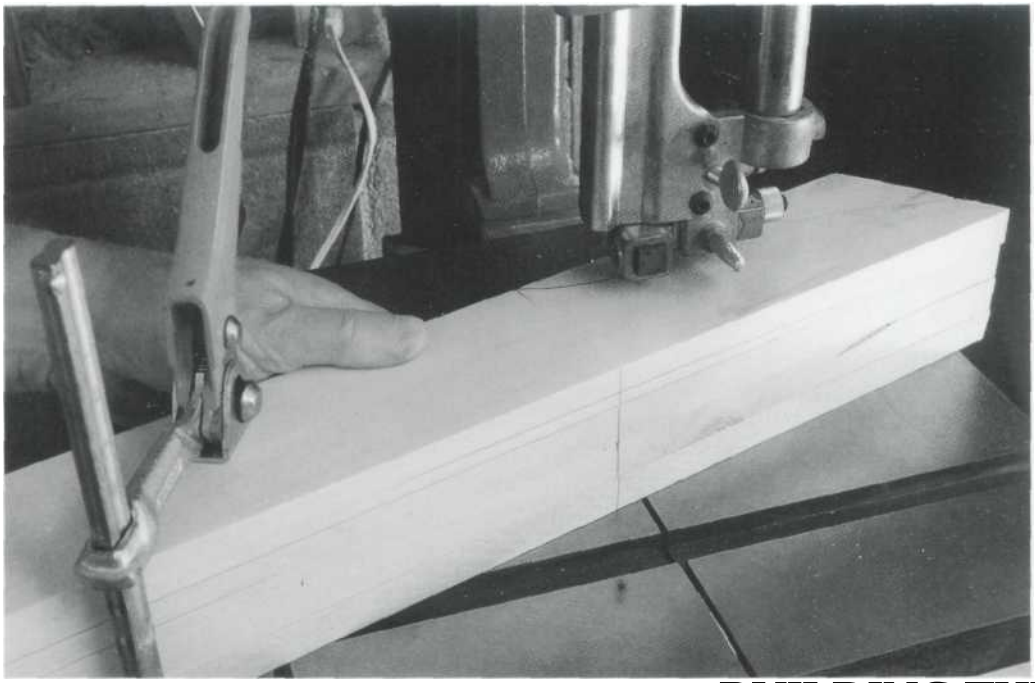
SHOP TIP

Storing Biscuits



You'll keep your biscuits out of the damp, stopping them from swelling and making assembly much easier, if you keep them in an air-tight container. I use an old coffee can with a plastic lid.

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Use your band saw to cut the feet to shape

BUILDING THE TABLE

STEP 1. Cut all the pieces to size.

STEP 2. Build the board that will become the top. Alternate the growth rings to minimize the effects of warping.

STEP 3. Use a 1/2″ roundover bit in your router and **round** over the upper edge of the top.

STEP 4. Using the pattern, cut the eight shaped pieces that will form the two feet.

STEP 5. Using the pattern, cut the eight pieces that will form the two cleats.

STEP 6. Using the pattern, cut the two legs to shape.

STEP 7. Cut the mortises, one in each leg, that will accept the lower rail.

STEP 8. Cut the tenons, one on each end of the rail, as laid out in the drawing.

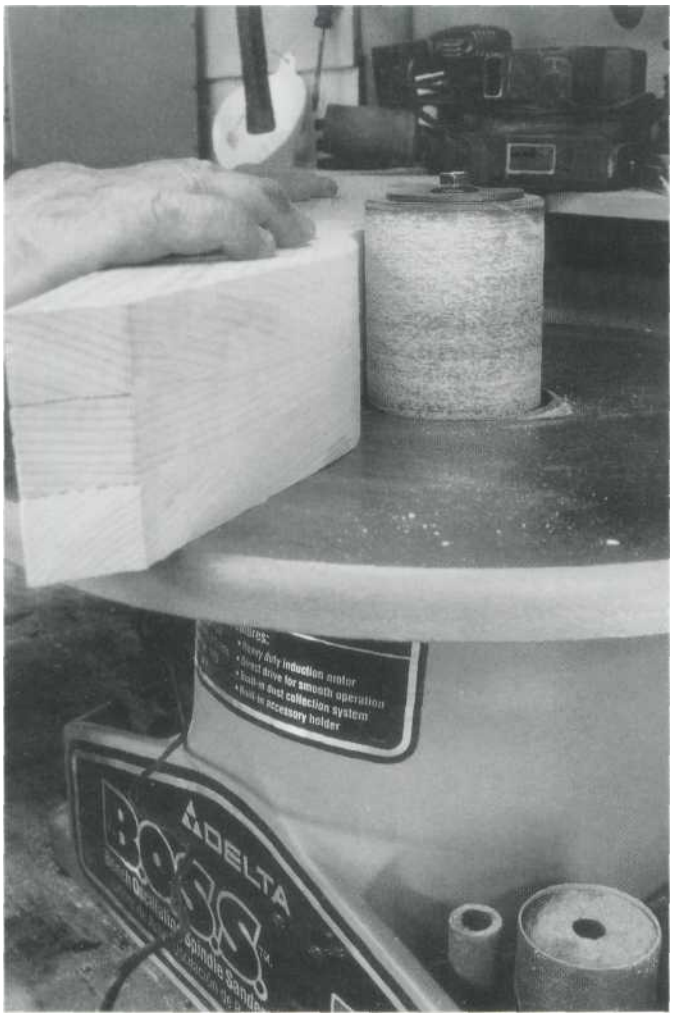
STEP 9. Cut the two mortises, one to each tenon, that will accept the retainer pegs.

STEP 10. Cut the two pegs to their final shape.

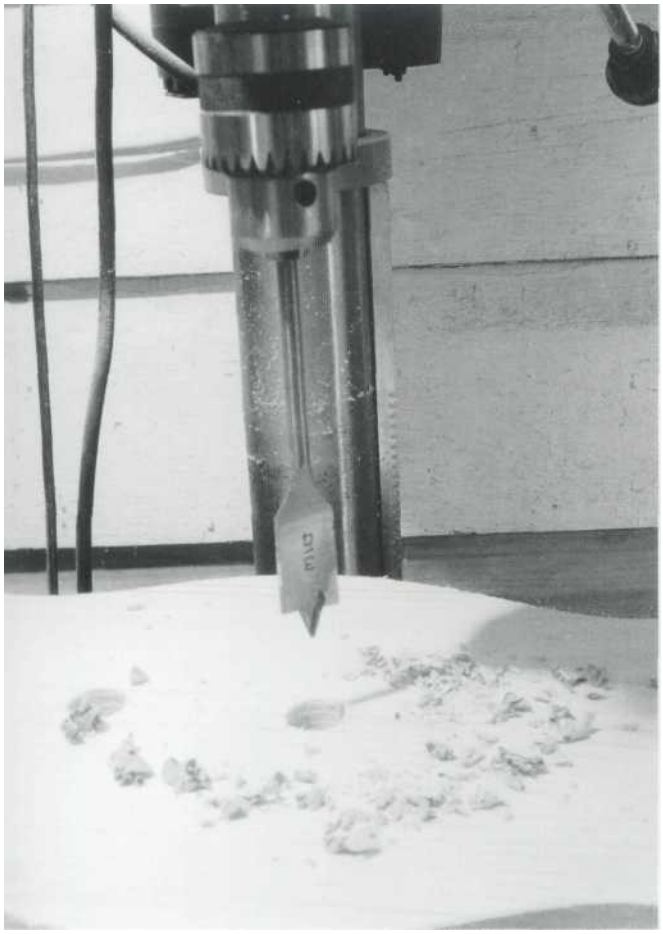
STEP 11. Sand all the pieces smooth and break all of the sharp edges.

STEP 12. Glue and clamp the feet and cleats (see photo) and set them aside to cure overnight.

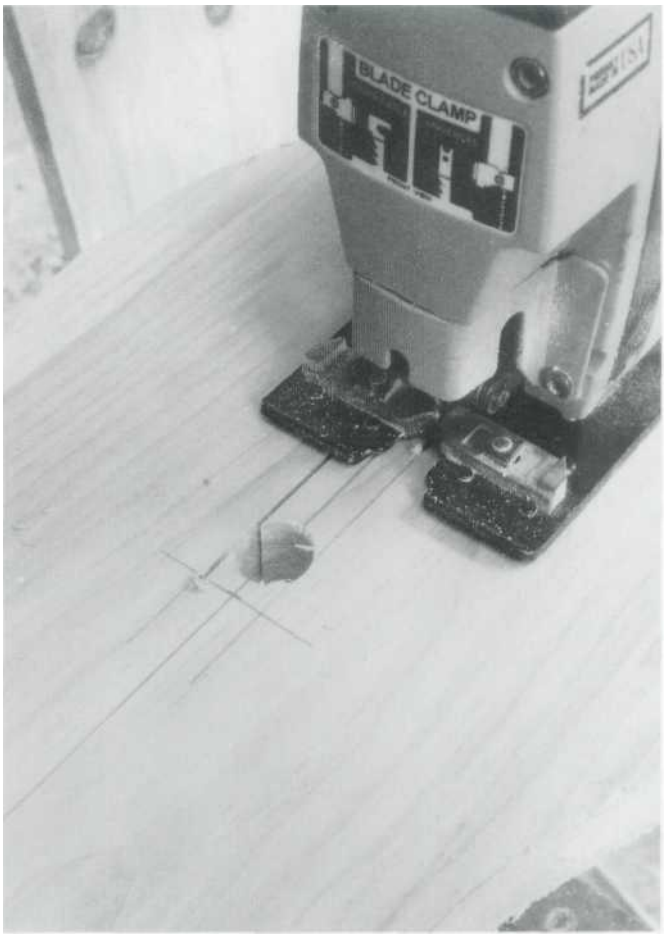
STEP 13. Use a 3/16" bit in your drill press to drill pilot



A spindle sander makes easy work of the final shaping of the feet.



Use your drill press and a 3/4" bit to mill starter holes in the legs for the mortise that will receive the rail.



Use your jigsaw to remove the rest of the waste material from the mortise.

holes in the feet and cleats to receive the screws that will fasten the understructure to the top.

STEP 14. Use a 1/2" Forstner bit to countersink the pilot holes to a depth of *1/2".*

STEP 15. Glue and set the legs in place inside the cavities in **the** feel and cleats.

STEP 16. Drill 3/8" dowel holes through the cleats and feet as laid out in the drawing.

STEP 17. Glue and set the dowels in place to strengthen the joints between the cleats, feet and legs (see photo).

STEP 18. Set the rail in place in the mortises between the two legs (see photo). Do not use glue.

STEP 19. Secure the rail in place using the two tapered pegs.

STEP 20. Set the top upside down on the bench and set the understructure in place on the underside of the top, making sure the assembly is equidistant from the ends and sides.

STEP 21. Using eight no. 10 X 3" screws, four to each cleat and two to each side, fasten the legs to the top.

FINISHING

The best way, I think, to finish this piece is to give it a natural pine look.

First, do your finishing sanding, then some distressing—heavier around the feet and the edges of the tabletop. Next, apply an appropriate stain. I like either-Bleached Mahogany by Blond-it or Puritan Pine or Golden Pecan by Minwax. To apply the stain, simply wipe it on and wipe it off; there's no need to let it stand. When the stain is dry, you can apply a little antiquing glaze. Don't overdo this; just a very light smear is enough. Finally, you can protect the piece by applying either a couple of coats of satin polyurethane or a couple of coats of Antique Oil made by Minwax.

Nineteenth-Century Butler's Tea Table



It's not been that long since every great house, and many not so great, both in England and America, had a butler. Some of them still do. In the domestic hierarchy the butler was at the top. He was in charge of running the house as well as being the first line of communication between the family and its servant staff. He also looked after most of the family's needs, organizing menus, cleaning and supervising the daily routine



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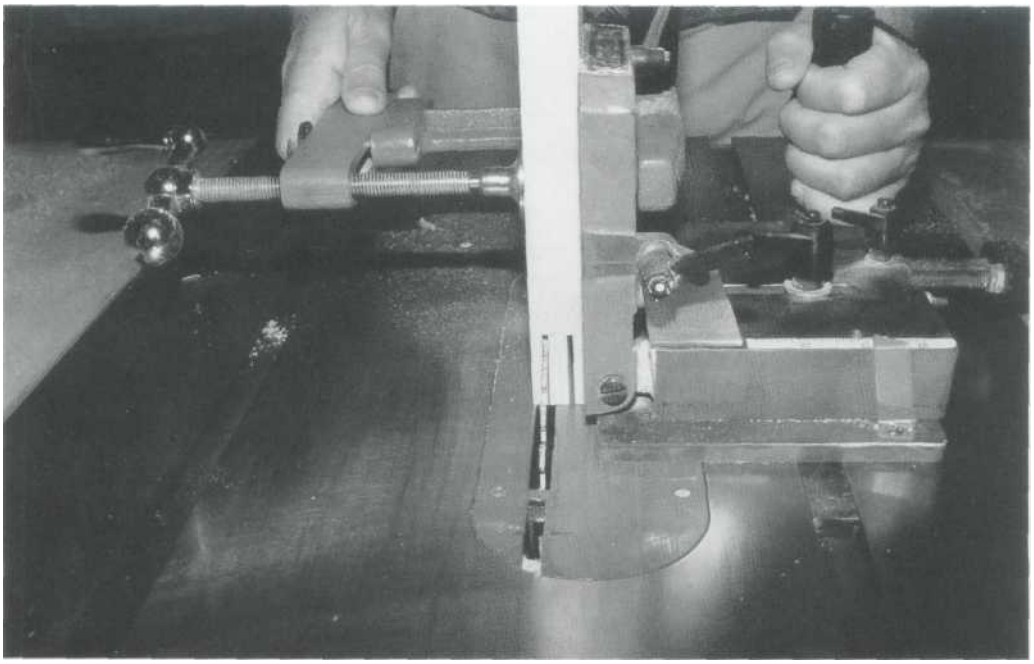
MATERIALS LIST

Butler Table

No.	*Letter*	*Item*	*Dimensions T W L*
1	A	Top	¾″×20″×30″
4	B	Legs	¾″×1¾″×1¾″
2	C	Apron	¾″×3″×27″
2	D	Apron	¾″×3″×17″
2	E	Gallery	¾″×3″×29″
2	F	Gallery	¾″×3″×19″

of the upstairs staff. His world was run from what was known as the butler's pantry—not a pantry in the true sense of the word, more a small office. He waited upon the family's every need, bringing the daily newspaper to the master of the house in the morning and serving all the formal meals—breakfast, lunch, dinner and, of course, afternoon tea. Afternoon tea in England, and to a lesser extent in America, was and still is a very important part of the day, especially among the upper class where it was always served by the butler. Afternoon tea was something of a ritual, taken casually in the parlor or, on fine days, outside on the lawns among the flowers.

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A tenoning jig is great for making quick, accurate tenons. You set the depth of cut for the blade, the position of the jig support plate, run the cut on one side, reverse the piece and run it, again, and then flip the piece end over and repeat the process.



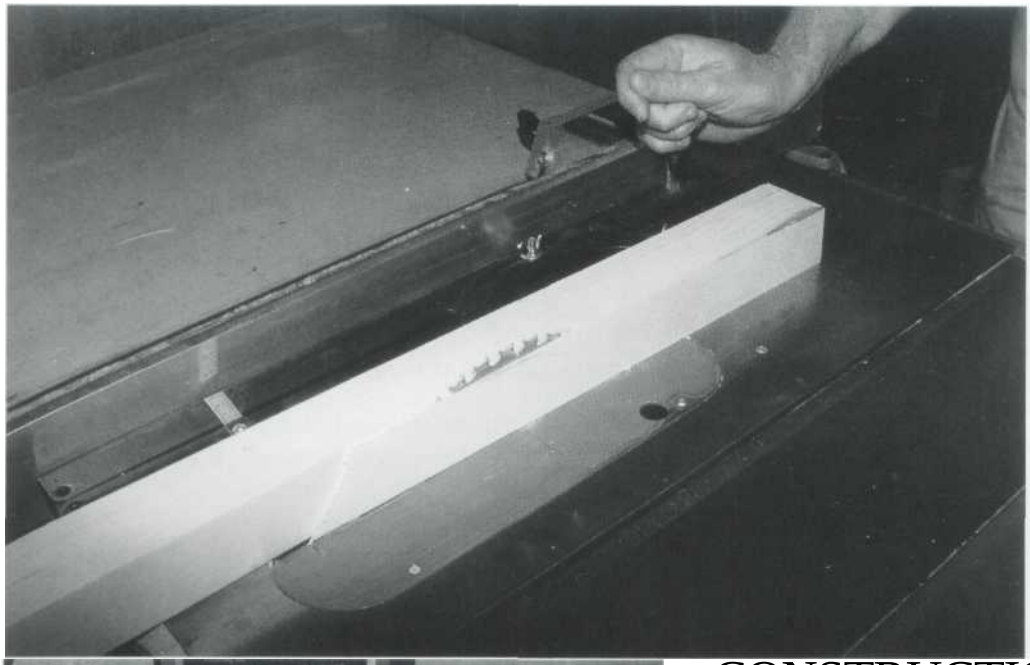
Set the depth of cut for your table saw blade to remove the waste and reveal the cheeks of the joint, and then, if your table saw has a movable rip fence, set it as a stop so you can make a consistently accurate shoulder cut. If not, you'll need to use a sacrifice fence.

It consisted of a pot of tea, small sandwiches and tea cakes, often scones and jam. All this was brought to 1 he family either on a large tray placed on a low table or a tray with legs of its own—a tea table.

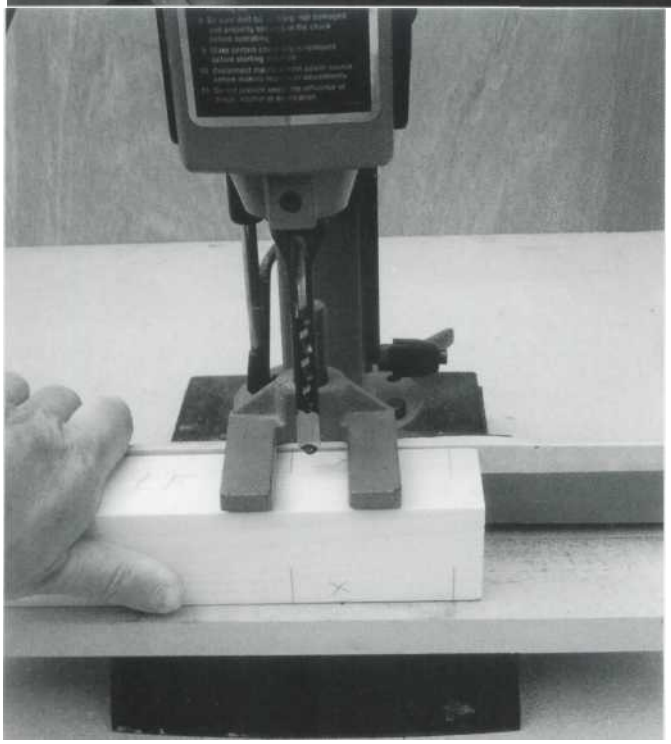
The earliest tea tables were simply that, small tables. Later they incorporated a low gallery pierced with handle holes. Those made around the middle to late nineteenth century had hinged sides, also pierced with handle holes, that stopped the goodies sliding off when the piece was being carried, but dropped flat when the journey from below stairs was complete, thus increasing the size of the tabletop.

It's the latter design you're probably familiar with and certainly see most often. Few of the earlier versions survived the centuries.

The early version of the butler's tea table was quite an elegant piece. Some had turned legs, some square and straight and some tapered. The gallery also took many forms. Some were no more than a rail that extended all around the edge of the tabletop, the piece being carried by placing the hands around the edges. Others were quite ornate. Ours incorporates the best of both worlds.



Use your tapering jig to cut the tapers to the legs. If you don't have one, it's a relatively simple job to make one



To be sure you mill the mortises in the correct position, it's best to lay out the legs before you start, and then mark the position of each mortise and each leg as left front, right front and so on.

CONSTRUCTION OUTLINE

This fairly simple project can easily be completed over a weekend. The construction for the legs and apron is mortise and tenon. The top is fastened to the understructure with screws in pocket holes. The gallery is fastened to the top also with screws. The gallery is constructed using dovetail joints at the corners, and the legs, being nicely tapered, are very much in the style of Hepplewhite.

BUILDING THE TABLE

STEP 1. Cut all the pieces to size.

STEP 2. Build the board for the top.

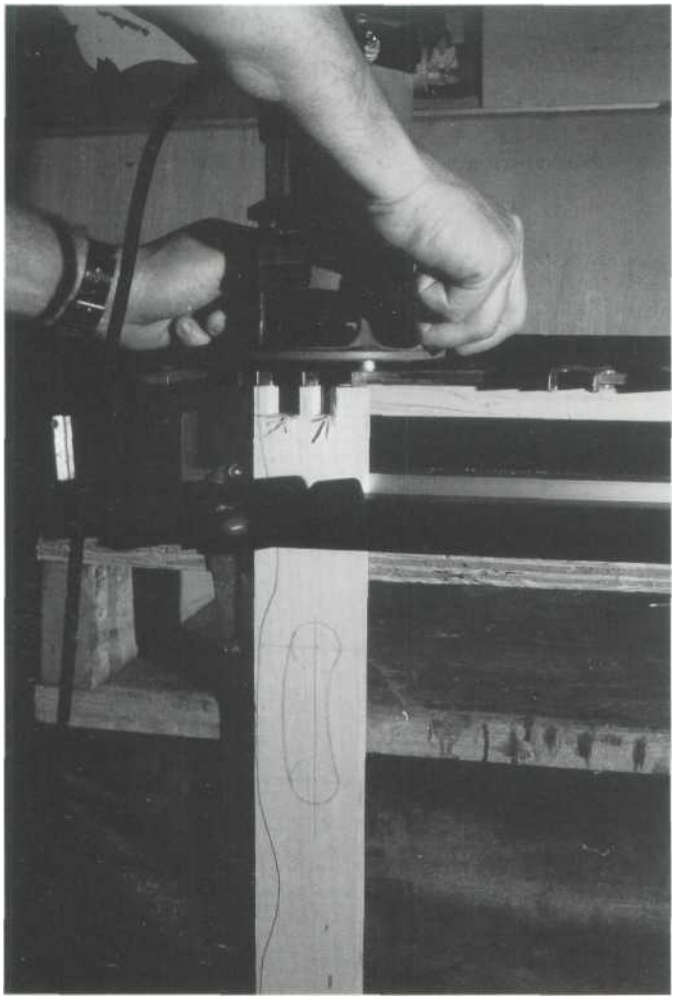
STEP 3. Using either the jointer, as I do, or the table saw and beginning 6" from the top, cut the tapers to two adjacent sides of each of the four legs. Be sure to cut two left- and two right-hand. The taper is roughly 2°.

STEP 4. Cut mortises 2" long X 3/8" wide X 1" deep to the tops of the tapered sides of all four legs. Set the mortises ½" from the top of the leg.

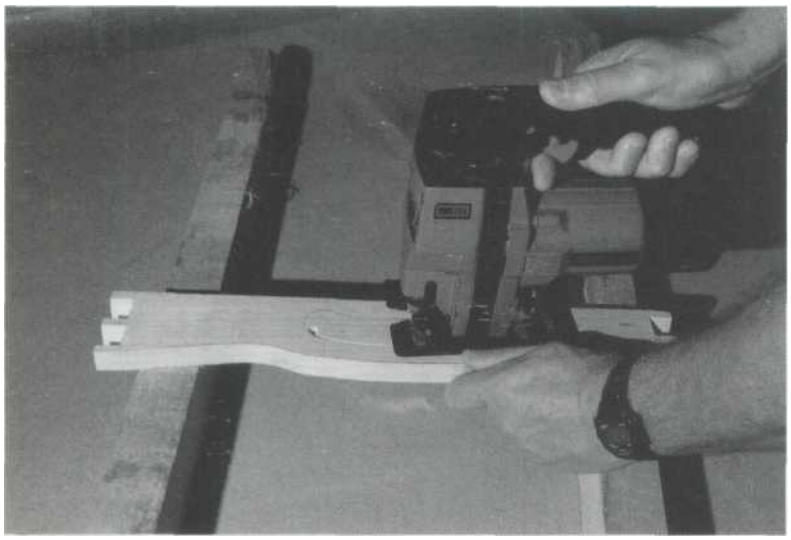
STEP 5. Mill tenons 2" long x 3/8" wide x 1" deep to the ends of all four pieces of the apron.

STEP 6. Dry assemble the pieces together to make sure you have a good fit, then disassemble them again**.**

STEP 7. Mill through dovetails to the ends of all four pieces that will make up the gallery.



It's best to mill the dovetails to the pieces of the tray section before you cut out the details.



To cut out the details to the handles and sides of the tray section, raise the pieces by using a couple of pieces of 2 x 4, and then use your jigsaw to remove the waste.

STEP 8. Dry assemble the gallery to make sure you have a good fit—the joints should be tight allowing for little or no movement between the pieces.

STEP 9. Disassemble the gallery and, using the pattern, cut the detail and handle slots to the gallery.

STEP 10. Sand all the parts smooth and break all sharp edges.

STEP 11. Apply an appropriate stain (I used Jacobean by Minwax) to all of the parts.

STEP 12. Glue, assemble and clamp the understructure and leave it overnight to completely cure.

STEP 13. Glue, assemble and clamp the gallery and leave it overnight to cure.

STEP 14. From underneath, using six no. 6 X 1 5/8" screws—two along each side and one at each end—fasten the gallery to the top. You should elongate the holes slightly to allow the top to breathe.

STEP 15. Mill six pocket holes to the upper inside edges of the understructure's apron. If you have a drill press you do this before you do the assembly (see drawing and photo).

STEP 16. Assemble the top to the understructure.

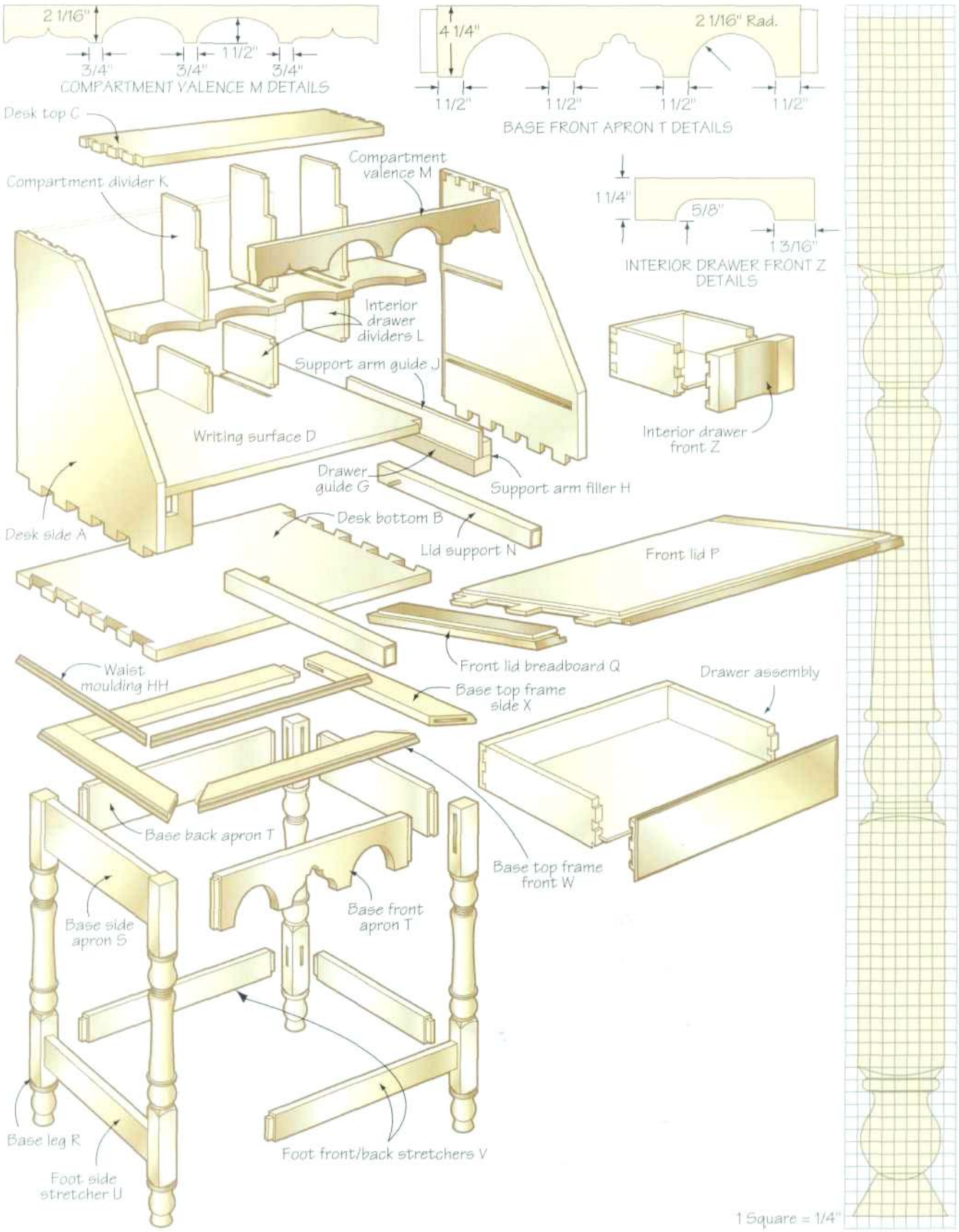
FINISHING

No big surprises here. I simply apply a half-dozen coats of seedlac over a couple of days and it's done.

SLANT-LID DESK ON FRAME



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SLANT-LID DESK ON FRAME

inches (millimeters)

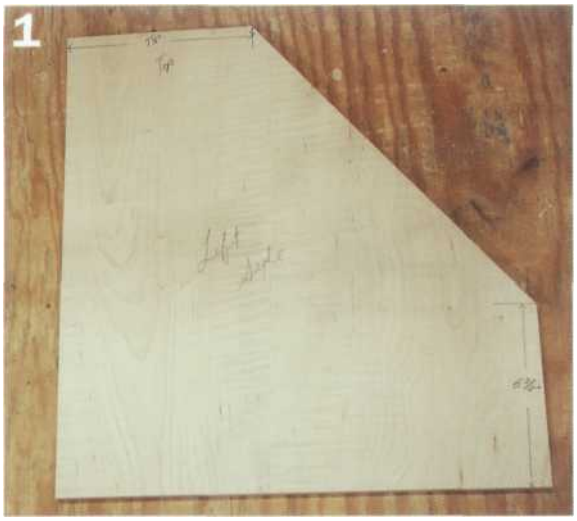
REFERENCE	QUANTITY	PART	STOCK	THICKNESS	(mm)	WIDTH	(mm)	LENGTH	(mm)	COMMENTS
A	2	desk sides	tiger maple	3/4	(19)	17 3/8	(442)	18	(457)	
B	1	desk bottom	pine	3/4	(19)	17 3/8	(442)	23 3/4	(603)	tiger maple on front edge
C	1	desk top	tiger maple	3/4	(19)	8	(203)	23 1/4	(590)	
D	1	writing surface	tiger maple	3/4	(19)	16 3/4	(425)	22 5/8	(575)	
E	1	middle shelf	tiger maple	1/2	(13)	6 3/8	(162)	22 5/8	(575)	
F	2	face-frame dividers	tiger maple	3/4	(19)	1 3/4	(45)	4	(102)	
G	2	drawer guides	pine	7/8	(22)	1 3/4	(45)	15	(381)	
H	2	support arm fillers	pine	1	(25)	1 3/4	(45)	15	(381)	
J	2	support arm guides	pine	1/4	(6)	2	(51)	15	(381)	
K	3	compartment dividers	tiger maple	1/4	(6)	6 3/8	(162)	8	(203)	
L	3	interior drawer dividers	tiger maple	1/4	(6)	6 3/8	(162)	3 7/8	(98)	
M	1	compartment valance	tiger maple	3/8	(10)	2 1/4	(57)	22 3/16	(564)	
N	2	lid supports	tiger maple	15/16	(24)	1 3/8	(35)	18*	(457)	size to fit
P	1	front lid	tiger maple	13/16	(21)	15 5/8	(397)	21 1/4	(539)	1 1/4" (32) TBE
Q	2	front lid breadboards	tiger maple	13/16	(21)	2	(51)	16 1/2*	(419)	trim to size
R	4	base legs	tiger maple	1 3/4	(45)	1 3/4	(45)	24 1/4	(616)	
S	2	base side aprons	tiger maple	3/4	(19)	4 1/4	(108)	16 1/2	(419)	1" (25) TBE
T	2	base front and back aprons	tiger maple	3/4	(19)	4 1/4	(108)	23 1/2	(597)	1" (25) TBE
U	2	foot side stretchers	tiger maple	3/4	(19)	1 3/4	(45)	16	(406)	3/4" (19) TBE
V	2	foot front and back stretchers	tiger maple	3/4	(19)	1 3/4	(45)	23	(584)	3/4" (19) TBE
W	1	base top frame front	tiger maple	3/4	(19)	2 3/4	(70)	26	(660)	45° BE
X	2	base top frame sides	tiger maple	3/4	(19)	2 3/4	(70)	18 1/2	(470)	45° OE
Y	1	base top frame back	pine	3/4	(19)	2 3/4	(70)	22 1/2	(572)	1" (25) TBE
Z	4	interior drawer fronts	tiger maple	1 1/4	(32)	3 1/2	(89)	5 5/16	(135)	
AA	8	interior drawer sides	pine	3/8	(10)	3 1/2	(89)	5 1/8	(130)	
BB	4	interior drawer backs	pine	3/8	(10)	3	(76)	5 5/16	(135)	
CC	4	interior drawer bottoms	pine	1/4	(6)	4 7/8	(124)	4 7/8	(124)	
DD	1	large drawer front	tiger maple	7/8	(22)	4	(102)	18 5/8	(473)	
EE	2	large drawer sides	pine	1/2	(13)	4	(102)	13	(330)	
FF	1	large drawer back	pine	1/2	(13)	3 1/4	(82)	18 5/8	(473)	
GG	1	large drawer bottom	pine	9/16	(14)	13	(330)	18 3/16	(462)	
HH		waist moulding	tiger maple	1/2	(13)	3/8	(10)	6 lf	(1830)	
JJ	1	set of backboards	pine	1/2	(13)	16 3/8	(416)	22 3/16	(564)	trim to size

Note: TBE = tenon both ends; BE = both ends; OE = one end.

hardware

6	1/2" (13mm) Brass knobs with antique finish for small drawer and lid support	item #H-42	Horton Brasses	Reproduction nails
1 pair	1 1/2" × 2 7/8" (38mm × 73mm) Antique-finish drop-leaf hinges	item #H-510	Horton Brasses	1/4" × 1/4" (6mm × 6mm) Square pegs
2	Antique-finish drawer pulls	item #H-114	Horton Brasses	Drawer stops
1	Antique-finish drawer escutcheon	item #H-115E	Horton Brasses	#20 Biscuits
1	Lid lock	item #LK-20	Horton Brasses	Moser Medium Amber Maple stain
1	Antique-finish lid escutcheon	item #H-114E	Horton Brasses	400-Grit wet/dry sandpaper
	Square 1/4" (6mm) pins			Boiled linseed oil
	Glue blocks			Blond shellac
	1 1/4" (32mm) Slotted-head wood screws			#0000 Steel wood
	3/8" (10mm) Dowel			Behlen Wool-Lube
				Paste wax

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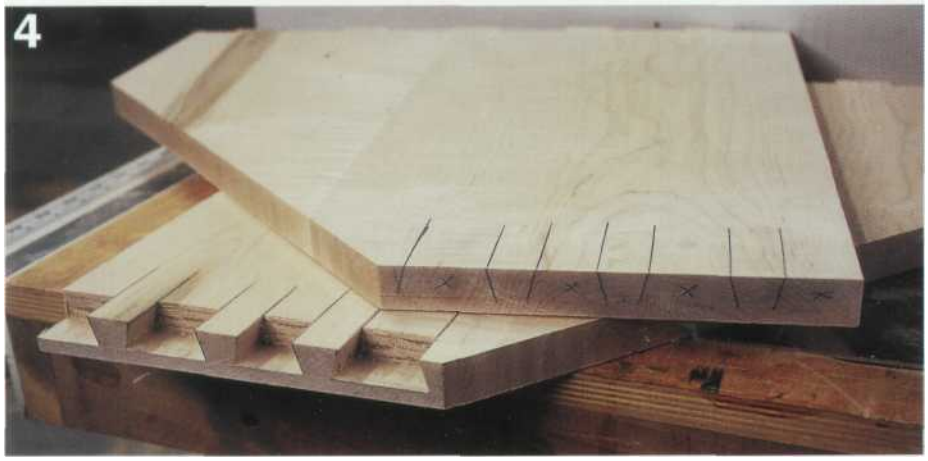
step 1 Begin this project by milling a pair of desk sides for the slant-lid portion of the desk. Identify the sides, making sure they are mirror images.

step 2 Lay out and form the pins on the desk sides, marking the depth to only 3/8". I make sure to end each side with half tails so that I can cut the rabbet for the back without stop-cutting (see step 7).

step 3 Cut the desk bottom to size, shown with the matching hardwood at the front and secondary wood making up the balance, and create a 3/8" x 3/4" rabbet at each end. Place the desk side in position and cut the corresponding tails. This detail allows you cover the dovetails with a small moulding and still keep the strength of the joint.









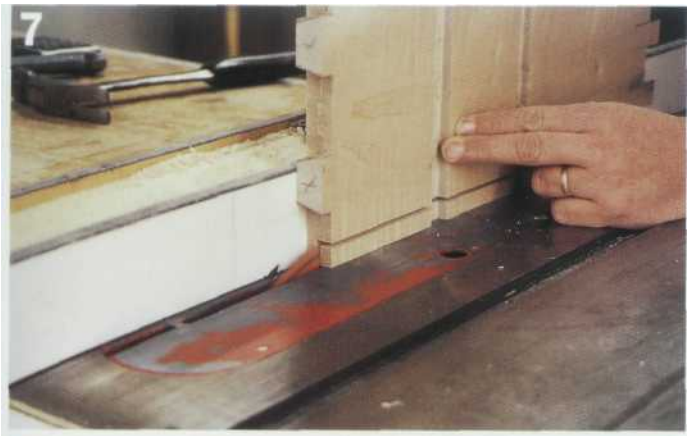


step 4 Lay out and cut the pins on **the** desk sides for the half-blind dovetails needed for the desk top. Again, leave a half tail at the rear

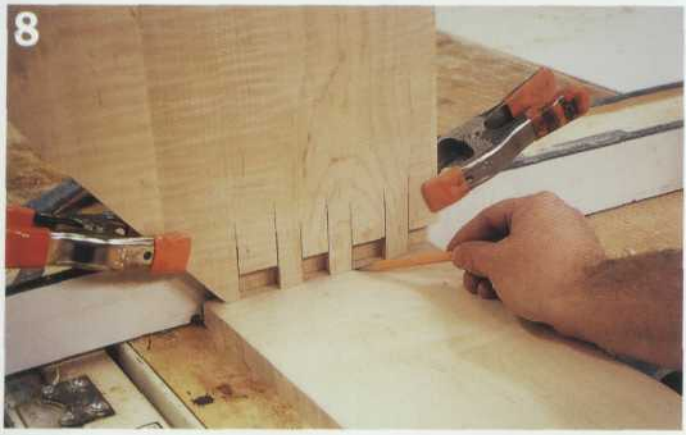
step 5 Mark the location for the writing surface and create the stop-dado. I like to use a straight-edge and 3/4" pattern-cutting bit.

step 6 Cut the second dado for the middle shelf.

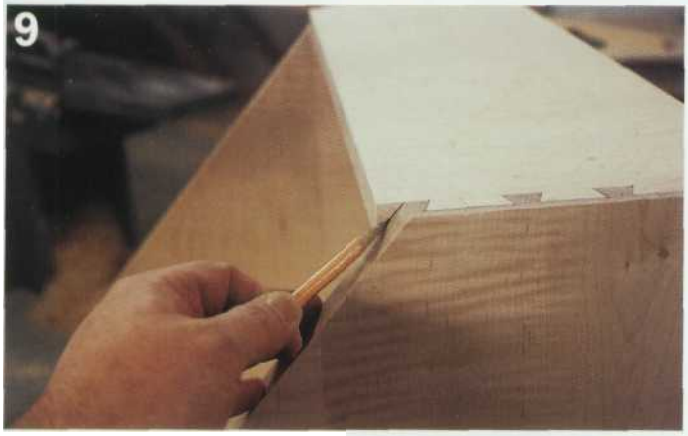
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step 7 Next, make the rabbet for the backboards. I make two cuts on the table saw. First, set the blade height to 3/8" and move the fence 1/2" away **to** make **the** cut. Then reset the blade to cut 5/8" high and move the fence to 5/16". This is shown here and completes the rabbet. Make sure to cut the inside rear of each side.



Step 8 With your desk top roughed to width and cut to length, invert the sides into place, transfer the layout for the tails and complete the **joint.**

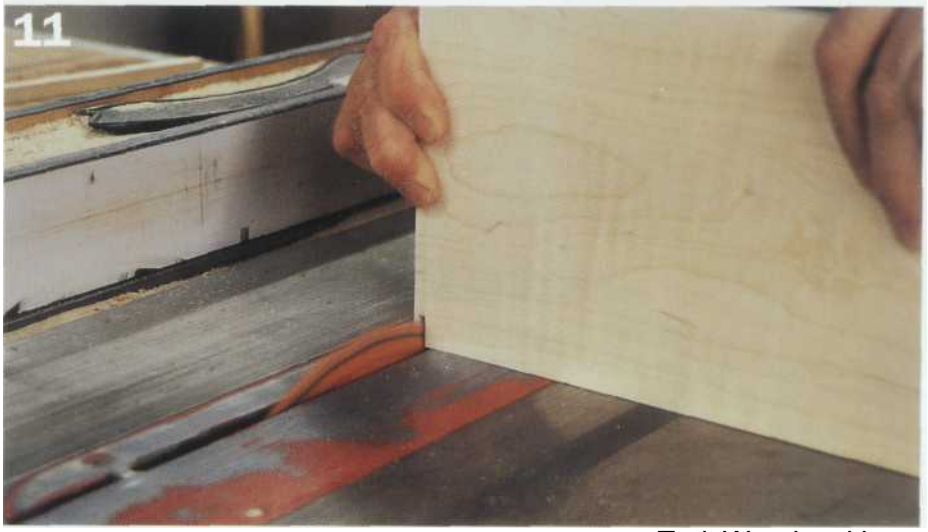




step 9 Tap the top into place, mark the front edge and cut the piece to its final width.

step 10 Next, back cut the lower edge of the top with an angle that is 90° to the top front edge, leaving a 3/4" run at the first cut,

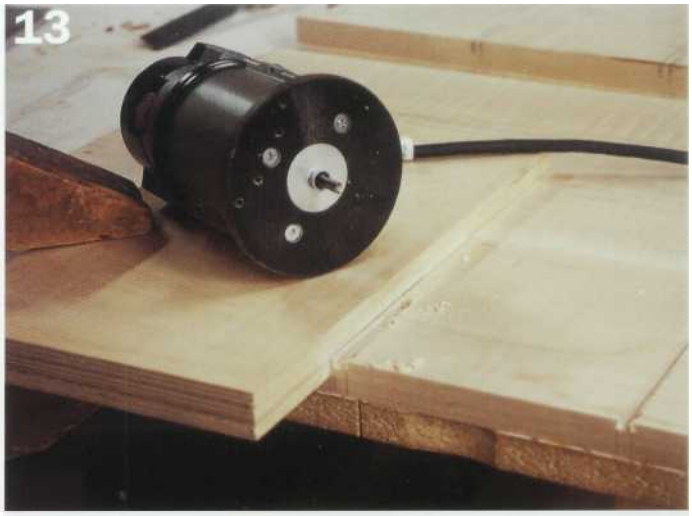
step 11 With the case temporarily together, cut and install the writing surface and middle shelf by notching the front edge to fit the stop dado cuts made earlier.



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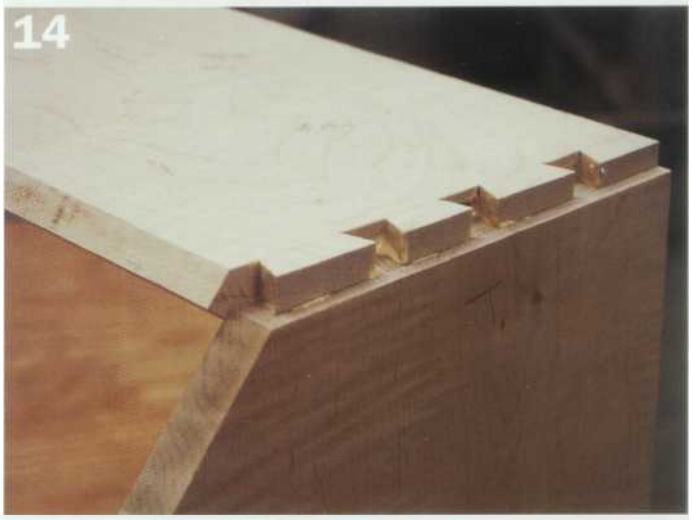


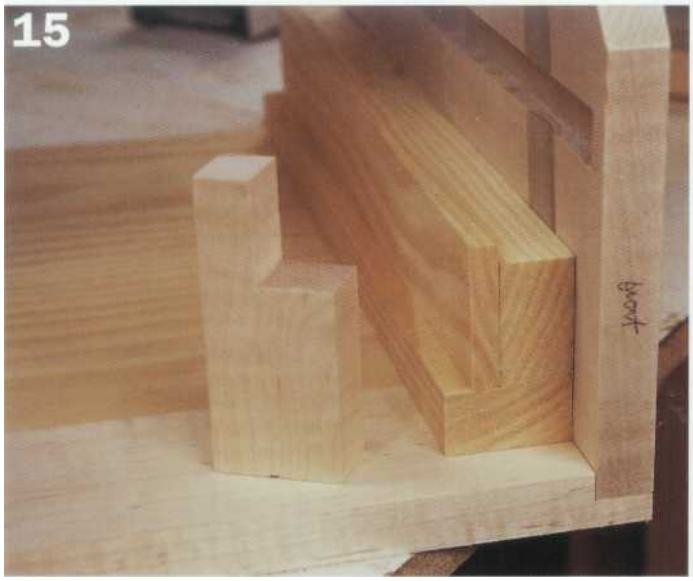
Step 12 Mark the location of the grooves tor the compartment dividers on the writing surface and underside of the desk top. Then use a straightedge to transfer the lines onto the other shelf.



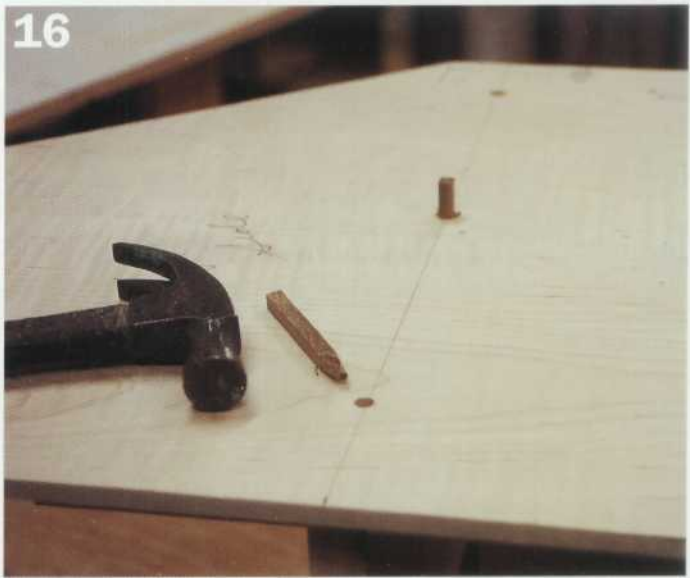
step 13 Dismantle the case and cut the 1/4"-wide dadoes for the dividers on the top of the writing surface, both top and bottom of the middle shelf and the underside of the desk top. Remember that all the cuts are stop-dado cuts and the cuts on the middle shelf are stacked over each other so they should be no more than 1/8" deep.

step 14 With the cuts finished, glue the case together.





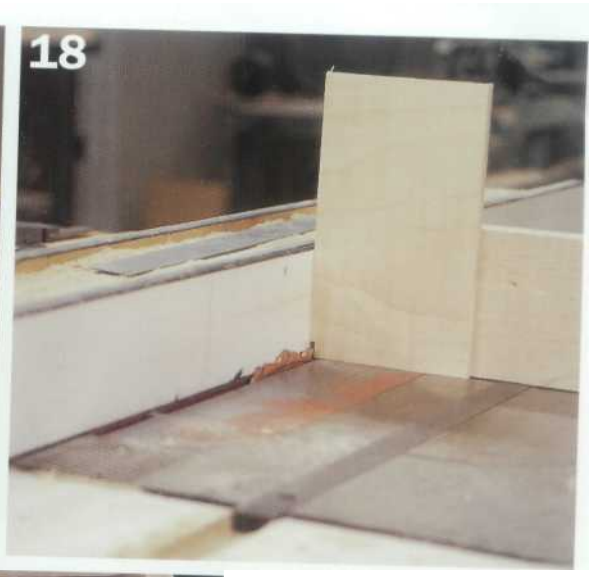
Step 15 While the case is drying, take advantage of the access to install the interior drawer dividers and support arm guides as shown. Attach the drawer guides and the support arm fillers, then glue the front few inches and nail the assemblies into place. Finally add the support arm guides. Do not install the face-frame dividers at this time.

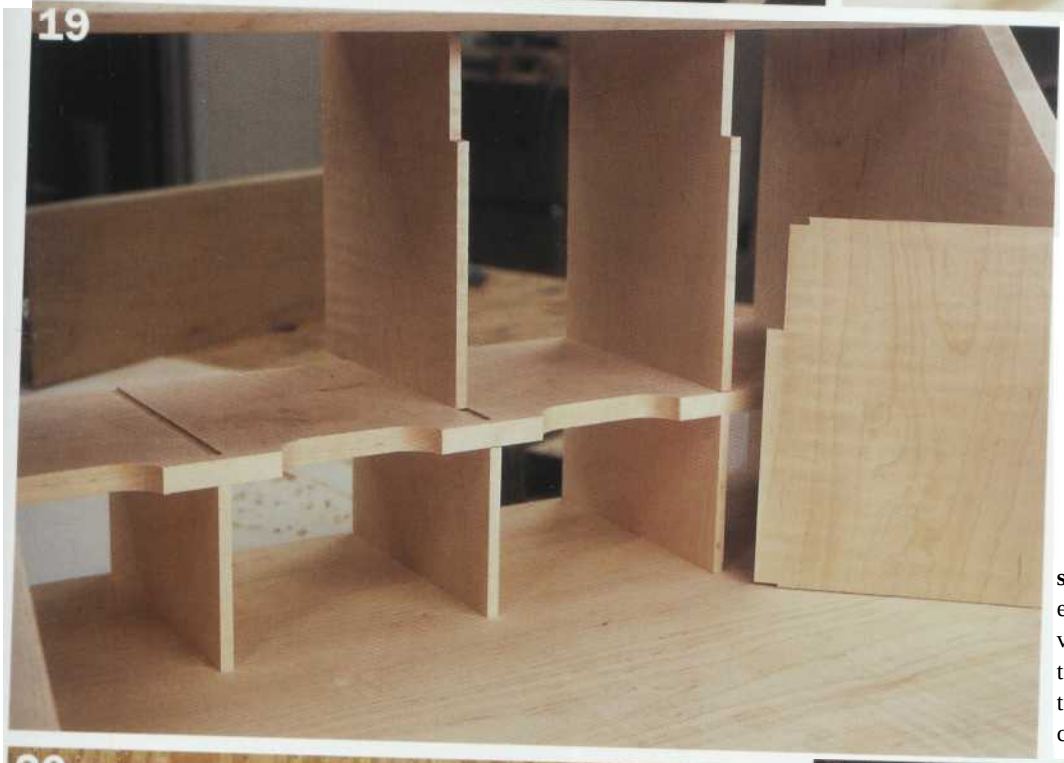


step 16 With the guide assemblies in place, slide the writing surface in and peg the piece through the side with 1/4"-square pins.

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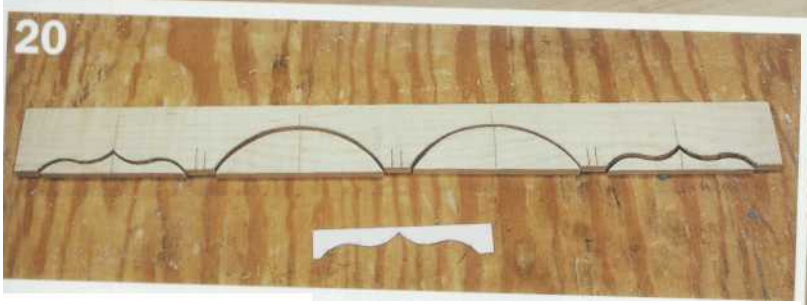




step 17 Next, create the blocked drawer area in the middle shell. Mark 3/4" from each compartment divider and use a 5/8" radius at each end of the area to be re moved. Cut it on the band saw and smooth the surface.

Step 18 Slide the completed middle shelf into the case. Measure and cut the interior drawer dividers to fit the stop-dado cuts by notching the front edge at the top and bottom.

step 19 With the drawer dividers fit, cut the compartment dividers the same, remembering to create a second notch at the top to accommodate the compartment valance.

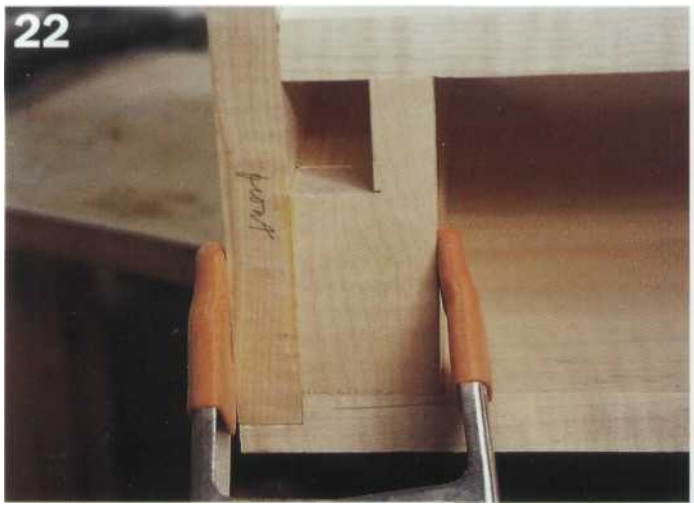




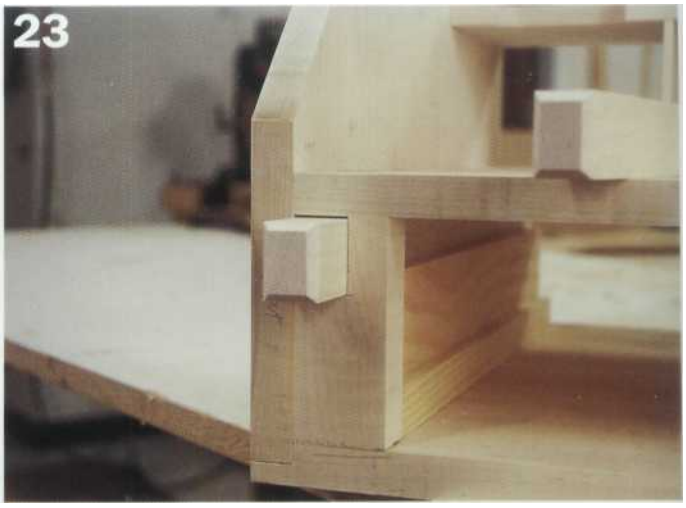
step 20 fit the compartment valance to the case, then lay out the decorative cuts as shown: Make cyma curves for the outer compartments and radius cuts for the centers, allowing a 1/4" flat on each side of the dividers.

Step 21 Install the compartment valance with glue and small blocks.

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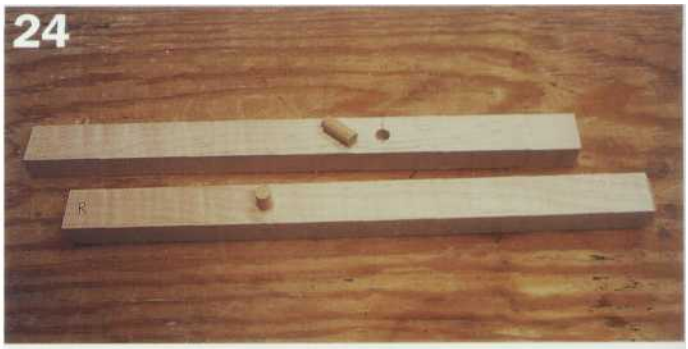


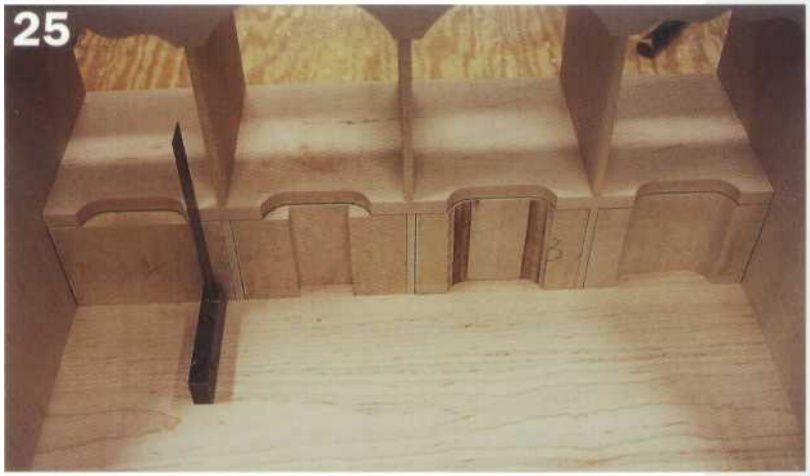
step 22 Next, glue the face-frame dividers into place and complete the installation with a screw through the bottom into the divider.



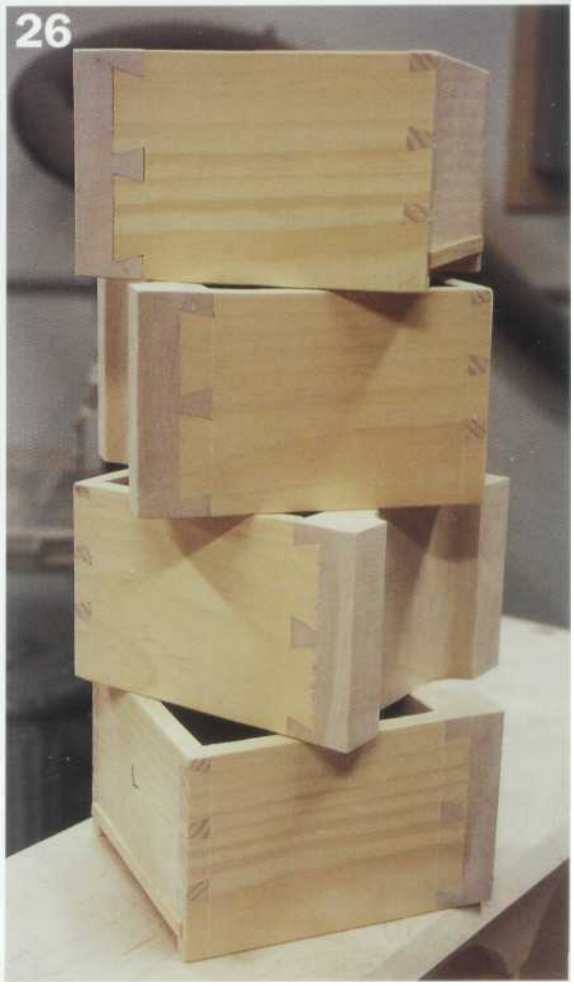
step 23 Mill the lid supports to fit into their respective areas. Create the beveled end on each support and fine tune the unit.

step 24 Mark the right and left lid supports and then drill for the 3/8" dowel on the inside face that will act as a stop. Place the hole so that a minimum of 10" extends out from the front.



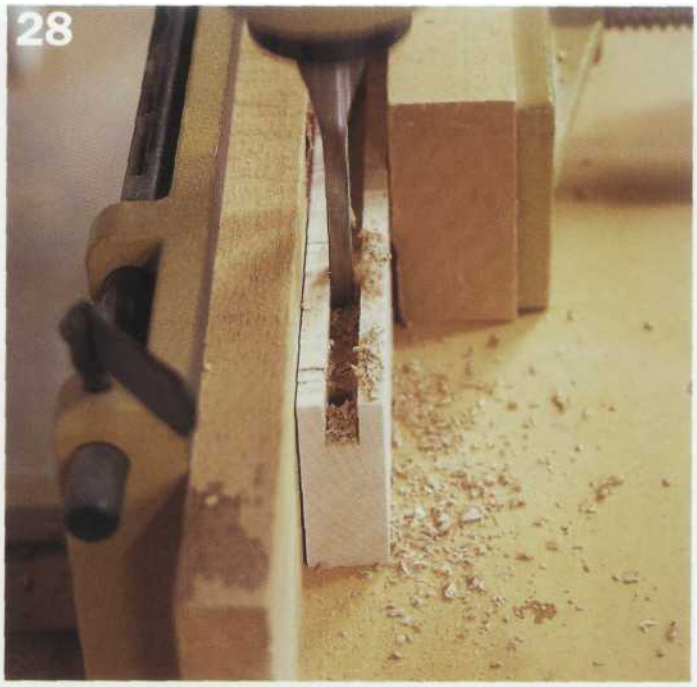


step 25 Build the drawers. This picture shows the tour steps to a finished drawer front. First, mill and fit the fronts in place. Use a small square to align the fronts, and mark the top edge by using the middle shelf profile as a guide. Next, use the table saw to remove as much waste as you can up to the scribe line. Then use the band saw to remove the rounded coiners. Finally, sand the area smooth.



step 26 Complete the five drawer boxes. I use hand-cut dovetails and place the bottoms into the grooves set in the drawer sides and front. The bottoms of the interior drawers are attached with brads. In the large drawer, the bottom is nailed through a slot with a reproduction nail.

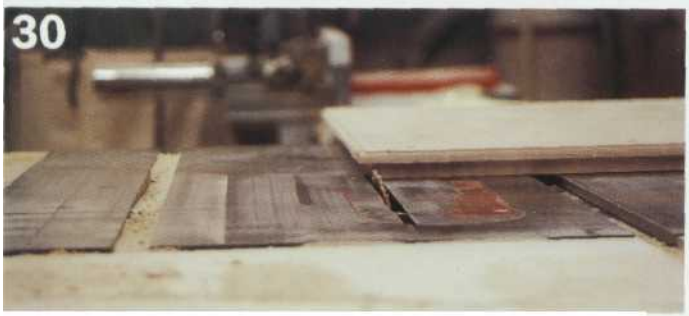


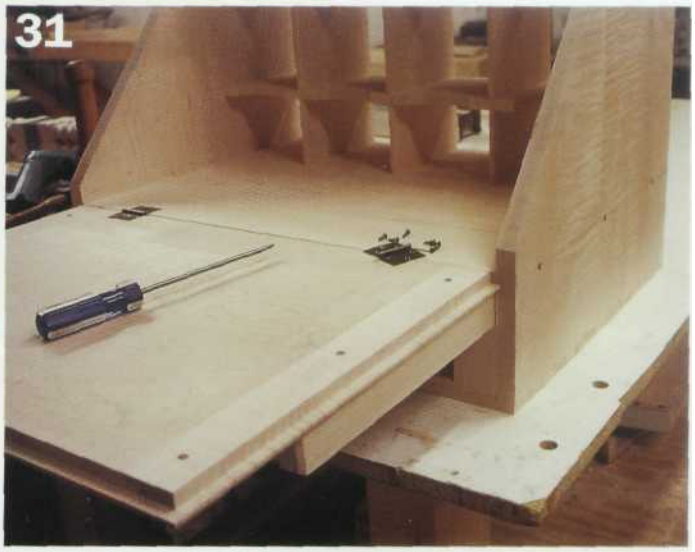


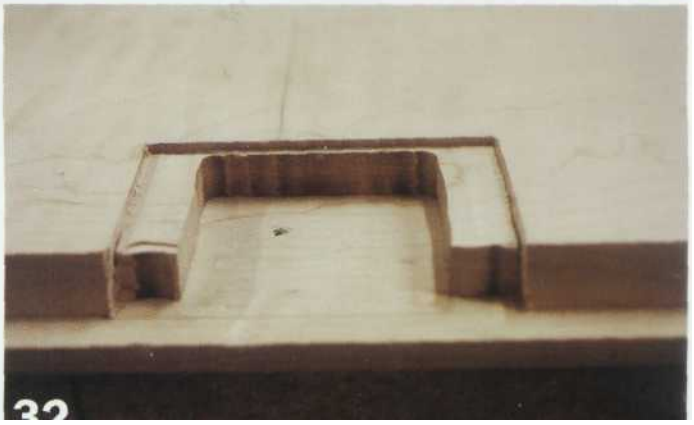
step 27 Mill the parts for the desk lid. Create the breadboard ends by cutting the tongue on the front lid and a 1/2" groove on the edges of the breadboard ends. (On a piece this size I generally make this cut on the table saw just as you would a tenon.) Then lay out the three extended areas that will accept the square pegs and remove the waste material.

Step 28 Transfer the marks onto the breadboards and create the mortises.









step 29 Slide the ends into place, damp and drill a 1/4" hole through each tenon. Remove the ends and elongate the outer holes, leaving the center round. Finally, glue the center area and drive square pegs into place, solidly gluing the center and placing glue only at the last 1/4" 1/4" the outer pegs to hold them in place.

step 30 Make the lipped edges on the lid sides. For the top edge, set the blade at the angle matching that of the desk top.

step 31 Mortise the writing surface for the lid hinges. Slide in the support arms, position the lid and transfer the hinge marks onto the lid. Finish installing the lid and hinges.

