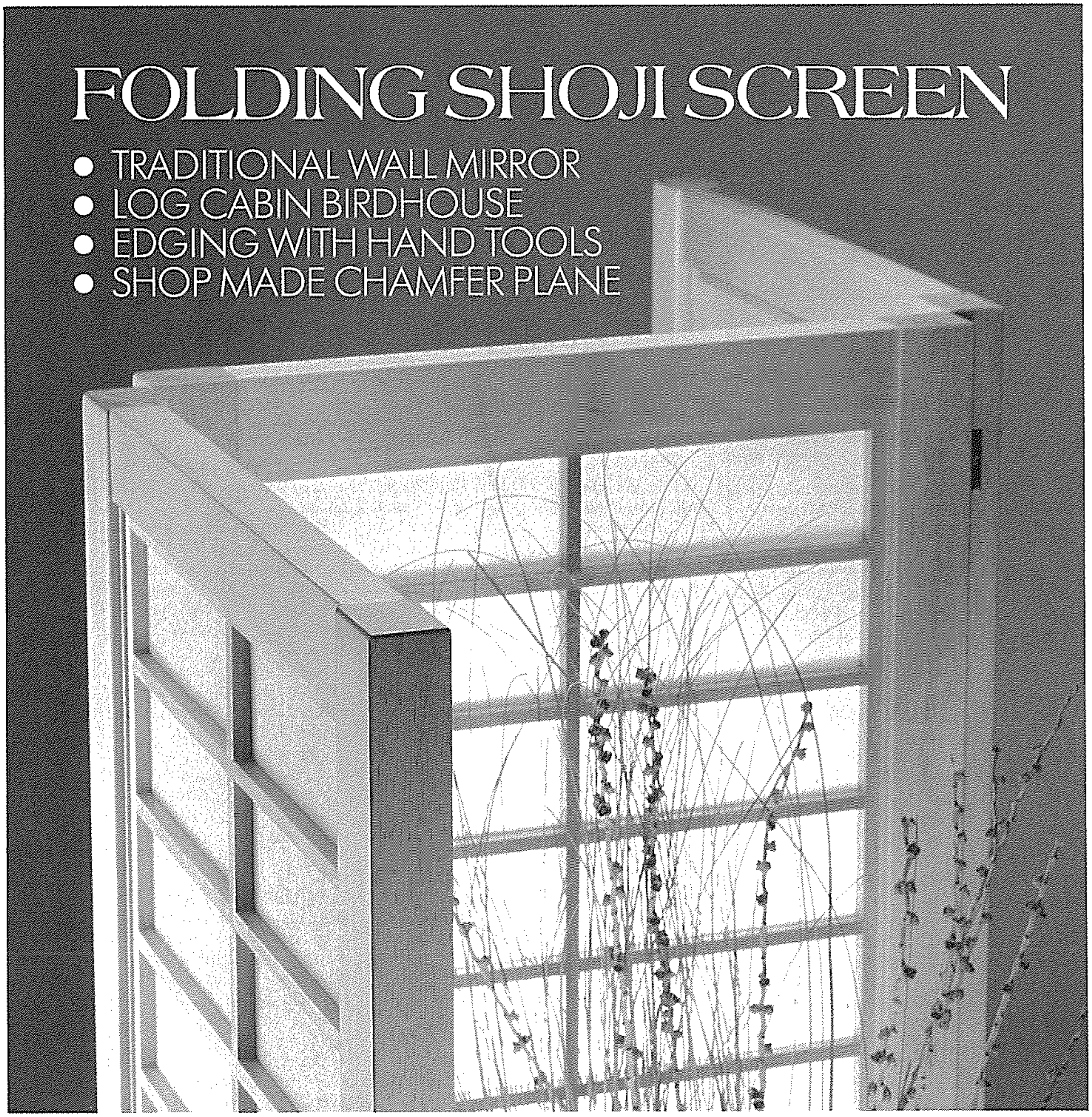
NO. 57 NOTES FROM THE SHOP $3.50

Woodsmith®



Woodsmith®

Number 57 **June, 1988**

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Sawdust

ABOUT THIS ISSUE. I've always respected Japanese architecture and craftsmanship. There's no doubt that traditional Japanese homes (and their surrounding gardens) bring man and nature in close harmony while at the same time being practical and efficient.

Yet, while I admire the genius of Japanese architecture, Japanese furniture design is not so much to my liking. And that presents a problem from the standpoint of a woodworker who wants to participate in some way with Japanese design.

I've been a lot more interested in building a Japanese house than any piece of Japanese furniture I've seen. The solution is simple — build only part of a house.

That is, I wanted to build the one design element that epitomizes Japanese architecture: shoji screens. (These are the sliding doors that allow the blending of architecture with nature while still offering some privacy.)

However, I will admit to feeling a little awkward about taking on this project. It seems best left to a lecture from a visiting Japanese master shoji maker (tategu-shi).

With a bow to those who have devoted their lives to this work, I decided to try my hand at this ancient trade. I decided to build a folding screen made with three shoji frames.

As we got into the initial design stages, my hesitation about the project resurfaced. What happened was that we wanted to make a couple of changes to the traditional shoji — and I didn't feel comfortable about changing a design steeped in tradition.

On traditional shoji, the grid that forms the center of the frame can be seen only from one side; rice paper covers the other side. But because of the nature of the folding screen, we wanted to have grids on both sides.

Since the grids are traditionally mortised into the frames, if the paper were damaged, it would be nearly impossible to replace without dismantling the entire frame.

Rather than mortise each piece of the grid into the frame, we assembled an entire grid that is held into the outside frame with removable stops.

So, are these authentic shoji or are they simply folding screens that look like shoji? The latter is more accurate. But no matter what the origin or authenticity, I've enjoyed building them.

BIRDS. As Ted begins the task of photography for each issue, he's always faced with the problems of how to "prop" the project. This became a real challenge when he started working on the birdhouse.

To get a little realism into the shot, he wanted to hang the birdhouse on a tree limb outside our shop window. Within two days a family of wrens promptly moved in. They worked on the nest, flying in and out, and at times perching on the roof. It would have been a perfect shot.

But every time he opened the window to get a clear shot, the wrens became camera shy. The only time they seemed not to care about Ted and the camera was in the late afternoon or evening when the light was low (too low for photography without a flash).

Well, Ted didn't get the shot he wanted. You'll have to use your imagination to see a camera-shy wren poking her head out of the birdhouse hole. Even with our periodic interruptions, the wrens seem to enjoy their new home and we have enjoyed watching them busily building it.

NEW FACES. I usually announce new members of our happy group in this column. But last year, when Kent Welsh joined us as manager of the *Woodsmith Store* here in Des Moines, I completely forgot to mention him.

I met Kent as he was helping us with the remodeling of an old carriage house behind our main building. His work was meticulous and careful — especially on the construction of the main staircase we added to lead to the second floor. (It's a big carriage house.)

Before he could complete his work on the carriage house, we were impressed enough that he was hired to take on the tasks of running our home-base store. For the past year he has worked hard to help all who come in the store. We're all glad to have Kent with us.

MOMS. Four years ago, Sandy, Christel and Vicky walked into my office one day and announced they were all pregnant. I quickly had tests run on the water in the drinking fountain, and was relieved to learn that the rest of us were safe.

Since then, however, all three have added to their families. And now Christel and Vicky have decided to leave us and devote full time as moms. We wish them well.

ANOTHER NEW FACE. To help fill the gap, Lisa Thompson has joined us to help with customer service. She is already working on the fulfillment of the kit orders that come in each day. I think that with her help we will be able to turn your order around within two days from the time we receive it.

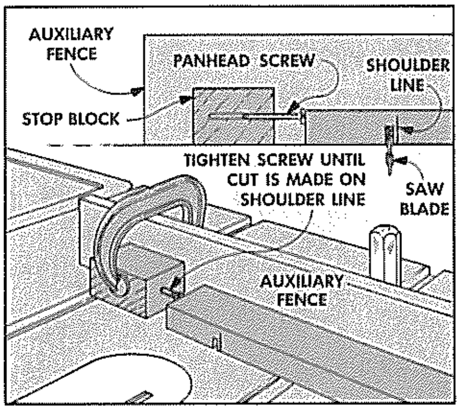
NEXT ISSUE. The next issue of *Woodsmith* will be mailed during the week of August 29, 1988.

Tips & Techniques

FINE ADJUSTMENT STOP BLOCK

I make lap joints frequently and use a simple adjustable stop block for my table saw to accurately locate and cut the shoulders. The stop block lets me *fine tune* the location of the cut.

To make the stop, screw a panhead screw part way into the end of a scrap block. Then clamp the block to an auxiliary fence screwed to the miter gauge so the screw head acts as a stop at the end of the workpiece.



Start by setting the screw head so the cut will be made just a little shy of the shoulder line. Then make a cut and check its location. Now sneak up on the shoulder line by slowly tightening down the screw with a screwdriver and cutting again until the cut is right where you want it. By turning the screw in or out just a little, you can really fine tune the location of the cut.

To make cross laps in the center of a board, clamp another stop block and screw it to the far end of the auxiliary fence to control the location of the other shoulder.

Clamping stop blocks to an auxiliary fence prevents the workpiece from ever sliding beyond the shoulder lines.

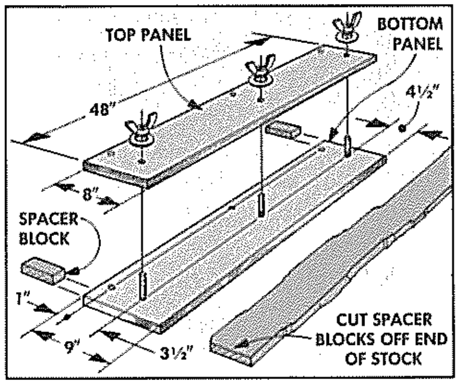
Lucian H. Brown
Excelsior, Minnesota

STRAIGHT-LINE RIPPING JIG

In *Woodsmith* No. 53 a reader recommended cutting a straight edge on a crooked board by temporarily gluing a workpiece to a straight carrier board with hot melt glue. Then the carrier board is run along the rip fence to cut a straight edge on the workpiece.

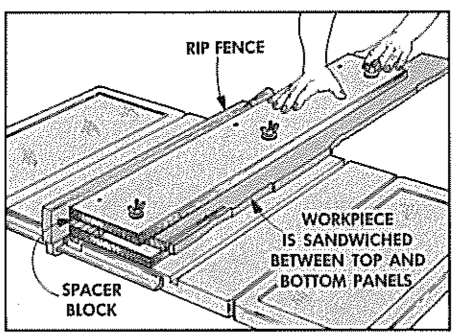
This method works fine when cutting flat, smooth boards, but when the workpiece is rough or warped, this can be ineffective and even dangerous. Instead, I use a simple jig that holds the workpiece firmly in place between two plywood panels.

Cut the top panel 8" wide and the bottom panel 9" wide. Then cut both to a common length. I found 48" a comfortable length for accommodating most workpieces, but if you work with longer stock and have an outfeed table or support, you can increase the length of the panels.



The two panels are held together with ⅜" carriage bolts and wing nuts. To drill the holes for the bolts, clamp the two pieces together with the back edges flush. Then drill two rows of holes through both of the panels.

I located one row of holes 1" from the back edge so the jig will accept wide boards. The other row is located 4½" from the back edge for narrow boards. On the bottom side of the bottom panel, counterbore each hole for the head of the carriage bolt.



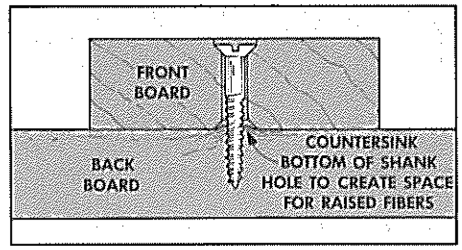
To use the jig, cut a couple spacer blocks the same thickness as the workpiece and slip them between the panels along the back edge of the jig (see drawing above). This keeps the back edge of the top panel from tilting down when the workpiece is fit along the front edge. Then slip the workpiece between the two panels and tighten down the wing nuts.

Now with the back edge of the jig running along the rip fence, cut a straight edge on the workpiece.

Steve Barrett
Missoula, Montana

SCREW GAPS

When screwing two flat pieces of wood together, a gap often appears between the two mating surfaces. The gap is usually caused by wood fibers that have raised out of the back board as the screw is driven in. If using hardwood, no amount of tightening will correct the problem.



To solve the problem, I slightly countersink the shank hole on the *underside* of the front board. This creates a void for any raised fibers to fit into. If you're already set up to countersink the top of the hole, it's easy to flip the board over and countersink the bottom.

Jim Benini
Kersey, Pennsylvania

PUNCHING TIN

In *Woodsmith* No. 55 we featured a country pie safe and an article on how to punch the tin panels for the doors. After the article appeared we heard from a couple readers who have built pie safes and offered two more tin-punching methods:

Edwin Bell of Homer, Illinois mounts a punch in a drill press. Then he sets the depth gauge on the drill press for the correct size hole when the punch is lowered. By moving the tin around on the drill press table and lowering the punch into the tin, he punches uniform holes.

Douglas Stovall of Danville, Virginia uses an automatic center punch that's normally used for metal layout work. A punch like this sells for about $10. It's a single-hand operation and can be adjusted from shallow to deep penetration. The tips can also be reground to different hole shapes.

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.

Folding Screen

A DESIGN BASED ON JAPANESE SHOJI

This folding screen is a scaled-down version of a traditional Japanese shoji (pronounced show-gee). In Japan, shojis are used as sliding doors or room partitions that run from floor to ceiling.

Our version is shorter. It can be used to divide off a section of a room or as a dressing screen. In addition to the size, we've also made some other changes. Japanese shojis have a center grid mortised into the frame with rice paper glued to the back of the grid. The paper is traditionally changed every year before New Year's Day so the house can begin the year with a fresh start.

Each of the sections in our folding screen has *two* grids with a translucent "paper" sandwiched between the grids. (We used a tough fiberglass material, but you could also use rice paper, see Sources, page 24.) Instead of being mortised into the frame, the grids are held in place with stops (strips that fit in grooves in the frame.)

CUT FRAMES TO SIZE

The first step in making the screens is to cut all of the frame pieces 1½" thick. (Note: See page 22 for a discussion of woods to use.) To obtain the 1½"-thick stock, you can resaw 8/4 stock (1¾" thick), glue up two pieces of ¾" stock, or use "2 by" (1½" thick) material.

STILES. Each frame consists of two stiles (vertical pieces) and three rails (horizontal pieces). To make enough parts for each frame, cut two stiles (A) to a width of 2" and a length of 61⅞", see Fig. 1. (This length is based on the spacing of the grid. If you want a different height screen, increase or decrease in increments of 3⅜" -- the height of one grid section.

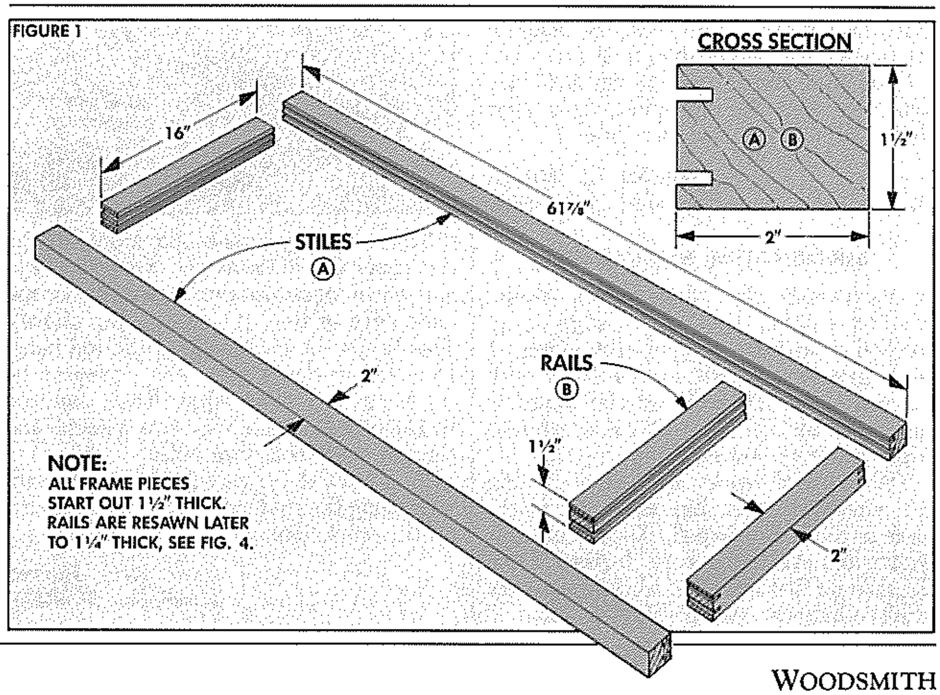
RAILS. After the stiles are cut to size, cut three rails (B) for each frame to a width of 2" and a length of 16", see Fig. 1. (Note: The rails start out at 1½" thick and are later resawn to 1¼" thick.)

GROOVES

Once all the frame pieces are cut to width and length, cut two ⅛" grooves on the inside edge of all the pieces. These grooves serve two purposes: First, they hold the stops that keep the panel and grids in place, refer to Figs. 22 and 23 on pages 8 and 9. Second, they hold splines to join the stiles to the rails, refer to Fig. 6.

