NO. 48 NOTES FROM THE SHOP

Woodsmith®

Heirloom Baby Cradle

JOINERY: CUTTING ANGLED MORTISE AND TENON JOINTS AND ARCHED-TOP PANELS

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Sawdust

ABOUT THIS ISSUE. Which comes first, the project or the technique? For both projects shown in this issue, I'll have to admit that the technique was probably the major inspiration.

Although we started out by talking about building a cradle (it would be a nice project, we thought, and one that we've had a lot of requests for). But as soon as that was decided, we quickly shifted interest to the techniques of how to actually build it.

The key to making a cradle is making end panels that taper so the cradle is wide at the top and narrow at the bottom. Now, that gets kind of interesting if the frames have raised panels mounted inside.

But how do you make an angled frame? Especially if you want to use mortise and tenon joinery? Then how do you make a raised panel (with chamfered borders) to fit inside the frame? And just to make it a little more interesting, how do you make this frame and panel combination so the panel has an arched top?

These are the kinds of techniques that get the juices flowing.

JOINERY. The joinery on the frame was one of the first considerations. We've used variations on an angled mortise and tenon in a few projects in the past. But I've always wanted to figure out a better way to cut the angled shoulder on the tenon.

You have to make angled cuts on both sides of the workpiece making sure the angles are exactly the same.

In the past, I used pencil marks and did a lot of test fitting to make sure the shoulder cuts on the tenon were the same angle. But there had to be a better way.

How about a "stop" of some sort? Well, that sort of works, but there are problems with... wait a minute. The problems are solved if you just cut the angle on the end of a block and use the block as an aid to set up the miter gauge.

This is just one of the details that made this project so interesting. And when we got into the raised panel with the arched top, well, that's the kind of challenge I like.

CRADLE PATTERN. I should mention a couple other things about the cradle. First, one of the reasons we haven't run this plan before is that it requires turned spindles. If you don't have a lathe, you're out of luck. But we found a source for pre-turned spindles, so that's not a problem any more.

And speaking of spindles, as we were working on the initial design of the cradle, we called the Compliance Dept. of the U.S. Consumer Product Safety Commission to check on the safety aspects of the spacing of the spindles.

We were told, "The spindles in a cradle should be no farther apart than 2⅜"."

To be on the safe side, we made them a little closer. At the widest they're 2" apart, and at the narrowest they're 1¾" apart. (The spacing varies because of the curved shape of the spindles.)

And one last thing about the cradle. It requires some patterns to draw the curves on the frame and the uprights (for the stand). We didn't have enough space for the patterns in this issue, but we've gone one step better. If you want the *full-size* patterns, they're free for the asking. See Sources on page 24 for how to order them.

SOURCES. We use the Sources page for quite a few things. Mostly it's a listing of where you can get the supplies and hardware needed to build the projects shown in an issue.

But we also use it to give a little longer explanation about some of the tools and supplies we use in our shop. In this issue, for example, we've found a new source for the bits we've been using to cut mortises.

These bits are from Sears — they're simple and they're cheap. But things change. They're still simple, but they're not cheap any more. Sears decided to package the nice little bits with a rather useless mortise chisel (to make square ends on the mortise). And that raised the price.

Fortunately, Doug Hicks decided there ought to be a way to get the bits by themselves. After several telephone calls and with the support of David Draves at Woodcraft Supply (in Woburn, Mass.), the bits (by themselves) are available again. See Doug's story on page 24.

STORE NEWS. About 18 months ago, we opened the first *Woodsmith Store* in St. Louis, MO. That store is now doing very well. Then this past fall, another opportunity arose.

Tad Laird owned a great little store for woodworkers called Rosewood Tool Supply, in Berkeley, CA. In talking with Tad, he had the same goals we did. In his words, he wanted, "a store that's a complete resource for woodworkers — tools, supplies, wood, information, everything."

To make a long story short, we decided to join forces. So, now Tad is running the *Woodsmith Store* in Berkeley.

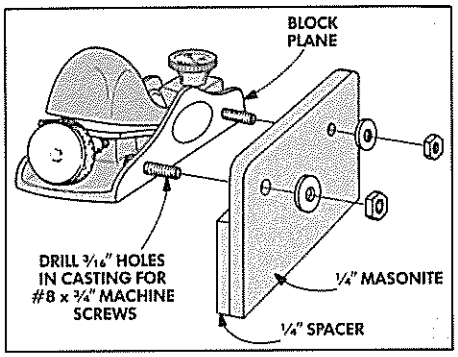
If you're in the San Francisco area, stop in and see our "new" store. Tad will be happy to show you around. It's easy to find. Just take the University exit off I-80 in Berkeley. The Store is at 1836 Fourth St. (We're between a stained glass store and a hot-tub maker.)

NEXT MAILING. The next issue of *Woodsmith* (No. 49) will be mailed the week of March 9th.

Tips & Techniques

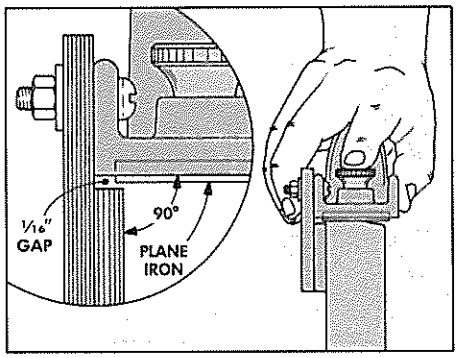
EDGE TRIMMING PLANE

At one time Stanley made a No. 95 edge trimming block plane that was a beauty. It would smooth the edge or end of a board and leave the edge at a right angle to the face. But Stanley stopped manufacturing the No. 95 in 1958. There have been some excellent remakes of this plane recently, but the prices start at $62.50.



I decided to make my own version of the plane by adding a removable fence to the side of a block plane so the fence projects below the bottom of the plane. The fence is actually two pieces of ¼" Masonite glued together. The second piece is glued onto the first to take up the space between the side of the plane and the corner of the plane iron (see drawing below).

When I added the fence to the plane I discovered that all plane sides are not perpendicular (90°) to the soles. To obtain a 90° angle using this attachment, the side with the fence must be perpendicular to the sole. So I started by filing one side carefully and checking it until it was square.



After the side is square with the sole, drill two holes in the side of the body casting for machine screws, washers, and nuts. Then locate and drill corresponding holes in the Masonite fence so there's a 1/16" gap between the plane sole and the top edge of the lower piece of Masonite. The gap allows the plane iron to project slightly from the sole and make the cut.

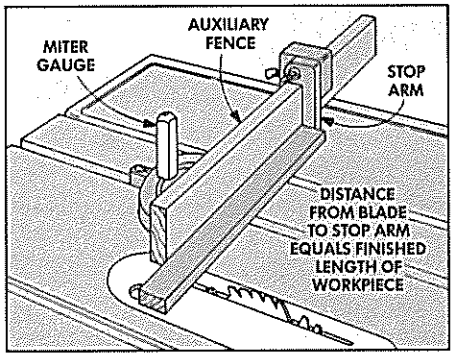
To use the plane, grab it in one hand and plane the edge of the workpiece with the fence rubbing against one of the faces. Rubbing a little wax on the Masonite fence makes it slide easier.

Martin Staunt
Baileys Harbor, Wisconsin

FLIP-UP STOP BLOCK

I built this little stop block to help when cutting wood to a specific length on the table saw. It hooks over the top of my miter gauge auxiliary fence and includes a stop arm that flips up out of the way when it's not needed.

I find the stop block handy in a couple of situations. First, it's always there, hooked over my auxiliary fence. I don't have to look around the shop for a suitable wooden block and C-clamp. When I want to use it, I just flip the arm down and position it for the cut. When it's not needed, the arm can be lifted out of the way.



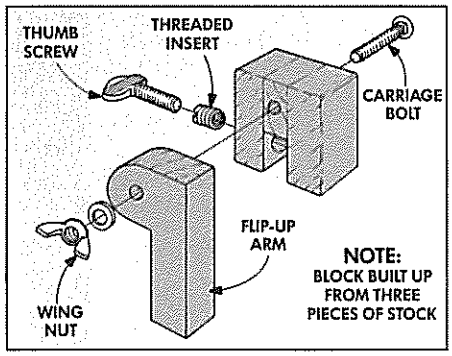
Second, it's handy when cutting multiple pieces to the same length. To use it, I start by positioning the block so the arm is at the correct distance from the blade. Then flip the arm up out of the way and square-up one end of the first workpiece. Next, flip the arm down and turn the workpiece end for end so the squared-up end is against the arm. Now cut the piece to length.

To get the next piece to the exact same length, flip up the arm and start the sequence again. By following this procedure I'm less likely to get confused. I'm only working with one piece at a time, but all the pieces end up the exact same length.

To build the stop block, begin by gluing up three pieces of stock to form an upside down "U" that straddles the auxiliary fence. Next drill and fit a threaded insert all the way through the back leg of the "U" block to accept a thumb screw.

To tighten the block onto the auxiliary fence just set the block on the fence and turn the thumb screw until it starts to dig in. (Eventually I need a new auxiliary fence, but I switch fences often anyway.)

The workpiece butts up against the flip-up arm that's shaped like a backwards "P."



Attach the arm to the block with a carriage bolt, washer, and wing nut, and the stop block is ready to use.

Dr. C. W. Ellis
Coldwater, Michigan

DRILLING DOWEL HOLES

A recent project called for several ¼" dowel pins. But when I purchased some ¼" dowels they were all very slightly different diameters. Most fit too tightly into the ¼" holes I drilled. Rather than make the dowels smaller by sanding, I decided to make the holes larger.

The next size fractional drill bit (17/64") was too large, so I purchased a "letter" size twist drill bit. Letter bits are used by machinists and are made in smaller graduations than fractional bits.

An "F" (.257") or "G" (.261") bit works fine for most ¼" (.250") dowels. A "V" (.377") or "W" (.386") bit works fine for most ⅜" (.375") dowels.

Joseph Jetton
Modesto, California

Editor's Note: Letter, number, and metric size twist drill bits are available locally from industrial equipment and supply houses. "Undersize" (-1/64", that's .0156") and "oversize" (+1/64") brad point bits are available from Woodworker's Supply of New Mexico, 5604 Alameda NE, Albuquerque, NM 87113. Tel. 800-645-9292.

SEND IN YOUR IDEAS

If you'd like to share a woodworking tip with other readers of *Woodsmith*, send your idea to: *Woodsmith*, Tips & Techniques, 2200 Grand Ave., Des Moines, Iowa 50312.

We pay a minimum of $10 for tips, and $15 or more for special techniques (that are accepted for publication). Please give a complete explanation of your idea. If a sketch is needed, send it along; we'll draw a new one.

Magazine Rack

A PLACE FOR YOUR PERIODICALS

The best part of building this magazine rack is the chance to make a frame with an arched-top raised panel. At least, that was one of the main reasons I wanted to build this project.

However, if you don't want to use frame and panel construction, there is an easier way. You could make the end panels by gluing up solid stock.

And there's also an option with the spindles on the sides of the magazine rack. If you don't have a lathe, no problem. You can buy the spindles, see Sources, page 24.

SOLID PANELS

If you want to make solid end panels, glue up enough 4/4 (13/16" actual thickness) stock to form blanks 13" wide by 15" long, see Fig. 1. When the glue is dry, trim the ends square, and mark a centerline on the bottom edge of the blank. Then mark a point 4" to each side of the centerline, and trim the sides off at 10° at these marks.

CUT TO SHAPE. To complete the solid end panels, transfer the curved pattern shown in the ½" grid in Fig. 3, and cut the top to shape. Then rout a profile on the edges (see Fig. 10) and drill the holes to attach the side rails, see Fig. 14.

FRAME CONSTRUCTION

The alternative to the solid panels is a lot more fun. The ends of the rack can be made with frame and panel construction. (Refer to the articles on pages 16 to 21 for details on this type of construction.)

STILES. Begin work on the frame by cutting the stiles (A) from 4/4 stock to 1½" wide by 12¼" long, see Fig. 2.

CUT GROOVES. After the stiles are cut to size, rout a ¼"-wide groove centered on the inside edge of the stiles. To do this, I used a ¼" slot cutter on the router table. (For the slot cutting technique, see page 19.)

Note: After cutting the grooves in the stiles, leave the router table set up so identical grooves can be cut in the top and bottom rails later.

LAYOUT AIDS. Before going to work on the top rail, I made two layout aids: a block with a 10° angle cut on one end for setting up the miter gauge; and a cardboard template with an arc with a 10" radius. (See page 16 for more on these aids.)

LAY OUT TOP RAIL. Now the top rail (B) can be laid out. To establish the overall length, begin by marking a shoulder-to-shoulder distance of 8⅝" on the bottom edge of the workpiece, see Fig. 3.

Then use the angled block to extend a line at 10° from these marks across the face of the top rail. (These are the shoulder lines of the tenons.) To establish the length of the tenon, draw a second set of lines ½" from the shoulder lines.

DRAW PROFILE. Now the curved profiles

MATERIALS LIST

Overall Dimensions: 18⅜" h x 12" w x 13⅜" d

A	Stiles (4)	13/16 x 1½ - 12¼
B	Top Rails (2)	13/16 x 3¼ - 11 rough
C	Bottom Rails (2)	13/16 x 1½ - 6¾ rough
D	End Panels (2)*	13/16 x 9½ - 11 rough
E	Side Rails (4)	13/16 x 1½ - 16¾
F	Handle (1)	13/16 x 3½ - 17¼ rough
G	Divider (1)	13/16 x 1½ - 16¼
H	Bottom Panel (1)*	13/16 x 7 - 16¾

* Edge glue smaller pieces to form end panels and bottom.

CUTTING DIAGRAM

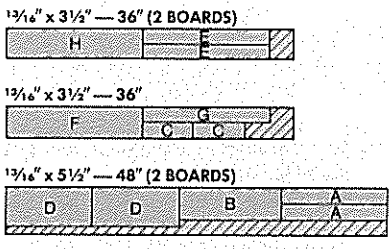


FIGURE 1

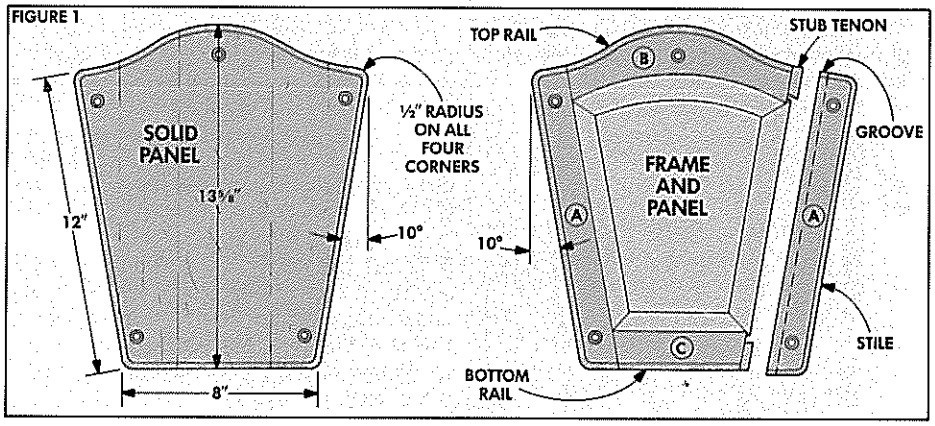
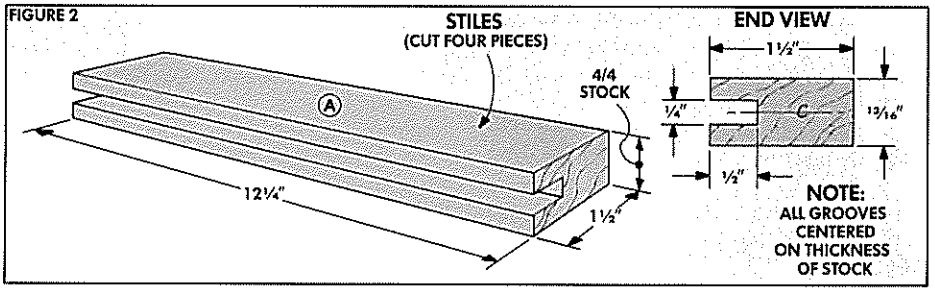


FIGURE 2



can be drawn on the top and bottom edges of the rail. Use the arch template (with the 10" radius) to draw the curve on the bottom edge of the rail. Then make another template (shown in the ½" grid in Fig. 3) to draw the shape on the top edge.

CUT RAILS TO LENGTH. After the profiles are drawn, the top rail can be cut to length. Set the miter gauge to 10° (using the angle block) and cut off both ends at the outside (tenon) lines, see Fig. 4.

BOTTOM RAIL. Before cutting the top rail to the arched shape, I made the bottom rail (C) . This rail is 1½" wide by about 7" long with one end trimmed off at 10°, see Fig. 4. (It's cut to final length later to fit between the stiles.)

JOINING THE FRAME

After the rails are cut to length, stub tenons are cut on the ends. (Stub tenons fit the grooves on the inside edge of the frame, refer to Fig. 5, rather than fitting in a full mortise as on the cradle shown in this issue.)

When cutting the stub tenons, I cut both ends of the top rail but only one end of the bottom rail. To cut the tenon on the other end of the bottom rail, clamp the rest of the frame together, see Fig. 6.

Then lay the bottom rail in place, mark where it meets the opposite stile, and cut the tenon on this end of the rail. (Refer to page 19 for more on this procedure.)

CUT TO SHAPE. After the tenons are cut, the top rail can be bandsawn and sanded to shape. Then rout the ¼"-wide groove for the panel on the inside edges of the top and bottom rails, see Fig. 7.

THE PANEL

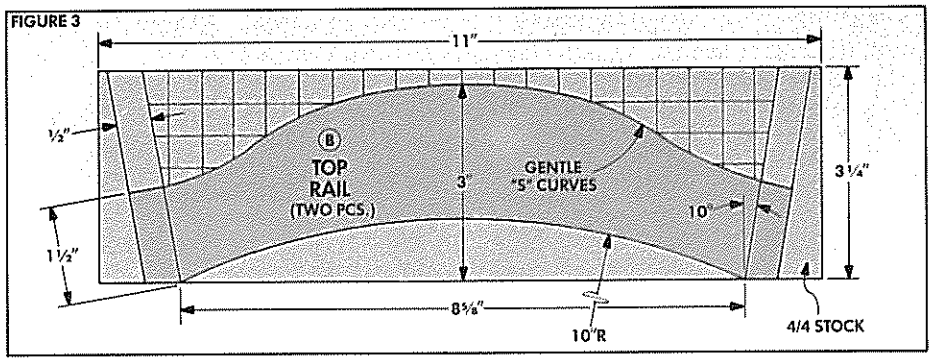
At this point, the frame is complete. Now the panel can be made. Glue up 4/4 stock to a rough size of 9½" by 11", see Fig. 8. When the glue is dry, cut the panel to fit inside the angled frame. (See page 20 for tips on cutting the panel to size.)

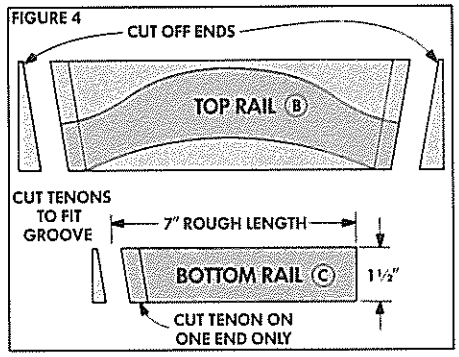
CUT CHAMFER. After the panel is cut to size, the edges are chamfered to "raise" the field in the center. To chamfer the edges, first make the jig for the table saw as described on page 20.

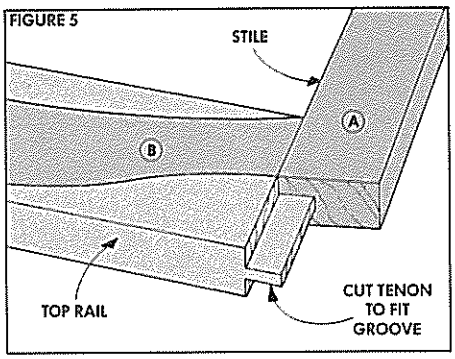
Note: The procedure for cutting the chamfered edge on this panel is the same as the procedure on the cradle described on pages 20 and 21, except the blade is tilted at 10° (instead of 7° as on the cradle), and the total width of the chamfered border is only 1", see Fig. 9.

