

Building a Cradle

Slab construction and heart-shaped dovetails

by Jacques Berger

My good friend was expecting a baby and I decided to build a cradle for the new arrival. The cradle I designed and built, shown below, is basically an open box made with simple slab construction, using flat boards sawn to shape. The cradle's corner joints needed to be strong, and since I had been experimenting with unusual variations of dovetails (see the sidebar on p. 51), I decided it would be fun to come up with a special joint for the piece. Because a new baby is such a sweet thing, I designed special heart-shaped dovetails that I call "lovetails." Further, I thought these exposed corner joints enhanced the look of the simple cradle so well that I decided to develop the lines of the cradle around this theme. Before I get into how I constructed the cradle and cut the lovetails, I'll tell you more about how my design evolved.

The design—Although I wanted my cradle to be a precious piece of furniture to be kept as a family heirloom after the baby has

grown, I also wanted the design to allow simple construction. My cradle is basically a box with trapezoid-shaped ends, which have sawn rockers on the bottom. I made the cradle rather small, so it wouldn't be too heavy and unmanageable. As you can see in figure 1 on the facing page, the cradle is 36 in. long, with the ends tapering from 19 in. wide at the top to 16 in. at the bottom of the joined sides. These dimensions allowed me to make the cradle 13 in. deep, enough to prevent an active baby from falling out and to allow the cradle to be used safely until the baby starts sitting up and needs a full-size crib.

One of the most important design parameters for the cradle is the radius of the rockers and their location in relation to the box. If the box is too high, it becomes too tippy; if it is too low, it doesn't look right. I found that 5 in. between the bottom of the rockers and the bottom of the box is just right, both for appearance and stability. The radius of the rockers must also be planned carefully to allow the cradle to rock gently, without tipping. If the rocker's radius is too long, the cradle comes to rest very quickly; if it's too short, the cradle becomes tippy. After a little experimentation, I settled for a radius of 25 in. I also added a slight knob on the rocker ends, for a little extra protection against tipping too far.

Once the rocker dimensions were established, I drew out the cradle's basic outline so that it had smooth, continuously flowing curves. To emphasize the heart motif in the lovetails, I designed a heart-shaped cutout on the headboard and echoed that shape with half-hearts on each end of the sides. I made the design consistent with the softness of the future resident by rounding the edges of the headboard and footboard and curving the sides slightly. And since I wanted the cutout heart on the headboard to be part of the curve, I extended the cutout to the edge, rather than just making it a hole in the board.

When sketching the cradle, I drew half of each curve freehand and then used tracing paper to draw the other half symmetrically. While lines drawn in this fashion are not as perfect as those made using a French curve, I find that working freehand gives me more freedom in creating shapes and in blending different curves—like those at the bottom of the cradle's ends—in one single movement. In the same way that you sight down a board to see if it is straight, I "eyeball" my curves from a low angle. This lets me see any irregularities, which I then correct by smoothing out the lines.

Preparing the stock—I chose Brazilian mahogany for this project, but any stock dense enough to hold detail and make strong dovetails will do. While the wood I chose was nicely figured, I found it slightly too dark after oil finishing, and I would choose a lighter wood, say oak or maple, if I made another cradle. I planed my rough $\frac{3}{4}$ stock down to $\frac{7}{8}$ in., which kept the cradle fairly



Built from Brazilian mahogany with slab sides joined together by unique heart-shaped "lovetails," the author's cradle is an attractive, simple-to-build project for any woodworker who knows someone expecting a visit from the stork.

lightweight but gave me enough meat for the dovetails. It is very important (as I learned too late) to choose pieces of wood of almost equal density for the cradle sides. If one side is heavier than the other, the cradle will lean when sitting at rest.

I glued up stock for the two sides and ends with the grain oriented to run horizontally around the cradle, and I left extra width for cutting out the curves later. For glue-up, I used the techniques illustrated in Chris Becksvort's article "Edge Gluing Boards" (*FWW* #79, pp. 68-70), although I had a little trouble matching my mahogany's color and figure. Once the glue dried, I scraped off the excess and sanded the four sides to a nearly finished state. Sanding now prevents problems later; if the stock is sanded after the dovetail pins are cut on the sides, the pins won't fit snugly into their sockets.