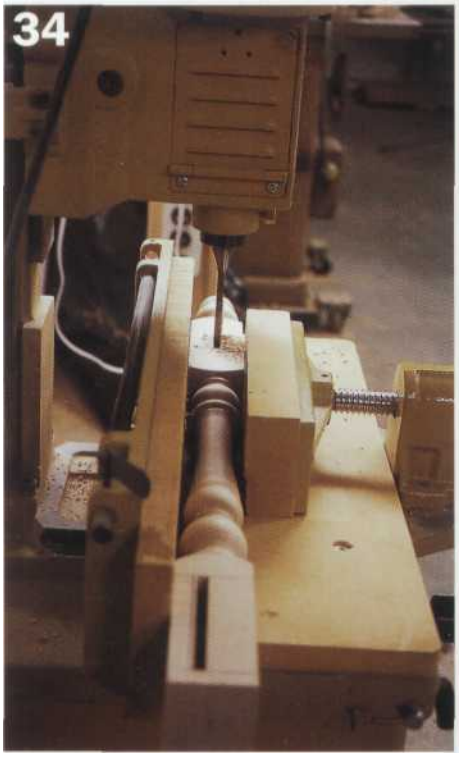
step 32 With lid installation complete, remove the lid and mortise and fit the lock.

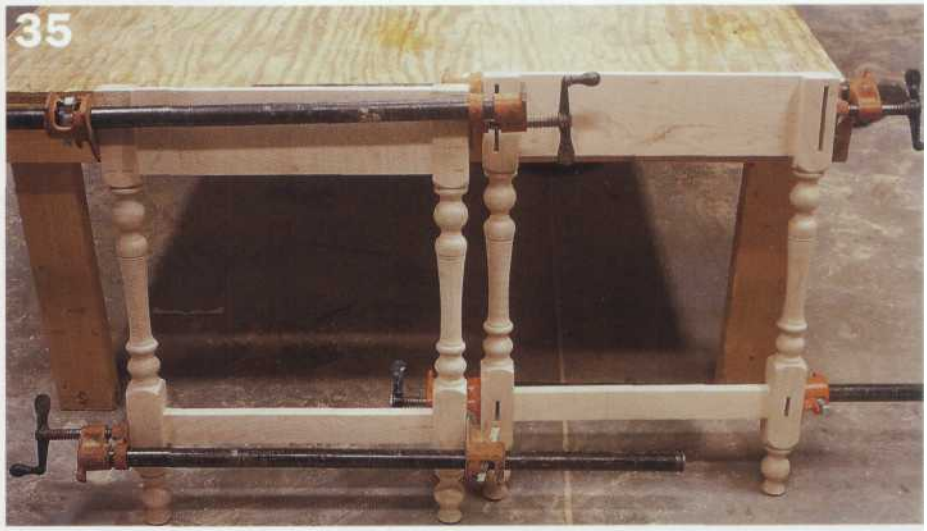


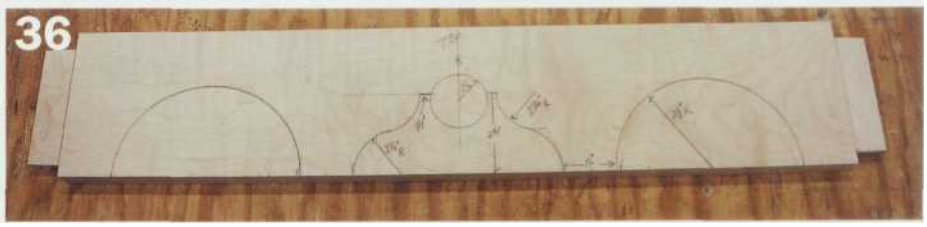
step 33 Glue and tack drawer stops to the back edge of the writing surface to align the drawer fronts with the middle shelf profile.

step 34 Turn the base legs according to the plan and create the mortises for the aprons (leaving a 1/4" reveal) and stretcher pieces (in the center of each leg).

step 35 Mill the aprons and stretchers to size, then make the matching tenons and assemble the two sides.





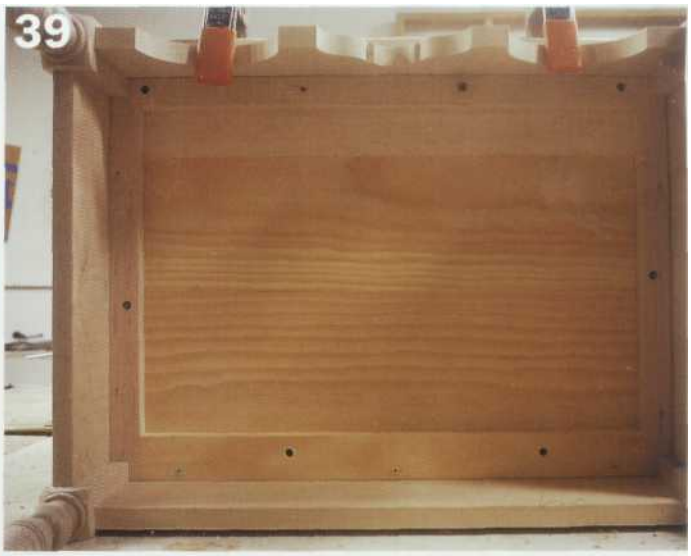




step 36 Lay out the design cuts on the front apron. Make the cuts, sand and finish the assembly of the base section, making sure to square the base.

step 37 Next, mill the pieces for the base top frame. Create the mortise-and-tenon joinery at the rear with 45° angle cuts and biscuits at the front edge. When ready, glue the frame. Once dry, sand the frame and create the moulding profiles.











step 38 Attach the top frame to the base with reproduction nails and glue.

step 39 With the base complete, lay the desk and base on a flat surface and connect the two with 1 1/4" screws.

step 40 Turn the piece back onto its feet, then make and install the waist moulding. Final sand all parts, and it is off to the finish room.

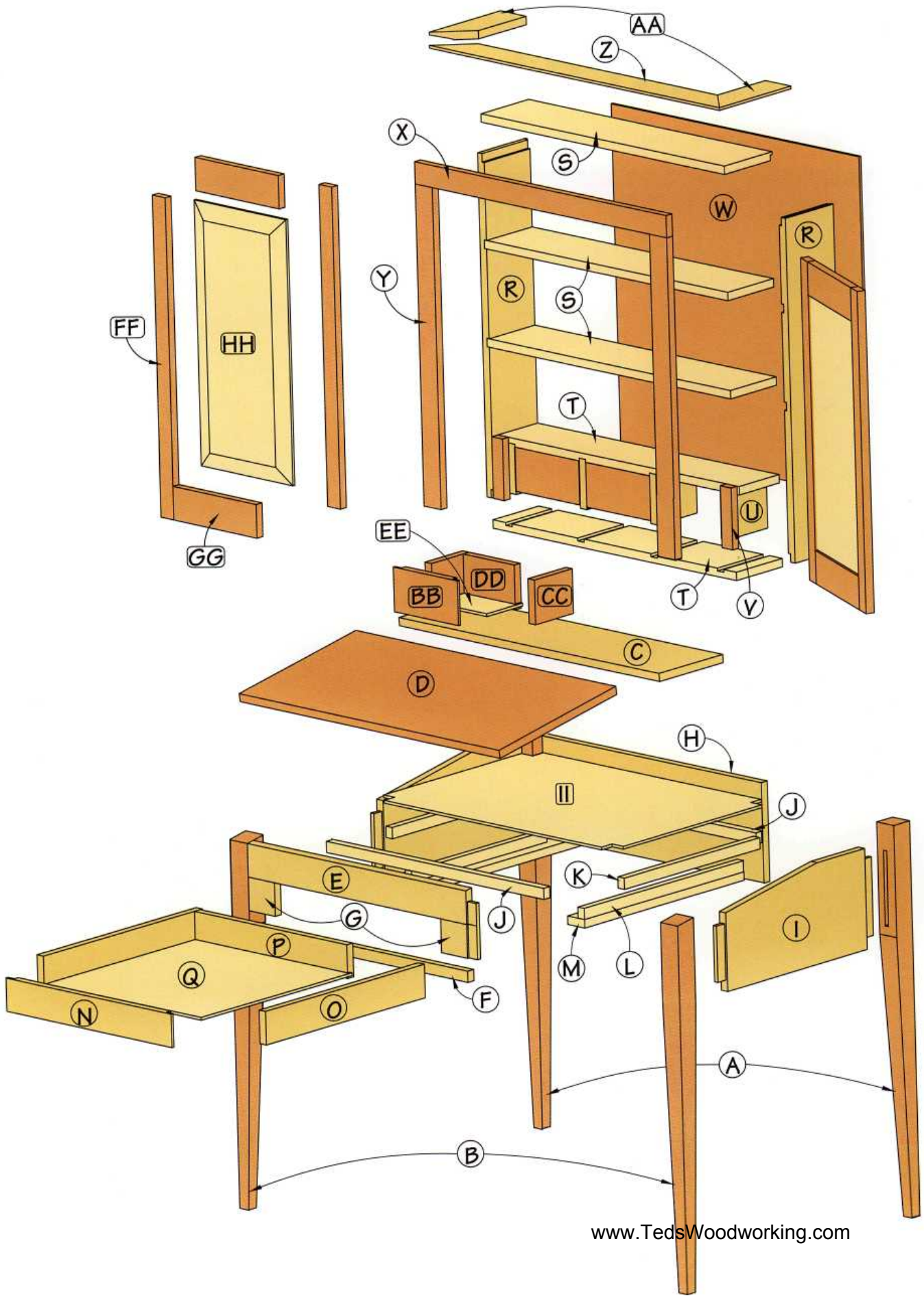
step 41 I chose to finish this desk with an application of aniline dye (J.E. Moser's Medium Amber Maple). After a light sanding with 400-grit wet/dry paper, I brushed on a coat of boiled linseed oil, which deepens the graining. Next, I sprayed three coats of blond shellac, sanded completely and sprayed an additional two coats. After it sits for **a** day or two, I rub the finish with #0000 steel wool and Behlen Wool-Lube. Finally, I apply a coat of paste wax.

tip In making a frame as used in this project, or any frame of this design, it is important to have all pieces sized correctly to en sure that the frame is square. To correctly size the rear piece, cut the front piece to size, then lay out the material needed to create the tenons on the rear piece, as shown. Match the front piece to the rear piece and mark the cut line at the opposite end.

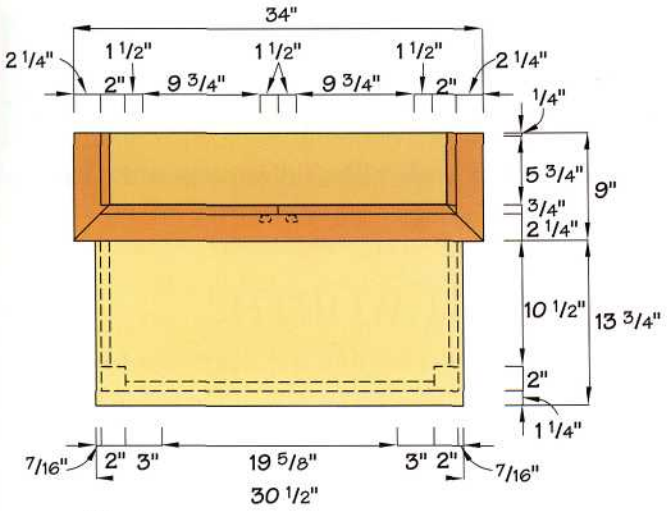
Plantation Desk



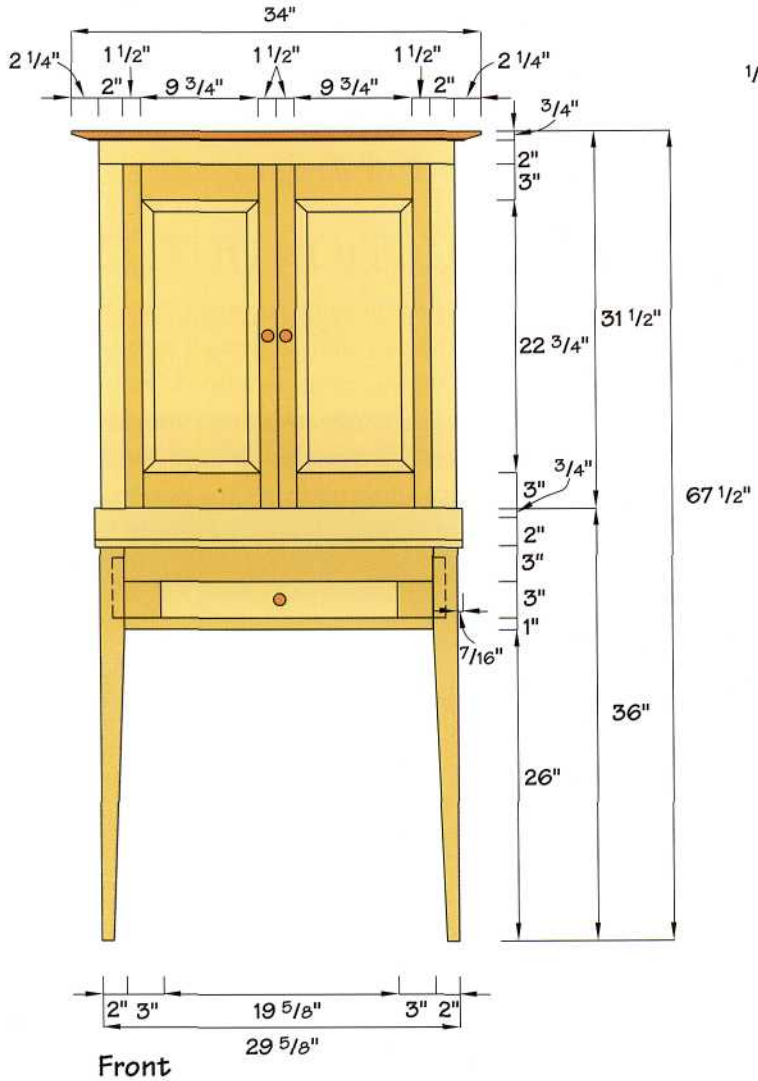
This type of desk first appeared around the turn of the nineteenth century. While the masters were turning out elaborate drop or fall-front secretaries, country furniture builders developed this much simpler style called a plantation or cupboard desk. Some were more elaborate than others. Some Shaker versions had fall-fronts that revealed several small drawers and a couple of pigeon holes: it was



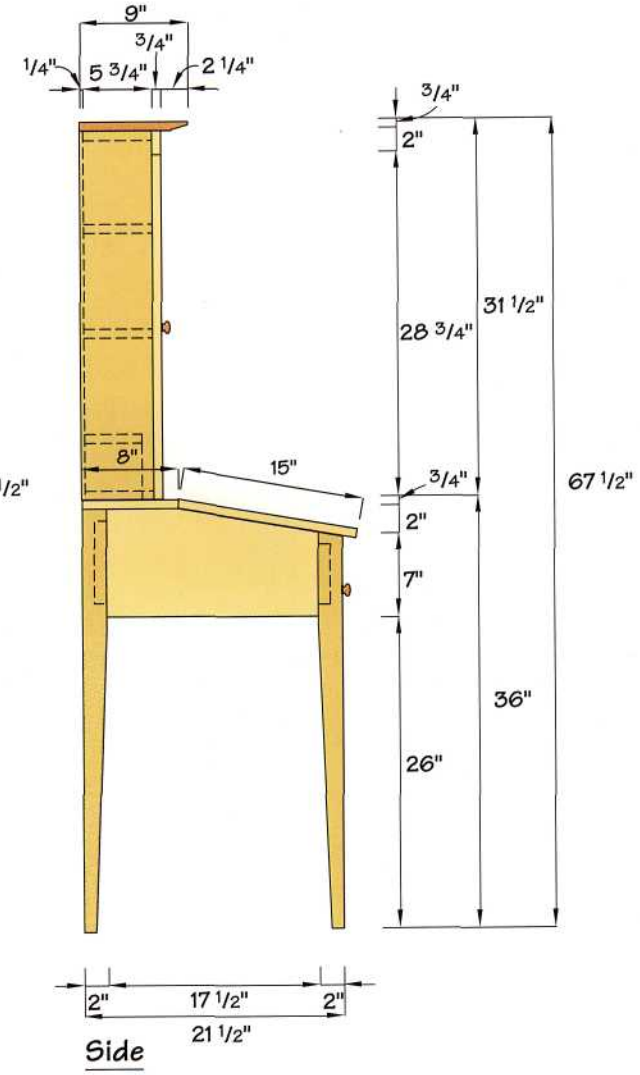
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Top



Front



Side

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MATERIALS LIST

Plantation Desk

No.	*Letter*	*Item*	*Dimensions T W L*
2	A	Legs	2½″×2½″×35¼″
2	B	Legs	2½″×2½″×33″
1	C	Lid	1″×8″×30½″
1	D	Lid	1″×15″×30½″
1	E	*Front	¾″×3″×27⅝″
1	F	*Front	¾″×1″×27⅝″
2	G	*Front	¾″×3″×4″
1	H	Back	¼″×9″×27⅝″
2	I	Sides	¾″×9″×19½″
2	J	Cleats	¾″×1″×25½″
2	K	Cleats	¾″×1″×17″
2	L	Cleats	¾″×¾″×17½″
2	M	Cleats	¾″×2″×17½″
1	N	Drawer Front	¾″×3″×19⅝″
2	O	Drawer Sides	¾″×3″×19″
1	P	Drawer Back	¾″×2½″×18⅝″
1	Q	Drawer Bottom	¼″×18½″×18⅝″
2	R	Upper Sides	¾″×6″×30¾″
3	S	Shelves	¾″×6″×28½″
2	T	Drawer Section	¾″×5″×28½″
2	U	Dividers	½″×5″×4½″
2	V	Spacers	¾″×1″×5½″
2	W	Back	¼″×31″×30″
1	X	Trim	¾″×2″×29½″
2	Y	Trim	¾″×2″×28¾″
1	Z	Crown	¾″×3″×34″
2	AA	Crown	¾″×3″×9″
Upper Drawers			
3	BB	Drawer Fronts	¾″×4″×7½″
6	CC	Drawer Sides	¾″×4″×4¾″
2	DD	Drawer Backs	¾″×4½″×6½″
2	EE	Drawer Bottoms	¼″×4″×6½″
2	FF	Door Stiles	¾″×1½″×28¾″
2	GG	Door Rails	¾″×3″×9¾″
2	HH	Door Panels	¾″×10¾″×24½″
2	II	Recessed Bottom	⅜″×17½″×26⅝″

*Includes for tenon

essentially a simple form of the more traditional secretary. The plantation or cupboard desk had a lift-top and was basically a cupboard on a frame. I have opted for this 1810 version: the plantation desk.

Some of these desks were made from hardwood—cherry, maple or walnut—but most were made from pine. Some had glass doors, some panel doors and some no doors at all. A few had a drawer below the writing section, as does ours.

CONSTRUCTION OUTLINE

As simple as most of these desks were, the somewhat challenging construction should be well within the capabilities of most moderately experienced hobbyists. There are one or two tricky areas you should be aware of. The top section has three small drawers set back from the shelves to allow room for the small pulls when the doors are closed. The dividers are made from 1/2 stock, which means you'll need to do either some planing or resawing.

The lift-top of the lower section slants forward at an angle of 10°. This means there are lots of angles to cut, the front legs are shorter than those at the rear and the tops are cut at an angle of 10°, the sides are also angled at 10°, so is the top edge of the front and the rear edge of the lift-top.

The bottom of the desk compartment is made from 3/8″ plywood secured to four cleats, and the drawer runners and guides are secured to two more cleats. These are all fairly simple to install and should be no cause for concern. As the plantation desk was basically a simple, homemade piece, the drawers are constructed using rabbets, glue and cut nails. The 1 1/2" cut-steel masonry nails you can buy at most hardware stores fill this task nicely and look quite authentic. You could, of course,

use blind dovetail construction, but the finished product, while looking much nicer, would not be authentic.

The legs are cut from 8/4 stock and tapered on two adjacent sides to 2°; be sure you make two left and two right, the tapers all facing inward and each other. The sides, front and back are secured to the legs using mortise-and-tenon joints. I used one of the newpolyurethane glues to achieve this. I like the way the glue expands to fill the joint.

The top and lid of the lower section (two pieces—lift section and fixed) is made from 1" furniture-grade pine. You could, of course, use the same good old shelving board from which the rest of the piece is made. The front of the lower section is made from four pieces of stock. The crown is simply made from nominal 1" stock, laid flat and cut just like a raised panel.

BUILDING THE DESK

STEP 1. Cut all the pieces to size, and cut the 3/8"-thick plywood bottom roughly to shape; you can make final adjustments later.

STEP 2. Build the board for the lid.

STEP 3. Using four pieces of stock, build the front of the lower section as laid out in the drawing.

STEP 4. Mill the dadoes in both sides of the top section as laid out in the drawing.

STEP 5. Glue, assemble and toenail the shelves to the sides of the upper section. Clamp, make sure the structure is completely square, then set it aside to fully cure.

STEP 6. Mill the tops of the two front legs—the two short ones—to an angle of 10°.

STEP 7. Cut the two sides of the lower section to shape as laid out in the drawing; the slope is 10°.

STEP 8. Starting 10" from the top of the two rear legs, and 8" from the top of the two front legs, using either your table saw or jointer, taper two adjacent sides of all four legs, making sure you have two left and two right.

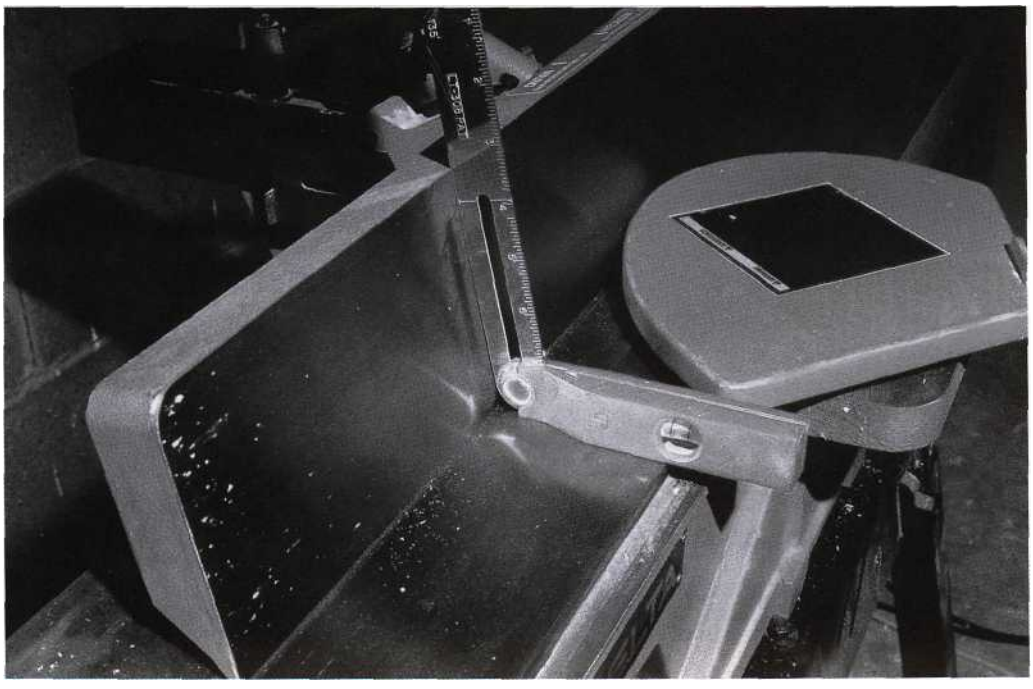
STEP 9. Cut the mortises to the tapered sides of all four legs as laid out in the drawing. **Note:** The mortises that will take the tenons of the front section are different from those that will take the sides and back. Also the 10° slope to the top of the front legs should slant forward—toward you.

STEP IO. Mill the tenons to the front, sides and back of the lower section as laid out in the drawing.

STEP 11. Dry assemble the lower section to ensure you have a good fit. If all is well, disassemble the piece, then glue, reassemble, clamp, ensure the structure is square, 'then set it aside until the glue is fully cured.

STEP 12. Glue and screw the two guide supports to the back and front of the inside of the lower section as laid out in the drawing.

STEP 13. Glue and screw the four cleats that will support the bottom of the desk cavity to the inside of the lower section as laid out in the drawing.

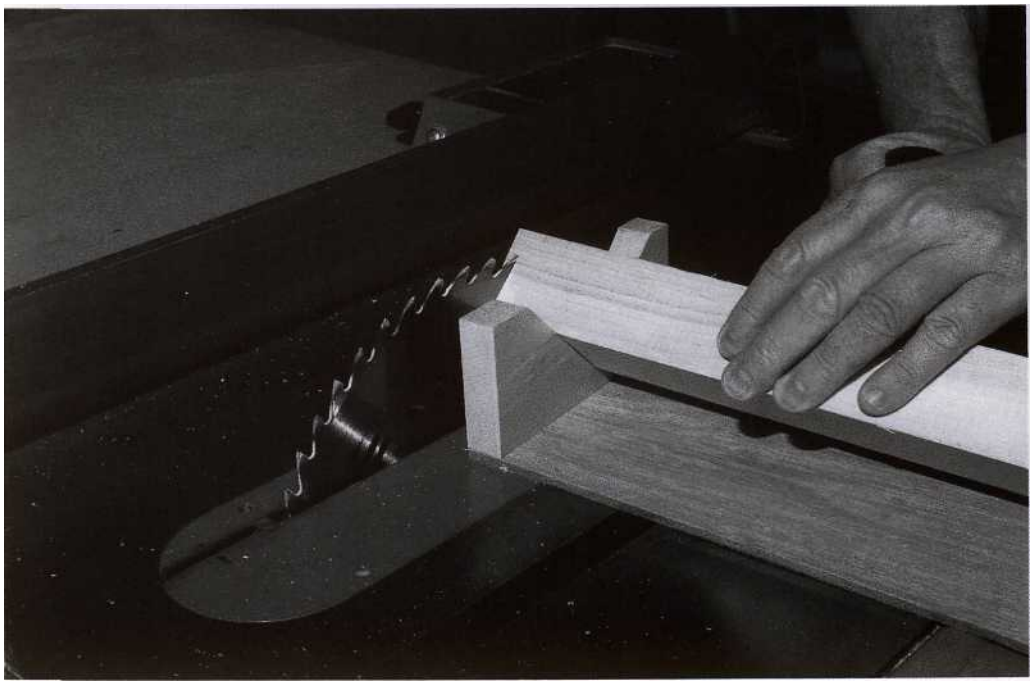


Use a movable square to set the angle to the back fence of your jointer.



When you've set the correct angle, use your jointer to mill the angle to the back edge of the desk lid.

You'll need to build a simple jig to cut the angle to the top of the two front legs.



STEP 14. Build the drawer guides and fit them to the two supports.

STEP 15. Make any final adjustments to the 3/8" plywood cavity bottom, then using small brass screws, fasten it in place on the four cleats above the drawer cavity.

STEP 16. Take both sections of the lid to the router and round over the two ends of the rear section and both ends and front of the lift section.

STEP 17. Take the lid to the jointer or table saw and mill the back edge to an angle of 10° so that it will fit nicely against the rear section.

STEP 18. Mark out and cut mortises for 1 1/4 brass butt hinges to both sections as laid out in the drawing.

STEP 19. Using two 1¼” brass butt hinges, assemble the two sections of the lid together.

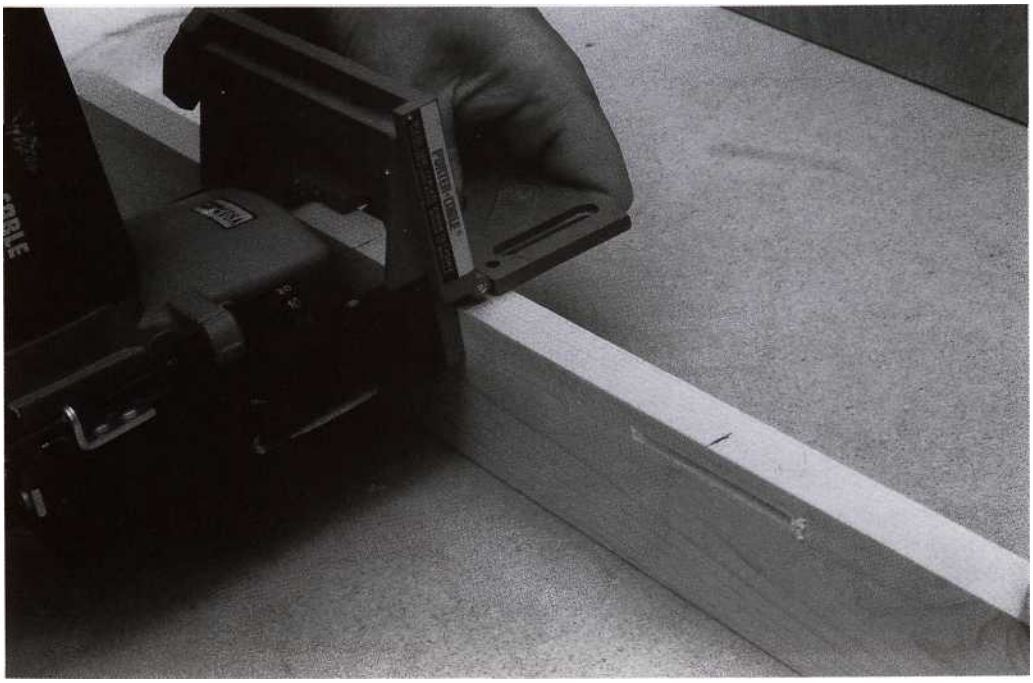
STEP 20. Carefully set the assembled lid section in place on top of the desk, then glue and screw the rear section of the lid in place on the flat area at the rear.

STEP 21. Returning to the upper section, lay it flat on the



To work your door panels, set the table saw blade to cut at an angle between 15° and 17°. The blade should just break through the surface, leaving a nice, clean step that will define the panel.

Attach the trim to the upper section with biscuits. Mark the side of the cupboard section and the edge of the trim, and then carefully mill the slots.



bench, put the trim in place and mark for biscuit slots. If you don't use biscuits you can glue, clamp and nail the pieces in place.

STEP 22. Remove the trim and mill the biscuit slots.

STEP 23. Glue and clamp the trim in place. If you've used nails, now's the time to set the heads and fill the holes.

STEP 24. Glue and clamp the two small fillers in place between the trim and drawer section as you see in the drawing and photo above (bottom).

STEP 25. Take the three pieces that will make up the crown to the table saw, which should be set to cut at an angle of 17°. Place the stock on edge and mill the crown just as you would if you were making a raised-panel door (see top photo above).

STEP 26. Cut the three sections of the crown to their final dimensions, then miter the ends to 45°.

STEP 27. Glue and screw the crown in place to the top of the cupboard section. Glue the miters together.



Try this setup to make milling the mortises for the hinges easier. The extra support provided by the top board will enable you to mill an accurate mortise.

STEP 28. Build the two doors as laid out in the drawing and the Shop Tip on page 91.

STEP 29. Mark the doors and opening for 1 1/4″ brass butt hinges as laid out in the drawing, but do not fit them
yet.

STEP 30. Set the cupboard section carefully in place on the rear flat section of the desk and carefully secure them together using no. 8 X 1 3/4" screws. If you've used 3/4″ stock for the lid you need to use 1 1/2 screws.

STEP 31. Build the three small drawers for the cupboard section as laid out in the drawing.

STEP 32. Build the drawer for the desk section as laid out in the drawing.

STEP 33. Finish sand all the completed sections and drawers.

STEP 34. Apply a coat of stain to all sections of the desk and drawers.

STEP 35. After finishing is complete you can attach the knobs to the doors and drawers and fit the doors to the cupboard section.

FINISHING

I kept things very simple for this piece. After doing a little light distressing and applying a medium stain, I applied eight coats of seedlac mixed to a three-pound cut. This gave the piece a deep, almost dark golden shine. The final step was to apply a couple of coats of beeswax—ummmm, nice.

SHOP TIP

Building a Raised Panel Door



Today, most people use a router table and an expensive set of bits to mill the pieces for a raised panel door. True, you can mill some pretty edges, as well as curved tops and the like, but to me, the expense is not worth the result. The heavy bits require a three-horse router or a shaper, the bits cost a fortune and the method requires more time than I have available. I prefer, instead, the old-fashioned look: square door frames and flat, beveled panels. They are quick and simple to make, especially with a little practice. I can make a set of four doors, complete, in a only a couple of hours. The way I do it is somewhat controversial, but it works for me. The method is as follows:

1. Begin by cutting your rails and stiles exactly to length.

2. Use either your router with a 5/16" straight-cutting bit or your table saw to mill 3/8"-deep grooves to the inner edges of the rails. The cut runs the entire length of the rails, and stops 2¾" short from both ends of the stiles. I use my router table with the stops marked on a piece of masking tape that shows just above the stock.

3. Once you've cut the slots, lay out the rails and stiles and mark for biscuit slots. You can use lap joints if you like, but you'll need to adjust the length of the rails to maintain the outer dimensions of the doors.

4. Mill the biscuit slots.

5. Dry fit the rails and stiles and measure the width and height between the grooves to get the true size of the panels.

6. Sand the rails and stiles smooth and stain the inner edges. It's much easier to stain them before than after assembly.

7. Glue and clamp the rails and stiles, *one side only*, dry fit the other, ensure all is square, then set them aside until the glue is fully cured.

8. If necessary, build the boards that will make the panels and trim them to size.

9. Set your table saw to cut at an angle of 17°, and the rip fence at 1/4" and mill the bevels to the edges of the panels. The tip of the blade should just break through the surface of the stock, leaving a small step and nice clean lines.

10. Sand the panels smooth, paying close attention to the bevels, and then apply the stain.

11. When the glue is fully cured, remove the clamps from the frames, and remove the dry-fitted stiles.

12. Slide the panels into place in the now open frames, glue and clamp the remaining stiles in place, and set the completed doors aside to allow the glue to fully cure.

13. Either round-over or break the outer edges.

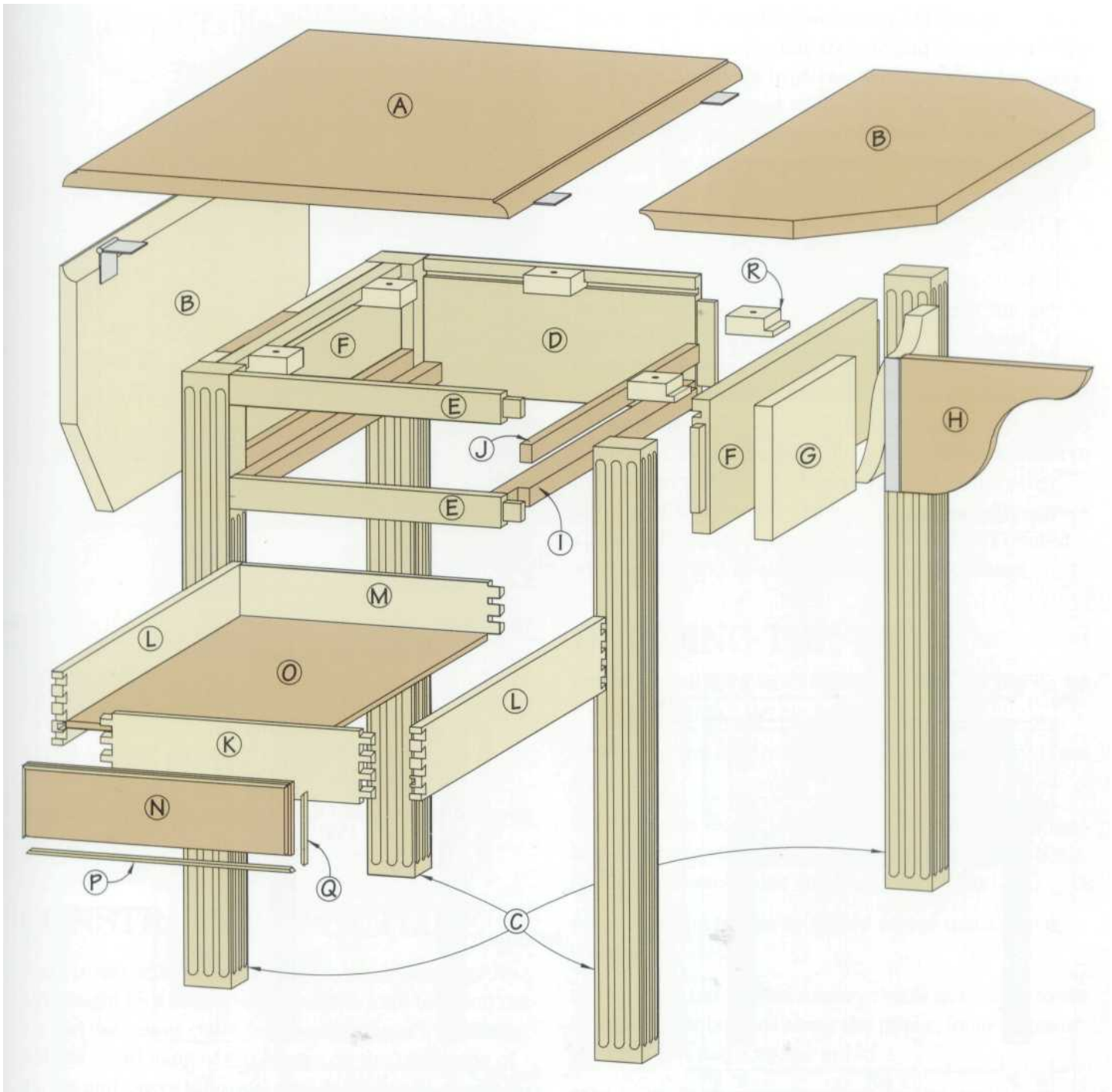
14. Do any necessary sanding to the joints, then the finish sanding and, finally, complete the staining.

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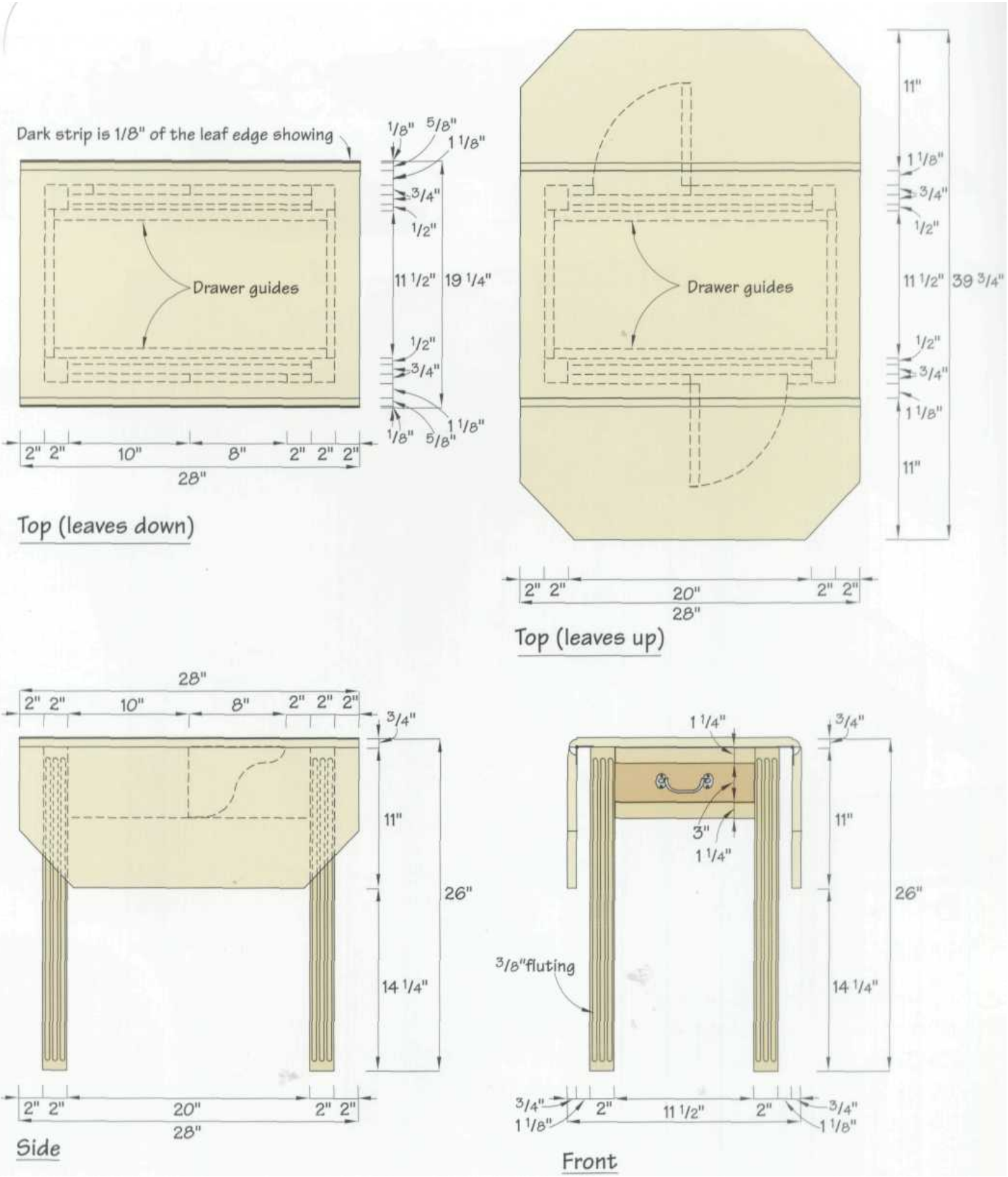
Eighteenth-Century Pembroke Table



Aesthetically pleasing and a nice piece to have around the home, the Pembroke table has become something of a classic since its introduction during the second half of the eighteenth century. The first was designed by Thomas Chippendale for Lady Pembroke, hence the name. Thomas Sheraton also made a variation, but his had a serpentine top and slender, turned, reeded legs and was missing the classic lower stretchers. Ours follows Chippendale's basic design. The top is supported by square, fluted legs. On some of his designs the legs were braced by a saltire—an X-shaped stretcher—sometimes arched; ours is not.



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MATERIALS LIST

Pembroke Table Bill of Materials

No.	*Letter*	*Item*	*Dimensions T W L*
1	A	Top	¾″×19″×28″
2	B	Drop Leaves	¾″×11″×28″
4	C	Legs	2″×2″×4½″
1	D	*Short Apron	¾″×5½″×13″
2	E	*Rails	¾″×1¼″×13″
2	F	*Long Aprons	¾″×5½″×21½″
2	G	Fillers (long)	¾″×5½″×10″
2	H	Fillers (with wings)	¾″×5½″×10″
2	I	Drawer guides	¾″×1¼″×22½″
2	J	Drawer guides	½″×½″×20″
1	K	Drawer front	½″×3″×11½″
2	L	Sides	½″×3″×22″
1	M	Backs	½″×2½″×11½″
1	N	False Fronts	¾″×4¾″×12″
1	O	Bottoms	¼″×11″×21¾″
2	P	Beading	⅛″×⅜″×11½″
2	Q	Beading	⅛″×⅜″×3″
5	R	Top Cleats	¾″×2″×2″

*Includes Tenons

CONSTRUCTION OUTLINE

Basic construction is quite simple, but a couple of features might be little tricky. The rule joint between the top and the leaves could pose something of a challenge, and the positioning of the hinges on the underside of the top and leaves is critical (see detail on the drawing). The rule joint is cut at the router table. Two bits are used: a 1/2″ roundover bit for the convex cuts along the edges of the top, and a *V″* cove for the concave cuts along the edges of the leaves. Make each cut deep enough to provide a 3/16" shoulder. You'll need to make several passes to complete each cut, and take care to ensure the depth of the two cuts is exactly the same and that both leaves and top marry together properly (see photo). The legs are cut from a piece of 2"X 12" stock. The flutes are cut with a 3/8″ V-groove bit (a round nose would work just as well) in the router table. The apron and legs are joined together with mortise-and-tenon joints. Watch the positioning of the side rails; they are inset to accommodate the pad and leaf support. The front rails are made from two separate pieces of stock, mortised and tenoned to the front legs. The leaves are supported by pivoted, shaped brackets. The brackets/supports are part of a pad glued to the outer face of the two side rails. The supports themselves are attached with short sections of piano hinge, mortised into the end grain of the flap. The drawer runners and guides are glued and screwed in place. The construction of the drawer itself is quite conventional, utilizing through dovetails at the front and butt joints at the back. The drawer front has beaded edges and is glued and screwed to the front of the drawer body. The tabletop is attached to the frame with buttons. The hardware is authentic to the period. As to the finish, most Pembroke tables were made from mahogany, cherry, maple or some other hardwood, but some did have softwood tops. They were all finely finished. Ours has been stained and treated with shellac and beeswax buffed to a high shine.

BUILDING THE TABLE

STEP 1. Cut all the pieces to size, glue up the pieces for the top and make the six buttons.

STEP 2. Cut the mortises into the legs, two left and two right.

STEP 3. At the router table, cut 1/4″ deep flutes into the legs—eight on each leg, two on each face—each equidistant from each edge and from each other.

STEP 4. Cut the tenons to all five pieces that make up the apron.

STEP 5. Using either your router or table saw, cut grooves to receive the buttons along the upper, inner edges of the rails that make up the apron.

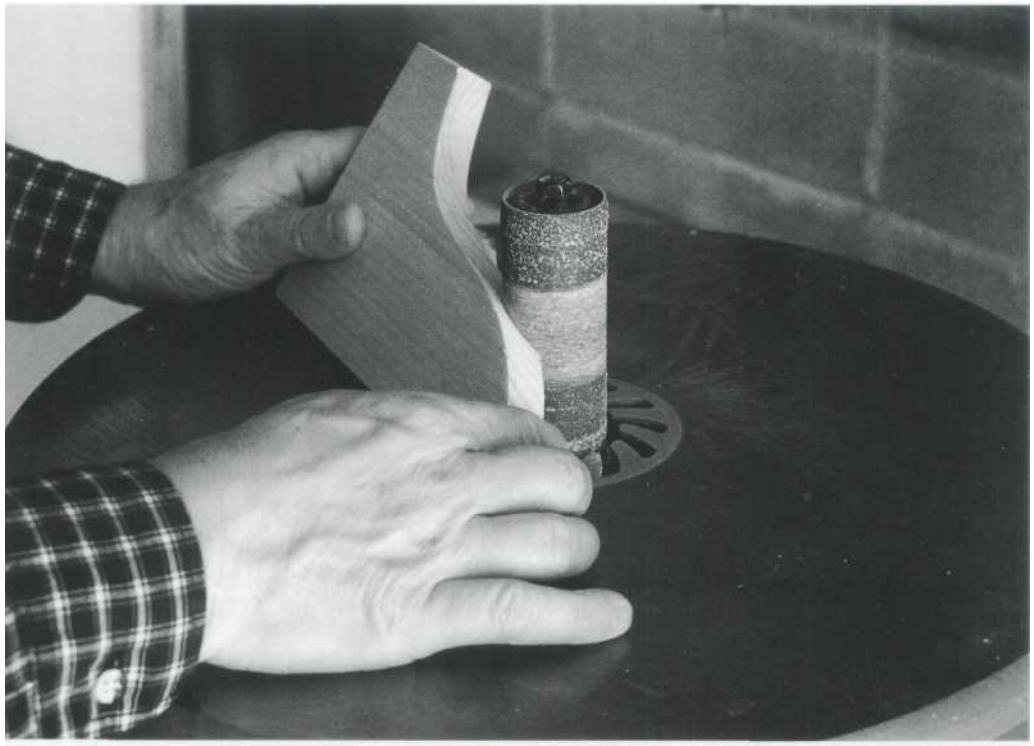
STEP 6. Dry fit the apron to the legs.

STEP 7. Sand the legs and apron and set them aside for assembly later.

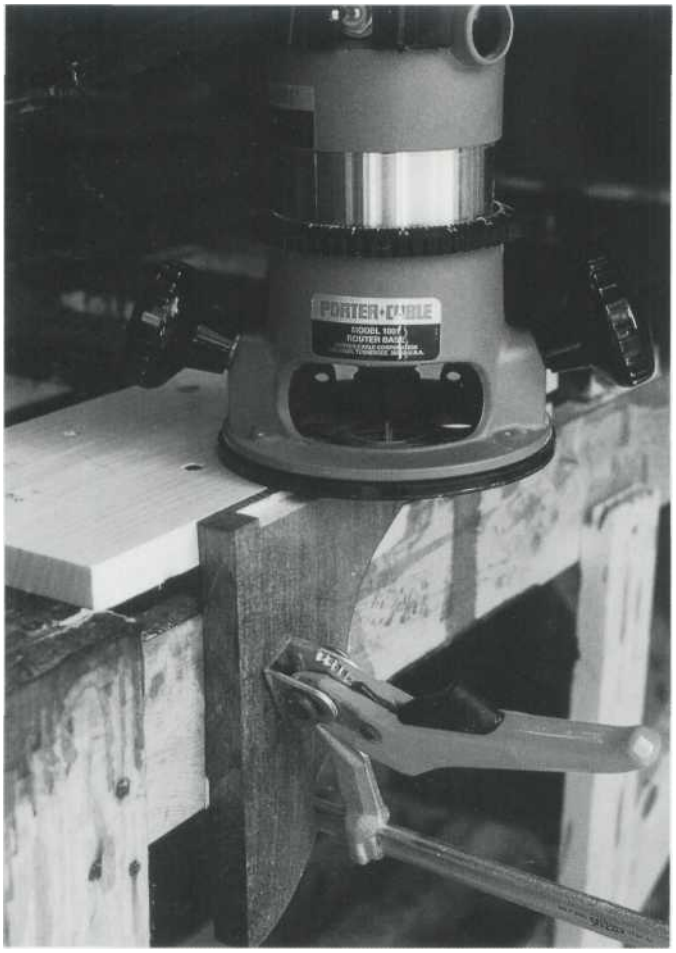
STEP 8. Cut the brackets from the two pieces designated for the pads and sand all of the resulting six pieces.

STEP 9. Cut the finger pulls to the curved section of each pad (see photo and drawing detail).

STEP 10. From a section of piano hinge, cut two pieces 4 1/2' long. You may have to drill extra screw holes.



Use your spindle sander, or a drum sander in your drill press, to cut the finger pulls in the pad and leaf support brackets. Simply hold each piece at an angle and push gently.



Try this **setup** for mortising the end grain of the leaf support **brackets.**

STEP 11. Cut mortises to receive the hinges in the ends of the brackets. Make sure you have a left- and right-hand (see the setup illustrated in photo).

STEP 12. Attach the hinges to the brackets.

STEP 13. Dry fit the pads and brackets over one of the side rails. Lay all three pieces of one set in line on top of the rail and make sure there's room enough for the bracket to pivot without fouling the outer edge of the pad. You may have to trim the end of the pad slightly and round over the inner edge of the bracket. Do the same with the second set, then set everything aside for assembly later.

STEP 14. Glue, assemble and clamp the legs and apron, and set the structure aside to cure overnight.

STEP 15. Glue and screw the pads to the outer faces of the two sides.

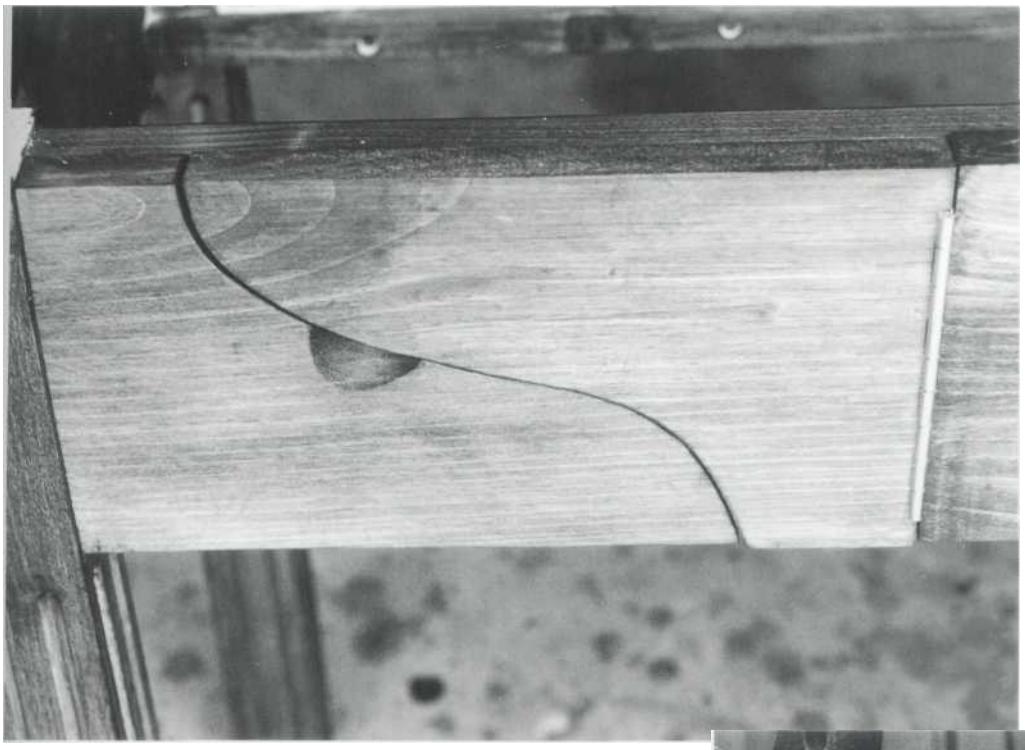
STEP 16. Glue and screw the drawer runners and guides to the inner face of the apron.

STEP 17. Attach the brackets to the pads. The frame is now complete.

STEP 18. Cut the angled corners to the two leaves.

STEP 19. At the router table, using a 1/2" roundover bit and 1/2" cover bit, cut the rule joints to the long edges of the top and the two leaves.

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This is how the pad and leaf support bracket should look after assembly; note the position of the finger pull.

STEP 20. Cut the beaded edges to the front and back of the top and the outer edges of the leaves.

STEP 21. Mark out the position of the hinges to the undersides of the top and leaves. Be sure to position them exactly as laid out. in the detail drawing; if you don't, the leaves will either foul the top or you'll have an unsightly gap between the two. There's no need to mortise the hinges.

STEP 22. Sand the top and leaves smooth, paying particular attention to the rules and beads. Do not assemble the top and leaves together yet.

STEP 23. Cut the through dovetails to the three pieces that make up the front of the drawer.

STEP 24. To the same three pieces, cut 1/4-wide grooves to receive the bottom, and make sure these do not foul the dovetails.

STEP 25. Assemble the drawer—butt joint the back with glue and brads.

STEP 26. Cut the beads to the edges of the drawer front.

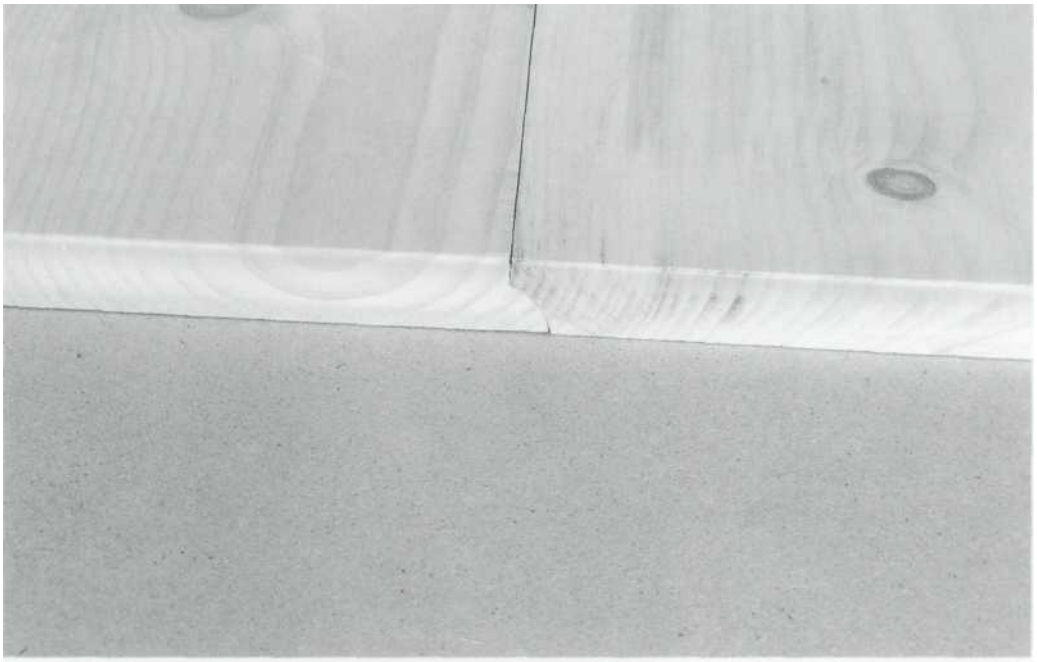
STEP 27. Sand the drawer front smooth and then glue and screw it, to the front of the drawer. Do not attach the hardware yet. You are now ready to begin the finishing process.



Use a 1/2" cove bit in your router table to cut inner lower edge of the leaf.

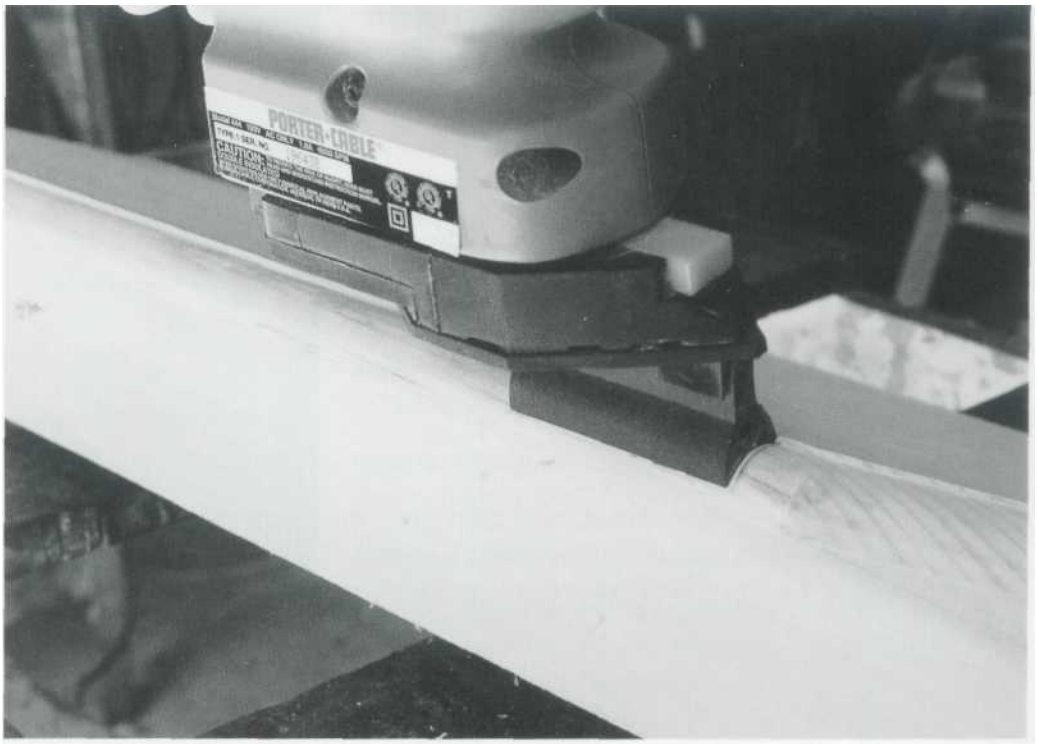
FINISHING

First you should do a little light distressing—just a small ding or two—then some final sanding before staining the pieces. I used Jacobean by Minwax. It's darker than Provincial. Now apply a sealer coat. I used shellac—seedlac at a one-pound cut left overnight to fully cure. Next., lightly sand the grain and apply four more coats of seedlac at a three-pound cut, leaving each to fully cure overnigh., and rub the surface smooth—0000 steel wool is best for this and gets right into the corners of the flutes. This will give the piece a rich, dark luster. You could, of course, finish the piece with a couple of coats of polyurethane, but the look will be something less than authentic. Next, assemble the leaves to the top. Do this on the bench on a folded blanket so as not to scratch the finished surfaces. Now assemble the top to the frame. Finally, finish it all off with a couple of coats of beeswax buffed to a shine, and attach the pull to the front of the drawer.



The leaves and the tabletop should marry exactly.

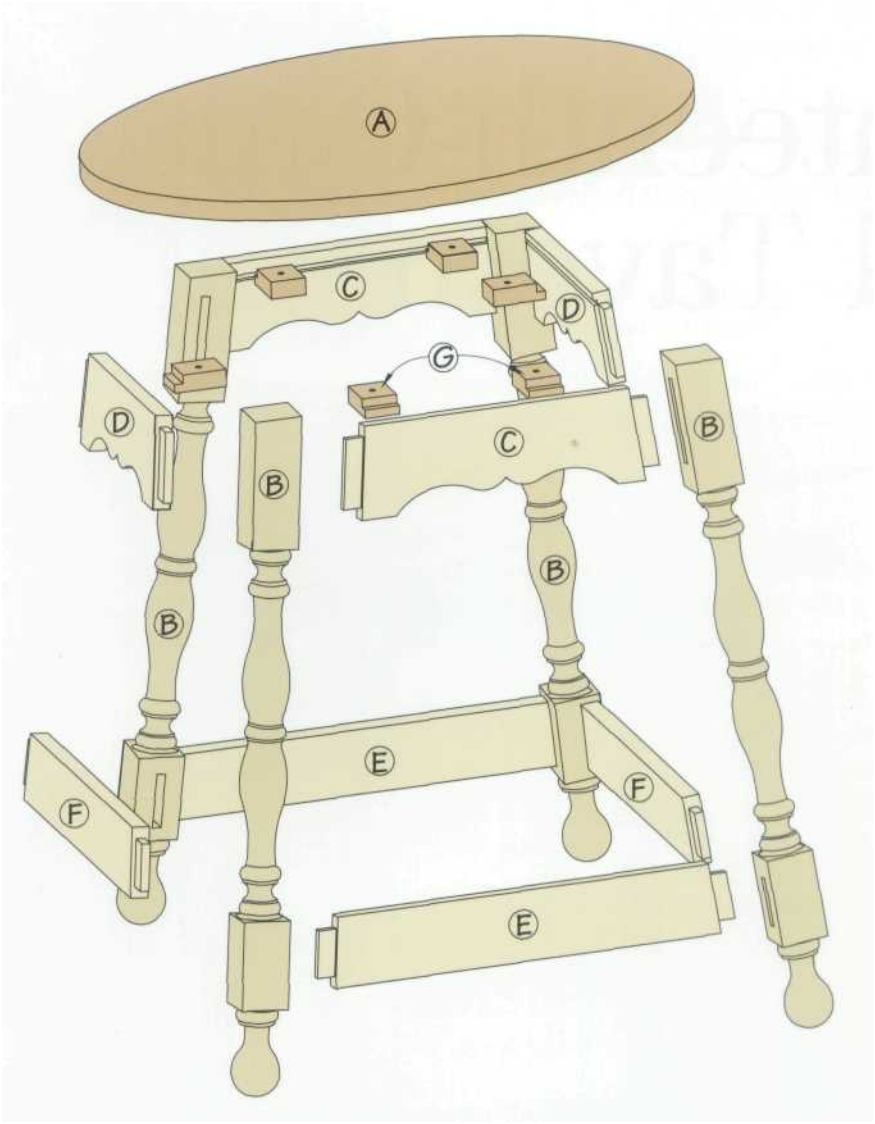
Sand all the profiles smooth before staining.