CUTTING THE GROOVES. To cut the ⅜"-deep grooves, set up the rip fence so it's ¼" from the saw blade, see Fig. 2. To hold the workpiece tight against the fence, I clamped a featherboard to the saw table.

FIGURE 1



Then cut two grooves on the *inside* edge of all of the stiles and rails. On the middle rail only, cut the grooves on *both* edges. To cut the second groove, turn the piece end-for-end. (Note: If the stiles are at all bowed, cut the grooves on the convex side so it bows in toward the center of the frame. Then the grid will force the piece straight.)

END GROOVES. Next, to accept the splines, cut matching grooves in the ends of the rails. To do this, don't change the saw setting, but stand the rails on end and cut the end grooves, see Fig. 3. (Shop Note: I supported the workpiece with a wood block. A tenon jig would also work, but that requires resetting the fence.)

CUT TO THICKNESS. After the end grooves are cut, the rails (B) can be cut to final thickness. Traditional Japanese design calls for the rails to be thinner than the stiles. To do this, cut ¼" off each rail using a two-step method, see Fig. 4.

First, set the rip fence 1⅜" from the blade and cut ⅛" off one side, see Step 1 in Fig. 4. Then move the fence in and cut ⅛" off the other side, see Step 2.

CHAMFERS

Before assembling the frame, I chamfered the edges. On the stiles, chamfer all of the edges except where the end of the stile meets the rail, see Fig. 5.

On the rails, chamfer only the top edges of the top rail and the bottom edges of the bottom rail. Don't chamfer the inside edges or the middle rail.

SPLINES

The frame is held together with splines that fit in the grooves. Start by resawing stock to thickness to match the grooves.

CUT TO WIDTH. For strength, the grain on the splines should run perpendicular to the joint line. This makes the splines wider than they are long, note grain direction in Fig. 6.

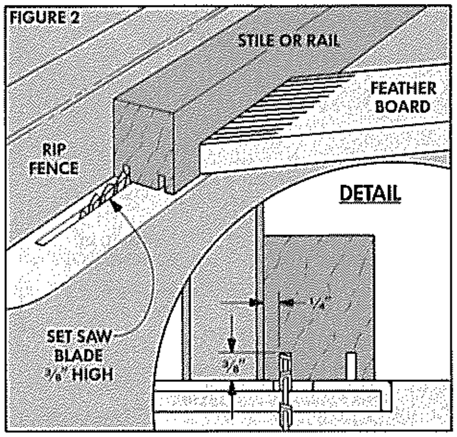
For the splines (C) on the top and bottom joints, cut them to width to fit from the edge of the rail to the bottom of the spline groove (1⅝"), see Fig. 6. Since there are grooves on both sides of the middle rail, the middle splines (D) are cut to fit between the spline grooves (1¼" wide).

ASSEMBLY

Once all of the splines are cut to size, the frame can be assembled, see Fig. 7. I started by gluing the splines into the end grooves in the rails. Keep the splines centered on the middle rail and flush with the top and bottom edges of the top and bottom rails, see Fig. 6.

Next glue and clamp the frame so the bottom edge of the middle rail is 10" up from the bottom end. Check that the pieces lie flat and the ends are flush.

FIGURE 2



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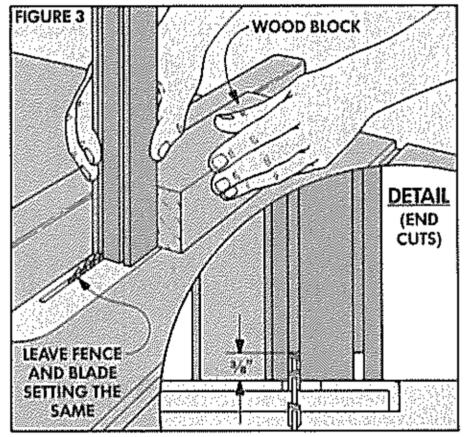

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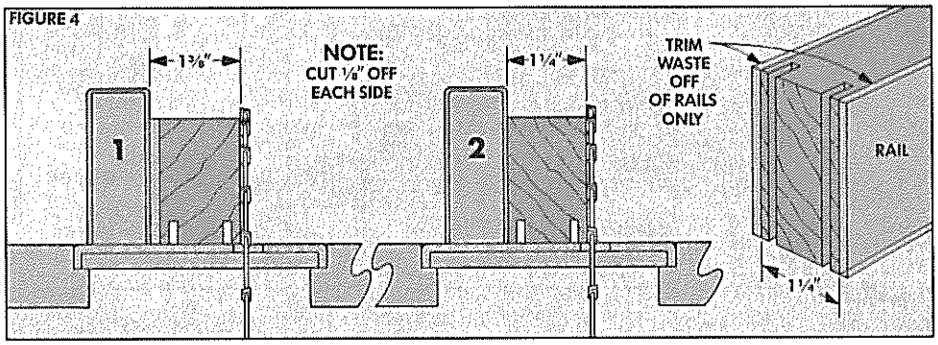

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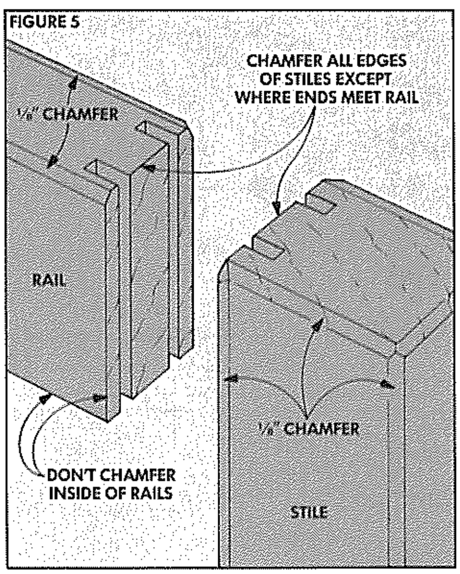

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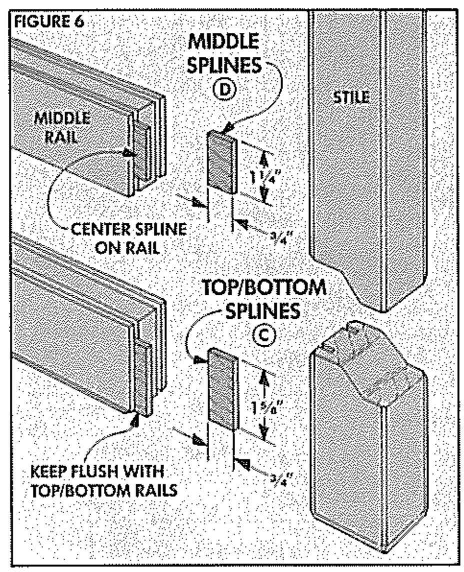

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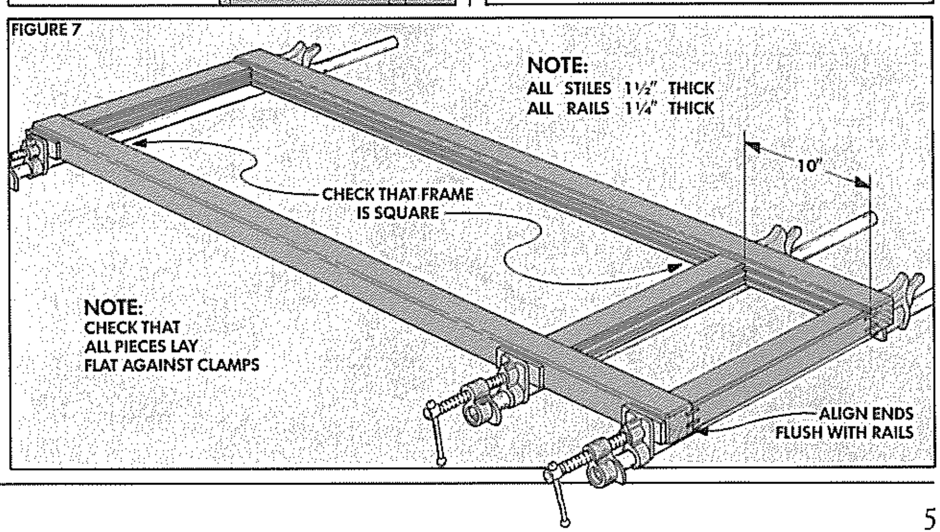

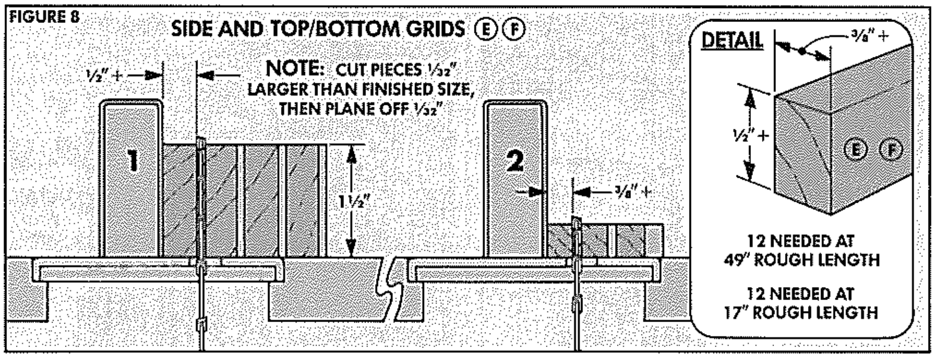

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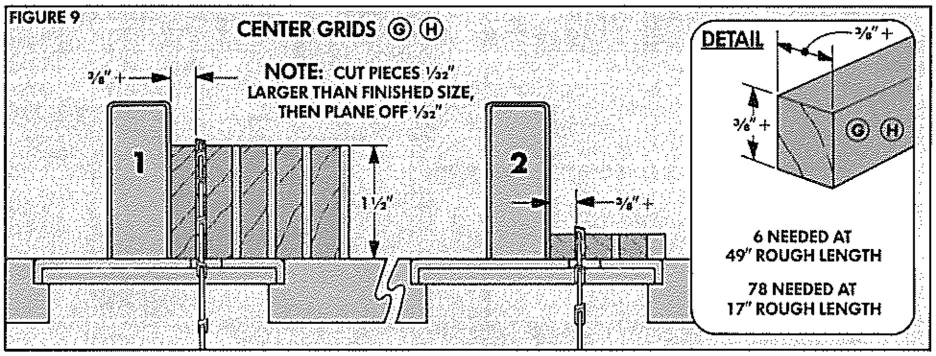

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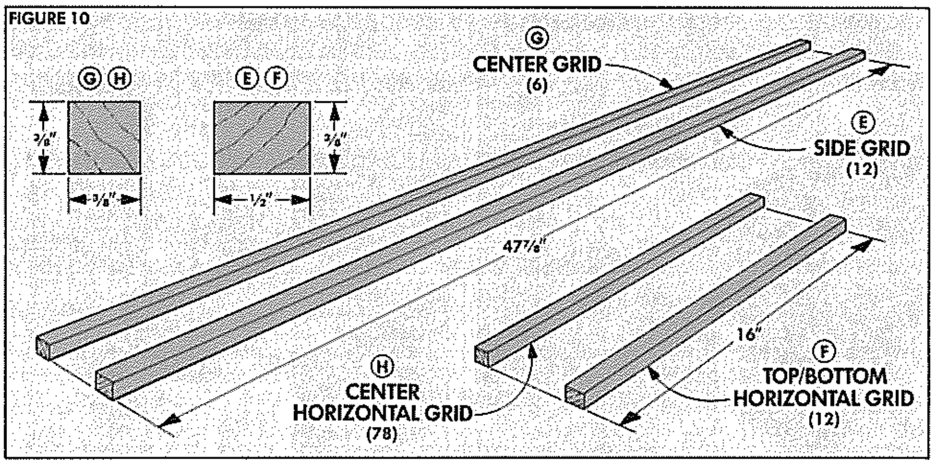


FIGURE 10

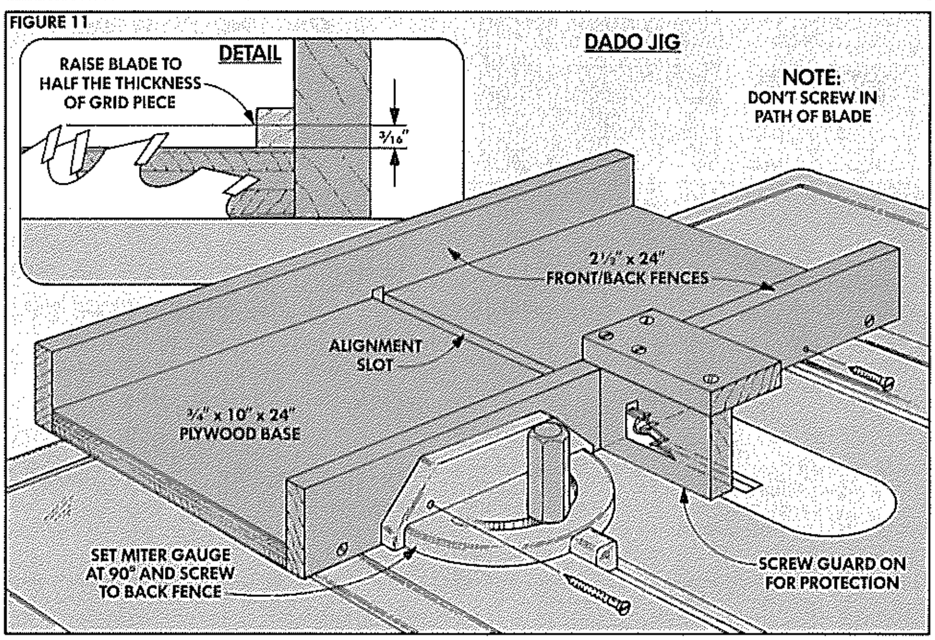


FIGURE 11

CUTTING GRID PIECES

After the frames are complete, work can begin on the grids that fit inside the frames. All of the grid pieces are ⅜" thick and held together with lap joints. The border pieces are ½" wide and the center pieces are ⅜" wide.

CUT TO WIDTH. Start by ripping 8/4 (or 1½"-thick) stock into strips for the side grid pieces (E) and the top and bottom grid pieces (F), see Fig. 10. To allow for planing, rip these strips a little (1/32") more than ½" thick, see Fig. 8.

If you're making three screens, cut at least four ½"-thick strips to a rough length of 49" for the side grid pieces (E), see Step 1 in Fig. 8. Also cut four ½"-thick strips to a rough length of 17" for the top/bottom pieces (F). (I cut extra strips of every size as "test" pieces and so I'd have extras in case any of the strips warped.)

CUT TO THICKNESS. After the ½"-thick strips are cut, reset the rip fence to a little more than ⅜" from the blade, see Step 2 in Fig. 8. Lay the workpiece down on its side and rip twelve sides (E) from the four 49" strips and twelve top/bottoms (F) from the four 17" strips.

CENTER GRID. With the rip fence still at the ⅜"+ setting, cut the center grid pieces (G and H) using the same two- step method, see Fig. 9. First, cut two ⅜"-thick strips 49" long for the center pieces (G), and at least 26 strips 17" long for the center horizontal pieces (H). Then lay these strips down and rip six center grid pieces (G), and 78 horizontal pieces (H), see Step 2 in Fig. 9.

PLANE TO SIZE. Once all of the pieces were cut to rough size, I planed the border pieces (E and F) to exactly ½" wide by ⅜" thick, see Fig. 10. Then plane the center pieces (G and H) to ⅜" by ⅜". (For more on planing these pieces to exact size, see the tips on pages 22 and 23.)

CUT TO LENGTH. To determine the final length to cut the pieces, measure the inside dimensions of the assembled frame and cut the pieces to match. In my case, the vertical pieces (E, G) were cut 47⅞" long and the horizontal pieces (F, H) were cut 16" long, see Fig. 10.

ALIGNMENT KEY. Before setting up to cut the lap joints, cut an 8"-long alignment key from one of the extra ⅜" square pieces. Resaw this piece to 5/16" thick. (This key is needed later, refer to Fig. 16.)

DADO JIG

Once all the pieces are cut to size, I built a simple jig to help when cutting the dadoes, see Fig. 11. Start with a ¾" plywood base and screw 2½"-high front and back fences to the base.

ATTACH MITER GAUGE. Next, set the table saw miter gauge to 90F and check that it's cutting perfectly square. Then position the jig so the blade cuts about in the center of the jig, and screw the miter gauge to the back fence of the jig.

GUARD. To keep fingers away from the blade, I made a guard from a couple pieces of scrap and screwed it to the back fence.

SET DADO. Now mount a ⅜" dado blade on the saw. Then raise the blade so it projects above the plywood and cut a ⅜"-wide alignment slot in the bottom of the jig.

CUTTING THE LAP JOINTS

After the jig is complete, raise the blade so it's *exactly* one half the thickness of a ⅜"-thick grid piece, see Detail in Fig. 11. Then cut the lap joints. Start by cutting ½"-wide rabbets on the ends of all pieces to lap over the ½"-wide border pieces.

RABBETS. To set up for the rabbets, clamp a squared stop block on the right side of the jig. The distance from the stop block to the left side of the alignment slot is ½". (Check this setting with one of the ½"-wide grid pieces, see Fig. 12.)