Next I cut the glued up slabs for the sides and ends to the dimensions shown in figure 1, using the tablesaw for the straight cuts and the bandsaw for the curves. After tracing the curves from my cardboard patterns onto the four slabs, I ran the bottom edge of each over the jointer to true them up. Then, with the miter gauge set to 90°, I trimmed the ends of the two sides to length on the tablesaw. After resetting the gauge to 76.5°, I taper-cut the ends of the headboard and footboard, stopping the cuts short to avoid sawing into the rockers. Finally, I replaced the regular sawblade with a dado blade and plowed a single 1/4-in.-wide by 3/8-in.-deep groove in each slab for the cradle's bottom. The rip fence is set so that the near edge of the groove will be 3/8 in. from the bottom edge of each side and 5 3/8 in. from the bottom on the ends.

To cut out the curved edges on the slabs, I used a 1/4-in. 8 t.p.i. bandsaw blade, which produced fairly clean cuts and easily handled the smallest radius in the pattern. Because the 12-in. throat of my Craftsman bandsaw was too narrow to handle the rotation of the stock for some of the cuts, I had to trace the curves on both sides of the slabs and flip the piece partway through some cuts. But you won't have this problem if you use a larger bandsaw, a hand-held sabersaw or a bowsaw.

After cutting the curves, I removed the sawmarks on all the edges, first with a fine rasp to eliminate the major flaws and then with sandpaper. The cradle sides were then ready for cutting the lovetails. Incidentally, because the stock is sanded before the joints are cut, it's important to work on a clean surface; wood chips pressed between the workbench and the pieces can leave nasty indentations on the nearly finished surfaces.

The corner joinery—I started making my lovetails by laying out and cutting the tails on the ends of the cradle. First I marked where the sides of the cradle were to meet the ends. Then, working on paper, I sketched out the heart shapes (that are cut out to create the tails) to come up with a spacing scheme that would look neither too crowded nor too sparse. Six pins, each 7/8 in. high and 7/8 in. wide (to correspond with the thickness of the stock), looked like the right number. The six hearts were laid out evenly along the 13-in.-wide ends, 1 1/2 in. apart, with the first and last ones set back from the board ends 1/8 in. (see figure 1).

Next I cut the tails. Each tail results from the wood left between the heart shapes, which are bored and sawn out. Before starting, I matched the sides with the ends and numbered them, so I could be sure all the parts would go together correctly at assembly time. Following the layout scheme shown in figure 2 on the next page, I marked the points of the hearts on the outer edge and located the centers of the two side-by-side holes that make the rounded top of each heart. I used the drill press fitted with a 7/16-in. brad-point bit to bore the holes. Two straight cuts made with a Japanese saw extend from the point of the heart and run tangent to the inside of