Eighteenth-Century Oval Tavern Table



One of the most important institutions, both in Europe and Colonial America, was the inn or tavern. It was, and in Europe still is, the social center of the community. But it was more than just a gathering place. It was the place to get up-to-date news, where politics were discussed and town meetings were held. It was also the scene of hard drinking and rowdiness, and the furniture therein was built to withstand



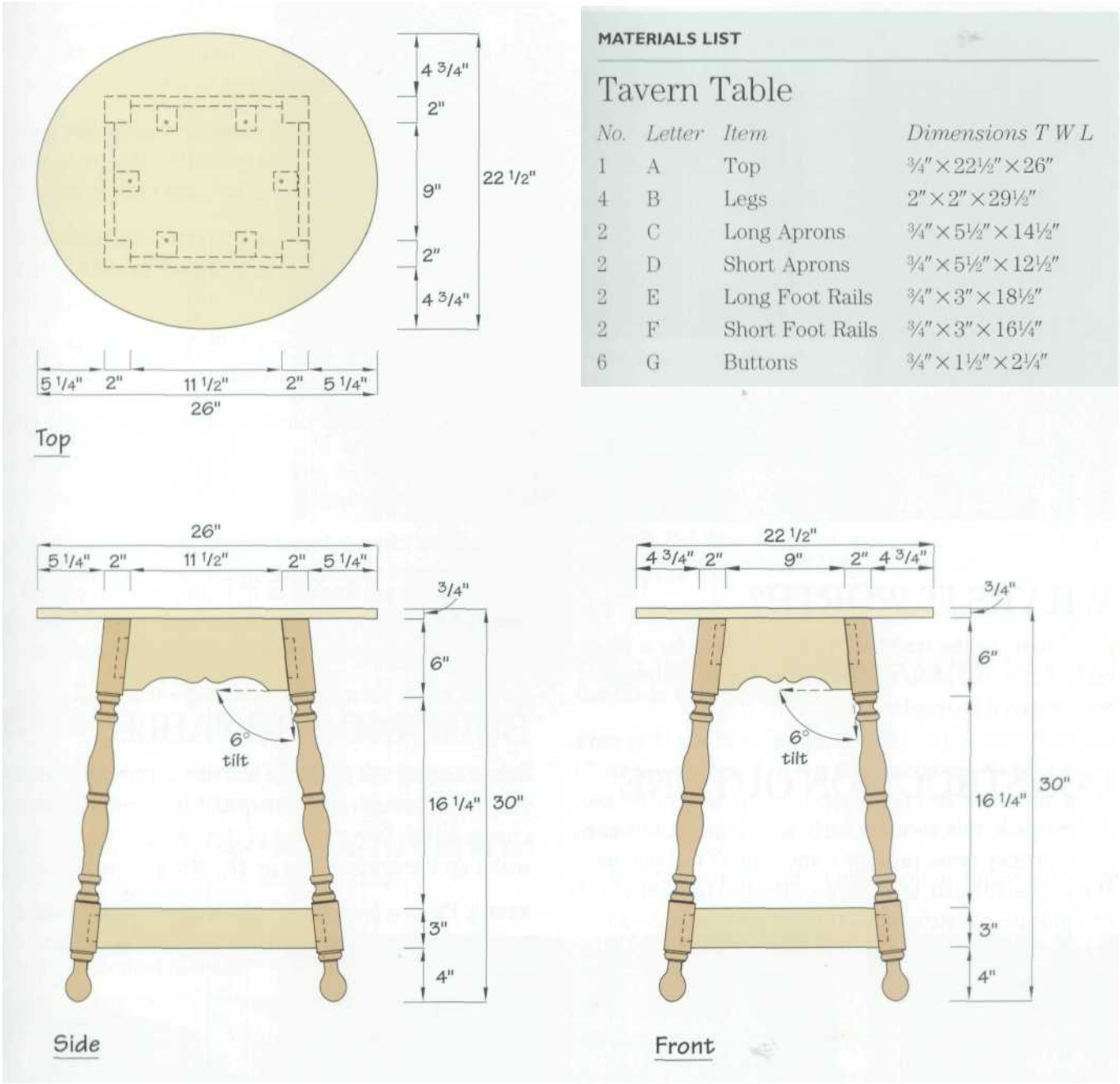
SHOP TIP

Marking an Oval



On your 27″ × 25″ plywood, mark a line down the center of the length. Mark the middle of the center line, then measure out 6¼″ to either side and mark both spots. Drive a small screw partway into each of the two spots, leaving the head proud by about ⅛″. Now take a piece of thin string, double it in two and make a loop 19¼″ in diameter; it doesn't need to be exact, ⅛″ either way won't matter. Next take a pencil, lay the string around the two screws as you see in photo on page 36, place the pencil inside the loop and draw the string tight. Now, keeping the string tight, push the pencil around the oval, which should finish roughly 26″ × 23″. Finally, cut the oval from the rectangle, adhering closely to the line, and sand the edge smooth and true.

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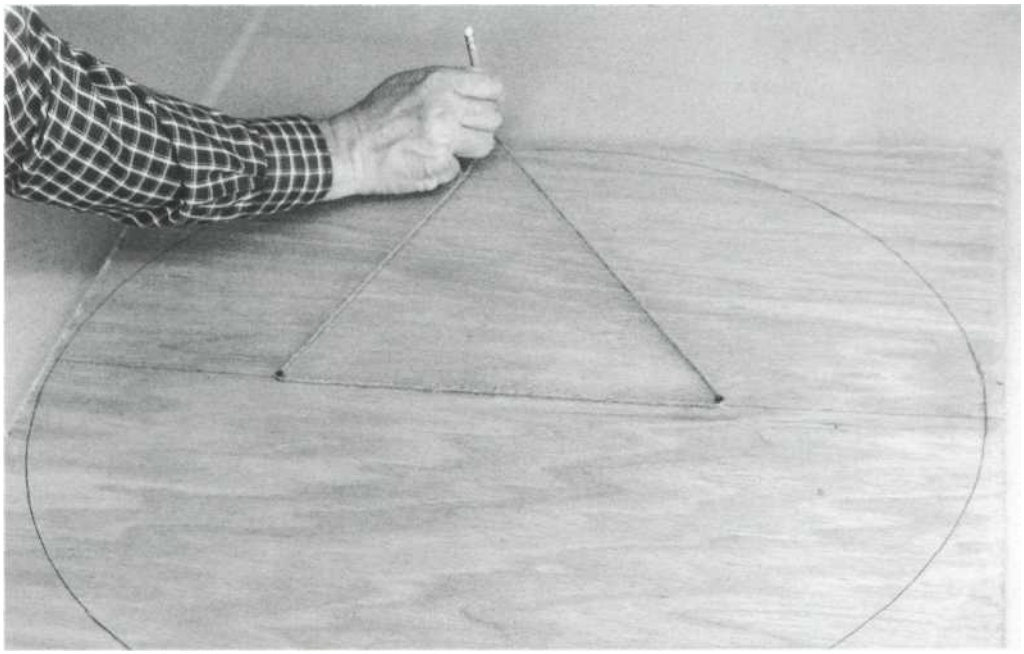
MATERIALS LIST

Tavern Table

No.	*Letter*	*Item*	*Dimensions T W L*
1	A	Top	¾″×22½″×26″
4	B	Legs	2″×2″×29½″
2	C	Long Aprons	¾″×5½″×14½″
2	D	Short Aprons	¾″×5½″×12½″
2	E	Long Foot Rails	¾″×3″×18½″
2	F	Short Foot Rails	¾″×3″×16¼″
6	G	Buttons	¾″×1½″×2¼″

inevitable abuse. So, tavern tables, in one form or another, have been around for centuries, but were at their most popular during the eighteenth and nineteenth centuries. Typically they had square, rectangular, round, octagonal or, in rare cases, oval tops, and three or four tapered, square or turned, splayed legs. (It seems square legs didn't appear until after 1790, before that they were all turned.) Antique oval tables were and are quite rare. This one is typical of those made in New England from 1700 until 1820. The turned legs are typical of the late Jacobean-early Queen Anne period. It's an elegant piece, unusual and will definitely be a nice addition to your home.

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This setup will provide the oval shape for the tabletop.

CONSTRUCTION OUTLINE

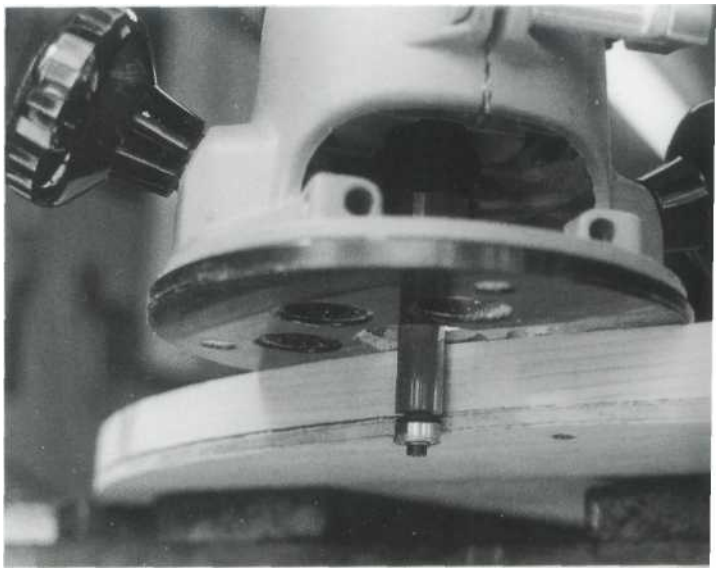
At first look, this seems a fairly simple piece, but one or two tricky areas present something of a challenge**.** But it's fun to build, incorporates the two basic elements of furniture construction—turning and joinery—and you get to use almost every tool in the shop.

The legs, apron and rails are joined together with mortise and tenon joints, and the top is attached to the base with six buttons, but you can use cleats and screws or pockets if you like. The board for the top is constructed using three pieces of stock eight inches wide with the grain alternated for stability. The legs are turned from blanks cut from 2" X 12" stock. If you don't have a lathe, you can substitute tapered square legs. I cut the mortises in the legs using a dedicated hollow chisel machine; you can use hand tools. If you use a mortise machine or an attachment for your drill press, you **may** find that cutting mortises for left- and right-hand legs can be a little confusing. I use a piece of scrap stock, screwed to the bed on my machine, and mark the stop and start positions on it; you might like to do the same (see photo). The compound angles at the top of the legs and apron take a little figuring out, but you'll find instructions below. The ends of the rails that make up the apron are angled at 6° to provide the correct splay of the legs, and the tenons have to be angled upward at an angle of 6° to fit the mortises (see photo).

BUILDING THE TABLE

STEP 1. Cut all the pieces as laid out in the materials list, run them through the jointer and then cut the cyma curves to the lower edges of the four pieces that will make up the apron. Glue up the stock to make the top.

STEP 2. From a piece of 1/4" plywood 27" X 25" make a pattern for the top—see Shop Tip.



Use your plywood pattern and a 1/2 flush trimming bit in your router to true the edge of the tabletop.

STEP 3. Use the pattern to mark an oval on the underside **of the** lop.

STEP 4. Cut the oval 1/8″ larger than the mark.

STEP 5. Use small screws to attach the plywood pattern to the underside of the top, making sure excess material **shows** all around the oval.

STEP 6. Take your router and a flush trimming bit and trim the edge of the top true. Remove the pattern from the top.

STEP 7. Replace the flush trimming bit with a 3/4″ round-over bit and round the top edge of the top.

STEP 8. Sand the top smooth and set it aside.

STEP 9. Take one of the leg blanks, mark the top and lower square sections and set it into your lathe.

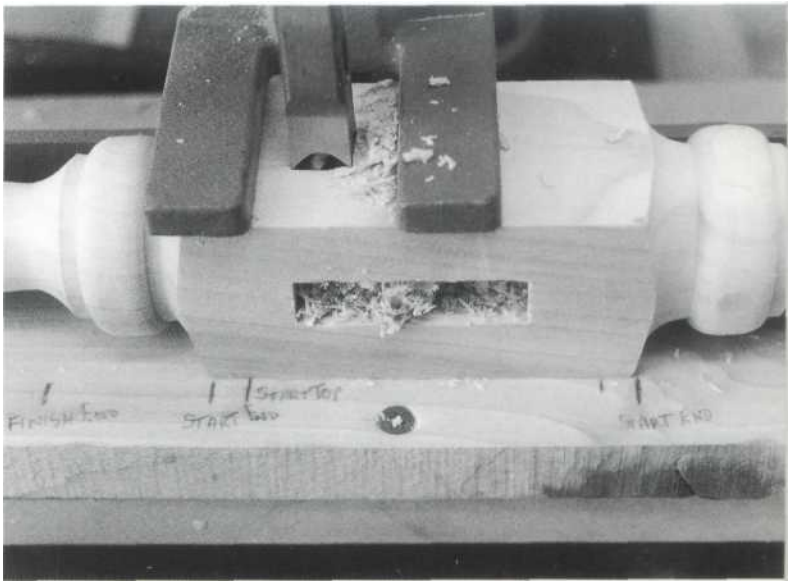
STEP 10. Using a large gouge, round the section between **the** squares and the section beyond the lower square.

STEP 11. Mark for the beads, coves and ball foot as laid out in the drawing, turn to size and sand smooth.

STEP 12. Repeat the process for the other three legs using **the** first leg as a reference and marking aid.

STEP 13. Cut the mortises 3/4″ deep in the legs—two left **and** two right—as per the drawing.

STEP 14. Set your table saw miter gauge to 6° off 90 and trim the ends of the apron and foot rails.



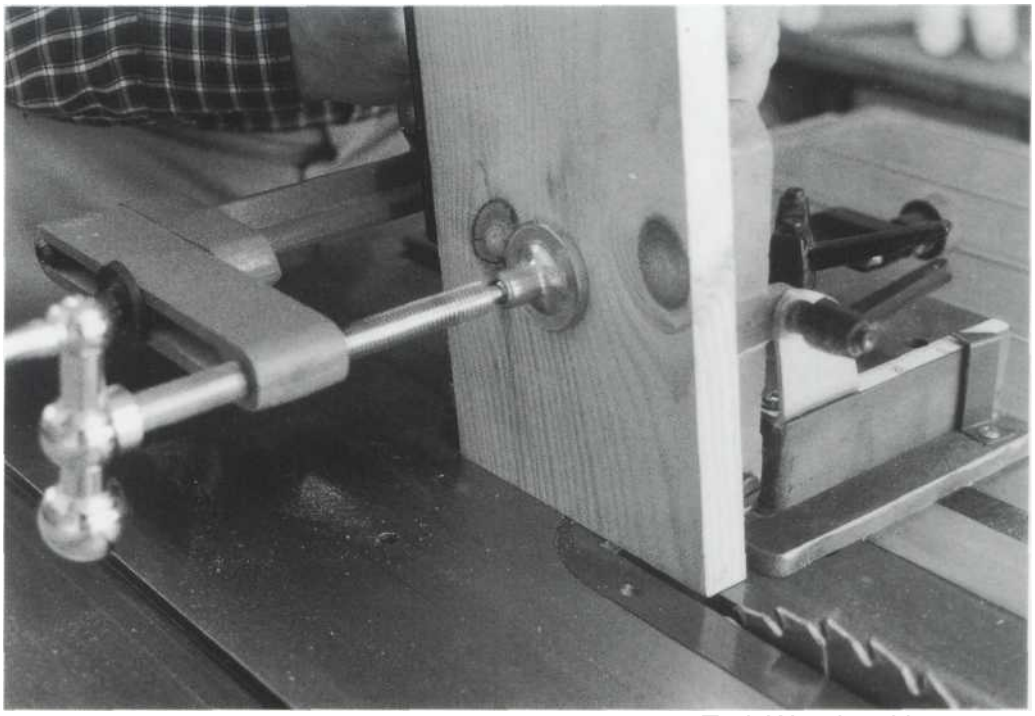
Attach a piece of scrap stock to the bed of your mortise machine or drill press, and mark the left- and right-hand start and finish positions. This ensures accurate positioning and makes it simple to work left- and right-hand legs.

STEP 15. Remove the guard from your table saw and set the blade to a depth of 3/4".

STEP 16. If you have a tenoning jig, set the back-stop to 6° off the vertical and cut the shoulders. **Note: D**o this first on a piece of scrap stock and test the tenon for fit in one of the mortises.

STEP 17. Mark the small shoulders at an angle of 6° (see

After cutting the rails to length and trimming the ends to an angle of 6°, set the back-stop on your tenoning jig to 6° and cut the tenons.



the photo) to accommodate the angle inside the mortise.

STEP 18. Use your band saw to cut the small shoulders.

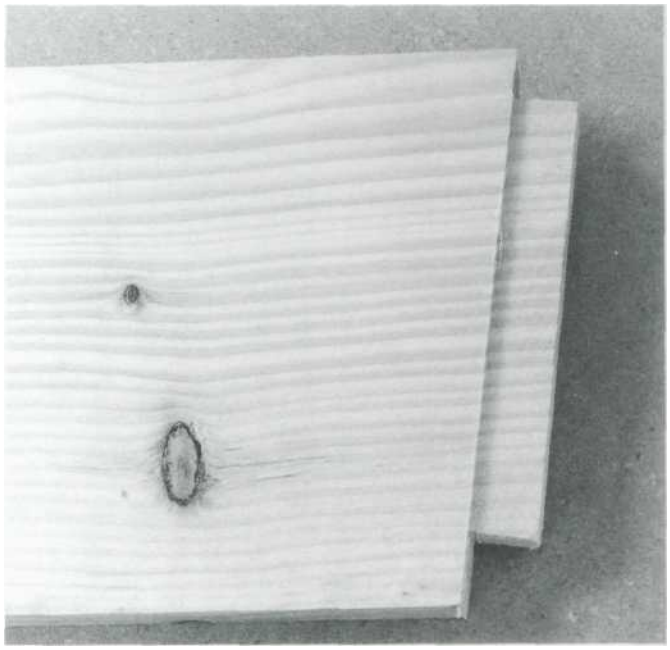
STEP 19. Replace the guard on your table saw and tilt the blade to 6°.

STEP 20. Set **your** rip fence to 5 ½", lay the rails flat on **the** table, outer side up and top edge toward the blade, and trim the edge to 6° so that top of the understructure will fit flush to the underside of the top. Mark the outer top corner of each leg as you see in the photo at right.

STEP 21. Make a small jig (see photo below), return the table saw blade to 90°, set your miter gauge to 6° off 90 and, using the jig, trim the top of each leg. This is also so the top of the understructure will fit flush to the **underside** of the top.

STEP 22. Dry fit all the rails to the legs and lay the top on the structure; all should sit true.

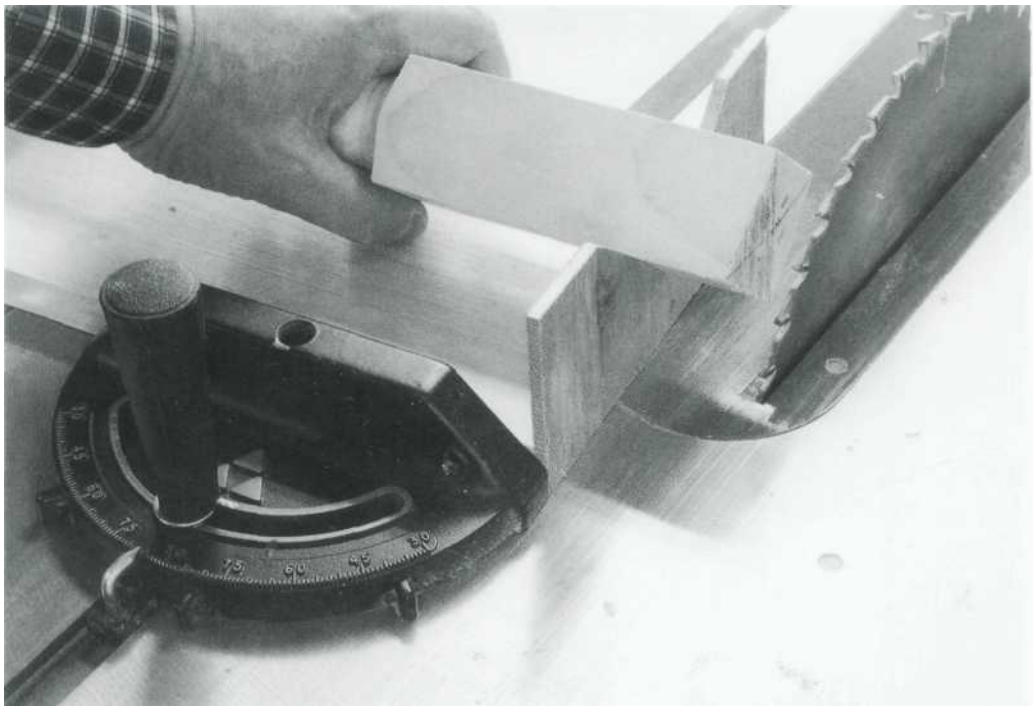
STEP 23. Disassemble all the pieces, sand everything smooth, glue, reassemble the understructure, clamp and leave overnight to cure, but do not attach the top yet.



You'll need to cut the shoulders of the tenons to angle upward at 6° so they'll fit the mortises properly.

FINISHING

1 did **a** little light distressing—just a small ding or two—before staining the pieces with Provincial by Minwax. Then I applied a sealer coat of shellac—seedlac at a one-pound cut—and left it overnight to fully cure. Next, I lightly sanded the grain and applied four more coats of seedlac at a three-pound cut and rubbed the surface smooth with 0000 steel wool (see "Finishing," chapter three). This gave the piece a rich, dark **luster.** Next, I assembled the top to the understructure and finished the whole thing off with a couple of coats of beeswax buffed to a shine.

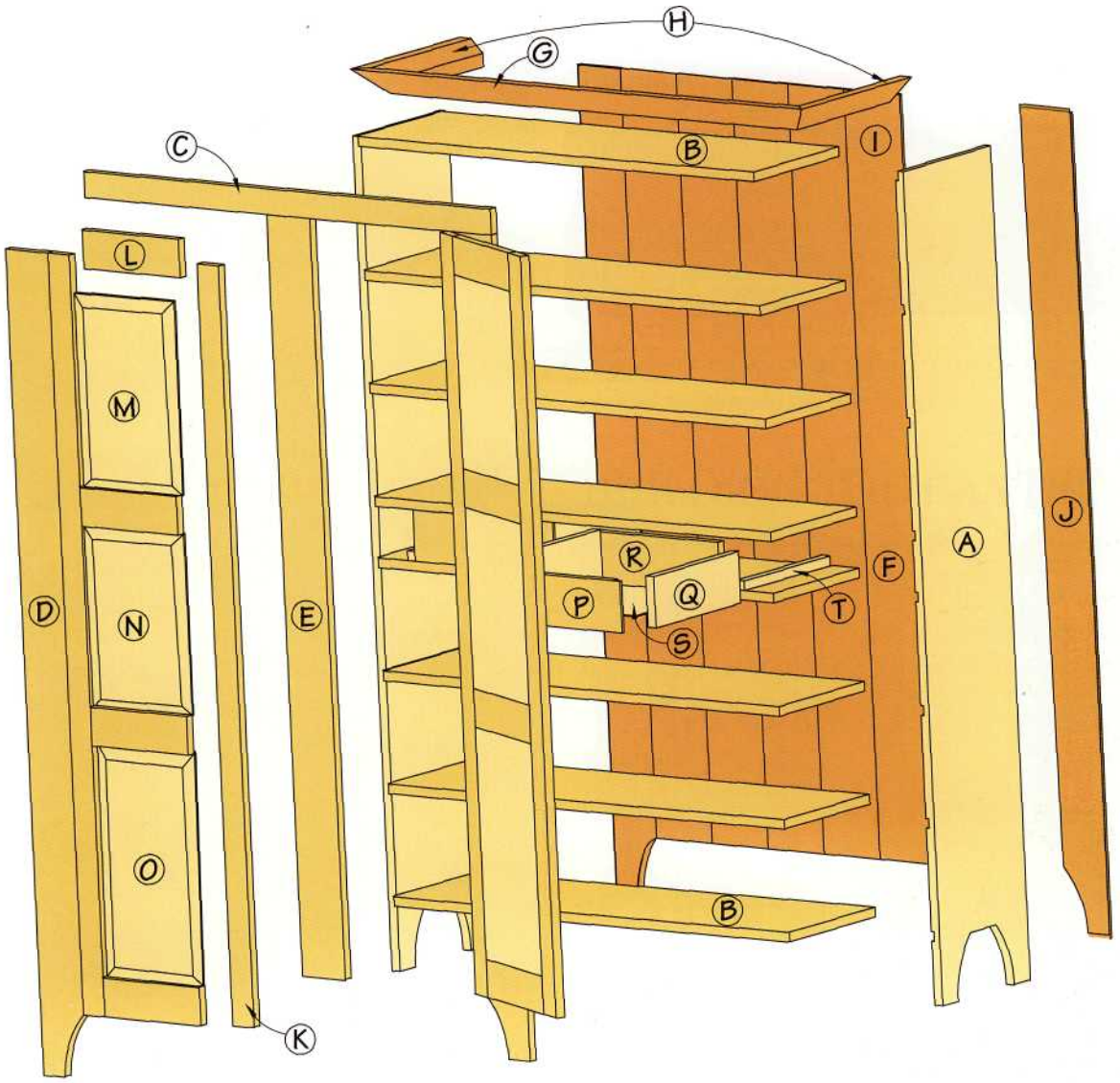


Make this simple jig to trim the tops of legs to an angle of 6°; note that the blade is vertical and that the miter gauge is set at 6°

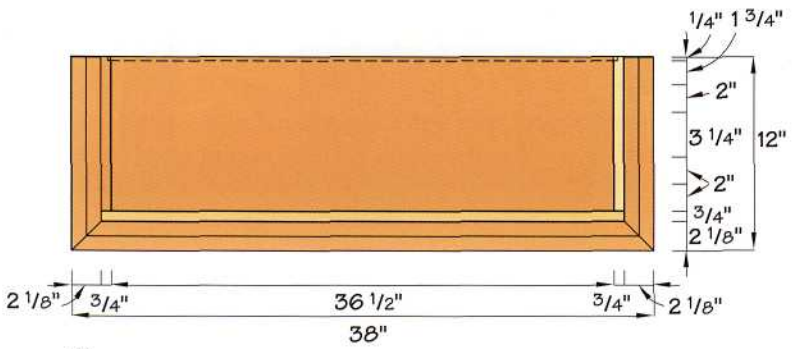
New England Pantry



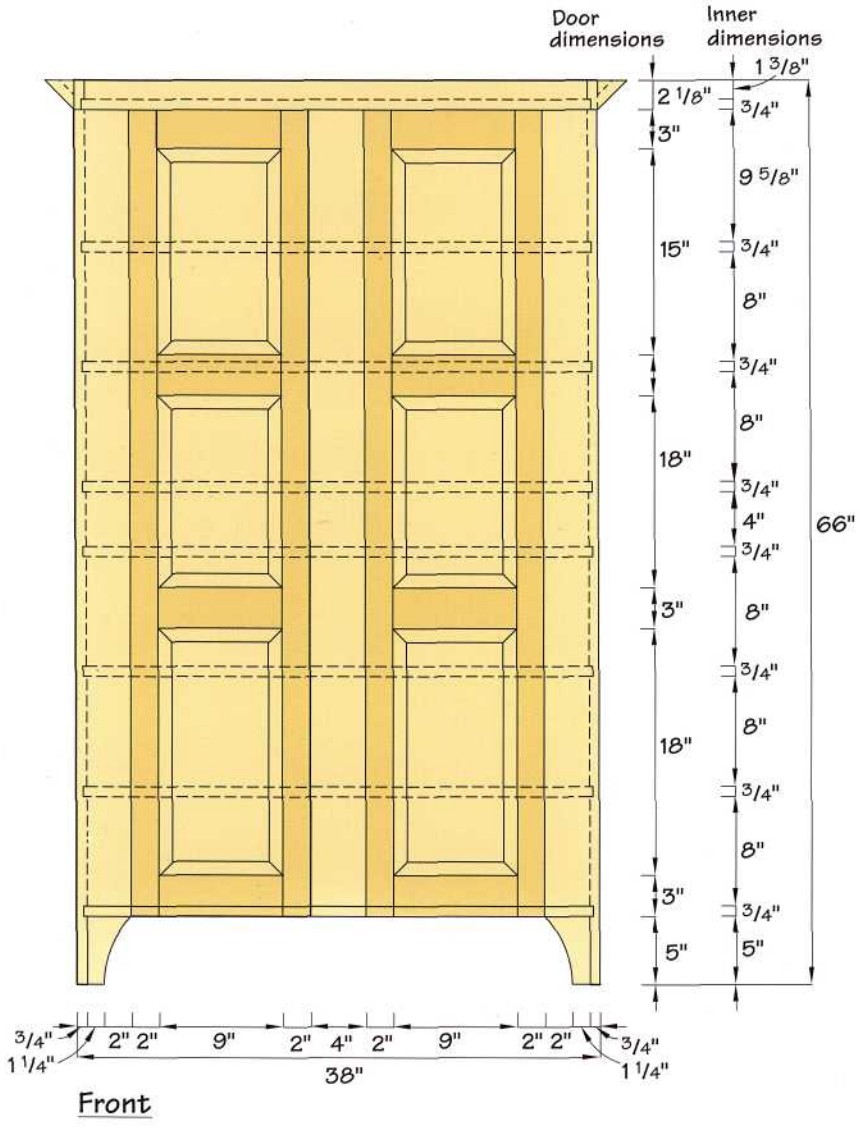
To think of a pantry is to think of a small, cold room beyond the kitchen where food, ingredients, utensils and other such culinary items are kept. Usually they're associated with large houses and butlers, but that's something of a misconception brought about by fiction writers such as Agatha Christie. I grew up in a house with a pantry. I remember it as a narrow, cold, dark place, lined with shelves and



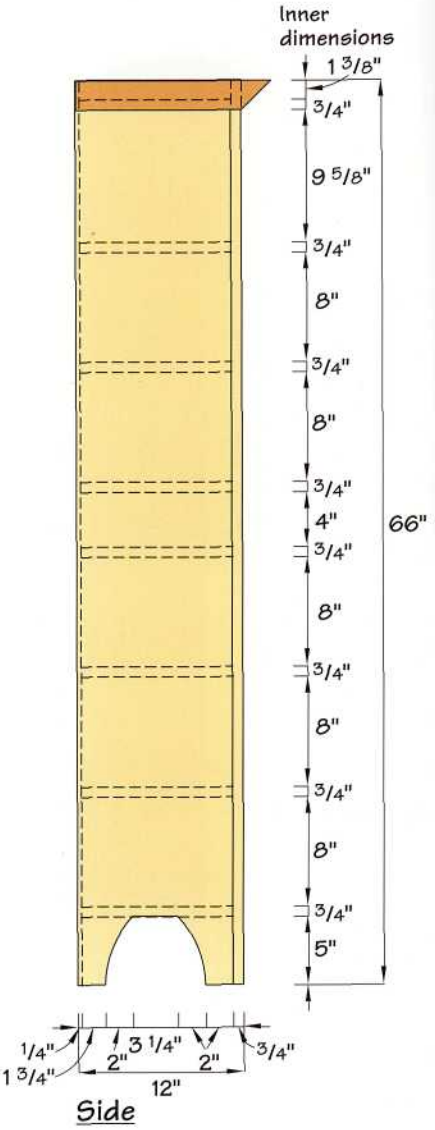
with a fine screen covering the tiny window. Here in America, in Colonial times, few settlers could afford homes with room enough for a pantry, so the pantry cupboard evolved. Always kept in the kitchen, it was a simple affair with two doors the full height of the piece, small legs to keep the food off the floor, shelves and perhaps a couple of drawers inside. They were almost always painted, often in bright colors, even white, and ours, a copy of one made in Pennsylvania around 1800, is no exception.



Top



Front



Side

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MATERIALS LIST

New England Pantry

No.	*Letter*	*Item*	*Dimensions T W L*
2	A	Sides	¾″×11¼″×66″
8	B	Shelves, Drawer Support, Bottom and Top	¾″×11¼″×26″
1	C	Trim	¾″×2″×38″
2	D	Trim	¾″×4″×64″
1	E	Trim	¾″×4″×59″
6	F	Shelf Cleats	¾″×¾″×3″
1	G	Crown	¾″×2″×3″
2	H	Crown	¾″×3″×13″
2	I	Back	¾″×5½″×66″
5	J	Back	¾″×5½″×61″
4	K	Door Stiles	¾″×2″×59″
4	L	Door Rails	¾″×3″×9″
4	M	Door Upper Panels	¾″×1½″×9½″
4	N	Door Center Panels	¾″×14½″×9½″
4	O	Door Lower Panels	¾″×18½″×9½″
4	P	Drawer Fronts	¾″×4″×13″
4	Q	Drawer Sides	¾″×4″×10″
4	R	Drawer Backs	¾″×3½″×11½″
4	S	Drawer Bottoms	¾″×12″×10½″
4	T	Drawer Guides	¾″×1″×11″

CONSTRUCTION OUTLINE

This is another fairly simple project. With the exception of the raised-panel doors, construction is quite straightforward.

The sides are made from single pieces of stock, dadoed to take the shelves, of which there are eight including the top, bottom and drawer support. The trim is fastened to the carcass with glue and nails as was done on the original, but you can use biscuits and glue if you like. If you do decide to use biscuits, you'll also need to use cleats and screws on the inside to hold the center trim to the shelves (these are allowed for in the materials list). The crown is constructed from three pieces of stock, mitered, glued and screwed to the top. The back is made from seven pieces of 3/4" pine stock butted together, similar to what you would find on an original piece, but you could use a single piece of lauan plywood. The drawers are set back just enough to allow room for the doors to close over the pulls and are made using simple lap joints, glue and cut-steel nails. The two doors are of raised-panel construction—the panels are irregular and sized to meet the demands of good design—and secured to the carcass with reproduction "H" hinges, stripped of paint and aged for authenticity. For the finish I chose first to stain the piece, then apply a couple of coats of dark green paint. You can expect to spend several weekends on this project.

BUILDING THE PANTRY

STEP 1. Cut all the pieces to size.

STEP 2. Mill the dadoes to the two sides as laid out in the drawing, then mark and cut out the details for the feet. (It's best to use your jigsaw for this operation.)

STEP 3. Sand both faces of the sides smooth and apply your chosen stain.

STEP 4. Sand both surfaces of all of the shelves, drawer support, bottom and top, then apply your stain.

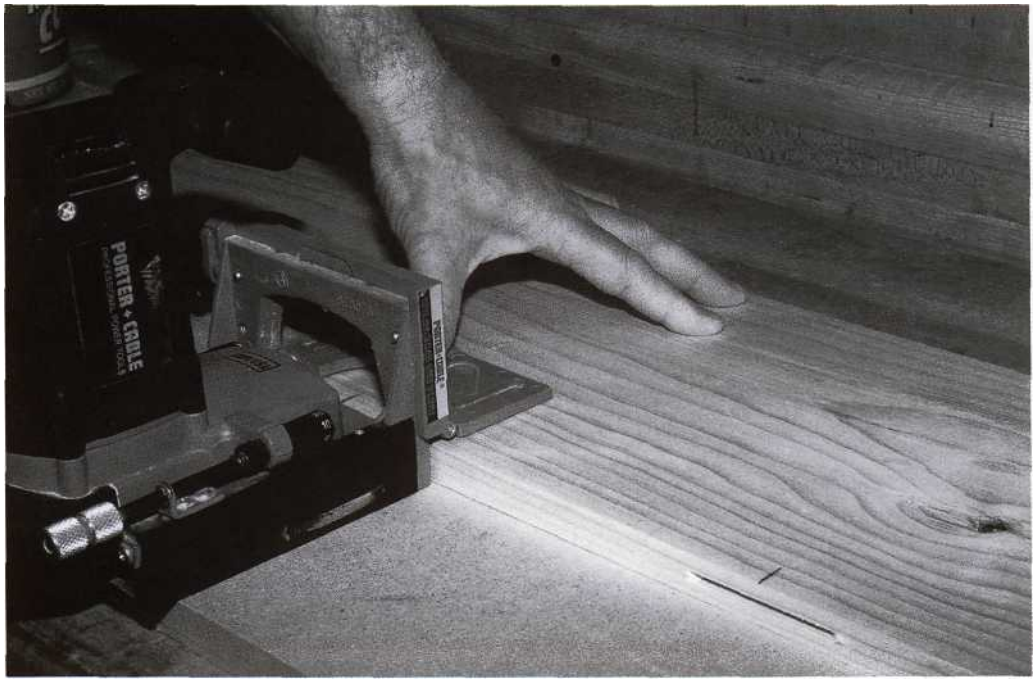
STEP 5. Using glue, clamps and toenails, assemble the carcass. Check the diagonals to make sure the structure is square, then set it aside overnight or until the glue is fully cured.

STEP 6. Sand all four pieces of trim smooth and apply stain.

STEP 7. There are a couple of ways to attach the trim to the carcass. You can glue, nail and clamp as I did, and as was done on the original, or you can biscuit them on. If you decide to use nails, skip the next four steps. Just set the nail heads and use a dark filler to cover the holes. They'll still show, but that's good; country carpenters 200 hundred years ago were not so particular as we are today. If you decide to use biscuits, remove the clamps from the carcass, lay it on its back, set the trim in place and mark for the slots. It's best if you allow 8" or 9" between biscuits.

STEP 8. Mill the biscuit slots.

STEP 9. Glue and clamp the trim in place and set the structure aside until the glue is fully cured.



You'll need to reinforce the butt joints between the two pieces of stock that make up the sides with biscuits or dowels. Ideally, these should be placed 8" to 10" apart.



For accuracy, when milling the dadoes, you can clamp two sides together and do both at once. You'll need to make sure your T square is exactly 90° to the sides, of course. You can make sure by measuring the setting at both ends of the square in relation to the top or bottom. Whichever you use, top or bottom, use the same reference point for each dado you mill.

STEP 10. Using no. 6 X *1 5/8"* screws, glue and screw the small cleats to the front underside of the six shelves, including the drawer support, the top and the upper front of the bottom.

STEP 11. Using no. 6 X 1%" screws, from the inside, glue and screw the center trim to the carcass. You'll need to drill pilot holes first. Make sure it is square to the outer trim and the openings match exactly.

cutting bit or your table saw to mill ^{5}/i6"-deep grooves to the inner edges of the rails and stiles that will make up the two doors.

STEP 13. Lay out the rails and stiles and mark for biscuit slots. You can use lap joints if you like, but you'll need to adjust the length of the rails to maintain the outer dimensions of the doors.

STEP 14. Mill the biscuit slots.

STEP 15. Dry fit the rails and stiles and measure the width and height between the grooves to ensure the panels will fit properly.

STEP 16. If necessary, trim the panels to size.

STEP 17. Sand the rails and stiles smooth and apply your stain.

STEP 18. Glue and clamp the rails and stiles, *one side only*, dry fit the other, ensure all is square, then set them aside until the glue is fully cured.

STEP 19. Set your table saw to cut at an angle of 17° and the rip fence at 1/4" and mill the bevels to the edges of the panels. The tip of the blade should just break through the surface of the stock, leaving a small step and nice clean lines.

STEP 20. Sand the panels smooth, paying close attention to the bevels, then apply the stain.

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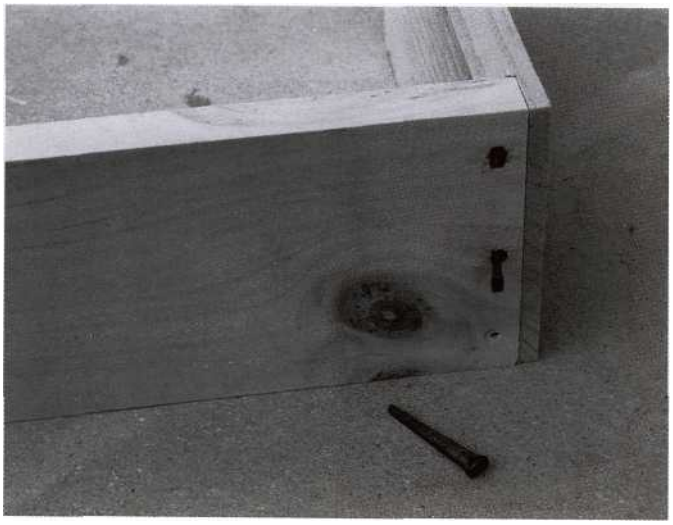
STEP 21. When the glue is fully cured, remove the clamps



Use a compass and pencil to mark the detail for the feet. You'll find your jigsaw the best tool for removing the waste.



For strength, glue and then toenail screw the shelves into the dadoes. When you've squared the carcass, and the glue has fully cured, you'll have a structure that's rock solid.



When you're putting the drawers together, drill pilot holes to ease the passage of the rather bulky cut-steel nails.

SHOP TIP

Fitting a Door



Fitting a door, or pair of doors, can often be something of a trial, especially if the frame or, in the case of a raised panel assembly, the door, is slightly out of square. Yep, it happens even to the best. This is the easy way to do it.

First, I always make my doors just a little larger than the opening, say ¼". The purists may say I'm cheating. Not so, just practical. You can always take a little off; you can't add a little on if you make a mistake. I don't have time and money enough to remake a raised panel door, or even a solid one for that matter.

Next I set the door in the opening and determine how to remove so it will fit closely.

Now, I remove excess material from the length of the door on the table saw. To remove it from the width I use the jointer.

If the door or opening is out of square, I cut the door to the correct length. Then, using the tapering technique described on page 87, I take the door to the jointer, set the machine to cut at a depth of 1/32", and make as many passes as necessary to remove enough material for the door to fit the opening. Usually two passes are quite enough.

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STEP 22. Slide the panels into place in the now open frames, glue and clamp the remaining stiles in place and set the completed doors aside to allow the glue to fully cure.

STEP 23. Glue and screw the four drawer guides in place, making sure they are square to the front openings.

STEP 24. Build the drawers as laid out in the drawing and Shop Tip at right.

STEP 25. Go to the finishing process below.

STEP 26. Attach the doors to the carcass.

STEP 27. Attach the hardware to the doors and drawers.

STEP 28. Set the swivel catches in place and fasten with no. 6 X 1 5/8" screws.

FINISHING

Your staining is all done, so all that's left is to do the appropriate distressing, painting and aging. First, do some light distressing around the trim, the corners and the edges of the doors, a little heavier around the feet, and then some final sanding with a fine-grit paper. Next, apply a couple of coats of polyurethane, then a couple of coats of a dark green paint of your choice. Allow the paint to dry completely, at least forty-eight hours, then go to the rubbing-down stage. You'll want the stain to show through in the areas that would be subject to heavy wear—around door edges, doorknobs, swivel catches, corners, outer edges of the carcass and around the feet. Next you'll need to complete the illusion by applying an antiquing glaze. I used pigmented paint thinner, but pigmented, diluted, water-based polyurethane would do the job just as well. Finally, you'll need to apply a coat of clear polyurethane for protection.

SHOP TIP

Simple Drawers



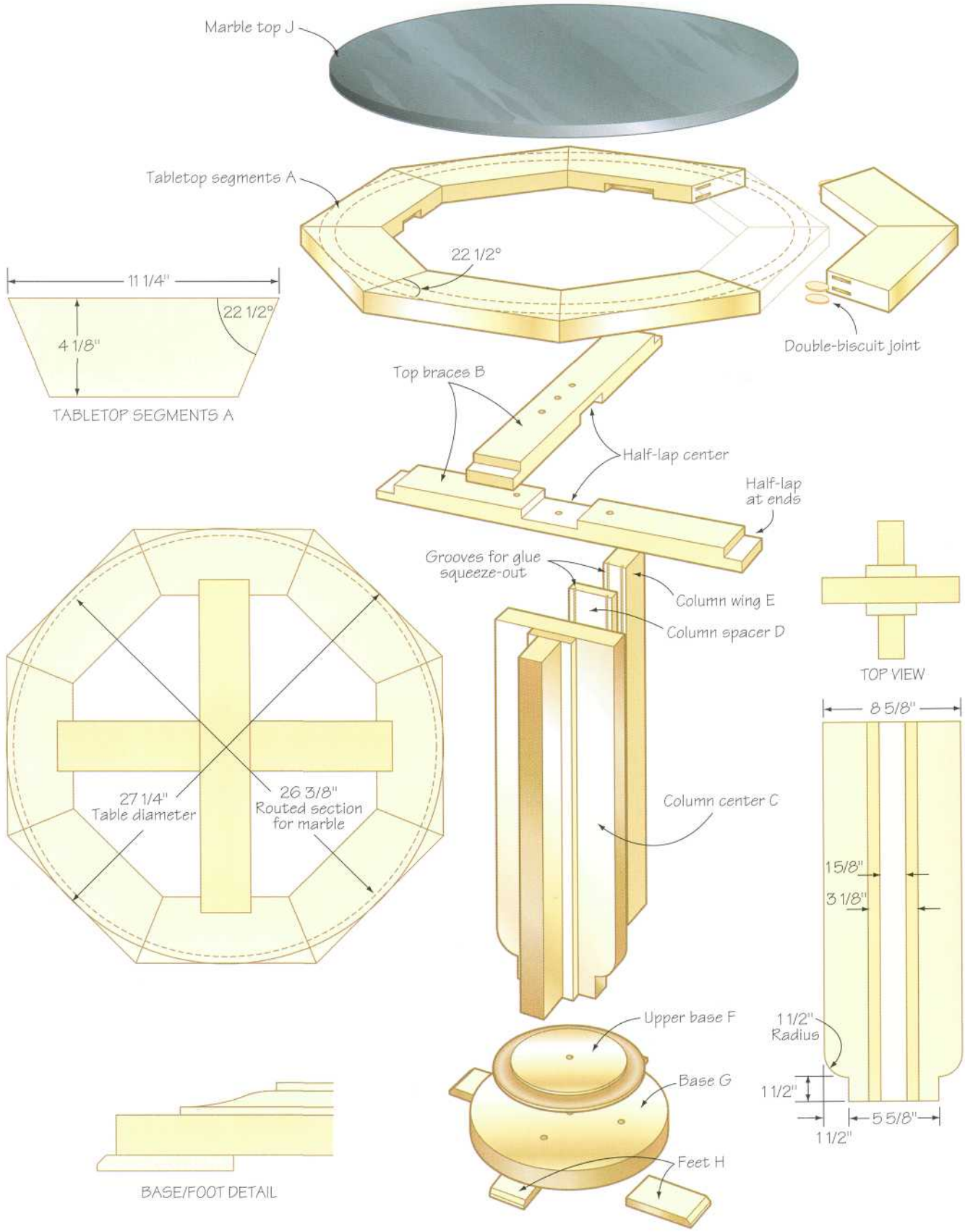
Most of the drawers you'll find in this book are made using very simple construction methods: lap joints, glue and cut-steel nails. This was the method most often used by the colonial craftsmen when working with pine. Pine tends to breathe, expand, shrink and swell, more so than the hardwoods, therefore lap joints were preferred to dovetails. I use cut-steel nails simply because they look more authentic than finishing nails. The method is as follows:

1. Cut all the pieces to size. The back of the drawer will be ½" narrower than the sides and front.
2. Rabbet the inside edges of the drawer fronts, ¾" wide and ½" deep, leaving ¼" of material on the outer face. I use my Delta tenoning jig to cut the cheeks, and my table saw to cut shoulders.
3. Rabbet the drawer sides on one end only, ¾" wide and ½" deep, leaving ¼"of material on the outer face.
4. Using one of the drawer backs as a template, set the table saw rip fence and blade to cut at a depth of ¼". Cut slots in both sides and the front to accept the ¼" plywood bottom. Cut once, then move the rip fence out ⅛" and cut again. Be sure you make two left- and two right-hand sides.
5. Assemble the drawer's using glue and cut steel nails, check the diagonals to ensure they are square, then clamp and set them aside until the glue is fully cured.
6. Fit the drawers bottom and secure it in place with a couple of brads to the back edge.
7. Attach the hardware.
8. Do any necessary finish sanding, break all the sharp edges and you're done.

MARBLE-TOP ARTDECO TABLE



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MARBLE-TOP ART DECO TABLE

inches (millimeters)

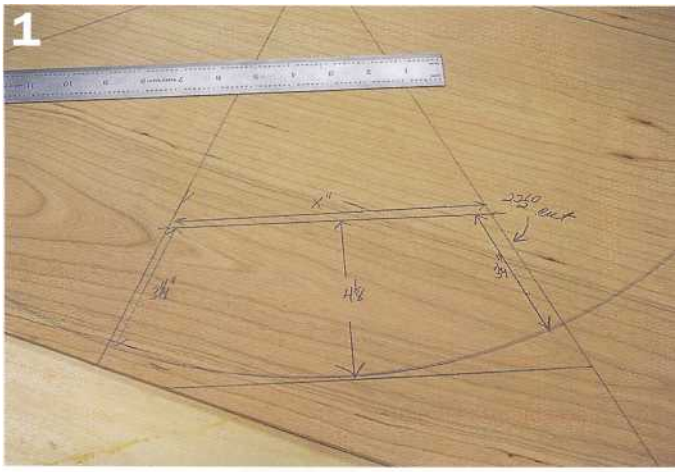
REFERENCE	QUANTITY	PART	STOCK	THICKNESS	(mm)	WIDTH	(mm)	LENGTH	(mm)	COMMENTS
A	8	tabletop segments	mahogany	1 3/4	(45)	4 1/4	(108)	11 1/4	(285)	22 1/2° cut BE
B	2	top braces	mahogany	1 1/2	(38)	3 1/8	(79)	20 7/8	(530)	1/2" (13) lapped center
C	1	column center	mahogany	1 5/8	(41)	8 5/8	(219)	23 3/4	(603)	
D	2	column spacers	mahogany	3/4	(19)	3 1/8	(79)	23 3/4	(603)	
E	2	column wings	mahogany	1 3/4	(45)	2 3/4	(70)	23 3/4	(603)	
F	1	upper base	mahogany	1	(25)	9 5/8	(245)	9 5/8	(245)	lathe-turned
G	1	base	mahogany	1 1/4	(32)	13 5/8	(346)	13 5/8	(346)	lathe-turned
H	4	feet	mahogany	1/2	(13)	1 5/8	(41)	4 1/4	(108)	
J	1	top	marble	3/4	(19)	26 3/8	(670)	round		

Note: BE = both ends.

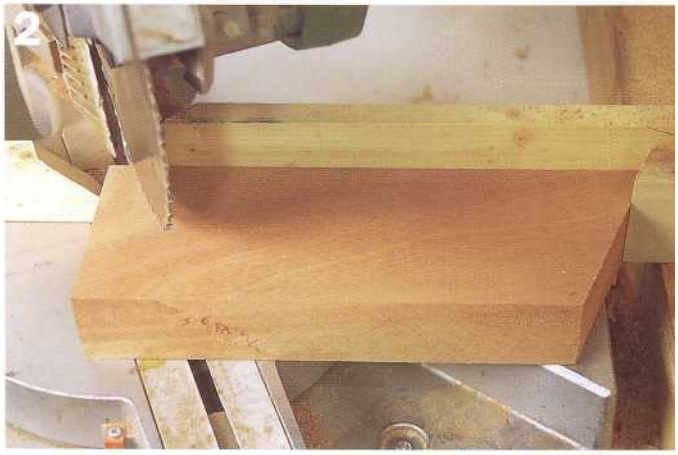
hardware

8	No. 8 x 1 1/4" (32mm) Slotted-head wood screws	local hardware store
5	No. 8 x 2" (51mm) Square-drive deck screws	local hardware store
5	5/16" x 4" (8mm x 102mm) Lag screw with washers	local hardware store
12	No. 7 x 3/4" (19mm) Slotted-head wood screws	local hardware store
	Glue	
	#20 Biscuits	
	3/16" (5mm) Dowel pin	
	1/4" (6mm) Spacer	
	3/16" × 1" (5mm × 25mm) Dowel	
	Aniline dye stain	
	Lacquer, sealer and finish	

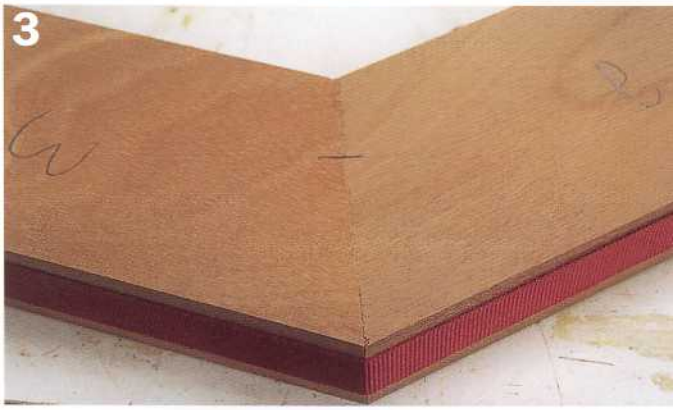
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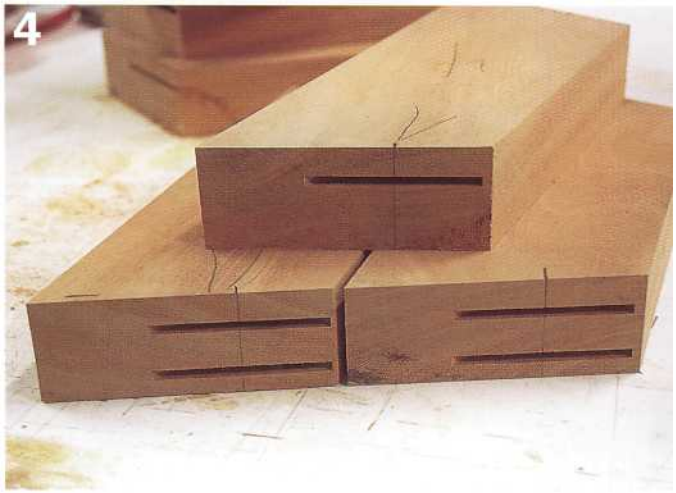
step 1 To start this piece, you need to determine the size of the segmented top. Create a full-size drawing of the round top and divide the circumference into eight sections. The eight sections determine the 22 1/2" cut for each end of the sections. Lay back 3 1/4" from the intersection of the circle and the section dividing line to ensure space for the biscuit joinery. From that back line, measure out to just past the apex of the circle. To copy my piece, the result is a 4 1/4"-wide piece that is ll 1/4" on the long side.



step 2 Mill your segment pieces to size and cut the 22 1/2^0 cuts on each end to form a pie-shaped piece. Repeat the cuts on all eight pieces.

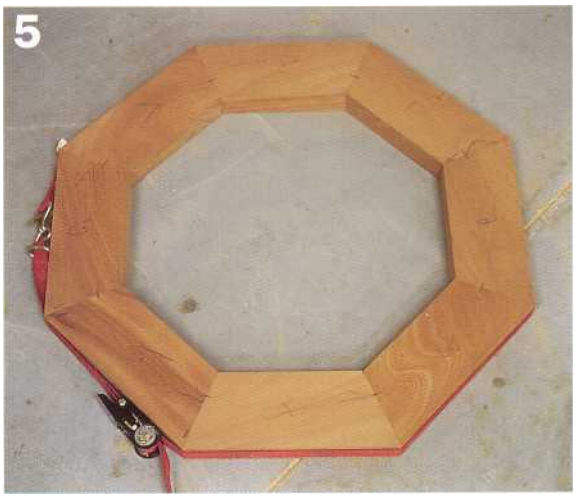


Step 3 Clamp the pieces with a band clamp. If your measurements were correct, the fit is tight. If you are off a bit, you can make small changes to the angle cuts on individual pieces to arrive at a tight fit. When ready, mark the location for the biscuit slot.

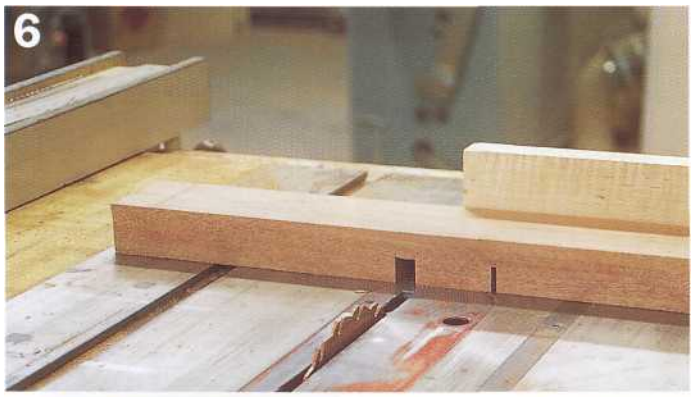


step 4 On the segments, transfer the layout line for the biscuit slots to both faces of the piece and cut one slot referenced to the top and one to the bottom, creating twin slots on each end.

step 5 Glue the ends with the biscuits in place and clamp with a band clamp until dry.



Step 6 Cut the top braces to size and create the half-lap center joint.



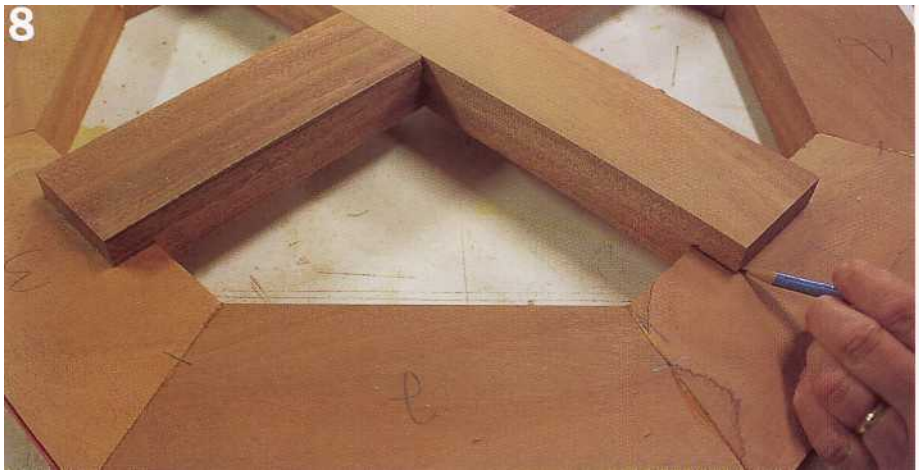
Step 7 Assemble the top braces and mark all four ends with an X. Separate the two and cut a 3/4" x 1" rabbet on the ends of each brace. Cut only the X-marked ends, so that when joined the braces have the cuts on the same face.

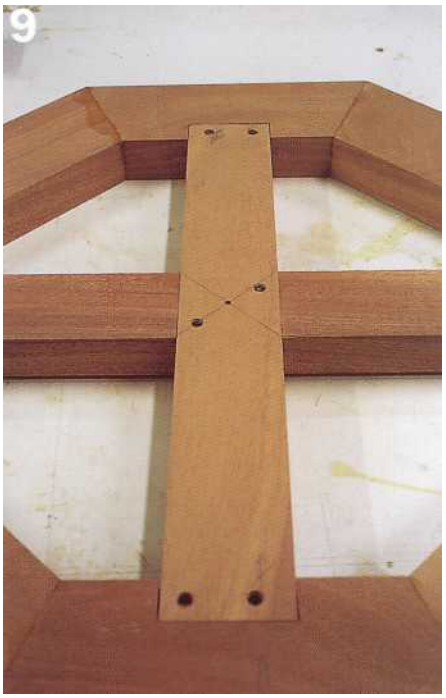


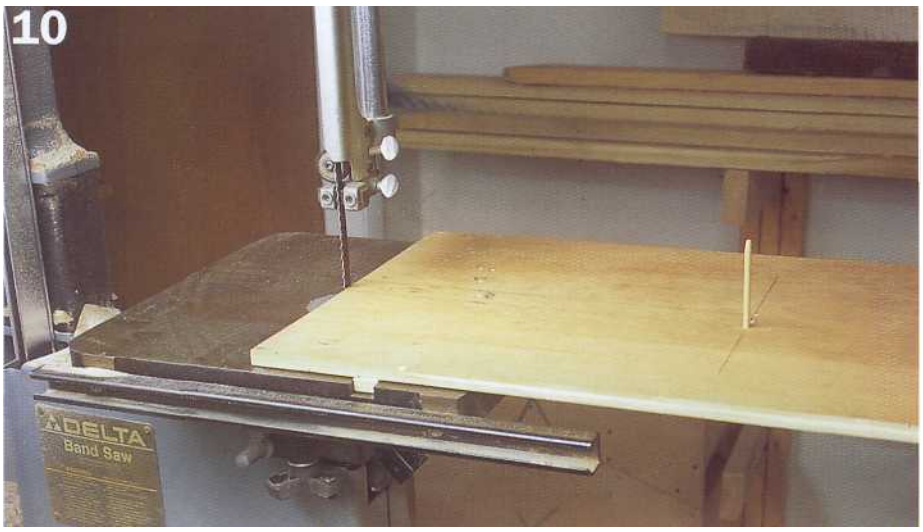
Step 8 Set the brace assembly in place on the underside of the joined top and mark the ends. Remove the necessary areas with a router or chisels. It helps to keep the brace in the same position to match the cuts, so mark one end with the top section location.

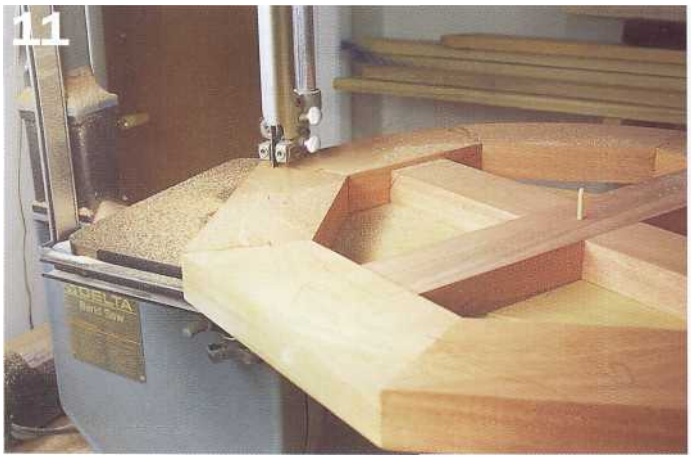
step 9 Before you attach the brace assembly to the top, locate a center in the brace and drill a 3/16" hole. Secure the brace with glue and 1 1/4" screws in the center, then attach the assembly to the top in the same manner.

step 10 Prepare your band saw to cut the top section to round. Attach a cleat that fits into the saw guide to a piece of plywood. Square a line from the blade and mark *13 1/8"*, or half the diameter of the finished top. Drill a 3/16" hole for a short dowel pin.









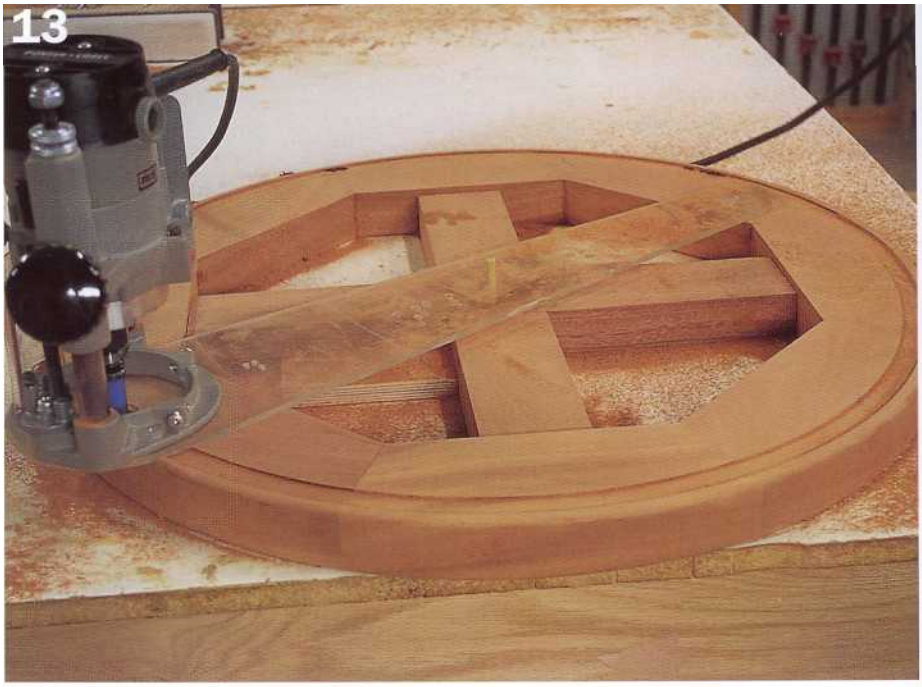


Step 11 Place the top section onto the pin in the plywood platform with a flat area at the blade. It will be a tight fit. Turn the saw on and slowly rotate the top section, cutting to a circle.

step 12 Once cut, sand all surfaces of the now round top. Round over both the top and bottom exterior edges with a 3/16" roundover bit.

step 13 Set up the plunge router with the circle-cutting jig. Place the 3/16" dowel pin in place, then add a 1/4" spacer to the pin. Set the router to cut 1/4" deep, and the outside cutting edge of the bit ($^3/_4$" straight) to be exactly $^5/16$" from the outside edge of the top. Hook the circle-cutting jig over the pin and plunge-cut the first pass on the top. With the outer edge defined, move to the extreme inside cut and repeat the process, each time moving toward the outer edge. This process allows the router base to rest on the existing material with each pass, and on the top's outer rim on the final passing cut. Also, notice how I lock the top in place with the plywood pieces. It will need to be secured.

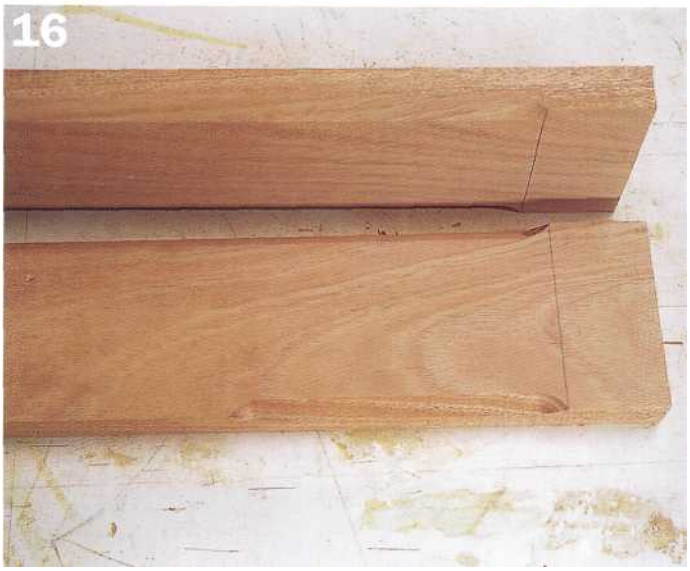
step 14 When the cutting is complete, clean up the recessed top with a scraper.

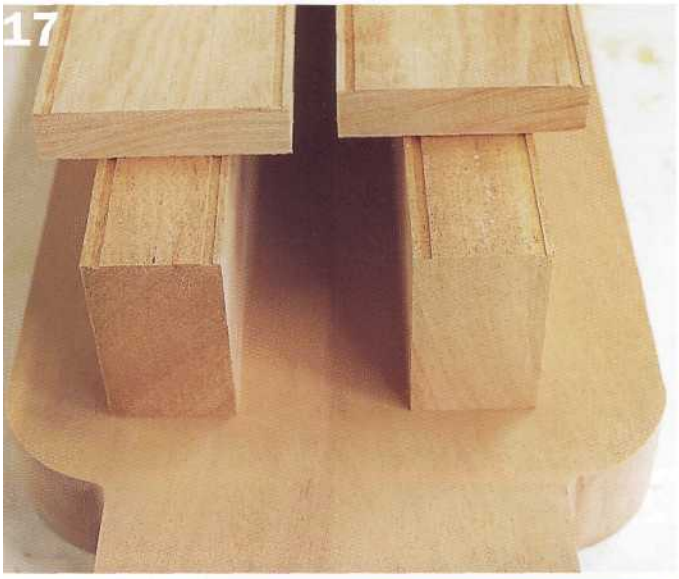






step 15 Next, mill the pieces for the column. Make the 1 1/2"-radius cut at both edges of the column center and one edge of each of the column wings. It is easy to create a simple jig and use a router and pattern bit to complete this step.





step 16 Use a chamfer bit and router on both edges of the two column spacers. Stay short of the ends for appearance.

step 17 At the table saw, cut a shallow groove on the back sides of the spacers and wings. Make the cut on both edges. This will become a reservoir to prevent glue squeeze-out during the assembly of the column.