Note: Don't switch to a ½" dado blade to cut these rabbets — you'll lose the ⅜" alignment slot in the jig. Instead, cut the ½"-wide rabbets with a ⅜" dado blade, in two passes. Start by cutting the shoulders with the ends tight against the stop block. I cut a number of pieces at the same time and held them down flat against the jig with a scrap block, see Fig. 13.

After cutting the shoulder, move the pieces slightly away from the stop block and finish the rabbet with a second pass.

DADO LAYOUT. Next, lay out the ⅜"-wide dadoes on one of the center strips and one of the side strips (E and G), see Fig. 14. Space out 13 dadoes (for 14 openings) *evenly* between the rabbets on the ends. (This should be an even 3" between dadoes.) Also, on one of each of the short pieces (F and H), lay out the ⅜"-wide dado so it's centered on the length, see Fig. 14.

CUT THE DADOES. To cut the dadoes, line up the first dado (on one of the layout pieces) over the alignment slot in the jig. Then clamp the stop block in place so it butts against the end of this piece. Now butt all the other pieces against the block and clamp them together, see Fig. 15.

After cutting the first dado, slip the alignment key (that was cut earlier) into the first dado, see Fig. 16. Now remove the clamp and cut the remaining dadoes by aligning the layout lines with the slot in the jig. (Keep the key in the dadoes. Don't fasten it to the jig as an "indexing" pin since any slight mistake in laying out the first dado will multiply.)

Before taking the pieces apart, mark the ends so you can keep common ends the same direction when the grid is assembled.

SHORT PIECES. To cut the center dadoes on the short pieces, locate the layout line over the slot and clamp the stop block to the jig, see Fig. 17. Again, mark the ends.

FIGURE 12

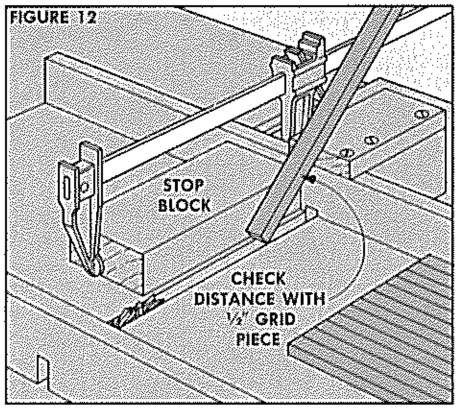
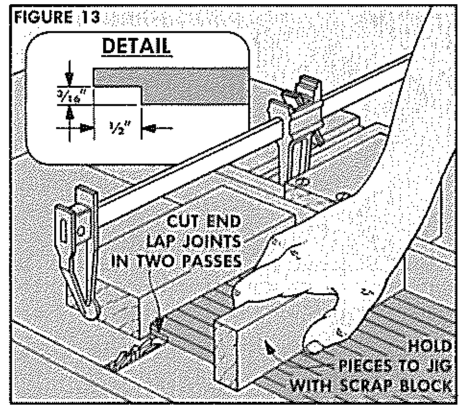


FIGURE 13



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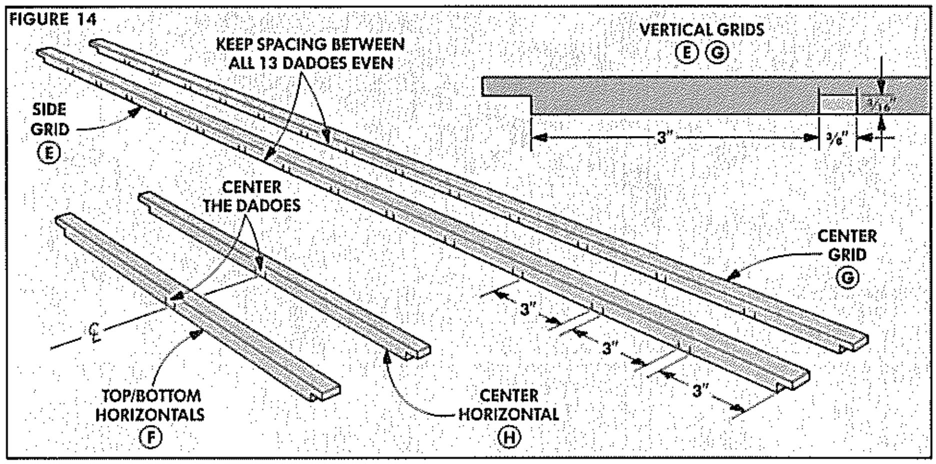

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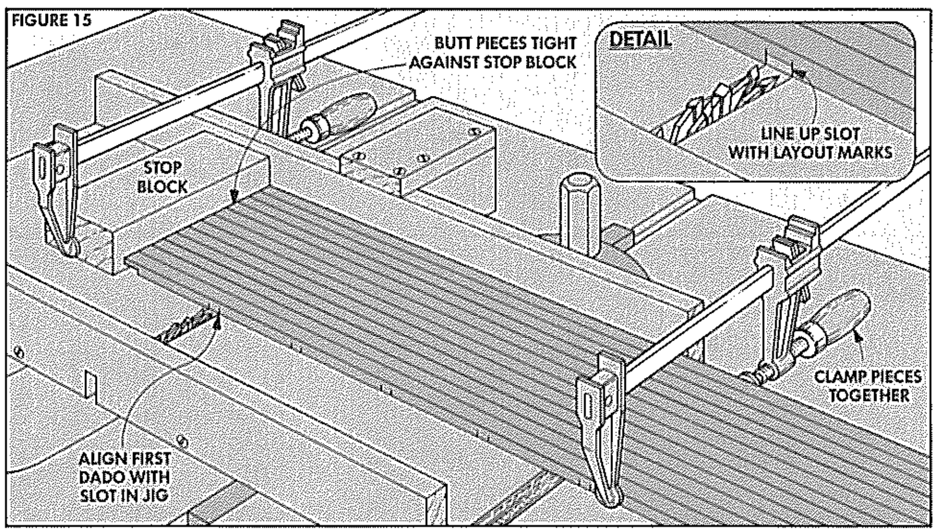


FIGURE 16

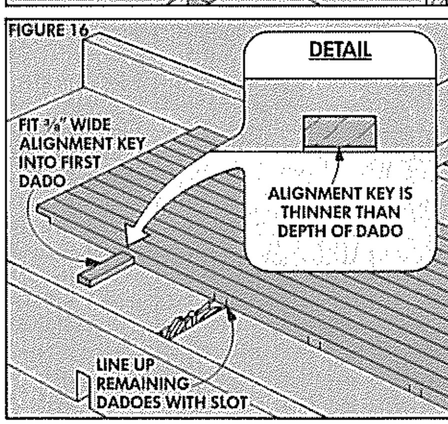


FIGURE 17

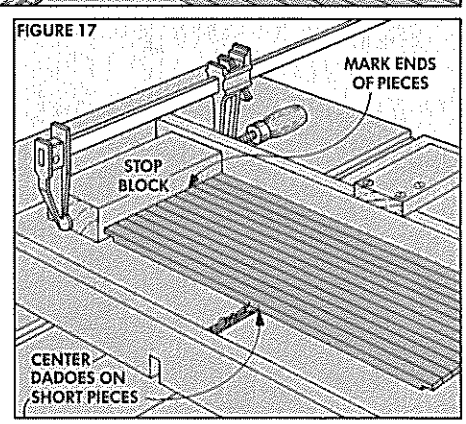
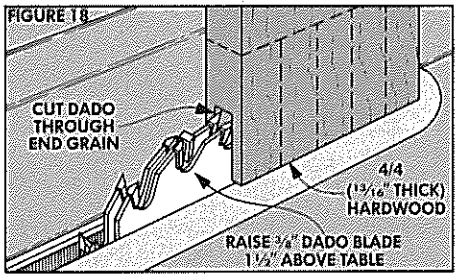


FIGURE 18



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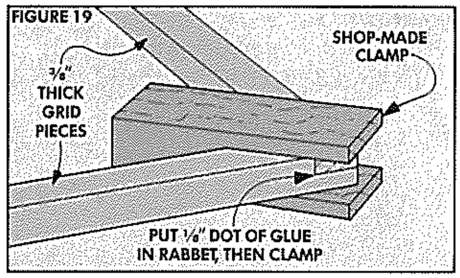


FIGURE 20

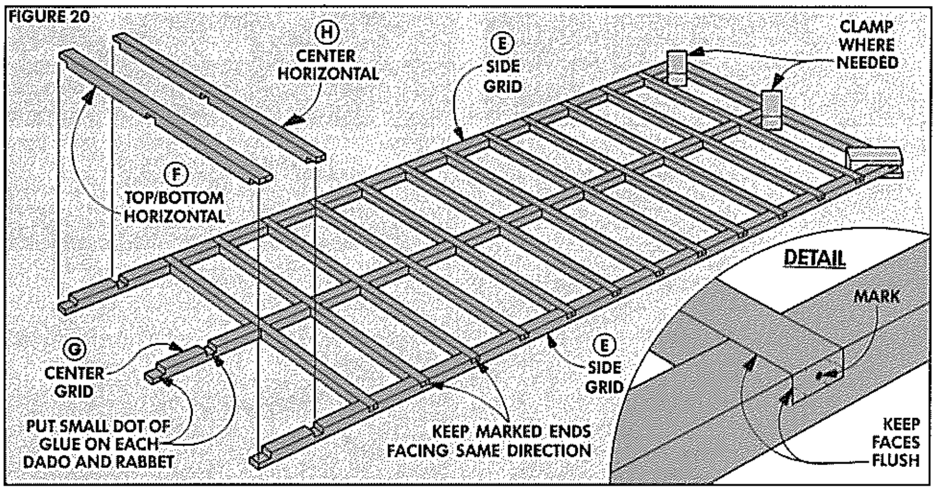


FIGURE 21

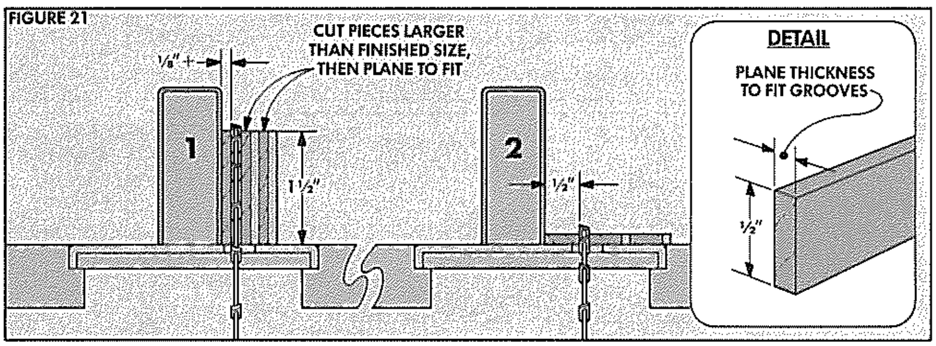
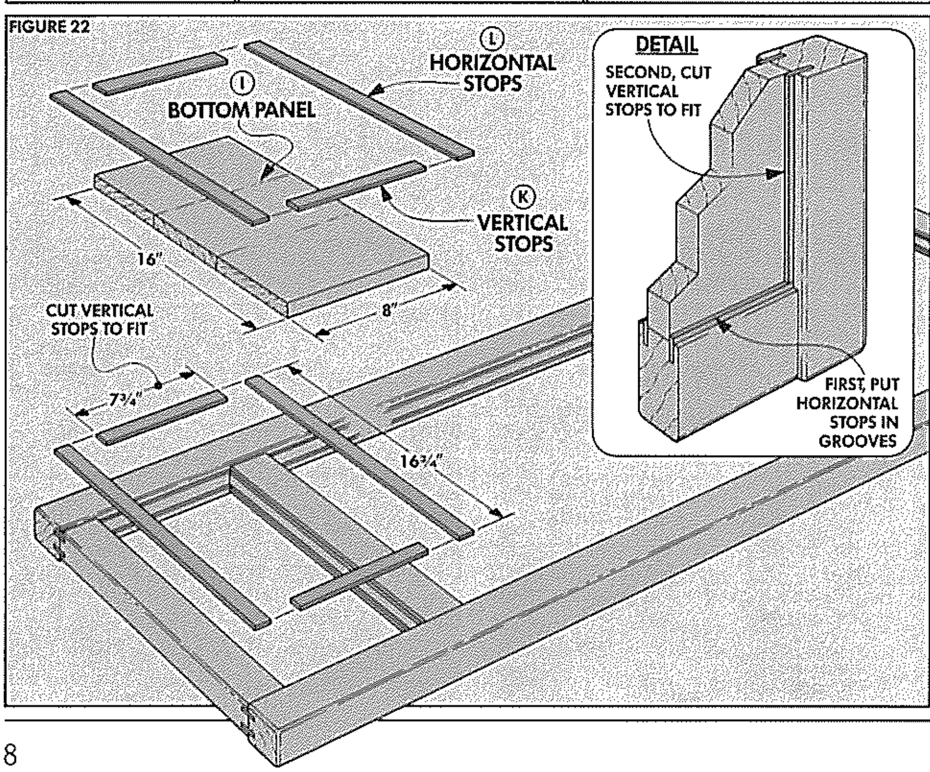


FIGURE 22



ASSEMBLING THE GRID

After all the dadoes are cut, the grid can be assembled. Since each grid has 45 lap joints, I started by making some shop-made clamps. (Or you can use spring clothes pins.)

MINI CLAMPS. To make the clamps, start by raising the 3/8" dado blade to 1½" above the table. Then stand a piece of 4/4 hardwood on end and cut a dado through the end grain, see Fig. 18. Next, cut a piece 2½"-long off the end and then rip off some 1"-wide clamps.

ASSEMBLY. To assemble a grid, lay one 3/8"-wide center vertical piece (G) down between two ½"-wide side pieces (E), see Fig. 20. Then put a small drop of glue on each dado and rabbet, and clamp the horizontals (F and H) in place with the marked ends facing the same direction.

After the glue dries, test fit the grid into the frame. If it's a little tight, plane the edges to make a snug fit. If it's a little loose, that's okay.

STOPS

The grid is held in the frame with stops. I started by cutting the stops a little thicker than the width of the groove and then planed them to fit, (again, see page 22).

CUT TO THICKNESS AND WIDTH. To cut the stops, I used the two-step cutting technique shown in Fig. 21.

CUT TO LENGTH. The length of the 24 horizontal stops (L) equals the width of the grid (16") plus the depth of two 3/8"-deep grooves (a total of 16¾").

There are two different vertical stops. The vertical stops (J) for the top grid are longer than the vertical stops (K) that hold the panel in place. Since the vertical pieces butt against (inside) the horizontals, cut them to fit after temporarily putting the horizontals in place, see Figs. 22 and 23.

BOTTOM PANEL

The bottom panel (called a hipboard on a shoji) can be either plywood or solid stock. Since I wanted the bottom panel (I) to match the rest of the screen, I glued up three pieces of ¾" pine to make each of the three panels (I), see Fig. 22.

After the panels are dry, cut them to fit the bottom opening. If you use solid stock, and you're building in a dry season, you may want to make the width slightly (1/16") narrower to allow for any expansion with an increase in humidity.

FINISH

Traditional Japanese shojis rarely receive finish. But I wanted some protection so I applied two coats of Deft Clear Wood Finish (semi-gloss). It's a durable finish, but I found it difficult to brush on the grid pieces without runs. Another time I might wipe on tung oil or Minwax Antique Oil.

ASSEMBLY

After the finish is dry, all of the pieces can be assembled. The screen is designed to fit into the frame without glue.

ASSEMBLE BOTTOM. To assemble the bottom (panel) area, insert the two horizontal stops (L) then the two vertical stops (K) into the grooves on one side, see Fig. 22. Next, set the panel into the opening and insert the stops on the other side.

ASSEMBLE TOP. To assemble the top (grid) area, start by cutting the fiberglass sheet to the same size as the grid and staple it to the back of one grid, see Fig. 23. I drove three staples into the top horizontal on the grid with a staple gun and allowed the sheet to hang down. (Note: If you use narrower rice paper, join and glue it behind the center vertical.)

The assembly process for the grids is the same as for the panel, see Fig. 23. Make sure that the grids are facing *out* on both sides — that is, with the vertical pieces running through from top to bottom.

Shop Note: The paper adds a little thickness between the grids. If there's not enough room to get the stops in, plane around the edges on the back of the grid, or plane the stops thinner.

HINGES

The three frames are connected with 1½"-long by 2"-wide hinges. To lay out the location of the hinges, clamp two of the frames together and mark around the hinge with an X—Acto knife, see Fig. 24. Locate one hinge 3¼" from each end and center the third hinge on the length.

ROUT MORTISES. Next, I routed out the majority of the waste freehand. To do this, set a straight bit to the same depth as the thickness of one hinge flap and rout out the mortises stopping short of the knife line, see Fig. 25. Then come back and clean up to the line with a chisel, see Detail.

MOUNT HINGES. Finally, mount the hinges in the mortises, see Fig. 26.

MATERIALS LIST

Overall Dimensions 1½" d x 60" w x 61⅞" h

FRAMES		
A	Stiles (6)	1½ x 2 — 61⅞
B	Rails (9)	1¼ x 2 — 16
C	Top/Btm Splines (24)	⅛ x 1⅝ — ¾
D	Middle Splines (12)	⅛ x 1¼ — ¾
GRIDS/PANELS		
E	Sides (12)	⅜ x ½ — 47⅞
F	Top/Btm Horiz. (12)	⅜ x ½ — 16
G	Centers (6)	⅜ x ⅜ — 47⅞
H	Center Horiz. (78)	⅜ x ⅜ — 16
I	Bottom Panels (3)*	¾ x 16 — 8
STOPS		
J	Grid Verticals (12)	⅛ x ½ — 47⅝
K	Panel Verticals (12)	⅛ x ½ — 7¾
L	Horizontals (24)	⅛ x ½ — 16¾

*Edge glue each panel from three pieces.