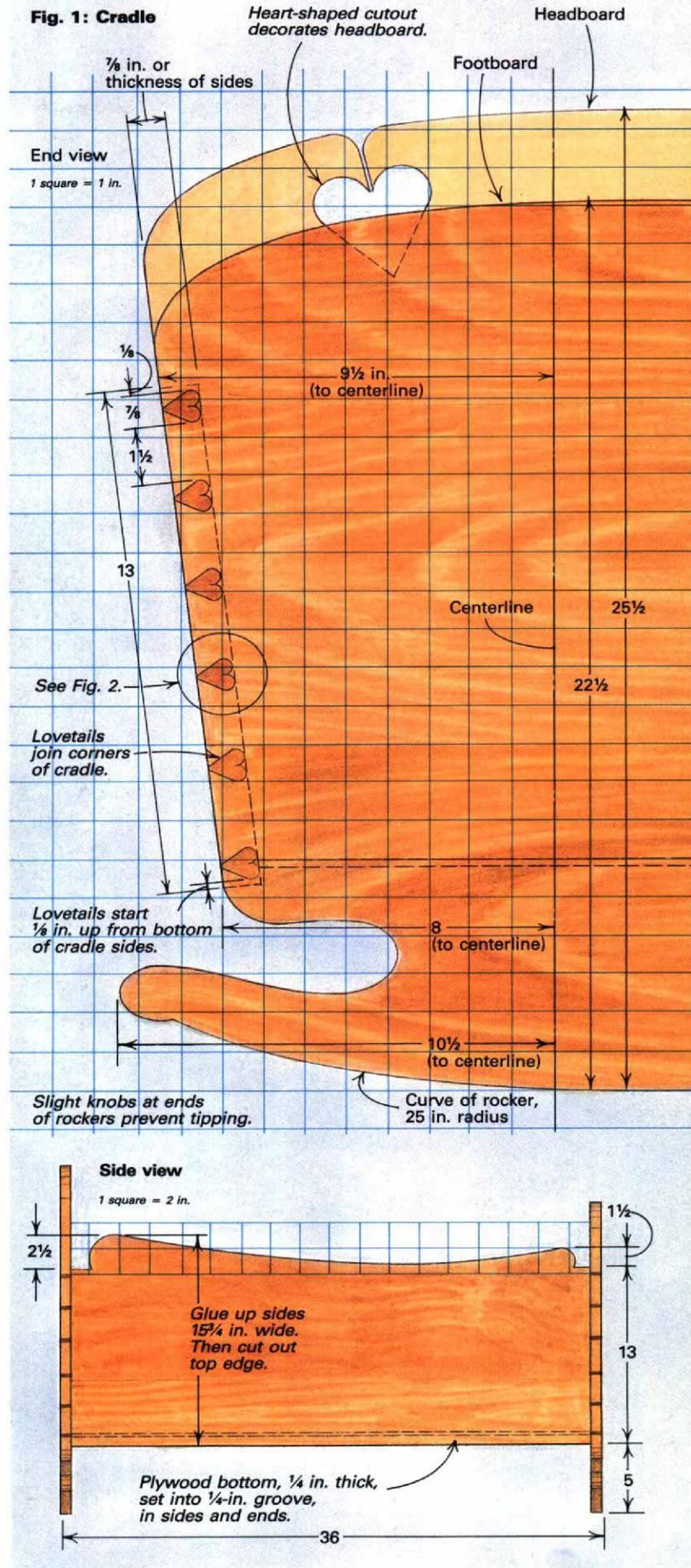
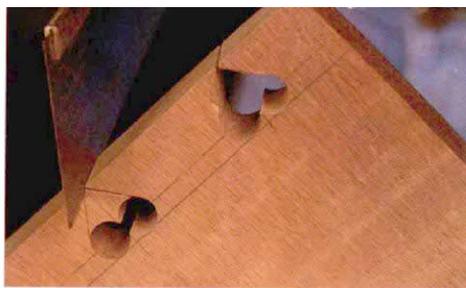
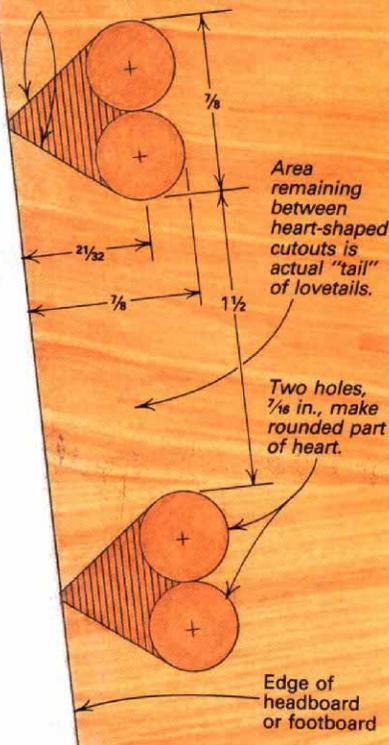