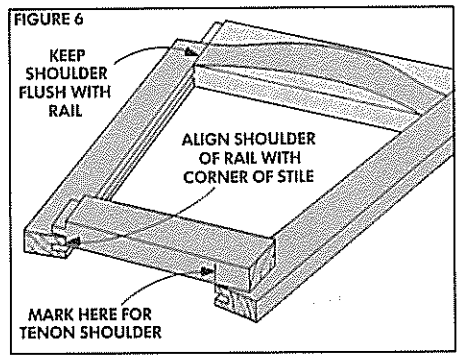
ASSEMBLE FRAME. Now the frame can be assembled with the panel inside. (Don't glue the panel into the grooves, it should be able to expand and contract.)

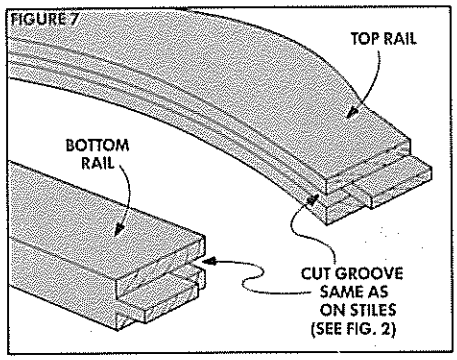
When the glue is dry, trim the bottom ends of the stiles flush with the bottom rail, see Fig. 10. Then round the corners to a ½" radius. And finally, rout the outside edges with a ¼" round-over bit, leaving a 3/32" shoulder, see Detail in Fig. 10.

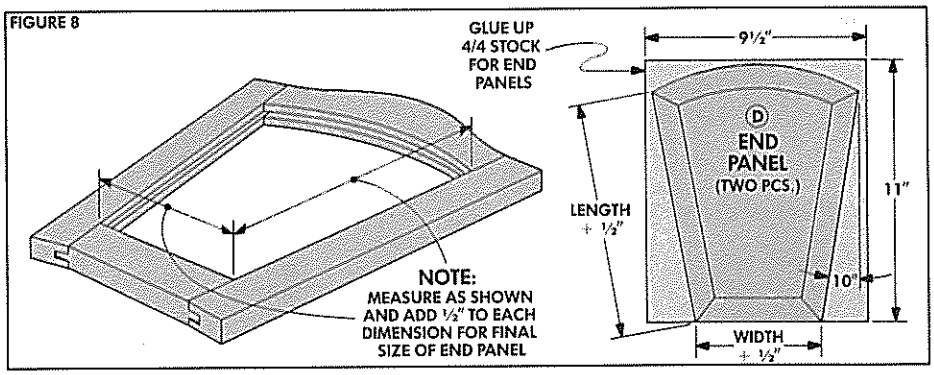


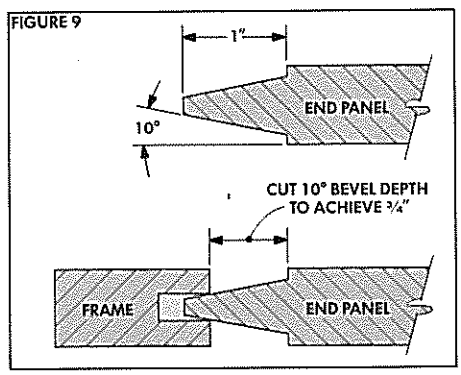


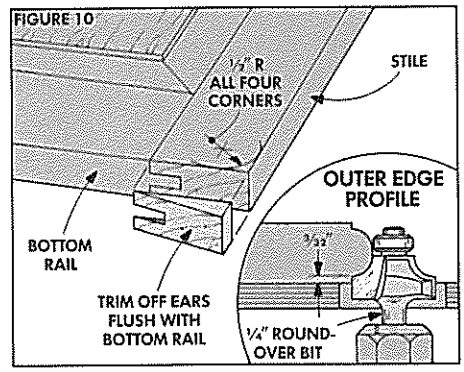


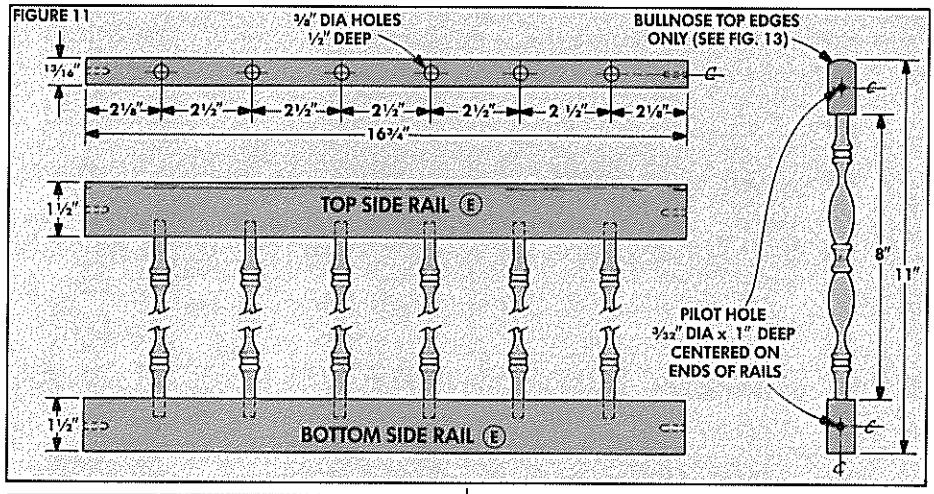


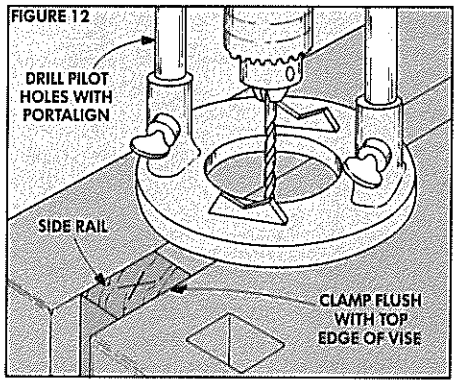


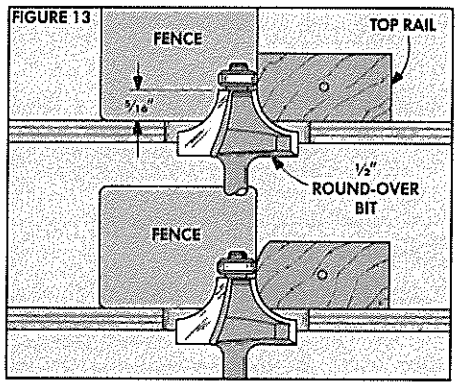


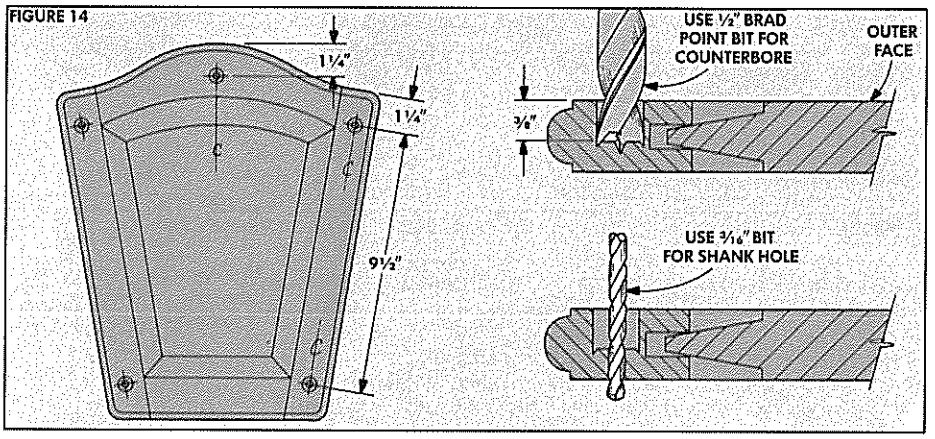


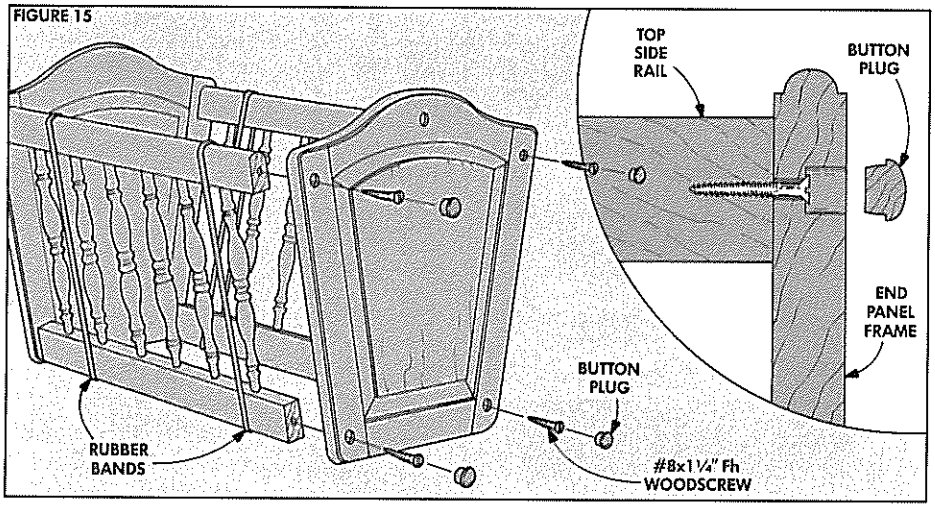












THE SIDES

After the frame and panel ends are assembled, the sides of the magazine rack can be made. Each side consists of six 9"-long turned spindles mounted between a top and bottom rail. Begin by ripping the top and bottom side rails (E) from 4/4 stock to 1½" by 16¾", see Fig. 11.

SPINDLE HOLES. After the rails are cut to size, ⅜" holes for the spindles are drilled ½" deep on the inside edges of the rails. To position the spindles, begin by drilling holes 2⅛" from each end. Then drill the remaining holes 2½" apart, see Fig. 11.

RAIL MOUNTING HOLES. The next step is drilling pilot holes for the screws that fasten the side rails to the end frames. Begin by marking the centerpoint on the ends of each rail, see Fig. 12. Then drill a 3/32" pilot hole 1" deep.

Shop Note: To make sure the rail ends are drawn tight against the end frames, these pilot holes have to be absolutely perpendicular. I secured the rail in a bench vise (see Fig. 12), and used a Portalign to drill the holes.

TOP RAIL PROFILE. The last step on the side rails is forming a bullnose profile on the upper edge of the *top* rails. I did this by using a ½" round-over bit set only 5/16" high in the router table, see Fig. 13.

DRILL MOUNTING HOLES. After the rails are finished, five counterbored holes are drilled on the end frames, see Fig. 14. The four holes in the stiles are for the screws that secure the end frames to the side rails. The hole in the top rail is for the handle.

These holes are bored in two stages. Begin by boring the ⅜"-deep counterbores with a ½" brad point bit. Then drill the rest of the way through with a 5/16" bit.

ASSEMBLE SIDES. The next step is assembling the rails and spindles to form the sides. Since the spindles aren't glued into the holes, this step requires three hands. (I strapped the sides together with rubber bands, see Fig. 15.)

With the rubber bands holding the sides together, the rails can be screwed to the end frames. Begin by attaching the top rails. Then align the bottom holes with the bottom rail and screw the parts together.

THE HANDLE

After assembling the pieces to form the basket, I made a carrying handle with an elongated hole for a grip.

CUT TO SIZE. Begin by cutting the handle workpiece from 4/4 stock 3½" wide and about 1" longer than the inside dimension of the assembled basket, see Fig. 16.

HANDLE ENDS. To prevent the handle from pivoting, shoulders are cut on the ends of the handle. These shoulders fit under the top rail of the end frame, and are flush against the chamfered border of the panel, see Cross Section, Fig. 19.

Forming these shoulders calls for some precise cuts. Begin by marking the inside dimension between the top rails of the assembled basket on the workpiece (16¾"). Then to make sure the shoulders fit tight against the panels, add ½" (two times ¼") to this measurement for a final length of 17¼" and cut the handle to final length, see Fig. 16.

Now, measure down 3⅛" from the top of the handle to mark the top edge of the support shoulder. Then notch out the shoulder by standing the workpiece on edge and cutting a ¼"-wide notch to the marked line, see Fig. 17.

CUT SHOULDER ANGLE. Next, the end of this shoulder has to be trimmed off to match the chamfer angle on the panel. To do this, set the miter gauge at 10° (to match the chamfer angle) and trim off the end so the distance to the long point of the shoulder equals the distance from the face of the rail to the face of the chamfered border on the panel, see Detail in Fig. 19.

GRIP HOLE. After the shoulders are formed, a grip hole is cut in the workpiece. Begin by marking a centerline on the workpiece. Then drill two 1" holes centered 1½" down from the top edge and 2" out from the centerline, see Fig. 16. Now cut out the waste between these holes and contour the inside edges with a ½" round-over bit.

Finally, cut the curved profile on the top edge of the handle to shape, see Fig. 16.

THE BOTTOM

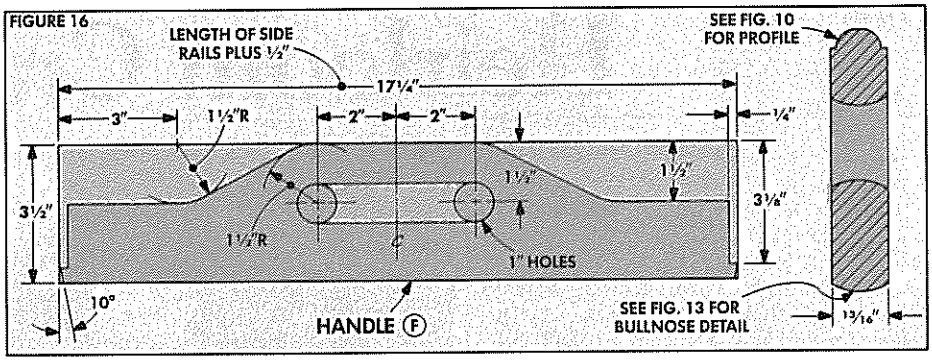
After I finished the handle, I made the bottom panel (H). This panel (which can be plywood or glued up stock) isn't fastened to the basket. Instead, it rests on dowels glued into holes on the bottom rails of the end frames, see Fig. 20.

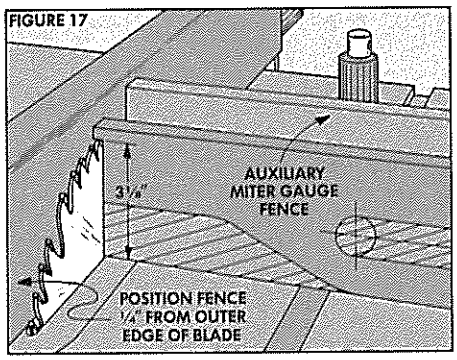
CUT PANEL. Begin by cutting the panel to length so it's slightly less than the length of the side rails. Then cut the panel to width so it fits loosely between the bottom rails (to allow for seasonal expansion). But measuring the width is difficult because the side rails are at a 10° angle.

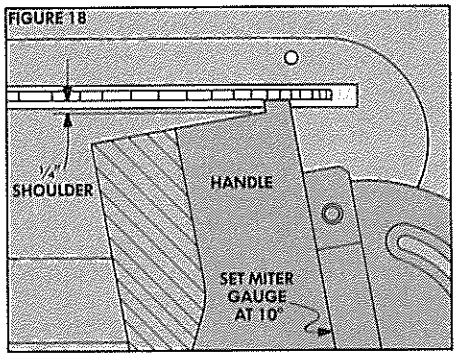
To deal with the angle, begin by setting the saw blade to 10°. Then trim the edges and test fit the panel between the rails. Keep trimming until the panel rests on the dowels with about 1/32" clearance on either side, see Fig. 21.

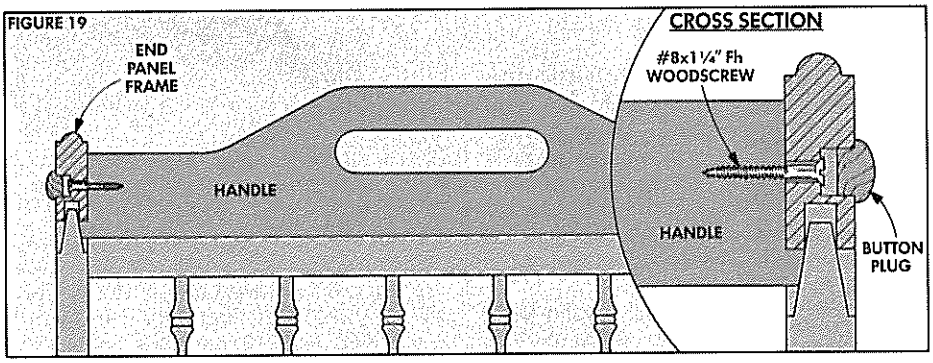
DIVIDER. The last step is making a divider to keep the magazines from slumping to the bottom of the basket. To make this divider, cut a piece of 4/4 stock 1½" by 16¼". Then bullnose the top and the ends and fasten it with screws through the bottom panel, see Fig. 22.

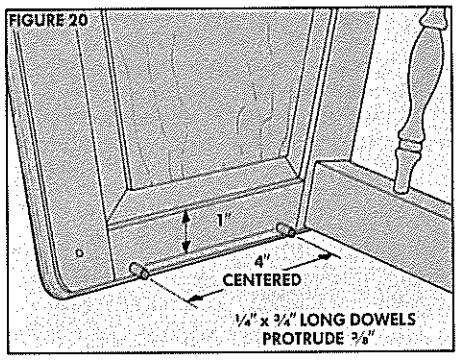
FINISH. I used the same Minwax finish as on the cradle, see Sources, page 24. But, before applying the finish, I disassembled the sides, handle, and bottom panel. Then I was able to wipe on and rub out the finish with no runs or built-up spots.

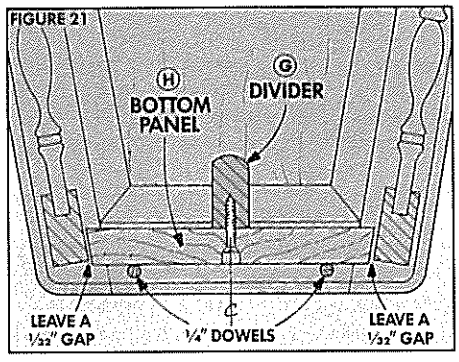


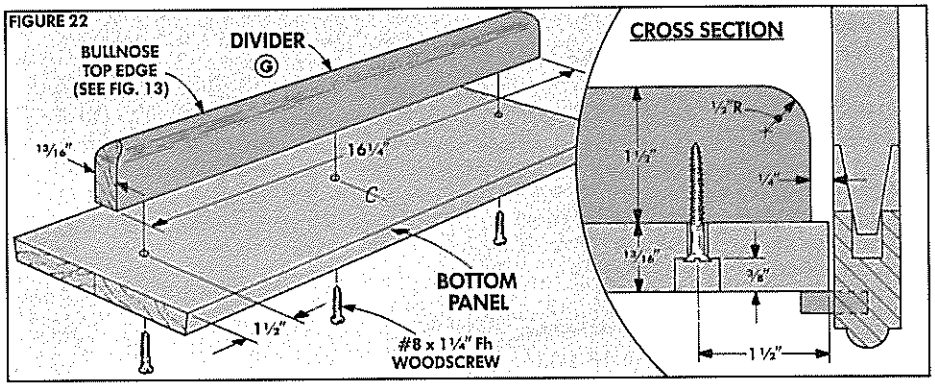












Heirloom Cradle

CRADLED IN CRAFTSMANSHIP

I've noticed a couple things about cradles, grandfathers, and babies. First, cradles are usually built by grandfathers for their first grandchild. Second, babies grow up too fast.