FIGURE 23

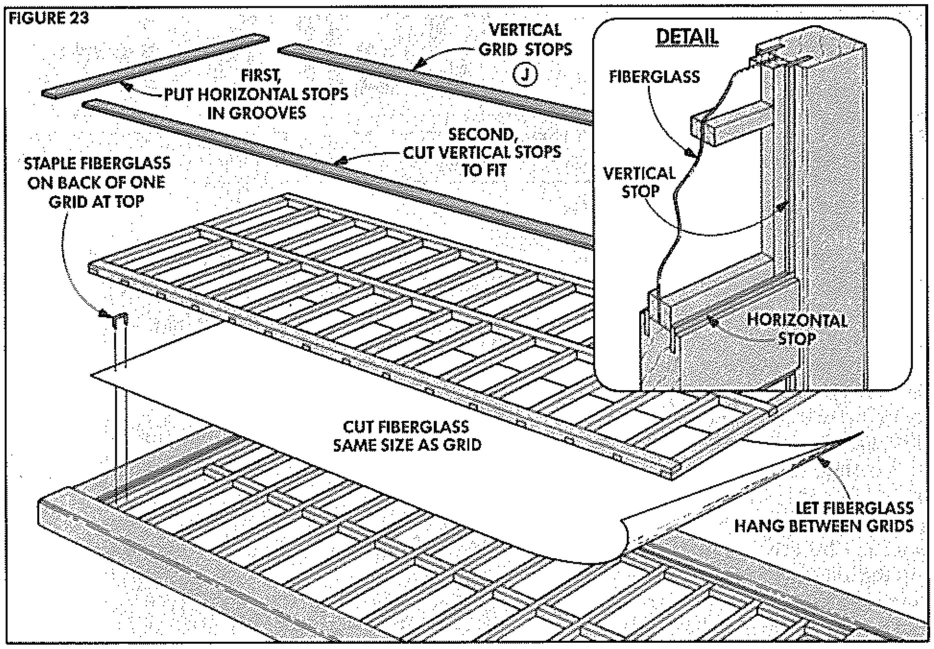


FIGURE 24

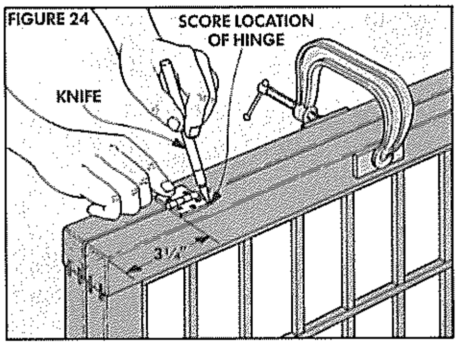


FIGURE 25

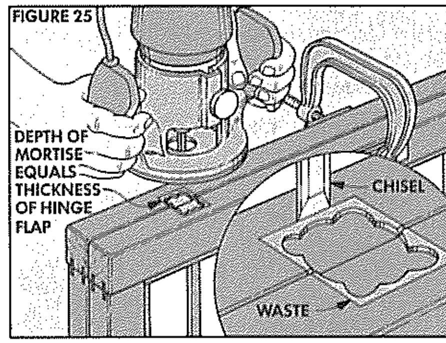
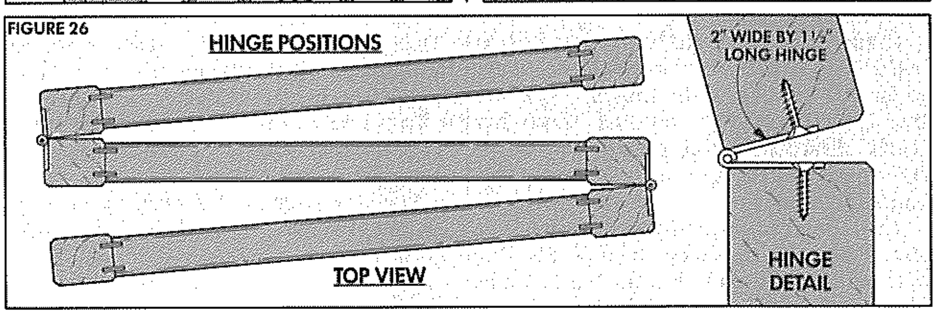
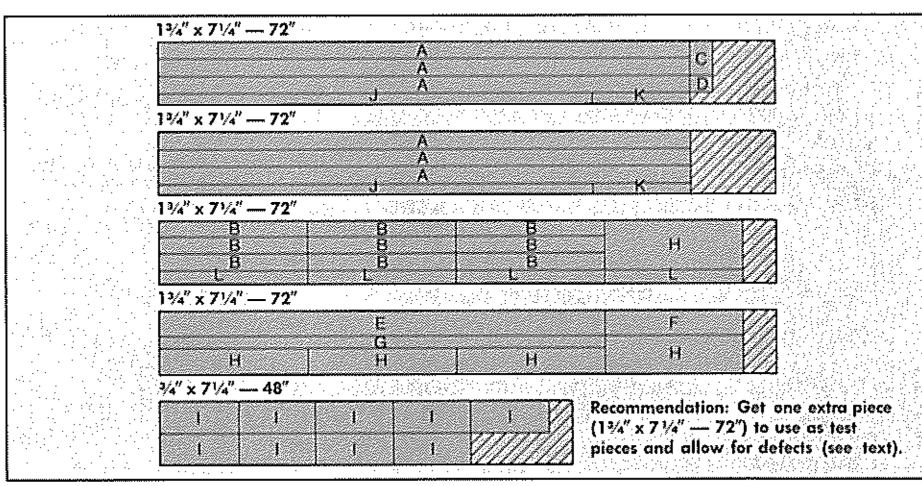


FIGURE 26



CUTTING DIAGRAM



Wall Mirror

A PROJECT THAT REFLECTS TRADITION

Building a frame is one of the basic procedures in woodworking. But it's not necessarily one of the easiest. On light frames for pictures and photos that don't have to be strong, I join the parts with mitered corners. But when the frame has to be strong (for large artwork or a mirror), I usually use a mortise and tenon joint.

Another choice is a lap joint. The biggest problem with this joint is a visual one — it allows part of the end grain to be seen on the edges of the frame (refer to Fig. 1).

However, because the design of this frame includes molding strips that cover the edges (and the end grain areas of the lap joints), I decided to use lap joints.

BUILDING THE FRAME

To build the frame, the four sides are cut to size and joined with half laps. Begin by ripping 4/4 stock (13⁄16" actual thickness) 1½" wide. Then cut the frame sides (A) 27⅝" long and the top and bottom frame pieces (B) 21⅝" long, see Fig. 1.

HALF LAPS. After the frame pieces are cut to length, half laps are cut on the ends to join the corners of the frame. There are two critical measurements for these lap joints. First, the distance from the end of the workpiece to the shoulder must be equal on all pieces.

To ensure this, I used the rip fence as a stop. Lock the rip fence down so it's 1½" (the width of the stock) from the *far* side of the dado blade, see Detail, Fig. 2.

SET HEIGHT. The second critical measurement is the thickness of each "lap." Adjust the height of the dado blade so it will cut *exactly* half way through the stock. (This will take some trial and error cuts on some test pieces.)

When the height of the blade is set, form the laps by making multiple passes over the blade.

GLUE FRAME. After laps are cut on the ends of all four pieces, the frame can be glued together. To hold the joints tight while the glue dries, clamp the lapped corners with C-clamps, see Fig. 1. (Check the inside corners with a square before final tightening of the clamps.)

TRIM STRIPS

After the glue on the frame is dry, trim strips are cut to cover the inside and outside edges of the frame. These trim strips serve two purposes.

First, their half-round forward edges add depth to the face frame, making it look molded (refer to Fig. 6). Second, the strips on the outside conceal the end grain of the lap joints.

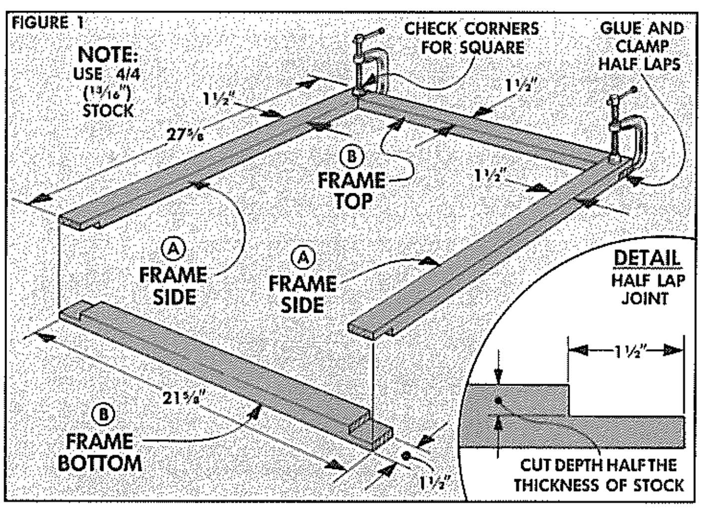
CUT STRIPS. To cut the strips, begin by cutting three 4/4 strips to a rough width of 1½" and to rough lengths of 29", 26", and 20".

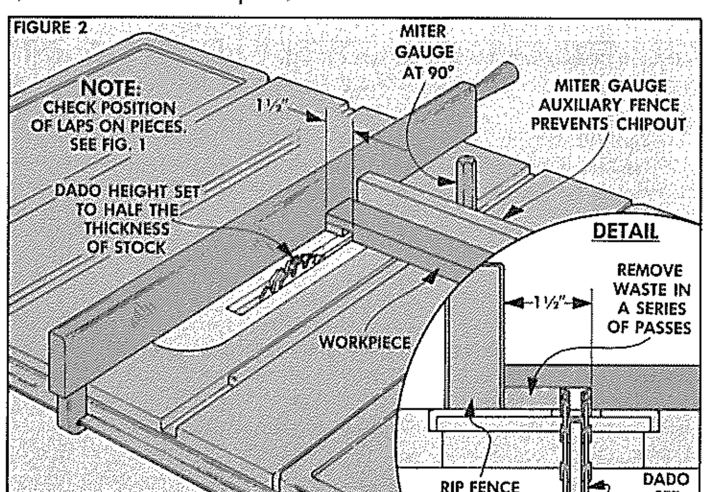
Next, each strip is resawn to produce two ¼"-thick molding strips (C, D and E). (To resaw these pieces, I used a thin push stick made from ⅛" Masonite.)

Now they can be ripped to final width. The two outside strips (C) are ripped to 13⁄16" wide, see Fig. 3. The inside trim strips (D) and the top/bottom strips (E) are ripped down to 15⁄16" wide, see Fig. 4.

EDGE PROFILE. The front edges of all six strips are rounded using a ⅛" round-over bit, see Detail, Fig. 3.

OUTSIDE STRIPS. After rounding the edges, the outside strips (C) can be glued to the frame. The key here is to glue them on so the rounded edge (at its full diameter) extends above the level of the frame.





GAUGE. To keep the rounded edge uniform for the length of the frame, I made a simple gauge. The gauge is two strips of ⅛" Masonite glued together with the edges offset about ¼", see Detail, Fig. 3.

MOUNT STRIPS. To mount the outside strips (C), apply glue to the strip and frame and put three C-clamps loosely in position, see Fig. 3. Next, use the gauge to align the top (rounded edge) of the strip, see Fig. 3. Then tighten the clamps.

TRIM ENDS. After the glue dries, remove the clamps and trim the ends off the outside strips flush with the top and bottom.

INSIDE STRIPS. Now the inside strips (D, E) can be glued to the inside of the frame. This is done in two steps. First, carefully cut the strips to fit the inside dimensions of the frame with 45° miters on the ends.

Next, apply glue to the strips and frame, and use the spacer gauge to position the strips and clamp them in place, see Fig. 4.

BACK. After the strips are glued in place, the ¼" plywood back (L) is cut to size. Cut it to width to fit between the outside strips (C). Then cut it to length so it's flush with the top and bottom edges of the frame, see Fig. 4. (Wait until later to attach it.)

MIRROR MOLDING

The mirror is held in the frame with profiled molding strips (F, G). I made these moldings on the router table from a 2"-wide piece of ½"-thick stock, see Step 1, Fig. 5.

CUT PROFILE. The profile is cut with a 5/32" Roman ogee bit. Begin by practicing on a piece of ½"-thick scrap and adjust the height of the bit until the top and bottom shoulders are equal, see Step 2. Then rout *both* edges of the 2"-wide blank.

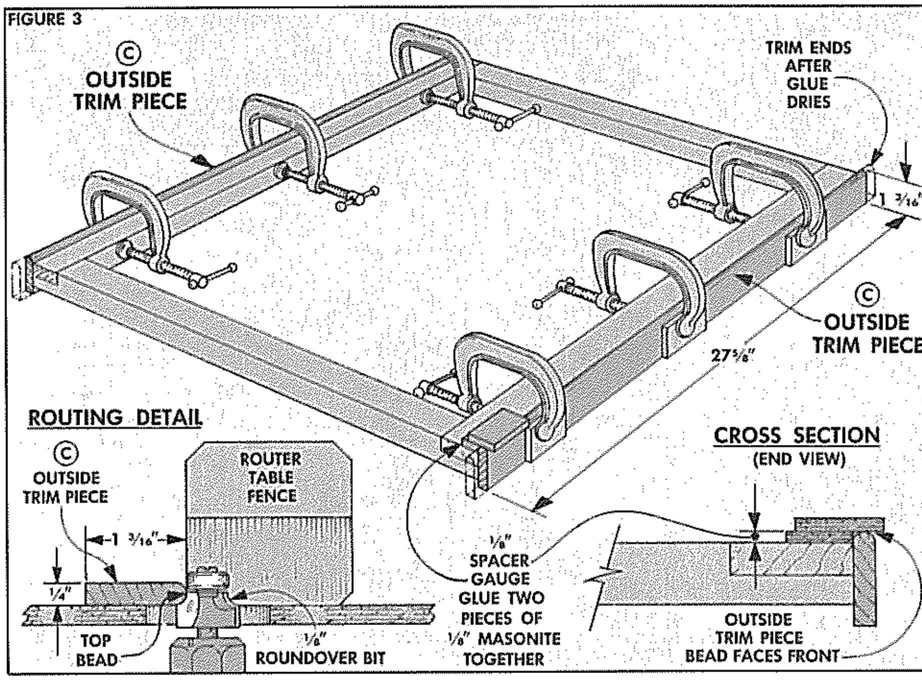
RIP MOLDINGS. After routing the profiles, the ½"-wide molding strips are ripped off the edges, see Step 3.

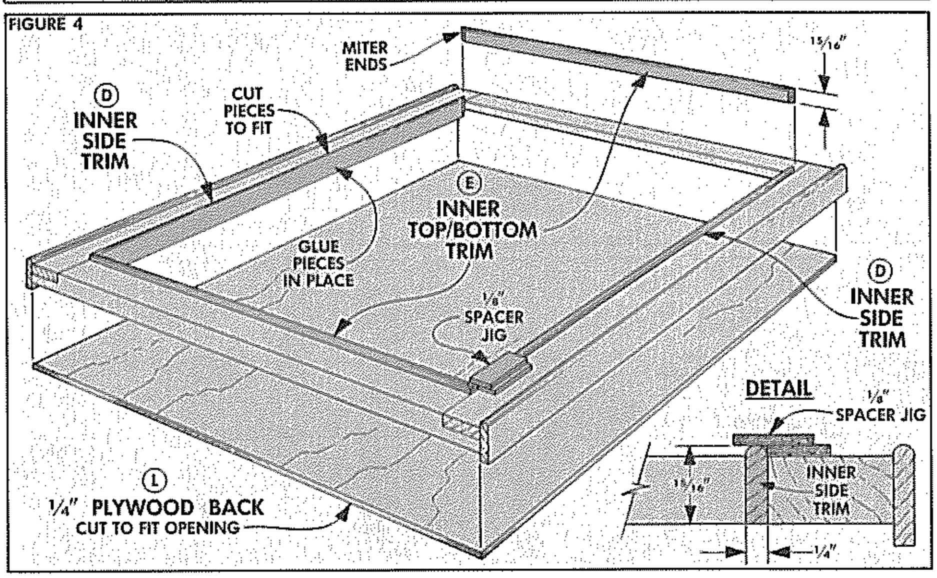
CUT TO SIZE. To fit the moldings inside the frame, begin by mitering the ends of the side moldings (F) so they fit tight between the top and bottom of the frame. Then miter the ends of the top and bottom moldings (G) for a tight fit between the side moldings.