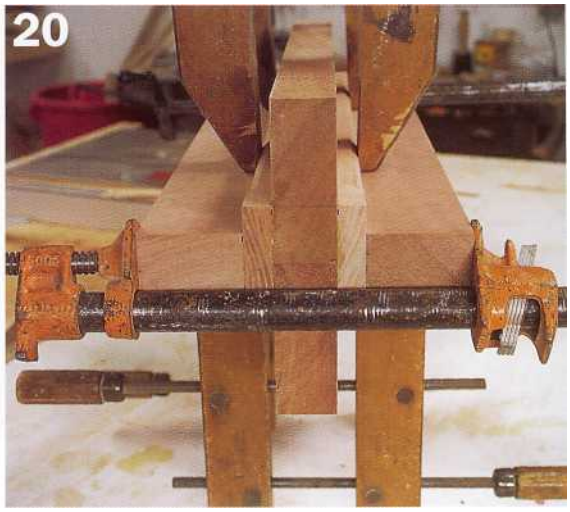
step 18 Attach the wings to the center of the spacers with glue and 1 1/4" screws. Use just enough glue to work; a slight excess should be caught in the grooves from the previous step, but too much will still result in squeeze-out.

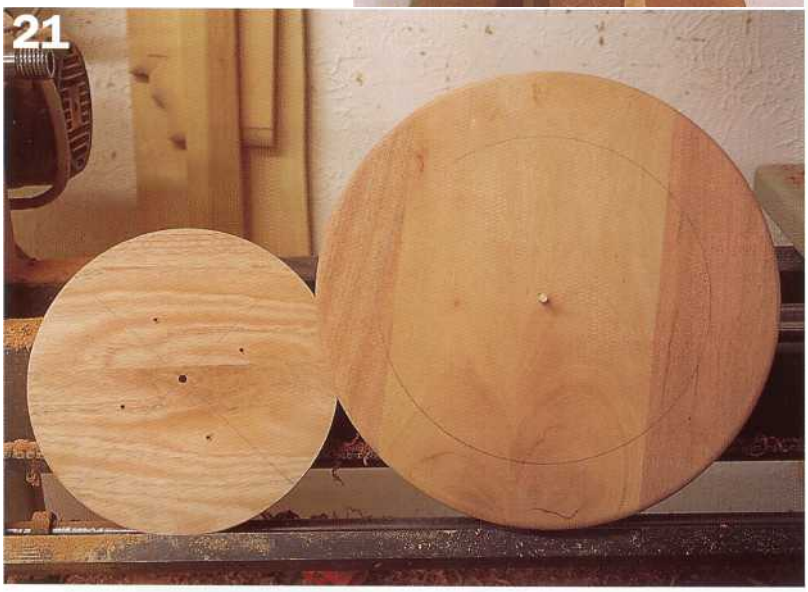


Step 19 This is how the wing/spacer unit attaches to the column center. Because we are joining face grain, the connection is made with glue only.



Step 20 Make the connection in two steps: one side, then the other when the first is dry.





step 21 Mill and turn the upper base to profile and the base to size. With the base on the lathe, mark the exact center. Drill a 3/16" hole at center of the base and at the intersection of the lines used to mount the face plate onto the upper base (this is the bottom side).



step 22 Insert a short dowel into the base and slide the upper base onto the pin. Mark a line around the upper base onto the base. Remount the base on the lathe and cut a shallow groove just inside the marked line. This is another glue reservoir.



Step 23 Attach the upper base to the column with 2" screws, making sure the heads are countersunk.

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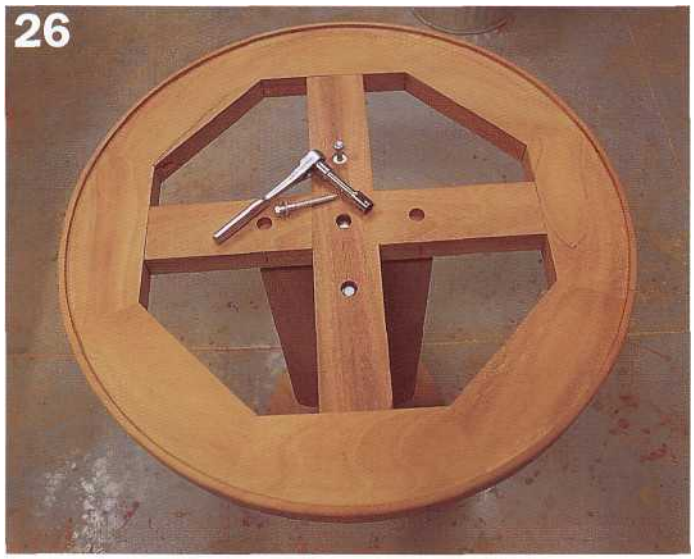


step 24 Spread glue onto the bottom side of the upper base and inside the groove cut into the top of the base. Using the dowel pin, attach the two and clamp until dry.

step 25 Mill the feet to size, cut a chamfer on the ends, then cut the blank into two equal pieces. Locate the feet directly in alignment with the column edges and attach with glue and 3/4" screws. Countersink the heads.

step 26 Predrill the top and column for the 5/16" lag screws. Drill a 7/8" countersunk hole in the top so that the washer and the lag-screw head will be recessed. Finish the hole with a 5/16" bit. Set the top in place on the legs and mark the hole locations. Predrill the column with a 1/4" bit. Attach the top to the column with the lag screws.

step 27 The finish I selected for this piece is a water-based aniline dye stain with a lacquer top coat. All that is left is to order the marble insert for the top and set it in place to finish the project.





tip Here's a hint: If the marble proves to be a bit too costly, contact a kitchen countertop manufacturer for a solid-surface tabletop. These products will also work nicely and come in some great new colors and designs.

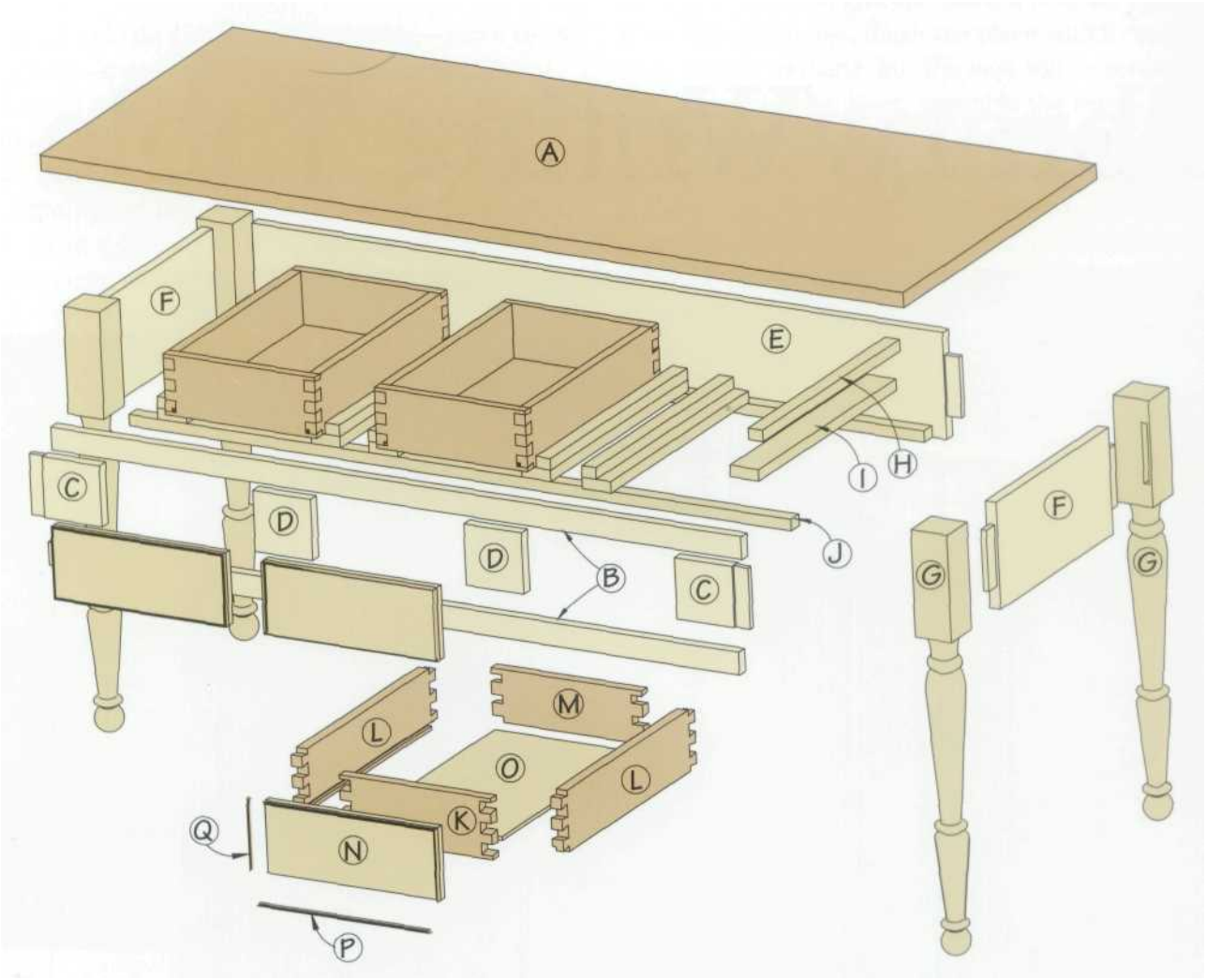
Library/Writing Table



These tables first appeared in America during the early 1700s. They were found most often in public places: libraries, town halls and courthouses. They were, of course, also found in many upper-class homes. The one I have chosen is an elegant piece, typical of the Queen Anne period, 1720-1750, with three drawers and turned legs. The original was a little larger. I've reduced the length from 72" to 60" so it will fit nicely into a smaller home.

CONSTRUCTION OUTLINE

Other than the legs (if you don't have a lathe you can use tapered legs) construction is fairly simple: the top is made from several pieces of furniture-grade pine, a full 1" thick, biscuited and glued together; the front, back and sides are mortised and tenoned to the legs; the front is a frame made from six pieces of stock; and the legs are made from 2 1/2"-square stock turned to an original design. The drawers have false fronts glued and screwed to through dovetail jointed carcasses. The hardware is early American and typical of the period**.** Finally, the piece is stained and finished with shellac to give it a deep shine.



MATERIALS LIST

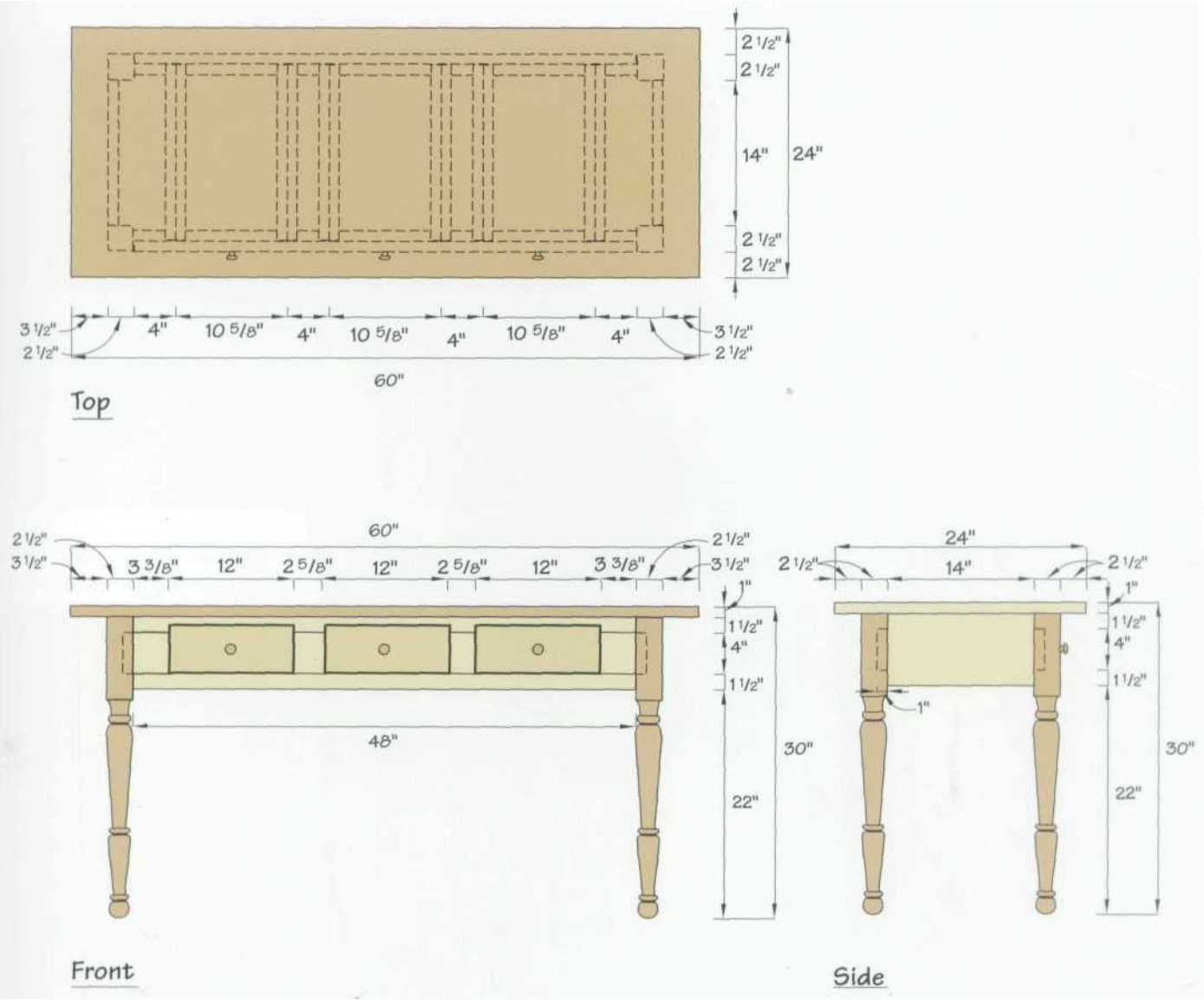
Library Writing Table

No.	Letter	Item	Dimensions T W L
1	A	Top	¾″×24″×60″
Apron			
2	B	*Front Apron	¾″×1½″×50″
2	C	Ends	¾″×4″×4½″
2	D	Dividers	¾″×4″×4″
1	E	*Back Apron	¾″×7″×50″
2	F	*End Aprons	¾″×7″×16″
4	G	Legs	2½″×2½″×29″
6	H	Drawer Guides	¾″×1″×16¼″
6	I	Drawer Guides	¾″×2″×16¼″
2	J	Cleats	¾″×1″×46″

No.	Letter	Item	Dimensions T W L
Drawers			
3	K	Fronts	¾″×4″×10½″
6	L	Sides	¾″×4″×16½″
3	M	Backs	¾″×3½″×10½″
3	N	False Fronts	¾″×4¾″×12″
3	O	Bottoms	¼″×9½″×16¼″
6	P	Beading	⅛″×⅜″×12″
6	Q	Beading	⅛″×⅜″×4¾″

*Includes Tenons

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BUILDING THE TABLE

STEP 1. Cut all the pieces to size.

STEP 2. Build the board that will form the tabletop.

STEP 3.Use a 1/2" roundover in your router and round the upper edge of the tabletop.

STEP 4. Sand the top smooth.

STEP 5. Using the scale pattern, turn the legs to shape.

STEP 6. Sand the logs smooth.

STEP 7. Cut mortises, 4" long X 3/8" wide X 1" deep, to the inside faces of the lops of all four legs as laid out in the drawing.

STEP 8. Using the six pieces of stock as laid out in the drawing, build the frame that will become the front section.

STEP 9. Cut tenons, 4" long x 3/8" wide x 1" deep, to the back and both sides of the apron.

STEP 10. Dry fit the apron to legs and make sure everything fits properly.

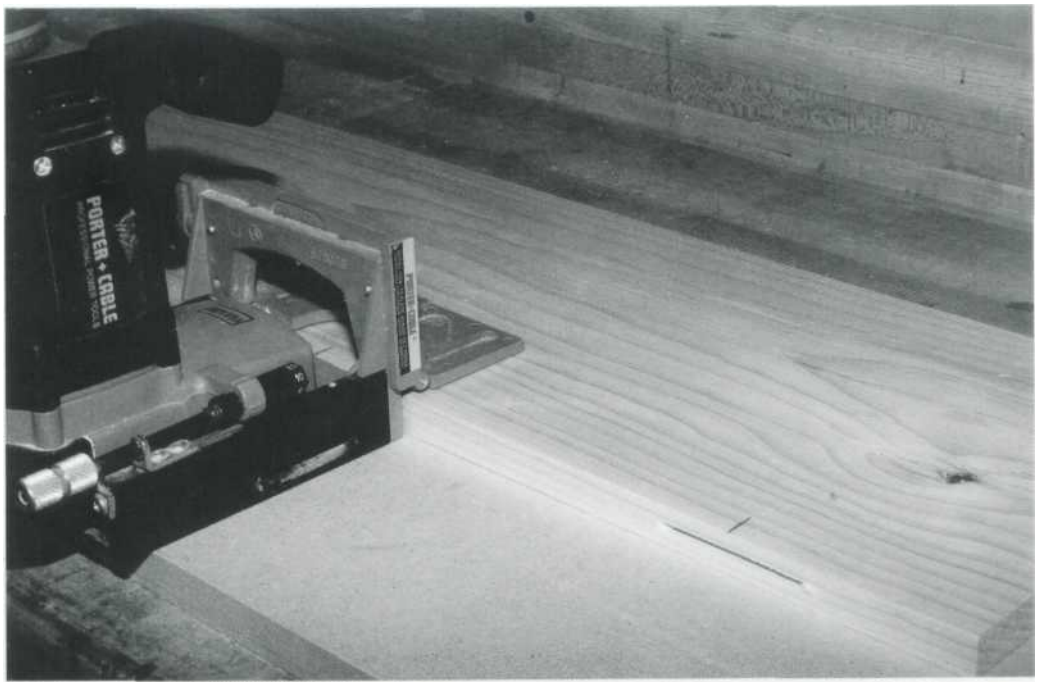
STEP 11. Disassemble the structure, then glue and clamp it and set it aside until the glue is fully cured.

STEP 12. Build the drawer guides.

STEP 13. Glue and screw the four cleats that will hold the top to the understructure in place to the top of the understructure.

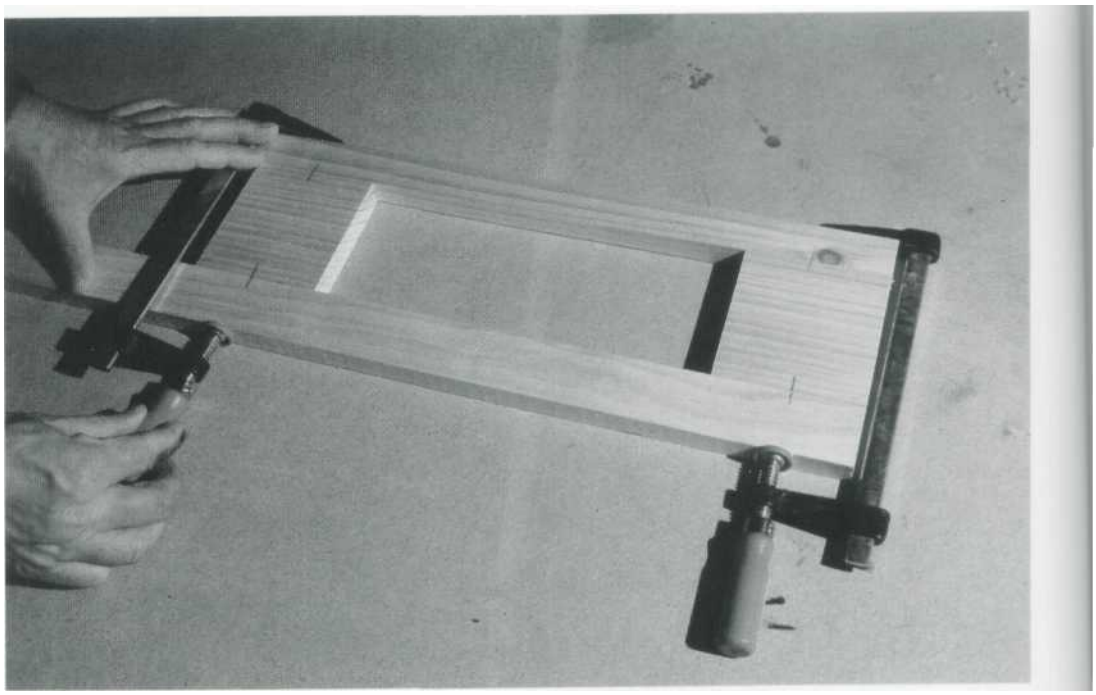
STEP 14. Glue and screw the two drawer supports in

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When you build the top, place your biscuits about 8" to 10" apart.

The front is easy to assemble. Jus! mark for biscuits, mill the slots, apply 11K[1] glue and clamp. Leave overnight, or until the glue is fully cured, and then mill the slot for buttons that will hold the lop to the subframe.



place to the lower edge of the understructure.

STEP 15. Set, the drawer guides in place on the supports and secure them using no. 6 X 1 3/4" screws.

STEP 16. Set the tabletop on the bench, underside up.

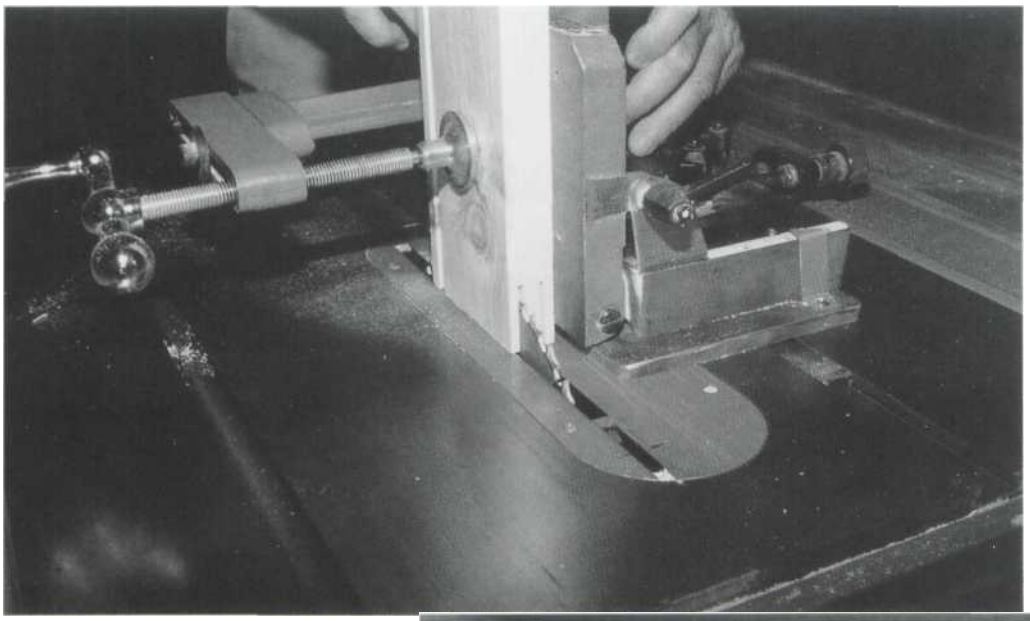
STEP 17. Set the carcass in place and secure to the top using ten no. 6 X 1 5/8" screws—four along each side cleat and one at each end. Elongate the holes to give the top room to breathe.

STEP 18. Using your router and dovetail jig, cut the through dovetail joints to the fronts, sides and ends of the drawers.

STEP 19. Set your table saw to cut at a depth of ¼" and cut the slots to the sides and fronts of the drawers that will receive the bottoms.

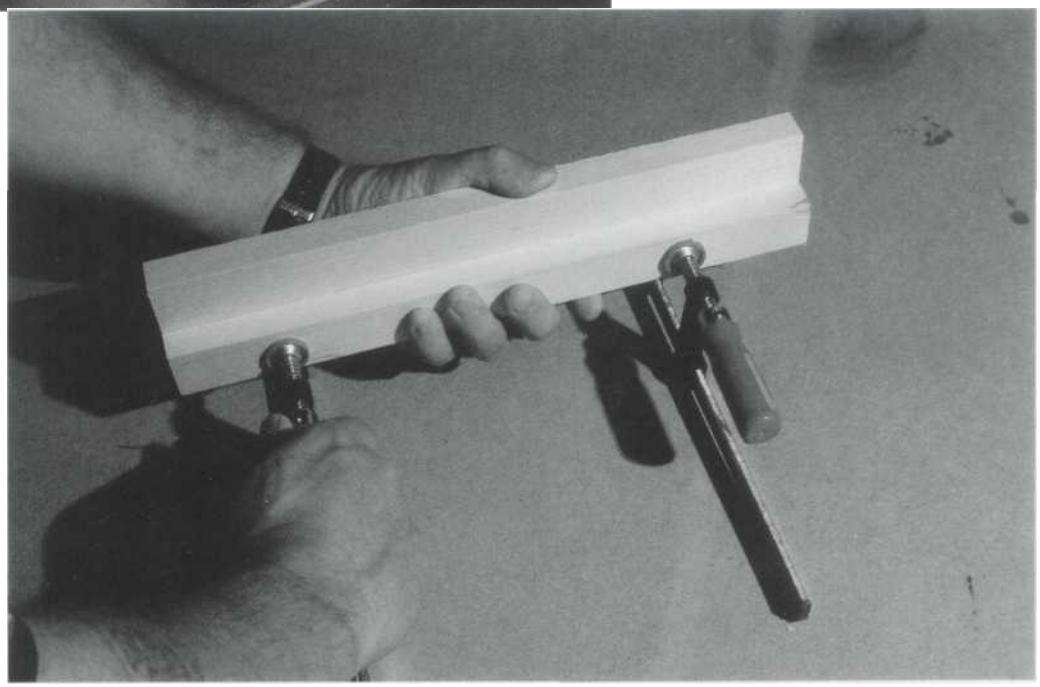
STEP 20. Dry fit the drawers to make sure they fit together properly, then glue, clamp and square them, and leave them overnight or until the glue has fully cured.

STEP 21. Use your router and a 1/4" roundover bit to trim



When you've milled the slot in the rails for the buttons that will hold the top to the sub frame, you can use your trusty tenoning jig to cut the tenons.

The drawer guides are easily made from two pieces of sleek, glued and clamped together. If you like, you can secure them with a couple of screws for extra strength.



the edges of the false drawer fronts to their final shape.

STEP 22. Complete the construction of the drawers by Fastening the hardware to the false fronts, the false fronts to the carcasses and the bottoms to the slots provided.

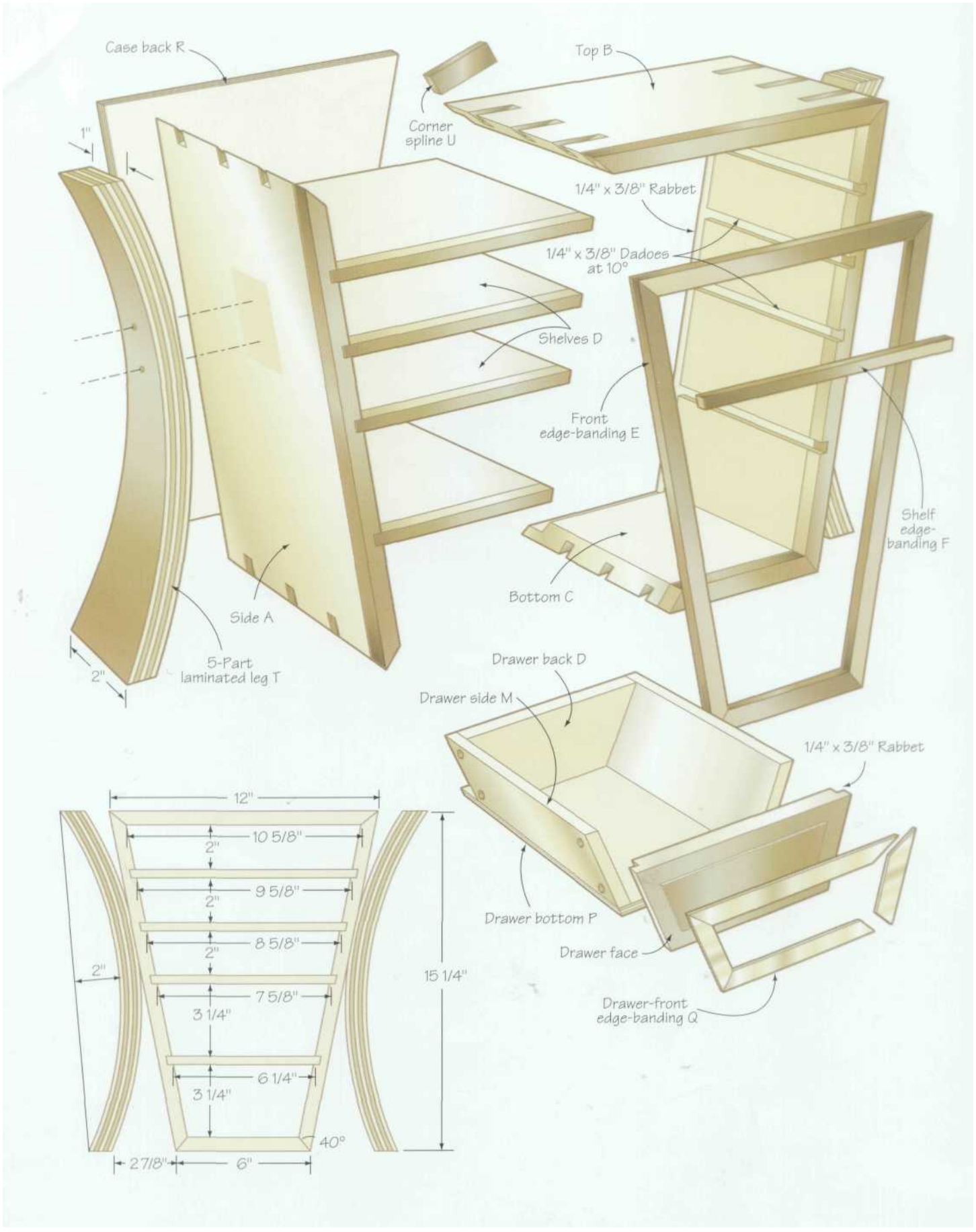
STEP 23. Do the final finish sanding. You'll need to take your time over this stage. The better the job you do, the better the Final finish will be.

FINISHING

I wanted a light finish for this piece, so I chose Puritan Pine stain made by Minwax. This I topped off with four coats of orange shellac at a three-pound cut. Each coat was allowed to dry for twenty-four hours before the next was applied. Also, I lightly sanded between coats with 400-grit paper.

JEWELRY CHEST





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JEWELRY CHEST

inches (millimeters)

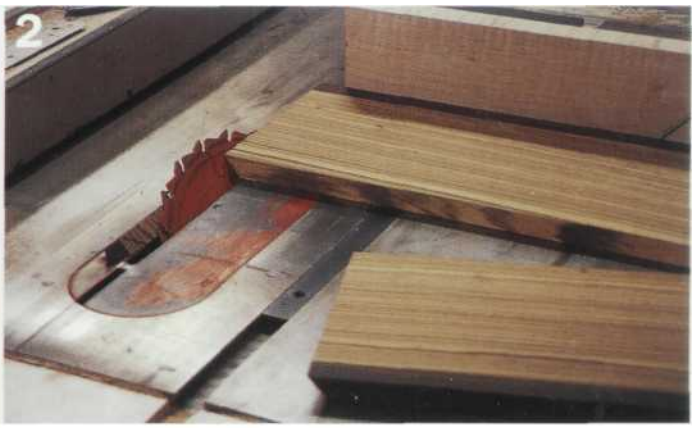
REFERENCE	QUANTITY	PART	STOCK	THICKNESS	(mm)	WIDTH	(mm)	LENGTH	(mm)	COMMENTS
A	2	sides	zebrawood	5/8	(16)	5 5/8	(143)	15 1/2	(394)	
B	1	top	zebrawood	5/8	(16)	5 5/8	(143)	12 1/8	(308)	
C	1	bottom	zebrawood	5/8	(16)	5 5/8	(143)	6	(152)	
D		shelving	zebrawood	3/8	(10)	5 1/4	(133)	3 1/2 lf	(1067)	
E		front edge-banding	wenge	1/4	(6)	5/8	(16)	4 lf	(1219)	
F		shelf edge-banding	wenge	1/4	(6)	3/8	(10)	3 1/2 lf	(1067)	
G	1	bottom drawer front	wenge	5/8	(16)	3 1/4	(82)	6 1/4	(158)	
H	1	drawer 1 front	wenge	5/8	(16)	3 1/4	(82)	7 3/16	(183)	
J	1	drawer 2 front	wenge	5/8	(16)	2	(51)	8 5/8	(219)	
K	1	drawer 3 front	wenge	5/8	(16)	2	(51)	9 9/16	(243)	
L	1	top drawer front	wenge	5/8	(16)	2	(51)	10 9/16	(268)	
M	6	2" (51) drawer sides	maple	3/8	(10)	2	(51)	5 1/4	(133)	angle-cut
N	4	3 1/4" (82) drawer sides	maple	3/8	(10)	3 1/4	(82)	5 1/4	(133)	angle-cut
P	1	drawer bottom	Baltic birch ply	1/4	(6)	12	(305)	30	(762)	
Q		drawer-front edge-banding	zebra	1/8	(3)	1/2	(13)	as needed		edge all sides of all drawers; use cutoffs from case and shelving
R	1	case back	Baltic birch ply	1/4	(6)	12	(305)	30	(762)	
S	2	drawer pins	walnut dowel	1/4	(6)			36	(914)	
T	10	laminated legs	wenge	3/16	(5)	2 1/8	(54)	17	(432)	5 pieces per leg
U	12	corner splines	wenge	1/4	(6)	5/8	(16)	1 3/4	(45)	

hardware

5	Knobs	item #REIB-00	contact Aquabrass.com to find store
	Cyanoacrylate glue with accelerator		
	Felt liner for drawer bottoms		
	3/4" (19mm) Brad nails		
	No. 6 x 1 1/4" (32mm) Square-drive face-frame screws		
	2 1/2" (64mm) Drywall screws for making the jig		
	Screw-hole plugs		
	Oil/varnish mixture		
	Wax		



Step 1 Glue and cut to size the material for the lour pieces of the case.



step 2 Set the saw blade at 40° and make the cuts on the bottom edge of the side pieces, as well as both ends of the bottom piece, while laying the material flat on the surface of the saw.

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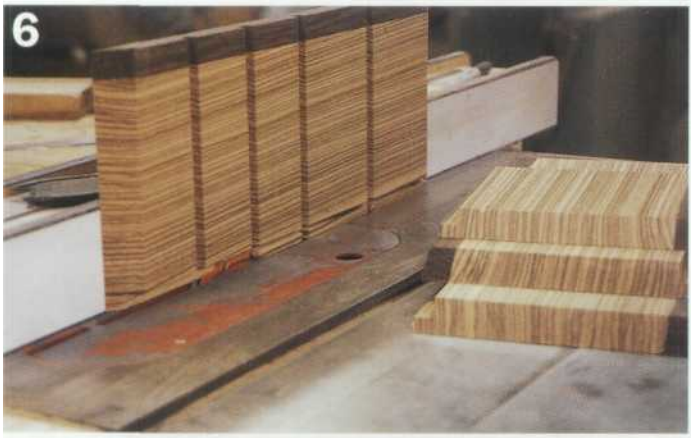
step 3 Position the fence on the left side of the blade and make the cut for the top edge of the side pieces and both ends of the top piece, creating a chiseled edge on the material. Here you can see that I raised the blade through a scrap piece of plywood in order to better control the work, eliminating any potential problem with the throat clearance.

step 4 Assemble the pieces check the fit and make any adjustments**.** Then lay out the shelf locations according to the plan.

step 5 Set the dado blade to a 3/8" cut, tilt the blade to 10° and plow the grooves for the shelves in each side. Set the distance from the fence and cut both sides at the same setting, making sure the sides are mirror images.







step 6 Next, cut the 3/8" x 1/4" rabbet for the case back.

step 7 Assemble the case with band clamps and glue, and while the glue sets cut the shelves to size, using the case as a guide. . Then lay out the shelf locations according to the plan.

step 8 Make the 1/4" cuts for the splines to reinforce the angled corner joints (see project nine, step 20 for information and procedure). Glue the splines in place and sand them flush with the case.









step 9 Slide the shelves into place with a bit of glue at the back edge, then attach the front edge-banding and shelf edge-banding to hide the shelf dadoes, as shown in the photo.

Step 10 Next, rip the drawer-front material to size and cut the fronts to fit the case openings. After the fronts are cut, install the plywood case back and nail it into place.



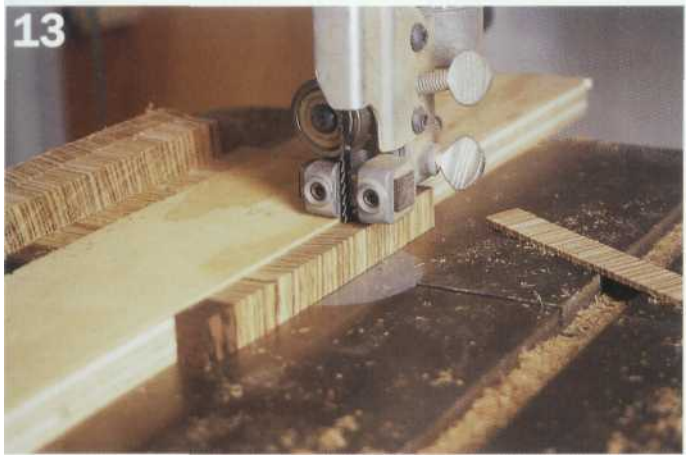
step 11 Mark the fronts and mill the 3/8" x 1/4" rabbets for the drawer sides and the 1/4" x 1/4" rabbets for the bottoms.

Step 12 Raise the blade to 1/2" and set the fence 1/2" from the blade to create the area for the drawer edge-banding. Cut all four sides of each front.

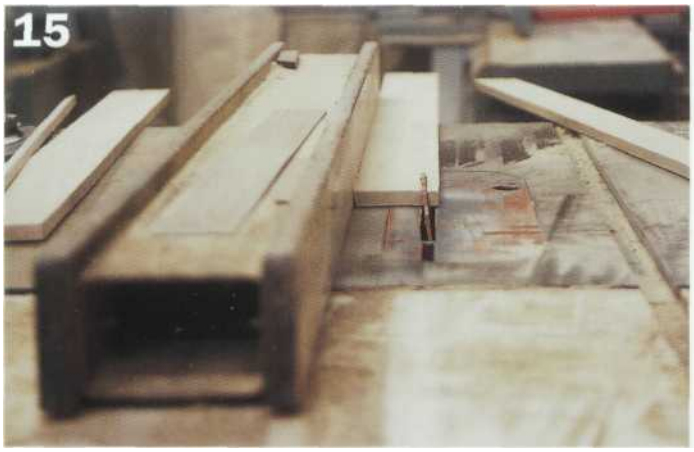


step 13 Using the cutoffs from the case and shelving, cut 1/2"-wide strips for the banding. At the band saw, rip those pieces into the 1/8"-thick banding.

Step 14 Fit the banding to each drawer. I used a cyanoacry-late glue with accelerator for instant setting.





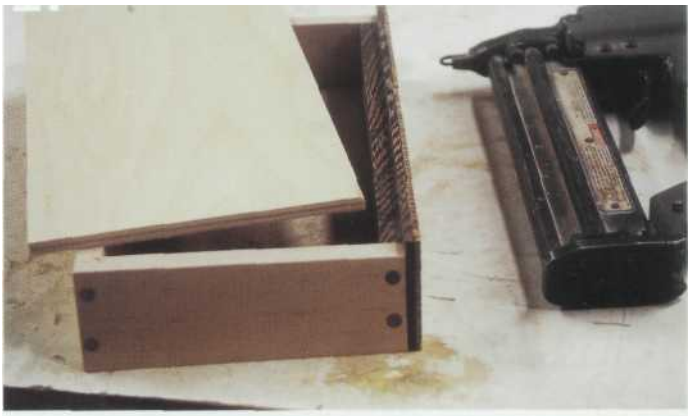


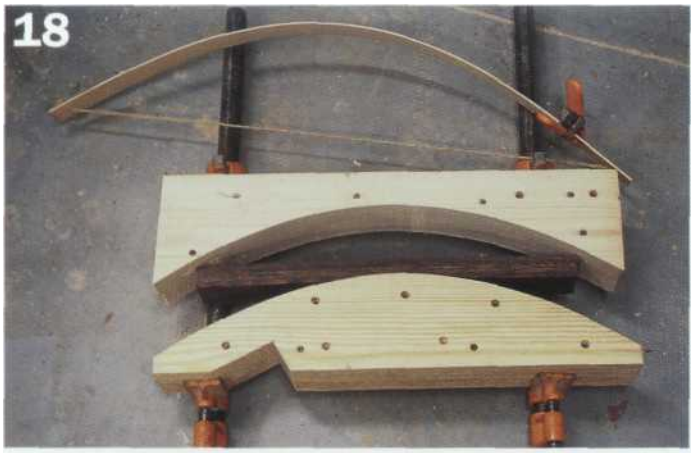
Step 15 Mill the remaining drawer material to size by setting the blade angle to 10° and cutting enough stock for both the 2″ and 3 1/4" drawers. Cut the sides and backs. Remember to cut the pieces 1/4" less than the drawer fronts to accommodate the drawer bottoms.

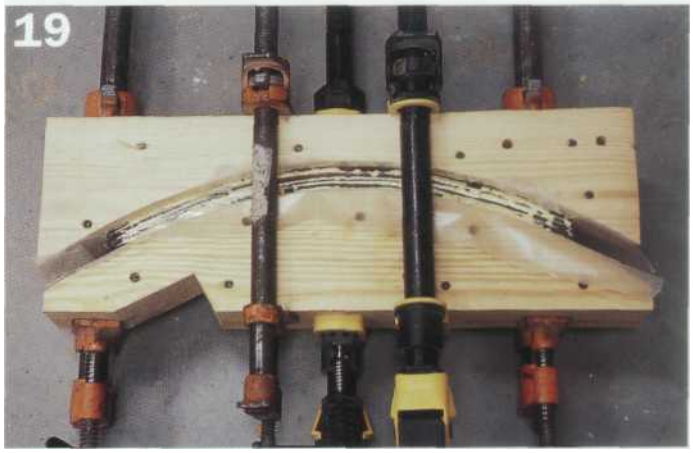


step 16 Assemble the drawers. 1 chose to glue the pieces and then, when dry, drilled a 3/16" hole for a walnut dowel for contrast. You may also elect to simply nail the drawers together.

step 17 With the drawers ready, position the bottoms, leaving them a bit long, and nail. Fit the drawers into the case, using the plywood bottoms as stops against the case back.









Step 18 Using a string and stick jig, set the desired bend for the legs. Make a quick bending jig with two pieces of 2x6 framing lumber and 2 1/2" drywall screws. Create the jig, remembering that the spring back is approximately 1/2" (overbend the material to allow for the spring back).

step 19 With the leg strips cut to size, apply glue to each matching face and clamp into the jig. Use a piece of wax paper to keep the squeeze-out off the jig. Set this aside until dry and repeat the process for the second leg.

step 20 With both legs laminated **and** dry, clean the glue from one edge and run each leg over the jointer to make a smooth and true 90° edge to the lace. Then set the saw to cut at 2".





Step 21 Set the legs against the case on a level surface, slide a 1/2"-thick piece of wood up to the leg edge and mark the cut line parallel to the level surface. Set the leg at the miter saw, align the mark with the blade and make the cut while holding the piece in place. Cut both leg bottoms then reset alongside the case and mark the top of each leg equal with the case top. Repeat the cutting steps.



step *22* With the case laid on its back, set the legs against the side and, using a 1/4"- thick piece of scrap, mark and cut away an area that will produce a true, flat joint with which to connect the leg to the case.

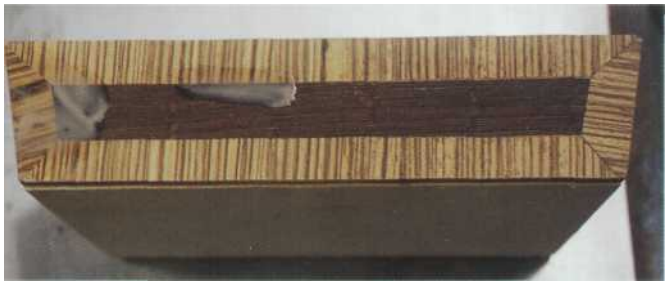
Step 23 With the legs cut to height and fit to the sides, lay out and cut the taper of 1/2" per side on the band saw, narrowing to the top of the leg. finish with a light pass over the jointer to clean up the cut.



Step 24 Attach the legs to the case with screws and plug the 3/8" holes with appropriate material.



step 25 I finished this piece with three coats of an oil/varnish mixture, allowed it to dry completely, then waxed the entire piece. Finally, add the selected hardware and install felt into the drawers.

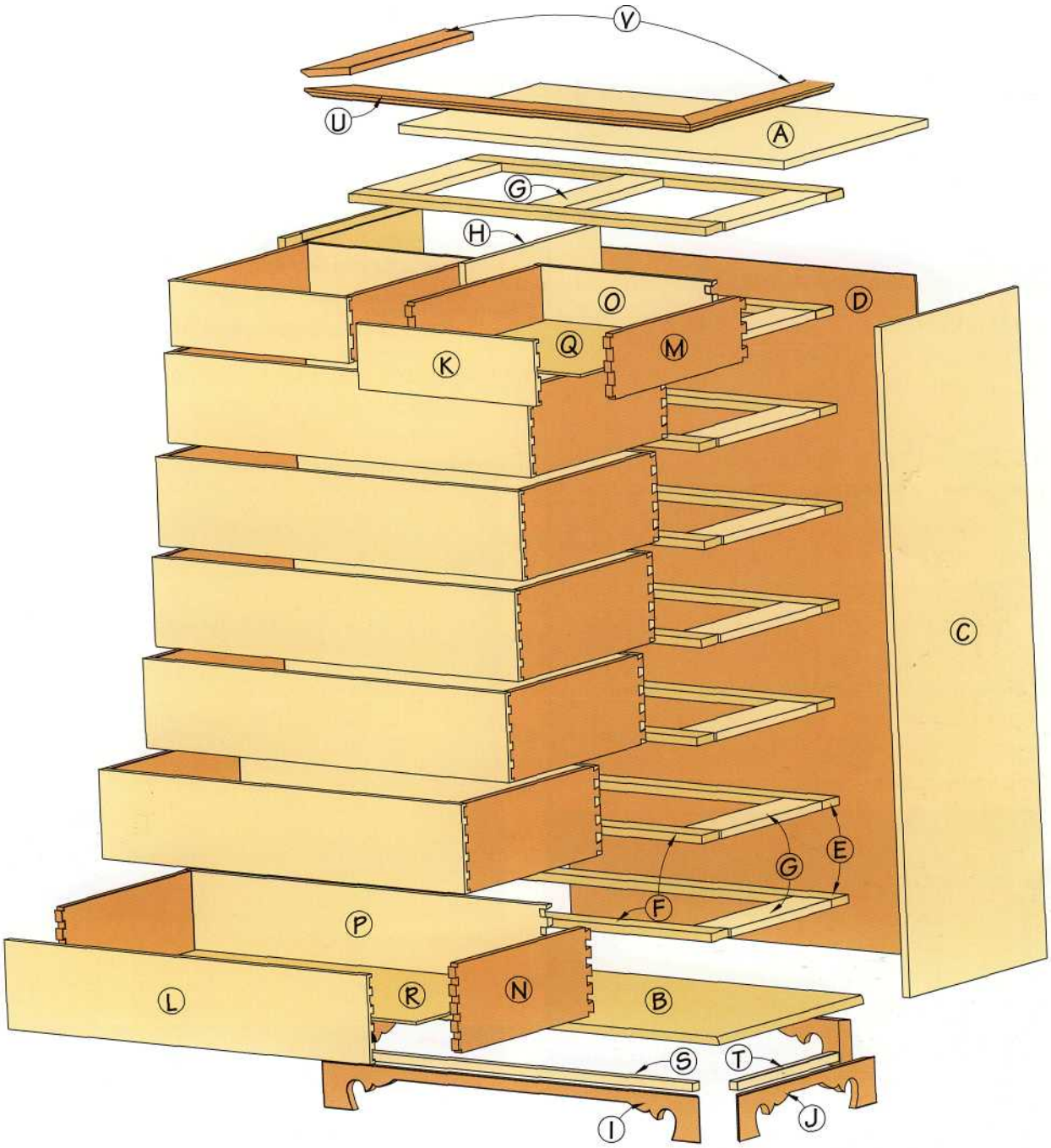


tip To close up any small gaps between the edge-banding and drawer fronts, apply a small amount of dark wood glue, and sand the surface, allowing the glue and sawdust to mix and fill the spots.

High Chest

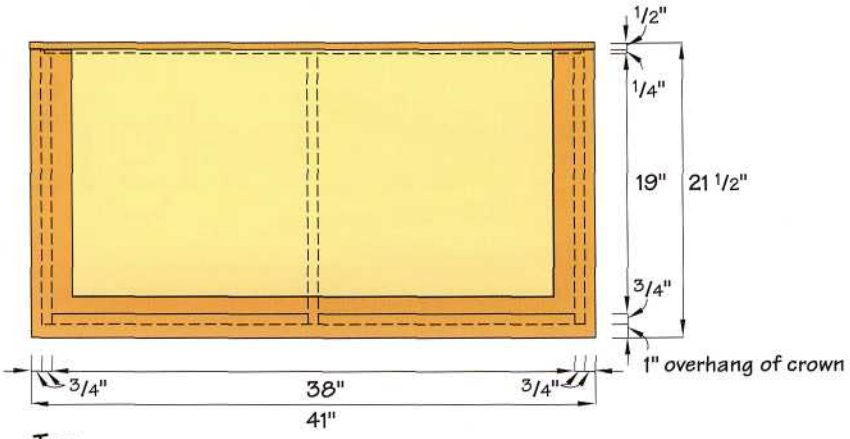


The chest of drawers was the result of the natural evolution of the blanket chest. First came the "chest on drawers." First one drawer, then another and another were added to the simple blanket chest until, finally, by the turn of the eigthteenth-century, the box section had been done away with altogether, leaving the chest of drawers we know so well today. Mr. Chippendale's famous *Gentleman and Cabinet-Maker's Director* of 1774 shows several nice versions. The high chest I've chosen is a copy of one found in Charleston, South Carolina, circa 1790-1810.

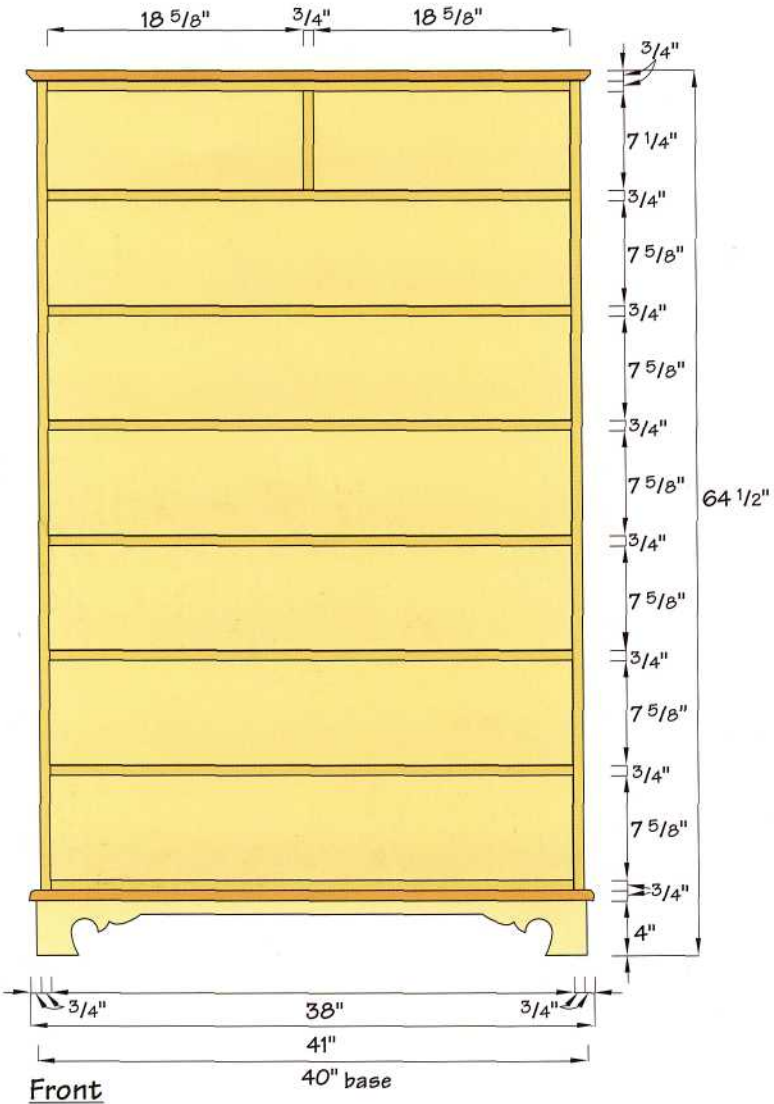


CONSTRUCTION OUTLINE

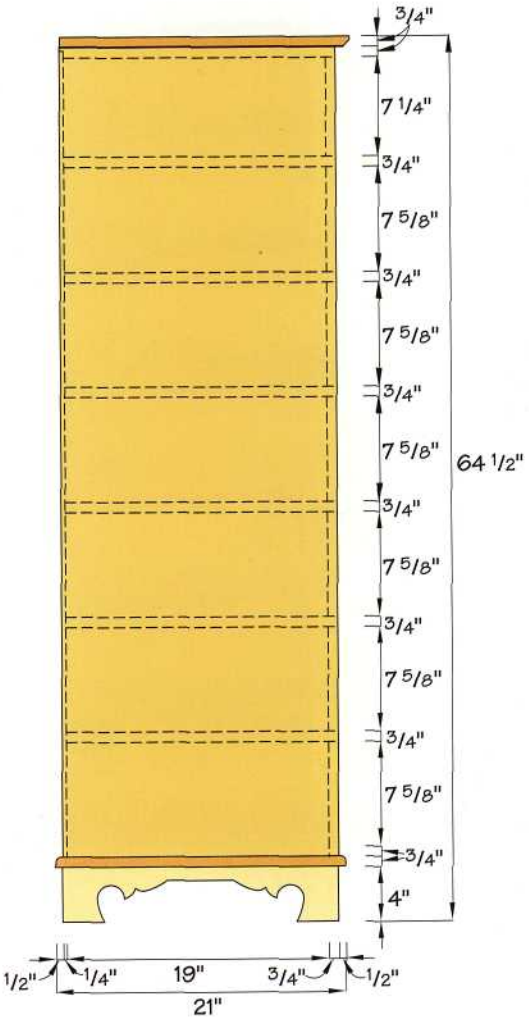
This is a substantial piece of furniture. It's bulky, heavy and difficult to maneuver. The carcass is of web frame construction with solid sides and top. The sides are stop-dadoed to receive the webs, and present a clean, unbroken front. The webs are offset for the same reason. The chest itself stands on feet attached to the bottom of the carcass. These are shaped, glued and then screwed in place from the underside of the one-piece bottom. The drawers are constructed using half-blind dovetail joints and fitted with period wooden knobs.



Top



Front



Side

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BUILDING THE CHEST

STEP 1. Cut all the pieces to size and run the edges through the jointer.

STEP 2. Build the boards that will make the sides, top and bottom.

STEP 3. Build the seven web frames (including one at the bottom to which the bottom board will be attached) as laid out in the drawing. You can use biscuits, as I did, or lap joints. Note the offsets, and that the top frame has an extra stretcher to carry the drawer separator.

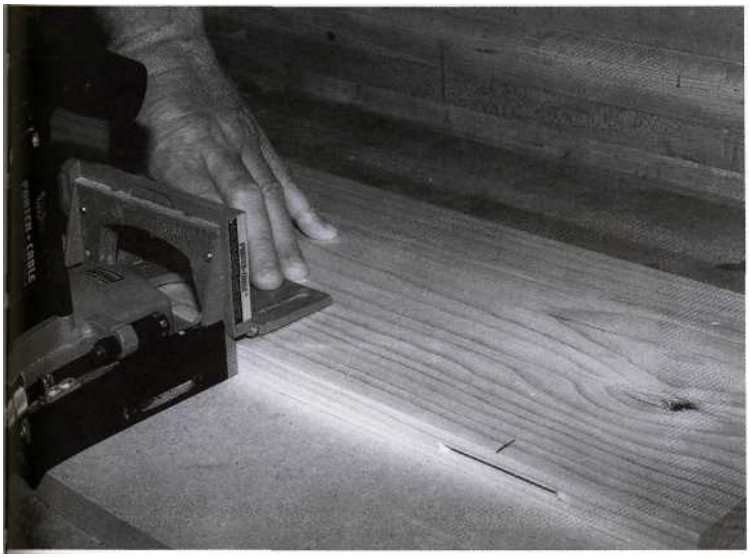
STEP 4. Mark the sides for stopped dadoes and top and bottom stopped rabbets as laid out in the drawing.

MATERIALS LIST

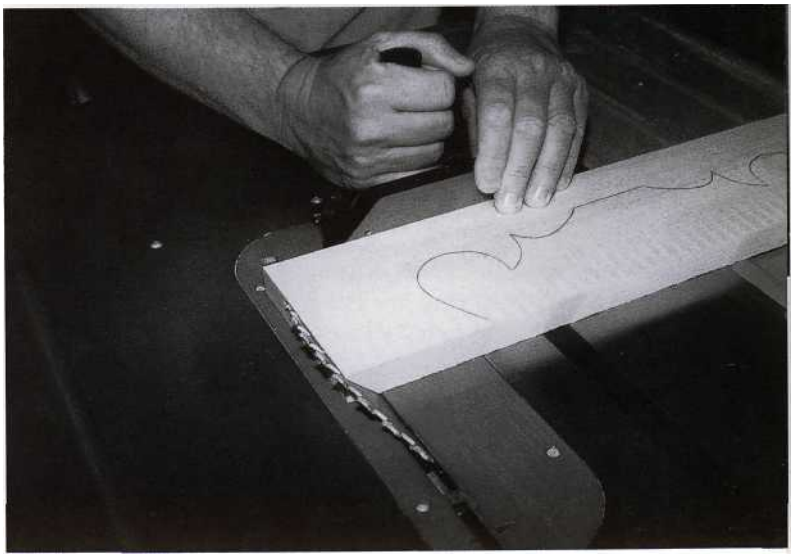
High Chest

No.	*Letter*	*Item*	*Dimensions T W L*
1	A	Top	¾″ × 21″ × 41″
1	B	Bottom	¾″ × 21″ × 41″
2	C	Sides	¾″ × 20″ × 59″
1	D	*Back	¾″ × 39½″ × 60″
8	E	Webs	¾″ × 2½″ × 38½″
8	F	Webs	¾″ × 2½″ × 38″
18	G	Webs	¾″ × 4″ × 14¾″
1	H	Drawer Separator	¾″ × 5½″ × 19¾″
2	I	Feet	¾″ × 4″ × 41″
2	J	Feet	¾″ × 4″ × 20″
2	K	Drawer Fronts	¾″ × 5½″ × 18⅞″
2	L	Drawer Fronts	¾″ × 7⅞″ × 38½″
2	M	Drawer Sides	¾″ × 5½″ × 19¾″
2	N	Drawer Sides	¾″ × 7⅞″ × 19¾″
2	O	Drawer Backs	¾″ × 5″ × 19⅞″
2	P	Drawer Backs	¾″ × 7⅜″ × 38½″
2	Q	Drawer Bottoms	¼″ × 18½″ × 19½″
2	R	Drawer Bottoms	¼″ × 38″ × 19½″

*Overlaps slightly at the bottom



When you edge-join the pieces that make up the sides, mill your biscuit slots about 9" apart.

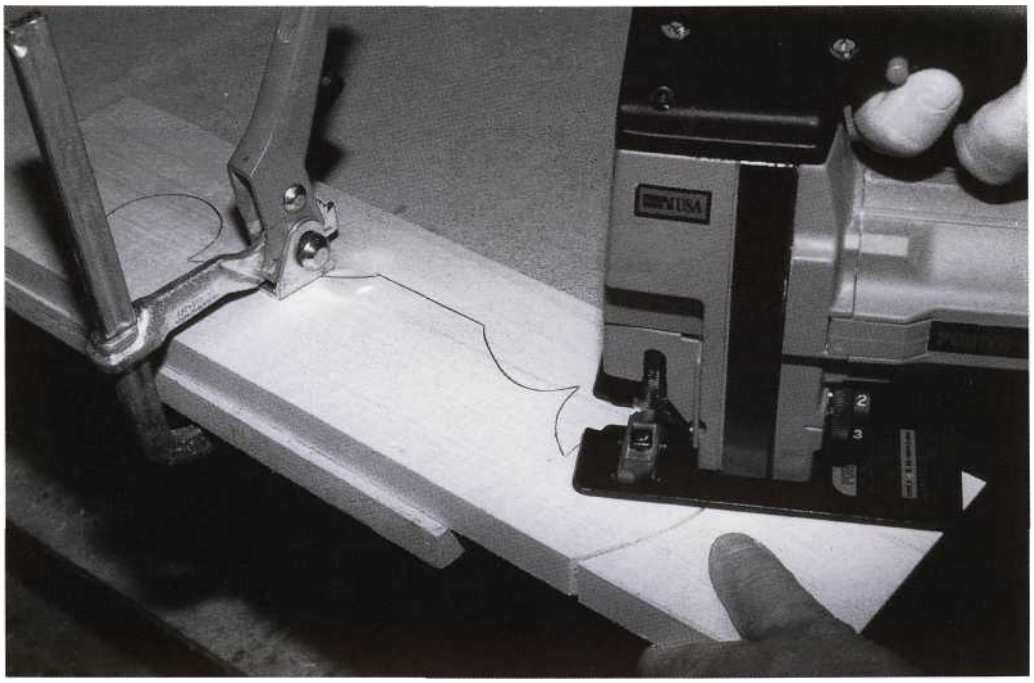


Cut the miters to the ends of the feet before you cut out the shapes.



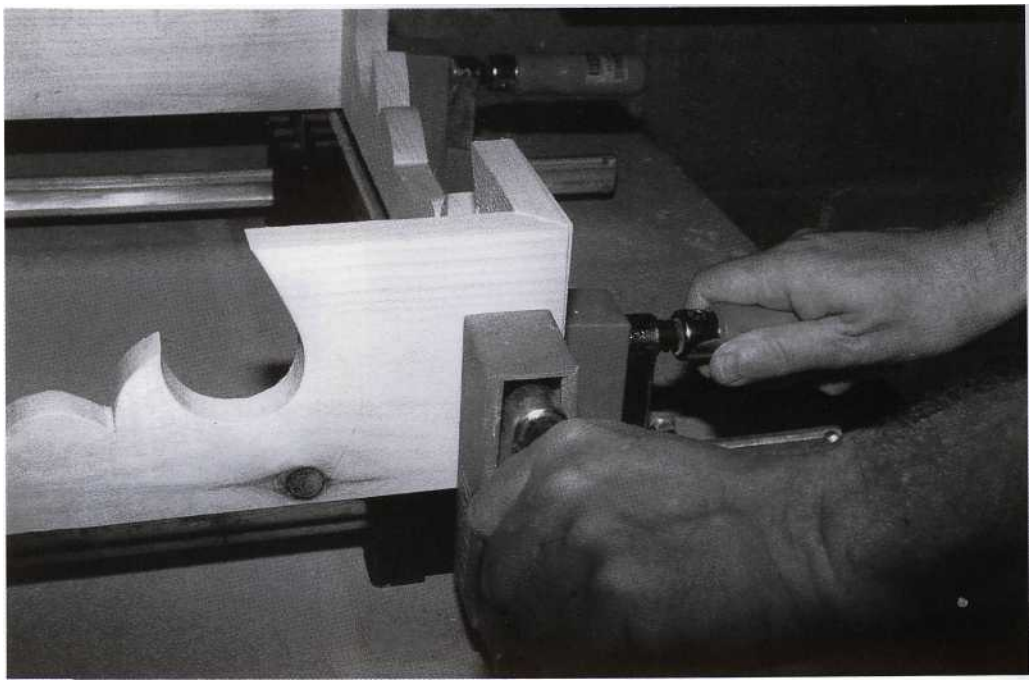
Use your router with a 3/4" bit and a T square to mill the stopped dadoes that will receive the top, bottom and web frames.

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If you don't have a scroll saw, your jigsaw is the best tool for removing the waste from the feet sections.

Bessy's block and clamp system makes gluing and clamping mitered frames easy.



STEP 5. Mill the stopped dadoes and rabbets. I used my router, a 3/4" mortising bit and a T-square jig as described in the Shop Tip on page 123.