Today, grandpa often lives across the country from his first grandchild and shipping a cradle like the one shown here would be a challenge. So we've made this cradle a knock-down version.

And from what I remember, babies outgrow a cradle quicker than two shakes of a lamb's tail. The cradle often spends much of its life in the attic waiting for the birth of a little brother or sister. Once again, the knock-down feature makes it easy to store.

There's one other thing I should mention about the cradle. You don't have to lathe-turn all the spindles (unless you want to). On page 24 is a source for beautiful pre-turned spindles in birch, oak, and cherry.

END FRAMES

I started work on the cradle by building the end frames. There are a couple of options when making these frames. You can build a frame with a solid raised panel (as I did). Or you can simplify it by making the panel out of plywood (flat, without the chamfered border). Or, to make it even simpler, you can make the entire end piece out of solid wood (no frame at all).

SOLID WOOD ENDS. To make solid wood ends, start by edge-gluing enough 4/4 stock (13/16" actual thickness) to form blanks that are 22" wide and 19" long, see Fig. 1. After the glue dries, plane the blanks flat and cut the panels so the sides are angled at 15° and the base is 13¼" wide.

Then trace and cut out the top profile. (Note: *Woodsmith* now offers a full-size pattern for the profiles in this project, see page 24.) Once the top profile is cut to shape, drill counterbored holes to screw the end panels to the basket sides and also drill a ¾"-dia. hanging hole near the top, see Fig. 6. Finally, round the corners and rout the bullnose edge profile, see Fig. 8.

FRAME AND PANEL. If you decide to make the frame and panel ends, there's more work, but it's rewarding in the end. (For an explanation on making a frame and arched-top panel, see pages 16-21.)

FRAMES

Each end frame consists of two identical stiles (vertical pieces) that are joined to a top rail and a bottom rail with mortise and tenon joints. Begin by cutting the stiles (A) from 4/4 stock to a finished width of 1¾" and length of 14¾", see Fig. 2.

MATERIALS LIST

Overall Dimensions: 38⅝" w x 20½" d x 33¼" h

A End Stiles (4)	13/16 x 1¾ - 14¾
B End Top Rails (2)	13/16 x 5½ - 24 rough
C End Bottom Rails (2)	13/16 x 2 - 14 rough
D End Panels (2)*	13/16 x 20 - 15
E Side Rails (4)	13/16 x 1¾ - 32½
F Side Stiles (4)	13/16 x 1¾ - 12 1/16
G Spindles (22)	⅞" dia. x 11 (see p. 24)
H Basket Bottom (1)*	½ x 12 - 32½
I Bottom Cleats (2)	½ x ¾ - 32½
J Feet (2)**	1⅝ x 3¼ - 21 rough
K Uprights (2)	13/16 x 7¼ - 34 rough
L Stretcher (1)**	1⅝ x 2⅝ - 39⅛
M Stretcher Cap (1)	13/16 x 2 - 34⅝
N Wedge Pins (2)	⅝ x 13/16 - 5

* Edge glue pieces to form panels and bottom.
** Build up from two pieces of 4/4 stock.

CUTTING DIAGRAM

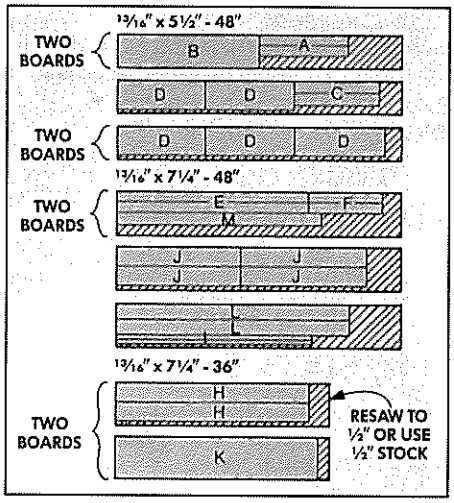
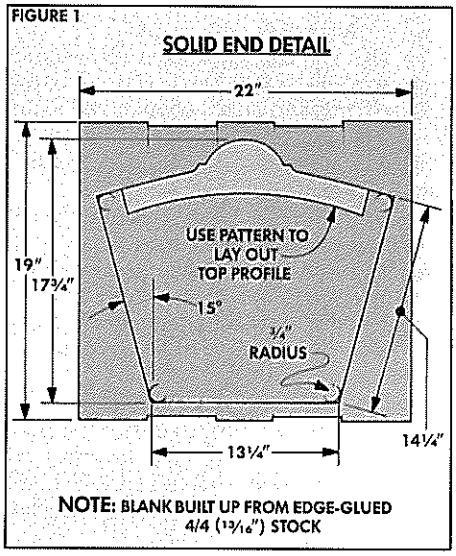


FIGURE 1



NOTE: BLANK BUILT UP FROM EDGE-GLUED 4/4 (13/16") STOCK

MORTISES. Next, cut ¼"-wide mortises on the inside edge of each stile. Locate the mortises ¼" from the top end and ½" from the bottom end, see Fig. 2. (They're located farther from the bottom end so radii can be cut on the completed frame.)

TOP RAILS. After the mortises are complete, cut the top rail (B) from 4/4 stock to a rough width of 5½" and length of 24". Then lay out the 1"-long tenons and the profile of the top on the blanks.

Once the layout is complete, cut the top rail to length with the angled tenons on each end. (Again, see page 16 for more details on this.) Finally, cut and sand the top profile to final shape.

BOTTOM RAILS. The bottom rails (C) are cut from 4/4 stock to a width of 2" and a rough length of 14", see Fig. 2. To determine the shoulder-to-shoulder length of the bottom rail, temporarily clamp the top rail between the stiles and measure.

Then cut the bottom rail with angled tenons for a tight fit between the stiles. Finally trim the tenons to fit the mortises.

ROUT GROOVES. Once all the frame pieces fit together, use a slot cutter to rout a ¼"-wide groove centered on the inside edges of all the pieces, see Figs. 3 and 4.

PANEL

With the frame complete, work can begin on the panel. As mentioned above, the panel could simply be a piece of ¼" plywood. But I decided to build a raised panel.

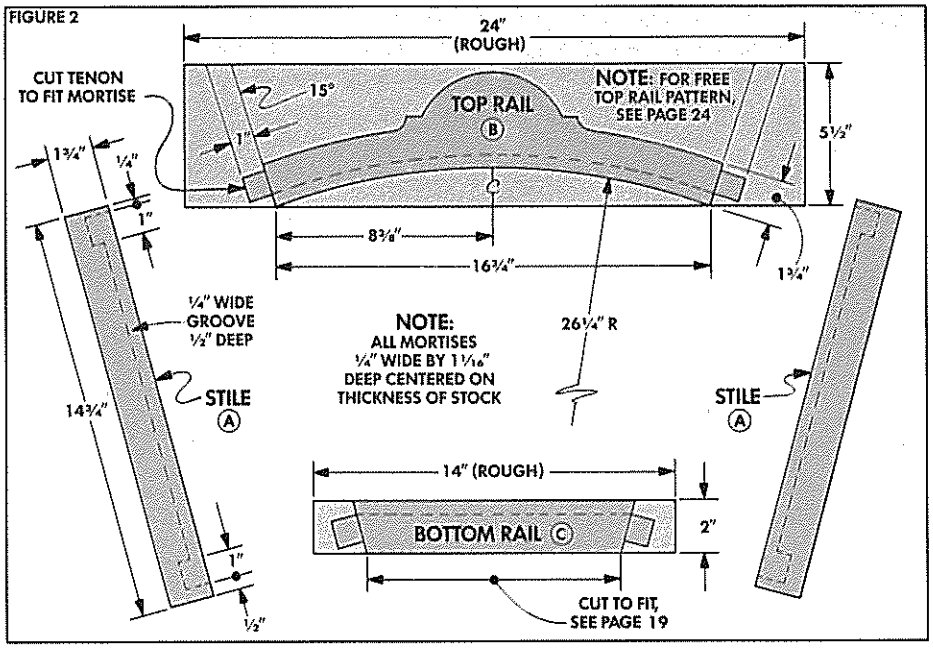
I began by edge-gluing enough 4/4 stock to make blanks for end panels (D) with a rough width of 20" and length of 15", see Fig. 3. To determine the finished size of the panel, temporarily clamp the frame together and measure the opening, see Fig. 3. Then add ½" to the opening measurements (so the panel will fit ¼" into the ½"-deep grooves on each side), and cut the panel to size.

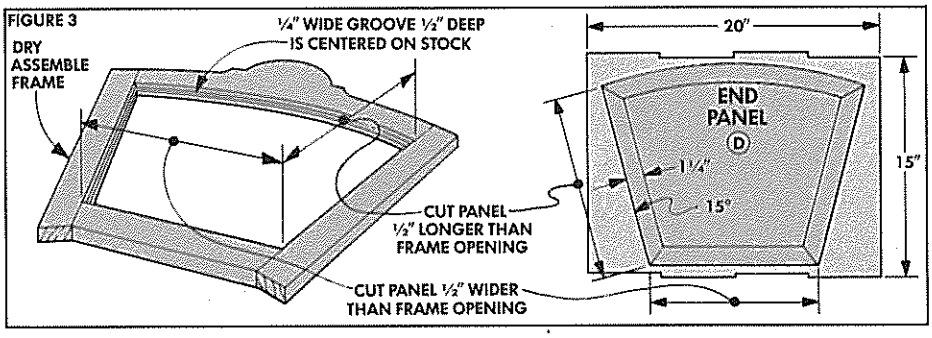
BORDER. Next cut a 1¼"-wide chamfered border on each side of the panel. To cut the arched-top edge, you will have to use a special table saw fence, see page 20.

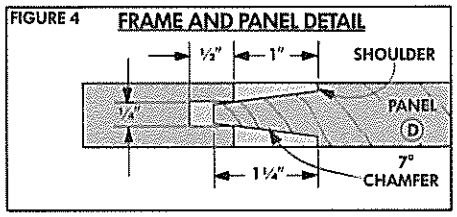
ASSEMBLY. Once the chamfered borders are cut, glue the frame together with the panel in place. (Note: It's a good idea to stain and finish the chamfered borders *before* assembly. You can't get to the edges of the border after it's mounted in the frame. Also, to allow for expansion/contraction, don't glue the panel to the frame.)

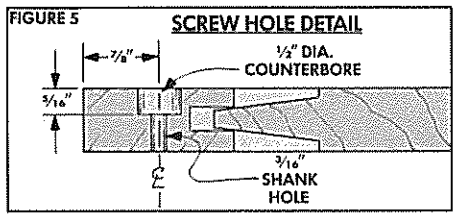
DRILL HOLES. Once the frame is dry, drill three counterbored shank holes in each stile for the screws that hold the end frame to the basket sides, see Figs. 5 and 6. Then drill a ¾"-dia. hole in the top rail to hang the basket from the stand, see Fig. 6.

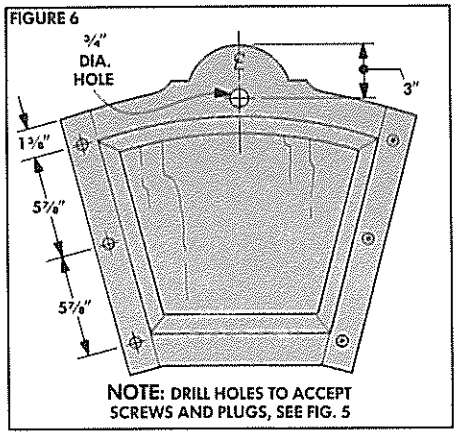
Now set the miter gauge to 15° and trim off the bottom "ears," see Fig. 7. Finally, radius the corners and rout a bullnose profile on the edges, see Fig. 8. (Note: The inside routed corners can be cleaned up with a chisel, see Shop Notes, page 15.)

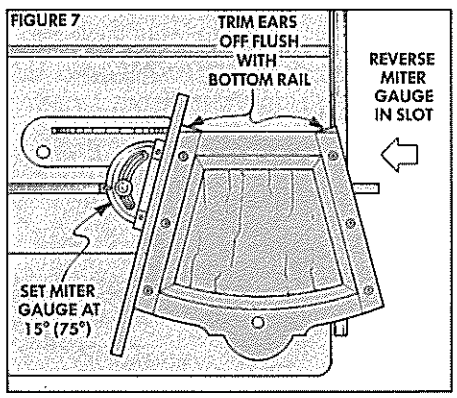


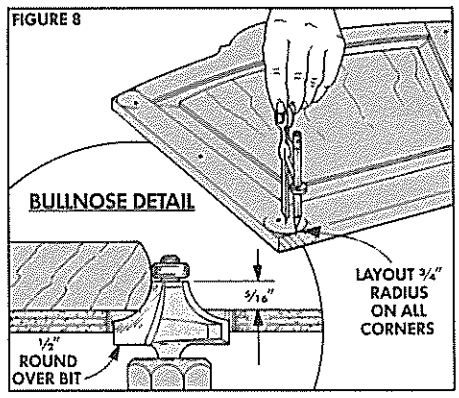


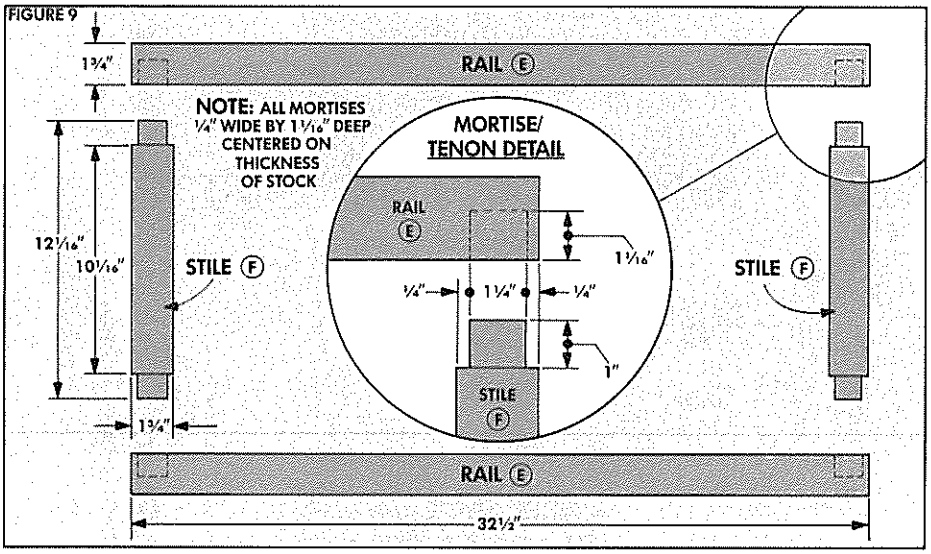


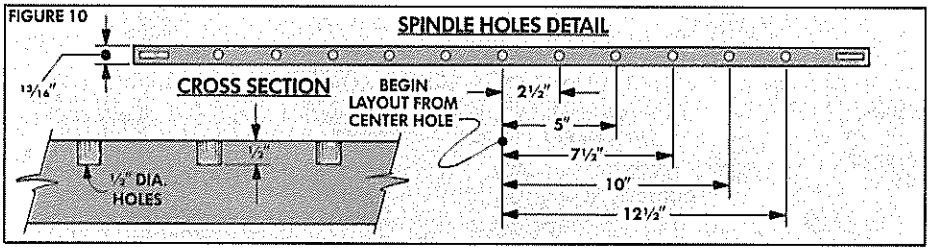


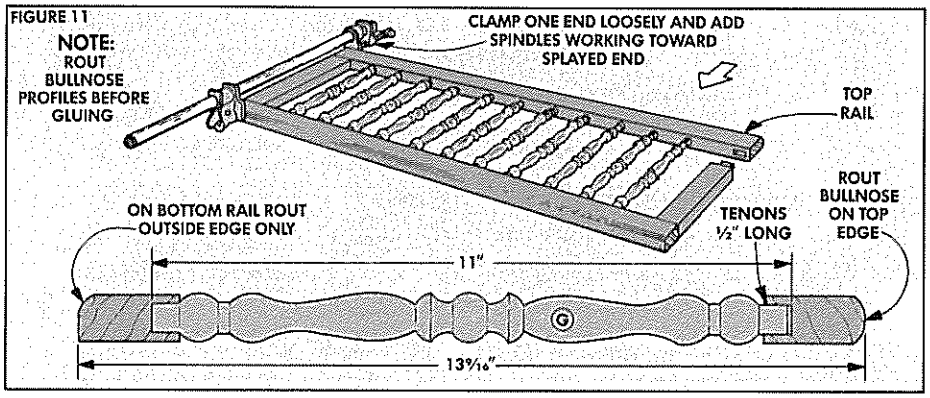


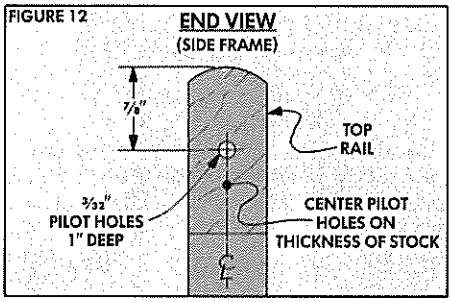


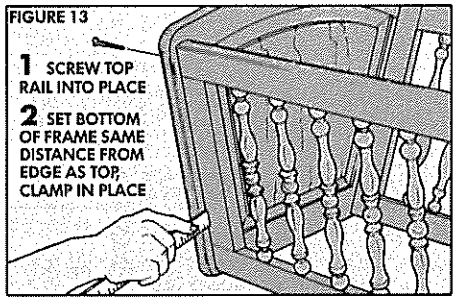


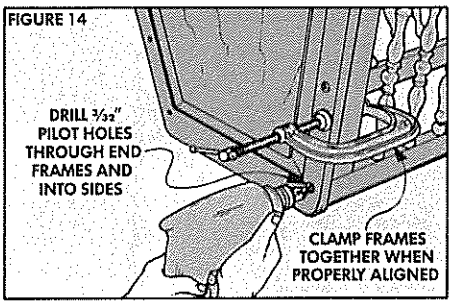


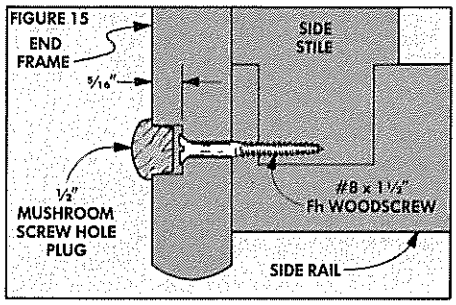












SIDE FRAMES

After the end frames were complete, I began work on the two side frames. Each side frame consists of stiles joined to rails with mortise and tenon joints and eleven spindles held between the rails.

CUT TO SIZE. Start by cutting the two rails (E) and two stiles (F) needed for each frame from 4/4 stock to a width of 1¾", see Fig. 9. Then trim the rails to a length of 32½" and the stiles to a length of 12 1/16".

MORTISE AND TENONS. After the rails and stiles are trimmed to length, cut mortises on the inside edge of each rail, see Mortise/Tenon Detail, Fig. 9. Then cut 1"-long tenons on the ends of the stiles to match the mortises.

Note: After cutting the tenons there should be 10 1/16" between the shoulders at each end, see Fig. 9. This 10 1/16" distance was determined by the length of the spindles (G) I used (see Sources, page 24). The 11"-long spindles have ½"-long tenons on each end, see Fig. 11. This makes the tenon shoulders on the spindles 10" apart, but to allow for inconsistencies in the spindles and prevent any bowing of the rails, I made the shoulder-to-shoulder distance on the stiles 1/16" longer (10 1/16").

HOLES FOR SPINDLES. Next, lay out and drill ½"-dia. holes centered on the inside edge of the rails to accept the spindles. Center the first hole on the length and then lay out the remaining holes working from the centerline, see Fig. 10.

ROUT BULLNOSE. Once all the holes are drilled, rout a bullnose profile (the same as on the end frames) on the top edges of the top rails, but only the *outside* edge of the bottom rails, see Fig. 11. (Later a bottom cleat is added on the inside edge.)

ASSEMBLE THE FRAMES. After routing the profiles, glue up the frames. The easiest way to assemble a frame is to start by gluing the stiles to the bottom rail. Then insert the spindles in the bottom rail. (If the spindles are too thick to fit in the holes, see Shop Notes, page 15.)