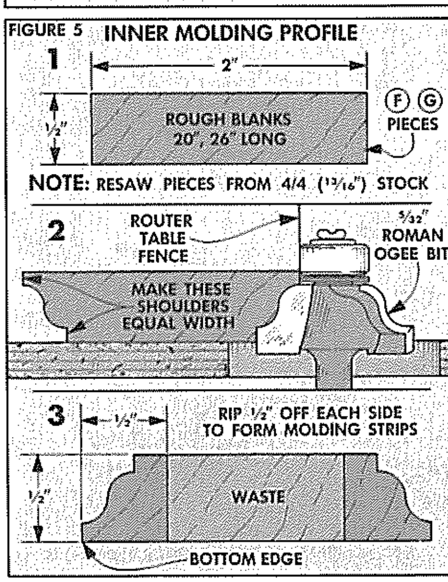
SPACE FOR MIRROR. When gluing the moldings in place, they have to be positioned to allow for the thickness of the mirror. To do this, I cut several spacers the same thickness as the mirror. (I used ⅛" Masonite for a ⅛"-thick mirror).

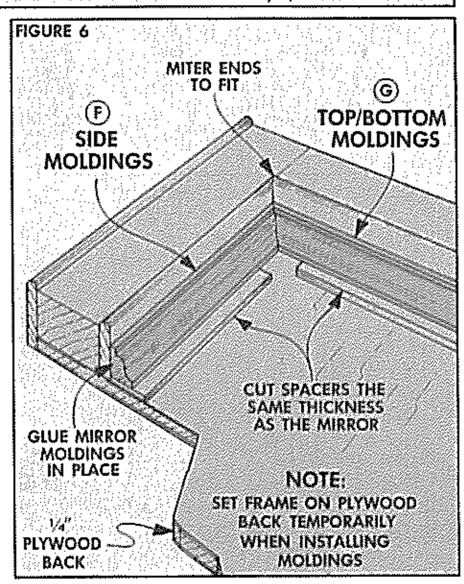
MOUNT MOLDINGS. Now, to mount the moldings, set the frame over the plywood back and position the spacer strips along the inside trim strips (D), see Fig. 6. Then apply glue to the moldings and press them against the inside trim strips and down on the top of the spacer strips.

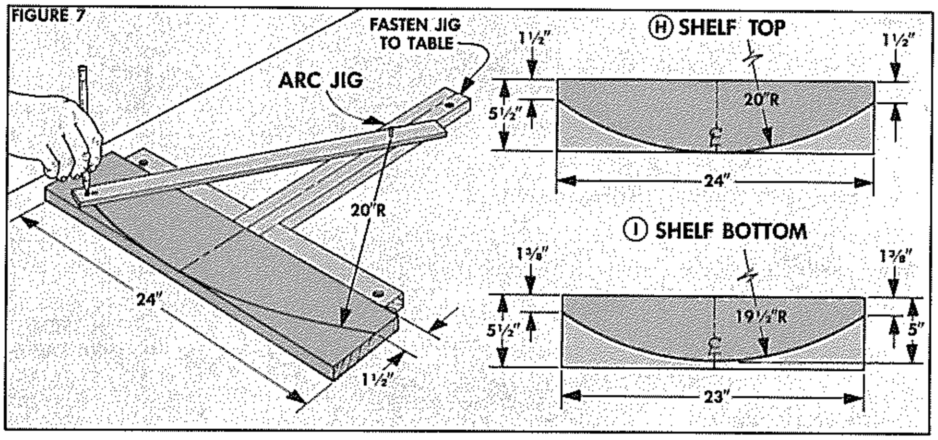
Note: It's almost impossible to clamp the moldings in place, so I held each piece of molding with my fingers until the glue grabbed (about a minute), then installed the next piece of molding.

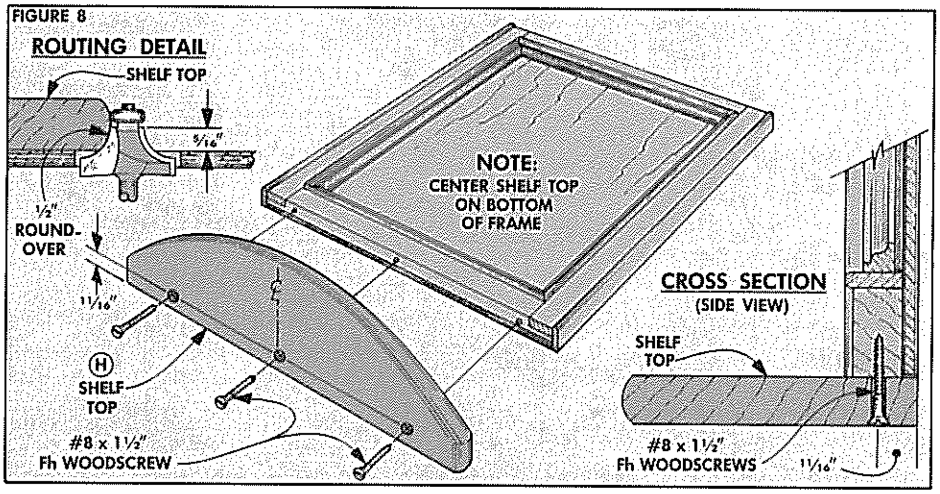


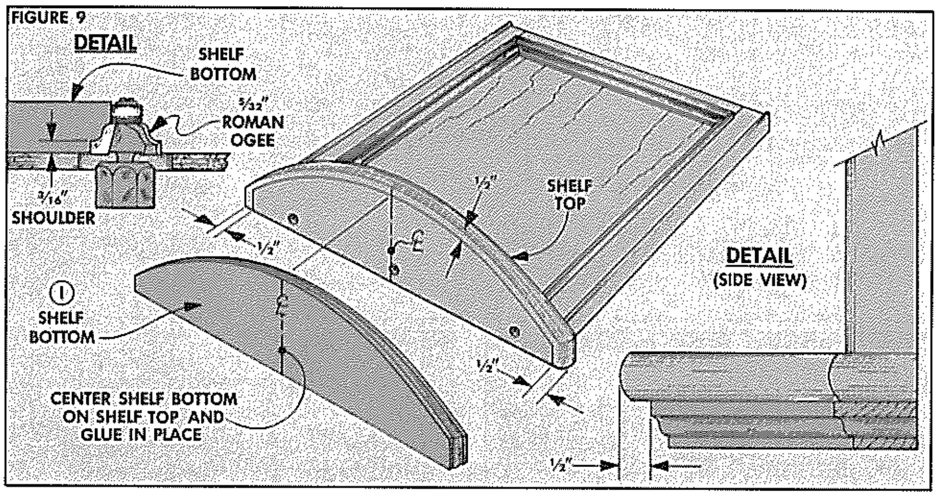


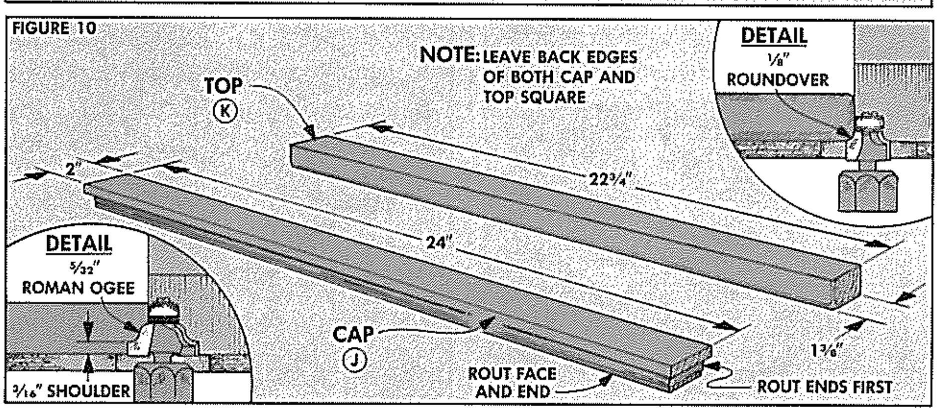












CURVED SHELF

When the frame was completed, I added a molded cap on the top and a shelf on the bottom. I started with the shelf.

TWO LAYERS. The shelf is laminated with two pieces: the top piece (H) with a bullnose edge and the bottom piece (I) with a Roman ogee profile, refer to Fig. 9. Both pieces are cut from 4/4 stock 5½" wide. Cut the top piece (H) 24" long and the bottom piece (I) 23" long, see Fig. 7.

ARCS. After the workpieces are cut to size, concentric arcs are struck on the front edges with an arc jig. To make the jig, join two pieces of stock in a "T" shape, see Fig. 7. Then draw a centerline down the stem of the "T".

The arcs are drawn using an arm made from a thin strip of scrap with three holes in it, see Fig. 7. Drill a hole at one end for the pivot point. At the other end drill two holes for the pencil, one 19½" from the pivot point, and the other 20" from the pivot point. (Don't mount this arm, yet.)

ALIGN JIG. After making the jig, draw a centerline across both shelf pieces (H, I), centered on the length. Then align the centerline on the top piece (H) with the centerline on the jig.

DRAW ARCS. To draw the arc on the top piece (H), mark a point on the *end* of the workpiece 1½" down from the top edge, see Fig. 7. Now center the 20" pencil hole over this point, and drive a brad through the pivot hole at the top of the swing arm. (Make sure the brad is centered on the centerline on the jig.) Then strike an arc along the front edge of the workpiece.

To lay out the arc on the bottom piece (I), mark a point on the end of the workpiece 1⅜" down from the top edge. Then put the pencil in the 19½" hole and strike an arc using the same pivot position.

Note: To make concentric arcs, it's important to change the position of the pencil, *not the pivot point.* If you change the pivot point, the lines won't be concentric.

CUT TO SHAPE. After striking the arcs, cut the top and bottom shelf pieces to shape with a saber saw or band saw and sand the edges smooth.

ROUT EDGES. Next, rout a bullnose profile on the curved edge and the ends of the shelf top piece (H). I did this with a ½" round-over bit set only 5/16" high, see Detail in Fig. 8. For the shelf bottom piece (I), rout the curved edge and ends with a 5/32" Roman ogee bit, see Fig. 9.

ATTACH SHELVES. The shelf top piece (H) is attached to the bottom edge of the frame with three No. 8 x 1½" Fh woodscrews. Drill pilot holes and then glue and screw this piece to the frame, see Fig. 8.

To mount the shelf bottom piece (I), center it on the shelf top piece (H) with the rear edges flush. Then glue and clamp it in place.

CAP MOLDING

The frame is topped with a cap molding piece made from two pieces of 4/4 stock.

CUT TO SIZE. Begin by cutting the top piece (K) 1⅜" wide and 1⅛" longer than the width of the frame (22¾"), see Fig. 10. Then cut the cap piece (J) 2" wide and 1¼" longer than the top piece (24" long).

ROUT EDGES. To complete the top piece round over the front bottom edge and the ends with a ⅛" round-over bit, see Detail, Fig. 10. On the cap piece (J), rout the bottom front edges and ends with a 5⁄32" Roman ogee bit. (Don't rout the back edges of either piece.)

FASTEN TO FRAME. After the edges are routed, fasten the top (K) to the top of the frame. Center the top piece on the top of the frame and glue and clamp it in place, see Fig. 11. After the top is glued in place, the cap (J) is glued and clamped to the top (K) so the back edges are flush.

FINISH. Before mounting the mirror, I applied two coats of satin varnish and let it dry thoroughly.

INSTALL MIRROR

While the finish is drying, measure the inside dimensions of the frame and cut a mirror ⅛" less in width and length than the opening.

INSTALL MIRROR. To install the mirror, place the frame face down on a table with the shelf overhanging the edge, see Fig. 12. Place the mirror in the frame and add a layer of brown paper to protect the reflective back on the mirror. Now fasten the plywood back in place with eight No. 8 x ¾" Fh woodscrews.

HANGING BRACKETS

In order to hang the mirror, I mounted two hanging brackets. These brackets are screwed through the back of the plywood and into the frame sides, see Fig. 13.

RECESS HOLES. When using this type of hanger, I usually bore a shallow recess hole in the back of the frame that's directly in line with the hole in the bracket, see Fig. 13. This hole provides a recess for the head of the screw used to hang the frame to the wall, see Fig. 14. Drill this hole a little larger in diameter than the head of the screw you're going to use.

HOW TO HANG. There are two ways to hang the mirror. The ideal way is with hollow wall driver anchors ("Molly" bolts), see Fig. 14. These fasteners can be located anywhere between studs and have a large pan head screw that provides a firm anchor for the hanger bracket.

You can also hang the mirror on a wire strung between the two hangers. If you choose this method, put two wire hooks in the wall (about 6" apart) instead of just one. (It's stronger and you'll have to spend less time straightening the mirror.)

FIGURE 11

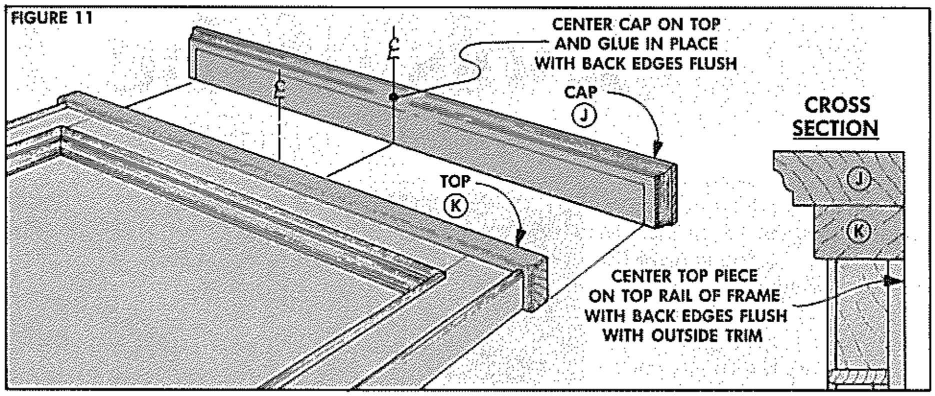


FIGURE 12

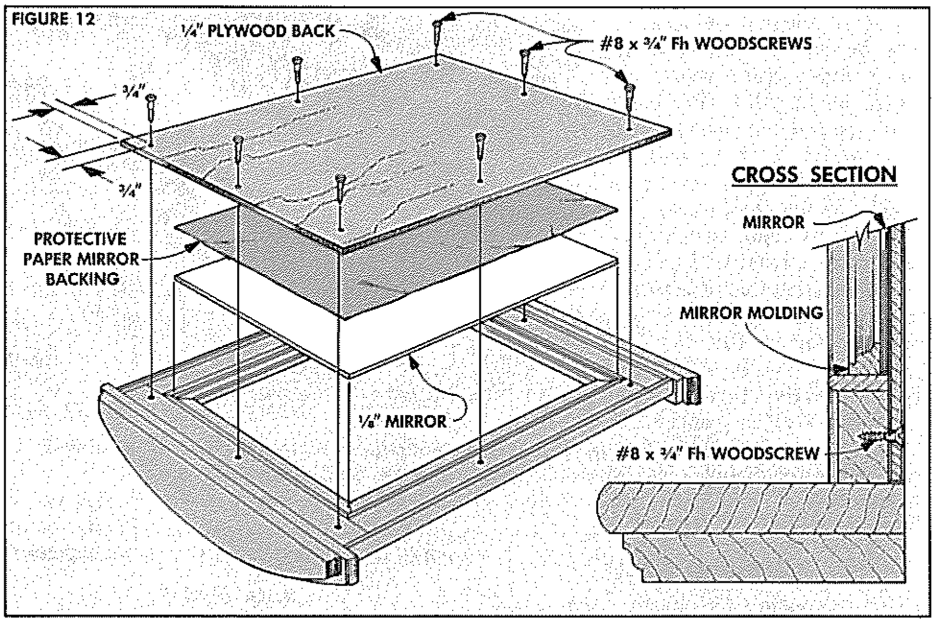


FIGURE 13

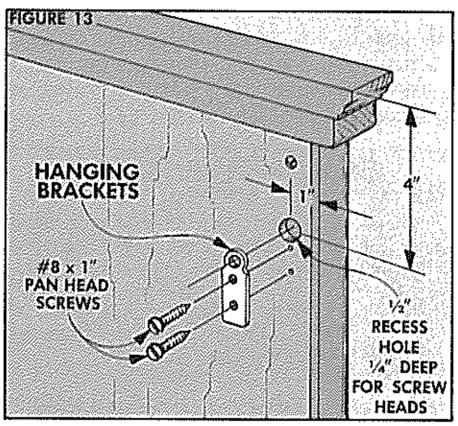
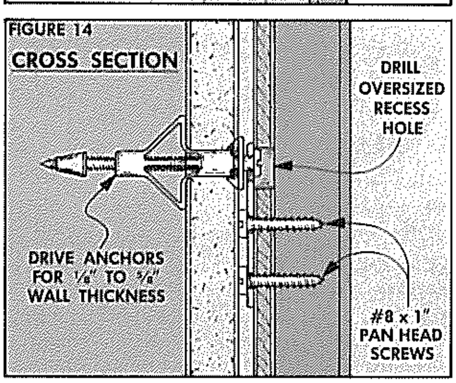


FIGURE 14

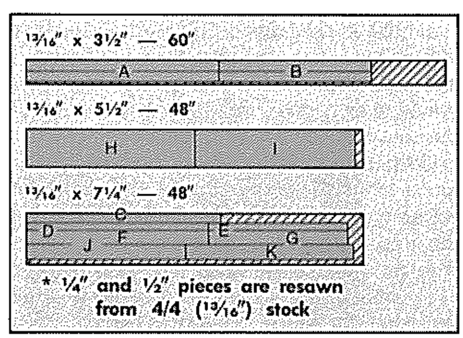


MATERIALS LIST

Overall Dimensions: 5½"d x 24"w x 30⅞"h

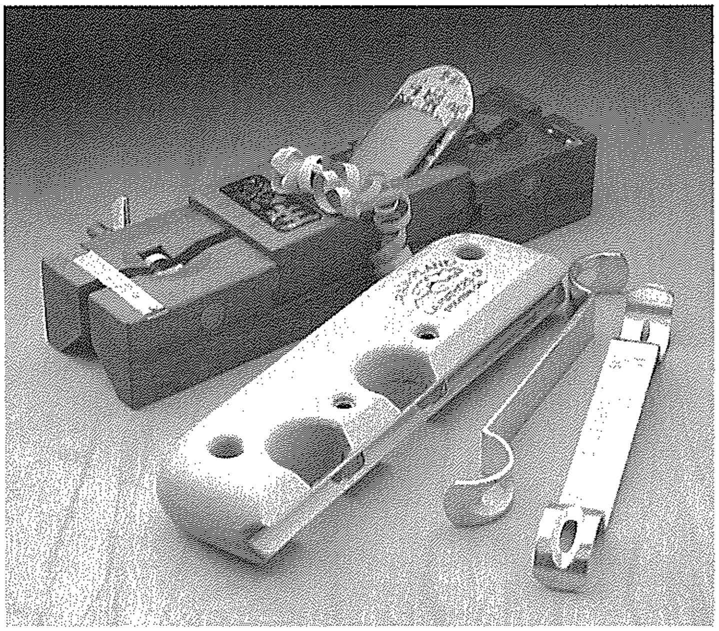
A	Frame Sides (2)	13⁄16 x 1½ — 27⅝
B	Frame Top/Btm (2)	13⁄16 x 1½ — 21⅝
C	Outside Trim (2)	¼ x 1 3⁄16 — 27⅝
D	Inner Side Trim (2)	¼ x 15⁄16 — 26
E	Inner Top/Btm Trim (2)	¼ x 15⁄16 — 20
F	Inner Side Molding (2)	½ x ½ — 26
G	Top/Btm Molding (2)	½ x ½ — 20
H	Shelf Top (1)	13⁄16 x 5½ — 24
I	Shelf Bottom (1)	13⁄16 x 5½ — 23
J	Cap (1)	13⁄16 x 1⅜ — 22¾
K	Top (1)	13⁄16 x 2 — 24
L	Back (¼" PLY)	21½ x 27½
M	Mirror	⅛ x 18 x 24

CUTTING DIAGRAM



Tools of the Trade

EDGING TOOLS



One of the easiest ways to dress up a project is to break the edges. That is, round over or chamfer the edges to give them a softer, more friendly feel.