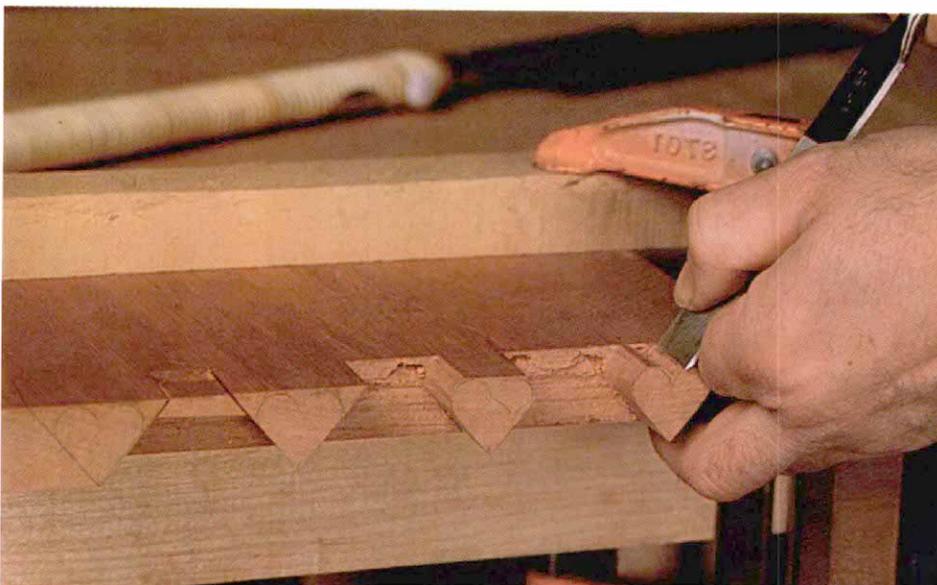
Fig. 2: Lovetails

Two sawcuts remove waste to complete heart-shaped pin.



Left: After laying out the tails and boring two holes for the rounded top of each heart, cut the straight lines of the pins with a thin-bladed Japanese saw.

Below: A wide chisel is used to shape the rounded top of the heart-shaped pins.



the holes to finish the hearts. The Japanese saw, with its thin blade that cuts on the pull stroke, is great for such fine-line sawing jobs because it can be controlled precisely and the resulting cuts are extremely clean. I draw the lines guiding the sawcuts after the holes are drilled rather than before, in case the holes end up slightly out of line. Once the tails are done, I don't touch them again; the fit of the joint will be adjusted by trimming the pins later.

The next step is to trace each row of heart-shaped holes onto the end of the corresponding cradle side to create the pins, as you would if you were cutting regular dovetails. I traced the pins by placing the tail side on the end of the board in what would be its actual position. To ensure that the lines would be as close as possible to the original heart shape, I used a pencil that I sharpened often. I marked the depth of the pins by striking a line across the edge of each board. After marking out, all I have to do is cut accurately to the lines, minimizing final-trimming. With the board clamped to the side of the bench, I then cut the straight parts of the pins, again using the Japanese saw (see the top photo above). After the first cut, I chiseled out the waste between the pins in the traditional fashion, going halfway through the stock thickness on each side and hollowing the bottom slightly to allow the joint to slide together more easily. Finally, I rounded the final shape of the top of each pin heart using a wide, sharp chisel and file (see the bottom photo above), and then I started the fitting process.

Generally, if the pins are cut with care, the joint will go together partially on the first try. The pins should slide in place to a depth of about $\frac{1}{16}$ in. to $\frac{1}{8}$ in. This is excellent, as far as I am concerned, as I much prefer to have a joint that is too tight rather than too loose at this stage. Then I filed and chiseled each pin, a little at a time, for a good fit. I know where to remove excess wood by the friction marks the tails left on the pins at each fitting. This can be a long painstaking process, but I always follow the rule that it's better to remove too little than too much. When all four corner joints fit snugly, I dry-assembled the cradle and enjoyed a first look at it.