Next, loosely clamp the top rail in place at one end. Then splay out the other end and slowly work down the frame adding one spindle at a time, see Fig. 11. (Note: It's not necessary to glue the spindles in place. I found it easier to apply the finish if they could spin.)

ATTACH ENDS TO SIDES. Once the side frames are assembled, they can be screwed to the end frames. (Note: I didn't glue them so the whole cradle could be "knocked down" flat.)

Start by drilling a pilot hole in the end of the top side rail, see Fig. 12. Now hold the end frame up to the side frame and screw in the top screw (through the pre-drilled hole in the end frame).

Then swing the side frame around until the bottom of the frame is the same dis-

tance from the edge as the top, see Fig. 13. Clamp the frames together and drill two pilot holes through the end frames and into the side frame, see Fig. 14.

Finally, use this same procedure with all the other screws. (Note: Once the project was finished, I covered the screws with "mushroom" screw hole plugs, see Fig. 15.)

BASKET BOTTOM

When the end and side frames are assembled, the basket bottom panel (H) can made. This panel is edge-glued from 4/4 stock that's been resawn to ½" thick (or use ½" stock). Glue up a panel that's roughly 13" wide and 34" long, see Fig. 16.

CLEATS. The bottom rests on two ½"-thick cleats (I). Tip the saw blade to 15° (to match the angles of the side frames) and rip two ¾"-wide cleats, see Fig. 16. Then trim each to length to match the side frames. Now screw and glue each cleat to the bottom inside edge of the side frame, see Detail in Fig. 17.

CUT BOTTOM TO SIZE. To complete the bottom panel, keep the saw blade at 15° (to match the side frames) and rip the bottom panel ⅛" less in width than the opening, see Fig. 17. Then trim the panel to length to fit between the end frames. To allow for wood movement (expansion/contraction), the bottom panel isn't glued down but just rests on the cleats.

FEET

With the basket complete, work can begin on the stand. The stand consists of uprights that are joined to feet (J) with mortise and tenon joints.

Each foot is made from two pieces of 4/4 stock laminated together, see Fig. 18. To get the two feet needed, cut four pieces to rough dimensions of 3¼" wide by 21" long and lay out a centerline on each piece.

CUT DADOES. After cutting the stock to rough size, cut two 4"-wide dadoes centered on the length of all four pieces, see Fig. 18. These dadoes form the mortises when the two halves are glued together.

Shop Note: To cut dadoes that are centered on the length of the stock, lay them out and cut one end of the dado using the rip fence as a stop. Then turn the workpiece end for end and cut the other end, see Step 1 in Fig. 19. Finally clean out the rest of the dado by making repeated passes over the dado blade, Step 2.

GLUE UP. Next glue the foot pieces together using a temporary alignment key to keep the dadoes lined up, see Fig. 18. Once the glue dries, trim the blank to 3" wide.

LAY OUT PATTERN. Now using the pattern, lay out the foot profile with the centerline on the blank as a guide, see Fig. 20. Then drill counterbored shank holes in each foot for screws that hold the upright to the foot, see Fig. 21. Finally, cut and sand the feet to shape.

FIGURE 16

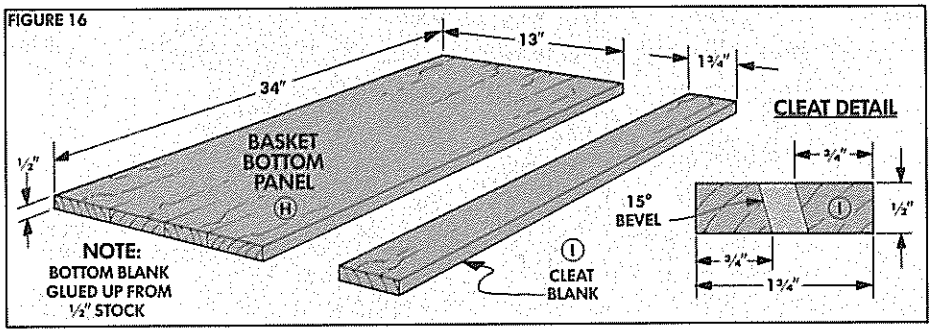


FIGURE 17

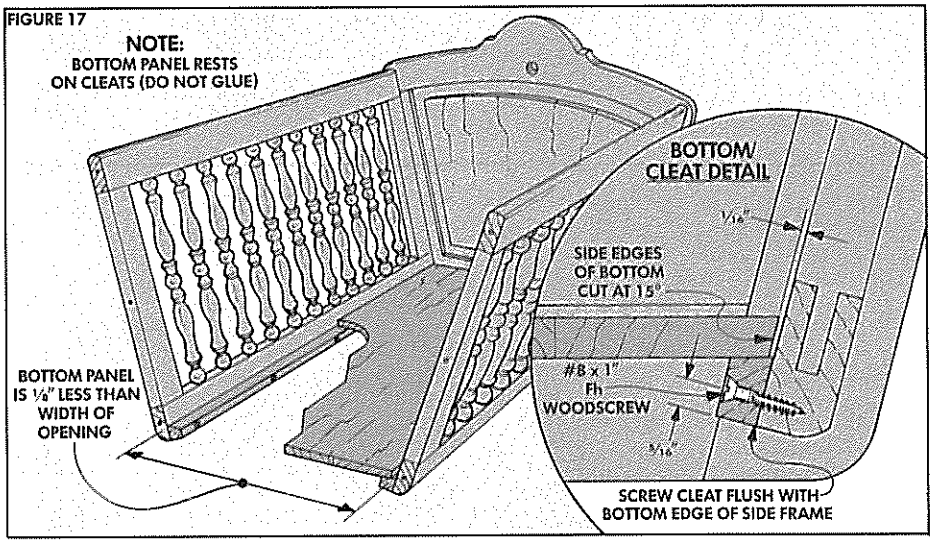


FIGURE 18

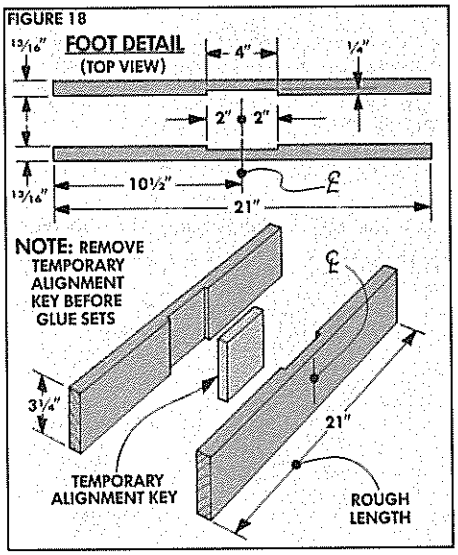


FIGURE 19

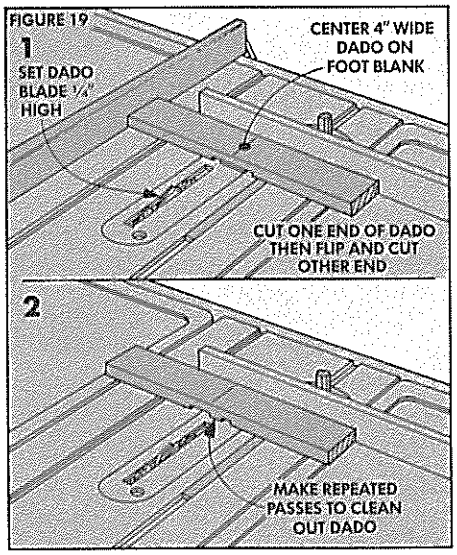


FIGURE 20

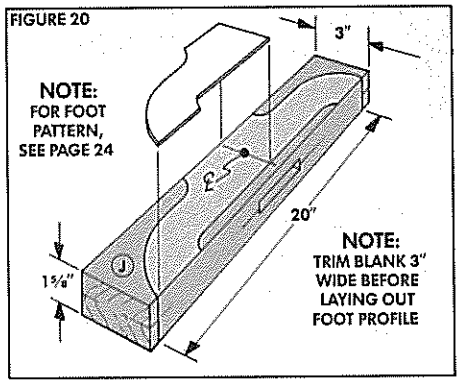


FIGURE 21

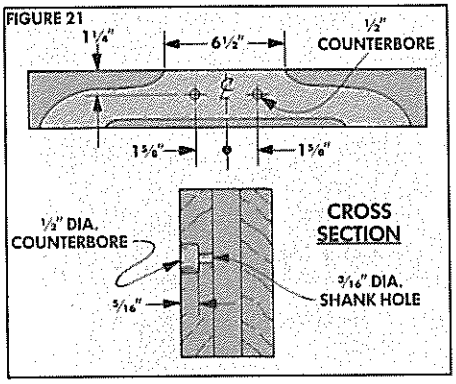


FIGURE 22

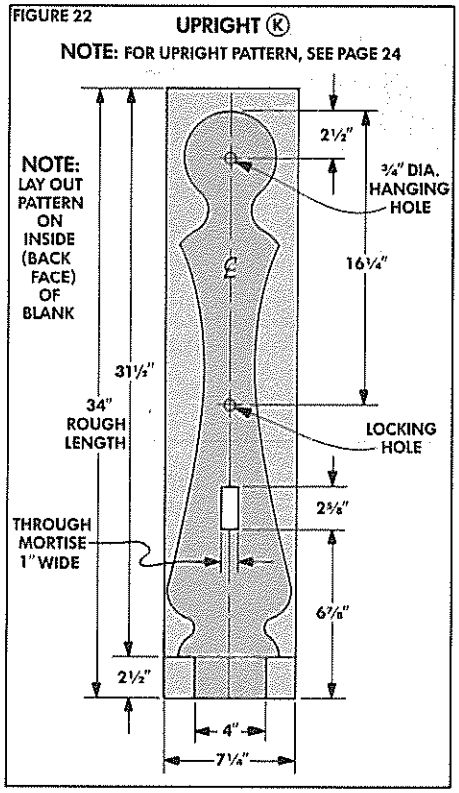


FIGURE 23

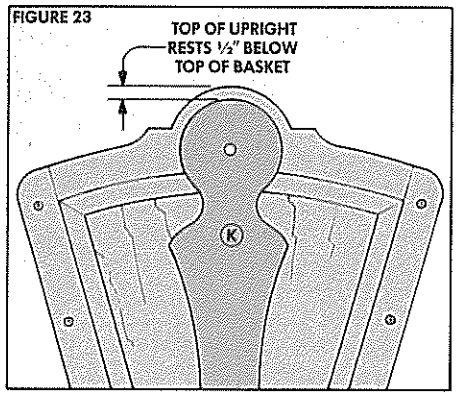


FIGURE 24

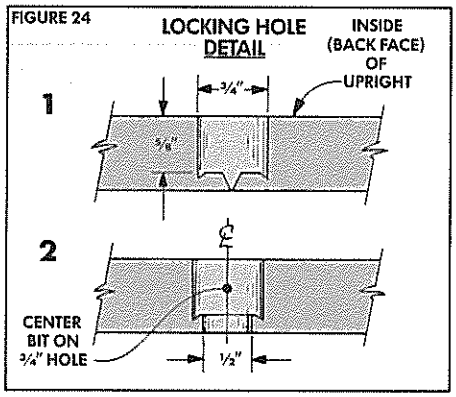


FIGURE 25

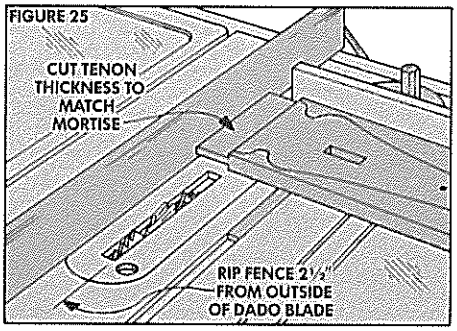


FIGURE 26

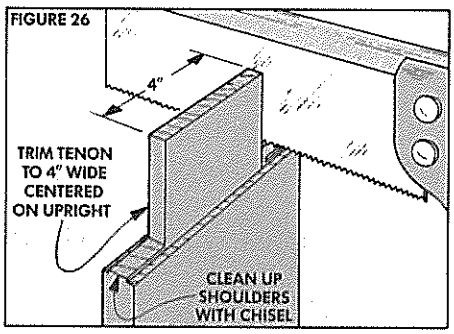


FIGURE 27

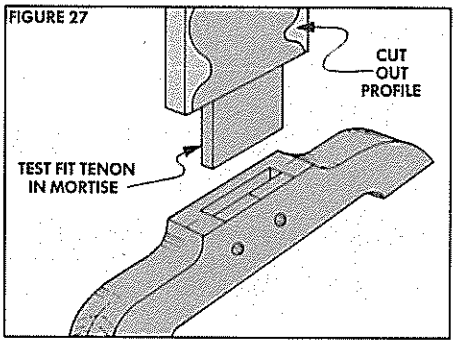


FIGURE 28

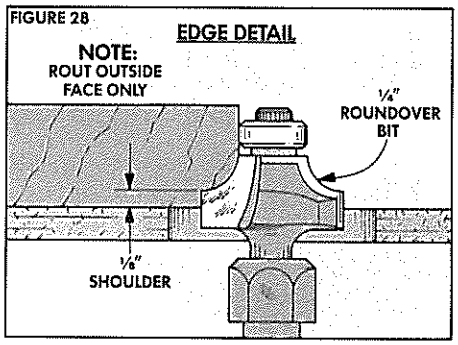
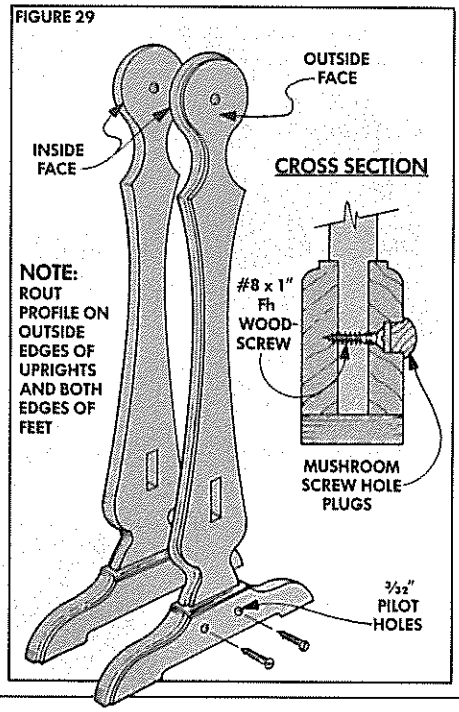


FIGURE 29



UPRIGHTS

After the feet are complete, work can begin on the two uprights (K). Start by cutting two blanks from 4/4 stock to rough dimensions of 7¼" wide by 34" long, see Fig. 22.

To help lay out the holes, mortise, and tenon needed on the uprights, draw a centerline the full length on the inside (back face) of the blank. Then use the *Woodsmith* pattern to draw the upright profile.

HANGING HOLES. Now lay out and drill a ¾" hole for a dowel that holds the hanging basket, see Fig. 22. (Note: With the dowel in place, the top of the upright rests ½" below the top of the basket, see Fig. 23.)

LOCKING HOLES. To lock the basket when you don't want it to swing, there's a locking mechanism on each end. The mechanism fits into a counterbored hole.

To make the counterbored hole, first drill a ¾"-dia. hole ⅝" deep on the *inside* face of each upright, see Step 1 in Fig. 24. Then drill a ½" hole the rest of the way through, see Step 2.

MORTISE. After the holes are drilled, lay out and cut the 1"-wide mortise for the stretcher. It's centered on the blank with the bottom edge 6⅞" up from the bottom, see Fig. 22.

TENON. Next, I cut tenons on the bottom of the blanks to match the mortises in the feet. To cut the tenons to correct length, set the rip fence 2½" away from the *outside* of the dado blade, see Fig. 25.

Once the tenons are cut to the correct length and thickness, trim each tenon to width so it fits the mortise, see Figs. 26 and 27. Then cut the uprights to final shape.

ROUT THE PROFILE. There's one other step on the uprights before they can be mounted to the feet. Rout a ¼" roundover with a ⅛" shoulder on the *outside* face of each upright, see Fig. 28. While I was at it I also routed the same profile on *both* top edges of the feet, see Fig. 29.

SCREW FEET TO UPRIGHTS. Now, put an upright into a foot (no glue) and drill pilot holes, see Cross Section in Fig. 29. Then screw the foot to the upright.

STRETCHER

The uprights are tied together with a stretcher (L) using mortise and tenon joints and wedge pins. I made the stretcher like the feet — cut dadoes in two pieces of 4/4 stock and then laminate the pieces together to form the mortises, see Fig. 30. Start by cutting both stretcher pieces 2⅝" wide (to match the mortise in the upright) and to a rough length of 40".

STRETCHER LENGTH. To determine the finished length of the stretcher, measure the overall length of the basket. Now add ½" (for two ¼" spacers) to this measurement and also add 4½" (for the two 2¼"-long tenons on the ends). In my case this came out to a total of 39⅛".

Before cutting the stretcher pieces to final length, something should be said about the dadoes that form the mortise. To hold the angled wedge pins, the dadoes in each half of the stretcher are cut at a 3° angle, see Fig. 30.

Orienting the dado angles in both pieces can get confusing, so I cut matching 3° angles on the *ends* of the stretcher first. Then the *full end* of the stretcher will run against the rip fence when the dado is cut, see Fig. 31. (Note: Cut the 3° angle on the end of the stretcher pieces so the finished length is 39⅛" from long point to long point, see Fig. 30.)

DADOES. To cut the dadoes, set the dado blade 5/16" high and set the rip fence ¾" from the inside of the dado blade. Then angle the miter gauge to 3° and push the angled end of the stretcher up tight against the rip fence. Now cut a dado at one end of each piece, see Fig. 31.

Next, turn the pieces end-for-end, angle the miter gauge 3° in the *opposite* direction, and cut the remaining dadoes.

After the dadoes are cut, glue the stretcher pieces together with temporary alignment keys in the dadoes, see Fig. 30.

TENONS. Once the glue dries, cut tenons on each end of the stretcher to match the mortises in the uprights, see Fig. 32. (Note: The shoulders of these tenons are not angled at 3°. They're 90° to the edges of the stretcher.) Now round over the ends of the tenons to a ¼" radius, see Fig. 32.

BOTTOM PROFILE. Next, using the pattern, lay out and cut the profile on the bottom edge of the stretcher, see Fig. 33.

STRETCHER CAP. After the profile is cut, a decorative stretcher cap (M) is added. Cut the cap from 4/4 stock to length to match the shoulder-to-shoulder length of the stretcher (34⅝"), see Fig. 33.

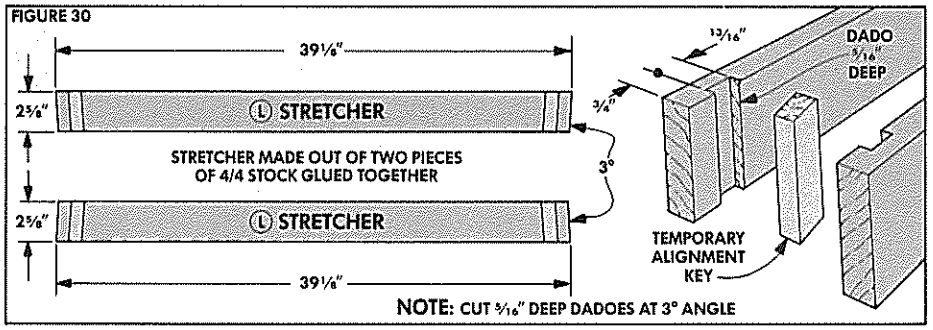
Now rout a ⅛"-deep groove in the bottom of the cap wide enough to fit over the stretcher, see Step 1 in Fig. 33. Then rout the profile on the top edges, see Step 2. Finally, glue the cap on the stretcher.