STEP 6. Mill 1/4"-deep rabbets to the inside back edges of both sides; these will receive the plywood back.

STEP 7. Glue, clamp and toenail the webs to the sides, making sure everything is square, and then set the structure aside until the glue is fully cured.

STEP 8. Glue and screw the drawer separator in place between the top and the top web frame as laid out in the drawing.

STEP 9. Set the carcass on the bottom board and fasten it in place using ten no. 6 X 1 5/8" screws: four at the back and front and one at each end. Be sure the heads do not protrude.

STEP 10. Use the scale pattern to mark the feet details.

STEP 11. Cut the miters to each end of the four pieces of stock that will make the feet.



Use a T square and your router equipped with a 3/4" mortising bit to mill the stopped dadoes in the sides.

STEP 12. Use your band saw or jigsaw to cut out the feet.

STEP 13. Glue and clamp the feet section together to form a frame, make sure the structure is square, then set it aside until the glue is fully cured.

STEP 14. Glue and screw the cleats to the upper inside edge of the feet section.

STEP 15. Turn the carcass upside down, set the feet section in place on the bottom board and then using ten no. 6 X 1 5/8" screws—four at the back and front and one at each end—attach it to the bottom board of the carcass.

STEP 16. Set your table saw to cut at an angle of 17° and a depth of 1 1/4" and cut the bevel to the three pieces of stock that will make the crown.

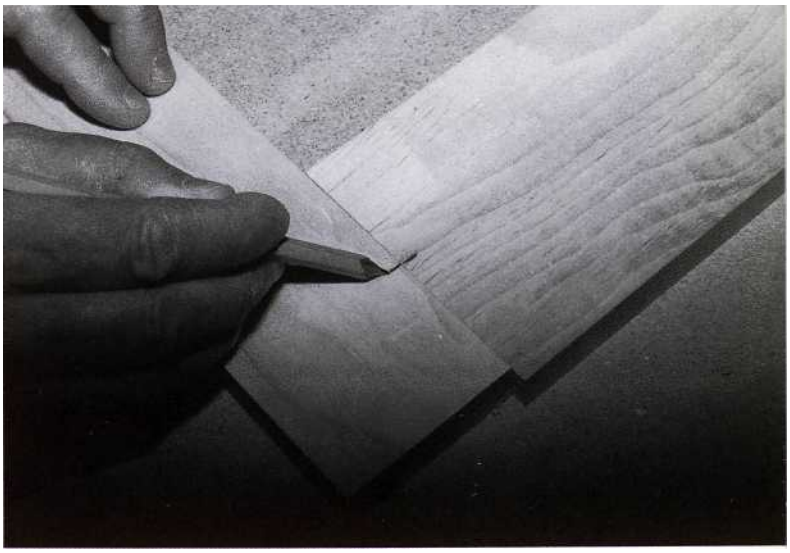
STEP 17. Cut the miters to the ends of the crown.

STEP 18. Glue the miters, set the crown in place and secure to the top of the carcass using ten no. 6 X *1 5/8"* screws: four along front and three at each end.

STEP 19. Make sure all the pieces for all eight drawers are exactly the right size, then, using half-blind and through dovetail joints, build the drawers.

STEP 20. Use small brads to attach the plywood back to the back of the unit.

STEP 21. Do some final sanding, then go on to the finishing process.



This photo illustrates how to mark the front components of the web frames for biscuit slots. Note the offset.

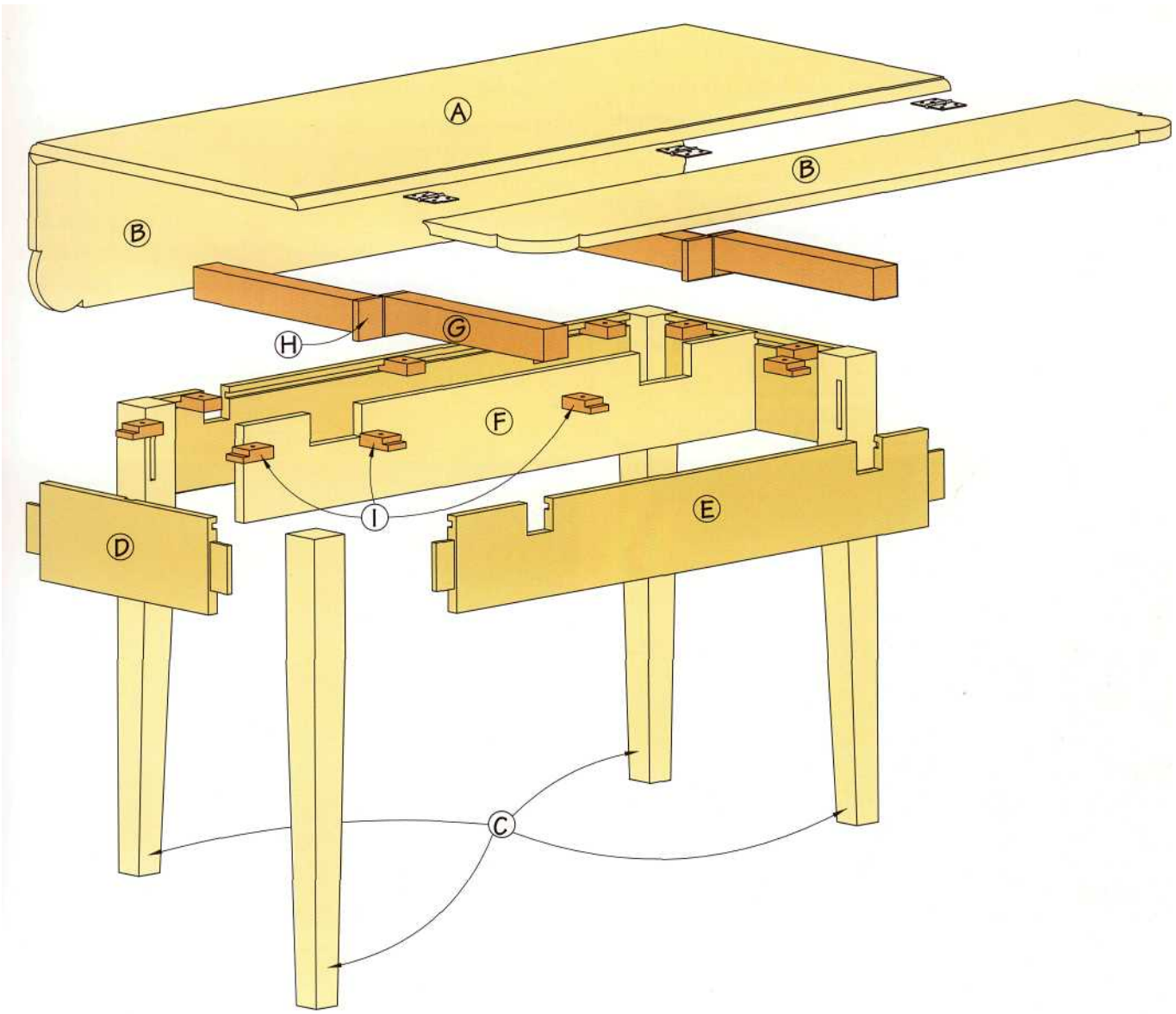
FINISHING

I did very little distressing on this piece on the advice of a good friend who owns a very upscale furniture store. Just a ding or two here and there seemed to be all that was required. For the stain I used tobacco juice. I applied several coats, allowing each one to dry thoroughly before applying the next, until I had the deep, dark color I was looking for. Next, I applied eight coats of buttonlac—it, too, has a dark color—sanding lightly between the coats. Finally, after a last wipe with 400-grit sandpaper, I applied two coats of beeswax and buffed to a shine.

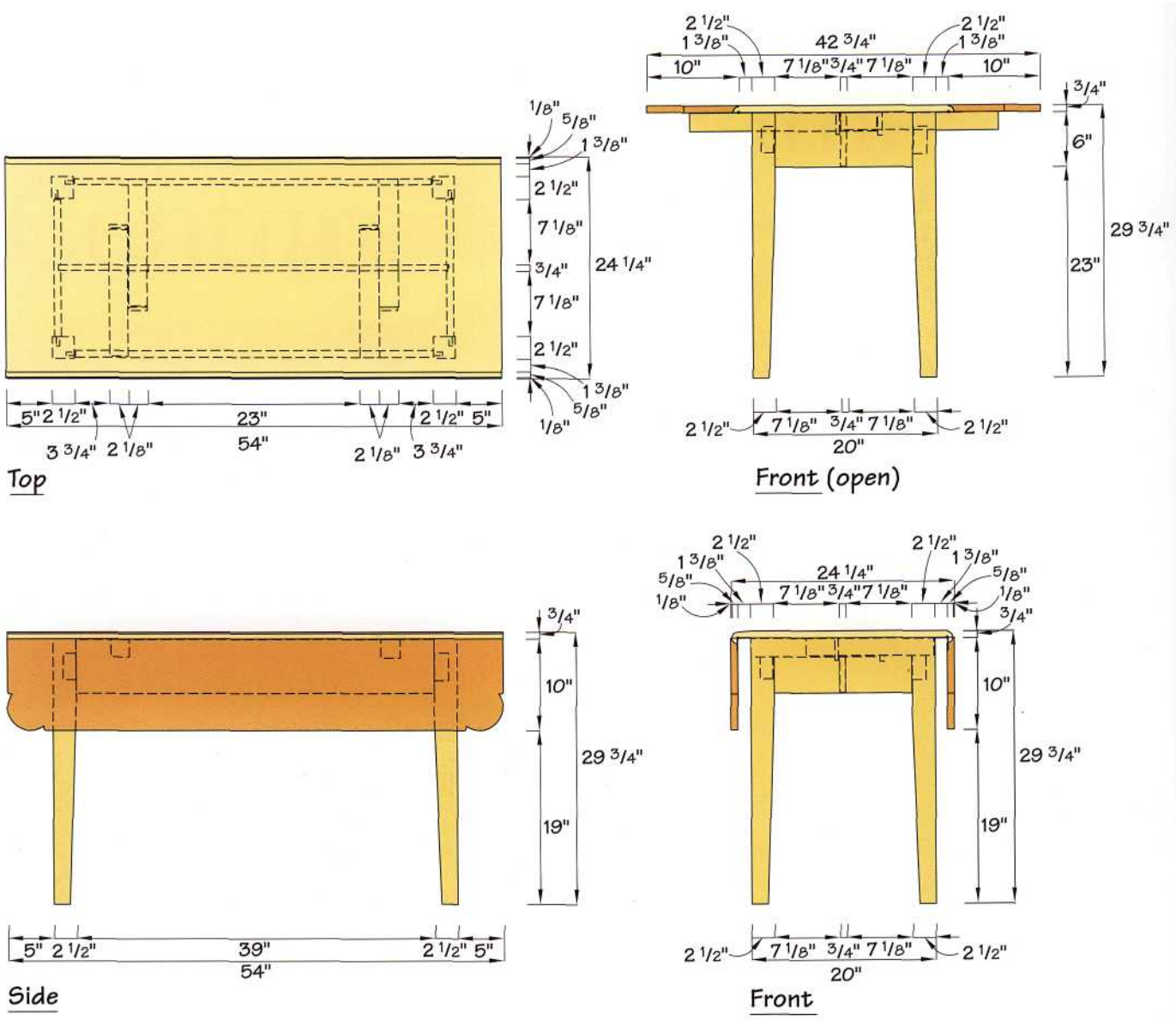
Early Nineteenth-Century Harvest Table



The term harvest table usually designates a very long dining table with one or two drop leaves supported by swing-out or pullout brackets. They were made all over the United States, usually from pine, but many had a pine top and a hardwood understructure. They were somewhat primitive in style, essentially unfinished as opposed to the highly polished dining room-style tables, and would have been found in homes of type and class. But most were country pieces, farmhouse furniture. Tables like this also would have been used in kitchens, large and small, where the seating would have been benches rather than chairs. They came in all sizes from as small as 48" long to as large as 10'. Ours is 54"x 44" when fully extended. I chose this size so it would fit comfortably even in a small dining area. You'll enjoy having a piece like this in your home just as much as you'll enjoy making it. The construction was quite simple, and the early versions might or might not have had a rule joint between the leaves; ours, a copy of one made around 1820, does not. Few



old harvest tables have survived the centuries. Those that have are well worn and in poor shape. So this one will make a rare conversation piece and will be sure to raise a few eyebrows.



MATERIALS LIST

Harvest Table

No.	*Letter*	*Item*	*Dimensions T W L*
1	A	Top	¾″ × 24″ × 54″
2	B	Leaves	¾″ × 10″ × 54″
4	C	Legs	2½″ × 2½″ × 29″
2	D	Short Aprons	¾″ × 6″ × 18″
2	E	Long Aprons	¾″ × 6″ × 42″

No.	*Letter*	*Item*	*Dimensions T W L*
1	F	Leaf Support Carrier	¾″ × 6″ × 42½″
4	G	Leaf Supports	2″ × 2″ × 14″
4	H	Stops	½″ × 2″ × 2½″
10	I	Buttons	¾″ × 1½″ × 2″

Note: There is a ¼″ setback on the aprons from the outside of the legs.

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CONSTRUCTION OUTLINE

The top, 24" wide, is made from three pieces of furniture-grade pine a full 3/4" thick, the grain alternated for stability. Each of the two leaves is made from a single piece of stock, also 3/4" wide, which will provide a table-top 44" wide when fully extended. The legs, made from 10/4 stock, are slightly tapered. The apron is mortised and tenoned to the legs. The leaf supports are simple pullouts set into cutaways in the apron. The top is fastened to the apron with a series of buttons placed strategically around the upper inside of the understructure. There are no drawers. You should be able to finish it over a couple of weekends.

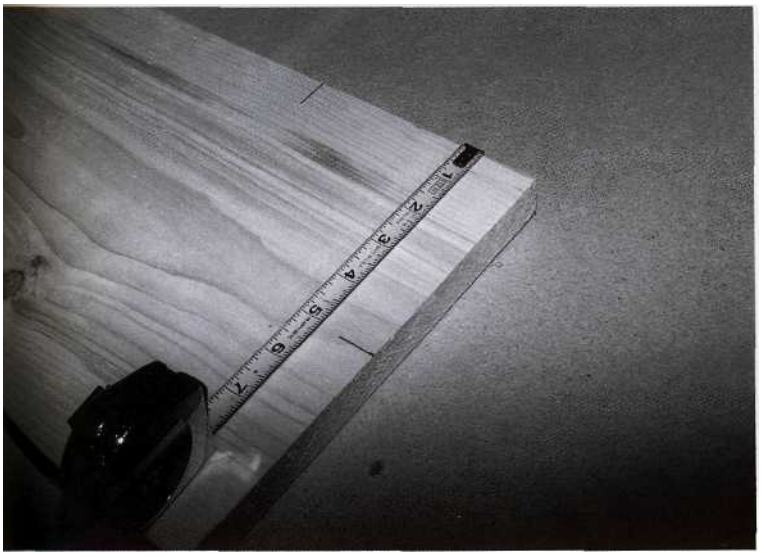
BUILDING THE TABLE

STEP 1. Cut all the pieces to size and run the edges through the jointer to ensure they are straight and square.

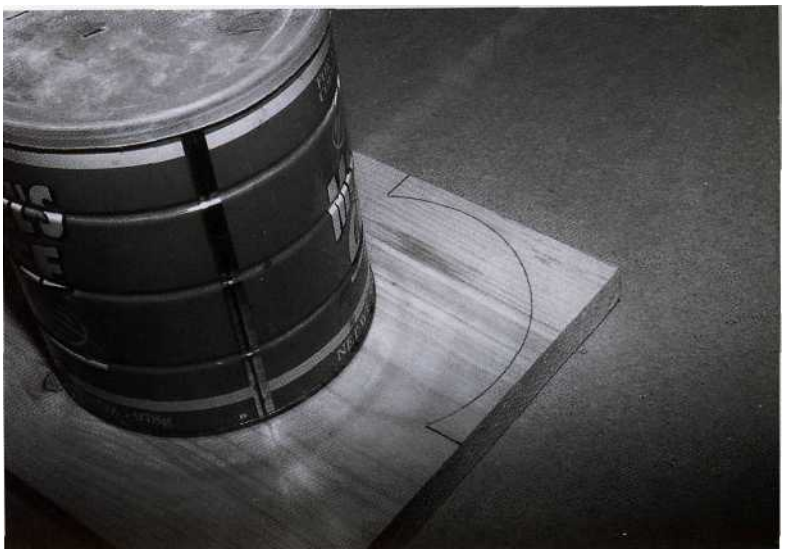
STEP 2. Build the board that will become the tabletop. You can use biscuits, as I did, or the more traditional dowels. Be sure to alternate the grain for stability.

STEP 3. Use the scale pattern and your jigsaw to cut the details to the corners of the leaves.

STEP 4. Use a 1/2" roundover bit in your router and round the upper edge of the ends of the top only, and the upper edge of the ends and outer edge of both leaves.



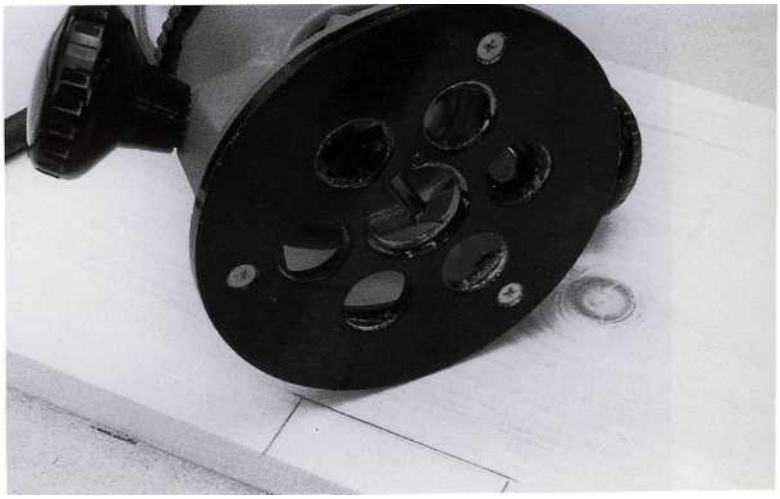
To begin working the detail at the ends of the leaves, on the underside at the outer edge of each end, scribe two lines 5" from the corners in both directions.



A three-pound coffee can is just the right size to use for marking the circle. Join the ends of two short, then use your jigsaw to remove the waste.

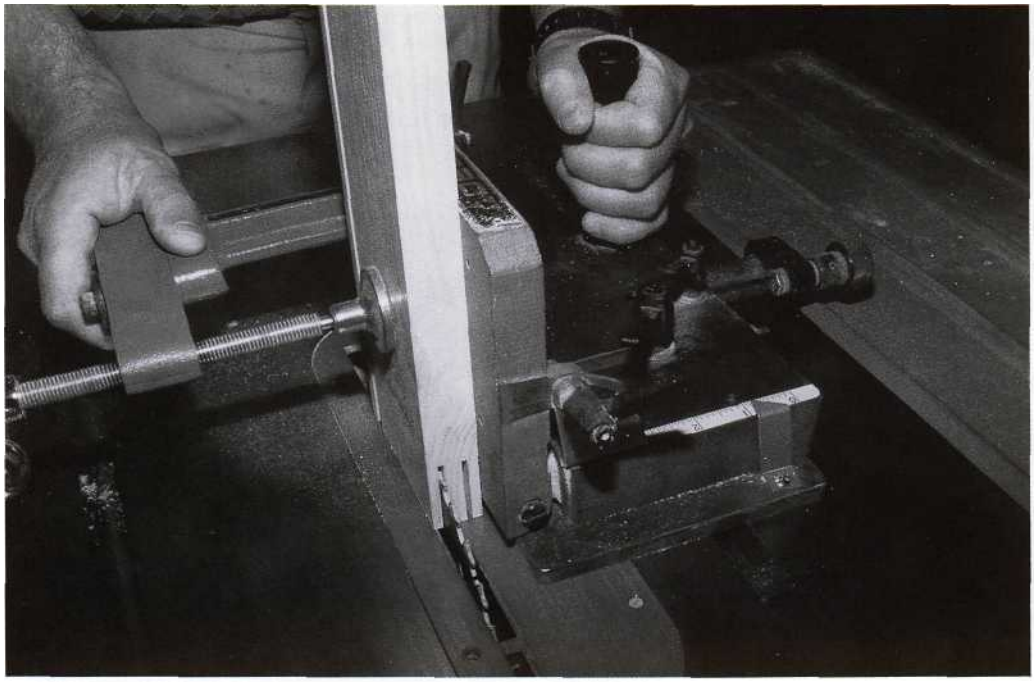


Use a 1/2" roundover bit to mill the outer edges of the two leaves and the ends of the tabletop.



Mark the position of the hinges on the underside of the top and leaves, score the outline with a utility knife, then remove the waste, freehand, with your router equipped with either a 1/4" or 5/16" straight bit.

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A tenoning jig makes short work of the joints at the ends of the apron, a sometimes tricky job. The results are consistent and accurate, but don't make the tenons until you've worked the mortises.



If your rip fence is movable, set it so that you can cut the shoulders of your tenons. If it's not movable, use a sacrifice fence attached to your rip fence.

STEP 5. Set your tapering jig to 2° and cut the tapers to the inside faces of all four legs. Leave the outside faces straight. Begin the taper 8" from the top of the leg, and make sure you have two left- and two right-hand legs.

STEP 6. Cut mortises 3" long x 1 1/2" deep x 3/8" wide to the inside faces of all four legs, again making sure you have two left- and two right-hand legs.

STEP 7. Mill the matching tenons to all four pieces that will make up the apron.

STEP 8. Dry fit the pieces to ensure everything is as it should be, then disassemble the pieces.

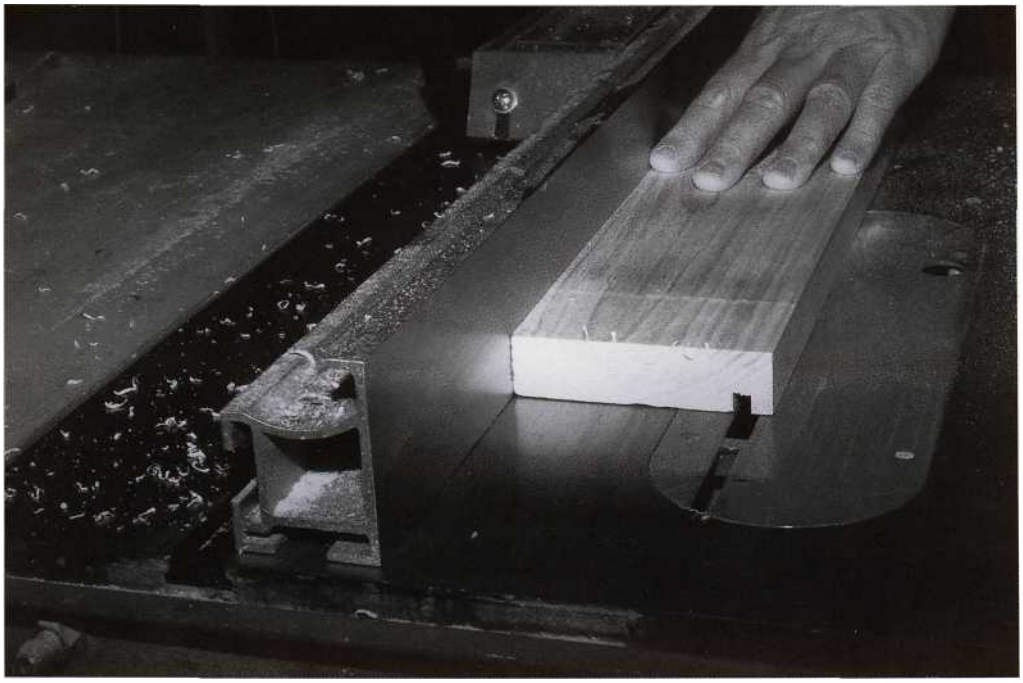
STEP 9. Mill the 3/8" slots to all four pieces of the apron that will receive the buttons to secure the top to the understructure.

STEP 10. Mill the dadoes in the inner faces of the two ends that will receive the leaf support carrier.

STEP 11. Mill the cutouts in the apron and carrier that will receive the leaf supports.

STEP 12. Sand all of the pieces smooth; do your distressing, to whatever degree suits you best, paying attention to the top, outer edges and corners, and to the bottom section of all four legs. Apply a coat of stain.

STEP 13. Glue, assemble and clamp the understructure—legs, apron and support carrier—and set aside overnight or until the glue is fully cured. I prefer to use one of the new polyurethane glues for this process.



Use your table saw equipped with a dado head to mill the button groove to the inner edge of the four rails that will make up the apron. If you don't have a dado head, you can use your regular blade, run the stock through once, and then move the rip fence and run it again.

STEP 14. Use no. 6 x 1 5/8" screws to fasten the stops to the ends of the pullout leaf supports.

STEP 15. Lay the top and leaves face down on the bench and mark the position of the mortises that will receive the hinges; use simple 3" brass butt hinges.

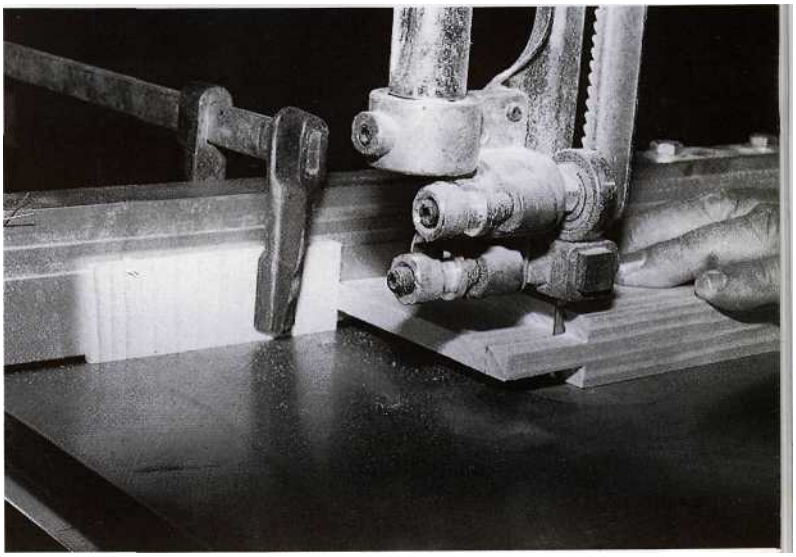
STEP 16. Use your router and a 1/4" straight bit to mill the mortises, or you can use a chisel if that suits you best, then screw the hinges in place; leave the top face down on the bench.

STEP 17. Go to the band saw and make ten buttons from the 2" X 1 1/2" X 3/4" pieces of stock laid out in the materials list, as per the drawing.

STEP 18. Set the understructure in place on the underside of the top—it should still be on the bench—and slip the four pullout leaf supports into place.

STEP 19. Use four buttons along each side and one at each end to fasten the top in place on the understructure.

STEP 20. Go to the finishing process.



For accuracy, you can use this setup on your band saw to cut the shoulders to the tenons of the rails that make up the apron. Set the rip fence in position, and then clamp your stop in position so that the blade of the saw just reaches the main body of the rail. If you don't have a rip fence, you can use a piece of scrap stock.

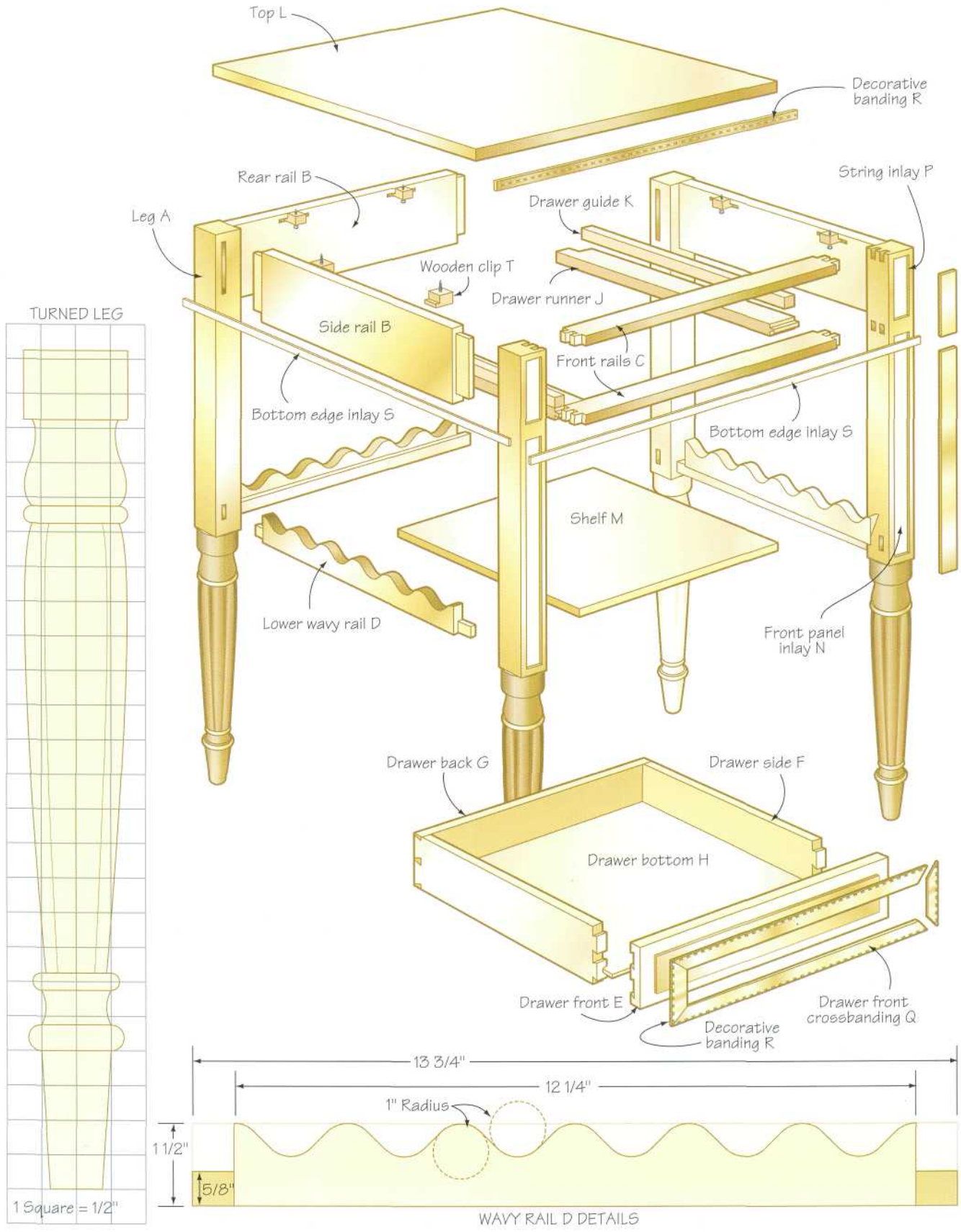
FINISHING

As this is supposed to be a simple farmhouse piece, finishing is minimal. An original, if not painted, would not have been finished at all. The pine would have been scrubbed and scrubbed over the years, would have suffered all sorts of abuse and would have taken on a deep, buttery yellow patina. So, as distressing is done purely to taste, I've only lightly distressed ours, and the finish is no more than a coat of Golden Pecan stain and a single wiping of antiquing glaze followed by a couple of coats of polyurethane for protection.

FEDERAL INLAID TABLE



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FEDERAL INLAID TABLE

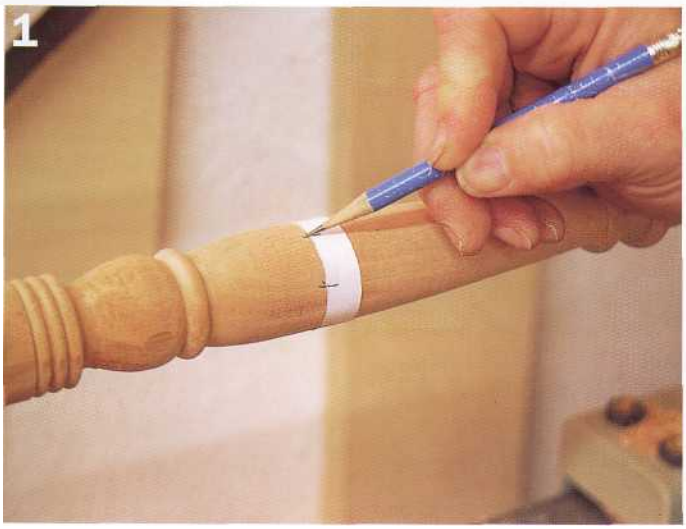
inches (millimeters)

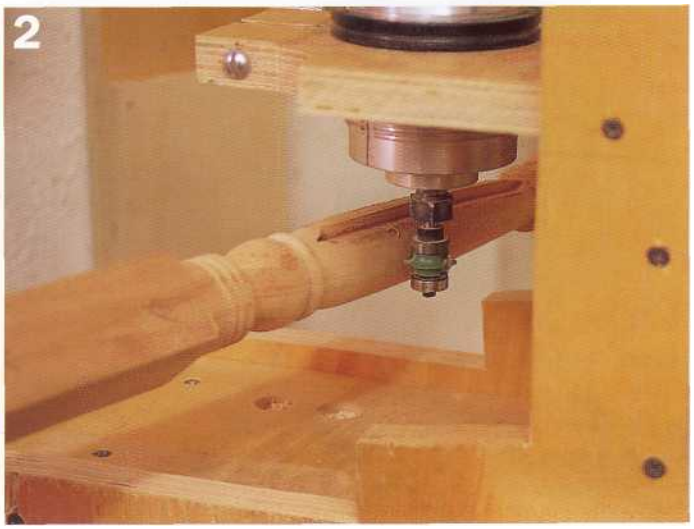
REFERENCE	QUANTITY	PART	STOCK	THICKNESS	(mm)	WIDTH	(mm)	LENGTH	(mm)	COMMENTS
A	4	legs	mahogany	1 1/2	(38)	1 1/2	(38)	27 1/8	(689)	
B	3	side and rear rails	mahogany	3/4	(19)	4 1/4	(108)	13 3/4	(349)	3/4" (19) TBE
C	2	front rails	mahogany	5/8	(16)	1 1/2	(38)	13 3/4	(349)	3/4" (19) TBE
D	4	lower wavy rails	mahogany	1/2	(13)	1 1/2	(38)	13 3/4	(349)	3/4" (19) TBE
E	1	drawer front	bird's-eye maple	7/8	(22)	3	(76)	12 3/16	(310)	
F	2	drawer sides	pine	7/16	(11)	3	(76)	13 5/8	(346)	
G	1	drawer back	pine	7/16	(11)	2 3/8	(61)	12 3/16	(310)	
H	1	drawer bottom	pine	1/2	(13)	11 3/4	(298)	13 5/8	(346)	
J	2	drawer runners	pine	5/8	(16)	1 5/8	(41)	13 1/4	(336)	3/8" (10) TOE
K	2	drawer guides	pine	5/8	(16)	3/4	(19)	12 1/8	(308)	
L	1	top	mahogany	3/4	(19)	16 1/2	(419)	16 3/4	(425)	
M	1	shelf	mahogany	1/2	(13)	14 3/4	(375)	14 3/4	(375)	
N	1	front panel inlay	bird's-eye maple	3/4	(19)	4	(102)	24	(610)	4 inlay pieces from board
P		string inlay	ebony	1/8	(3)	1/8	(3)	7 lf	(2134)	
Q		drawer front crossbanding	mahogany	3/16	(5)	3/4	(19)	3 lf	(914)	
R		Rockler inlay (dec. banding)				5/16	(8)	5 lf	(1524)	drawer and top (Rockler item #18812)
S		front and sides bttm edge inlay	tiger maple	3/16	(5)	1/4	(6)	4 lf	(1219)	
T	4	wooden clips	pine	1/2	(13)	7/8	(22)	4	(102)	

Note: TBE = tenon both ends; TOE = tenon one end.

hardware

2	1 1/2" (38mm) Antique-finish knobs with bolt fitting	item #H-46	Horton Brasses
	1 1/2" (38mm) Clout nails		
	Cyanoacrylate glue		
	Oil/varnish mixture		
	Paste wax		

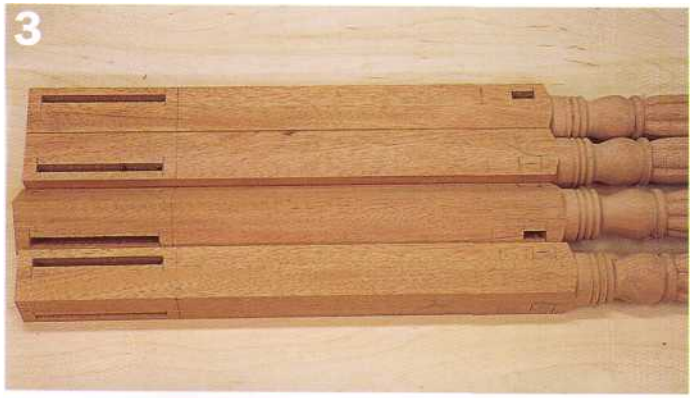




Step 1 Begin by turning the lower portion of the legs according to the plan. To create the reeds, wrap a strip of paper around the turning at the largest diameter and mark the point where the paper overlaps. Remove the paper, trim to that mark, then lay out six equal spaces. Rewrap the paper in the same location and transfer the marks onto the turning. This is a simple method to divide a turning into equal sections.

step 2 The method that you use to cut the beads on this project depends on the lathe that you use. The jig I use is an L-shaped bracket that my trim router sets into. The bit is a Lee Valley beading bit. Adjust the point of the bit at the center of the turning or exactly at the center of the drive spur. Run the cut the length of the post, stopping before touching the bead at the top and bottom. From here, you will have to finish the carving by hand.

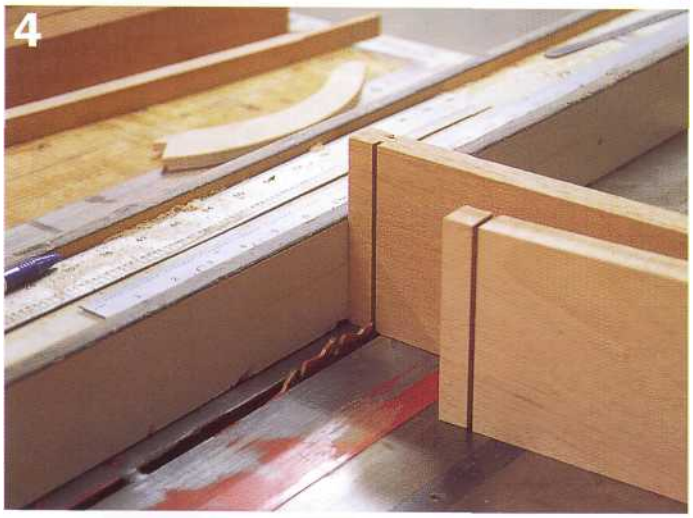
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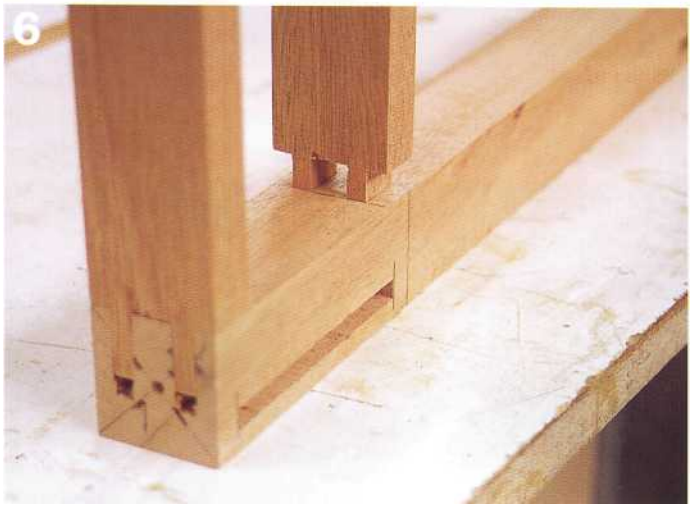
step 3 Mark and cut the mortises for all the rails. The front rail mortises are twin mortise and tenons (see step 6). You can also see the finished carving from the previous step.

step 4 Cut the tenons on the side and rear rails.

step 5 To create the twin tenon, make the shoulder cut on the 3/4" sides only. Using a tenoning jig, make the edge cut for both edges and reset the jig to remove the waste between the tenons.



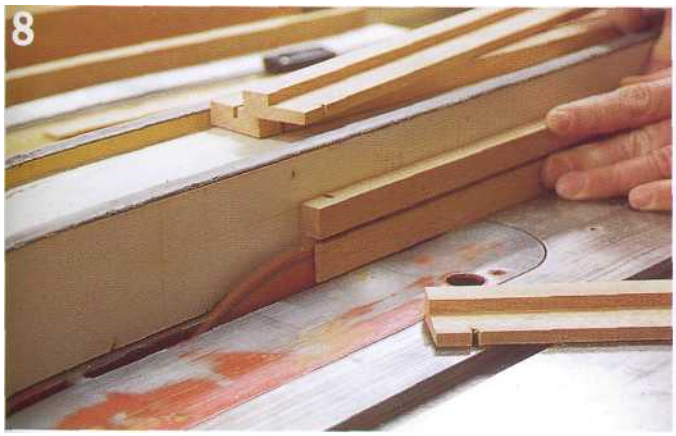




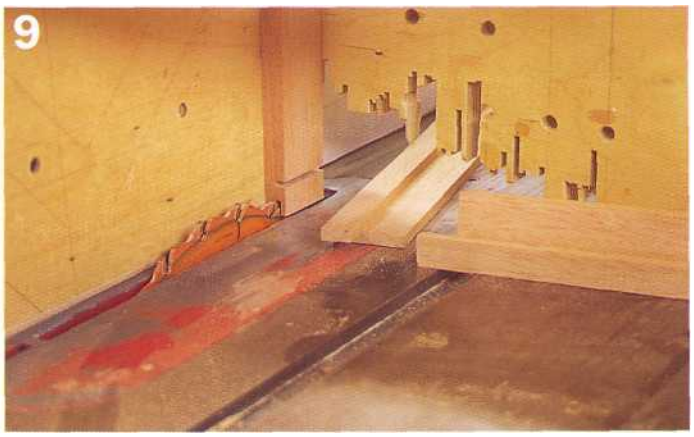
step 6 This is the finished twin mortise-and-tenon joint used for both front rails. Cut the mortises in the back edge of the bottom front rail to accept the drawer runner tenons.



step 7 For the wavy rails around the tray, begin with a 1/4" cut on the face of the piece, then make a second cut on the opposite face with the fence set 1/2" away from the blade.

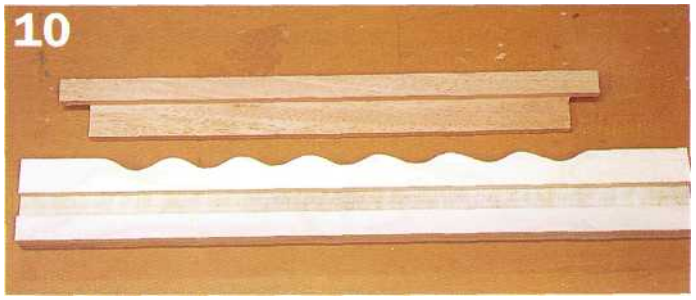


step 8 Reset the fence to 1/4", then raise the blade to remove the 7/8" waste up to the second cut made. This produces an L-shaped profile.



step 9 Finally, make the cheek cut that leaves the necessary tenon.

step 10 Make a pattern of the wavy design with a piece of 1/2" plywood. Cut a groove into the plywood so that the stock snugly fits into the groove.





step 11 Fit the stock into the groove, with the ends of the stock located at the top of a wave, and with a 1/4" beading bit set to the correct height, make the cut, creating the wavy design. You should make this a climb cut or move against the spin of the bit.



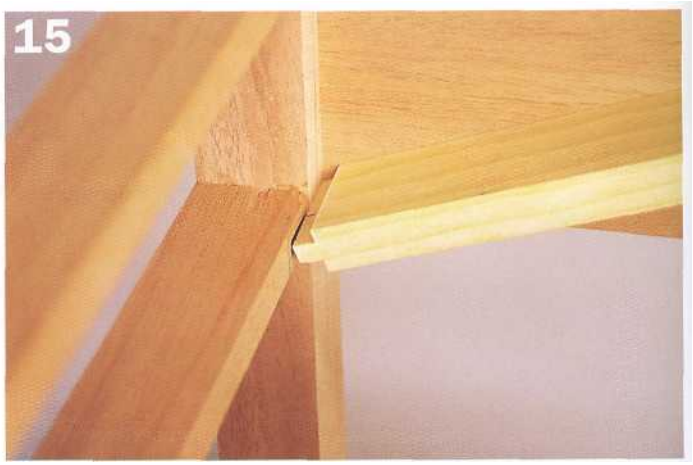
step 12 Assemble the table in steps. First, glue the side rails to the legs, then, when dry, glue the front and rear rails. Before you assemble the rear rail, cut the slots for the wood clips near the ends of the piece (see step 17).

step 13 Mill the shelf to size and make a 1/4" x 1/4" rabbet on all edges. Slide the piece into the area, allowing the front edge to rest against the back side of the front legs. Mark where the edge of the leg meets the shelf. Repeat this process on all four sides of the shelf. When complete, extend the marks to form the area that needs to be removed so that the shelf fits between the legs.





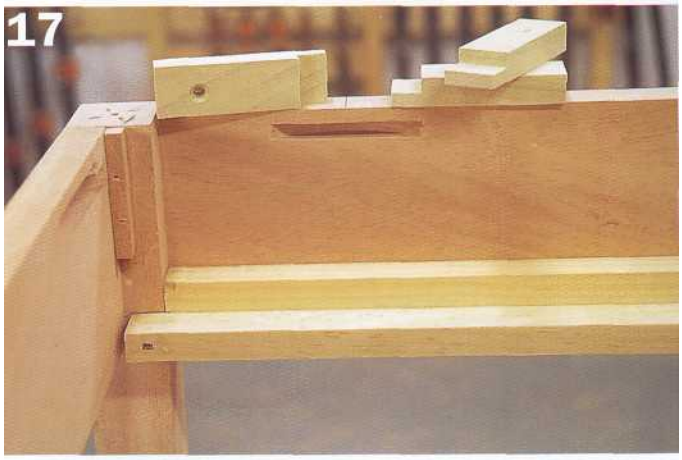
step 14 Make the cuts on the shelf and check the fit.



Step 15 Prepare the drawer runners and guides and make the tenon on one end of each runner. Remove the tenon at the front leg and cut a notch at the rear leg.



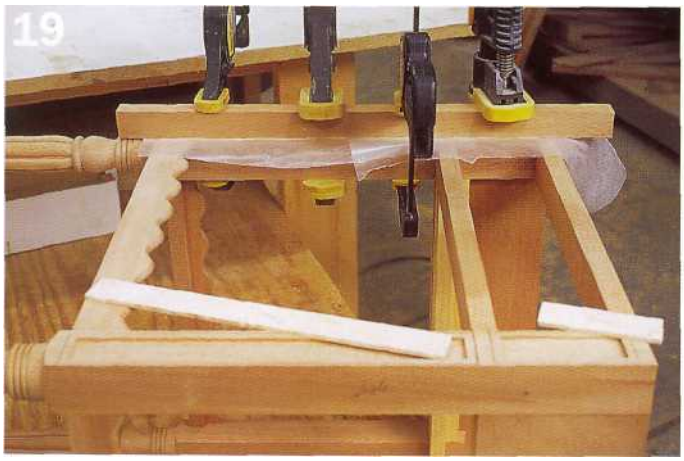
step 16 Glue the mortise and tenon, slide the runner into place, hold tightly to the front rail and nail into the rear post to secure. Glue and nail the drawer guide into place, even with the two posts.



Step 17 Use a biscuit joiner to cut the slots for the wooden clips. Set the cut to begin 1/4" down from the top edge. Cut a 1/4" slot. Make the wooden clips for the top. Secure with No 8 x 1" wood screws.

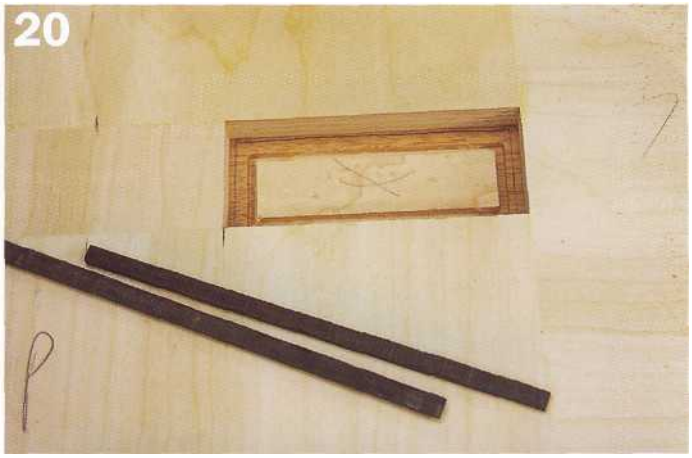


step 18 Make a jig for cutting the inlay by using 1/2" birch plywood and biscuit joinery. Remember to oversize the area to compensate for the inlay bushing. Mark the edges of the inlay jig carefully. Using the 1/8" bit, cut the leg for the inlay and remove the waste.

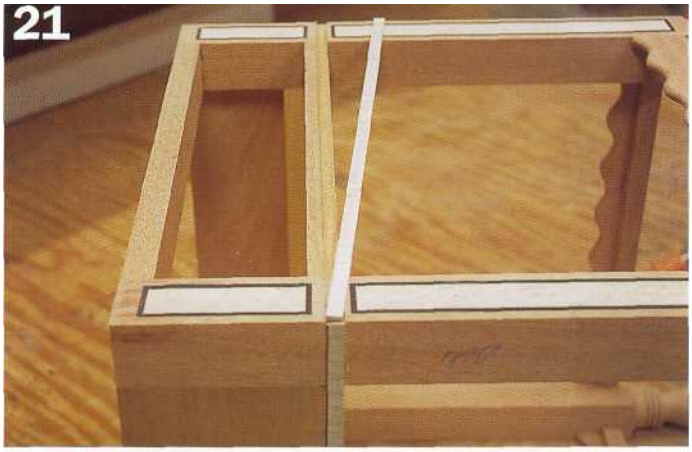


step 19 Following the directions with the inlay kit, cut the material for each of the front panel inlay areas and glue in place.

step 20 Place the jig back at the marks created in step 18. With the same setup, carefully cut a 1/8" groove around each inlay for the ebony string inlay. Mill the string inlay to size and glue. When dry, sand the inlay smooth.



Step 21 cut a ¼”-wide by 1/8”-deep groove on the front and both sides, even with the bottom edge of the rails. Cut an inlay of tiger maple to fill the groove and glue it in place, allowing the front to overlap the sides, hiding the ends of the inlay.

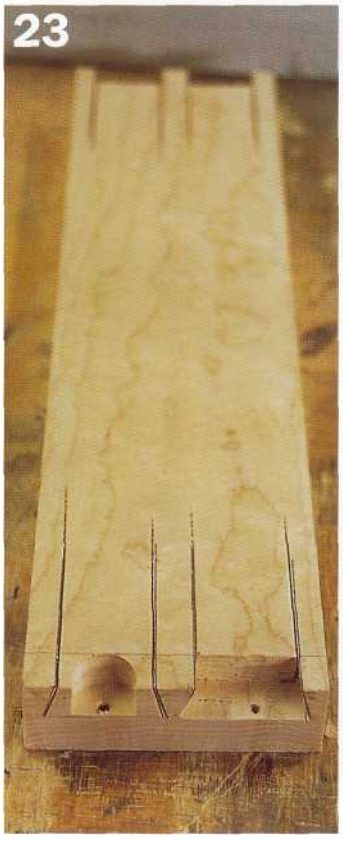


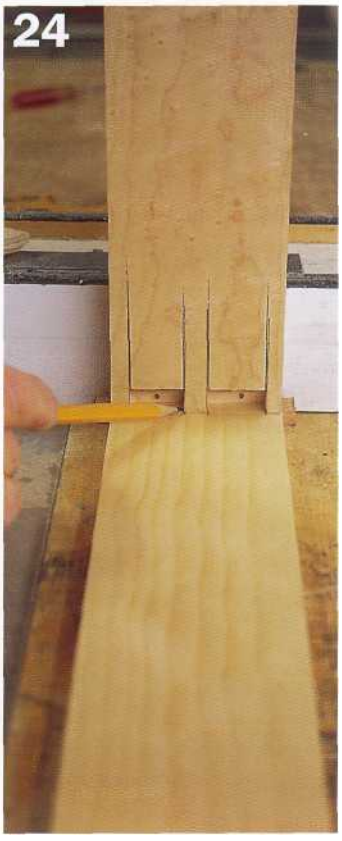


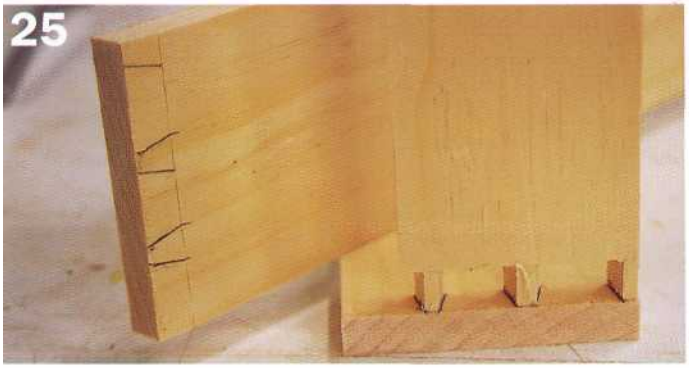
step 22 Build the drawer. Begin by laying out the dovetails on the drawer front. Cut the lines down to a line scribed 7/16" from the inside of the drawer front. Overcut toward the center of the interior face of the front. A front this size has two full tails, one pin and two half pins.

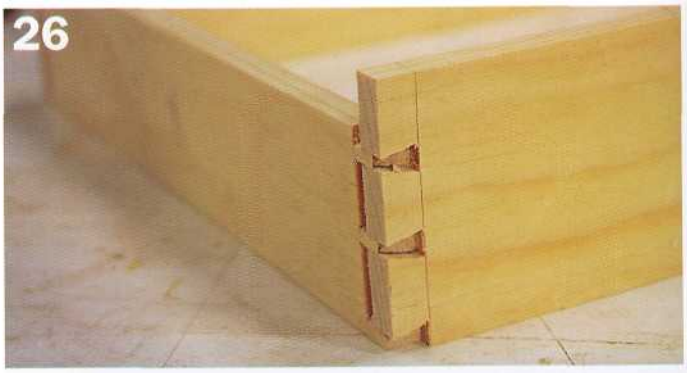
step 23 With a Forstner bit, cut away some of the waste, then clean the area with your chisels.

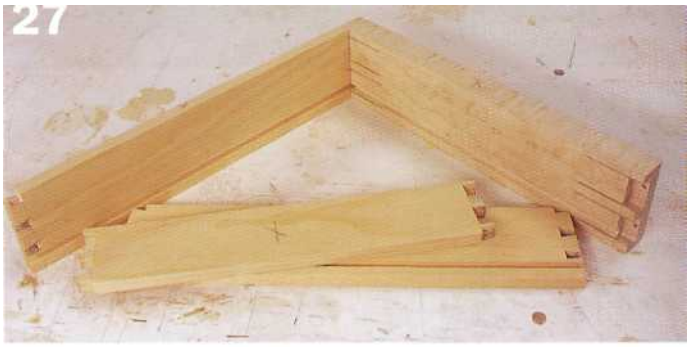
Step 24 Set the front onto a side piece with the inside even with a line scribed 7/16" from the end of the side and mark with a sharp pencil. Remove the waste area with the chisel and test the fit.











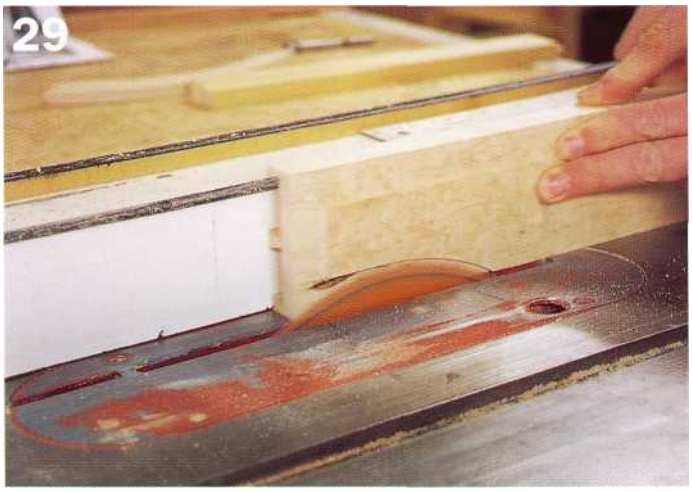
step 25 Lay out the back piece so there are two full pins and one half pin at the top. Cut those pins, removing the area of the tails. Set the back onto the side and transfer the marks from the back to the sides as shown. Then remove the waste, leaving the tails.

step 26 This is a look at how the side tails fit into the drawer back pins.

step 27 With the dovetails complete, cut a 1/4" groove that is half the thickness of the drawer sides for the bottom.



step 28 Cut the drawer bottom to size so the grain runs across the drawer and bevel three edges — the two end-grain ends and one other edge — to fit the groove. Make a 1/8" cut into the drawer bottom, just to the inside edge of the back piece.

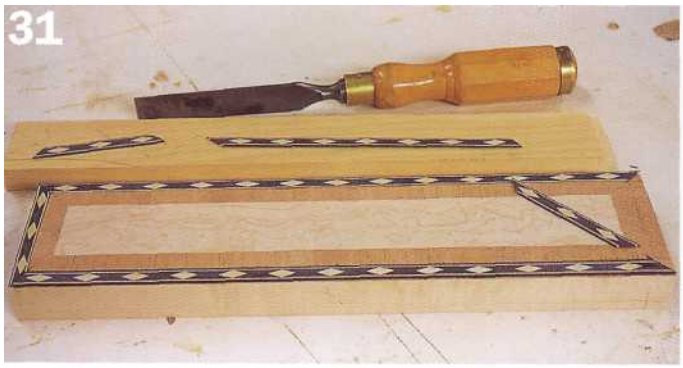


step 29 With the drawer apart, set the saw blade to 3/4" and cut the front on all sides, creating the shoulder for the crossbanding.

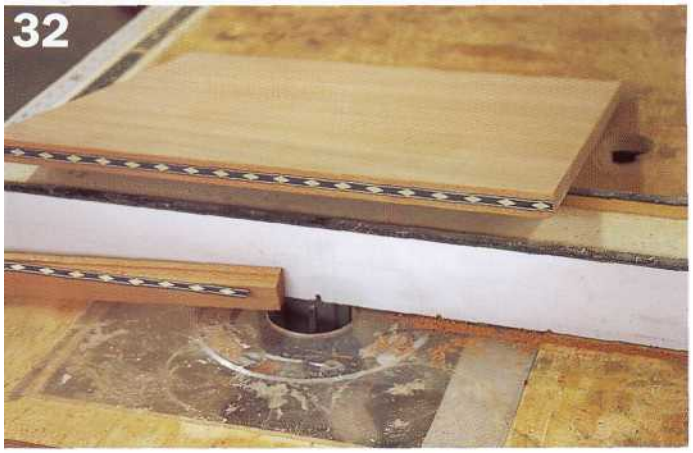


step 30 Cut the crossbanding on the band saw, noticing the grain direction, and fit to the drawer front with mitered corners. Use cyanoacrylate glue to bond the banding to the drawer face.

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step 31 Repeat the process to install the decorative banding, as well.



step 32 With a 5/16" straight-cut bit in the router table, run the front edge of the top, creating the groove for the decorative inlay. Glue the strip in place.

step 33 Sand the table completely, then you're ready to finish. The finish I use is an oil/varnish mixture. Three to four coats give a good sheen and protection. Then a coat of paste wax seals the deal.

step 34 Install the knobs by drilling the location with a 3/32" bit through the front. On the inside of the drawer front, drill a 5/8" hole 1/2" deep with a Forstner bit to recess the nut on the inside. Compete the process by redrilling the first hole with a 3/16" bit. Cut the knob shaft to size and attach the knob.





t i p To set the depth of the biscuit joiner, cut a scrap to the thickness necessary, set the piece against the blade that is extended, then bring the fence tight to that scrap. Make sure the tool is unplugged!

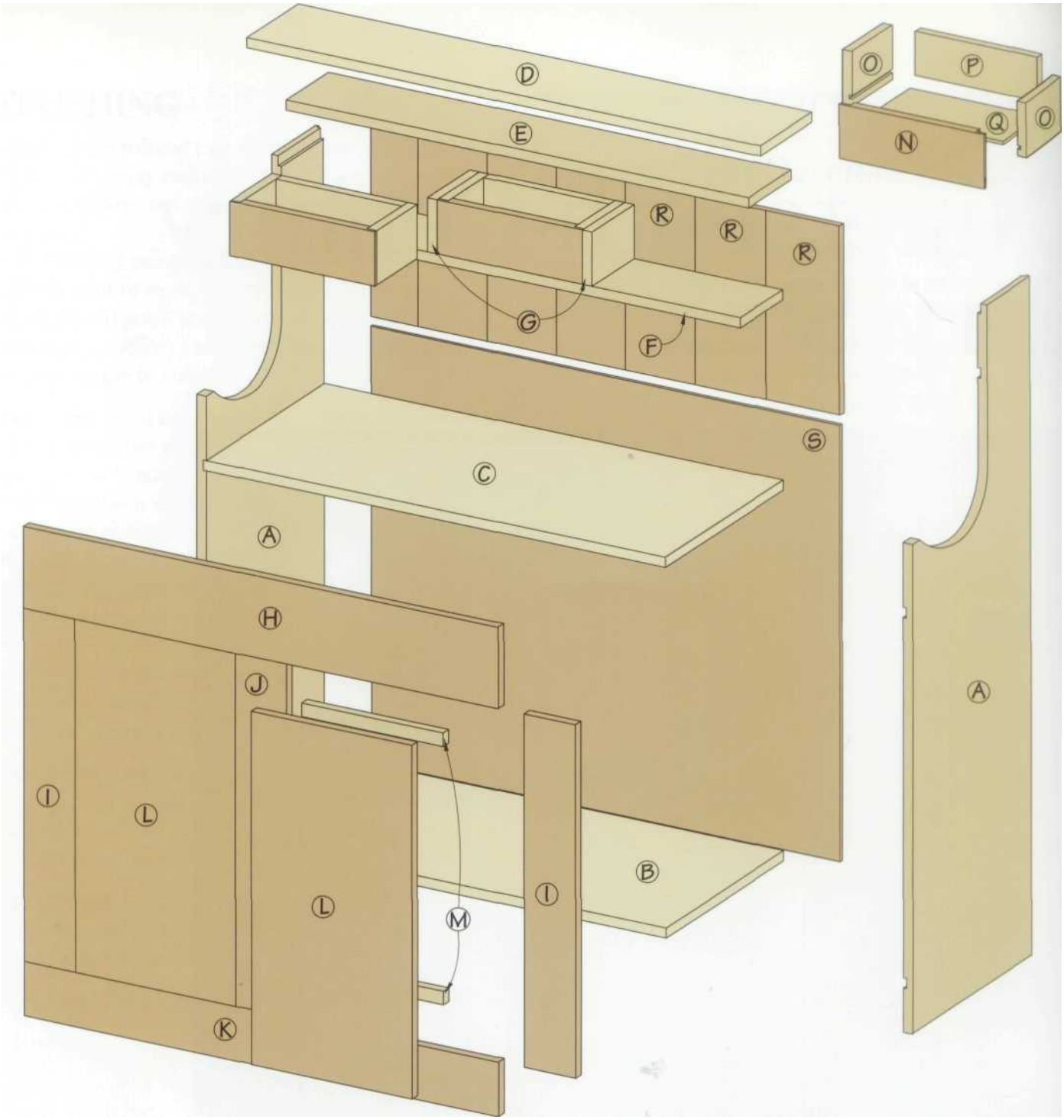


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Nineteenth-Century Dry Sink



These pieces first came into use in the mid-eighteenth century. They were simple pieces found in the kitchens of country homes throughout America. They were used to hold water; a basin was simply placed in the well. Most incorporated a cupboard below and some even had drawers where towels and pots and pans and dishes were stored. Most of the early pieces were made from pine, but oak, poplar and maple



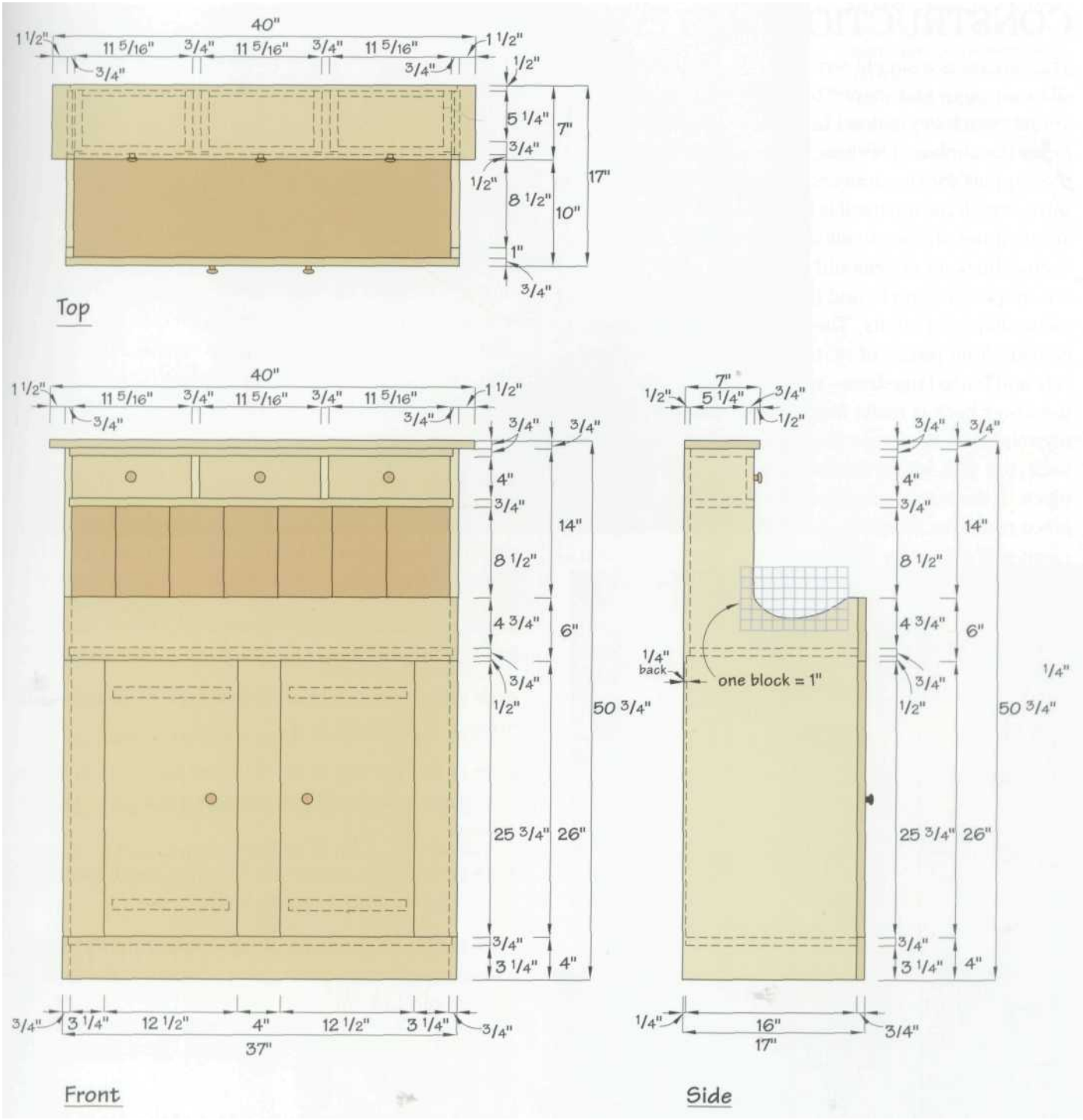
MATERIALS LIST

Low Dry Sink

No.	*Letter*	*Item*	*Dimensions T W L*
Material			
2	A	Stiles	¾″×2½″×29¾″
1	B	Center Stile	¾″×3″×31½″
1	C	Rail	¾″×2½″×36½″
2	D	Doors	¾″×14¼″×29½″
2	E	Ends	¾″×15¾″×34″
3	F	Shelves	¾″×15½″×35½″
1	G	Top	¾″×18″×38″

No.	*Letter*	*Item*	*Dimensions T W L*
2	H	Sink Ends	¾″×4½″×18″
1	I	Sink Front	¾″×5″×38″
1	J	Sink Back	¾″×4½″×36½″
1	K	Sink Top	¾″×4½″×38″
3	L	End Base	¾″×3½″×18″
3	M	Front and Back Base	¾″×3½″×36″
3	N	Back	¼″×36″×34″

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were also used. Most were painted in dark colors—green, black or brown. Many were left unfinished, scrubbed and rescrubbed over the years. Today, they are enjoying a new popularity due very much to the country crafting community.