However, once you've decided to break the edges, you're faced with a lot of choices as to how to go about it. Most of the time we use a router (on the router table) with a round-over or chamfer bit. But while working on the projects shown in this issue, we decided to test out some hand tools designed specifically for these tasks.

There's no doubt that it's easier to grab a hand tool and run it along an edge than it is to take the time to set up a router to do the job. The perfect tool is a molding plane — if you want to explore the adventures of woodworking in the last century.

If not, two relatively new hand tools are being marketed as quick and easy solutions for the task of rounding over an edge: a cornering tool and a Radi Plane.

CORNERING TOOLS

What's the easiest, cheapest way to round over an edge? Well, take a bottle opener and transform it to round edges. At least, that seems to be the theory behind "cornering tools." These tools look more like bottle openers than woodworking tools. Despite their appearance, they're used to round the edges of a board.

It doesn't take a close examination to recognize that these tools are not precision instruments. Each end of the tool is bent and a slot is cut in the bend to form an oval-shaped hole, see photo. The rim of this hole is the cutting edge. And the depth of the slot determines the radius of cut it will make. Each tool cuts two sizes: 1/16" and 1/8", or 3/16" and 1/4".

To use a cornering tool, choose the end that has the radius you want and place the oval hole on the edge of the workpiece. Just pull or push the tool along the edge and it will shave off a sliver of wood, rounding the edge as it goes. When it "bottoms out," the tool has cut the full radius.

Cornering tools tend to tear the edge because it's difficult to control the depth of cut on each pass. We were able to improve the initial poor results with a little practice. Sharpening the oval hole also helped. This was simply a matter of using a small slipstone (or some 320-grit silicon carbide sandpaper wrapped around a dowel) to sharpen the cutting edges.

But does it work? Well yes and no. If you're not picky about the quality of an edge, it's a quick replacement for a router.

RADI PLANE

At first glance, a Radi Plane looks like a nineteenth-century molding plane. Indeed, it's made on much the same principal.

The solid maple body has a V-shaped brass wear plate along the bottom edge. Housed in openings in the brass plate are two small steel cutters, each ground to the same radius.

The two cutters work in tandem. Adjust the front cutter (with an Allen wrench) to trim a slight round-over off the workpiece. The second cutter is set to the full depth you want to produce the finished radius.

The theory of double cutting makes sense, but I found the Radi Plane difficult to adjust. You have to fiddle with the two cutters to get both set to the correct depth for the round-over you want to cut. Then just when they're set, you realize one is cocked to the right and the other is cocked to the left.

There are other limitations. The maximum round-over you can cut with the Radi Plane is 1/4". And the combination of two cutters and the straight brass plate makes it impossible to follow a curved workpiece.

However, once the Radi Plane is set up correctly with sharp cutters, it cuts a smooth round-over — even in hardwoods.

CHAMFER PLANE

If you're looking for an alternative to a rounded edge, cutting a chamfer produces a crisp and formal-looking appearance. To form the chamfers along the edges of the Japanese-style folding screen in this issue, I appropriately used a Japanese chamfer plane.

The main body of this plane has a V-shaped sole. By adjusting the distance between the two sides of the "V" you can cut a chamfer that ranges from 1/64" up to 3/4" wide. Once the plane is set up, it "bottoms out" when the desired chamfer is reached.

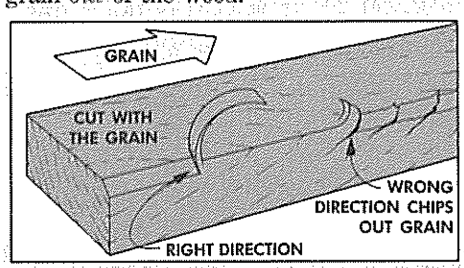
Riding in this V-sole is a small plane that does all the work. The plane slides laterally in the main body which allows you to move the plane blade over if one part of the blade dulls.

This plane is not limited to straight lines. By tipping the plane at an angle, I was also able to cut a fairly clean chamfer around a 3" curve.

If you want a crisp chamfer without the noise and fuss of a router, this is the tool to use. However, after cutting the chamfer, the edges can quickly turn into a round-over with just a little well-intentioned sanding. To keep the edges crisp, sand all surfaces *before* chamfering.

GRAIN DIRECTION

All three of these edging tools will dress edges when they're set up correctly. But they all face the same problem — grain direction. A hand tool should always cut *with the grain*. That is, so it follows the grain *out* of the wood.



One way to visualize this is to think of the wood as a feather. If the feather is stroked in the same direction the barbs are pointing (with the grain), the feather feels smooth. Stroked the other way, the barbs lift and tear — like chipping out wood grain.

Chamfer Jig

GET A NEW SLANT ON AN EDGE

It's easy to chamfer the edge of a board with a block plane — if you're not fussy about the angle or the width of the cut. We decided to add a little more control and precision to this type of cut by mounting the block plane in a "shoe."

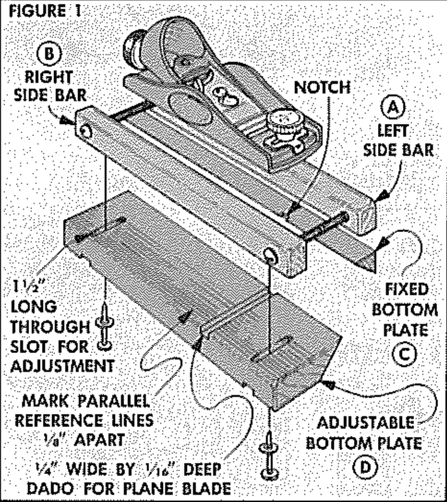
This shoe holds a block plane precisely at a 45° angle to both sides of the workpiece, while at the same time keeping the chamfer a uniform width over the entire length of the cut. It's similar in function to the Japanese chamfer plane shown on the opposite page (but it's a lot less expensive).

To make it, you only need some scrap ¾" stock (I used maple), a couple machine screws, hex nuts, and sheet metal screws.

SIDE BARS

All of the wooden pieces are cut from a piece of stock that's 5" wide and 1½" longer than the length of your block plane. After cutting this piece, rip off two ½"-wide strips to form the side bars.

FIGURE 1

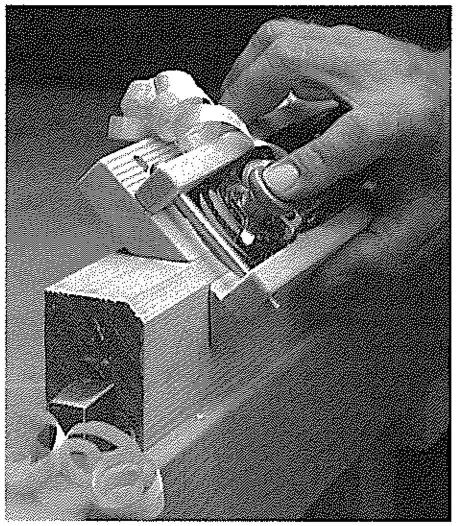


The two side bars are held together with ¼" machine screws and hex nuts. The hex nuts are recessed into the left side bar (A). (That is, "left" from your viewpoint as you hold the finished chamfer shoe and plane.) To do this, drill counterbores with a diameter equal to the distance across the *flats* of a hex nut (so the corners of the nut wedge into the wood). Center the counterbores ½" from each end of the side bar.

After the holes are drilled, clamp the side bars together and drill holes through the counterbores for the machine screws.

BOTTOM PLATES

Next, I made the bottom plates. These plates are each cut at a 45° angle in order to form a 90° angled cutout between them,



see Fig. 2. (The cutout straddles the workpiece edge so the plane cuts a 45° chamfer.)

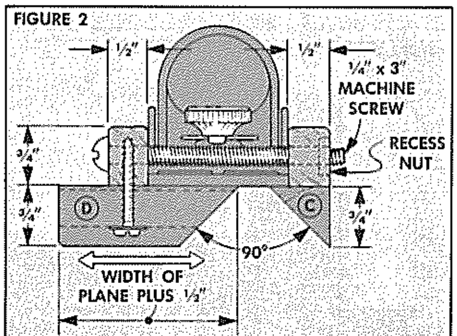
FIXED PLATE. I cut the two bottom plates from the piece of scrap stock that was left after cutting the side bars. First, set the saw to 45° and cut off the fixed plate (C) ¾" wide, see Fig. 2.

ADJUSTABLE PLATE. Now, trim down the scrap piece that's left (with the 45° angle from the previous cut), so it's ½" wider than the width of the block plane. This forms the adjustable plate (D).

There are a couple more steps on the adjustable plate. It's held to the right side bar (B) with sheet metal screws that are set in a slot. By loosening the screws, the plate can be moved closer or farther from the fixed bottom plate to vary the width of the chamfer, see Fig. 2.

To mount the screws, first cut two dadoes to accept the heads of the sheet metal screws. Cut these dadoes ½" wide by ¼" deep on the bottom (the same side as the bevel) of the adjustable plate, centering them 1" from each end, see Fig. 1.

FIGURE 2



Then cut a 1½"-long slot through the bottom of each dado so it's centered on the length of the dado. I cut this slot by drilling overlapping holes with a 3/16" bit.

After the slots are cut, turn the plate over and cut a ¼"-wide by 1/16"-deep dado across the top to provide a notch for the plane blade to sit in. To locate the dado, set the plane on the workpiece so it's centered on the length. Then mark the location of the throat opening on the workpiece and cut the dado there.

REFERENCE LINES. To help align the side bar for different width chamfers, I drew a series of parallel reference lines on the top side of the adjustable plate with a fine-tipped black pen, see Fig. 1.

ASSEMBLY

Now that all of the pieces are cut, assembly can begin. Start by pounding the hex nuts into the counterbores in the left side bar (A). Then glue the triangular-shaped fixed plate (C) to the bottom of the left side bar (A). (Make sure the angle in the fixed plate faces *opposite* the nuts, see Fig. 2.)

SCREW ON ADJUSTABLE PLATE. Next, push 1"-long sheet metal screws through the slot in the adjustable bottom plate (D) and screw them into pilot holes drilled in the bottom of the right side bar (B).

CUT NOTCH. There's one more step before screwing the two sides of the jig together. Cut a small notch for the plane blade on the inside edge of the fixed plate (C), see Fig. 1. (This notch is aligned with the dado on the adjustable plate.)

SCREW TOGETHER. Now the two sides of the jig can be screwed together around the block plane with ¼" machine screws.

USING THE JIG

To use the jig, loosen the sheet metal screws and open up the distance between the two bottom plates to a little less than the desired chamfer. (You want it a little less because the plane blade sits slightly below the opening.)

Now check to see that the distance between the bottom plates is equal at the front and back of the jig. (The parallel reference lines drawn on the top of the adjustable plate help with this alignment.)

It would seem logical to start chamfering with one of the angled faces tight against the workpiece. But I found it easier to start with the edge of the workpiece centered in the middle of the opening.

Start planing and stop when both of the angled faces "bottom out" on the two sides of the workpiece. The chamfer will be 45° from both sides and a uniform width over the entire cut.

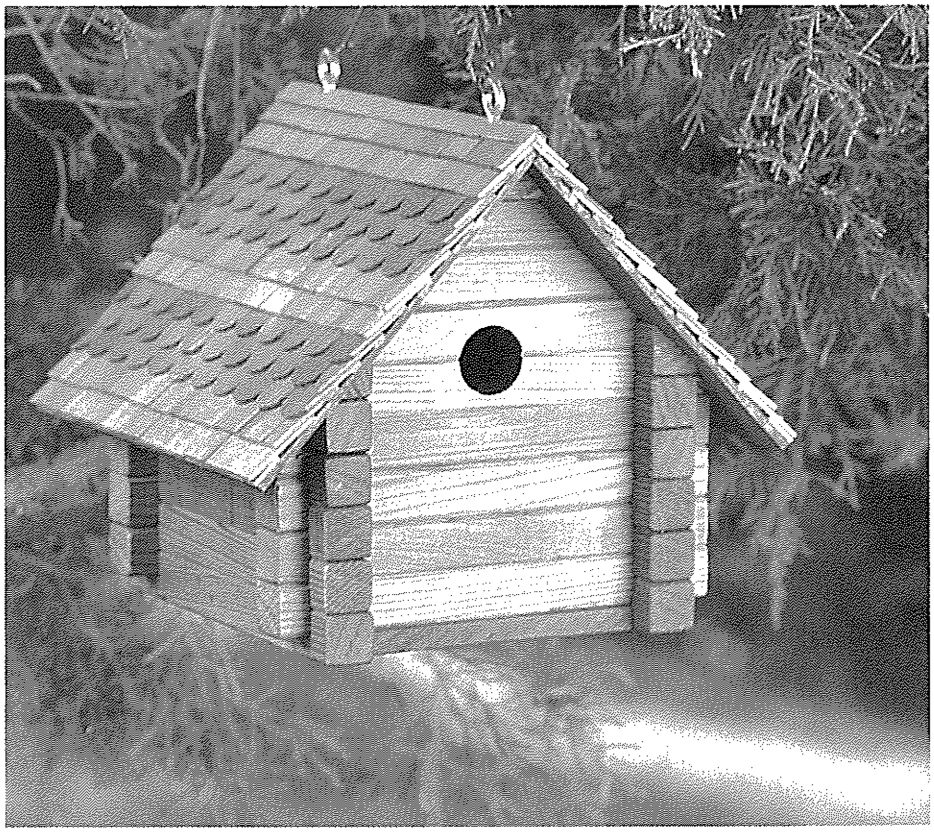
Log Cabin Birdhouse

WRUSTIC WREN WRETREAT

What's the best time to build a birdhouse? I usually start thinking about it in the spring — just as all the birds have found homes for the season. Next year, I always promise, I'll start earlier in the spring.

But it turns out that late spring or during the summer is the best time to build a bird house. The reason: birds usually don't like to move into brand new homes. They prefer established neighborhoods. So the idea is to get the house outside for a season so it can weather before the birds return looking for real estate next spring.

Most of the birds that are attracted to bird houses are those that naturally seek out hollow trees. So, generally, they're satisfied with any shelter with a small opening. But it's a lot more fun to build the house I would like if I were a bird — a log cabin with a cedar shingle roof.



LOG CONSTRUCTION

At first glance the logs used for this birdhouse resemble the Lincoln Logs I played with under the Christmas tree just a few years back. But a closer look reveals that these logs are joined with half-laps rather than a notch on both sides like Lincoln Logs (or full-sized log cabins). This simplifies log manufacture.

CUT STOCK TO SIZE. The first step in making the logs is to cut the stock (I used ¾"-thick cedar) into 7" lengths. Then, rip these pieces to get 26 (plus a few extras) individual strips ¾" square, see Fig. 1. (Before cutting to width, check this measurement with the size of your dado blade, see tip on page 23.)

Note: 20 of these strips are for the walls (A), and 6 are for the gable ends (B). Also, you need one 7"-long piece at full width that's used later to make the two angled eave logs (C).