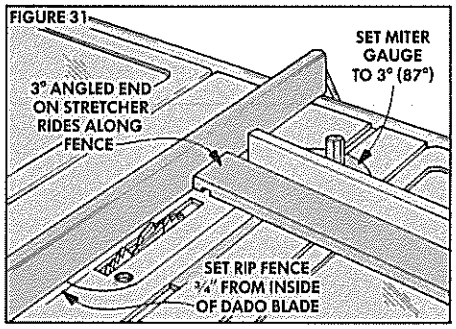
WEDGE PINS

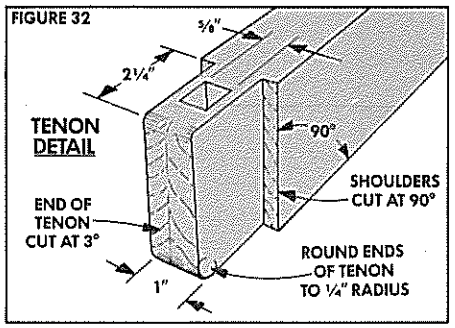
The stretcher is held tight between the uprights with wedge pins (N). To make the wedge pins, start by resawing a blank of 4/4 stock to match the mortise (⅝" thick). Then cut the blank 1¾" wide and 5" long.

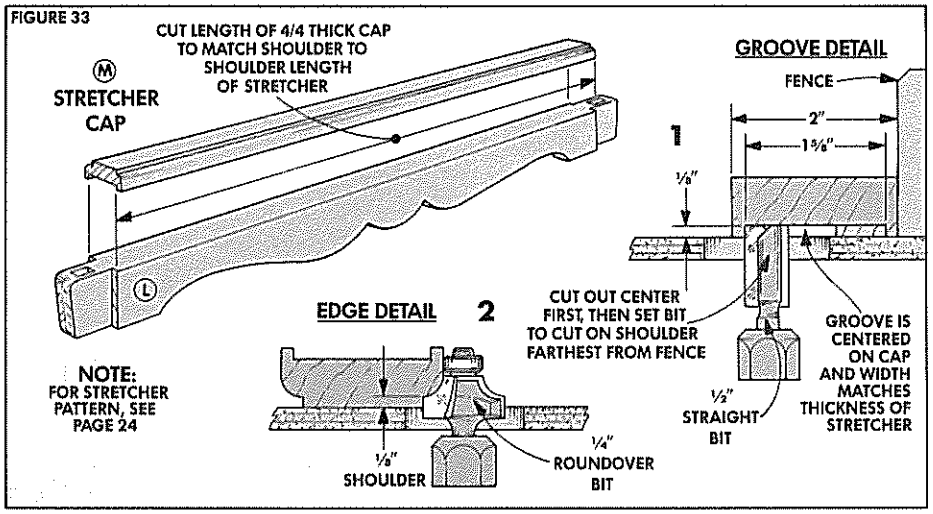
Next push the stretcher tenon through the mortise in the upright until it's tight against the shoulders. Then hold the wedge pin blank behind the tenon and make pencil marks where the wedge pin will enter and leave the mortise, see Fig. 34.

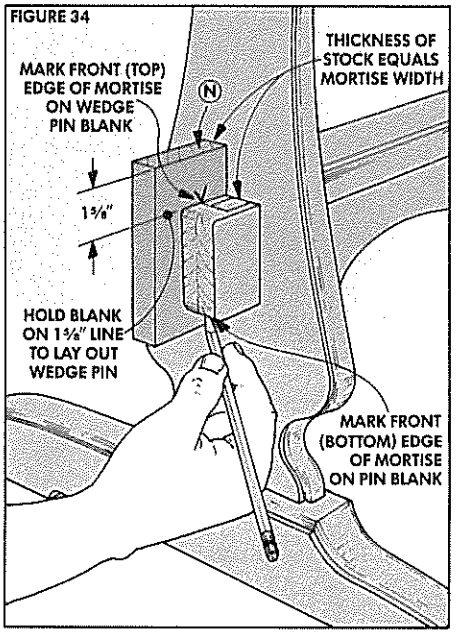
Now connect the pencil marks and cut out the wedge pin shape slightly oversize, see Fig. 35. After it's cut to shape, hand plane the front of the pin sneaking up on the final size. The top of the pin should be about 1⅝" above the tenon when the pin is driven down tight, see Fig. 36.

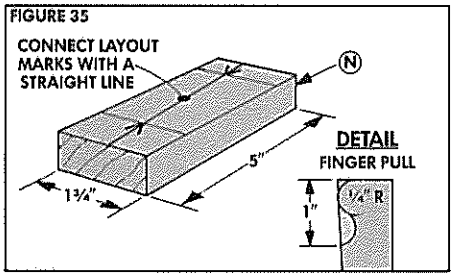


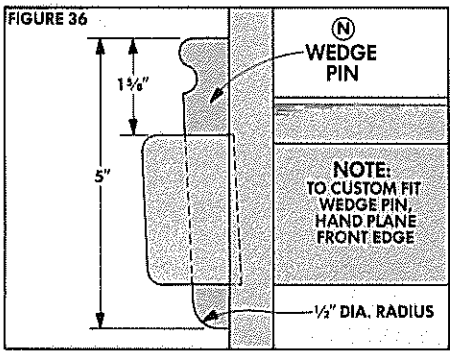












SWINGING MECHANISM

All that remains is to join the basket to the uprights with a swinging mechanism.

SPACERS. To keep the basket from rubbing on the uprights, I made ring-shaped spacers from ¼"-thick Masonite. To make the spacers, first lay out two 1½"-dia. circles on the Masonite, see Step 1, Fig. 37.

Then, using the point made by the compass as a center hole, bore out ¾" holes, see Step 2. Then cut out the rings using a hole saw, bandsaw, or sabre saw, see Step 3.

Once the spacers are cut, glue them to the inside of the uprights, see Fig. 38.

HANGING DOWELS. Next, cut a couple of ¾" hanging dowels (one for each end of the cradle) that are slightly longer than the combined thickness of the upright, end frame, and spacer (1$^{15}/_{16}$"), see Fig. 39.

KNOBS. The dowels are held in place with 1½" wooden knobs on each end. To hold the knobs, I cut the heads off the knobs' screws and epoxied the screws in $^{5}/_{32}$"-dia. holes centered on the ends of the dowel.

Shop Note: To hold the dowel while drilling, I bored a ¾" hole in a 2x4. Then I cut a relief kerf up to the hole and clamped the dowel in tight, see Fig. 40.

After the headless screws are epoxied into the holes, epoxy a knob onto *one* end of each dowel. Then set up the cradle and check that the basket swings smoothly.

LOCK PINS

To lock the basket so it won't swing, I added lock pins on each end. The pins pass through the uprights and into the bottom rail of the end frame, refer to Fig. 43.

TENONS ON DOWELS. To make the two lock pins, start with a 5"-long piece of ¾" dowel, see Fig. 41. Then cut ½"-dia. by ½"-long round tenons on each end. (For information on cutting the tenons, see Shop Notes, page 15.) Now trim a 1¼"-long stop pin off each end of the dowel.

COUNTERBORE FOR SCREW. Next use the drilling block (Fig. 40) to hold the stop pin and drill a counterbored hole for a knob's screw. First drill a ⅜"-dia. hole ½" deep for the screw head, see Step 1 in Fig. 41. Then drill a $^{3}/_{16}$" hole the rest of the way through the pin, see Step 2. Now sand a chamfer on the thick end of each pin.

END FRAME HOLE. Once the stop pins are complete, locate the matching holes in the bottom rails of the basket by pushing a ½" brad point bit through the hole in the upright and drill a slight reference mark on the rail, see Fig. 42. Then remove the basket from the upright and drill a ¾" hole ⅜" deep into the rail, see Fig. 43.

Finally push the stop pin through the hole from the inside of the upright and screw a 1½" knob to the outside.

FINISH. I finished the cradle with two coats of Minwax Early American Stain and then two coats of Minwax Antique Oil.

FIGURE 37

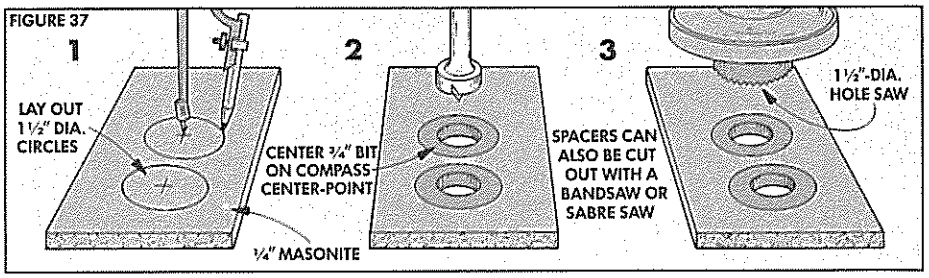


FIGURE 38

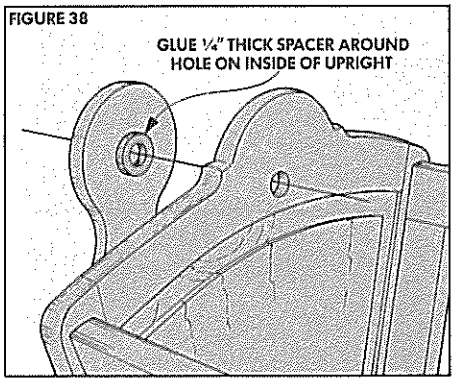


FIGURE 39

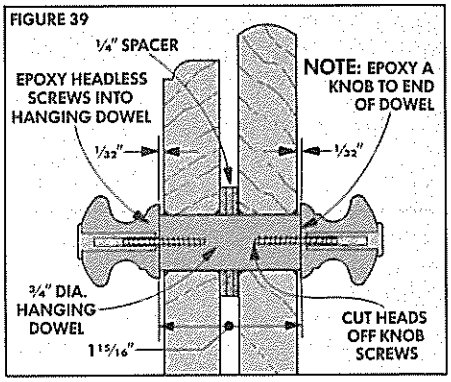


FIGURE 40

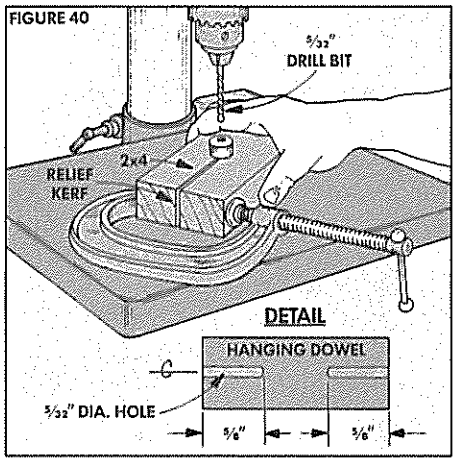


FIGURE 41

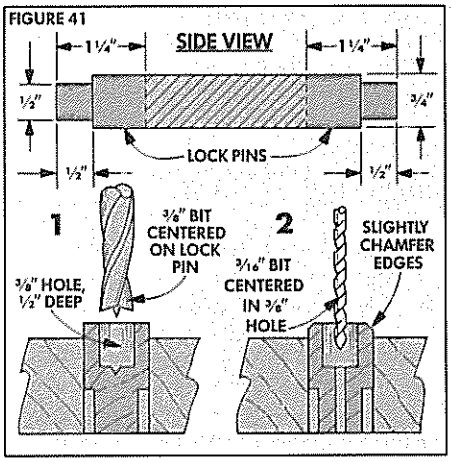


FIGURE 42

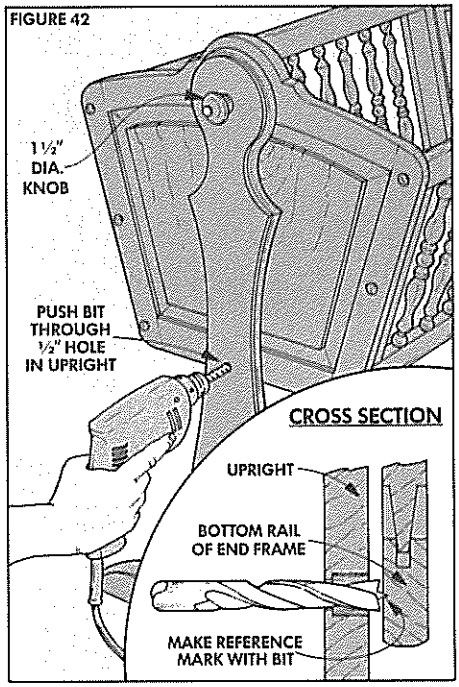
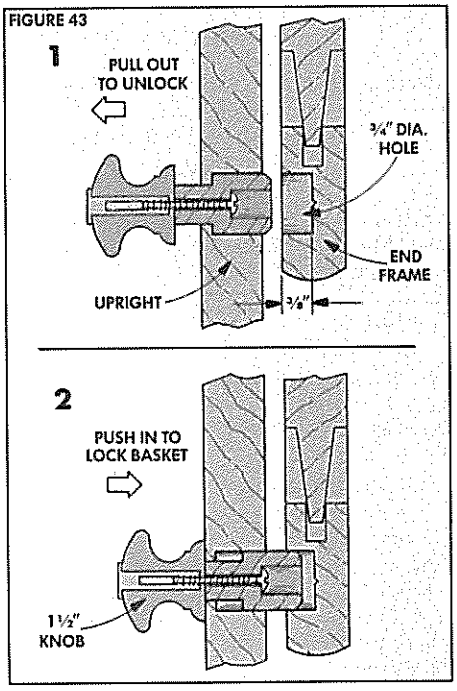


FIGURE 43

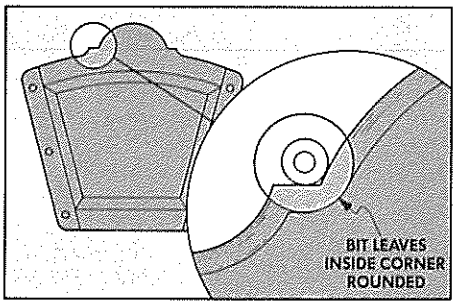


Shop Notes

SOME TIPS FROM OUR SHOP

CLEANING ROUTED CORNERS

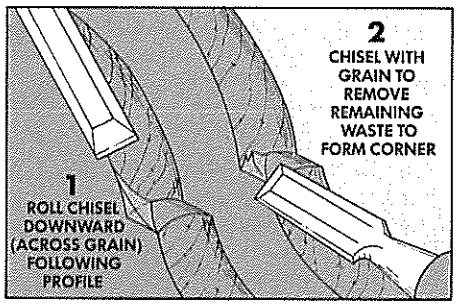
I ran into some problem areas as I was routing the bullnose profile on the top rail of the cradle. Since a router bit is round it cuts an outside curve nicely, but it's impossible to cut into square inside corners.



To finish off the corners, it took some hand work with a chisel. To do this, stand the workpiece up in a vise. Now following the routed profile and working *across the grain*, chisel down towards the corner, see Step 1 in drawing below.

Then make a 90° cut by cutting the waste off *with the grain* until you meet the first cut, see Step 2. (Note: You have more control and the wood won't split ahead too far when cutting across the grain first.)

It's easy to go overboard and chisel too far down with the first cut. Do a little bit at a time — chisel down, then chip off the waste.



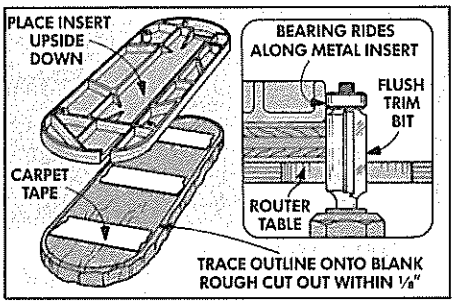
After the majority of the waste is removed, use a skew action to slice off the last bit. Run the chisel along the profile rolling away from the workpiece just as the cuts meet in a nice crisp corner.

TABLE SAW INSERT

Most standard metal inserts that come with table saws have too large a slot around the blade for fine work. When making the raised panels for the projects in this issue, this can be a problem. The tongues on the panels can slide down into the slot.

WOODEN INSERT. To make a new insert for the table saw, start by resawing a blank to thickness so it will be perfectly flush with the surface of the table. Then trace the outline of the metal insert onto the blank and rough cut it to within ⅛" of the pencil line with a sabre saw or bandsaw.

Now stick the metal insert and the new wooden one together with double-sided carpet tape. Then mount a flush trim router bit in the router and, with the bearing riding along the metal insert, trim the wooden insert to exact shape. (Note: Without a flush trim bit you could file or sand the insert until it just fits the opening.)



CUTTING THE SLOT. To cut the slot for the table saw blade, lower the blade completely, position the insert into the recess, and hold it in place by tightening down the rip fence over the insert. (Be sure the fence isn't directly over the blade). Then turn on the saw and slowly raise the blade through the wooden insert.

To make it a multi-angle insert, lower the blade below the table, tip the blade to 45°, and raise it through the wooden insert.

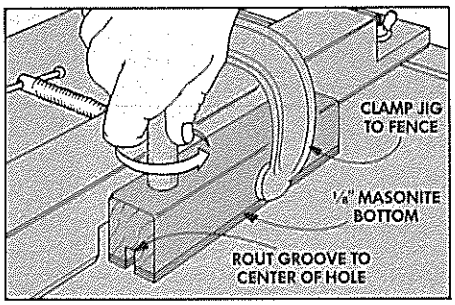
TENONS ON DOWELS

When I was building the stop pins for the cradle (see page 14), I needed to cut a clean tenon centered on the end of a dowel. Ted came up with a nifty method using a simple jig and the router table that reminds me of sharpening pencils on my new electric pencil sharpener.

MAKING THE JIG. To make the jig, start with a 6"-long piece of 2x4 and rip it in half so it's about 1¾" wide. Next drill a hole that's the size of the dowel (in this case ¾") toward one end and centered on the thickness of the 2x4. Once the hole is drilled, tack on a ⅛" Masonite base plate on the bottom. Keep the tacks on the end of the block away from the hole.

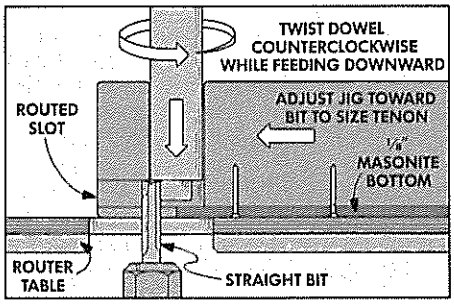
Now mount a straight bit in the router table (I used a ¼" straight bit), and adjust the fence so the bit is centered on the 2x4. Then raise the bit until its height above the table equals the length of the tenon you want (½") plus the thickness of the ⅛" Masonite. (This means the bit should be ⅝" above the tabletop.)

Once the router is set up, push the jig along the fence moving from right to left until the bit cuts about half way into the ¾" hole. Now it's a matter of fine-tuning to get the correct size tenon.



Start by turning off the router and looking down into the hole. Back off the jig to the right until the bit is barely visible. Then C-clamp the jig to the fence.

TEST CUT. Now you're ready to make the first test cut on a dowel. Turn on the router and slowly push the dowel down into the hole turning it in a counterclockwise direction as you push down. Continue to push and turn (like a pencil in an electric sharpener) until it hits the Masonite. Then pull it out and check the size of the tenon.



If the tenon is too thick, move the jig slightly to the left, reclamp it, and try again. It's just a matter of slowly sneaking up on the finished thickness. Once the jig is positioned correctly, you can make the same size tenons all day. (It's almost as much fun as sharpening pencils.)

FITTING TENONS/DOWELS IN HOLES

Sometimes round tenons or dowels are just a little too thick to fit into a hole. I found this when trying to fit the ½"-thick tenons on the ends of the cradle spindles into the ½" holes I had drilled.

To solve the problem I used an idea from Tinker Toys. Cut a centered kerf a little ways into the end of the tenon with a bandsaw or back saw. With a slit in the end, the tenon should have enough "give" to slide into the hole.

