
Heart-Shaped Puzzle Box



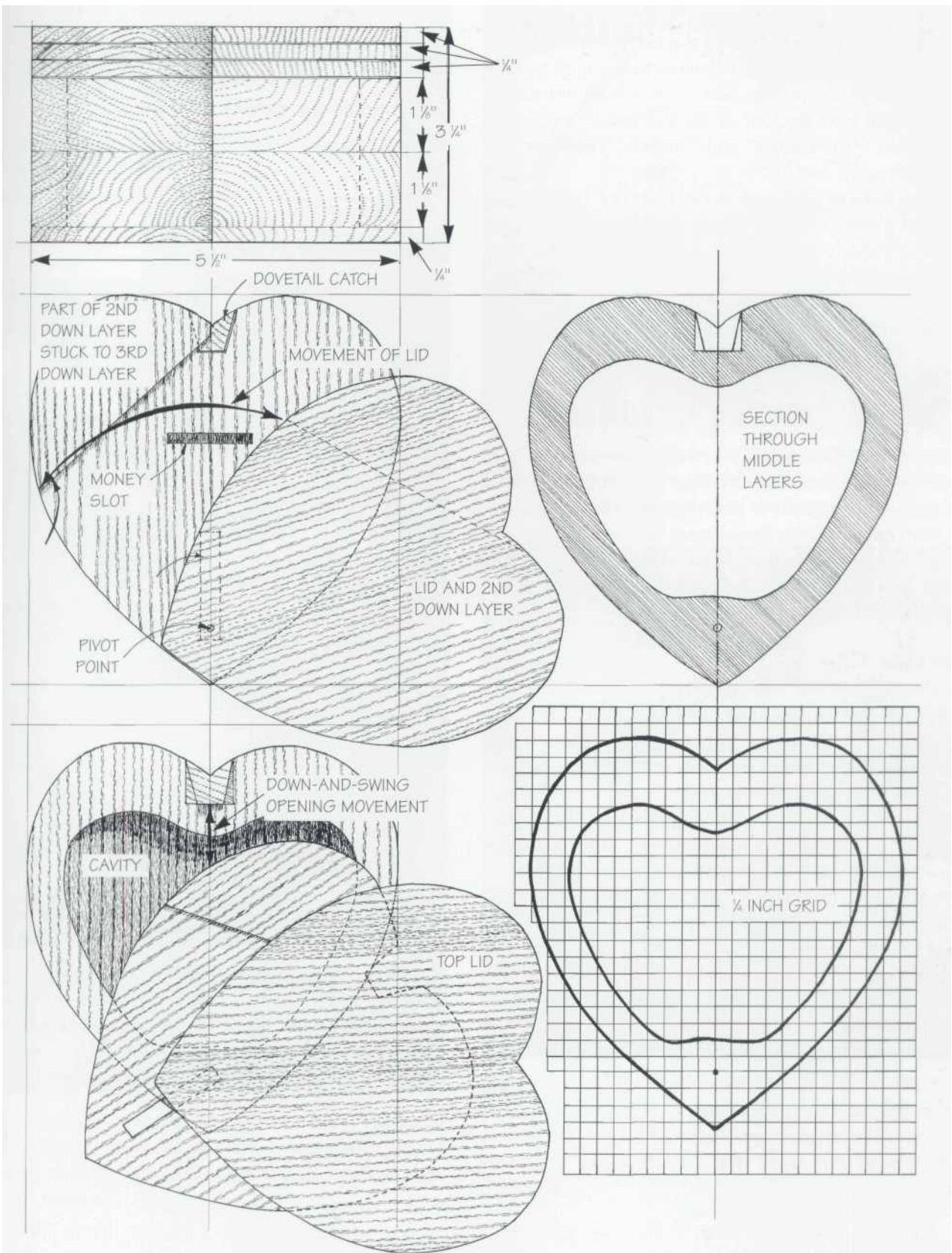
When I was a kid, an old woman left me a small wooden box in her will. The funny thing was that, although it appeared to be just an ordinary empty box with a small division to one side, when I shook it, it rattled. After variously pushing, pressing and sliding the sides and base of the box, I discovered 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



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 takes 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. I 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)	1/4" x 6" x 7"—I used English yew throughout
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HARDWARE AND EXTRAS

