Book Caddy

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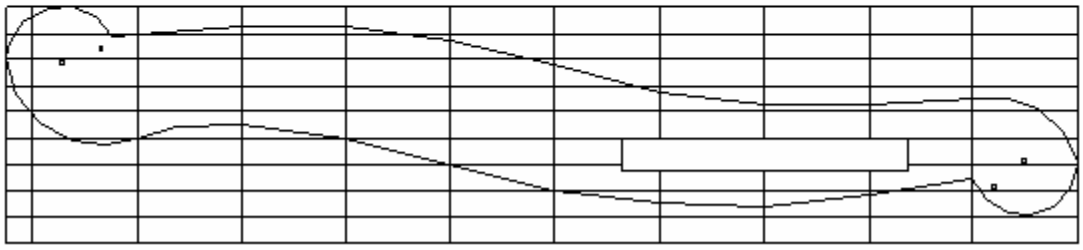
Leg Template
1/4 x 1" Grid



The usual way to hold books on top of a shelf or cabinet is with bookends- but here is an alternate way that is attractive in its own right and also tilts the books upward so you can read the titles more easily. This is a quick project that you can do in a weekend or two. You'll need a band saw, table saw, and a router; having a radial arm will help too but isn't necessary.

Begin the project by getting out the stock for the legs. Notice that the stock is 2-1/4" wide, but the legs themselves are no more than 1-1/2" wide. Why the difference? It's because of how the slots are cut for the slats that connect the two leg assemblies- the slots are not parallel to the centerline of the legs, and in order to cut the slots on a router table you need a side on the stock which is parallel to the slots. Thus the side of the stock cannot be parallel to the leg centerline, and since the leg must therefore be placed at an angle on the stock, the stock must be wider than the leg itself.

Set up the router table as in photos 1 thru 4 to cut the slots for the connecting slats. Set the bit height at 3/16". Locate the fence at 3/4" away from the bit. Use a 5/16" straight flute bit- or another size close to that will do. Set up the stop blocks along the fence so that the slot begins at 1-3/4" from the top of the pieces, and is not longer than 2-3/4". Note that the stop on the left determines the location of the end of the slot on the right of the piece, and vice versa. Measure carefully to locate the stops.

Photo 1- Lower the piece onto the bit at the router table to start the cut.

Photo 2- Next push the part along between the stops.

Photo 3- Lift the part off the bit after it touches the far stop.

To cut each slot, first butt one end of the piece against one stop as in photo 1, then carefully lower the piece onto the cutter. Then push the piece along the fence as in photo 2, until it butts against the other stop. Lift the piece away from the bit as in photo 3,

keeping your fingers as far from the bit as possible.

Photo 4- The finished cut.

You can't cut all four legs on one setup. The stops must be moved so that they are at equal distances on opposite sides of the bit for the second setup. Cut two legs on each setup.

Photo 5- Make a pattern from the drawing and use it to trace the legs.

Trace the leg pattern onto the pieces (photo 5). Place the template on each piece so that the lines showing the slot on the template are directly over the slot itself (or close- it doesn't have to be exact). Flip the template over to trace the second set of legs. Cut the legs out on the band saw as in photo 6.

Photo 6- Cut out the legs on the band saw.

Smooth the curves to get rid of the band saw marks and to give the legs an even, flowing shape. A good way to do so is with a drum sander placed in a drill press as in photo 7. Whether you smooth the curves this way or by hand with sandpaper, spokeshave or

chisels, keep a close eye on the line of the curve to be sure there are no bumps or divots. Keep the edges close to 90o to the faces.

Photo 7- Smoothing the leg edges with a drum sander in the drill press.

Now make the slats- because they will be needed for properly aligning the laps that join each pair of legs. Vary the thickness of the slats to adjust the fit in the leg slots. A planer is handy for this, but not necessary. You can make thin stock by double ripping wider stock as in photo 8. Start with stock 3" wide and make several cuts on each edge so that you aren't trying to cut through 1-1/2" at one pass. Cut out the stock a bit over thickness and then belt sand or hand plane it smooth. Establish the final fit in the slots not with the belt sander (which cuts too fast) but by hand sanding with 60 grit on the ends of the pieces, or with a block plane, again cutting primarily on the ends.