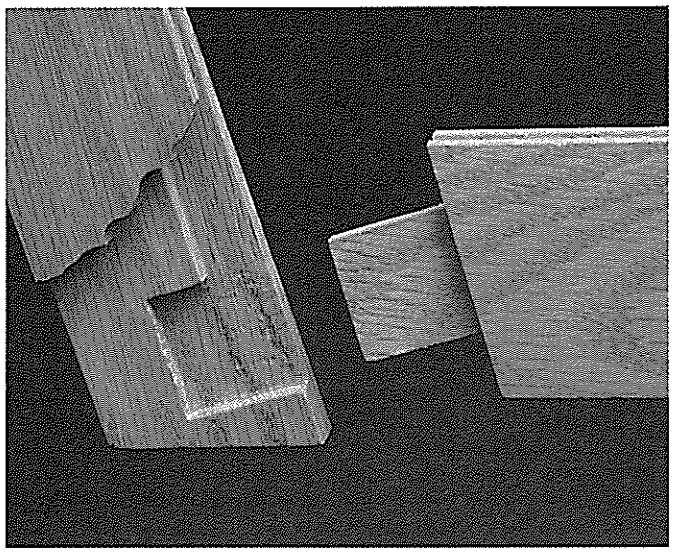
Angled Mortise & Tenon

A DIFFERENT SLANT ON A TRADITIONAL JOINT

The frames for the ends of the cradle and the magazine rack call for an angled mortise and tenon joint, see photo. This joint is less complex than it looks because it's really not an angled joint at all.

It's not a true angled joint because although the rails and stiles meet at an angle, the tenons fit into the mortises at 90°. Basically, it's just a normal mortise and tenon joint except the shoulders of the tenon are cut at an angle (the mortise doesn't have to be angled).

Before actually cutting the pieces for the angled frames, I made two aids — one to help cut the angled shoulders on the tenons, and another to draw the arched edge of the frame and the top of the arched-top panel.



MAKING THE AIDS

The hardest part of cutting angled shoulders on a tenon is getting the shoulders on both sides to turn out even and parallel. The trick is to be able to set and reset the miter gauge and keep it consistent. To accomplish this I made an angle-setting block for setting up the miter gauge.

ANGLE-SETTING BLOCK. To make this block, cut one end off a piece of scrap plywood at the angle you want for the shoulders. (This is 15° on the cradle and 10° on the magazine rack.) I cut this block out of a piece of plywood that measured about 6" by 8", refer to Fig. 2.

SETTING MITER GAUGE. To set up for the cut, first I added an auxiliary fence to the miter gauge to support the workpiece all the way to the blade, refer to Fig. 2.

Then to set the angle of the miter gauge, slide the rip fence over next to the miter gauge and press the angle-setting block tight against the fence, see Fig. 2. Now pivot the miter gauge until it's aligned with the angled edge of the block, and tighten it at this setting.

With the miter gauge locked at this setting, the angled shoulder (and remaining face of the tenon) can be cut on one side of the rail.

To cut the opposite side, just flip the angle-setting block over and reset the miter gauge, see Fig. 3. This is the whole purpose of the block. The angle will be exactly the same for this second setting as it was on the first since the same block is used both times.

ARCH TEMPLATE. However, before actually cutting the tenons, I took a moment to make a large arch template that's used to trace the arches on the top rails and on the tops of the panels. For the cradle, draw an arc with a radius of 26¼", see Fig. 4. And for the magazine rack, draw a radius of 10".

Note: This template will also be used later for making the jig to cut the arched tops on the panels, see page 20.

CUT MORTISES IN STILES

After making the angle-setting block and arch template, I cut the stiles (vertical pieces) of the frame to size. (See pages 4 and 8 for dimensions.) Then I started to work on the joints by laying out the positions of the mortises.

MARK MORTISES. Begin by marking the length of the mortises, see Fig. 5. Next, to help in setting up the drill press, mark a centerline on the thickness of one stile Then mark the depth of the mortise on one end of the stile, see Fig. 5.

SET DRILL PRESS. I used a drill press with a ¼" brad point bit to rough-shape the mortises. (You can also use the mortising bit discussed on page 24.)

Begin by setting the quill stop so the bit goes just as deep as the mark on the end of the stile. Then clamp a fence in place so the point of the bit is on the centerline of the mortise, see Fig. 6.

BORING SEQUENCE. With the drill press set up, the mortises can be bored. Begin by

FIGURE 1

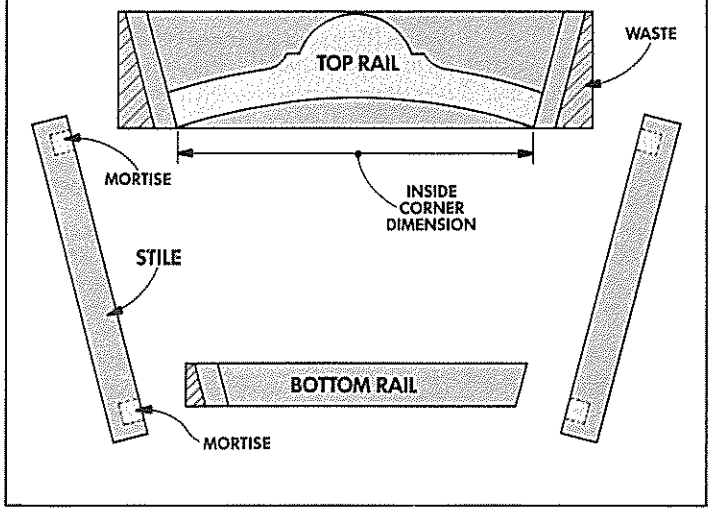


FIGURE 2

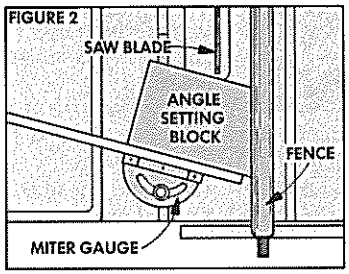


FIGURE 3

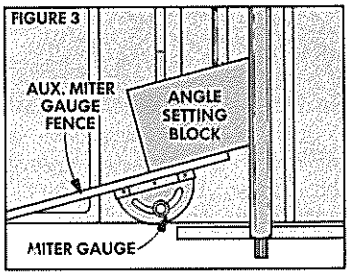
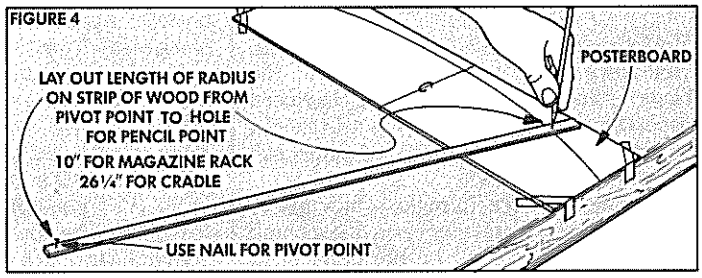


FIGURE 4



boring a hole at each end of the mortise, see Step 1, Fig. 7. Then bore overlapping holes between the end holes, see Step 2.

CLEAN UP MORTISES. After the mortises are roughed out on the drill press, clean up the sides by paring straight down the walls with a chisel, see Step 3.

There are two ways to finish the ends of the mortise. They can be left round (and the tenons rounded later to match). Or, the ends can be chopped square with a narrow chisel, see Fig. 8.

LAY OUT TOP RAIL

After I cut the mortises on all four stiles, I went to work on the top rail. I started by laying out the shoulder lines (that determine the inside corner dimension) on an oversized blank of 4/4 stock, refer to Fig. 1.

SHOULDER LINES. The distance between the shoulders on the top rail is a key measurement because it determines the inside width of the frame. This measurement, in turn, determines length of the bottom rail and the width of the panel.

To locate the shoulder lines, draw a centerline on the workpiece for the top rail, see Fig. 9. Then measure out equal distances from the centerline to mark the locations of the shoulder lines. (This is 8⅜" each way for the cradle and 4⁵⁄₁₆" for the magazine rack.)

Now use the angle-setting block to scribe the shoulder lines across the entire width of the workpiece, see Fig. 9.

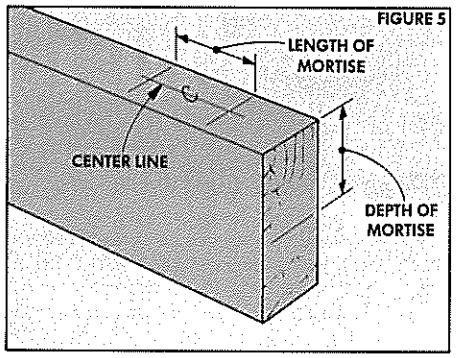
MARK TENON LENGTH. After the shoulder lines are drawn, a second line is drawn parallel to them to establish the length of each tenon, see Fig. 10. (This tenon is 1" long on the cradle and ½" long on the magazine rack.) The distance between these outside (tenon) lines is the overall length of the top rail.

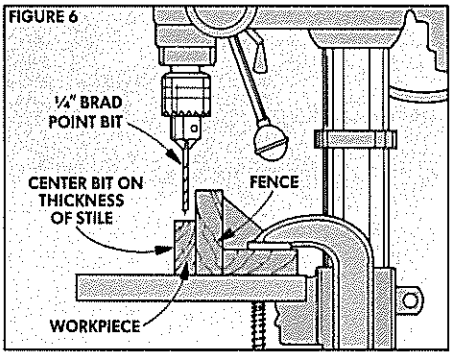
TRACE CURVE PROFILES. After the lines for the tenons are marked, use the arch template to draw the arch along the bottom edge of the rail, see Fig. 11. Place the template on the workpiece so the edges of the arc just touch the shoulder lines on the bottom edge.

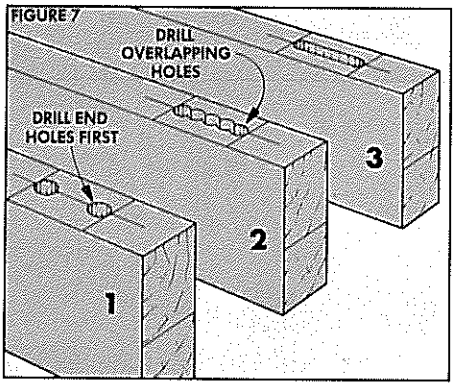
To complete the top rail for the cradle, transfer the free *Woodsmith* pattern (see page 24) to a piece of posterboard and trace the top profile, see Fig. 12.

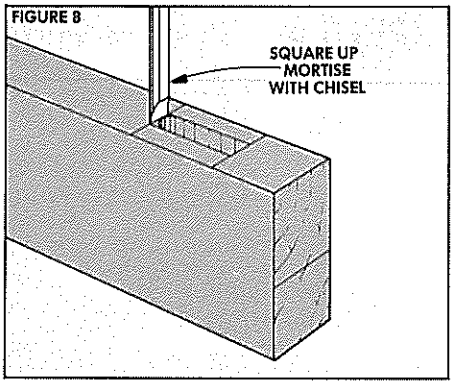
CUT TOP RAIL TO LENGTH. After all the outlines are drawn, the top rail is cut to length. Begin by setting the miter gauge with the angle-setting block, refer to Fig. 2. Then cut off the ends at the outside (tenon) lines, see Fig. 13.

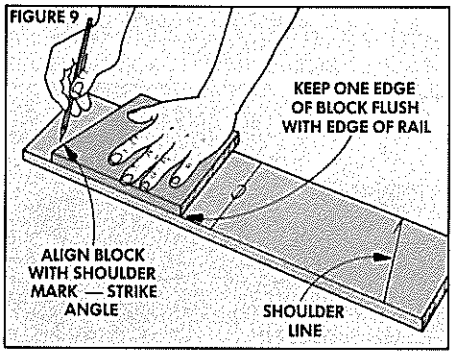
CUT BOTTOM RAIL TO LENGTH. The last step before actually forming the tenons is cutting the same angle off each end of the bottom rail, see Fig. 1. There are no critical measurements here. For now, just cut the workpiece about an inch longer than what the plans call for. It will be trimmed to final length later.

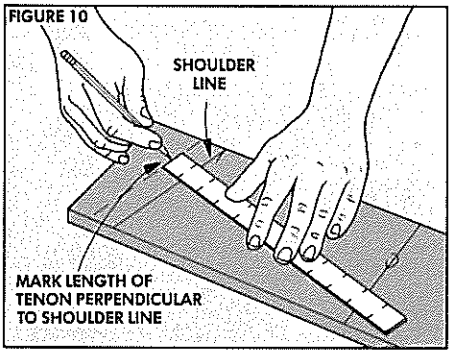


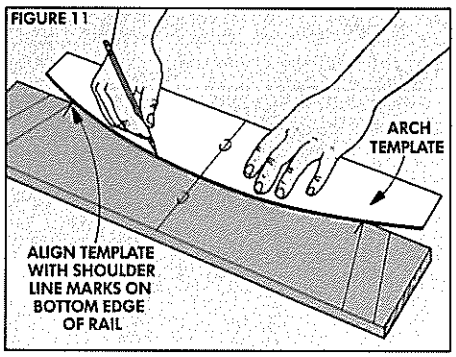


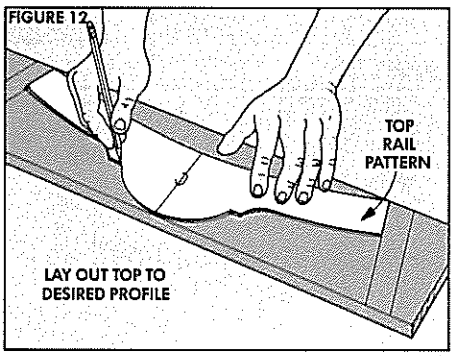


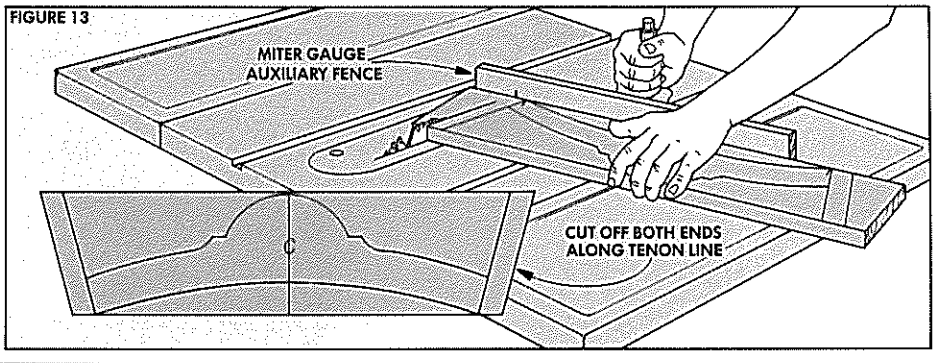


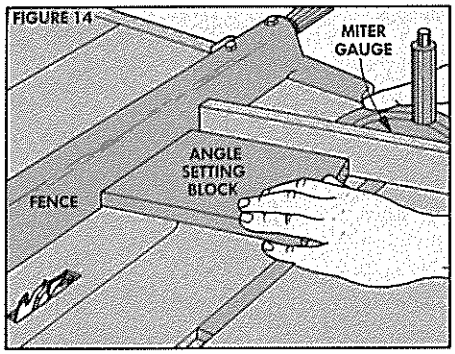


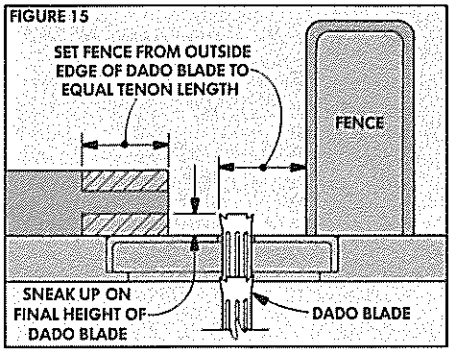


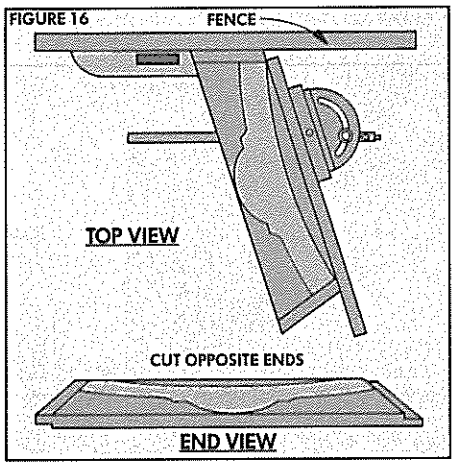


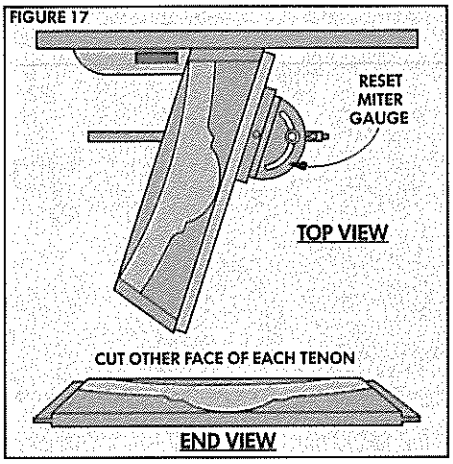


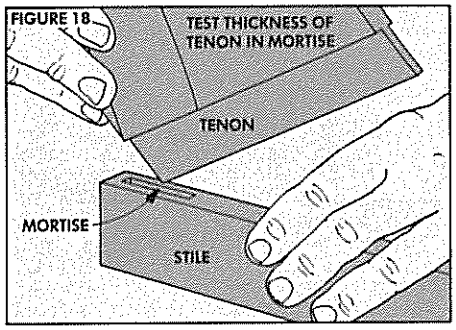


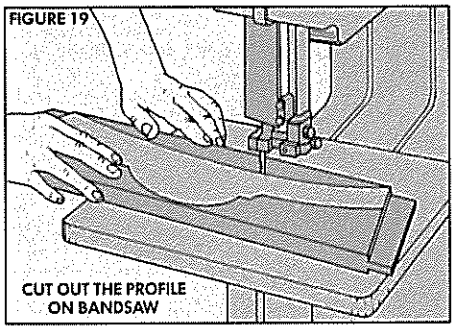


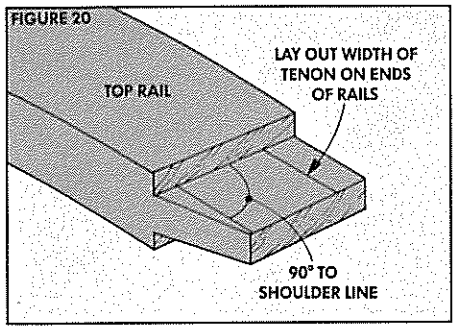


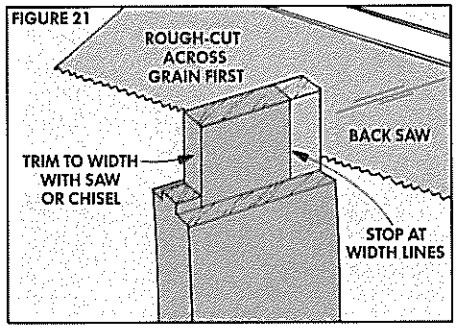


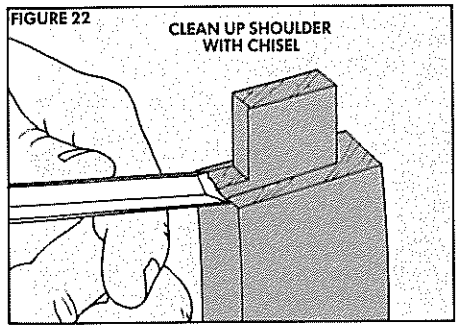


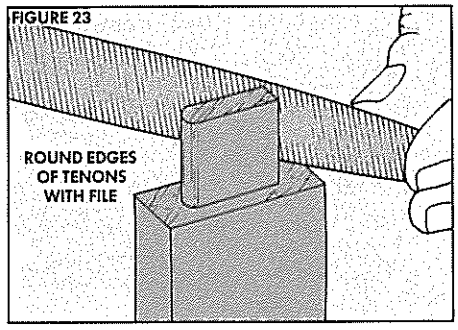












The mortises have been cut in the stiles and the rails are cut to rough length. Next, the tenons can be cut on the rails.

ADJUST MITER GAUGE. Since the shoulders of the tenons are angled, the first step is setting the miter gauge for the shoulder angle. Begin by pressing the angle-setting block against the rip fence, see Fig. 14. Then pivot the miter gauge until it aligns with the angled edge of the block and lock it tightly in place.

SET UP SAW. The tenons are cut to length and thickness by making multiple passes over a dado blade. There are two steps to setting up the saw. First, position the rip fence so the distance between it and the *outside* (left) edge of the dado blade is equal to the length of the tenon, see Fig. 15. (The fence acts as a stop to cut all tenons to the same length.)