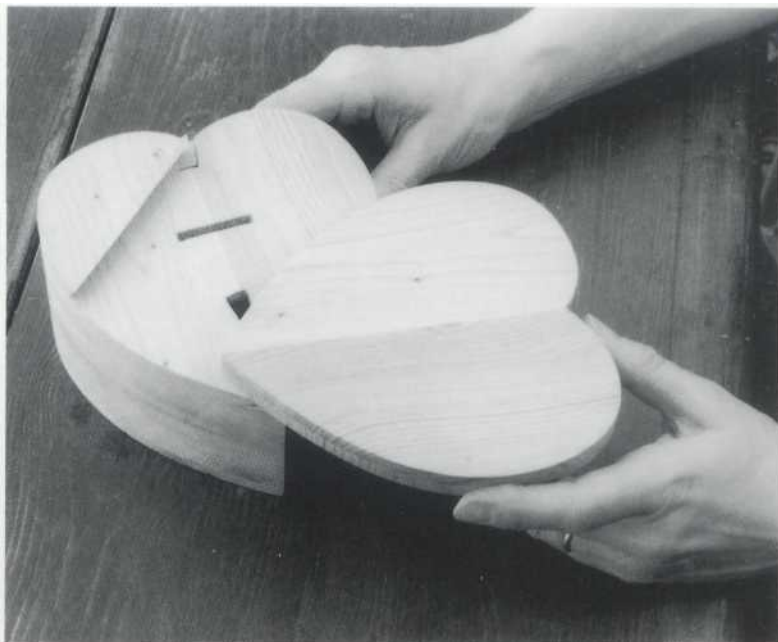
Swivel screw (1)	1/4"-long brass countersunk screw
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STEP-BY-STEP STAGES

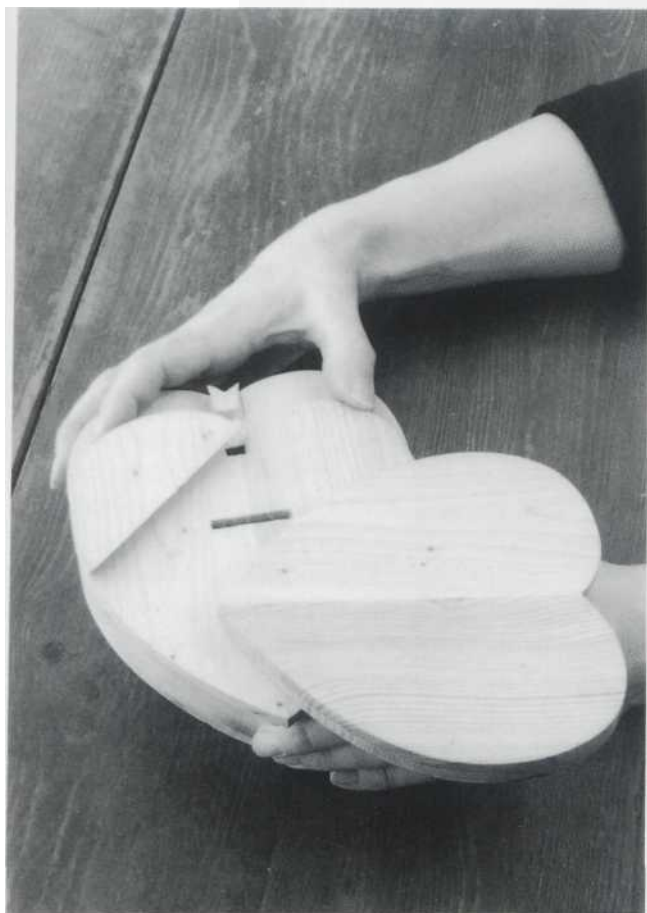


1 Detail showing how the square rod fits in the channel so that the dovetail at the top locates in the slotted layer. The procedure is to first glue and fit the rod, then cut the dovetail.