HALF LAPS. The wall logs (A) are joined by cutting half-lap notches. To cut these notches, set the dado blade to cut the same width as the logs (in my case, ¾"). Next, adjust the height of the blade to cut exactly halfway through the log.

When the dado blade is set, adjust the rip fence to act as a stop so it's ½" from the dado blade, see Fig. 2. Now, hold the logs tight against the miter gauge with the ends butted against the rip fence and cut the notches on both ends of the wall logs.

FIGURE 1

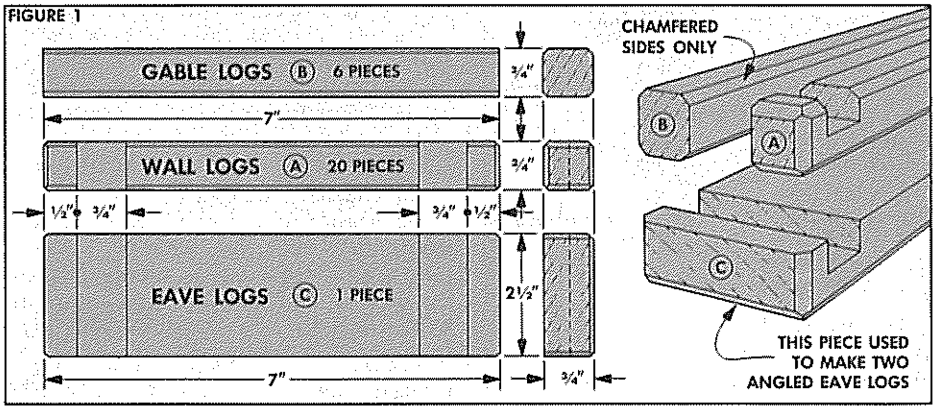
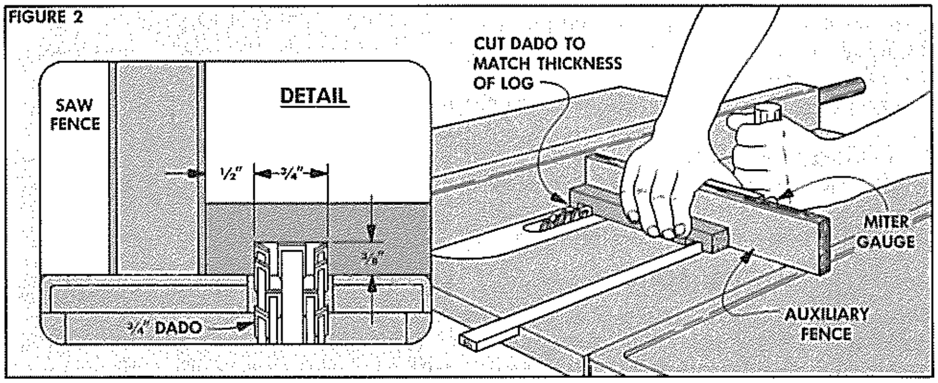


FIGURE 2



CHAMFER LOGS

Up until now, the logs are just square stock. To make them look like logs, I chamfered the ends and the edges on the router table, see Fig. 3.

ADJUST BIT. To set up the router table, align the front edge of the router table fence with the edge of the pilot on the bit, see Detail, Fig. 3. Then, using a scrap as a test piece, adjust the height of the bit until it cuts a chamfer that's 1/16" high.

CHAMFER ENDS. After the router table is set up, the ends of the wall logs (A) are chamfered first. (If there's chipout when making these cross-grain cuts, chamfering the edges later will clean them up.)

To guide the logs while chamfering the ends, I used a scrap of wood about 4" x 8". Press the guide block and the end of the log against the router table fence. Then, while holding the log tight against the block, slide them along the fence to cut a chamfer. Repeat on all four sides at both ends of the log, see Fig. 3.

CHAMFER EDGES. Next, the edges of all the logs (A,B) are chamfered. To do this, use a push stick to feed the logs from right to left across the chamfer bit, see Fig. 4.

EAVE LOGS. After the wall logs are chamfered, the eave logs are made from the uncut piece of stock (C), see Fig. 5.

To make these logs, begin by chamfering the ends and *bottom* edges of the workpiece. Next, set the table saw to a 45° angle and rip one eave log off the outside edge. Then reset the fence and cut another one on the opposite side, see Detail, Fig. 5.

WALL ASSEMBLY

After the logs are finished, they're assembled to make the walls of the log cabin birdhouse. This is where the basic difference between the double-notched joints of the Lincoln Logs and the half-laps used on the logs on the walls becomes obvious.

The main difference is that Lincoln Logs are truly interlocking, so the ends of the walls stay aligned by design. But with half-lap joints, the logs can slide, so the walls won't stay aligned of their own accord.

WALL SCREWS. This sliding is no big deal because the wall logs have to be screwed together anyway. I used 2¾"-long No. 8 screws to tie the lower four tiers of logs together (screwing up from the bottom), see Fig. 6. Then I sank two more screws through the top of the front and back walls to tie the top tiers of logs to the bottom, see Fig. 6.

Shop Note: The screws join four logs together. Drilling a shank hole through the first three logs and a pilot hole into the fourth would be a typical procedure. But in this situation there would only be about three threads holding each screw in soft cedar. So I spot glued the logs together first and drilled a 1/8" pilot hole through all four logs, see Cross Section, Fig. 6.

ADD EAVE BLOCKS. To complete the walls, nail the angled eave logs to the top of the walls, see Fig. 6. (I pre-drilled the hole to make it easier to drive the brads without splitting the wood.)

FIGURE 3

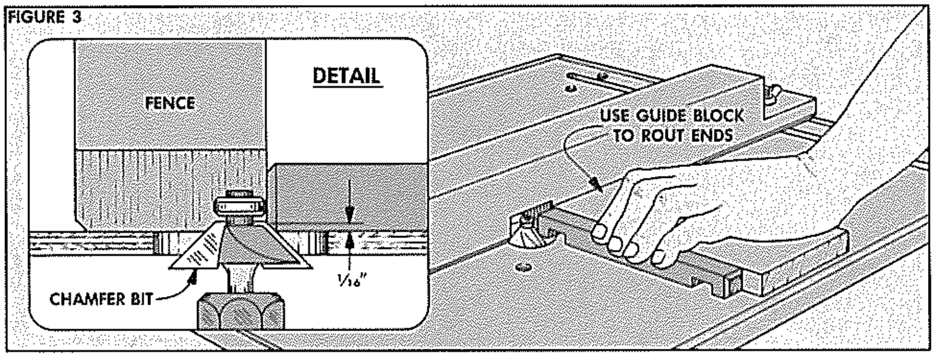


FIGURE 4

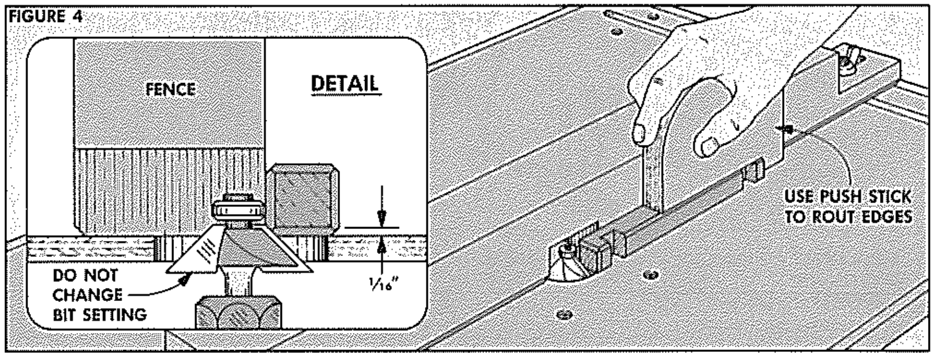


FIGURE 5

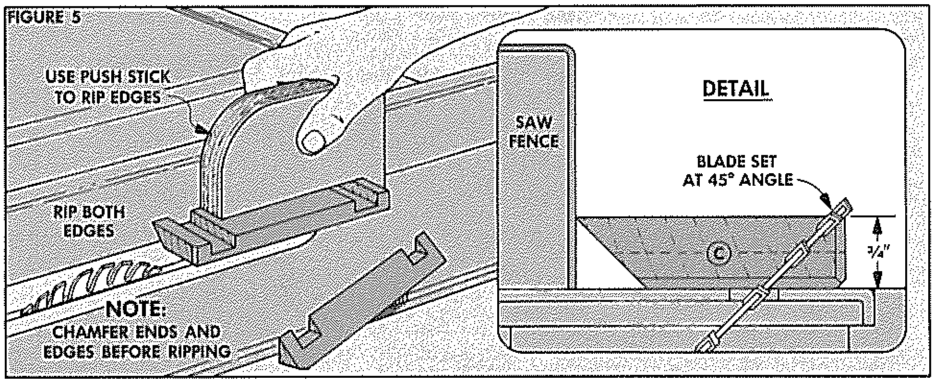


FIGURE 6

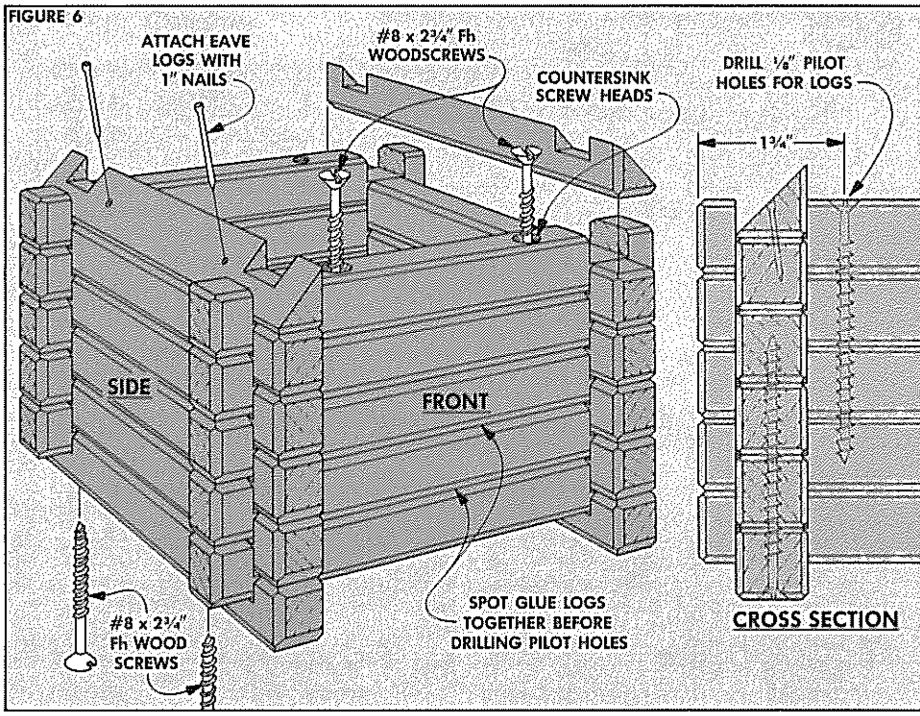


FIGURE 7

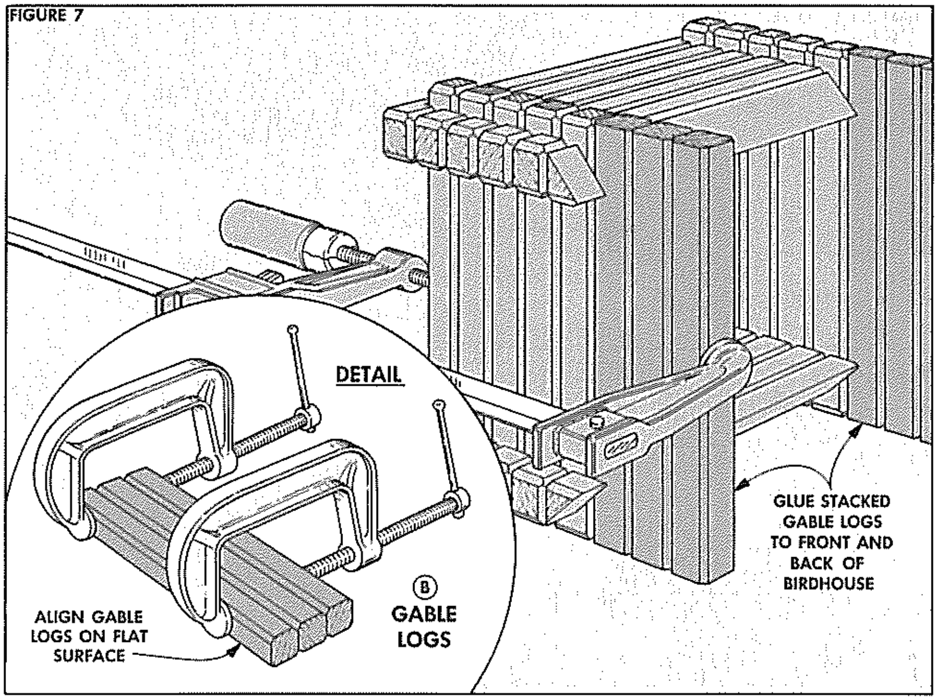


FIGURE 8

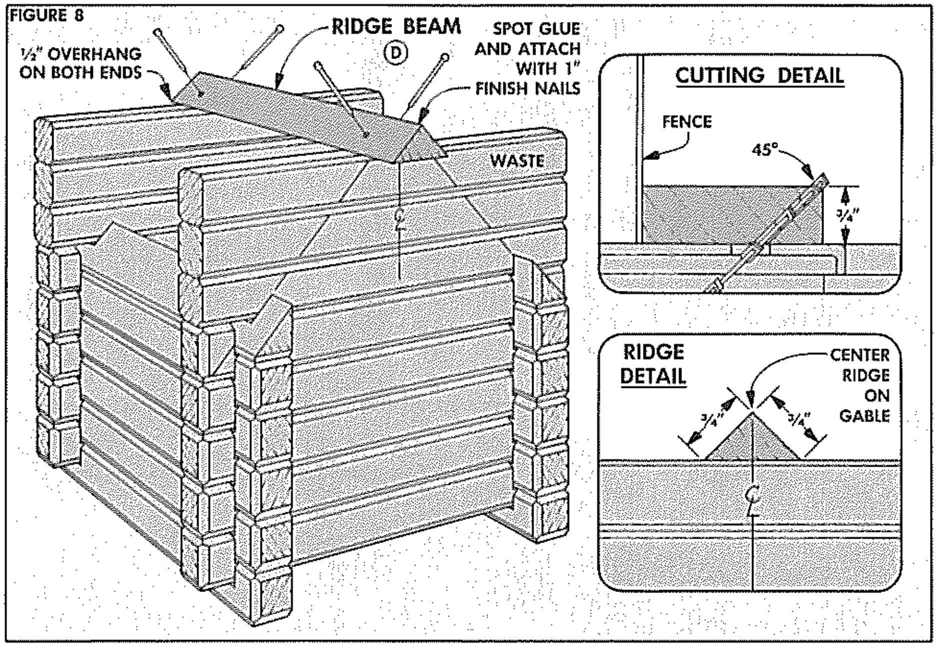


FIGURE 9

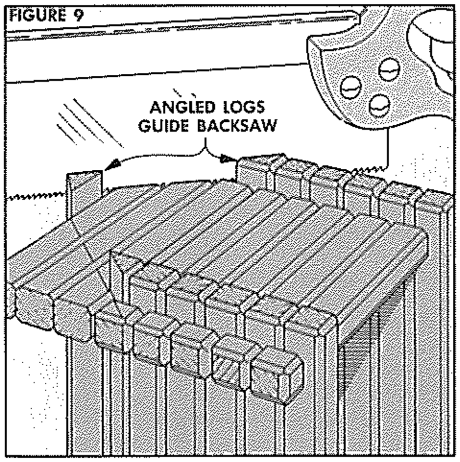
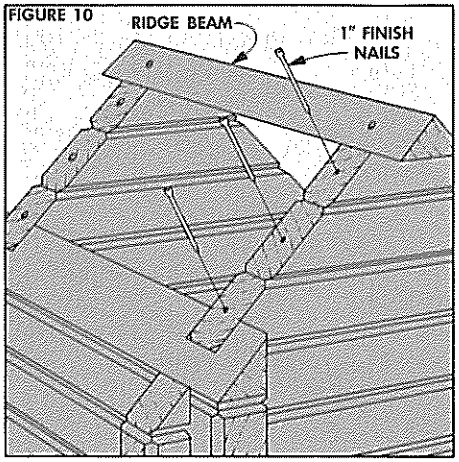


FIGURE 10



GABLES

With the walls complete, the next step is to make the gable logs (B) that form the peak of the roof. I found the easiest way to do this was to stack the three full-length logs first, then cut them to a triangular shape as a unit.

GLUE LOGS. To build up the gable logs, glue three logs together, keeping the front faces parallel. To do this, apply glue to the facing edges and lay the logs flat. Then clamp them tightly keeping the faces and ends aligned, see Detail in Fig. 7.

After the glued stack of logs is dry, place it in the notches in the angled eave logs. Then glue and clamp the three logs as a unit on top of the walls, see Fig. 7.

Note: It doesn't matter what kind of glue is used (waterproof or not) because the gable logs will actually be held together with nails later.)