The second step is raising the dado blade so it cuts the tenon the right thickness. Set the blade a little low so the tenon is a hair thick. It will be fine-tuned later.

CUT TENONS

When the saw is set up, cut the face of the tenon by making multiple passes over the dado blade, see Fig. 16. Then flip the rail over and repeat on the *opposite end.*

SECOND PASS. After one face has been cut on each end, the opposite face is cut to bring the tenon to thickness. To do this, use the angle-setting block to reset the miter gauge to the *opposite angle*, see Fig. 17. Then make passes on the other side.

BRING TO FINAL THICKNESS. Test fit a corner of the tenon in the mortises in the rails, see Fig. 18. If necessary, raise the blade in very slight increments and shave just a little off each face until the tenon fits the mortise.

CUT TO SHAPE. Continue on the top rail by cutting the arched profile on the bottom edge, see Fig. 19. Then cut away the profile on the top edge.

Now the top rail is starting to take shape. The next step is to trim down the width of the tenons to fit the mortises.

MARK TENON WIDTH. The tenon is laid out so it's perpendicular to the angled shoulders, see Fig. 20. I used a steel rule to lay out the tenons by pressing the end of the rule tightly against the tenon shoulder and drawing lines to indicate the width of the tenon.

CUT TO SIZE. Next, cut the tenons to size with a back saw. To lessen the risk of cutting into the shoulders, I made cuts along the angled shoulders first, stopping at the width lines, see Fig. 21. Then I cut down on the end of the tenon.

FINISHING TOUCHES. To complete the tenon, I cleaned up the shoulder with a sharp chisel, see Fig. 22. Then, if the ends of the mortise were left round, there's one last step. Round the edges of the tenons to match the mortises, see Fig. 23.

FIT BOTTOM RAIL

When the tenons for the top rails are finished, the tenons on the bottom rails can be cut. This is a cut-to-fit operation. The key thing here is not the overall length of the bottom rail, but the distance *between the shoulders* of the tenons. This is determined by the distance between the angled stiles. So, temporarily clamp the stiles to the top rail, see Fig. 24.

Shop Note: To concentrate clamping pressure, I used two 15° wedges, see Fig. 24. Then to keep the wedges from slipping when the clamps are tightened, I mounted dowels at the top ends, see Detail in Fig. 24.

MAKE ONE TENON. The trick to making the rail fit is cutting the tenon on one end to final thickness first, see Fig. 26. (Use the angle-setting block to set the miter gauge and cut both faces of the tenon.)

MARK OPPOSITE SHOULDER. Now, the inside measurement between the stiles can be transferred directly to the other end of the bottom rail.

To do this, lay the rail down so the tenon is on top of the stile with the shoulder butted tightly against the inside edge of the stile, see Fig. 25. Then mark the inside edge of the opposite stile on the rail.

MAKE THE TENON. Now the tenon on this end can be cut to length. Note: Begin by cutting outside the line. The object is to shave a little off the shoulders until they fit between the stiles with no gaps, see Fig. 26. Finally, cut the tenon length to the depth of the mortise, see Fig. 27.

CUT GROOVES

The last step is cutting the grooves for the panel on the inside edge of all frame pieces. To do this, I mounted a slot cutter in the router table, see Fig. 28.

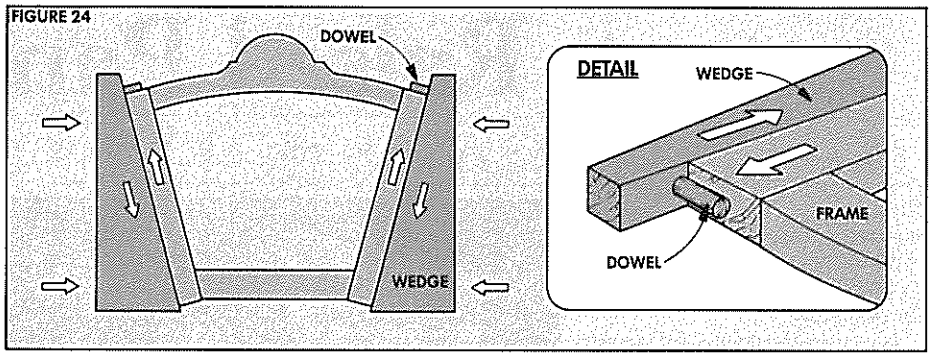
Shop Note: The slot cutter tends to tear the edges of the groove. To lessen the tearing, make a light pass (1/16" deep) feeding the workpiece backward. (That is, feed the workpiece from left to right.) Then make the full-depth cut, feeding from right to left.

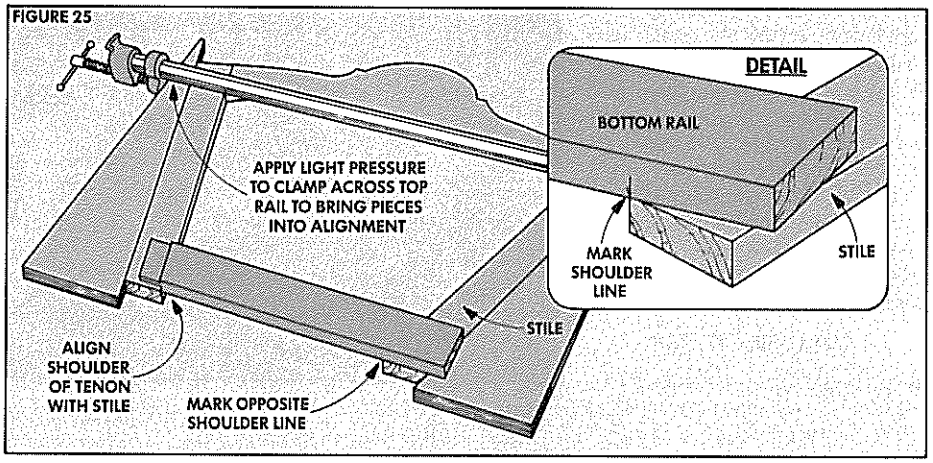
ROUT STILES. To get the feel of routing with the slot cutter, I routed the grooves in the stiles first. The groove starts at one mortise and ends at another. I clamped stop blocks to an extension on the fence to prevent overshooting the cut, see Fig. 28.

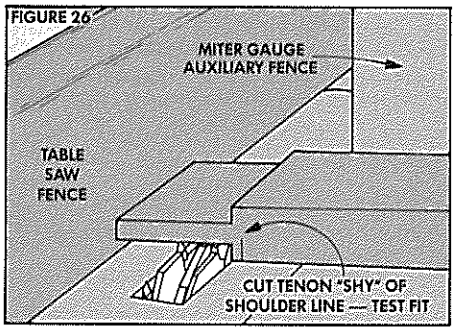
ROUT BOTTOM RAIL. Routing the bottom rail is the same as the stiles, except the groove is straight through from end to end.

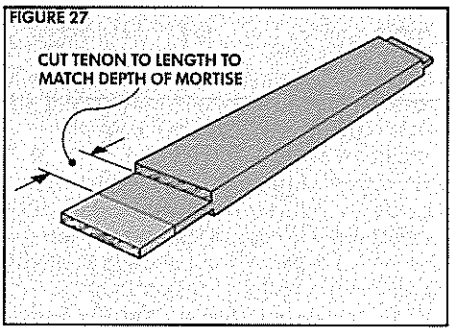
ROUT TOP RAIL. To rout the groove on the arched inner edge of the top rail, the workpiece is fed freehand against the bit's pilot, see Fig. 29. Note: A freehand pass near a slot cutter is scary. For safety, I put the guard in place and used a grout trowel (see *Woodsmith* No. 47) to grip the rail.

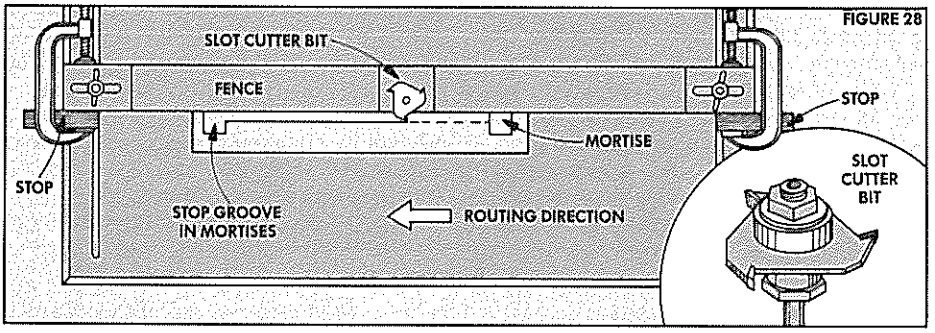
CHECK FIT. As one last check, I clamped the frame together, see Fig. 30. Then I was ready to make the arched-top panel.

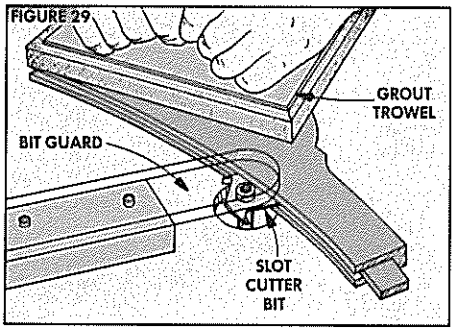


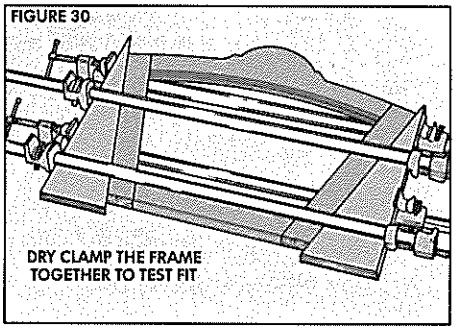












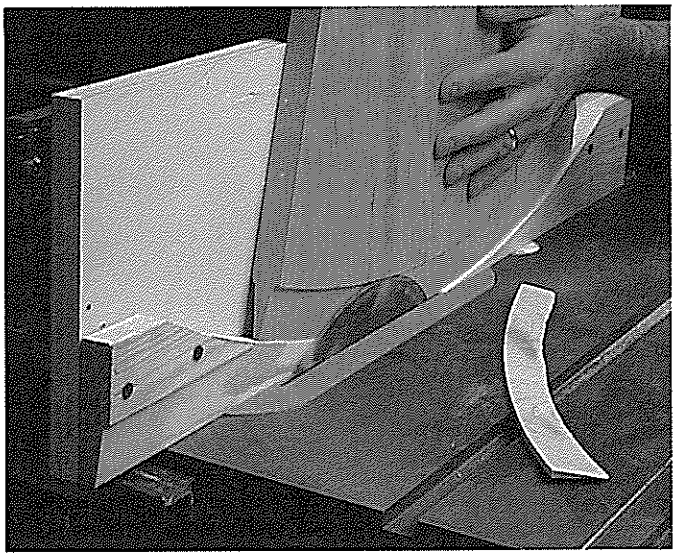
Raised Panel

CUTTING AN ARCHED TOP ON A TABLE SAW

Making raised panels on a table saw isn't difficult. It's just a matter of standing the panel on edge and running it through a tilted blade on the table saw.

However, the frames for the cradle and magazine rack have arched tops, which means the panels have to have an arched border to match. Although this can be done on a shaper or on a router table (with a very expensive bit), I decided to try it on the table saw.

The idea is to make a jig to swing the panel in an arc (as though on a pendulum) as the blade trims the edge. But, first, I cut the workpiece for the panel.



CUT PANEL TO SIZE

Begin by gluing up 4/4 stock for the panel to get an oversized workpiece (about 20" wide by 15" long for the cradle). When the glue is dry, square up the panel and then mark a centerline on the bottom edge, see Fig. 1.

Then I cut the angled sides on the panels working from dimensions transferred directly from the inside of the frame.

BOTTOM WIDTH. The first dimension is the bottom width of the panel. To get this dimension, measure between the stiles along the inside edge of the bottom rail (see Fig. 1), and add ½" so the edges of the panel fit ¼" deep into each groove.

Now to lay out the cuts on the panel, divide this measurement in half and mark it on each side of the centerline on the bottom edge of the panel workpiece.

SET UP MITER GAUGE. In order to cut the angled sides, use the angle-setting block to set the miter gauge at the same angle as the tenon shoulders. Next, cut one side of the panel, aligning the blade with one of the marks on the bottom edge of the panel, see Fig. 2. Then flip the panel over and cut off the other edge.

TOP ARCH. The next step is establishing the height of the panel. Again, take the measurement from the frame. Measure the distance between the inside edges of the top and bottom rails, see Fig. 1. Add ½" to this measurement and mark this distance up from the bottom on both sides of the panel workpiece. Then position the arch template so it touches both marks, trace the top curve, and cut away the waste.

MAKE CURVE CHAMFERING JIG

After the panels are cut to shape, the edges are ready for chamfering. To do this, I made a jig with a high auxiliary fence and a curved "runner" that guides the arched top of the panel in a curved path through the blade.

FENCE. Make the auxiliary fence from a piece of ¾" plywood about 8" wide and as long as the table saw fence, see Fig. 3. Then draw a vertical centerline on it.

MAKE RUNNER. After cutting the fence to size, I laid out the runner on another piece of ¾" plywood. First, lay the arch template on the plywood so its edge is about 1½" from the bottom edge of the template, see Fig. 3. Then align the two centerlines, trace the curve, and cut away the waste.

The next step is to position this curved runner on the plywood auxiliary fence so the bottom of the curve just touches the bottom of the fence, see Fig. 3. When they're aligned, screw the pieces together. Then trim the bottom of the runner so the curve is flush with the bottom edge of the vertical fence, see Fig. 4.

REFERENCE MARKS. Before attaching the jig to the saw's rip fence I made a reference mark on the saw table to indicate the very front of the saw blade (where the leading saw tooth is level with the table), see Fig. 6.

To locate this mark, first tilt the blade to the chamfer angle (7° on the cradle; 10° on the magazine rack), and raise the blade to the height of the chamfer shoulder (the angled border around the panel).

Note: Determining the height of the blade is a little tricky. It's not the same as the width of the chamfer because of the way the jig and saw blade are aligned, refer to Fig. 5. (By coincidence, the blade has to be raised to 1⅝" for both the 1¼"-wide border on the cradle and the 1"-wide border on the magazine rack.)

BLADE CLEARANCE. There's just one more step before the jig is ready for use. Cut a chamfer off the bottom of the back part of the runner to allow blade clearance. Stop cutting as the blade comes to the centerline on the fence, and make multiple passes until the width of the runner is about ⅜" at the bottom, see Fig. 6.

FIGURE 1

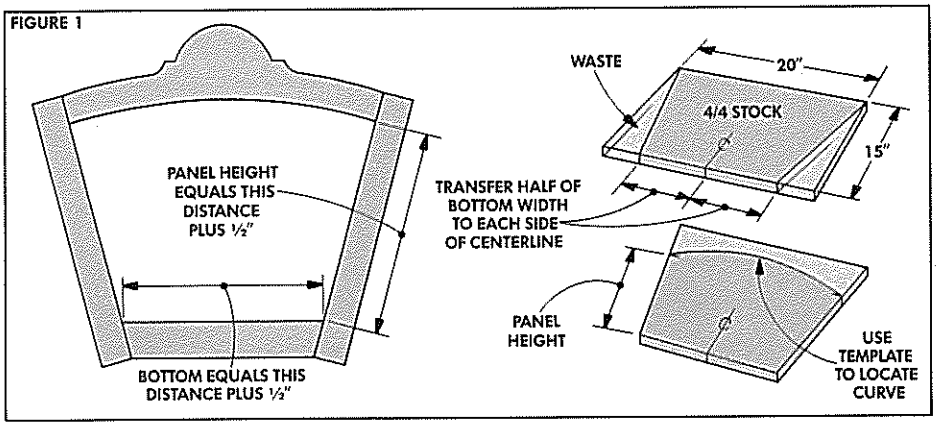
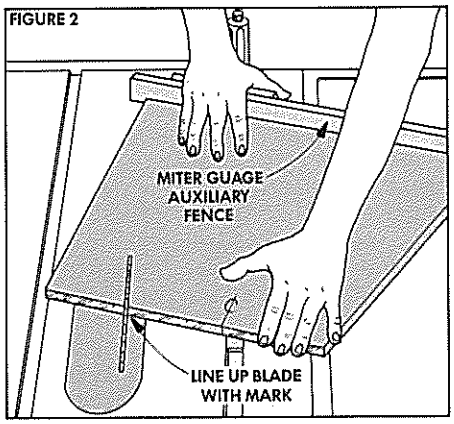


FIGURE 2



ATTACH JIG. After the back half of the runner is chamfered, line up the centerline on the jig with the reference mark on the table, and screw the jig to the fence, see Detail in Fig. 6.

CHAMFER THE EDGES

Cutting the chamfers on the panels takes a lot less time than making the jig. But getting a feel for it takes practice. I warmed up on a few plywood test panels.

SETTING UP. To set up for the arched chamfer, slide the fence over so the top of the blade is outside the face of the panel, see Fig. 7.

CUT THE CURVE. Making the arched cut requires a light touch. Begin by letting the panel rest in the curve of the runner, see Fig. 10. Then press the panel against the fence just hard enough to keep it upright and slide it along the runner.

When doing this, I think of the vertical fence as the table. That is, concentrate on pressing the panel against the face of the fence — not down on the saw.

Shop Note: To make sure the workpiece wouldn't catch in the table saw insert slot, I made a new insert with a narrow kerf, see Shop Notes on page 15.

After cutting the first chamfer, repeat the process on the opposite side of the panel. Next, to get the edge to fit the groove, adjust the fence and jig toward the blade, see Fig. 8. Then keep making passes on both sides until the edge of the panel fits about halfway to the bottom of the groove, see Fig. 9.

CUT STRAIGHT CHAMFERS. To chamfer the straight sides, unscrew the curved runners and lower the blade. Then cut a test piece to make sure that the width of the chamfers on the straight edges is the same as on the arched part, see Fig. 11.

CLEAN UP SHOULDER. There's just one last step before the panel is ready to be mounted in the frame. Lightly sand the shoulder so it's perpendicular to the panel face. I did this with a sanding block with one edge cut at the same angle as the chamfer, see Fig. 12. It straightens the shoulder and smooths the chamfer at the same time.