Photo 8- Resaw stock for the slats at the table saw. Make the cuts in stages.

Rip the slats to width and cut them to length (2-3/4 x 18"), and square up the ends of the slots to fit the slats (photo 9) using a chisel and one of the slats as a guide for the final length of the slot itself.

Photo 9- Square up the ends of the slots with a chisel.

Now put two legs together with the slats as in photo 10 to align the legs for scribing the laps that join the legs. Place a square on the slats to guarantee that they are at 90o to each other. The second alignment to confirm is the distance from the bottom of each slat to the opposite leg- that is, the leg to which the slat is not attached. Note in the photo that a measuring rule shows 1/4" from the slat to the opposing leg. Confirm that there is this distance below both slats. Once you have all this lined up- and yes, it is a bit of a juggling act holding it all together- scribe along the juncture of both legs with a pencil. These lines show the edges of the laps.

Photo 10- Aligning the parts for marking out the lap joints.

Cut the laps 1/2 way through the thickness of each leg, staying within the scribed lines. This can be done with a handsaw and a chisel. A faster way to hog out the bulk of the waste is to set up on the radial arm saw as in photos 11+12. Don’t attempt to cut these parts on a radial arm without a jig to hold them. Make the jig that holds the legs out of one of the scraps left over from the band saw cuts- these are just the right shape to cradle the parts. One additional piece must be applied at the end of the leg to keep it from sliding along the first piece. Attach these pieces to a piece of plywood at an angle that allows the blade to cut a maximum of the waste away. Set one leg on the plywood so that the scribed lines are roughly at right angles to the edge of the ply, then set the jig pieces alongside the leg. Screw the jig pieces down, but don't put the screws in line with the blade.

Photo 11- Radial arm saw jig for cutting out the lap joints.

Photo 12- Use a stick to hold the part down during the cut, not your fingers, because your fingers would be too close to the blade for safety.

Place a leg in the jig and raise the blade up to where the depth of cut will be above the half way mark through the thickness of the leg. Slide the jig along the radial arm fence until the blade is aligned with the middle of the lap, and make a cut. Hold the leg down with another stick, not your fingers because they would be too close (photo 12). Push the saw back, remove the leg and measure the depth of cut. Adjust the saw height until the depth of cut is 1/2 the thickness of the leg.

Photo 13- Fine tuning the lap walls with a chisel.

Cut out the laps, coming as close to the scribed lines as you dare with the radial arm. You

can't cut out the entire lap because the radial arm cuts a straight line and the lap edge is curved. Cut the last bit of the curved edge on the laps with a chisel as in photo 13. Use the least wide chisel that you have (or better yet-a curved carving chisel) and use the "cut a little and fit a lot" approach. Trim a bit and try to fit the two legs together, looking at where you need to take off a little more and where you have already taken off enough- or too much. Yes, I used a little putty in the finished laps because they didn't fit perfectly. You can too, so don't worry too much about perfection.

Photo 14- Gluing up the legs.

Photo 15- Round over the outsides of the legs at the router table.

Once the laps are fitted glue the legs together as in photo 14. Once they are dry, set up a 3\8" radius roundover bit in the router table as in photo 15 and round over the outside of the legs, but not the inside, because here the roundover will interfere with the slots for the connecting slats. Use a file to smooth the insides of the curls on either end of the legs (photo 16), and to roundover the edges where the bit couldn't reach. Sand the legs to 180 grit before you glue them to the slats, because it is easier to do so at this point.

Photo 16- Use a file to get into the corners.

Glue the slats and legs together as in photo 17. If the fit of the slats in the leg slots is snug, you can take the clamps off after the slats are pulled home in the leg slots. Either way, check to see that all four legs touch the table top. If not, twist the whole assembly in the direction necessary to make them do so.

Photo 17- The final glue up.