The dry sink I've chosen for this book is an attractive piece, simple in design and easy enough to make over a weekend. The period? I'm not sure. I found the original, an authentic antique, illustrated in a book on antique American furniture. It wasn't dated, but I estimate it must have been made during the early part of the nineteenth century.

CONSTRUCTION OUTLINE

The carcass is a simple structure. The sides are made all in one piece and shaped to form the top section. They arc rabbeted and dadoed to accept a single shelf that forms the cupboard bottom, the bottom of the sink area, the support for the drawers above the sink and a false top to which the top itself is fastened with screws. There are no inner shelves to allow for storage of large items such as buckets, churns and other containers. The doors arc simple flat panels, and the drawers are constructed using simple lap joints. The back of the upper section is made from pieces of 1/2-thick stock, edged on one side and butted together—no tongue-and-groove joints; the lower back is made from a single piece of 1/4″ lauan plywood. You could use lauan plywood for all of the back, but that would destroy the antique look of the piece. A dedicated weekend of work should see the piece ready for finishing. As to finishing, the original piece was extremely attractive—that's why I chose it— and 1 saw no reason to change the look.

BUILDING THE DRY SINK

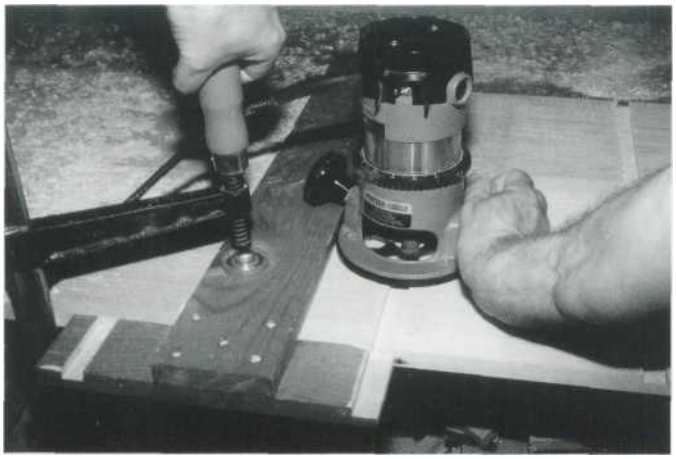
STEP 1. Cut all the pieces to size.

STEP 2. Build the two boards that will form the sides.

STEP 3. Build the two boards that will form the bottom of the cupboard and the bottom of the sink area.

STEP 4. Build the two boards that will form the doors.

STEP 5. Cut the sides to shape as per the drawing. It's best to use a handheld jigsaw for this process.



When you mill the dado to the sides, you can use either your radial arm saw or a router with a 3/4" bit. If you use both the router and the T square, you'll find it easier to make matching cuts if you clamp both sides together and run the router over both pieces.

STEP 6. Sand all the pieces smooth.

STEP 7. Mill the dadoes in the sides as per the drawing. Make sure you have a left and a right.

STEP 8. Glue, toenail and clamp the cupboard bottom. sink bottom, drawer support, and false top to the dadoes and rabbet in the sides, and set the structure aside until the glue is fully cured.

STEP 9. There are several ways to attach the trim to the carcass. You can glue, nail and clamp as I did, and as was done on the original, or you can biscuit them on. I believe, because the original was a simple country structure, the way to go is to use nails and fill the holes. They'll still show, but that's good and adds to the overall look of the piece.

STEP 10. Glue, nail and clamp the Front of the sink area to the carcass.

STEP 11. Glue, nail and clamp the side trim and the center trim to the carcass.

STEP 12. Toenail the side trim and the center trim to the front of the sink area.

STEP 13. Set the nail heads and fill the holes with wood putty.

STEP 14. Set the top in place on the false lop and, from underneath, fasten the two together with no. 6 x 1 5/8" screws.

STEP 15. Use glue and screws to fasten the drawer dividers in place; plug the screw holes.

STEP 16. Use 3/4" stock *4 1/2" X* 18"—or assorted widths for a pleasing effect—and no. 6 X 1 1/2" screws, and form the ends of the sink top.

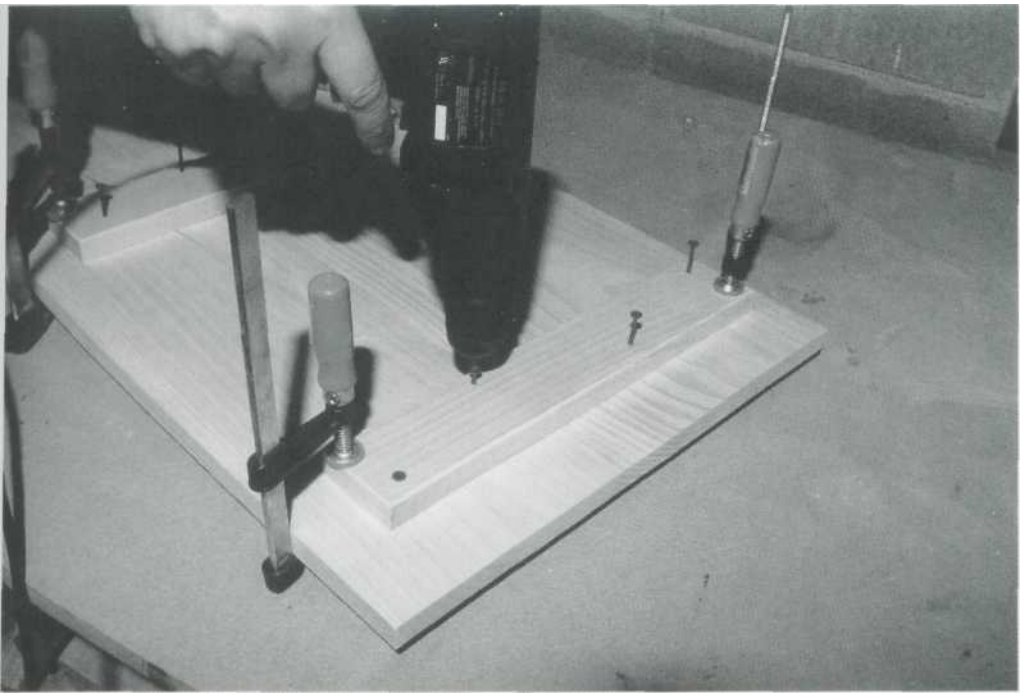
STEP 17. Fit the doors to the carcass. Trim for a good fit as necessary.

STEP 18. Cut mortises in the edges of the doors and frames to receive brass butt hinges. Do not, attach the doors yet.

STEP 19. Cut and sand the two swivel cat catches as you see in the drawing.

STEP 20. Build the three small drawers using simple lap joints and cut-steel nails.

STEP 21. For a really authentic look, resaw some narrow stock to make 1/4″ boards to form the bottoms of the drawers.



To prevent the doors from warping, screw and glue cleats across the widths of the backs. For doors this size, you'll need three cleats, one at each end and one in the middle.

STEP 22. Do any necessary finish sanding and break all the sharp edges.

STEP 23. Go to the finishing process below.

STEP 24. Attach the doors to the carcass.

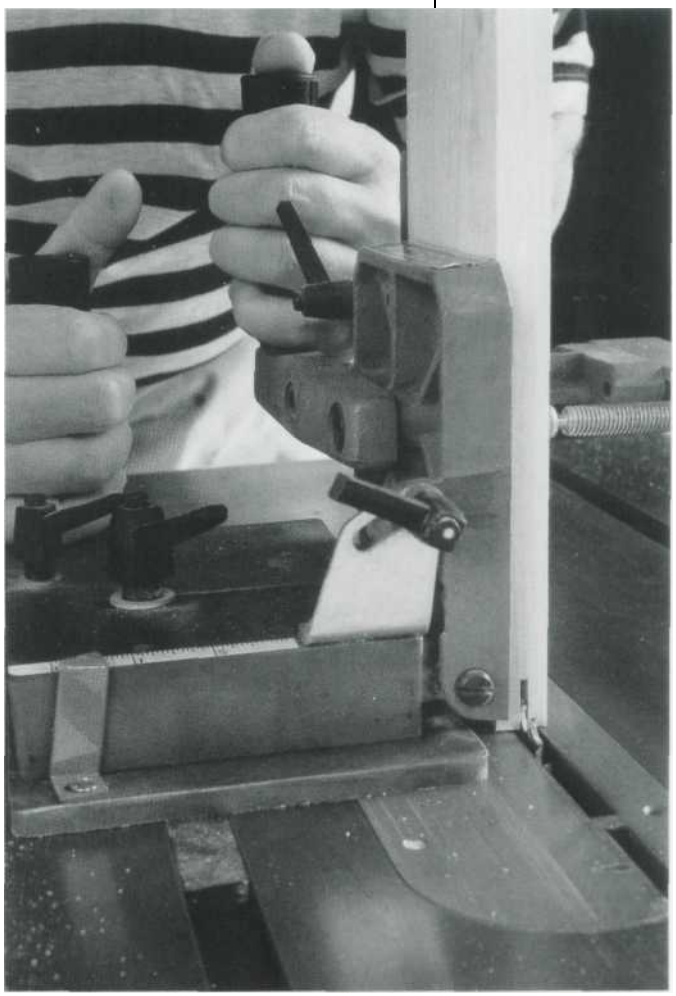
STEP 25. Attach the lower back to the carcass using 1" brads.

STEP 26. Attach the hardware to the doors and drawers.

STEP 27. Set the swivel catches in place and fasten with no. 6 x 1 5/8" screws**.**

FINISHING

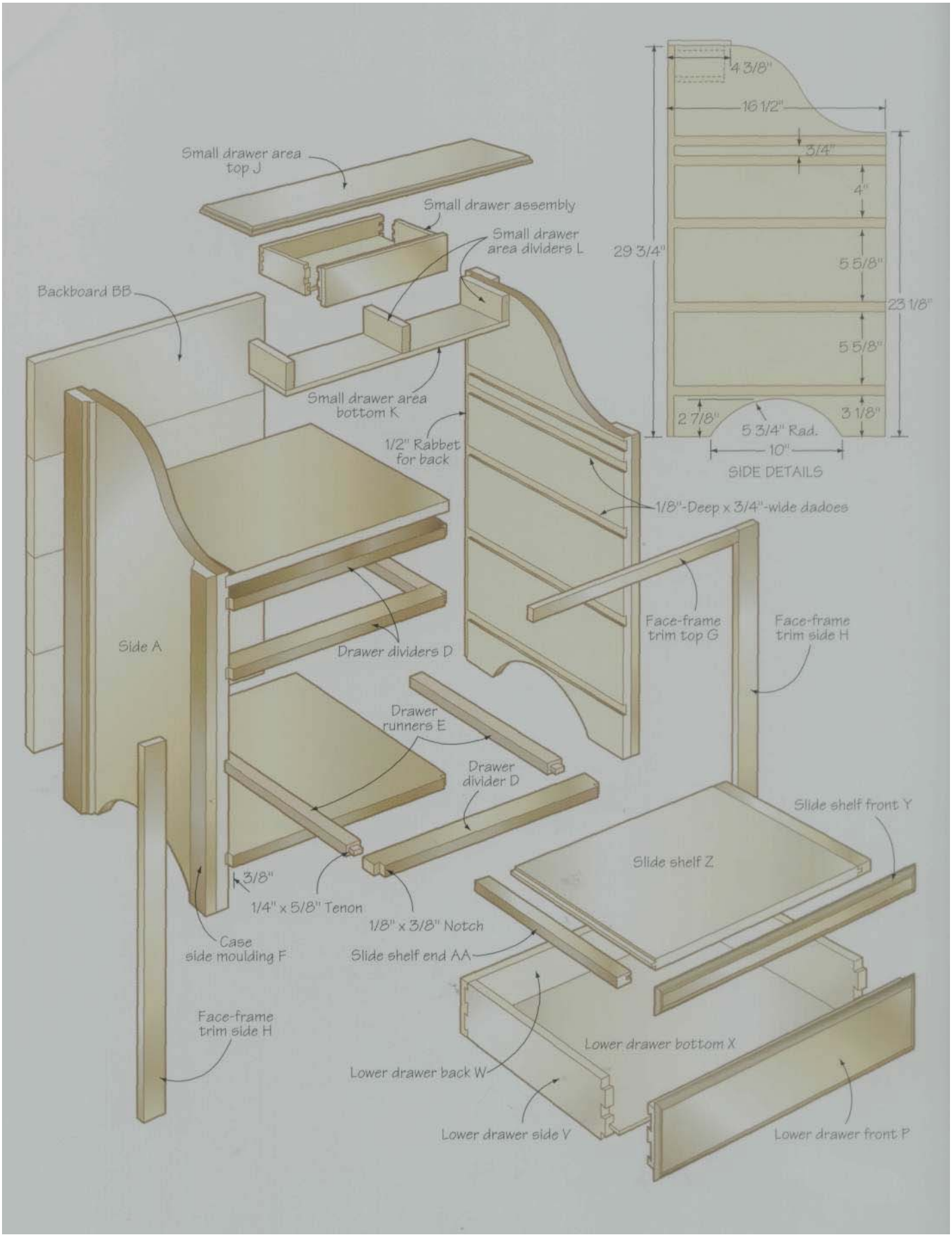
No secrets here other than the stain. I chose tobacco juice and then finished it with a couple of coats of satin polyurethane for protection.



As always, you'll find your tenoning jig is the best tool for forming the rabbets to the drawer fronts.

SHAKER SMALL CHEST OF DRAWERS





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SHAKER SMALL CHEST OF DRAWERS

inches (millimeters)

REFERENCE	QUANTITY	PART	STOCK	THICKNESS	(mm)	WIDTH	(mm)	LENGTH	(mm)	COMMENTS
A	2	side panels	cherry	9/16	(14)	16 1/8	(409)	29 3/4	(756)	
B	1	top panel	cherry	3/4	(19)	15 1/2	(394)	20 7/8	(530)	
C	1	bottom panel	pine	3/4	(19)	15 7/8	(403)	20 7/8	(530)	strip of cherry at front edge
D	3	drawer dividers	cherry	3/4	(19)	1 3/4	(45)	20 7/8	(530)	
E	6	drawer runners	pine	3/4	(19)	1	(25)	14 1/2	(369)	1/2" (13) TOE
F	4	case side mouldings	cherry	3/8	(10)	2	(51)	30	(762)	
G	1	face-frame trim top	cherry	3/8	(10)	1	(25)	20 9/16	(522)	
H	2	face-frame trim sides	cherry	3/8	(10)	1	(25)	23 1/8	(587)	
J	1	small drawer area top	cherry	9/16	(14)	4 3/8	(112)	22 3/4	(578)	moulded three sides
K	1	small drawer area bottom	cherry	9/16	(14)	3 3/4	(95)	20 9/16	(522)	
L	3	small drawer area dividers	cherry	3/4	(19)	3 3/4	(95)	2	(51)	
M	2	top drawer fronts	cherry	13/16	(21)	2 3/16	(56)	9 1/2	(242)	5/16" (8) rabbet three sides
N	1	upper drawer front	cherry	13/16	(21)	4 3/16	(107)	21	(533)	5/16" (8) rabbet three sides
P	2	lower drawer fronts	cherry	13/16	(21)	5 7/8	(149)	21	(533)	5/16" (8) rabbet three sides
Q	4	top drawer sides	pine	3/8	(10)	1 15/16	(49)	3	(76)	
R	2	top drawer backs	pine	3/8	(10)	1 7/16	(36)	8 15/16	(227)	
S	2	top drawer bottoms	pine	1/4	(6)	2 3/4	(70)	8 9/16	(217)	
T	2	upper drawer sides	pine	1/2	(13)	3 7/8	(98)	14 1/2	(369)	
U	1	upper drawer back	pine	1/2	(13)	3 1/8	(79)	20 1/2	(521)	
V	4	lower drawer sides	pine	1/2	(13)	5 1/2	(140)	14 1/2	(369)	
W	2	lower drawer backs	pine	1/2	(13)	4 3/4	(121)	14 1/2	(369)	
X	3	drawer bottoms	pine	5/8	(16)	15	(381)	20	(508)	
Y	1	slide shelf front	cherry	5/16	(8)	1	(25)	21	(533)	
Z	1	slide shelf	pine	3/4	(19)	15 1/2	(394)	19 1/2	(496)	1/4" (6) TBE
AA	2	slide shelf ends	cherry	3/4	(19)	1	(25)	15 1/2	(394)	
BB	1	backboard		1/2	(13)	21 3/16	(538)	29	(737)	made from various pieces

Note: TOE = tenon one end; TBE = tenon both ends.

hardware

3	1 1/2" (38mm) Cherry wooden knobs for lower drawers	item #61692	Rockler
2	1" (25mm) Cherry wooden knobs for upper drawers	item #61665	Rockler
2	1/2"-dia. (13mm-dia.) Brass knobs with antique finish	item #H-42	Horton Brasses
	1 1/2" (38mm) Fine finish nails	item #N-5	Horton Brasses
	J.E. Moser's Dark Antique Sheraton aniline dye stain		Woodworker's Supply
	Reproduction squarehead nails		
	Finish nails		
	No. 8 × 1 1/2 (38mm) Slotted-head wood screws		
	Screw-hole plugs		
	Lacquer sanding sealer		
	Lacquer		
	Glue		

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Step 1 Begin the piece by gluing the side panels. Mark the location for and cut the 1/8” deep by 3/4"-wide dadoes for the top panel, drawer dividers and bottom panel. I use a straightedge with a 3/4" pattern bit for this procedure. Make sure you have mirror-image sides.

step 2 Cut the top design, as well as the arched cutouts at the bottom of each side.

Step 3 with the drawer dividers milled, set the saw blade to create a 1/8”-wide by 3/8”-deep notch on the front edges of each divider and the bottom panel.

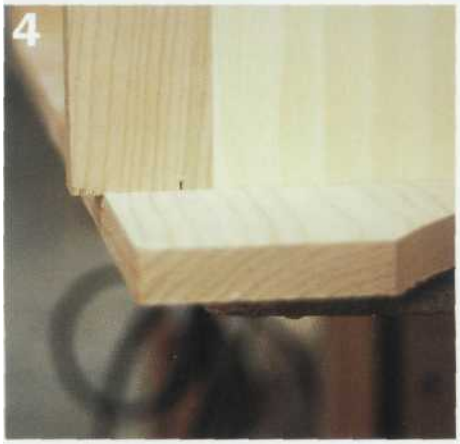




step 4 Next, fit the bottom panel with the front edge, extending the bottom panel V' in front of the side panels. Nail the joint**.**

step 5 Pit the top panel into the groove while holding the edge of the panel flush with the sides. Nail the joint with a reproduction squarehead nail**.**

Step 6 After cutting the 1/4" x 5/8" mortise in the dividers, cut a matching tenon on one end of the drawer runners.









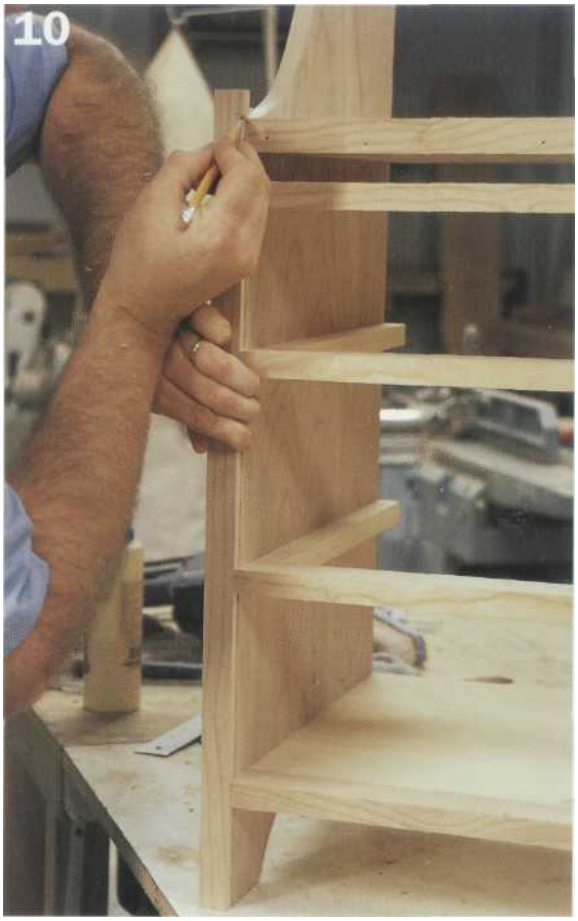


Step 7 Install the drawer dividers into the dadoes in the sides and nail, making sure that the nail enters the solid area of the dividers, not the mortised area.

step 8 Next, lay the piece on its side and glue the tenon on the runners into the mortise in the dividers. Then place a single nail through the side into the runner, locking it into the dado.

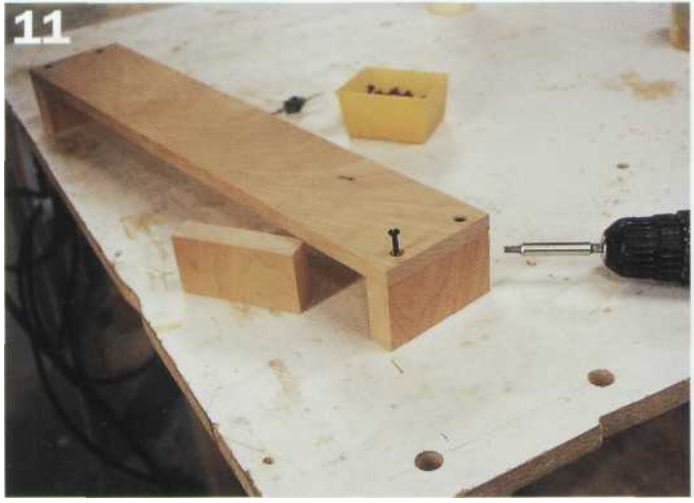


step 9 With the dividers and runners in place, set the cabinet upright and cut the case side mouldings to lit. Attach these with glue and a few nails. Here vou can see the shallow groove made in the moulding to capture any excess glue, preventing it from spreading onto the sides.



Step 10 After attaching the face-frame trim to the top panel with a bit of glue and a few finish nails, measure and repeat the process with both side trim pieces.

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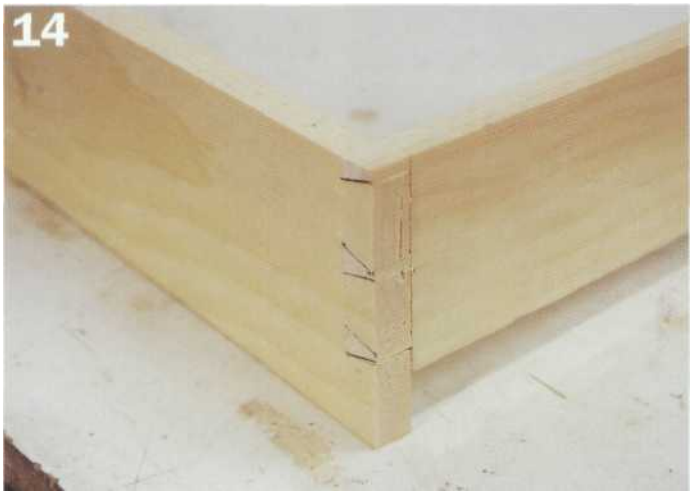


Step 11 Take the small drawer area bottom and attach the dividers with screws. One divider at each end and the third at the center equally separate the space.

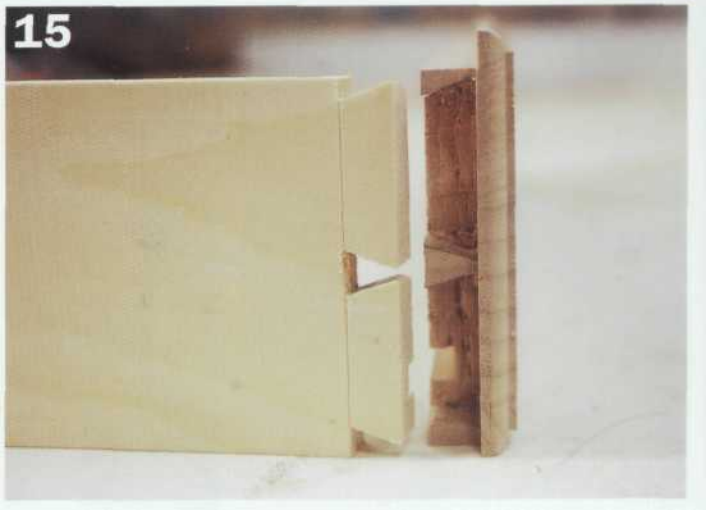
Step 12 Set that assembly in place, bottom down, and using screws, attach it to the sides, making sure that the dividers are flush with the top edge of the sides. With that accomplished, set the top piece in place and attach it, as well. Fill the screw holes with a matching plug.

step 13 Mill the drawer front and slide shelf front pieces to size, mould the edges with a 3/16" roundover bit and create the rabbet detail on the top and sides of the fronts, leaving the bottom edge intact.





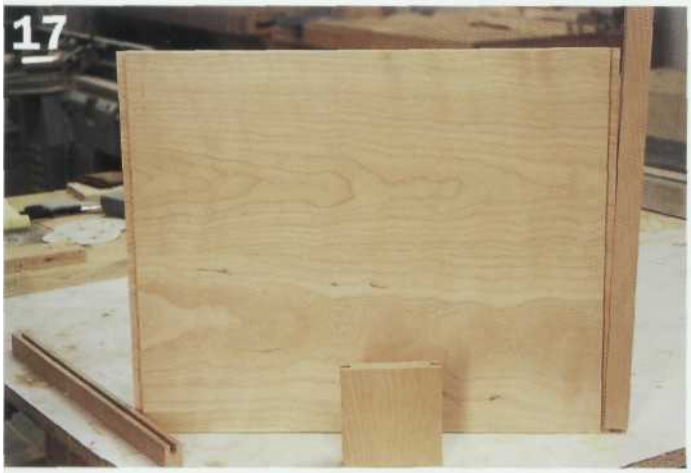
step 14 Dovetail the drawer parts. I start with the back and lay out the pins first. Next, transfer the lines for the matching tails using the pins.



step 15 Repeat the process with the fronts and sides (tails on the sides), then locate the 1/4" x 1/4" groove that will accept the drawer bottoms.



step 16 Make the drawer bottoms with the beveled edge to fit into the groove. Cut a blade-wide slot into the bottoms so that it terminates just at the inside edge of the drawer back. Slide the bottoms into place and secure with a nail as shown.



step 17 Mill the slide shelf and create the 1/4" x "1/4" tenons on the two ends. Create a matching groove on the slide shelf ends, just as breadboards on a table, and attach with nails through the ends. Here you can see that 1 mill those grooves on a wider piece and then cut to the required width.



step 18 With glue and finish nails, attach the slide shelf front into place with the bottom edge flush, creating the lip at the top and ends.



step 19 Next, make the backboards for the chest, remembering that the top board needs to be made from matching hardwood. It will be seen from the front and should be treated in the finish stages just as the case and drawers are.



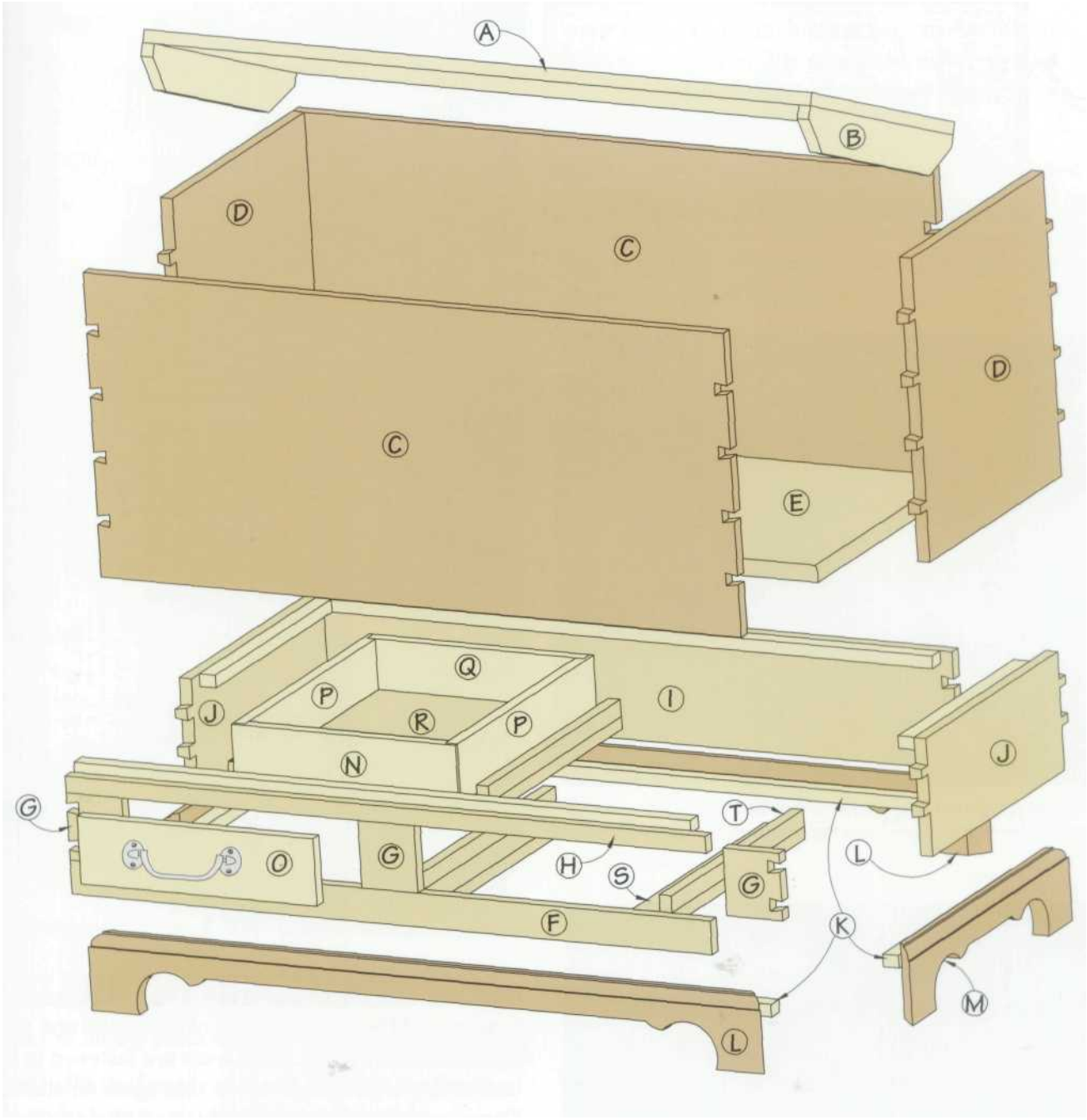
step 20 This piece is finished with a water-based aniline dye stain, J.E. Moser's Dark Antique Sheraton, and when dry, sealed with lacquer sanding sealer, then top-coated with lacquer. The entire piece was sprayed using an HVLP (high-volume, low-pressure) system. With the finish complete, attach the backboards and secure the knobs to the drawer fronts.

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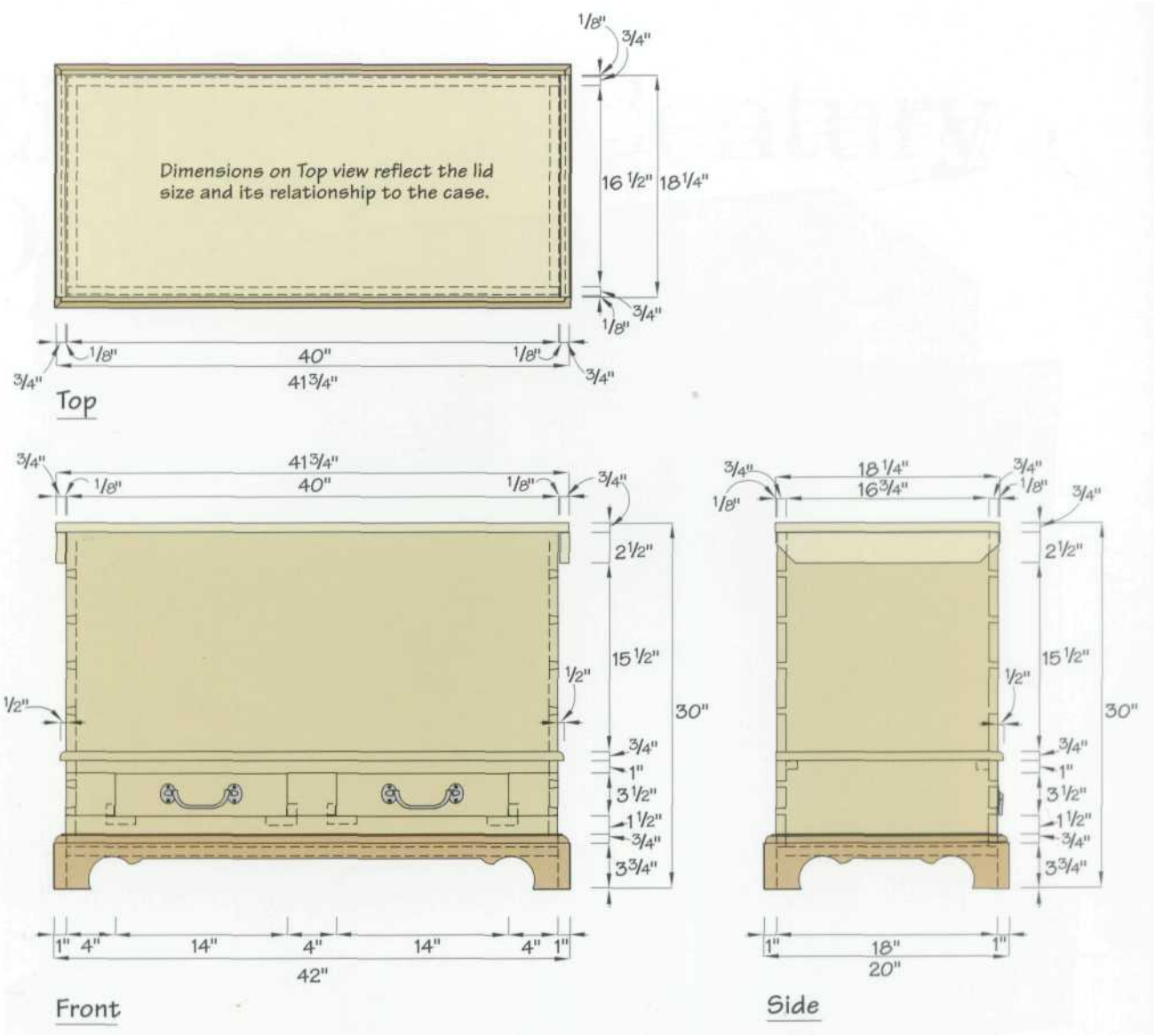
Eighteenth-Century Dower Chest



For hundreds of years, at least from the time of the Norman Conquest in England, chests like this were traditionally built for a girl when she reached ten years of age. In it she would store personal items, her own needlework and other bits and pieces accumulated over the years preceding her marriage. Today the tradition is still alive, but now the dower is called a hope chest. During medieval times the chest was a very heavy piece, constructed usually from oak. Later they were made mostly of pine. Few have survived the centuries. Those that have are all in museums. During Elizabethan times the chests were still heavy but more intricate in design, usually featuring panel construction. Early American versions were often simple six-board affairs. Later they were much better made with dovetail joints and one or two drawer's below the chest. Some had tills (small trays) just inside the top. Most, especially Pennsylvania German versions, were hand painted with lots of color and, perhaps, flowers or animals. The dower chest was usually painted a soft blue



color. Unfortunately, examples with the original paint are extremely rare. The one I have chosen is a copy of a dower chest made in Bucks County, Pennsylvania, circa 1780**.** The original was hand painted with a variety of designs. Not being much of an artist, I left out the designs, preferring instead a heavily aged, distressed look.



CONSTRUCTION OUTLINE

Construction of this piece is quite challenging. Both sections of the chest are constructed using dovetail joints. Whether you put the tails on the ends or the sides is a matter of aesthetics and personal choice. I quite like the large end grains showing, so I put, mine on the face of the piece; you should do whatever pleases you most.

The front of the lower section containing the drawers is made From live pieces of stock. Inside, the drawer runners and guides are secured to cleats that run the entire length of the front and back. The drawers themselves are constructed using simple lap joints, as was the case for many of the earliest versions. You can use half blind dovetails if you prefer. The top and bottom, sides and ends of the upper section are constructed from two, three or four pieces of stock; the end grains are alternated for stability. Cleats are fastened to the undersides of both ends of the top, again for stability. These are held in place with glue and biscuits; dowels would do just as well. The lower skirt, which includes the feet, is mitered to fit around the lower section, then screwed in place from the inside; only the miters are glued. Hardware for a piece such as this is always a problem. I used drawer pulls salvaged from an old piece. The "H" hinges are reproductions. You could use piano hinges but, as always, that would not look light. You'll also need to insert a lid support of some sort.

MATERIALS LIST

Dower Chest

No.	Letter	Item	Dimensions T W L
Top			
1	A	Top	¾″×41¾″×18¼″
2	B	Cleats	¾″×2¼″×18¼″
Upper Chest			
2	C	Front and Back	¾″×40″×18″
2	D	Ends	¾″×18″×18″
1	E	Bottom	¾″×41″×18½″
Drawer Section			
1	F	Front Lower Rail	¾″×2″×40″
2	G	Front Stiles	¾″×4″×3½″
1	H	Front Upper Rail	¾″×1″×40″
1	I	Back	¾″×6″×40″
2	J	Ends	¾″×6″×18″
4	K	Cleats	¾″×1″×38½″
*2	L	Front and Rear Feet	¾″×4½″×42½″
*2	M	End Feet	¾″×4½″×20½″
Drawers			
2	N	Fronts	¾″×3½″×14″
2	O	False Fronts	¾″×4½″×15″
4	P	Sides	¾″×3½″×17″
2	Q	Backs	¾″×3″×13″
2	R	Bottoms	¾″×17″×13″
4	S	Guides	¾″×2½″×17″
4	T	Guides	¾″×1″×17″

*Leave extra length for cutting miters

BUILDING THE CHEST

STEP 1. Cut all the parts to size.

STEP 2. Build the boards that will make up the front, back, ends**,** bottom and lid of the upper chest.

STEP 3. Build th**e** front of the lower section. You can use biscuits, dowels or simple butt joints to secure the five pieces. Glue, clamp and set aside to cure overnight.

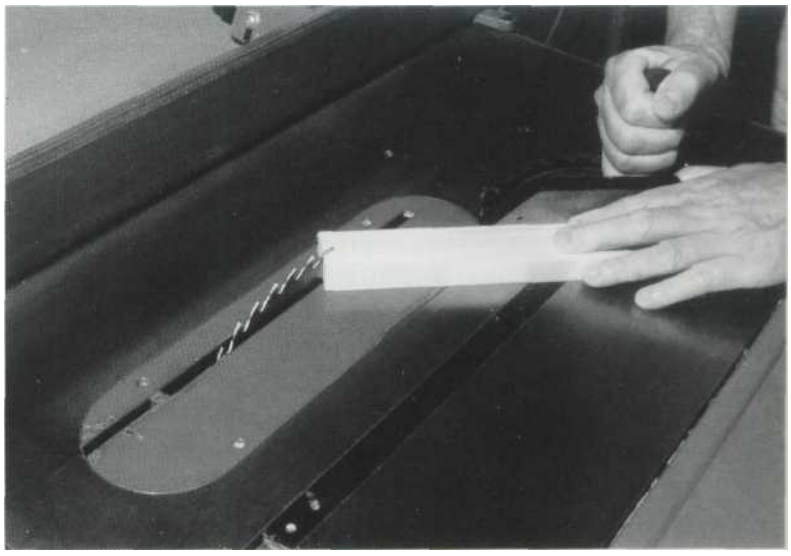
STEP 4. Sand the front of the lower section smooth.

STEP 5. If you have a dovetail jig—I use Leigh's—turn the guide fingers to the TD mode and set the fingers at roughly 2 1/2″ intervals (see photo). This will work quite nicely for both upper and lower sections.

STEP 6. Turn the guide fingers over and cut the tails to the front and rear boards of the upper chest and the front and rear of the lower section.

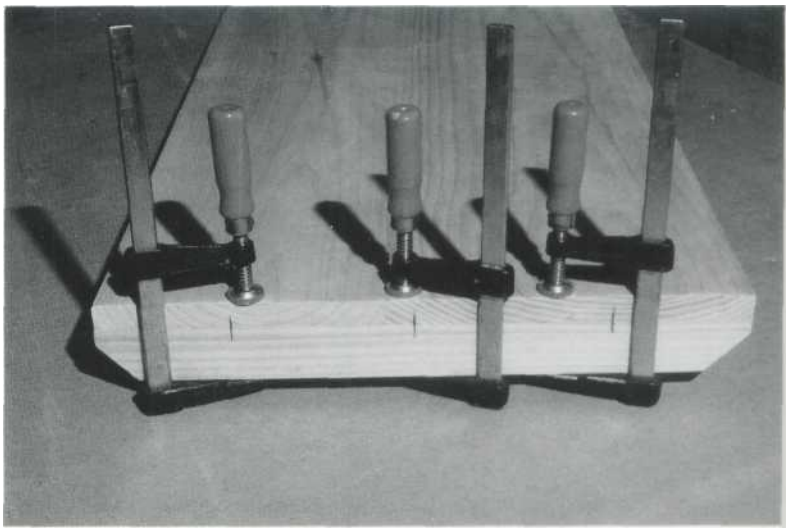
STEP 7. Turn the guide fingers back to the TD mode, set the assembly to cut the pins slightly oversize (see Shop Tip) and cut the pins to the edge of one of the ends of the upper chest.

STEP 8. Remove the work piece from the jig and test, the fit to either the front or back of the upper chest. The fit should be tight. If the pins are too large, reset the jig, replace the workpiece in the jig and recut. the pins. *Be sure you don't cut them too small* (see Shop Tip).

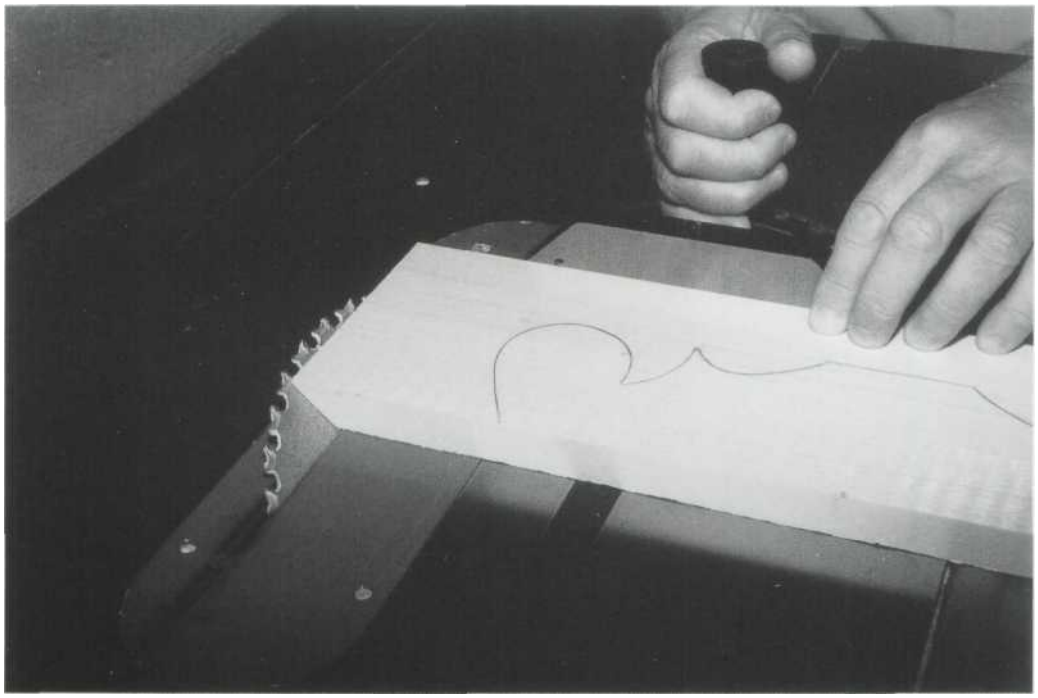


To make the cleats that will support the lid and slop it from warping, cut your stock to size, and then cut the corners away at a 90° angle.

Fasten the cleats to the lid with biscuits and glue and then clamp



the assembly and leave it overnight, or until the glue is fully cured.



When forming the feet, it's a good idea to cut the miters before you cut the details.

STEP 9. When you've recut the pins, test the fit once **again.** If you have it right, continue on and cut the pins to the remaining pieces of the upper and lower sections.

STEP 10. Use plenty of glue to assemble the dovetailed sections; I use one of the new polyurethane glues. Glue, assemble and damp both the upper and lower sections, Check both to make sure they are perfectly square. Set both sections aside to cure overnight.

STEP 11. Using a 1/2" bit in your router, round over the two ends and front edge of the bottom.

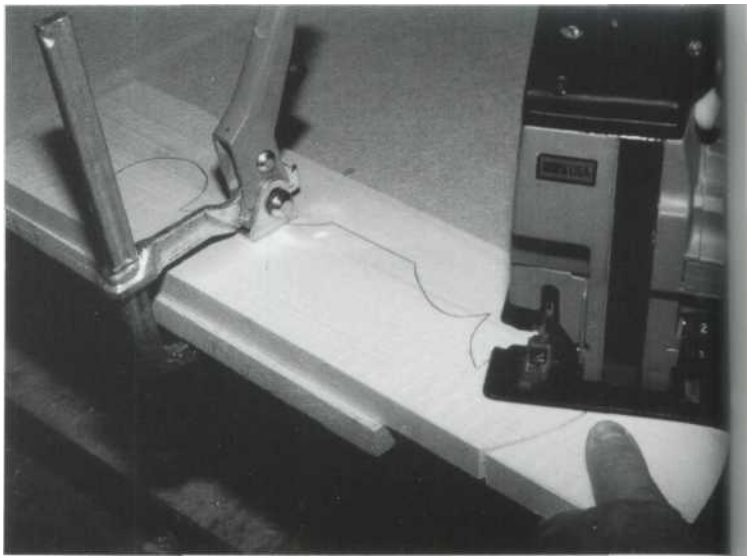
STEP 12. Turn the upper section of the chest so the bottom is uppermost and place it on the bench. Set the bottom board in place, making sure it is flush with rear of the chest and projects at the front and equally at both **ends.** Now, using ten no. 6 X 1 3/4″ screws—four along each side and one at each end—fasten the bottom board **to** the chest walls.

STEP 13. Using glue and screws, assemble the two long cleats that will support the drawer guides to the lower section as laid out in the drawing.

STEP 14. Using glue and screws, assemble the two long cleats that will secure the lower section to the upper chest **as** laid out in the drawing.

STEP 15. Build the four drawer guides as laid out in the drawing.

STEP 16. Using glue and screws, assemble and fasten the drawer guides to the lower set of cleats on the lower section. Be sure they run square to the openings.

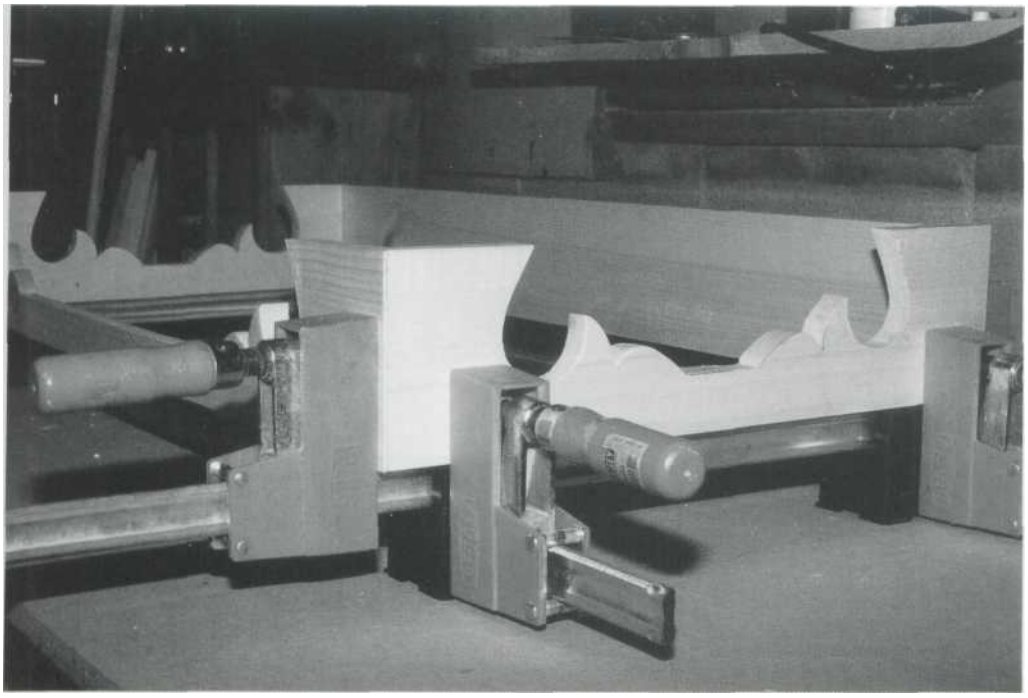


Your jigsaw is the best tool for cutting out the detail to the feet.

STEP 17. With the chest still bottom up on the bench, place the lower section upside down on the underside of the upper chest and set if in place so both upper and lower sections align perfectly.

STEP 18. Using ten no. 6 x 1 3/4" screws—four along each side and one at each end—fasten the lower section **to** the upper chest.

STEP 19. Using the pattern, cut the detail to all four sections of the feet.



Bessy's system of blocks and clamps makes the assembly of the mitered feet section a simple job. Set the clamps in the block, glue the miters, assemble the pieces, apply slight pressure with the clamps, make sure all is square, and then fully tighten the clamps and leave the piece overnight, or until the glue has fully cured.

STEP 20. Cut the feet sections accurately to length and miter the ends to 45°.

STEP 21. Cut the cleats to length and glue and screw them in place, 1" from the top, on the inside of the feet sections as you see in the drawing.

STEP 22. Still with the chest assembly upside down on the bench, from the inside of the lower section, screw the front and rear feet sections in place.

STEP 23. From the inside, and using a little glue on the miters, screw the two end-feet sections in place. Set the assembly aside and leave overnight or until the glue fully cures.

STEP 24. Using a 1/2″ bit in your router, round over the top edge of two ends and both edges of the top front.

STEP 25. Mark the cleats and lid for biscuit slots.

STEP 26. Mill the biscuit slots to the cleats and lid.

STEP 27. Glue and clamp the cleats to the lid, set aside and leave overnight to cure.

STEP 28. Finish sand the entire assembly using 220-grit paper, *but do not assemble the lid to the chest yet*. Wait until the finishing is complete.

STEP 29. Using simple lap joints, build the drawers as you see in the drawing.

STEP 30. Using a ¼" bit in your router, round over the edges of the two drawer false fronts.

STEP 31. Fasten the drawer pulls to the false fronts.

STEP 32. Using four no. 6 X 1 1/4″ screws—two to each drawer—fasten the false fronts to the drawers.

STEP 33. Assemble and fasten the drawer bottoms.

STEP 34. Apply the finish to all sections.

STEP 35. Using three hinges, assemble the lid to the chest.

STEP 36. Assemble the lid support to the inside of the chest and lid.

SHOP TIP

Leigh Dovetail Jig



To ensure optimum results from your Leigh dovetail jig, or any dovetail jig, make sure the workpiece touches not only the two stops on lower left of the jig *but the underside of all of the fingers*. Failure to do this will cause a slight misalignment—steps at the bottom and top edges—between the sections.

FINISHING

I chose an old painted look for this piece. You can follow my lead or simply stain it and give it a couple of coats of polyurethane, but that would miss the point somewhat.

The peeling painted finish you see in the color shot will take a bit of work, but the final effect is well worth the effort and you'll end up with a chest that does, indeed, look a couple of hundred years old. It's very effective and simple to achieve.

STEP 1. First you'll need to do some distressing. Over an extended number of years, a piece like this would receive quite a beating. The upper edges of the chest would have been extensively knocked about, as would the cornel's of both sections and feet. The top front to edge of the chest would have been heavily worn and rounded. The corners would have rounded over. The lid would have a lot of dents and dings, and I wore away the front edge and inward from the edge for about six inches to duplicate the wear one might expect from a couple of hundred years of people sitting on it. You really can't go overboard on a piece like this.

STEP 2. Next, apply an appropriate stain to give the wood an underlying patina. I chose Minwax's Provincial, but Early American or Blond-it's Bleached Mahogany would have done just as well.

STEP 3. To achieve the peeling paint look you see in the photo, follow the steps for the Peeling Paint Effect on page 22 of chapter three.

STEP 4. Now you'll need to apply the wear and tear of the ages. Using 320-grit wet-and-dry and a lot of water, wear away the paint to the polyurethane coats below but take care not to go too deep. Show the bare, unstained wood and you'll spoil the entire finish. Also, be careful to use only the lightest pressure for the rubbing down; the paint may still tend to strip.

STEP 5. Finally, apply a light film of antiquing glaze—don't overdo this—and seal the finish with a couple of coats of satin polyurethane.

Assemble the lid to the chest and you're done.

SHOP TIP

Cutting Tight Dovetails



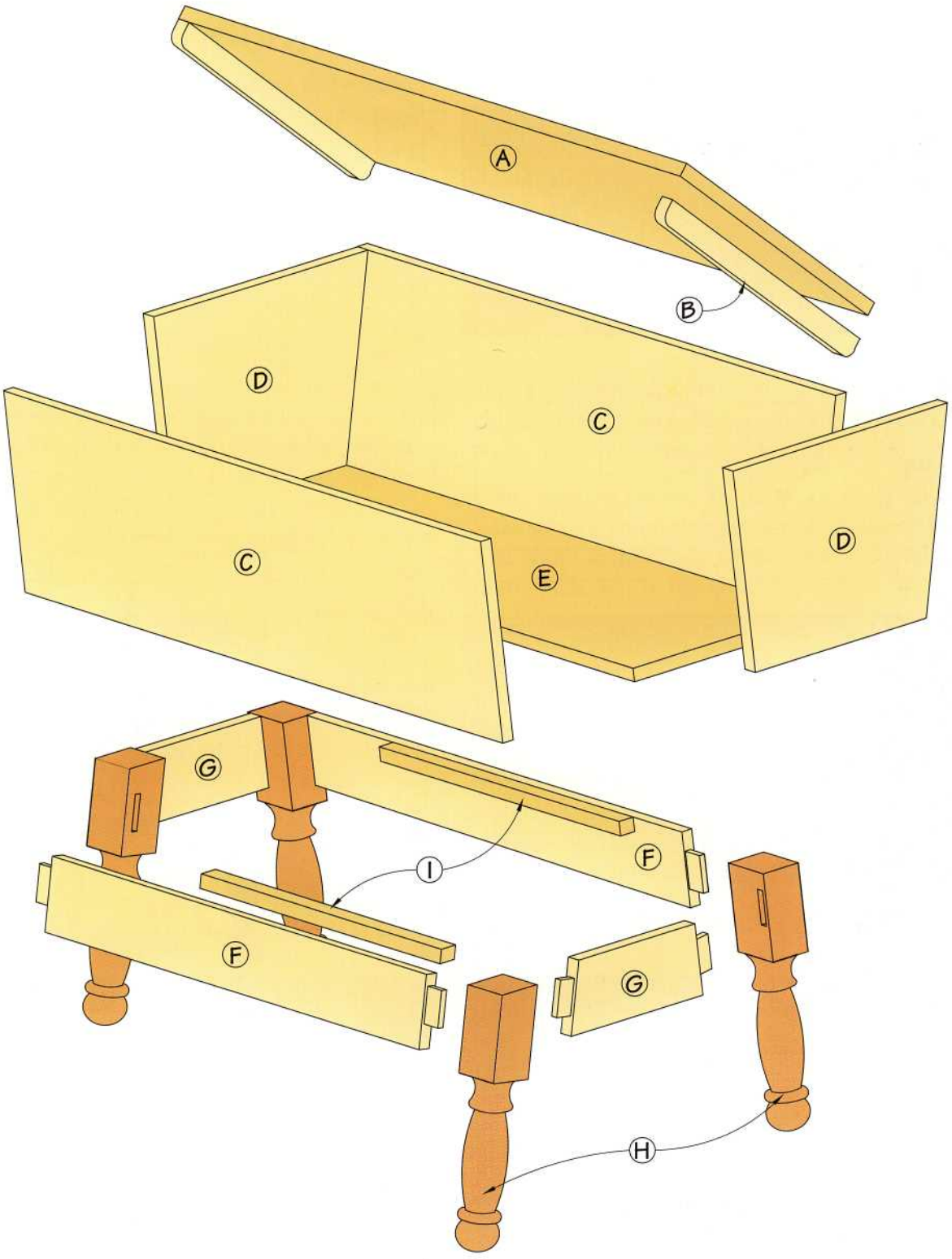
It may cause something of a struggle during assembly, but I recommend you set your dovetail jig to cut the tails a little tighter than for a normal fit. The tendency for long sections of joints such as this is to cut them slack to make assembly easier.

Unfortunately, this will have several effects. First the joint will be weak and subsequently the glue may break. Second, you'll have a lot of filling to do between the pins and tails. Finally, you'll have to clamp almost every pin and tail to bring everything together while the glue cures. Cut the tails for a tight fit and you'll not only eliminate all of the above, but the pins will pull the joint tightly together and the resulting assembly will be almost perfectly square.

Nineteenth-Century Dough Box



The dough box was a functional piece found in many a country kitchen. The idea was that the cook would make a large batch of bread dough, knead it on the large work surface that formed the lid, then throw it inside the box and leave it to rise. Once the dough had risen she would bring it out again, drop it once more on the surface of the lid and prepare it for the oven. Today, the piece is just as functional, though not used for dough. Most dough boxes are used as storage units, conversation pieces and decoration. They come in all shapes and sizes, depending upon the size of the house where they originated. Some had square or tapered legs; others had turned legs. A large country home with a large family and staff would have required more baked goods than a small town house, thus the box would have been in the order of perhaps 48" wide X 24" deep X 27" high. Ours is a smaller unit 36" wide X 17" deep X 27" high. I found it in a book of American country antiques. It was dated to the early 1800s and was somewhat primitive in design. I have changed nothing except to add hinges to the one-time lift-off lid. This makes it a little more functional and convenient. What can you use it for? How about storing linens-tablecloths, napkins, etc.?

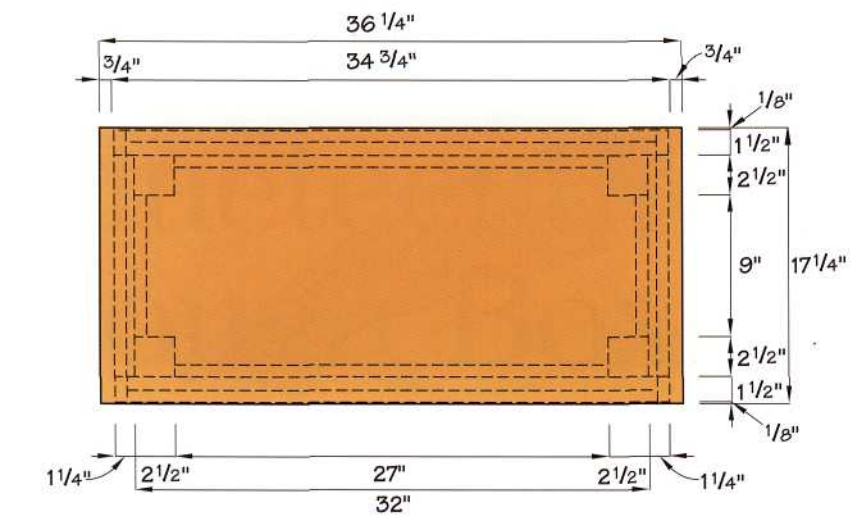


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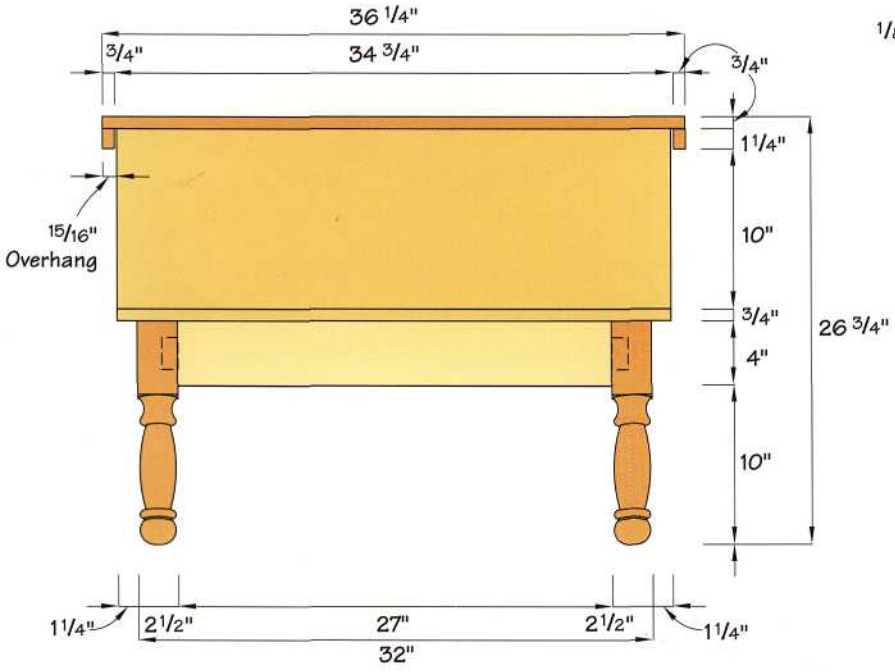
CONSTRUCTION OUTLINE

For the sake of authenticity, I constructed the box section using glue and cut-steel nails. The ends are tapered to an angle of 8°. The bottom of the box is attached with screws. The top is a simple board built from several smaller pieces of stock, the grain alternated for stability,

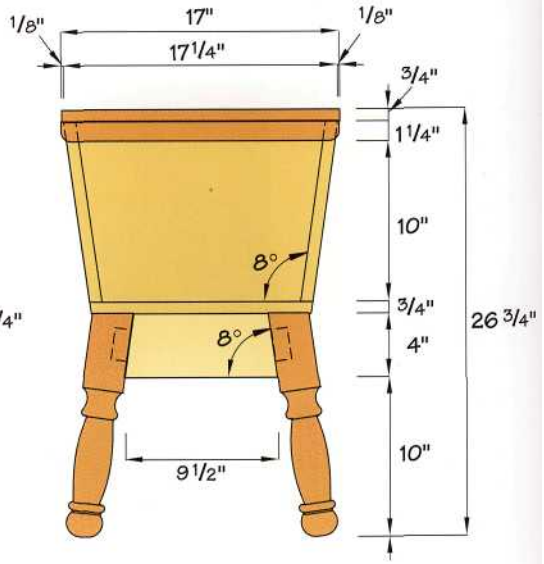
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Top



Side



End

MATERIALS LIST

Dough Box

No.	*Letter*	*Item*	*Dimensions T W L*
1	A	Top	¾″ × 36¼″ × 17″
2	B	Cleats	¾″ × 1¼″ × 17¼″
2	C	Box Sides	¾″ × 11¼″ × 34¼″
2	D	Box Ends	¾″ × 11¼″ × 15½″
1	E	Box Bottom	¾″ × 13¾″ × 34
2	F	Aprons	¾″ × 4″ × 29
2	G	Aprons	¾″ × 4″ × 10½″
4	H	Legs	2 ½″ × 2½″ × 14¼″

biscuited together. The original had cleats added to the ends of the lid, just as I have done, but did not have hinges; ours does. The understructure is a simple affair built using mortise and tenon; the legs are splayed forward and backward at an angle of 8° to match the box section. I kept the finish simple, just as it was on the original. These pieces were used exclusively in the kitchen and saw a lot of water, so I gave this one the scrubbed look you'll find described on page 25.