With the four sides assembled, I checked to make sure the surfaces of the joints were all flush and I did some touch-up planing and sanding where needed. Finally, I rounded over all the edges of the pins and tails slightly by sanding them lightly across the ends. I have two reasons for doing this: First, it makes the joints look softer, and second, the rounded edges help camouflage any imperfections in the fit. Without rounding, I find it nearly impossible to make this unusual type of dovetail fit perfectly without the hint of a gap between the pins and tails.

Final assembly—All that remains is to cut out the bottom, assemble the cradle and finish it. The bottom is a piece of $\frac{1}{4}$ -in. mahogany plywood that is inserted in the groove cut earlier. The final assembly of any project is always a tense period for me; so I always recruit my wife as a helper (and for moral support). Before beginning, I resand each part down to 280-grit. It was clear that I could not assemble the entire cradle in one operation; with 24 pins to paint with glue and four sides to assemble around a bottom piece using clamps and protective pads, I decided to assemble one end at a time. I glued the footboard to the sides first, leaving the headboard in place dry to align the sides. After the glue had set a few hours later, I slid the bottom piece into its groove and final-assembled the headboard.

After cleaning up a little glue squeeze-out and giving the entire surface of the cradle the once-over with #000 steel wool, I finished the cradle with three coats of Watco Danish oil. Some people may worry about the baby chewing on the wood and getting sick from the finish; fortunately, most oil finishes are non-toxic when they're completely cured (about six weeks or so). You still should check with the manufacturer of the finish you choose, just to be on the safe side. □

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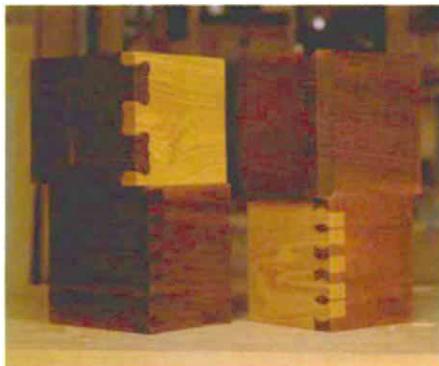
The dovetail revisited

A dovetail joint on a piece of furniture or cabinetry is usually the hallmark of conscientious workmanship. In addition to its prestige, the handmade dovetail is a very strong joint: The two halves lock two boards together and create an ideal joint for heavily used furniture components, such as drawers, which take a lot of stress and strain. Finally, the dovetail is aesthetically pleasing—so much so that many craftsmen employ dovetails throughout their work to show off their skill on drawer fronts or the edges of a carcass.

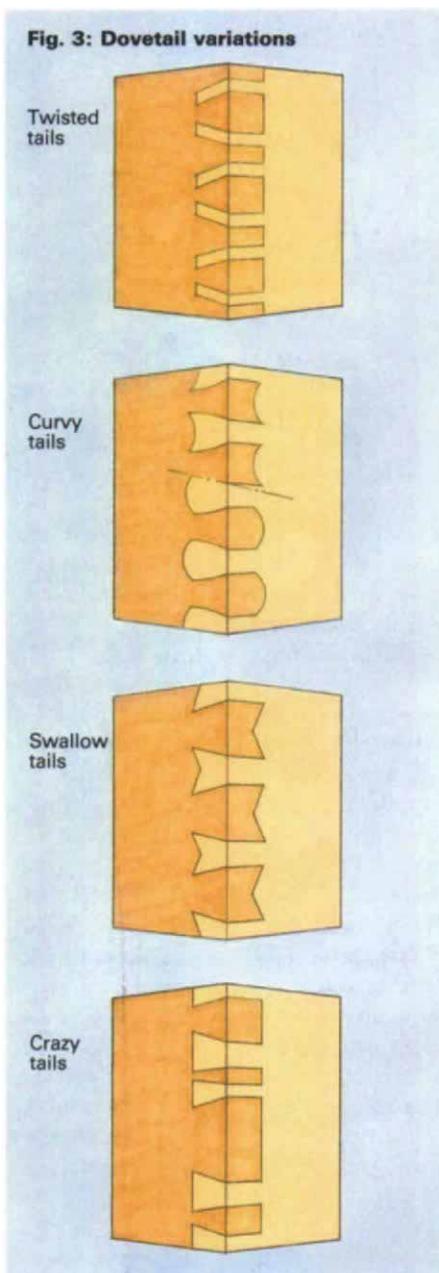
But as strong and beautiful as the dovetail is, is it really the perfect joint? After you've cut hundreds of dovetails and explored all the possible variations on the basic theme—varying the angle of the dovetails, changing the distance between the pins, cutting the pins tiny or wide—you may end up feeling that a dovetail is a dovetail. When I investigate a piece of furniture, I'm always thrilled to discover something unusual or special in the joinery; a little hidden treasure that reassures me of the piece's quality.