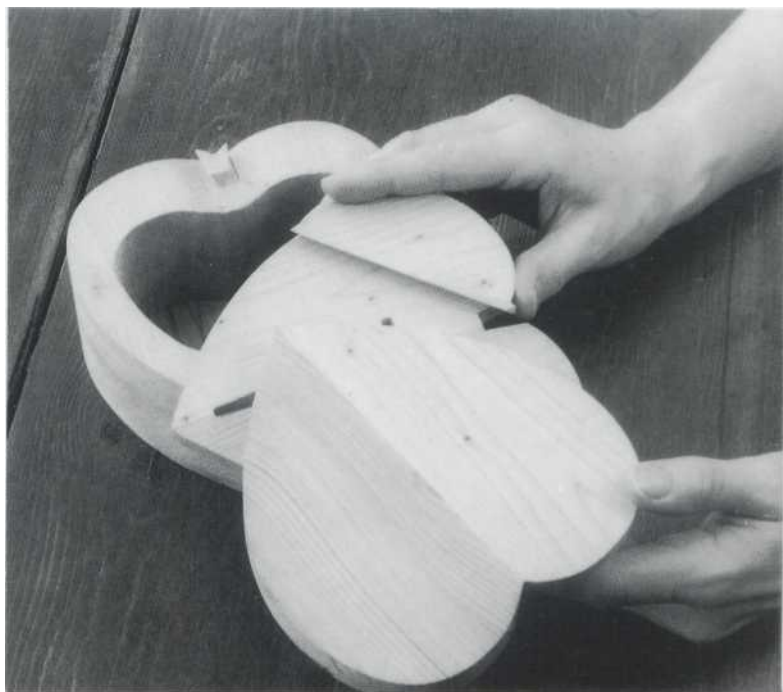
2 The miter cut on the second layer needs to be angled so that it looks toward the bottom of the heart. Be mindful that the finer the saw used to make the cut, the better the fit.



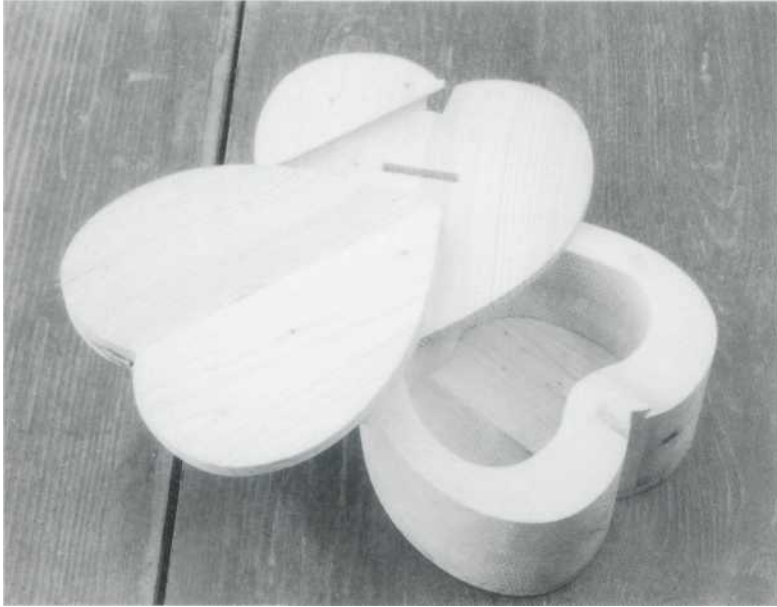
3 See how the top-left part of the mitered layer needs to be glued to the slotted layer, so that the topmost part of the miter hangs clear of the dovetail.



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.



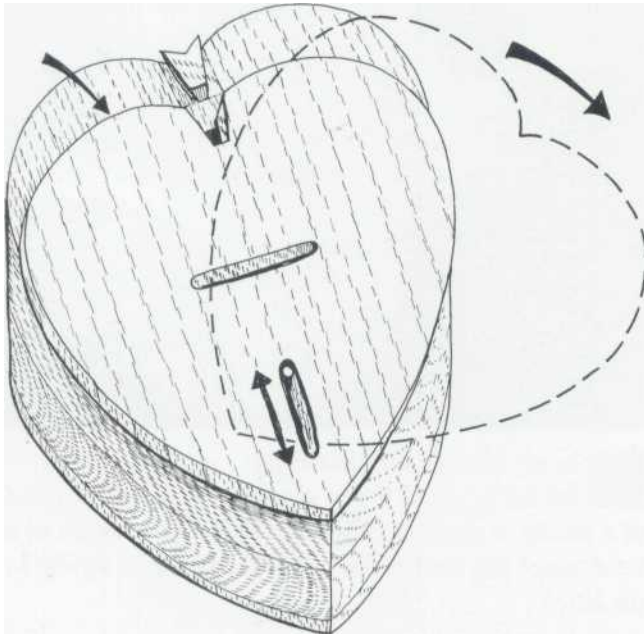
5 In my design, the slotted layer is able to swing to the left or right. If you want to make the box more of a puzzle, a good modification would be to build in a little "stop" peg so that the layer could only be swung to the left.



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 time around I will redesign the dovetail post so that it cuts right through the wall of the box. Then I 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, I 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, I made a moving toy that looked good on paper, but when I 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.