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BUILDING THE DOUGH BOX

STEP 1. Cut all the pieces to size as laid out in the materials list, then run them through the jointer to clean up the edges.

STEP 2. Build the boards to make the top and bottom of the box unit.

STEP 3. Glue and screw the cleats to the underside of the top.

STEP 4. Sand the top smooth and set it aside.

STEP 5. Go to the lathe and, using the pattern provided, turn the four legs. If you don't have a lathe you can use tapered legs. The procedure is as follows: set your tapering jig to 3° and taper the legs on the two inside edges, making sure you have two right- and two left-hand legs. Begin the taper 4" down from the top of the

STEP 6. Cut the mortises—1" deep x 3/8" x 2"—in the tops of the legs as you see in the drawing.

STEP 7. Set your table-saw miter gauge to 8° off 90 and trim the two end pieces of the apron. Do the same to the ends of the two pieces that will make the end pieces of the box.

STEP 8. Remove the guard from your table saw and set the blade to cut at a depth of 1".

STEP 9. If you have a tenoning jig, set the back-stop to 8° off the vertical and cut the cheeks. **Note:** Do this first on a piece of scrap stock and test the tenon for fit in one of the mortises.

STEP 10. Mark the shoulders at an angle of 8° (see photo below) to accommodate the angle inside the mortise.

STEP 11. Use your band saw to cut the scrap stock away from the shoulders.

STEP 12. Replace the guard on your table saw and tilt the blade to 8°.

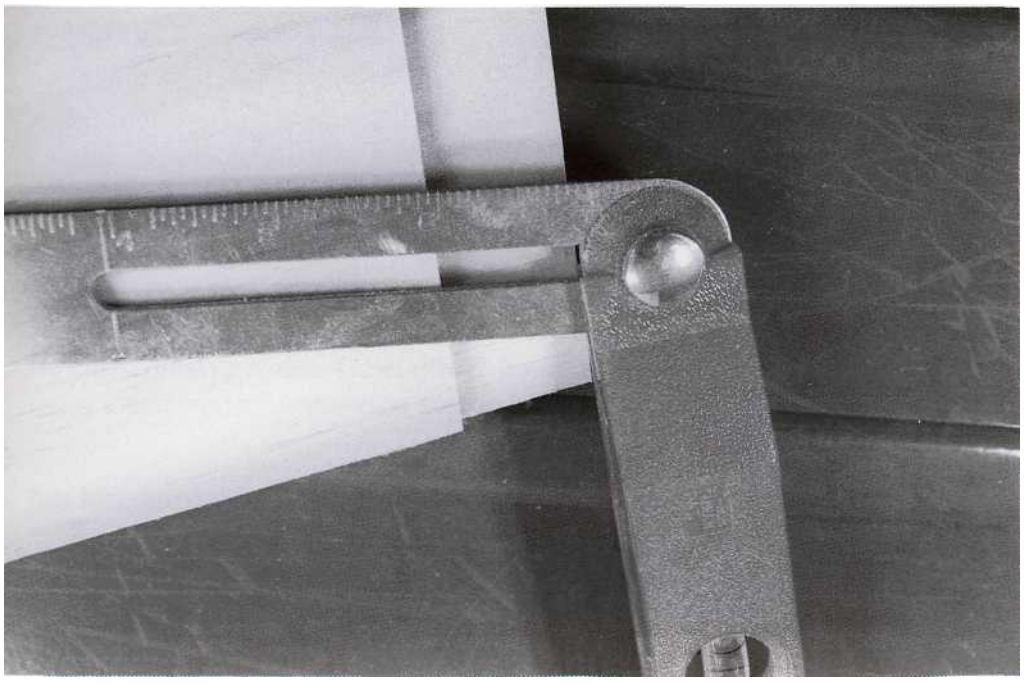
STEP 13. Set your rip fence to 4", lay the apron pieces flat on the table, outer side up, top edge toward the blade, and trim the edge to 8°; this is so the top of the understructure will fit flush to the underside of the box. **Note:** You can do this step on your jointer if you wish.

STEP 14. Do the same to the tops of all four legs, once again making sure you maintain two left and two right. This is also so the top of the understructure will fit flush to the underside of the box.

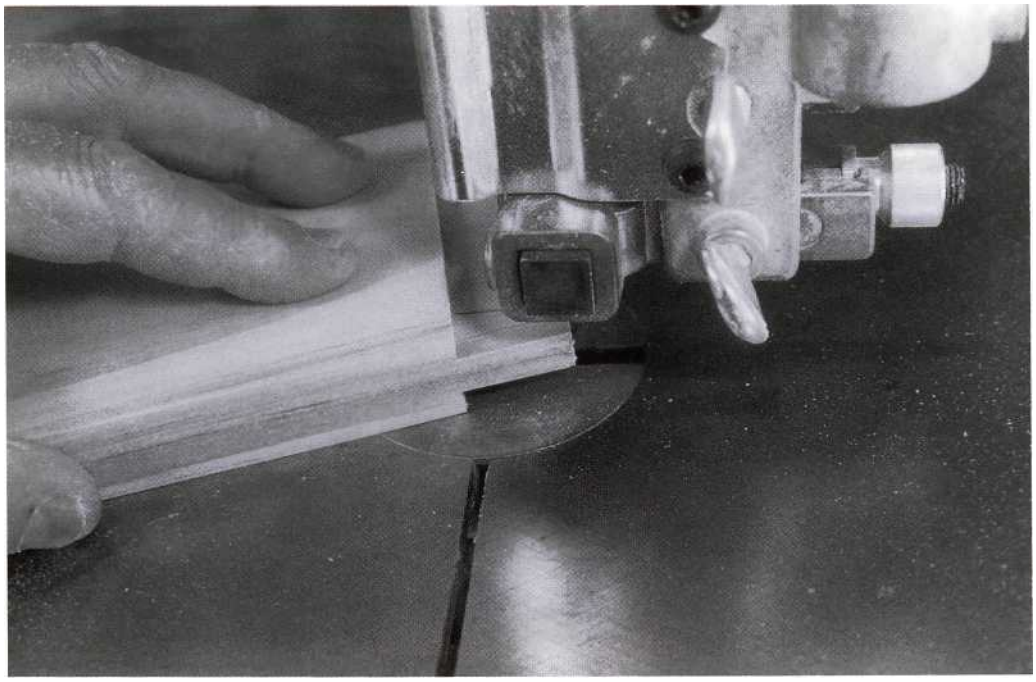
STEP 15. Take the four pieces that comprise the apron to the drill press and mill the pocket holes you'll use to attach the understructure to the box unit.

STEP 16. Dry fit all the rails to the legs and lay the lid, upside down, on the structure; all should sit true.

STEP 17. Disassemble all the pieces, sand everything smooth, then glue and reassemble the understructure, clamp it and leave overnight or until the glue has fully cured.

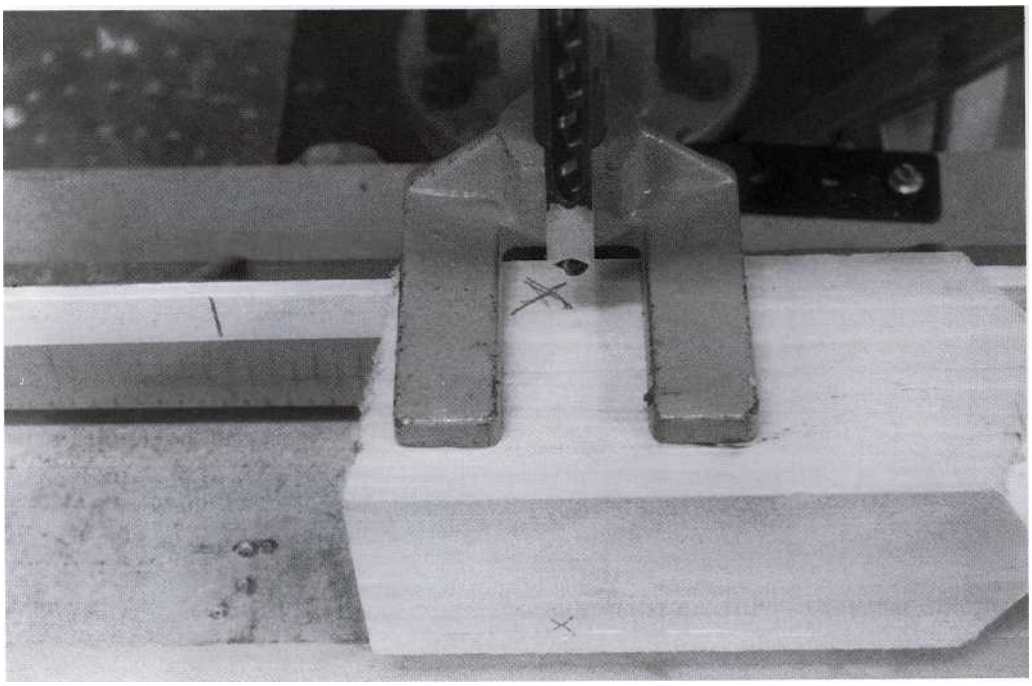


Use a movable square to mark the angles of the tenons to the rails that make up the apron.



The best way to cut away the waste at the shoulders of the tenons is to do it freehand on your band saw.

Before you mill the mortises, mark the position of each one to ensure you have two left- and two right-hand legs.



STEP 18. With the table-saw blade still set at an angle of 8°, mill the top and bottom edges of the two long sides of the box section so the top and bottom will fit flush.

STEP 19. Take the bottom board to the table saw and mill both edges to an angle of 8° so the bottom and sides will both follow the 8° splay.

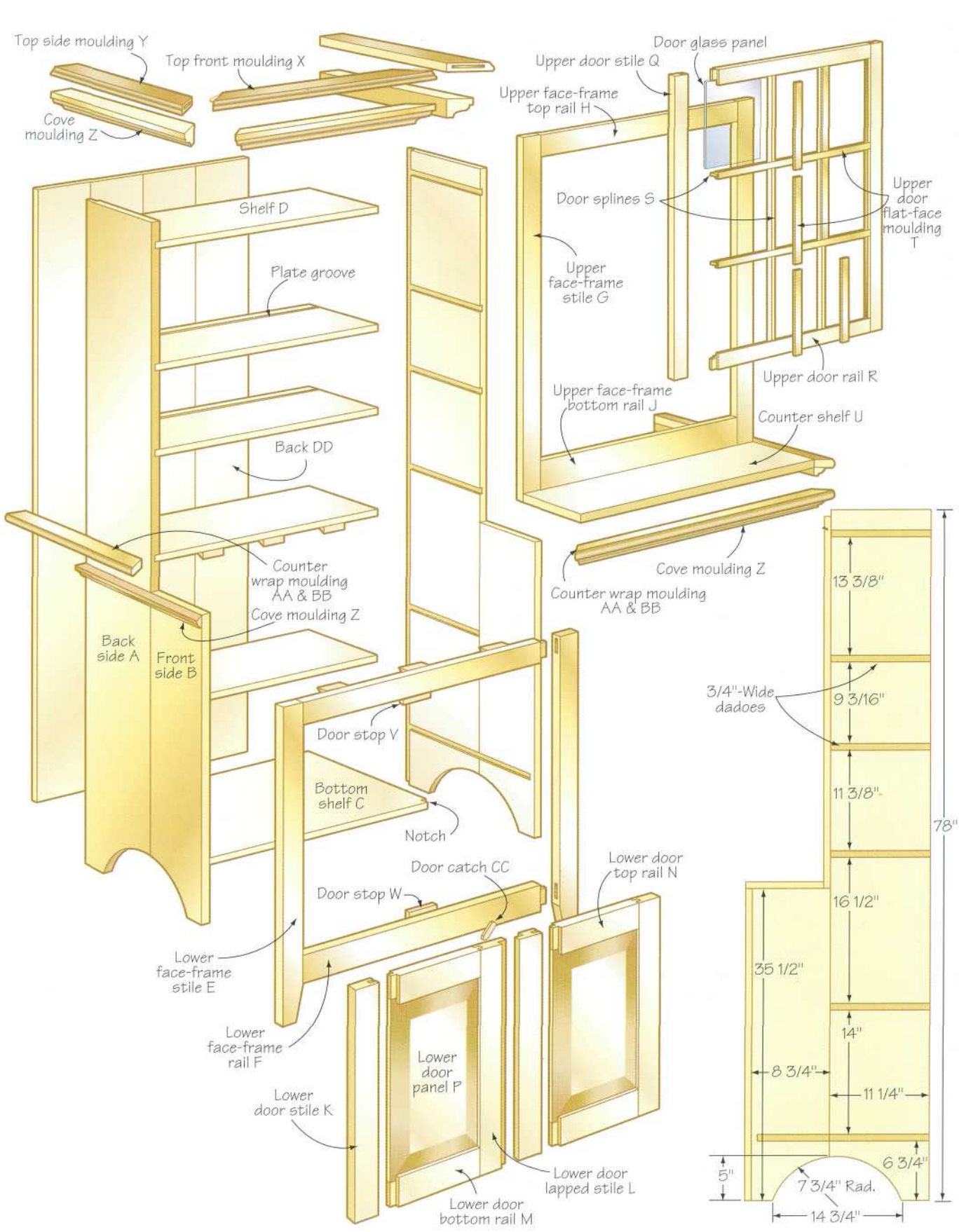
STEP 20. Using 1 3/4" cut-steel nails and glue, assemble the box unit. **Note:** You'll need to drill pilot holes to accommodate the nails. First use a 1/8” bit and drill through both pieces of stock, then a slightly larger bit to enlarge the hole in the outer piece only. Clamp the structure, making sure it's square, and set it aside until the glue is fully cured. **Note:** Bessy makes a clamp that works well when clamping angled .

STEP 21. Place the box unit on the bottom board and mark a pencil line around inside.

STEP 22. Remove the box unit and, using the pencil line as a guide, drill twelve pilot holes in the bottom board—four along each side and two at each end.

DIMINUTIVE DISH CUPBOARD





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DIMINUTIVE DISH CUPBOARD

inches (millimeters)

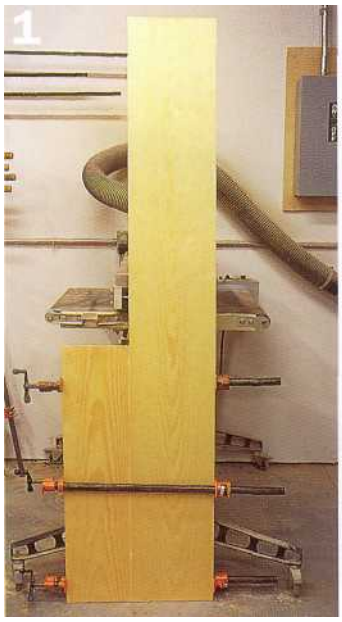
REFERENCE	QUANTITY	PART	STOCK	THICKNESS	(mm)	WIDTH	(mm)	LENGTH	(mm)	COMMENTS
A	2	sides (back section)	pine	3/4	(19)	11 1/4	(285)	77 1/4	(1962)	
B	2	sides (front section)	pine	3/4	(19)	8 3/4	(222)	35 1/4	(895)	
C	1	bottom shelf	pine	3/4	(19)	19 1/4	(489)	37 1/4	(946)	
D	5	shelves	pine	3/4	(19)	10 1/2	(267)	37 1/4	(946)	
E	2	lower face-frame stiles	pine	3/4	(19)	4	(102)	25 1/4	(641)	
F	2	lower face-frame rails	pine	3/4	(19)	3	(76)	32 1/4	(819)	1" (25) TBE
G	2	upper face-frame stiles	pine	3/4	(19)	3 1/4	(82)	42	(1067)	
H	1	upper face-frame top rail	pine	3/4	(19)	4 1/4	(108)	33 3/4	(857)	1" (25) TBE
J	1	upper face-frame bottom rail	pine	3/4	(19)	3 3/4	(95)	33 3/4	(857)	
K	3	lower door stiles	pine	3/4	(19)	2 7/8	(73)	24 1/4	(616)	
L	1	lower door lapped stile	pine	3/4	(19)	3 1/4	(82)	24 1/4	(616)	
M	2	lower door bottom rails	pine	3/4	(19)	3 1/4	(82)	12	(305)	1 1/4" (32) TBE
N	2	lower door top rails	pine	3/4	(19)	3	(76)	12	(305)	1 1/4" (32) TBE
P	2	lower door panels	pine	5/8	(16)	10 1/2	(267)	18 5/8	(473)	
Q	2	upper door stiles	pine	3/4	(19)	2	(51)	34	(864)	
R	2	upper door rails	pine	3/4	(19)	2 1/2	(64)	30 1/4	(768)	1 1/4" (32) TBE
S	5	upper door splines	pine	1/4	(6)	1/2	(13)	30	(762)	
T	5	upper door flat-face mouldings	pine	1/4	(6)	3/4	(19)	30	(762)	
U	1	counter shelf	pine	3/4	(19)	8 3/4	(222)	39	(991)	trim to fit
V	1	lower door stop (top)	pine	5/8	(16)	3	(76)	2 3/4	(70)	
W	1	lower door stop (bottom)	pine	5/8	(16)	3	(76)	1 1/4	(32)	
X	1	top moulding (front)	pine	3/4	(19)	3 3/8	(86)	45	(1143)	
Y	1	top moulding (side)	pine	3/4	(19)	3 3/8	(86)	32	(813)	
Z	2	cove mouldings	pine	3/4	(19)	3 1/8	(79)	45	(1143)	
AA	1	counter shelf edge moulding	pine	3/4	(19)	2 1/4	(57)	45	(1143)	
BB	2	counter trim mouldings	pine	5/8	(16)	7/8	(22)	45	(1143)	
CC	1	lower door catch	pine	5/8	(16)	3/4	(19)	5	(127)	
DD	1	backboard	pine	5/8	(16)	37 1/2	(953)	75	(1905)	made up of many boards

Note: TBE = tenon both ends.

hardware

2	1"-dia. (25mm-dia.) Antique-finish cupboard turn knobs	item #H-97	Horton Brasses
1	1"-dia. (25mm-dia.) Antique-finish dummy knob	item #K-12	Horton Brasses
1 pair	2 1/2" (64mm) Blackened upper hinges		local hardware store
2 pairs	2" (51mm) Blackened lower hinges		local hardware store
	1 1/2" (38mm) Case nails	item #N-5	Horton Brasses
	1 1/2" (38mm) Back nails	item #N-7	Horton Brasses
	Full-restoration glass for upper doors		Bendheim
	Glue		
	Glue blocks		
	#20 Biscuits		
	1 1/4" (32mm) Flathead wood screws		
	Cherry aniline dye		
	Shellac		
	Paint		
	Dark wax		
	Durham's Water Putty		

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step 1 Begin this cupboard by gluing the pieces for the sides. I used two pieces and cut them so the lower portion was cut straight and located exactly where it is necessary.



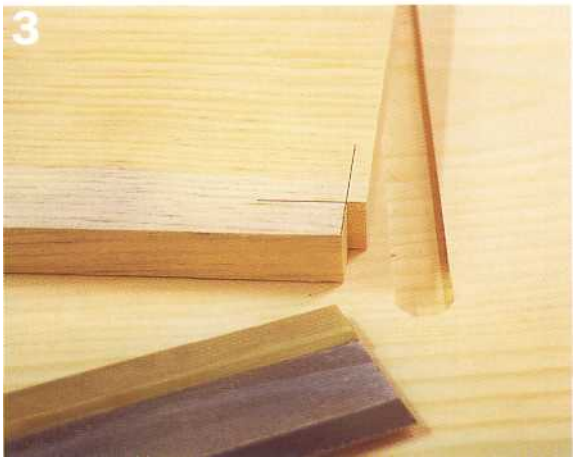
step 2 Next, lay out and cut the dadoes according to the plan. Remember that the dado for the shelf in the lower area is a stop-dado.

step 3 After cutting the rabbet for the backboard, mill the shelves to size. For the bottom shelf, notch the front edge to accommodate the stopped cut.

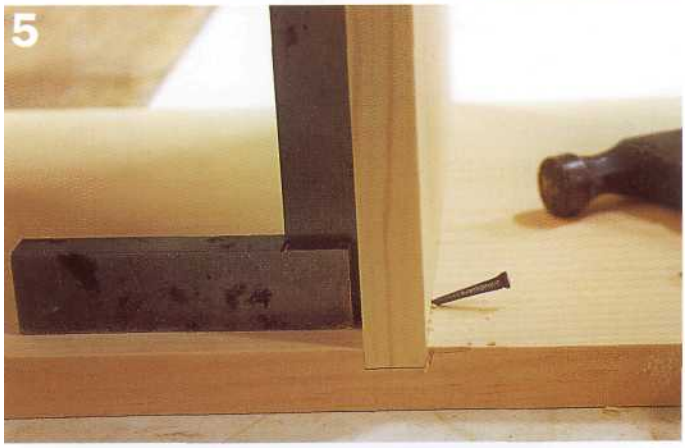
Step 4 Apply a small amount of glue in the dadoes and install the shelves.

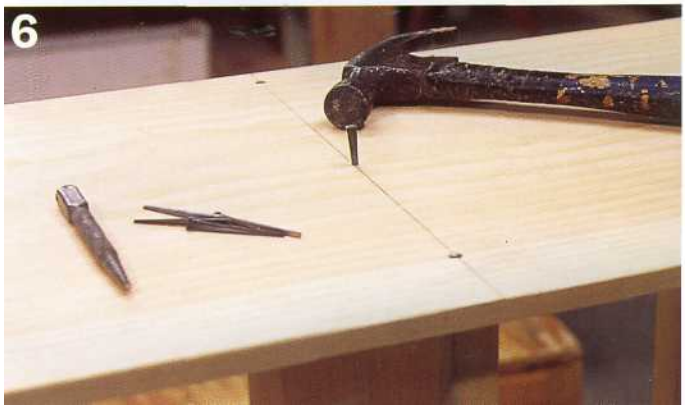
step 5 Nail through the under-side of each shelf, using a square to set the shelf at 90° to the sides.

Step 6 Repeat the process on the opposite side and place three nails through the sides at each shelf.









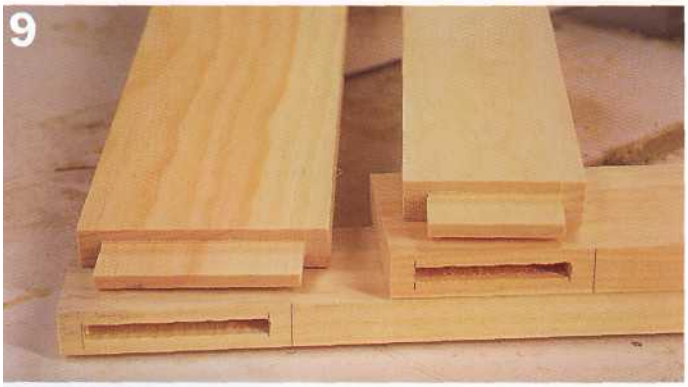


step 7 Mill the pieces for the face frames. Create the mortises in the frame stiles and cut the matching tenons on the rails. Start with the shoulder cuts.



step 8 Finish the tenons by making the cheek and edge cuts.

step 9 With all the joinery cut, glue the face frames and allow them to dry.

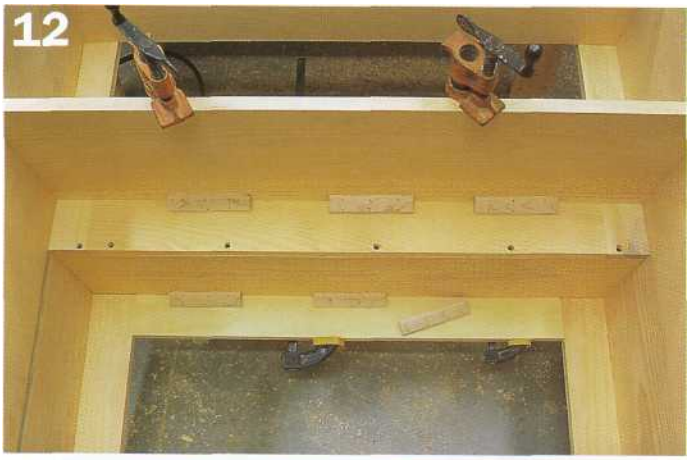




Step 10 When they are dry, glue the face-frame assemblies to the cupboard.



Step 11 Mill the counter shelf, fit it to the cupboard and clamp it to hold.



step 12 Place clamps to tighten the upper face-frame rail to the shelf, then turn the cabinet onto the face. Place screws into the back edge of the counter shelf and install glue blocks at the front edges of both shelves.

step 13 Using a 1/2" core box bit and a straightedge, place plate grooves into the appropriate shelves, 1 1/2" from the back edge to the center of the groove.

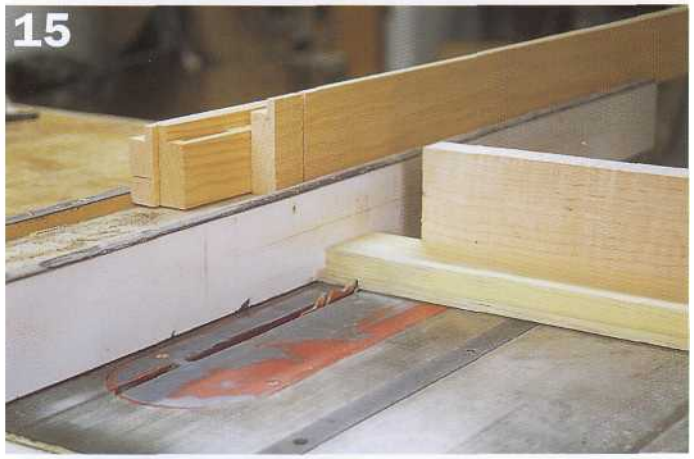


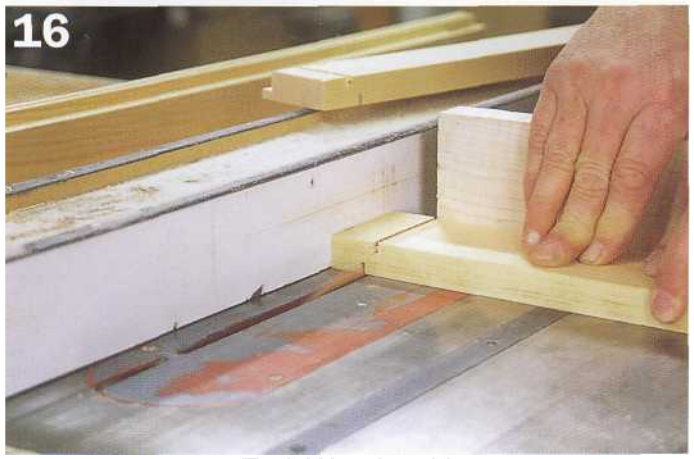


step 14 Next, make the cutout area at the sides and create the angle cuts for the front feet.

step 15 Begin the glass upper door by milling the stock to size, cutting a 3/8" x 1/2" rabbet on the inner edge of all the pieces. Cut mortises in the door stiles, both top and bottom, and make the face-side shoulder cut on the rails.

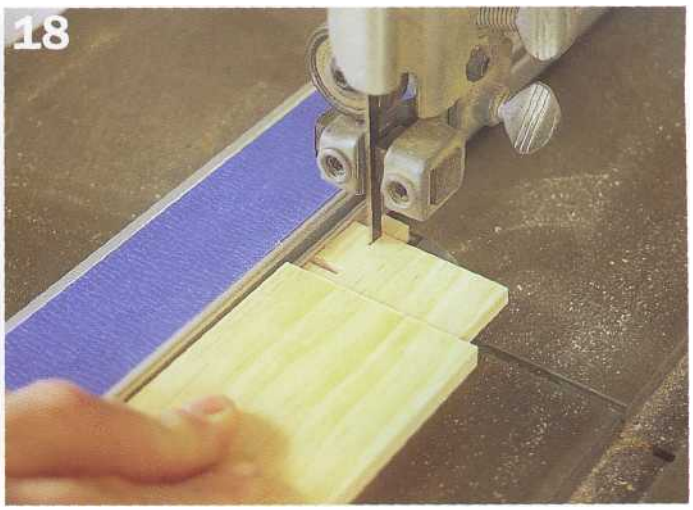
step 16 Adjust the fence 3/8" closer to the blade, then make the rear shoulder cut.



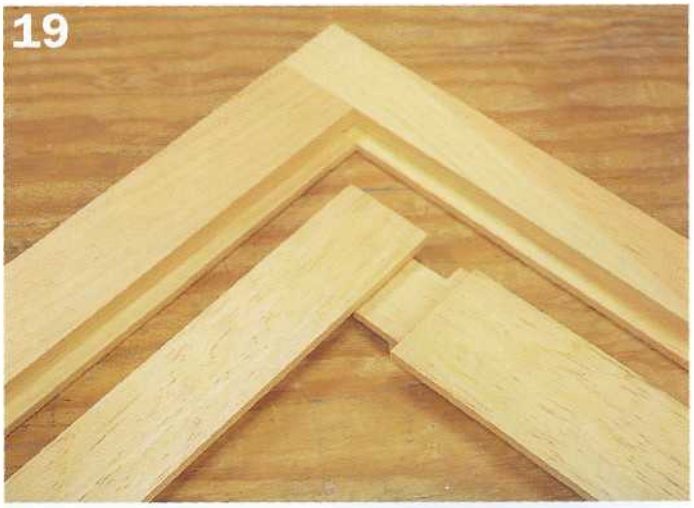




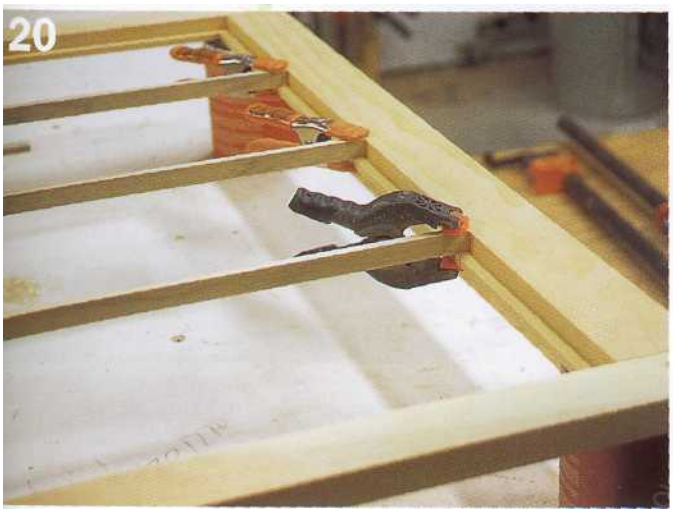
step 17 Raise the blade to 3/8" and make the outer edge cut.



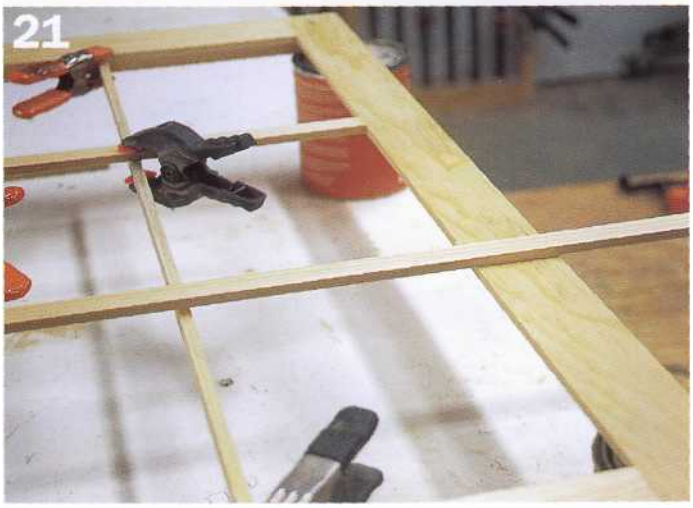
step 18 Next, make the cheek cuts, remembering that there are two different height settings. Remove the haunch area, fine-tune anything necessary, and the door frame is ready to assemble. This method creates the rabbets for the glass in the joinery. It is also possible to rabbet this area after assembling the door frame with simple mortise-and-tenon joints.



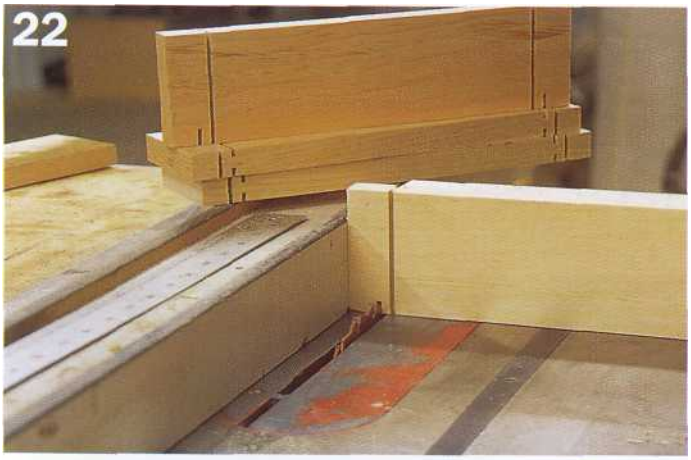
step 19 This is the front and back view of the joinery on the glass door frame.



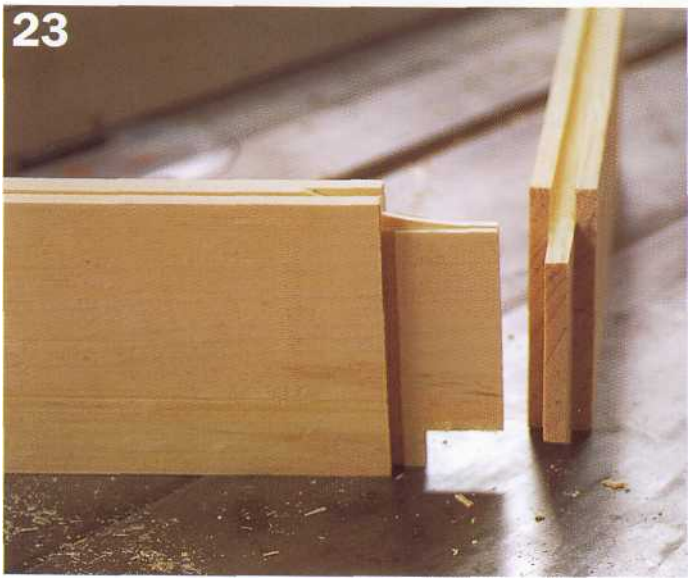
Step 20 With the door dry and pegged, begin the upper door splines. First, fit the door to the case and mark the location of the shelves onto the door frame. The splines should align with the shelves. Glue in the splines from rail to rail, dividing the glass area into three equal sections.



step 21 Flip the door and install the flat-face moulding into the door at each shelf location. Then simply cut and fill the remaining pieces to complete the glass door.



Step 22 Next, turn to the lower panel doors. Mill the stock to size and cut the 1/4" mortises into the stiles, leaving 3/8" at the top and bottom of each rail width. Begin the tenons by setting the blade height to 1/4" and cut the shoulder for each rail. Then, raise the blade to 3/8" and move the fence 3/8" closer to the blade, just as we did in the glass door.



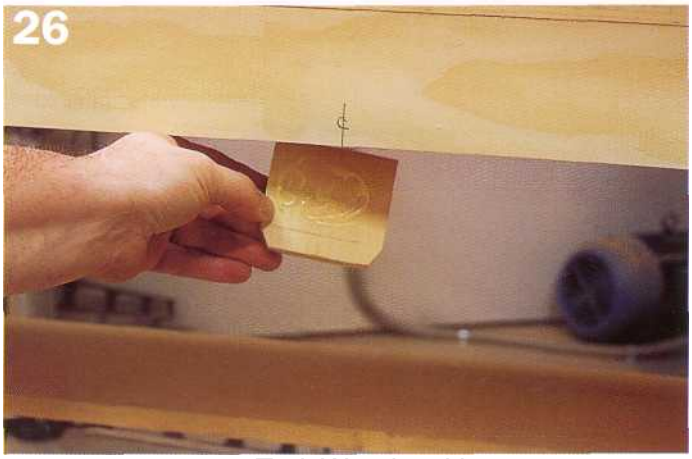
step 23 Make the cheek and edge cuts, then make a 1/4" x 3/8" groove at the center of both the rails and stiles. The end result of the tenons should look like this.



step 24 Mill the panels to size, set the blade at a 12° angle, then, with the fence set to the left of the blade, make the cut to create the raised panel.

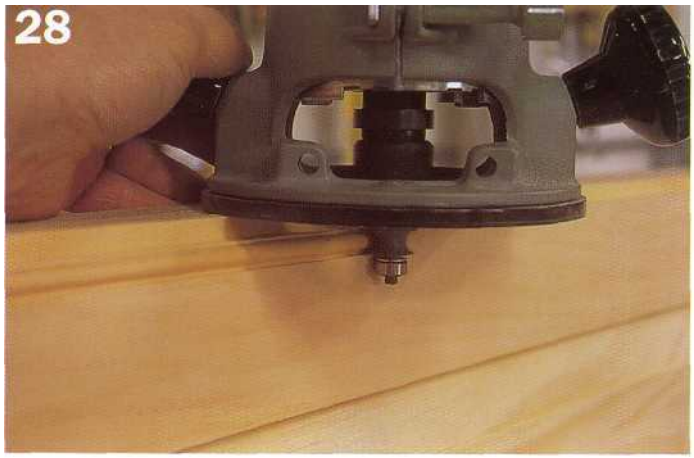


step 25 In order to fit the panel to the door groove, you will need to make a 3/8"-high cut on the inside, or back, of the panel. Test the fit and glue the lower doors when complete.



Step 26 Cut the door stops for the lower door, one nailed to the lower shelf and the other as pictured here. Glue them in place and nail from the back to secure.





step 27 Hang and fit the lower doors. The operable door (on the right) laps over the other door with a 1/4" rabbet. Mark the edge of both doors onto the case to determine the rabbet location.

step 28 Once the doors are complete and fit into the case, remove them and add the bead detail on the outside edge of all stiles. I use a 1/4" beading router bit with an auxiliary fence clamped even with the door edge.



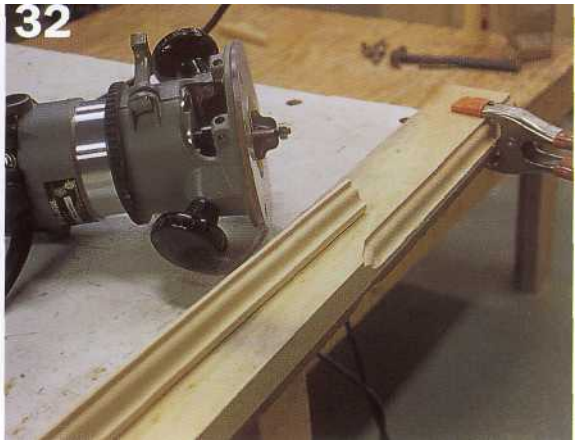


step 29 Make the counter shelf edge moulding by running a 3/16” roundover bit on all four edges of the 3/4"-thick piece, then rip to the required two pieces that are 1" wide.

step 30 Cut the pieces to size and install the front piece by temporarily clamping a scrap of the moulding at the side.

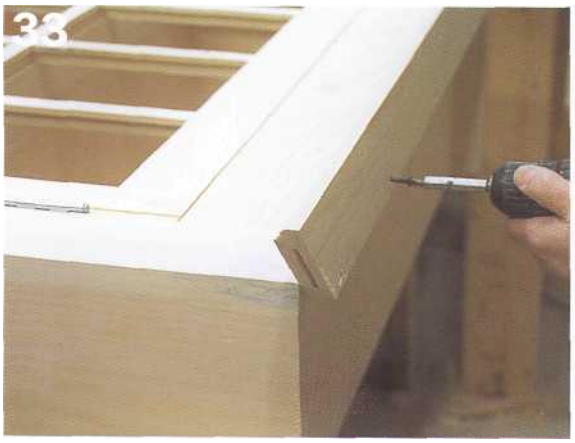


Step 31 With the front piece in place, nail the two sides in the same manner.



step 32 Mill the counter trim moulding as we did the counter shelf edge moulding, using a Roman ogee bit and ripping to size. When you're ready, cut to fit and nail in place.

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Step 33 Next, make the top moulding pieces. These pieces have a moulded edge and are cut to fit with 45° angles that are biscuited at the front corners. They are attached to the case with 1 1/4"" screws.

Step 34 Make the cove moulding and fit it to the case.

Step 35 Next, mill the backboards and create the 5/16" x 3/8" rabbet for the shiplap detail. While I sometimes make this with the table saw, here I used the router and a rabbeting bit.

step 36 Sand the piece completely, knock down the edges with coarse-grit sandpaper and send this to the finish room. This is to be a painted piece, but I begin with a cherry aniline dye.

step 37 With the stain dry, apply a couple of coats of shellac. Here I apply a coat of paint that has had fine sawdust mixed into it. Brush it on and as it becomes tacky, remove some paint and most of the sawdust by wiping with a wet rag.





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Step 38 paint the interior of the cupboard, and on the exterior add a coat of dark wax to add depth and age to the piece.

Step 39 Next, cut the glass and glaze the upper door. I use Durham's Water Putty for the yellowing effect.

Step 40 Reinstall the doors. Add the hardware and the door catch in the lower door. Here you see how the catch is attached and works from the inside.

Step 41 The backboard is stained on the exterior and painted on the inside. It is nailed using reproduction nails.



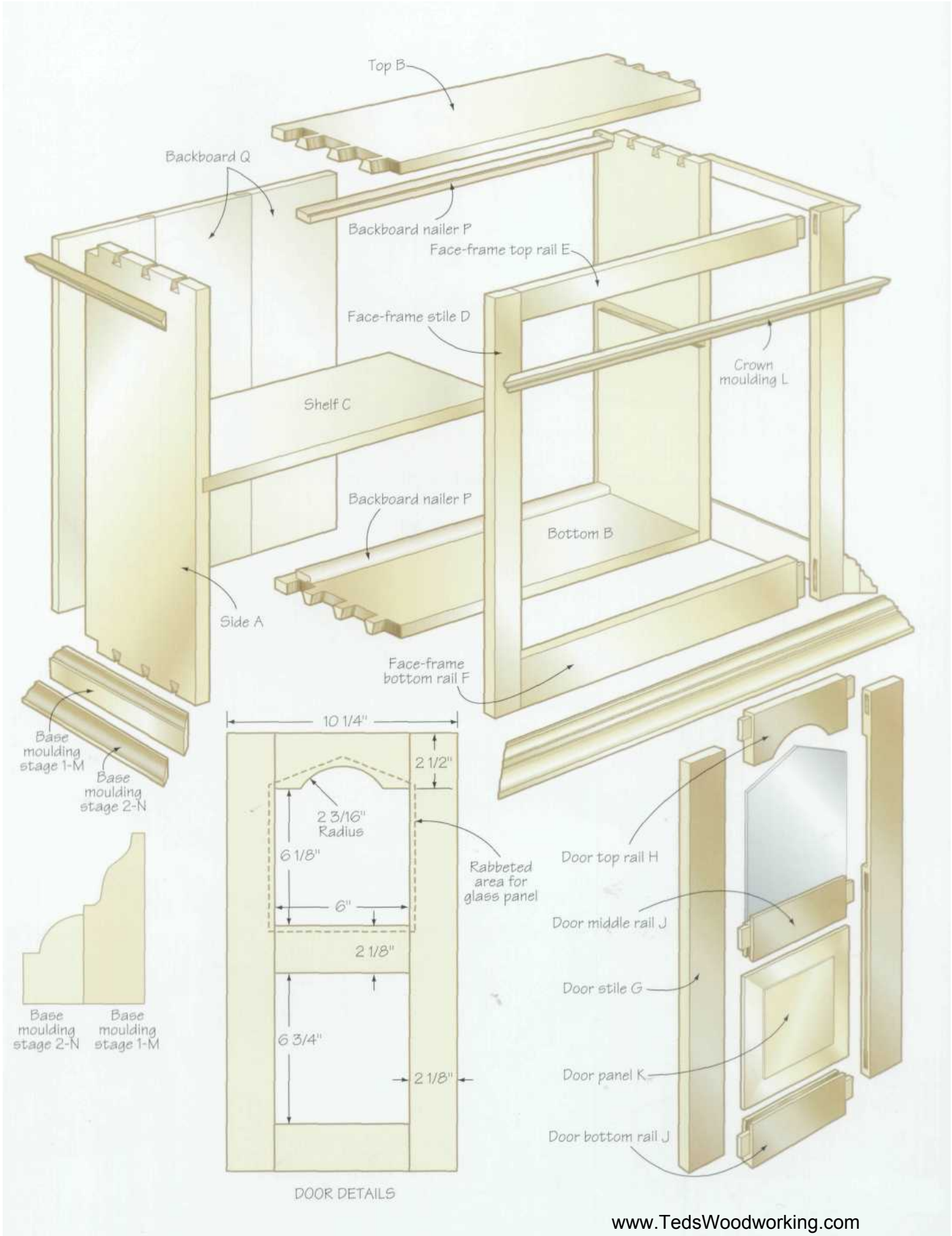


t i p When setting up to cut the glass door grid pieces, I find it helpful to use a new scrap fence with my miter gauge. The piece acts as a backer and the new cut helps to line up your cut.

18TH-CENTURY HANGING CUPBOARD



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DOOR DETAILS

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18TH-CENTURY HANGING CUPBOARD

inches (millimeters)

REFERENCE	QUANTITY	PART	STOCK	THICKNESS	(mm)	WIDTH	(mm)	LENGTH	(mm)	COMMENTS
A	2	sides	walnut	3/4	(19)	9 1/4	(235)	24	(610)	
B	2	top and bottom	walnut	3/4	(19)	9 1/4	(235)	24 1/2	(623)	
C	1	shelf	walnut	3/4	(19)	8 1/2	(216)	23 1/2	(597)	
D	2	face-frame stiles	walnut	3/4	(19)	2	(51)	24	(610)	
E	1	face-frame top rail	walnut	3/4	(19)	1 5/8	(41)	22 1/2	(572)	1" (25) TBE
F	1	face-frame bottom rail	walnut	3/4	(19)	2 3/4	(70)	22 1/2	(572)	1" (25) TBE
doors										
G	4	stiles	walnut	3/4	(19)	2 1/8	(54)	19 5/8	(499)	
H	2	top rails	walnut	3/4	(19)	2 1/2	(64)	8 1/2	(216)	1 1/4" (32) TBE
J	4	middle and bottom rails	walnut	3/4	(19)	2 1/8	(54)	8 1/2	(216)	1 1/4" (32) TBE
K	2	panels	walnut	5/8	(16)	5 5/8	(143)	7 3/8	(188)	5/16" (8) TAS
mouldings										
L		crown moulding	walnut	3/4	(19)	3/4	(19)	5 lf	(1524)	
M		base moulding, stage 1	walnut	5/8	(16)	1 3/4	(45)	5 lf	(1524)	
N		base moulding, stage 2	walnut	5/8	(16)	1	(25)	5 lf	(1524)	
P	2	backboard nailers	poplar	5/8	(16)	1 3/4	(45)	22 7/8	(581)	
Q	1	backboard	walnut	7/16	(11)	22 1/2	(572)	23 7/8	(606)	made from various pieces
R	1	door catch	walnut	1/2	(13)	3/4	(19)	3	(76)	
S	1	lock catch	walnut	1/4	(6)	3/4	(19)	2	(51)	

Note: TBE = tenon both ends; TAS = tenon all sides.

hardware

2 pairs	2" × 2" (51mm × 51mm) Wrought-iron butterfly hinges	item #HF-12	Horton Brasses
1	Brass half-mortise cabinet lock	item #LK-9	Horton Brasses
	1 1/2" (38mm) Clout or shingle nails	item #N-7	Horton Brasses
2 pieces	Full-restoration glass, cut to fit		Bendheim
	1/4" (6mm) Square pegs, red oak		
	Button lac shellac		
	Behlen Wool-Lube		
	Olde Century Colors acrylic latex in Brierwood Green		
	Paste wax		
	Glue		
	#0000 Steel wool		

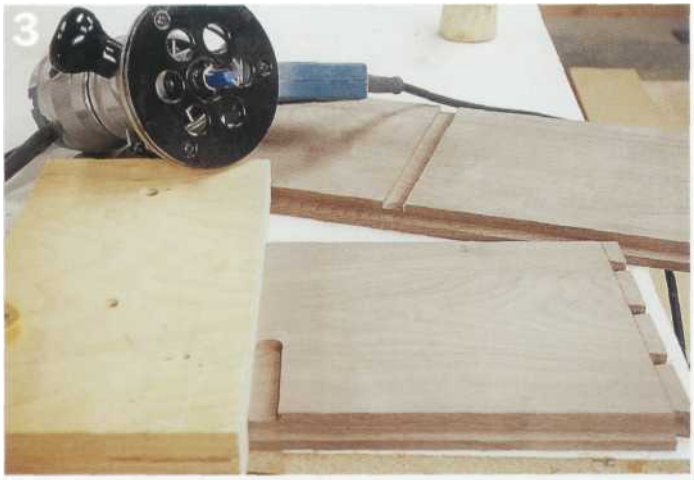


Step 1 Cut the sides, top and bottom to size according to the materials list. Then create the pins of the dovetail joint on the top and bottom pieces.



Step 2 Cut the corresponding tails into the side pieces.

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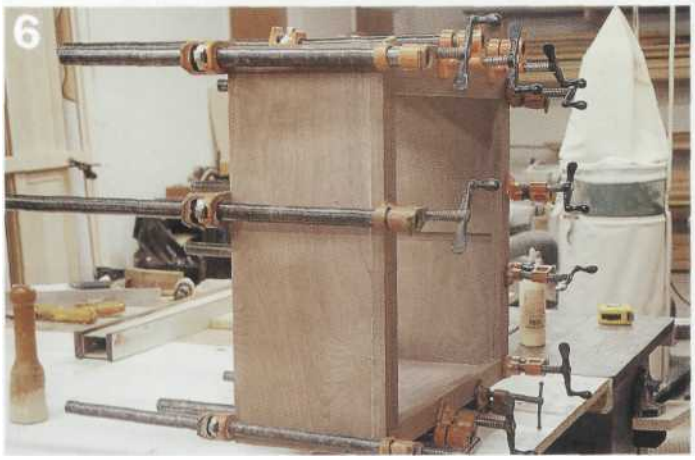
Step 3 With the dovetails complete, cut the 1/2" x 1/2" rabbet for the backboards, then locate and create the 3/4" dado for the shelf. Assemble the dovetailed box.

step 4 Mill the parts for the face frame and create the mortise-and-tenon joinery to assemble the frame.

step 5 Assemble the face frame, checking to assure that it is square.







step 6 Using glue and plenty of clamps, attach the face-frame assembly to the dovetailed box.

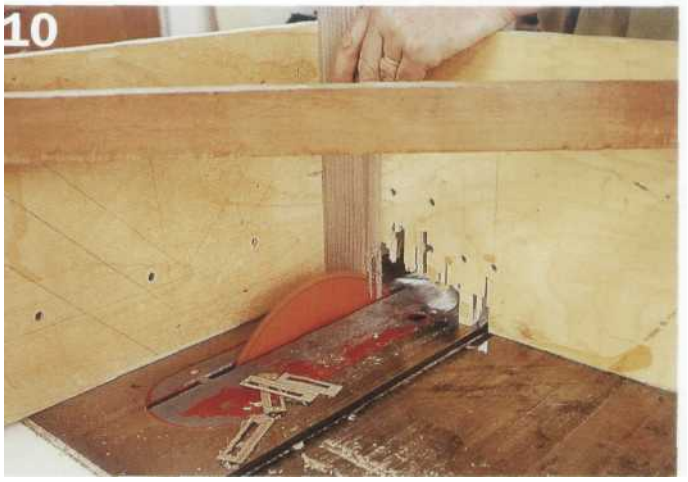


step 7 Slide the shelf into place and use 1/4" square pegs to affix the shelf. I use red oak for the pegs.

step 8 Next, cut the door pieces according to the materials list, lay out the radius on the top rail and create the tombstone effect. Use a 3/16" roundover bit on the inside edge of all pieces, making sure to run both edges on the middle rail of each door.



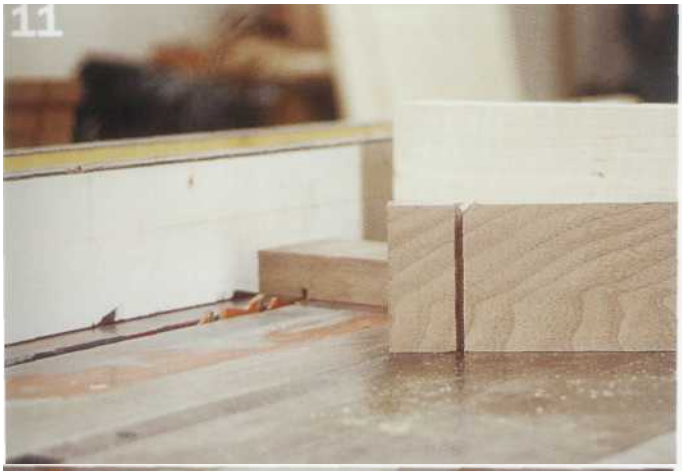


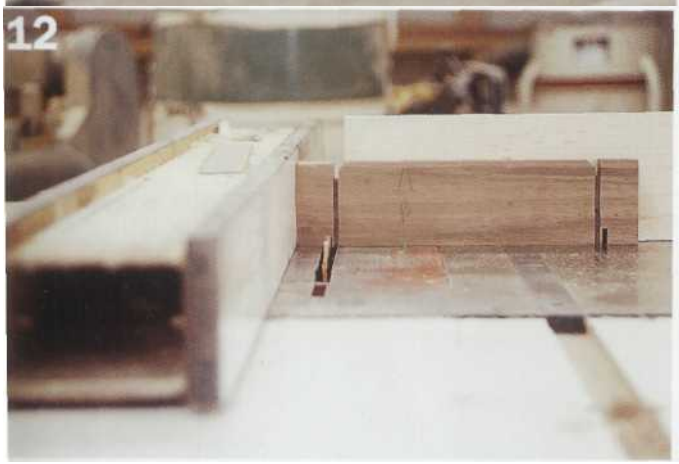


Step 9 Lay out the location of the rails on all the door stiles, then cut the mortises as seen on the pieces. Set the saw blade to 45° and cut just to the shoulder of the roundover. There is one cut for each top and bottom rail, and two cuts for the middle rail. The area for the middle rail must be nibbled away and cleaned up with a chisel.

step 10 Use a tenoning jig to remove the waste material where the top and bottom rails meet the stiles.

step 11 Create the same 45° cut in each rail at the required location, then reset the blade to 90° and complete the cul that defines the cheeks.







Step 12 Next, adjust the lade height to 3/8" and make the cut that defines the shoul-ders, remembering that this is a haunched tenon (offset the tenon by 3/8").

Step 13 Return to the tenoning jig to complete the cuts for the tenon.

step 14 With all the mortises and tenons finished, set the blade to cut a 1/4"-wide by 3/8"-deep groove on the inside of all pieces and both sides of the middle rail.



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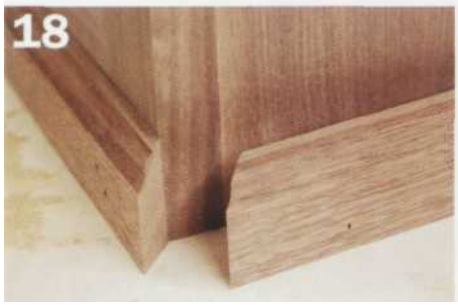




Step 15 Dry fit the door pieces and make any adjustments necessary. Take the measurement for the panels and cut to size, adding the 5/16" on all sides. Moving the fence to the left side of the blade, set the blade angle to 12° and make the cut that creates the raised-panel effect. Here you can see that I have raised the blade through a scrap of plywood for safety. The lower edge has to be able to fit into the 1/4" groove created in the stiles and rails, and not fall into the saw insert throat.

step 16 Glue the door parts and allow to dry. When dry, mark a 3/8" line (shown here in white) to denote the area for the glass. With a straightedge and ½" pattern bit in the router, remove the waste material.

step 17 This is how the glass area should look when complete.





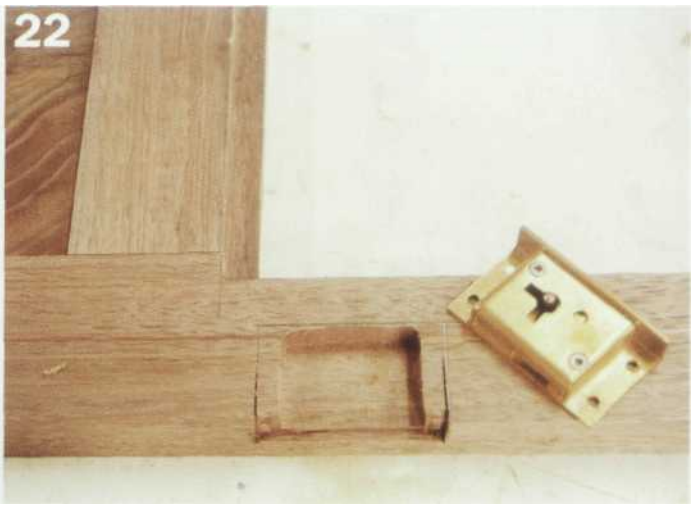


step 18 Mill the pieces that are to become the case mouldings. The stage 1 moulding for the base is routed with a Roman ogee bit. Cut the miters and nail the pieces to the case.

step 19 Using a 1/2" roundover bit to form the edge of the stage 2 base moulding, create the piece and nail it to the stage 1 moulding to complete the base moulding.

step 20 The crown is made with a classical ogee bit and sim-ply nailed to the top edge of the case. It's easier to attach the crown when the case is turned upside down on your work surface.







Step 21 The backboard nailers are glued and nailed to the top and bottom of the case. Here you can see a groove cut into the bottom of the nailers to eliminate any glue squeeze-out.

step 22 Install the lock into your operable door, then fit the doors into place and install the hinges, making sure to allow equal spacing around the doors.

step 23 Using the biscuil joiner, make a groove in the bottom edge of the shell, just behind the stile and 1/4" from the shell front, to accept the door catch. Next, mark the location of the lock strike and create that catch. It is also possible to purchase an angled strike plate from the lock supplier to eliminate this procedure.

step 24 Cut the stock for the backboards and mill the halt-lap joinery for the pieces.





step 25 Remove all hardware and mark each hinge location. t*he* piece is ready to finish. This cupboard is finished with Eve coats of button lac shellac that is sanded after three coats. After the two additional coats are applied and dry, it is hand rubbed with #0000 steel wool and Behlen Wool-Lube, which aids in smoothing the surface. The interior is painted with two coals of Olde Century Colors acrylic latex in Brierwood Green. Next, nail the backboards into place.



step 26 Install the glass into the doors. Reinstall the hinges into the exact same locations, reinstall the lock and apply a coat of paste wax. Your hanging cupboard is now complete.

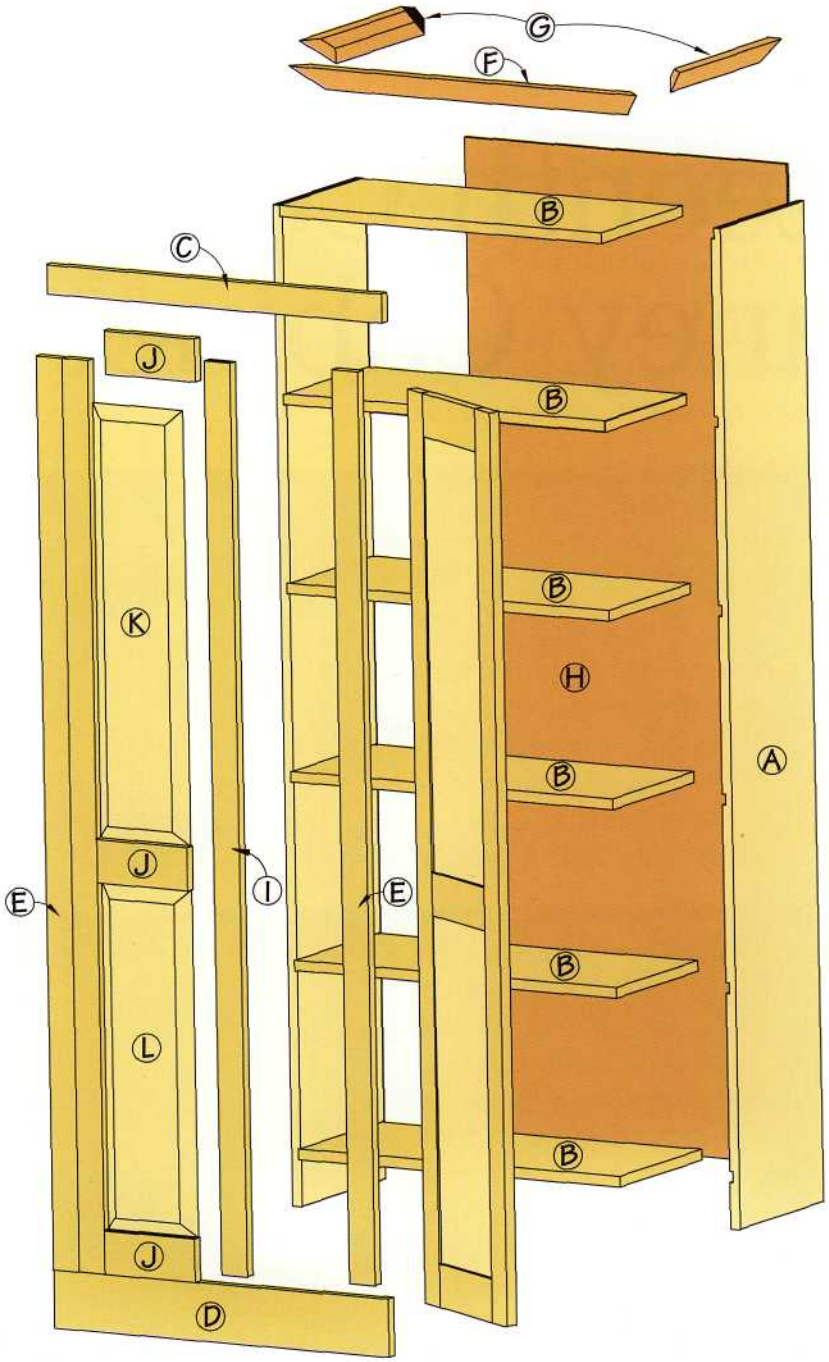
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Eighteenth-Century Chimney Cabinet



these pieces were made to fit nicely beside a fireplace mantle. Some were little more than 12" wide while some were a couple of feet or more.

Today they make great conversation pieces, interesting projects and they sell well. This version is a copy of one made around the turn of the nineteenth century.