That's the feeling that got me thinking about what could be done to spruce up the design of the good old standard dovetail, but without changing the basic principle of the joint: two halves that lock together. The fruits of some of my joint-designing experiments are shown in the photo above and figure 3 at right. The "twisted tails," my first try, were easy to cut, and different from anything I'd seen before, but the design isn't very bold. Although my next attempt, "swallow tails," also resembled regular dovetails, the pins and tails were almost the same and showed on both sides of the joint.

My next try was an experiment in changing angles; when I realized that there was nothing forcing me to keep the same angles throughout the entire joint, I came up with the "crazy tails." I was still not satisfied, however. To me, the resulting joints looked too typical, too humdrum. I thought, why not try curves? By rounding off one edge of both the tails and pins, I ended up with the "curvy tails." The mating parts create an undulation of concave and convex lines. Then, I thought, the regular dovetail's locking effect produced by complementary angles could also be created by conflicting curves, as shown in the bottom, left test joint in the photo above. Even though the joint wasn't very strong because of its curved pins, I liked its appearance. In fact, most of my fancy joints probably lack the strength of the regular dovetail. They are, however, at least as strong as finger joints



Experiments in joinery: Berger makes up pattern boards in his quest for unique alternatives to the standard dovetail.



and their slight loss of strength is counterbalanced by the pleasing design.

If you're willing to experiment, there's no limit to the possibilities for unusual joints. The principle of the dovetail, not the dovetail itself, becomes the guideline: complementary angles and/or curves will create a locking joint. While unusual joints can be effective in any piece of furniture or cabinetry, you probably won't want them in situations where you have lots of joints to cut because they're usually too time-consuming. Rather, use them as a decoration or for a prominent feature on the piece. This is how I've used the dovetails to join the sides on my cradle, shown in the photo on p. 48.

Construction: To those who have mastered regular dovetails, my fancy joints may seem unrealistic or just too much trouble to cut. But, aside from a few tricks, the main ingredients in producing these joints are patience and good skill with a handsaw, chisel and mallet. Here are a few tricks that may help you cut the joints pictured or any others you may wish to design yourself.

On dovetails that involve rounded parts, start by cutting the tails first. Then, cut the pins and trim them till they fit snugly with the tails. This is contrary to the way many people cut regular dovetails, but it seems to work well for the unusual joints. In some designs, determining which part is a pin and which is a tail may be difficult; I usually choose the half with the more convex shape as the pin, since this is easier to chisel, file or rasp when trimming to fit.

With some of my joints, as with regular dovetails, the bottom of the spaces between tails and pins is flat. In this case, the depth of the joint is a straight line that's laid out as far from the corner as the joining stock is thick. When bottoms of the spaces aren't flat, as with the swallow tails, chisel out the pattern on the bottom first. Then, transfer it to the end-grain of the other half and chisel it out to match, undercutting it slightly if needed. In some cases, as with the lovetails, I create round patterns by simply boring on the drill press. The shape of the concavity can be completed by sawing, chiseling or filing after drilling. Some designs have pins that can be cut directly on the bandsaw, such as the twisted tails. Unless you are a hand-tool purist, the router used with a template can be indispensable for creating curved or irregular joints, like the example shown on the top right in the photo above.

—J.B.