FIGURE 3

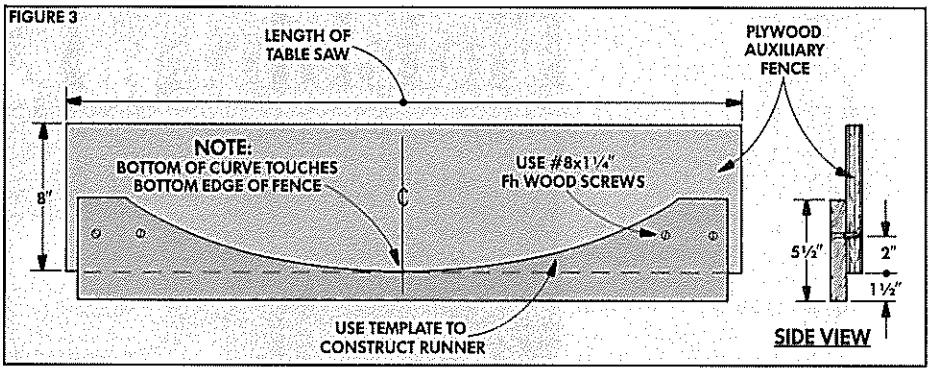


FIGURE 4

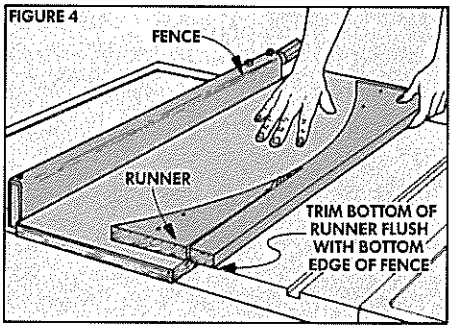


FIGURE 5

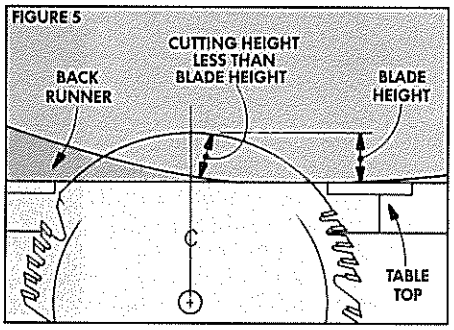


FIGURE 6

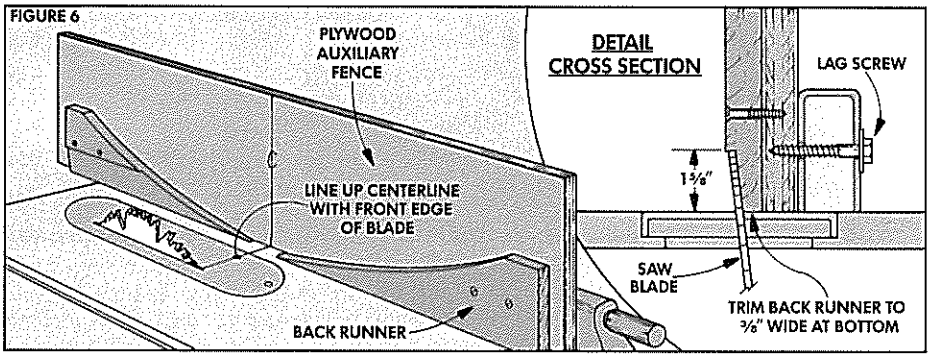


FIGURE 7

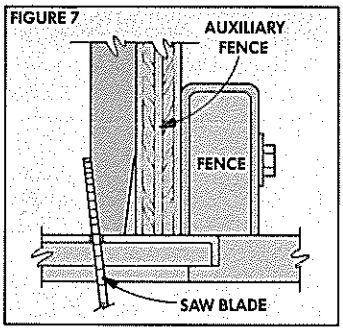


FIGURE 8

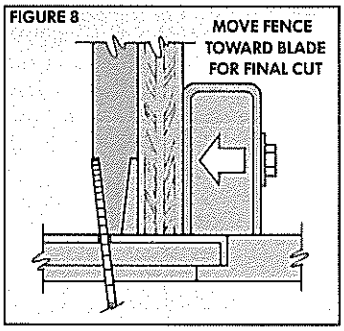


FIGURE 9

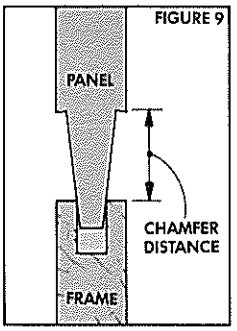


FIGURE 10

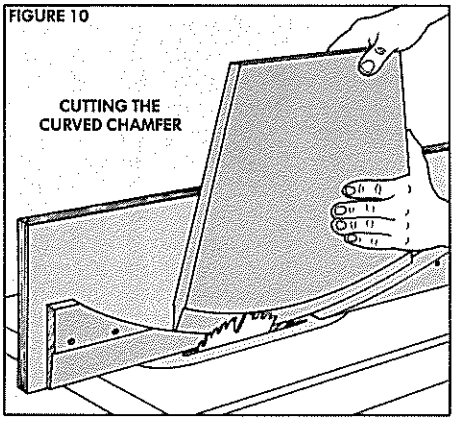


FIGURE 11

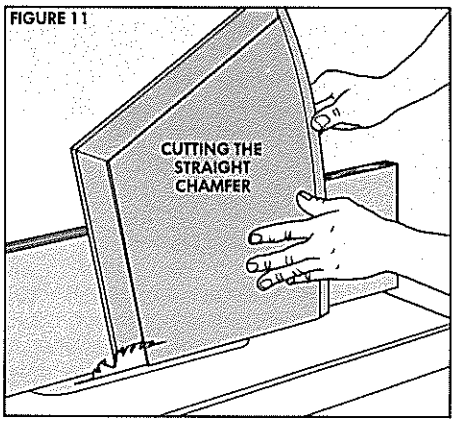
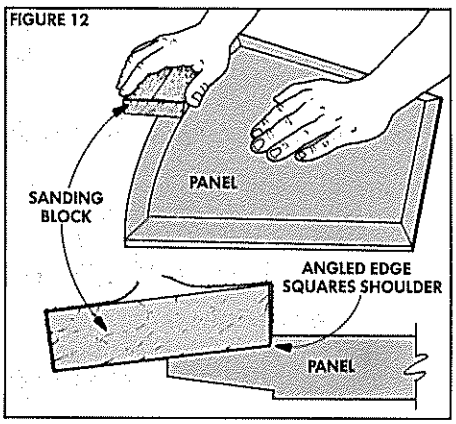


FIGURE 12



Finishing: Deft

AN INTERVIEW WITH DEFT'S TECHNICAL DIRECTOR

I've been using Deft Clear Wood Finish for years, but never have been sure what's in it. Is it a lacquer, a varnish, or something else?

To find the answer I called Dan Bernard, Technical Director for Deft, Inc. He answered that question and provided a lot more information about Deft:

Woodsmith: How was Deft Clear Wood Finish developed?

Bernard: In the early 1950's Bill Desmond had a paint store called Desmond Brothers. One day a friend asked him for help finishing some woodwork in his house. Bill did some experimenting in the back of the store with different clear finishes and came upon a mixture that did a good job when brushed on the woodwork.

He got a couple chemical companies to help him modify his mixture, and by 1955 the final formula came on the market.

Woodsmith: Did Desmond's formula for Deft Clear Wood Finish include a lacquer?

Bernard: Lacquers, by definition, are anything that dry by solvent evaporation. Nitrocellulose happens to be one kind of lacquer, and it's one of the ingredients of Deft Clear Wood Finish. So its basic backbone is lacquer, yes.

Woodsmith: What else is in it? Are resins and gums added?

Bernard: Yes. Nitrocellulose lacquer by itself is not a good film former. When it dries it's like brittle old movie film. In order to get some good film properties we put in plasticizing alkyd-type resins. The resins give it toughness and sandability.

Then we add a little free oil to give it flexibility so it will pass cold-check cycles. But we have to be careful not to give it too high a percentage of oil or its resistance properties will go down. It wouldn't be water or alcohol resistant if the formulation was out of balance.

Woodsmith: I've heard a number of myths about Deft. I've even heard that one of the oils added is coconut oil?

Bernard: Yes, there is coconut oil in our system, but it's cooked and modified. You can't use pure coconut oil by itself. It's totally non-drying and would lay there and collect dirt.

Woodsmith: What's the difference between Deft and other lacquers?

Bernard: Other lacquers replace some of the nitrocellulose with hard resins. These lacquers qive a quick-drying, hard surface but aren't very flexible. As an example, if lacquer is sprayed on picture frames in a factory it's probably nitrocellulose, maleic resin, and a little bit of chemical plasticizer. The idea is to get a hard, fast-drying finish so the frames can be quickly packed for shipping. The flexibility is poor, but on frames it doesn't show up.

But with a brushing lacquer, such as Deft, most manufacturers generally add an alkyd resin. It's designed for woodworkers who want to be able to rub out the finish and still have good resistance properties.

Woodsmith: Why does Deft smell stronger than other brushing lacquers?

Bernard: Part of the reason is that some brushing lacquers are only 16% solids by weight. Deft Clear Wood Finish (semi-gloss) is 21-22% solids. As you increase the solids, it takes several strong solvents to obtain the brushing viscosity.

Deft contains three solvents to dissolve the nitrocellulose. The first is an aromatic hydrocarbon, toluene. Then, to stabilize the viscosity it contains alcohols.

It also contains what's classified as an active solvent, acetates and/or ketones. It's the ketones that have a strong odor. And Deft has a special blend of ketones.

Woodsmith: One of the things I've noticed about Deft is that it's slower drying than most brushing lacquers. Is there a retarder put in Deft?

Bernard: Yes, it's a product called Butyl Cellosolve (that's a trademark of Union Carbide), and we put it in Deft.

When you mix Butyl Cellosolve with the ketones, you get a liquid with a strong odor, but it does the job. It slows down the drying time so you can work with it without many of the brushing problems associated with brushing lacquers.

Woodsmith: How about Deft in an aerosol can? Does it have more thinner (and therefore a lower percentage of solids) than in a liquid form?

Bernard: Yes, considerably. To put a material in an aerosol can it takes several things. First, we have to reduce the solids or the tiny spray nozzles won't allow that heavy material to come through the orifice. We thin the liquid down until it may contain only half the solids.

Then the propellants in the spray cans have to be compatible with the material or it could cause it to solidify. There are actually some additional solvents and different types in spray cans. But the basic end product is the same.

Woodsmith: Recently Deft has started selling a gloss Clear Wood Finish. How is it different from semi-gloss?

Bernard: Semi-gloss Deft contains stearates as a sanding aid and they refract light rays to give a satin look. It's the stearates that give semi-gloss Deft the whitish appearance when you look at the liquid. The stearates also create a fine white dust like sanding sealer does when it's sanded.

There was a demand for a gloss product that had the same qualities as Deft semi-gloss, including the sandability. But the stearates had to be removed so it would be a glossy finish. That change meant a couple of the oils had to be changed to maintain the same flexibility and sandability.

At the same time it was discovered that more solids (28% of the total weight) could be put into the new liquid. And this required a solvent change to achieve the same brushing characteristics.

Woodsmith: What's the best kind of brush to use with Deft?

Bernard: I like a good bristle brush. A nylon brush leaves ridges and brush marks

that are more difficult to level out. When we test the brushing quality, we use a panel that's four feet by four feet. And we never quite get rid of all the brush marks with a nylon brush.

The problem is that a lot of people don't want to spend the kind of money necessary for a bristle brush. We're searching for a brush that costs less but will still work and are beginning to do some testing on "exploded-tip" polyester brushes.

Woodsmith: The instructions that come with Deft say "about the only mistake you can make is to apply too little finish." Is that true?

Bernard: It *is* possible to apply too much if you're working on a vertical surface. I've had it sag and run onto the floor. The advantage with Deft is that if you do get a sag, it's easy to dissolve it.

If it's just a slight curtain-type run, lightly sand it and give it another coat. The next coat will usually force it to melt flat. But if it's a big drip or sag, I would wash it off with lacquer thinner in that area and recoat it.

Woodsmith: Should the first coat be thinned? And then how many coats should be applied?

Bernard: For typical brush application, Deft shouldn't have to be thinned — not the first or any remaining coats. And I always apply a minimum of three coats.

After sanding the first coat with 220 to 320-grit sandpaper, you've exposed some bare wood fibers. The second coat fills these voids, but not totally. And there are still some very thin areas over bare wood. A third coat gives a more uniform protection over the bare wood. Some people I know put on four coats, but I think three makes a good system.

Woodsmith: The label on the can reads that you need three coats to make it alcohol-proof and water-proof. Is that a marketing gimmick or is it true?

Bernard: It's not a marketing gimmick. If it were, it would read "put on five coats." The biggest hazard for water attack on the finish is attacking the wood fibers and swelling them. All surfaces, especially the edges, should be completely coated for moisture protection.

Woodsmith: So the water doesn't attack the finish itself, but the wood?

Bernard: Water will damage it if it's extreme. Don't try to finish your boat with it. To determine the degree of water and alcohol resistance, we run tests in our laboratory on panels covered with three coats of Deft. We put some drops of water on the finished surface and cover it with a watch glass for 24 hours. The water doesn't bother the Deft finish.

Then we run the same test with alcohol. Sometimes some of the things in bourbon will leave a little white haze. But with a little polish it comes right off.

Another test we run is to coat a panel with Deft and put its edge grain into a wet sponge for three days. Then we remove it to make sure there isn't any film damage. We run that test on Deft after every new batch of resin is cooked.

Woodsmith: I've had problems applying Deft over stain. It seems to lift oil-based, pigmented stains in particular. What's the solution?

Bernard: The best solution is to use Deft Wood Stain or Deftoil finish. The resins in other stains are slower drying and can be dissolved by the solvents in Deft Clear Wood Finish. But Deft Stains include a resin that's not as easily accepted by the nitrocellulose.

If you're going to use a stain other than a Deft Stain, allow the stain to dry at least three days before topping with Deft Clear Wood Finish. And then avoid excess brushing of the first coat.

Woodsmith: I've heard you can leave a brush soaking in Deft rather than clean it? Or you can wrap it with aluminum foil to store between coats?

Bernard: We know shop teachers in schools who leave bristle brushes suspended in Deft all through the school year. They take the lid off a gallon can of Deft and cut a slot in it where the brush will stay. Since Deft dissolves itself, I don't see any reason why this shouldn't be done unless it attacks the glue that holds the brush together.

You can even immerse a hard brush in Deft for 10-15 minutes and it will soften.

Woodsmith: How do you recommend rubbing Deft smooth after the last coat?

Bernard: First, wait at least 24 hours after the final coat so it won't gum up on you. Then rub with 0000 steel wool and hand buff with a soft cloth. We've also found the 3M Scotch-Brite Wood Finishing Pads work well.

Woodsmith: If *Woodsmith* readers are having a problem or have a question about Deft, how can they get help?

Bernard: Anyone can call Deft at (714) 474-0400 during business hours (Pacific time) and ask for the Technical Service Dept. for Consumer Products. Your readers also can receive a catalog describing Deft products and how to use them by sending a self-addressed, stamped envelope with $.32 postage to Deft, Inc., 17451 Von Karman Ave., Irvine, CA 92714.

USING DEFT ... *some tips from our shop*

I like using Deft Clear Wood Finish. Though it's a brushing lacquer, it doesn't have the application problems usually associated with brushing lacquers (see *Woodsmith* No. 46). But like any finish, it has some unique characteristics.

ODOR. The biggest problem I have with Deft is the odor. It's an extremely strong odor and unless there's adequate ventilation or it's applied outdoors, the smell can fill the whole house and linger for days.

SEMI-GLOSS DEFT. The traditional semi-gloss Deft also tends to be a bit cloudy — it's not as crystal clear as other brushing lacquers. And it has a slightly waxy feeling, especially before it's rubbed out.

NEW GLOSS DEFT. Since the new gloss Deft doesn't have stearates, it doesn't have the waxy feeling and it is crystal clear. I ran a test by spreading both types on a piece of glass. The semi-gloss left a whitish cloud but the gloss was completely transparent.

Since the gloss has more solids, it's heavier and covers more quickly. But you have to be careful because it tends to run and sag more easily. For most projects, I prefer the gloss, but am a little careful about brushing it on. And since it dries more slowly, wait longer between coats. (Note: Like any glossy finish, gloss Deft can be rubbed to a semi-gloss appearance with 0000 steel wool once it's dry.)

AEROSOLS. Both semi-gloss and gloss are available in aerosol cans, but there's a difference between the two. The semi-gloss sprays out an extremely thin coat that dries almost immediately. The gloss is just the opposite. It sprays out a heavy coat that tends to drip and run. You also have to be careful not to build up a thick coat of either finish or the surface may look like an orange peel when it dries.

I've found a good use for the semi-gloss aerosol — sealing in stain. A light spray coat puts on a film that dries quickly and there isn't the brush action disturbing the stain. After it dries completely, it's safe to brush on the remaining coats of Deft.

RUBBING. I've noticed that when rubbing out the final coat of Deft with pumice and rottenstone, it's *very* easy to cut through the Deft and expose the wood — even with as many as five coats on. I think the problem is that a dried coat of Deft is considerably thinner than other lacquers and varnishes I'm used to rubbing.

To obtain a *satin finish*, I apply three or four coats of Deft. When it's completely dry, rub it with a 0000 steel wool pad that's had some paste wax worked into it. Afterwards it can be buffed to a fine satin sheen.

To get a *high-gloss finish*, I brush on a couple coats of gloss Deft, sand with 220-grit between coats, and then spray on a light final coat. This approach eliminates the brush marks by sanding, but I don't go broke buying all the aerosol cans needed to spray three coats on a large project.

Sources

BABY CRADLE PATTERN

A full-size pattern that incudes profiles of the top rails, feet, uprights, stretcher, wedge pins, and spindles (with dimensions if you want to turn your own) is available from Woodsmith Project Supplies.

Cradle Pattern
8005-010 Cradle Pattern

PARTS FOR CRADLE

Woodsmith Projects Supplies is also offering the spindles, buttons, and knobs for the cradle. The spindles and screw hole buttons can be ordered in either oak, cherry, or walnut. But the knobs (used on the end of the hanging dowels and for the lock pin) only come in maple. Note: The spindles we offer might not be exactly the same profile as the ones pictured on page 8.

The spindles and screw buttons are also available from the catalogs listed below. Note: When ordering the spindles from other catalogs they may not be exactly the same size or be the same profile as the ones we used. Be sure to check the size and profile before ordering.

Cradle Parts
748-110 Cradle Package Oak
748-120 Cradle Package Walnut
748-130 Cradle Package Cherry
- Cradle Pattern
- (22) Spindles
- (20) Screw Hole Buttons
- (6) Knobs (maple only, not stained)

FINISH

We used Minwax Wood Finish stain and Minwax Antique Oil Finish on the cradle and magazine rack. These products are available at many local paint and hardware stores. Or they can be ordered from the catalogs listed below.

CRADLE PAD/SHEET

For a mattress, we cut a piece of 2"-thick foam to fit the cradle bottom (12" x 32½").

For those times when the Pampers don't quite hold it all, we covered the foam mattress with a waterproof crib pad from Sears. Their waterproof crib pad measures 27" x 36", so one crib pad can be cut in half to make two cradle pads. Then we slipped the foam and pad into a king-size pillow case (20" x 40") for a sheet and tucked the excess around the bottom.

MAGAZINE RACK

You can order the spindles and the screw hole buttons needed for the magazine rack from the catalogs listed below. Be sure the spindles are the correct length and the profile you want before ordering.

ROUTER BITS

The carbide-tipped router bits needed to rout the profiles and grooves in the Cradle and the Magazine Rack are available from Woodsmith Project Supplies. (See other suppliers below in the Mail Order Sources section.)

Router Bits
271-814 ¼" Round-Over Bit
764-200 ½" Round-Over Bit
271-643 ½" Straight Bit

SLOT CUTTER

The slot cutter needed to make the arched top frame and panels is available from the catalogs below.

Note: Freud makes a three-wing slot cutter that's available from a number of sources. The cutter has a 2"-diameter and the largest Freud ball bearing has a ⅞" outside diameter. This means the cutter will actually cut a 9/16"-deep slot (instead of ½").

This slot is slightly deeper but it isn't a problem on the cradle. But because the magazine rack end frames are joined with ½" stub tenons, there would be a 1/16" gap visible on the outside of the joint. To prevent this gap when routing a slot in the stiles with a Freud cutter, be sure the router table fence is ½" from the outside tip of the cutter, see Fig. 28, page 19. (Note: A 9/16"-deep kerf is okay for the arched top rail.)

DEFT

On page 22, we talked about Deft Clear Wood Finish. Deft also makes Defthane (polyurethane), Deftoil (a urethane/tung oil Danish oil), and Deft Wood Stains.

You can purchase these products locally, or through mail order from the catalogs listed below.

WOODSMITH PROJECT SUPPLIES

ORDER BY PHONE

For fast service, use our Toll Free order line. Phone orders can be placed Monday thru Friday, 7:00 AM to 7:00 PM Central Standard Time.

Before calling to place an order, please have your VISA, MasterCard, or Discover Card ready.

800-444-7002

Merchandise is subject to availability. Please call for current prices.

MAIL ORDER SOURCES

Similar hardware and supplies may be found in the following catalogs. Please call each company for a catalog or information.

Cherry Tree Toys
800–848–4363
Cradle Parts

Constantine's
800–225–1153
Finish, Screw Hole Buttons, Slot Cutter, Router Bits, Deft

Woodcraft
800-225-1153
Router Bits, Slot Cutter Screw Hole Buttons

The Woodworkers' Store
800-279-4441
Finish, Cradle Spindles, Screw Hole Buttons, Router Bits, Slot Cutter, Deft

Woodworker's Supply
800–645–9292
Router Bits, Screw Hole Buttons, Slot Cutter