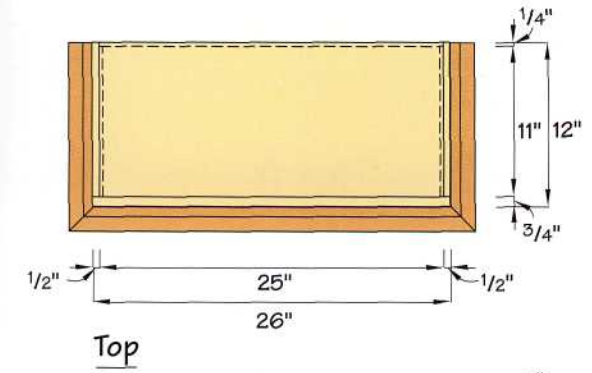
MATERIALS LIST

Chimney Cabinet

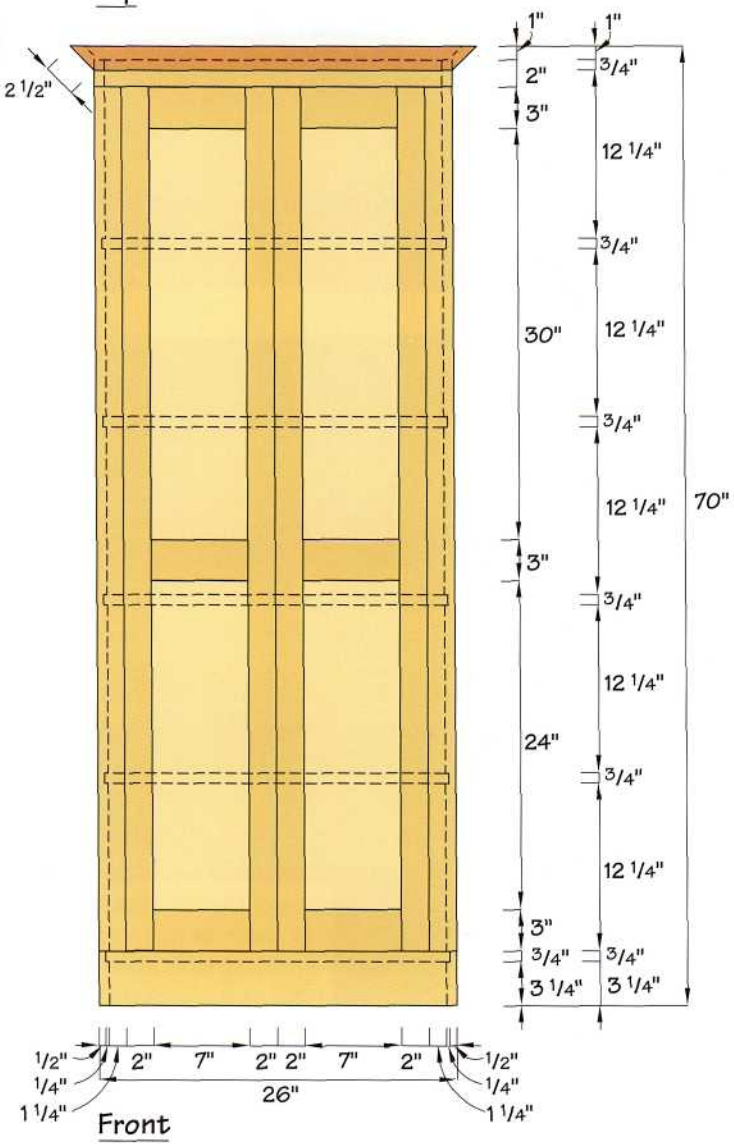
No.	*Letter*	*Item*	*Dimensions T W L*
2	A	Sides	¾″×11¼″×69″
6	B	Shelves, Bottom and Top	¾″×11¼″×23″
1	C	Trim Top	¾″×2″×24″
1	D	Trim Bottom	¾″×4″×24″
2	E	Trim Uprights	¾″×2″×63″
1	F	*Crown	¾″×2½″×27″
2	G	*Crown	¾″×2½″×14″
2	H	Back	¼″×24″×69″
4	I	Door Stiles	¾″×2″×69″
6	J	Door Rails	¾″×3″×7″
2	K	Door Panels	¾″×7½″×30½″
2	L	Door Panels	¾″×7½″×24½″

*allows for trimming

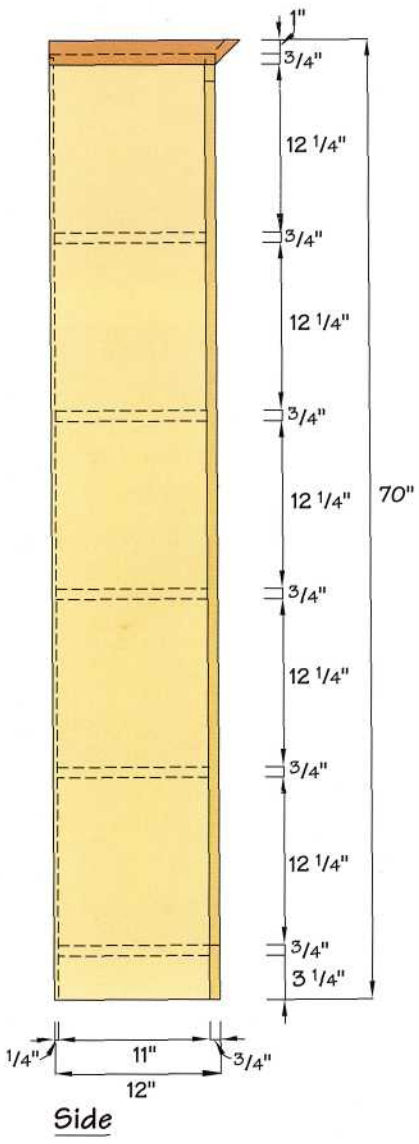
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Top



Front



Side

CONSTRUCTION OUTLINE

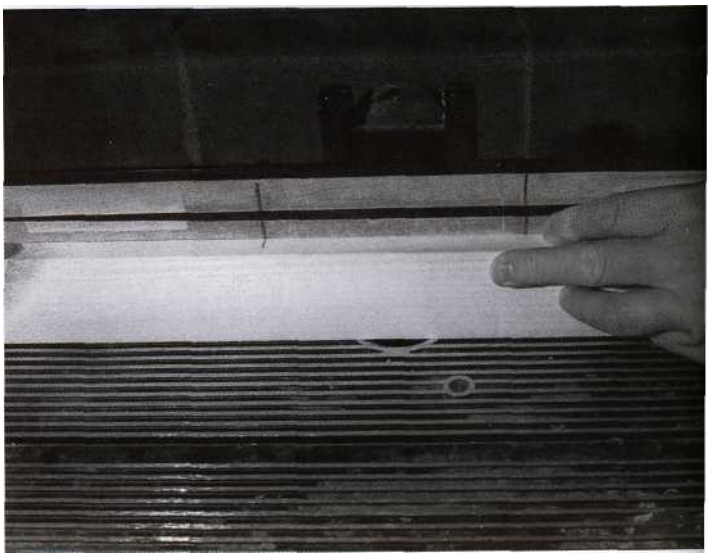
This is a simple project. With the exception of the raised-panel doors, construction is quite straightforward and shouldn't take more than a couple of weekends.

The sides are made from single pieces of stock, dadoed to take the six shelves, including top and bottom.



When making the doors, you can fasten the rails and stiles together with lap joints or biscuits. As you can see, I prefer to use biscuits. It's quick, simple and strong.

These can be set equidistant apart, or you can vary them to allow room to store larger objects at the bottom and smaller ones at the top. The trim can be fastened to the carcass with glue and nails or with biscuits and glue. The crown is constructed from three pieces of stock, the edges beveled to 45°, the ends mitered then glued and screwed to the top. The back is made from a single piece of lauan plywood, but you could go the distance and use 1/2" tongue-and-grooved boards, as you would likely find on an original piece. The two doors are constructed with raised panels and secured to the carcass with reproduction "H" hinges, stripped and aged for authenticity. For the finish I chose dark blue paint over white and a dark stain.



To mill the grooves in the edges of the rails and stiles that will house the door panels, you can use your router table and a 5/16" bit, or your table saw. I run a piece of table along the top of the back fence and, to ensure the groove is consistently in the proper place, mark the start and stop points as you see here.

BUILDING THE CABINET

STEP 1. Cut all the pieces to size.

STEP 2. Mill the dadoes to the two sides as laid out in the drawing.

STEP 3. Sand both faces of the sides smooth and apply your chosen stain—it's much easier to do this now than when assembly is complete.

STEP 4. Sand both surfaces of all four shelves, bottom and top, and then apply your stain.

STEP 5. Using glue, clamps and toenails, assemble the carcass. Check the diagonals to make sure the structure is square, then set it aside until the glue is fully cured.

STEP 6. Sand the trim smooth and apply stain.

STEP 7. Once the clamps are removed, lay the carcass on its back, set the trim in place and mark for biscuit slots. It's best if you allow 8" or 9" between biscuits.

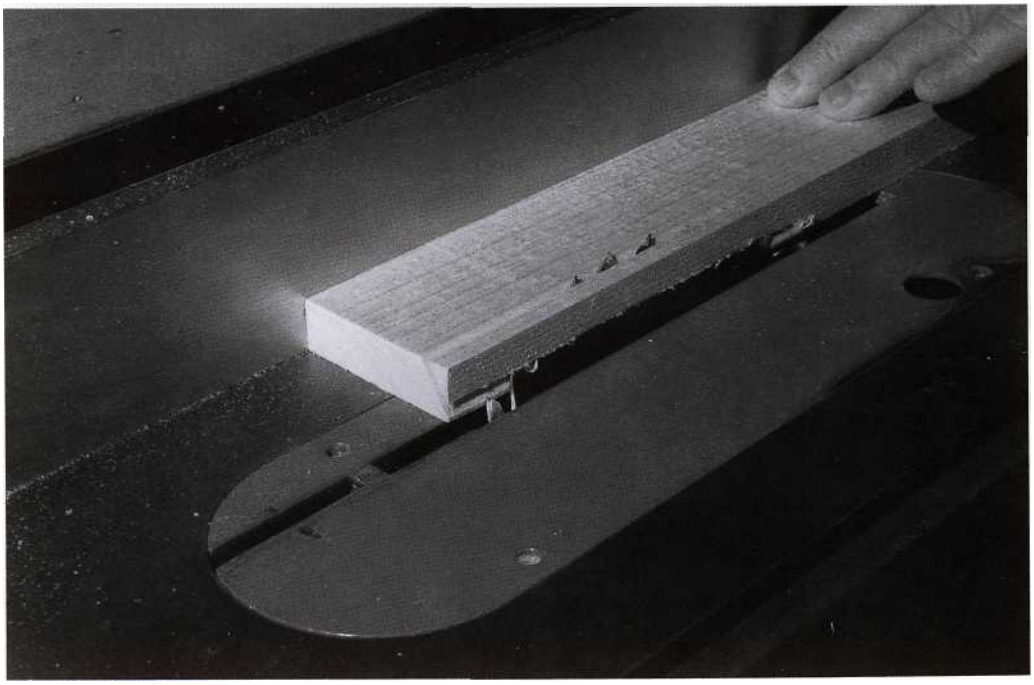
STEP 8. Mill the biscuit slots.

STEP 9. Glue and clamp the trim in place and set the structure aside until the glue is fully cured.



The door panels are quite small and easily handled on the table saw. Set the angle of the blade to between 15° and 17°, and then set the depth of cut so that the tip of the blade just breaks through the surface of the panel.

To make the crown, trim the edges of all three pieces of stock to 45°. Do this so that both angles are on the same side so that, when you look at the end grain, you see a triangle with a flat top.



STEP 10. Use either your router with a 5/16" straight-cutting bit or your table saw to mill 3/8"-deep grooves to the inner edges of the rails and stiles that will make up the doors.

STEP 11. Lay out the rails and stiles and mark for biscuit slots. You can use lap joints if you like, but you'll need to adjust the length of the rails to maintain the outer dimensions of the doors.

STEP 12. Mill the biscuit slots.

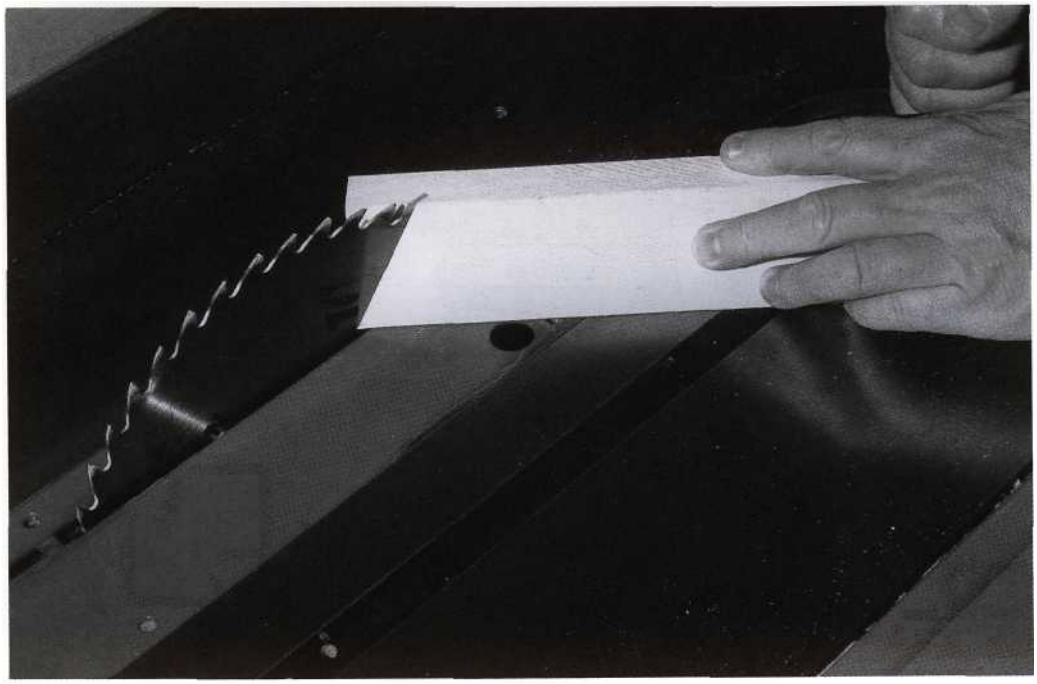
STEP 13. Dry fit the rails and stiles and measure the width and height between the grooves to ensure the panels will fit properly.

STEP 14. If necessary, trim the panels to size.

STEP 15. Sand the rails and stiles smooth and apply your stain.

STEP 16. Glue and clamp the rails and stiles, *one side only,* dry fit the other and set them aside until the glue is fully cured.

STEP 17. Set your table saw to cut at an angle of 17°, the



To form the miters on the ends of the crown, set the miter gauge to 45°, place one of the mitered edges against the face of the miter gauge and the other down on the saw table, and then gently make the cut.

rip fence at 1/4", and mill the bevels to the edges of the panels.

STEP 18. Sand the panels smooth, paying close attention to the bevels, then apply the stain.

STEP 19. When the glue is fully cured, remove the clamps from the frames and remove the dry-fitted stiles.

STEP 20. Slide the panels into place in the now-open frames, glue and clamp the remaining stiles in place, and set the completed doors aside to allow the glue to fully cure.

STEP 21. Use a beading bit in your router table to detail the edges of the three pieces of stock that will make the crown, then cut the miters.

STEP 22. Set the crown in place on the carcass, check for size, make any necessary adjustments then glue and screw the pieces in place.

STEP 23. Set the doors in place and make any necessary adjustments for a good fit.

STEP 24. You've now reached the point where you'll need to complete the finishing process (see right).

STEP 25. When finishing is complete, set the doors in place and attach the hinges and knobs; the project is complete.

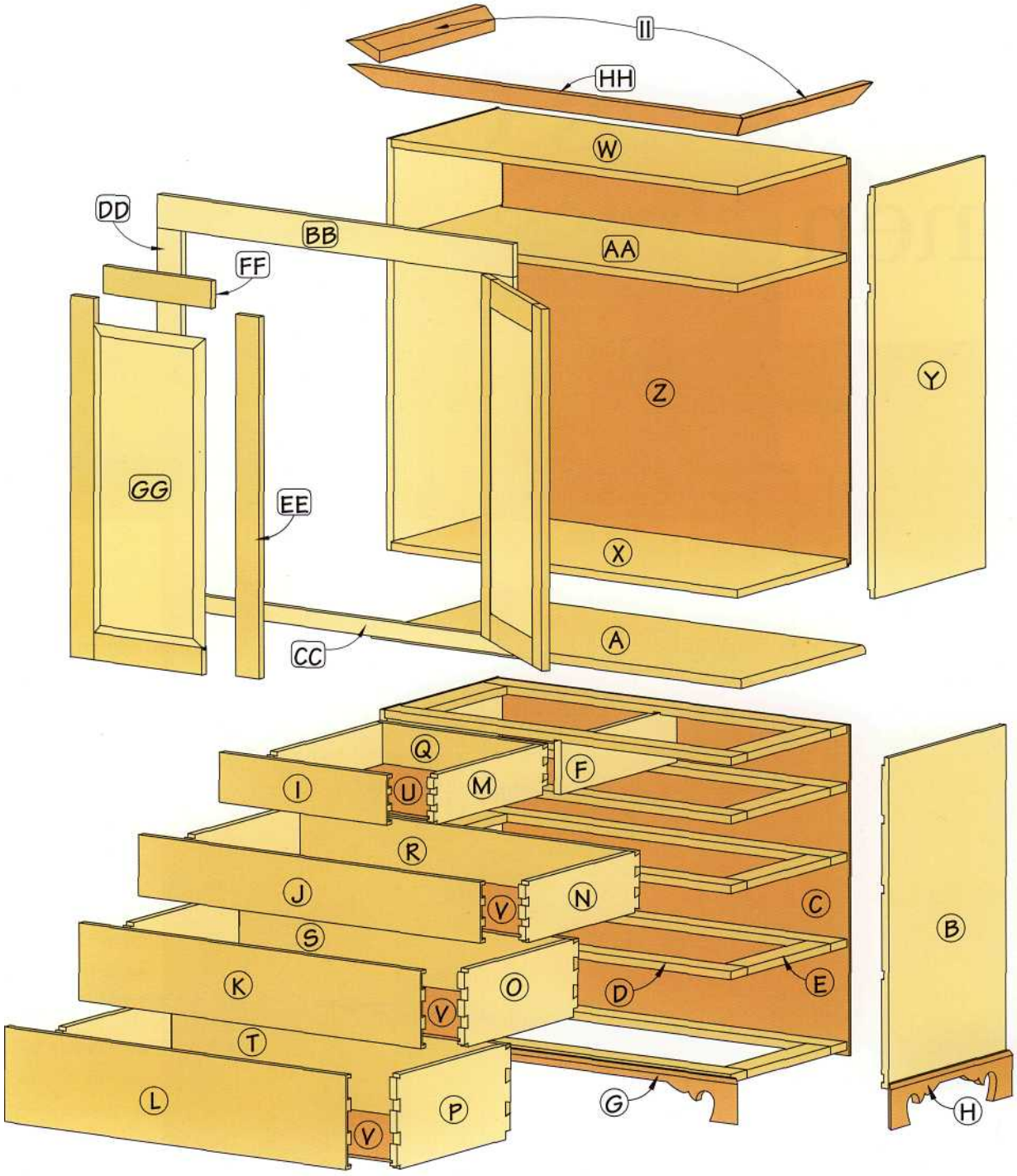
FINISHING

If you've done your staining as you worked your way through the project, all that now remains to complete the finish is to do some light distressing around the trim, the corners and edges of the doors, a little final sanding with a fine-grit paper and then add the paint. The choice between colors, one over the other, is a personal one; I used dark blue over white. Finally, to complete the illusion, you'll need to apply some sort of antiquing glaze. I recommend you use the polyurethane-pigment combination described in chapter three.

Bachelor's Chest/ linen Press



This bachelor's chest was a prized piece of furniture during the eighteenth century and has remained so. The design, a linen press over a chest of drawers, is English and was imported to America more than 200 years ago. It's a large, functional and attractive piece. The one I have chosen is a copy of one made in Connecticut circa 1830. You can make it with three shelves in the press section, or you can leave two



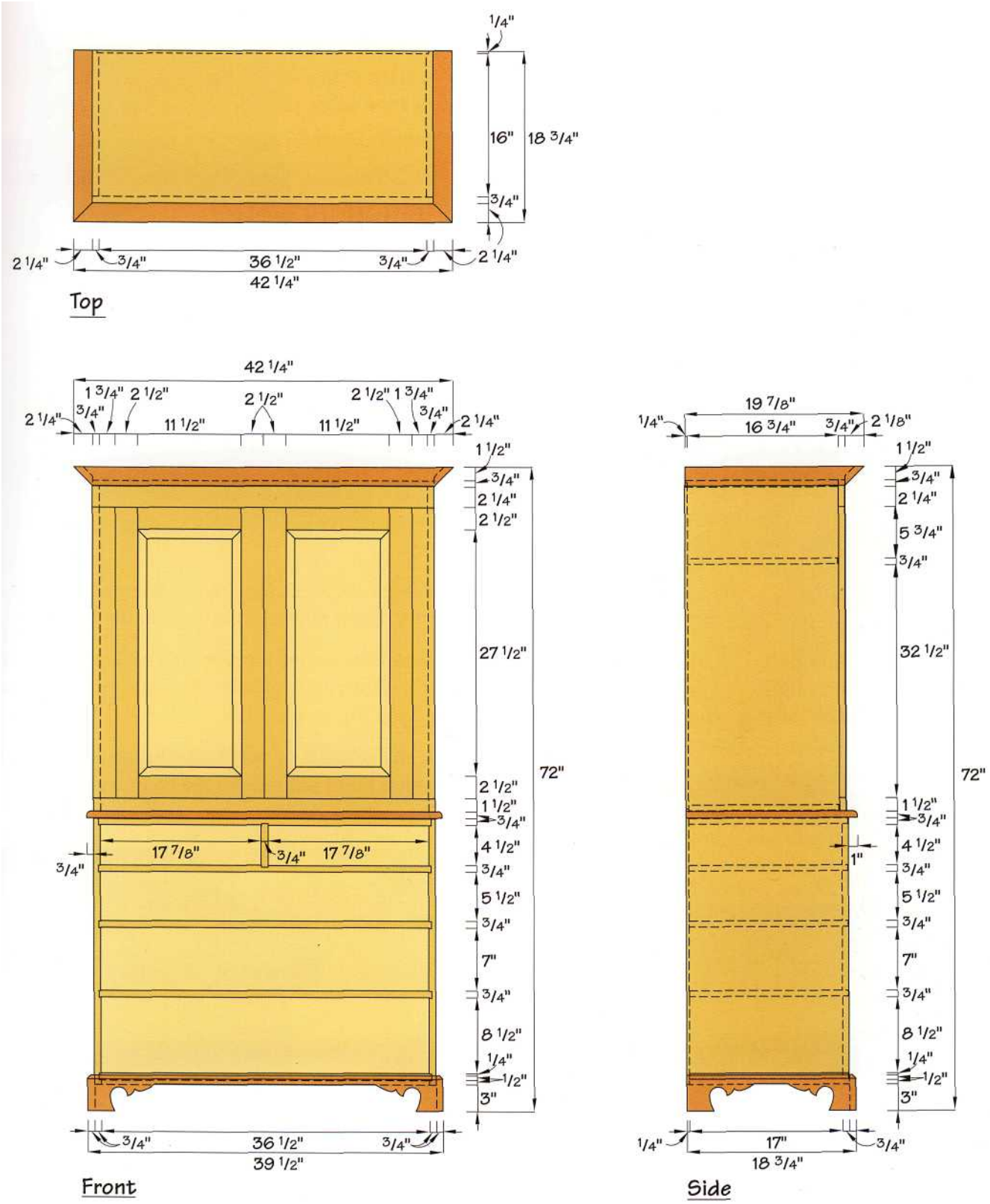
of them out and use the piece as an entertainment center; the top shelf will nicely accommodate a VCR and the large opening a 19" television.

CONSTRUCTION OUTLINE

The piece is made in two parts, and for the sake of mobility and convenience, the parts should remain separate, the upper section freestanding on the lower section. For such a seemingly complicated piece, construction is relatively simple with a couple of exceptions.

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The original was made from walnut. I don't think pine was ever used. Still, there's no reason why it shouldn't be used. I decided to use furniture grade throughout.



It's stable, predictable, easy to work and takes stain well. The upper section, the press, is no more than a cupboard with a single shelf (three, if you decide not to make it as an entertainment center). The shelves are dadoed into its sides; the top and bottom are rabbeted into the sides; the plywood back is also set into rabbets. The trim is fastened to the front with biscuits and glue, and the crown is fastened to the top with glue and screws. The hardware consists of reproduction brass knobs and "H" hinges.

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MATERIALS LIST

Bachelors Chest

No.	Letter	Item	Dimensions T W L
Drawer Section			
1	A	Top	¾″ × 19″ × 39½″
2	B	Case Sides	¾″ × 18″ × 29¾″
1	C	Case Back	¼″ × 29¾″ × 37½″
10	D	Web Parts	¾″ × 2½″ × 37″
10	E	Web Parts	¾″ × 4″ × 12¾″
1	F	Drawer Partition	¾″ × 4½″ × 17¾″
1	G	*Foot	¾″ × 4″ × 42″
2	H	*Feet	¾″ × 4″ × 22″
2	I	Drawer Fronts	¾″ × 4½″ × 17⅝″
1	J	Drawer Front	¾″ × 5½″ × 36½″
1	K	Drawer Front	¾″ × 7″ × 36½″
1	L	Drawer Front	¾″ × 8½″ × 36½″
4	M	Drawer Sides	¾″ × 4½″ × 17½″
2	N	Drawer Sides	¾″ × 5½″ × 17½″
2	O	Drawer Sides	¾″ × 7″ × 17½″
2	P	Drawer Sides	¾″ × 8½″ × 17½″
2	Q	Drawer Backs	¾″ × 4″ × 17⅝″
1	R	Drawer Back	¾″ × 5″ × 17⅝″
1	S	Drawer Back	¾″ × 6½″ × 17⅝″
1	T	Drawer Back	¾″ × 8″ × 17⅝″
2	U	Drawer Bottoms	¾″ × 16⅝″ × 17½″
3	V	Drawer Bottoms	¾″ × 35½″ × 17½″
Press Section			
1	W	Top	¾″ × 17″ × 37″
1	X	Bottom	¾″ × 17″ × 37″
2	Y	Sides	¾″ × 17″ × 37″
1	Z	Back	¼″ × 37½″ × 36½″
1	AA	Shelf	¾″ × 16½″ × 37″
1	BB	Trim	¾″ × 3″ × 38″
1	CC	Trim	¾″ × 1½″ × 38″
2	DD	Trim	¾″ × 2½″ × 32½″
4	EE	Door Stiles	¾″ × 2½″ × 32½″
4	FF	Door Rails	¾″ × 3″ × 11½″
2	GG	Door Panels	¾″ × 12″ × 28″
1	HH	*Crown	¾″ × 3″ × 43″
2	II	*Crown	¾″ × 3″ × 20″

*Extra length added for cutting

The bottom section is no more than a simple chest of drawers with web frames dadoed into the sides. The top is a board constructed from several smaller pieces of stock; the grains are alternated for stability. The feet are cut from single pieces of stock. The drawers are constructed using half-blind and through dovetails.

BUILDING THE DRAWER SECTION

STEP 1. Cut all the pieces to size and run the edges through the jointer.

STEP 2. Build the boards that will make the sides, top and bottom.

STEP 3. Build the four web frames as laid out in the drawing—you can use biscuits, as I did, or lap joints. Note the offsets, and also the frame, which has an extra stretcher to carry the separator that will support the drawers.

STEP 4. Mark the sides for stopped dadoes and top and bottom stopped rabbets as laid out in the drawing.

STEP 5. Mill the stopped dadoes and rabbets. I used my router, a 3/4" mortising bit and a T-square jig as described in the Shop.

STEP 6. Mill 1/4"-deep rabbets to the inside back edges of both sides; these will receive the plywood back.



When sanding the butt joints on the side section, or any butt joints, use your belt sander and work first across the joint and grain in a diagonal direction, and then finish with the belt sander by working the machine along the direction of the grain.

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Finish sanding with your random orbital sander, making sure to remove all the tool and belt marks, especially on the knots.

STEP 7. Glue, clamp and toenail the webs and bottom board to the sides; make sure everything is square, and then set the structure aside until the glue is fully cured.

STEP 8. Glue and screw the drawer separator in place between the top and the top web frame as laid out in the drawing.

STEP 9. Set the top board in place on the top web frame and fasten it in place using ten no. 6 X 1 5/8" screws: four at the back and front, and one at each end.

STEP 10. Use the scale pattern to mark the feet details.

STEP 11. Cut the miters to each end of the four pieces of stock that will make the feet.

STEP 12. Use either your band saw or jigsaw to cut out the feet.

STEP 13. From the inside, glue and screw the feet to the bottom of the carcass, making sure they are level and true.

STEP 14. Make sure all the pieces for all five drawers are exactly the right size, then using half-blind and through dovetail joints, build the drawers. You can see how in the Shop Tip.

BUILDING THE PRESS SECTION

STEP 15. Build the boards that will make the sides, shelf (or shelves), top and bottom.

STEP 16. Mark the sides for dadoes and top and bottom rabbets as laid out in the drawing.

STEP 17. Mill the dadoes and rabbets.

STEP 18. Mill 1/4"-deep rabbets to the inside back edges of both sides to receive the plywood back.

STEP 19. Glue, clamp and toenail the shelf (or shelves), top and bottom to the sides; make sure everything is square, then set the structure aside until the glue is fully cured.

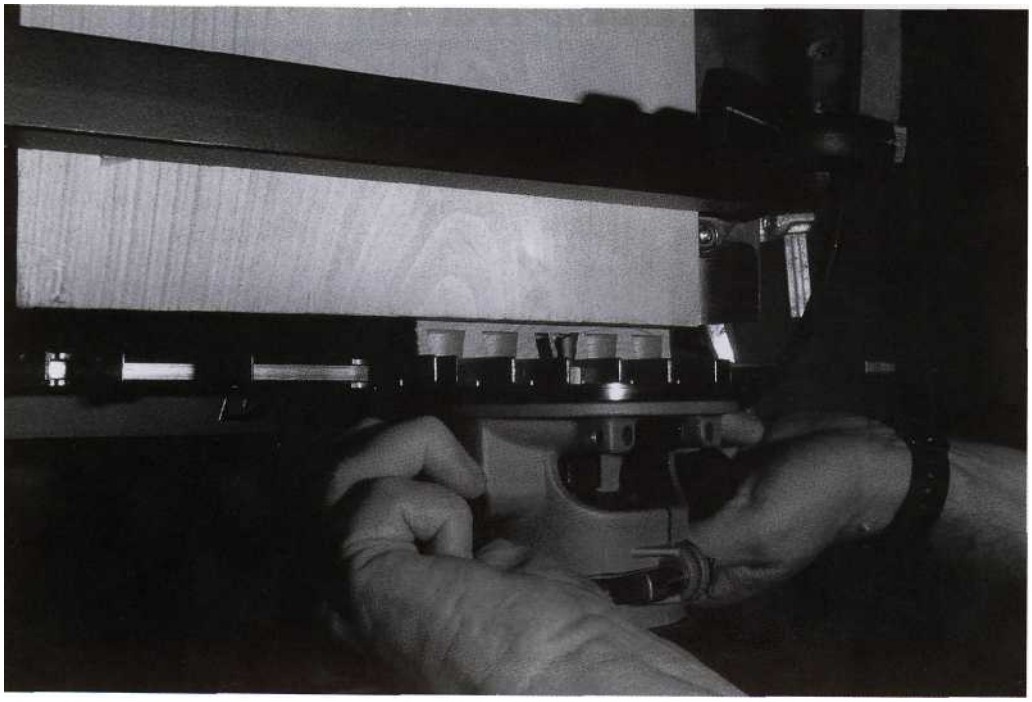
STEP 20. Lay the carcass flat on its back on the bench, put the trim in place and mark for biscuit slots. If you don't use biscuits you can glue, clamp and nail the pieces in place.

STEP 21. Remove the trim and mill the biscuit slots.



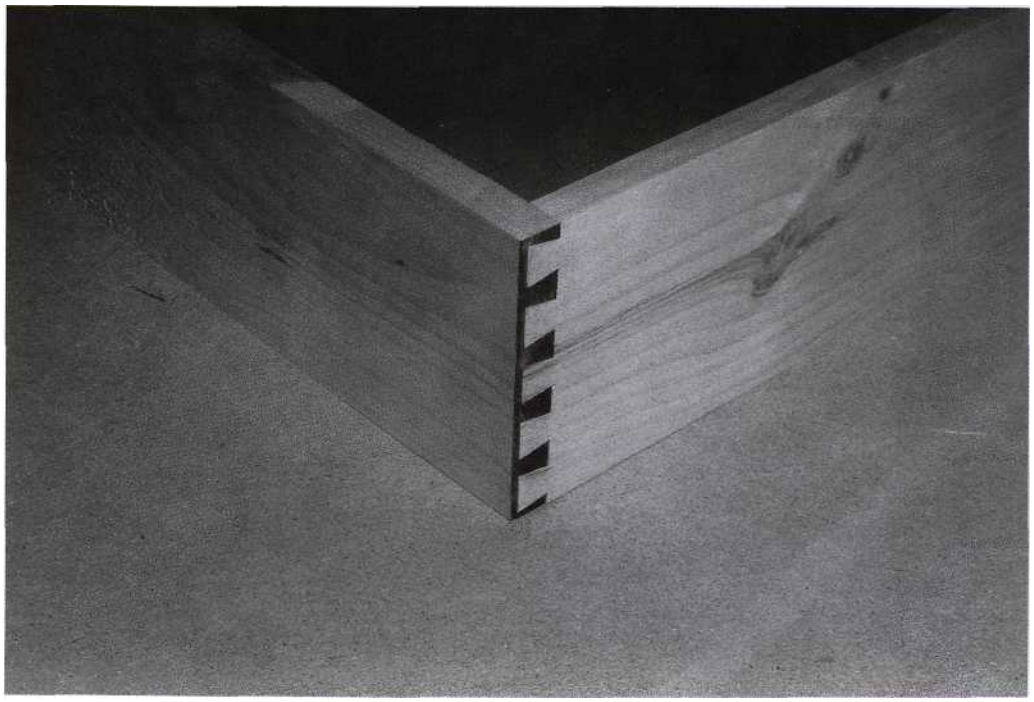
Use your table saw or router table to mill the grooving along the front and sides of the drawer sections.

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Milling blind dovetail joints is a simple job if you have a dovetail jig. It just takes attention to detail and an effort to make sure the stock is properly placed in the jig, touching all the stops and fingers. Just a small deviation will produce a sloppy joint.

There's nothing quite so satisfying as the perfectly finished joint.



STEP 22. Glue and clamp the trim in place. If you've used nails, now's the time to set the heads and fill the holes.

STEP 23. Build the two doors as laid out in the drawing and the Shop Tip.

STEP 24. Set your table saw to cut at an angle of 45° and a depth of 1 1/4" and cut the bevels to the three pieces of stock that will make the lower section of the crown.

STEP 25. Cut the miters to the ends of the crown.

STEP 26. Use a 1/2" roundover bit in your router to round the front edges of the three pieces that will make the upper section of the crown.

STEP 27. Glue the miters, set the upper section of the crown in place and secure to the top of the carcass using nine no. 6 X 1 5/8" screws: four along the front and three at each end.

STEP 28. Apply glue to the edges and miters of the three pieces of the lower section of the crown, set them in

place, then secure them with a couple of brads.

STEP 29. Use small brads to attach the plywood back to the back of the unit.

STEP 30. Apply a coat of stain to both sections, chest and press, then move on to the finishing process.

STEP 31. After finishing is complete you can attach the knobs to the doors, the pulls to the drawers, and then fit the doors to the cupboard section using reproduction hinges.

FINISHING

How to finish a nice piece such as this is a tough decision. I decided to keep things relatively simple. Thinking that it would be used in a bedroom and therefore would not be subject to heavy traffic and wear and tear, I decided to go with a little light distressing—just a ding or two, here and there—a very dark stain (I used Jacobean by Minwax) and a couple of coats of shellac. Finally, I finished the process with a couple of coats of beeswax buffed to a shine.

SHOP TIP

Cutting Dados With a Router



You can cut dados a number of ways: on the table saw, on a radial arm saw, or you can do as I do and use your router.

Over the years, I've found the router to be the best, most reliable and most convenient way to cut dados. You'll find it very convenient not having to break down your table saw or radial arm to fit the stacked dodo head. You'll also find the finished product is much better. The bottom of a dado cut with a router is dead square and flat, and the two sections will fit tightly and squarely together, making final squaring of the piece extremely simple.

To mill dados with a router, you'll need a couple things. First, obviously, you'll need an appropriate bit: ¾″ × 1″ if you're using standard stock—one with carbide tips works best.

Next, you'll need a jig. I use a simple, home-made T square. Make the T long enough so the router will pass through it the first time you use it. This makes setting the square for future cuts extremely simple.

Finally, you'll need a clamp to hold the square in place while you make the cut. I love the little, quick-release clamp you see in the photo. It's made by Bessy, and makes setting and re-setting the square quick and easy.

Finally, set the depth of cut on your router to ¼″, or whatever depth you prefer, clamp the square in place and make the cut.

I've cut thousands upon thousands of dados, in stock of widths from 3″ or 4″ to as much as 3′ or even more, always with the very best results. I wouldn't even consider doing it any other way. Once you get used to it, it's very quick and easy to do.

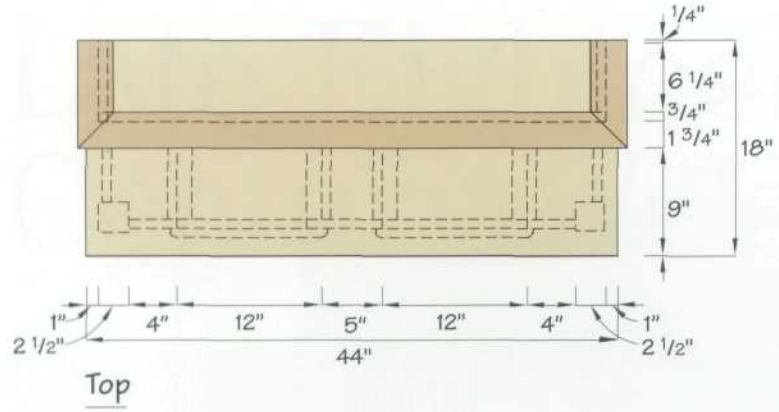
Late Eighteenth-Century Welsh Dresser



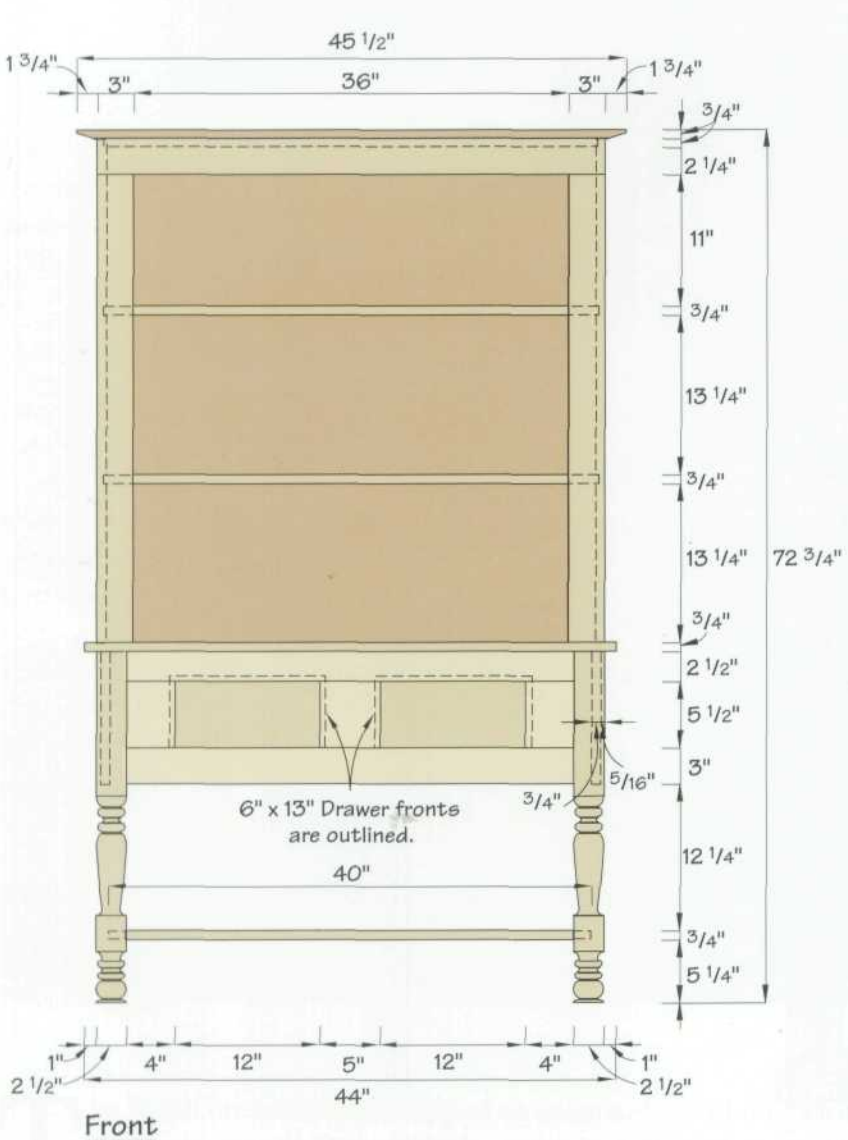
The Welsh dresser is something of an enigma. There seems to be little restriction as to size and form of this traditional piece. I've seen huge examples. One, I recall, in the Childswickham Arms, one of the oldest pubs in England, is some eight feet wide and seven feet tall, with shelves stacked with antique pewter plates, pots and jugs. Another, imported into the United States from England, for sale in an antique



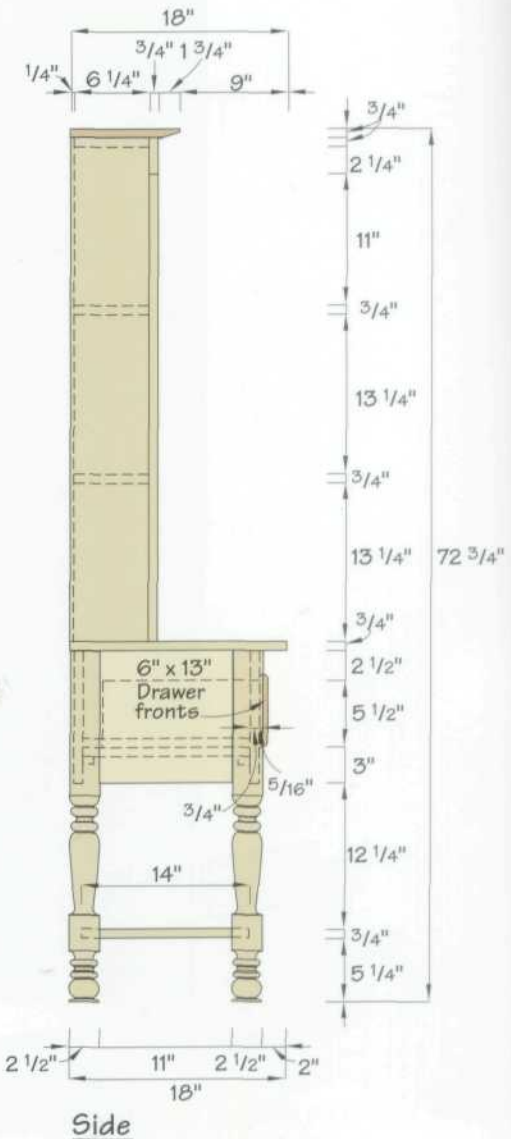
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Top



Front



Side

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MATERIALS LIST

Welsh Dresser

No.	*Letter*	*Item*	*Dimensions T W L*
4	A	Legs	2 ½″×2½″×29¼″
1	B	*Front	¾″×2½″×39″
1	C	*Front	¾″×3″×39″
1	D	Front	¾″×5½″×5″
2	E	Fronts	¾″×5½″×4″
1	F	*Lower Back	¾″×11″×39″
2	G	Lower Sides	¾″×11″×13″
1	H	Work Top	¾″×18″×48″
1	I	**Shelf	¾″×14″×40″
4	J	Cleats	¾″×1″×37″
2	K	Cleats	¾″×1″×10¾″
4	L	Drawer Guides	¾″×2″×13⅞″
4	M	Drawer Guides	¾″×1″×13⅞″
2	N	Drawer False Front	¾″×6″×13″
4	O	Drawer Sides	¾″×5⅜″×13″
2	P	Drawer Backs	¾″×4⅞″×10½″
2	Q	Drawer Fronts	¾″×5⅜″×12″
2	R	Drawer Bottoms	¾″×11″×12½″
2	S	Upper Sides	¾″×6½″×42″
2	T	Upper Top	¾″×6½″×41″
3	U	Upper Shelves	¾″×6″×41″
2	V	Plate Strips	½″×¾″×40″
1	W	Trim	¾″×3″×42″
2	X	Trim	¾″×3″×39″
1	Y	Crown	¾″×3″×45½″
2	Z	Crown	¾″×3″×9″
6	AA	Back	½″×7⅛″×41½″

*Includes Tenons
**Cutting allowance included

dealer's store in Atlanta was even bigger, at least ten feel wide. Then again, I've seen small versions not more than 30" wide and 66" fall. The design, and there are two primary versions, takes its name from Wales, a small part of the United Kingdom, where it's supposed to have originated. The earliest versions, made prior to and including the early eighteenth century, were rather crude affairs made primarily by village carpenters. By the turn of the nineteenth century, however, the piece had evolved to the point where it could be regarded as fine furniture, suitable to grace even the finest of drawing rooms. Even so, the basic design remained true to the original traditional form and still does today.

As previously mentioned, there are two basic forms of Welsh dresser: One has a cupboard-bottom and an open-shelf upper dresser; the other, the one we shall be dealing with, is called a "pot-board" Welsh dresser. The original was made in the late 1700s. It has the usual open-shelf upper dresser, but the lower section has two deep drawers side by side and is supported by turned legs connected by a low shelf. This I believe to be the more traditional of the two styles. And, most important, at least to me, it's certainly the more aesthetically appealing of the two designs. It's a challenging piece to build, will take many hours and will involve the use of every tool in the shop. When it's finished you'll have a family heirloom you can be justly proud of; I certainly am of mine.

CONSTRUCTION OUTLINE

Construction is quite straightforward, but there are a couple of tricky areas you should be aware of: the attachment of the lower shelf to the legs and the legs themselves. The legs are made from 2 1/2″ fumiture-grade stock, cut to size, planed smooth and then turned on the lathe to an authentic eighteenth-century pattern. Pine is not the best material for turning, but with time and care you should be able to do a good job. The lower shelf is attached by way of two-way mortises cut into the corners of the legs. To do this I used a combination of dovetail saw and dedicated mortising machine. If you don't have the machine, it would be quite easy to do with a saw and a good sharp chisel.

The upper section is constructed using simple dadoes to attach the shelves to the sides. The back is made from boards of irregular widths, just as was the original. and is fastened to the lower section with removable screws so the piece can be taken down for transportation.

The lower section is constructed using traditional mortise-and-tenon joints to secure the front, back and sides to the legs. The front is made from five separate pieces of stock. The top is made from two pieces of

furniture-grade stock a full 1" thick after planing and sanding. The drawers are constructed using lap joints and cut-steel nails, as were those in the original. You can use dovetails if you desire.

For the finish, I chose painted crackle green over red to match the pie safe described in chapter sixteen. Since then, I've made a second piece and finished it using a dark stain and eight coats of orange shellac followed by a couple of applications of beeswax. Either way, it's a stunning piece.

It will take at least forty hours to construct and finish this traditional Welsh dresser, but the result will please you beyond your expectations.

BUILDING THE DRESSER

STEP 1. Cut all the pieces to size.

STEP 2. Build the boards that will become the shelf and top of the lower section. You can do this using your plate jointer and biscuits or dowels. The dimensions given for the lower shelf are slightly larger than the finished piece. This allows you to cut it to the exact size once the lower section can be dry fitted together.

STEP 3. Using five pieces of stock, build the front of the lower section as laid out in the drawing. Be sure to make the offsets to incorporate the tenons.

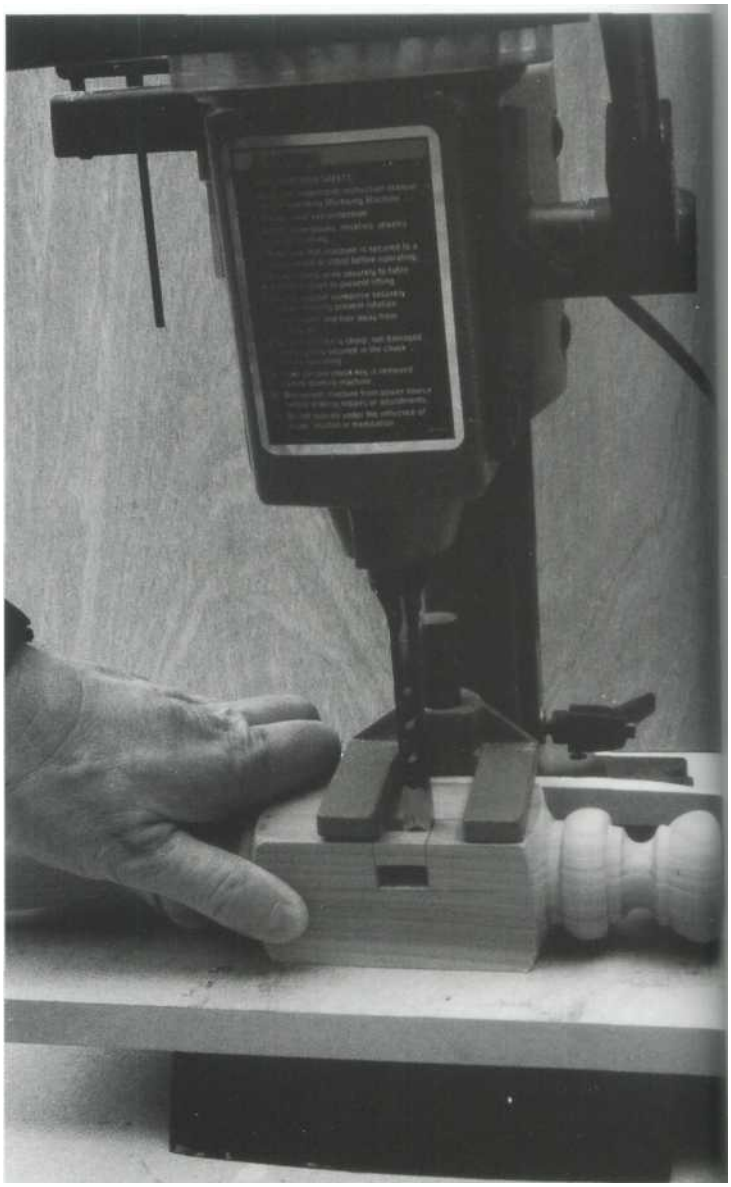
STEP 4. Using the scale pattern, turn the legs. Take care to remove material in very small bites using very sharp tools, and take time to do a good job of the sanding. Even the smallest ring will show dark when you apply the stain. I suggest you do the first finishing steps to the legs before going any further—at least to the sealing and sanding stage—as you'll find in the Shop Tip on **page 75.**

STEP 5. Cut dadoes and rabbets 1/4″ deep to the sides of the upper section as laid out in the drawing.

STEP 6. Glue, clamp and toenail the shelves and top to the sides of the upper section. Check the structure is square, then set it aside to fully cure.

STEP 7. Using either your dedicated mortising machine, mortising attachment in your drill press or hammer and chisel, cut 3/8" mortises, 6" long and 1" deep, into the inner faces of the rear legs to accept the tenons you'll cut to the back and both sides.

STEP 8. Cut two mortises to the front inner faces of the two front legs, 3/8" wide, 2" long and 1" deep, to accept the tenons of the front section as laid out in the drawing, and a single mortise to each inner side face of each front leg to accept the sides. These should be 3/8" wide, 6" long and 1" deep.



To make the mortise in the lower section of the legs, you can begin by using either your dedicated mortising machine, mortising attachment for your drill press or those good old hand tools. Mark out the position of the mortise, making sure you have a left and right, and front and back, and then remove the waste, first from one side and then the other.

STEP 9. Cut the two-way mortises you see in the drawing and photo above to accept the lower shelf.

STEP 10. Cut the tenons to the back, sides and front of the lower section.

STEP 11. Dry assemble the lower section to ensure a good fit and clamp it to ensure everything is tightly together.

STEP 12. Measure the distance between the backs of the mortises that will accept the lower shelf. Measure from side to side and from back to front. Ensure you do this accurately; the final fit and appearance will depend on how well you do this.

STEP 13. Disassemble the structure.

STEP 14. Cut the lower shelf accurately to size.

STEP 15. Assemble the lower section in the following *specific* order**.**

STEP 16. Using one of the new polyurethane products, glue and clamp the back to the two rear legs and set the result aside until the glue is fully cured, at least twelve hours.

STEP 17. Do the same for the two front legs and the front section.

STEP 18. When the glue is fully cured, remove the clamps from the back and front sections and set the back section on the bench with the mortises that will accept the sides facing up**.**

STEP 19. (Hue the two sides in place.

STEP 20. Apply glue to the two-way mortises that will accept the lower shelf, then set the shelf in place.

STEP 21. Take the front leg section, apply glue to all of the mortises and the tenons of the two sides.

STEP 22. Set the front leg section in place on the tenons and the lower shelf.

STEP 23. Stand the structure on its feet on a flat surface and clamp everything in place.

STEP 24. Check to make sure everything is square and the piece stands squarely on its feet. If you need to make adjustments, do so by adjusting the alignment of the clamps.

STEP 25. When all is satisfactory, set the structure aside for at least twelve hours to ensure the glue cures completely.

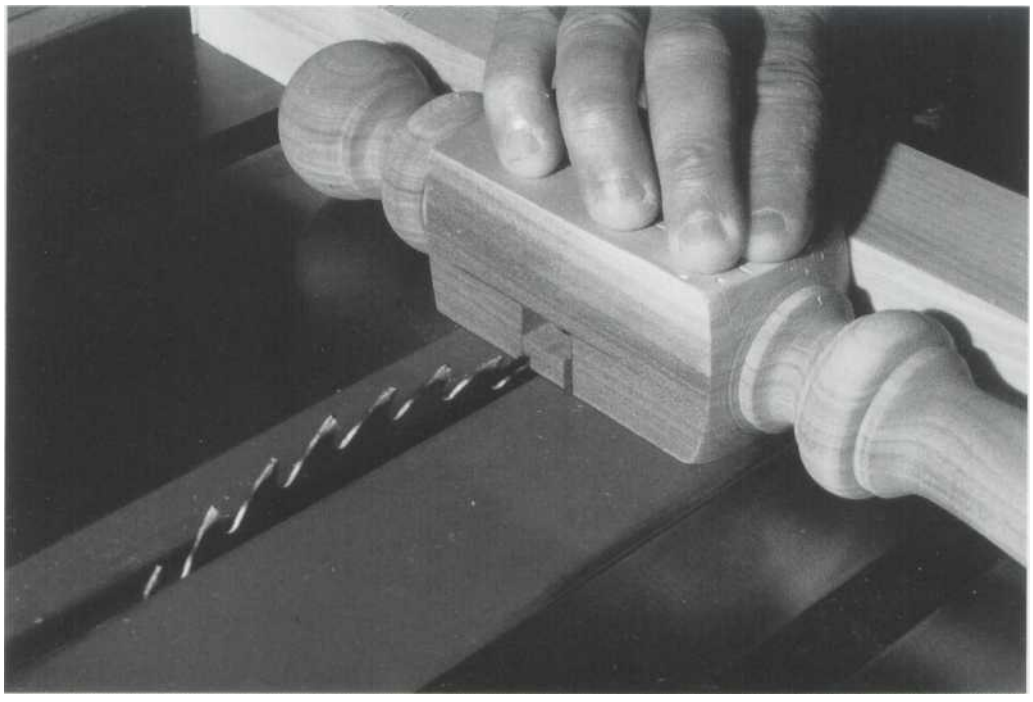
STEP 26. Remove the clamps and, using glue and screws, attach the cleats that will secure the top to the inside of the lower section.

STEP 27. Glue and screw the cleats that will support the drawer guides in place, as laid out in the drawing.

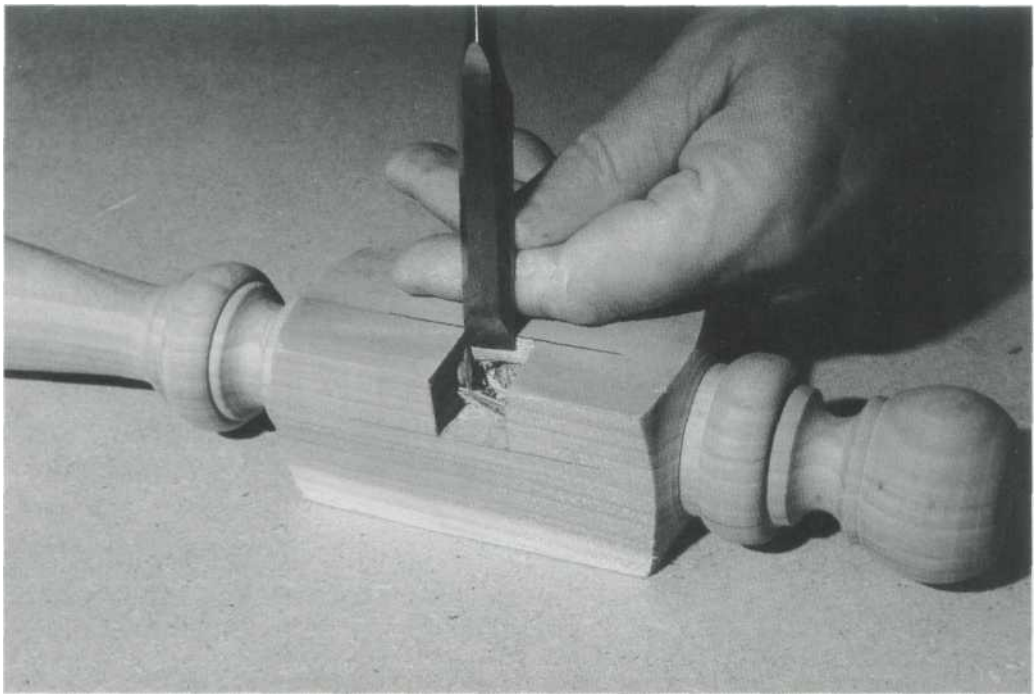
STEP 28. Build the drawer guides and, using glue and screws, fasten them in place on their support. Make sure they are square to the front.

STEP 29. Now, using twelve no. 8 X 1 5/8" screws, five along front and back and one at each end, fasten the top to the cleats. Be sure to elongate the holes slightly to allow room for the top to breathe.

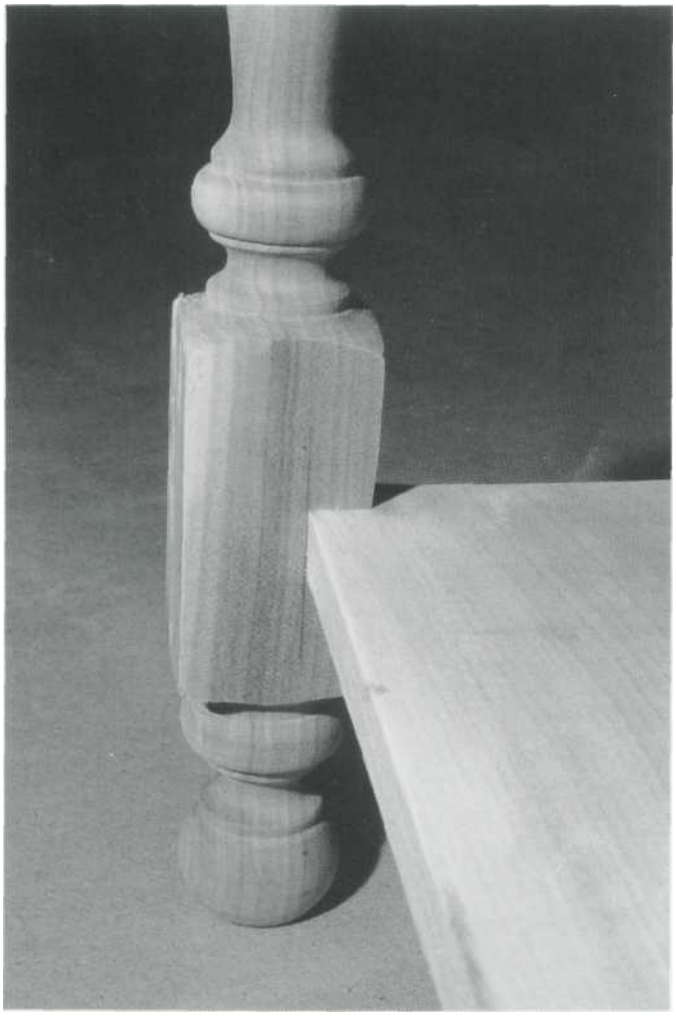
STEP 30. Returning to the upper section, slightly round over the edges of the boards that make up the back.



Now you can use either your table saw or hand saw to remove the small strip that remains.



Clean out the mortise with a chisel, but be careful not to remove too much material or the join! will be sloppy.



Finally, dry fit the shelf to the leg. If all is well, the joint should be nice and tight. When you complete the final assembly, you can use a small amount of glue inside the mortise.

STEP 31. Screw the back boards in place, roundovers facing forward. If you've used odd widths, you can set them in place with widest in the center or in no particular order as I did. The result is pleasing whichever way you do it.

STEP 32. Set your table saw to cut at an angle of 17°. You will use this to mill the bevels to the three pieces that make up the crown.

STEP 33. Mill the bevel to the three pieces that will make up the crown as laid out in the drawing. It's best you do this using a single piece of stock, then cut the three pieces from it when the detail is complete

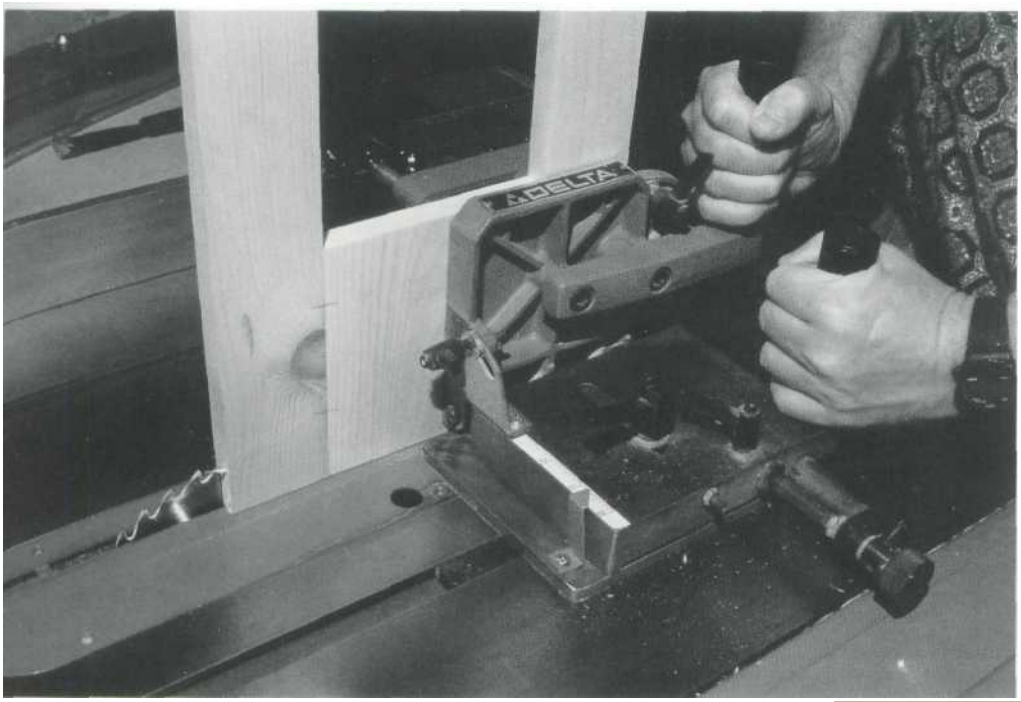
STEP 34. Glue and screw the crown in place on top of the upper section.

STEP 35. Tack and glue the plate-stop strips to the shelves as laid out in the drawing.

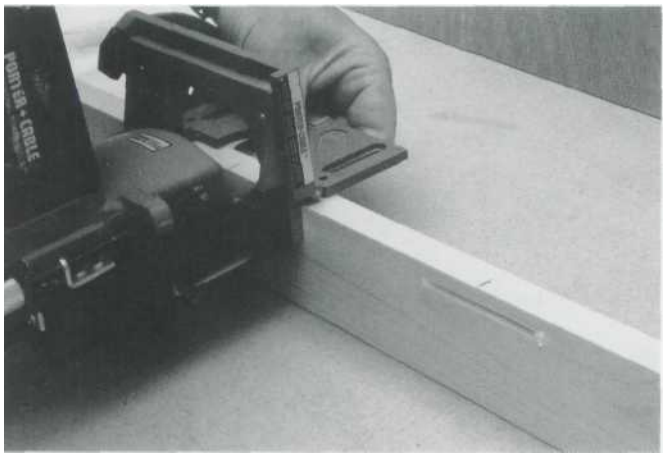
STEP 36. Set the top section in place on the lower section, make sure it stands square, then drill four screw holes through the lower edge of the hack. These will take the screws that will hold the upper and lower sections together. Don't fasten them together yet.

STEP 37. If the upper section is square to the lower section, remove it and set it aside. If not, make any necessary adjustments and try again.

STEP 38. Build the drawers as per the drawing and the Shop Tip



You can use your tenoning to cut the tenons to the ends of the front, as well as the back and sides of the lower case, just as you would with any solid piece of stock.



Attach the trim to the front of the upper case with biscuits and glue. Mark the sides and edge of the trim, and cut the slots in both. Just remember that the mark will always point toward the machine.

SHOP TIP

Sanding and Finishing a Turned Leg or Spindle



Turned legs, once they are assembled to the rest of the piece, can be a real pain to sand smooth, especially if you've used a water-based product that raises the grain. You can make life a lot simpler if you do the following. Once you've sanded the leg smooth, remove it from the lathe and do any necessary staining, sealing, polyurethane coating, etc. When all the coats have dried completely, return the leg to the lathe, set the machine to its slowest speed and start it turning. Then, using either 320- or 400-grit sandpaper, lightly sand the turned sections until they are nice and smooth. Finally, remove the leg from the lathe and apply a final coat of finish.

FINISHING

You have a choice here. As mentioned earlier, I finished the one you see in the color photo to match the pie safe in chapter sixteen. If you decide to do the same, find the technique described there and in chapter three.

If you decide to go with stain and shellac, you'll find that technique described in chapter three. Whichever you choose, lake your time and do a good job, especially where the legs are concerned. The turnings are difficult to do and will lake a lot of care and attention.