RIDGE BEAM. After the gable logs are dry, a ridge beam (D) is made to support the roof, see Fig. 8. The easiest way to make this beam is to set the saw blade at 45° and cut off one of the edges of a 7"-long, ¾"-thick piece of stock. (This is the same technique used to cut the eave logs, see Cutting Detail in Fig. 8.)

MOUNT RIDGE BEAM. To mount the ridge beam, position it so the 90° corner faces up and it's centered on the gable logs, see Fig. 8. Then apply a couple dabs of glue and nail it in place with 1" finish nails, see Ridge Detail in Fig. 8.

CUT GABLES. After nailing the ridge beam in place, the gable logs are cut off at a 45° angle to form the roof line. To do this, use the angled surfaces of the ridge beam and eave logs to align a backsaw. Then saw off the ends of the gable logs, see Fig. 9.

Note: When cutting the gable logs, the saw will also cut off the end of the top logs on the walls, see Fig. 10. This is okay. It will provide clearance for the roof.

NAIL GABLE LOGS. After the gables logs are sawn to shape, they're nailed down. (With all the expansion and contraction that's likely to take place when the birdhouse is hung outside, nails will hold the house together better than glue.)

I drove in 1" finish nails at a 90° angle to the cut ends of the gable logs. (This is actually a 45° angle through one log into another, see Fig. 10.)

ROOF

Now the wall structure of the house is complete. To top it off, I made a cedar shingle roof. The roof begins by putting down the sheathing to serve as the base for the shingles.

SHEATHING. For the roof sheathing, I used ⅛" *tempered* Masonite. (Tempered Masonite is moisture resistant). Begin by cutting two pieces, one 6" x 8", and the other 6⅛" x 8", see Fig. 11. Screw these pieces to the gable logs, overlapping them 1/8" on the peak, see Detail in Fig. 11.

SHINGLES. The roof sheathing is covered with genuine cedar shingles. After a little experimenting, I decided to cover the roof with two different styles of shingles: square butted and rounded, refer to Fig. 15 on page 20. Although you could use doll-house shingles (they're available mail order, see Sources, page 24), I decided to make my own.

SHINGLE STOCK. The stock for the shingles (E) starts out as two pieces of clear, straight-grained 3/4"-thick cedar about 5½" wide and 9" long. (The length isn't critical; the 9" minimum provides a good, safe handle when cutting the strips that are later sliced up into shingles.)

ROUND ENDS. To prepare the workpiece to make the rounded shingles, begin by rounding the ends of the cedar stock with a 3/8" round-over bit on the router table, see Fig. 12. Align the pilot bearing with the front of the fence and set the shoulder of the bit a hair lower than the table, see Detail in Fig. 12. Then round over both sides of both ends of the two workpieces.

CUT SHINGLE STRIPS. After both ends of the two workpieces are rounded, they're cut into shingle strips. To do this, I clamped a stop block to the rip fence and locked the fence so when the end of the shingle stock is butted against the block, the blade is aligned to cut off a 1¼"-wide strip, see Fig. 13. Use the miter gauge as a guide to cut off the strips.

The first cut off each end of the piece produces a 1¼"-wide strip for the round butted shingles, see Detail in Fig. 13. Then, just make a second pass on each end to cut off two strips for square shingles.

SLICE SHINGLES. After all eight shingle strips are cut to size, they are cut into individual shingles. (Old timers would have used a mallet and froe to split them, but I cut them to size on the band saw.)

Although shingle making isn't precision work, I found I got the best results by using the band saw fence as a stop and guide. Set the fence 1/16" from the blade. Then hold the end of the strip against the fence and push it through the blade to saw off the individual shingles, see Fig. 14.

Note: As each new shingle is being cut from the end of the strip, it will push the previously cut shingle clear of the blade. If you find that the shingles aren't being pushed clear (and are being chewed up by the blade), try using a piece of scrap as a push block behind the strip. If the shingles come out wedge-shaped instead of a uniform thickness, use a miter gauge on the band saw to push the shingle strip straight through the blade.

Making shingles is tedious work. You need about 150 of each style (rounded and square) for the roof. (This amount provides about 15% extra for waste and spoilage.)

FIGURE 11

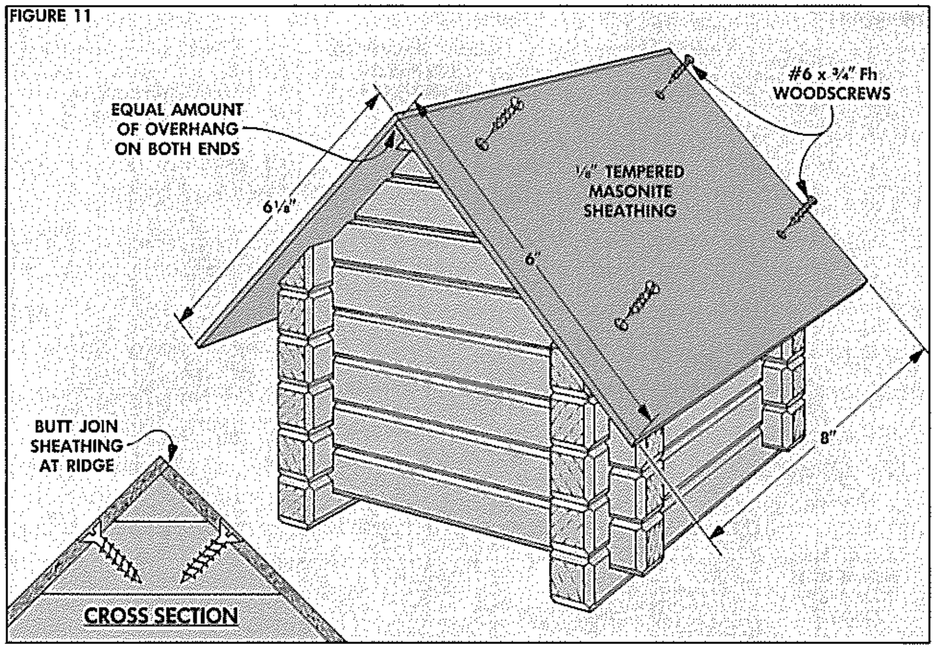


FIGURE 12

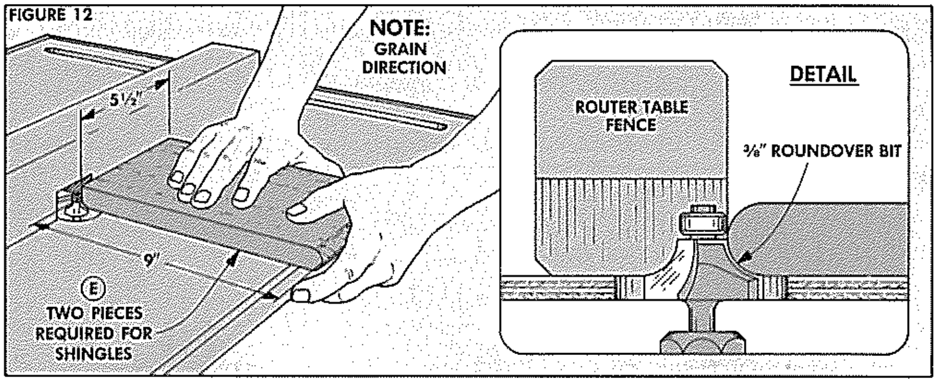


FIGURE 13

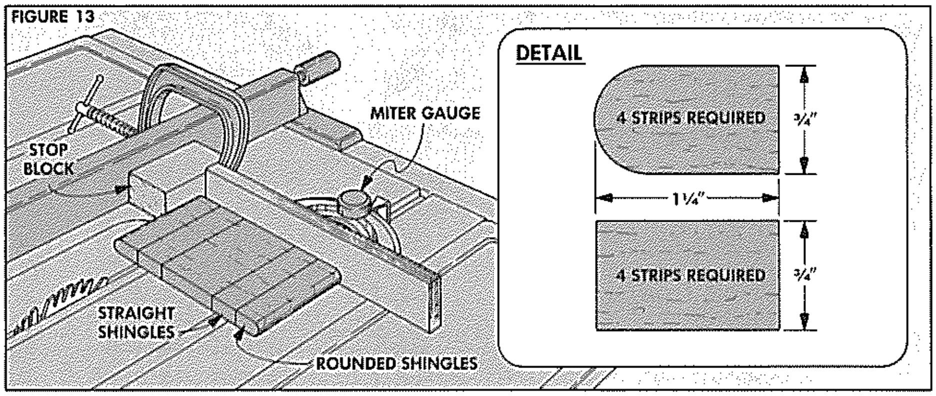


FIGURE 14

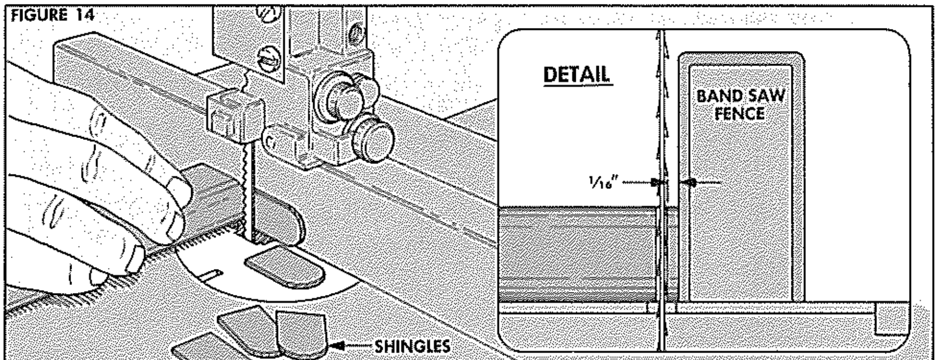


FIGURE 15

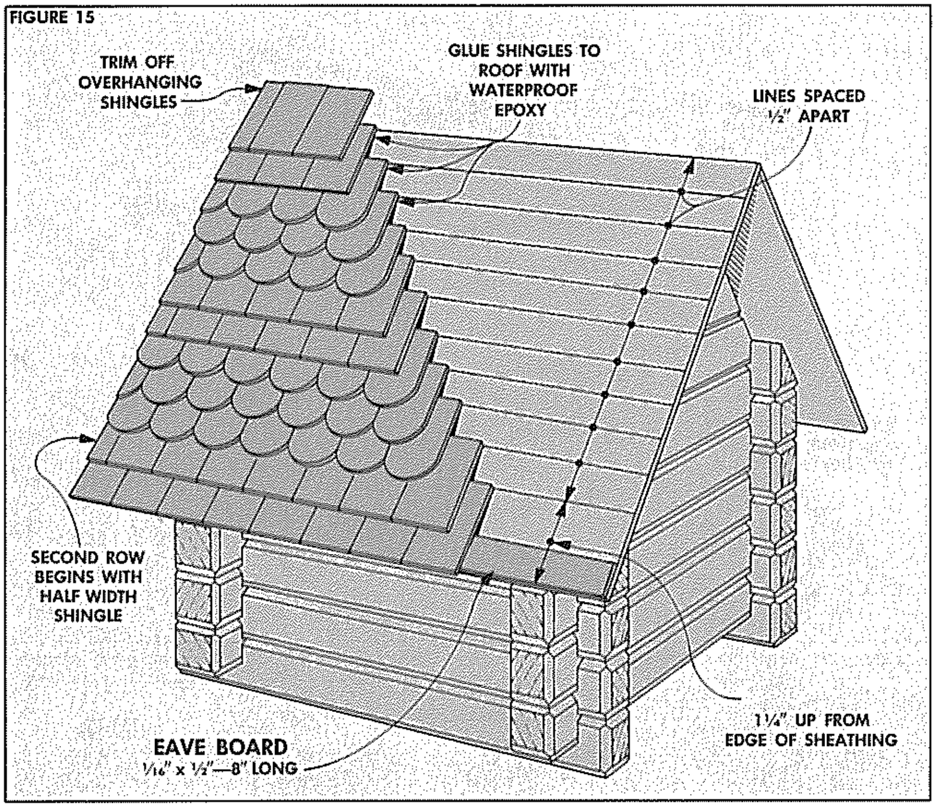
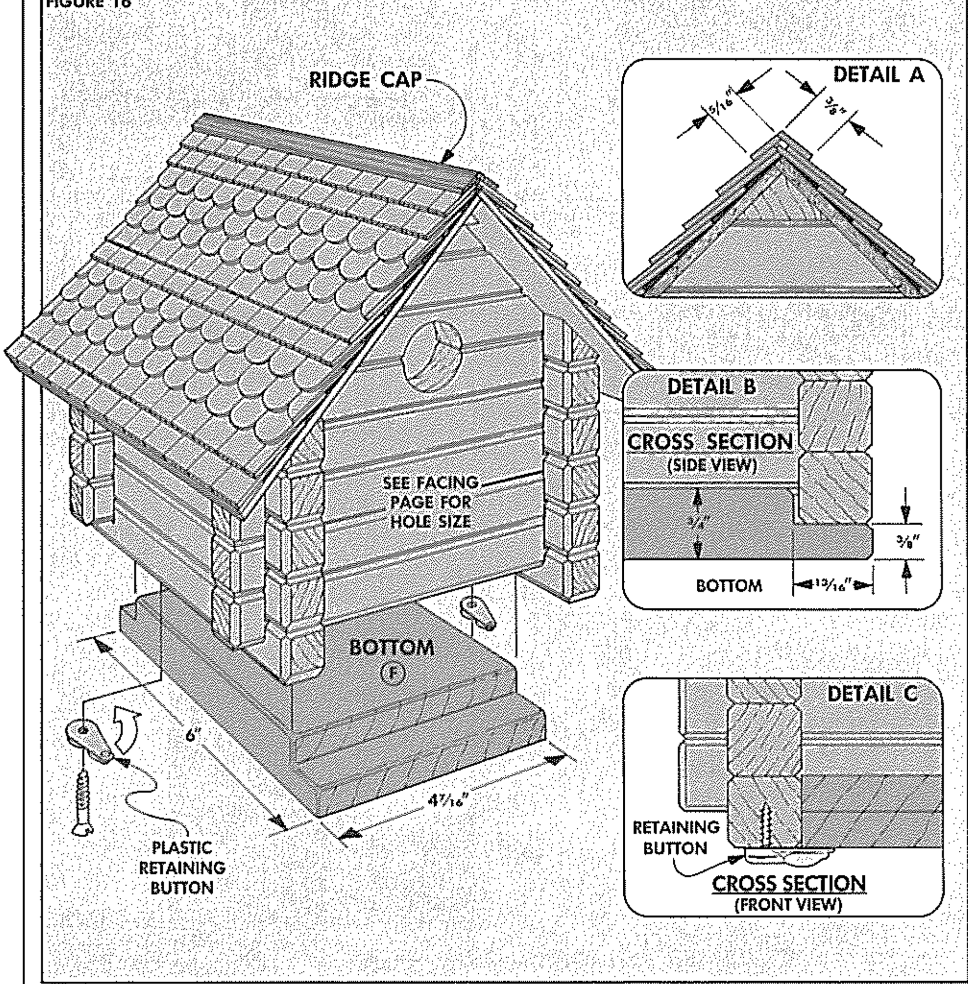


FIGURE 16



LAY SHINGLES

After all the shingles are cut, they're glued to the Masonite roof sheathing. Although professional roofers use a shingling hatchet to align the shingle courses, I scribed lines on the sheathing for alignment.

LINE SPACING. The lines are spaced so the roof is two shingles thick at any given point and three layers thick directly above where the end of the shingle is glued to the roof. Since the shingles are 1¼" long, this is achieved by spacing the lines ½" apart, see Fig. 15.

Note: To minimize cutting, scribe the first layout line 1¼" from the edge of the eave. This way the butt of the shingle will be even with the edge of the sheathing and all the other shingles will be evenly spaced above it.

EAVE BOARD. When roofing a full-size house, it's general practice to lay a half-course of shingles along the edges of the eaves. This way the shingles are double-thick at all points. But rather than try to cut these little shingles in half, I ripped two 1/16"-thick by ½"-wide "eave boards" to fit under the bottom course of shingles (along the eaves), see Fig. 15.

Note: While I was set up for ripping these strips, I ripped two extras to be used as ridge caps when the shingling was done, refer to Fig. 16.

GLUE. To attach the shingles to the roof, I used quick-set epoxy. The kind that comes in the double-plunger dispenser is the easiest to apply (see Sources, page 24). Epoxy sets up fast enough (less than five minutes) to keep the just-laid shingles from slipping out of alignment.

Note: We actually made this birdhouse last fall and left it outside all winter and spring to see how the glue would hold up. We didn't lose a single shingle.

GLUING SEQUENCE. To lay the shingles, begin by applying a bead of glue on the eave board and glue it in place flush with the bottom edge of the sheathing. Next apply a bead of glue to the sheathing centered between the upper edge of the eave board and the first scribed line.

To lay the shingles, start with a whole shingle with its left edge aligned with the left edge of the sheathing and its bottom edge even with the eave. Then work from left to right, keeping the left edge of the shingle tight against the shingle next to it and the top even with the scribed line. The last shingle may have to be trimmed in half (I used an X-Acto knife) to make it even with the front edge of the sheathing.

NEXT ROW. After laying the first course of shingles along the eave, apply another bead of glue between the top edge of the first shingle row and the next layout line. Then lay down the second course of shingles. But this time, start with a half-width shingle. Then use full-width shingles and work to the right end. Repeat this process all the way up the roof.

TRIM RIDGE. The last course of shingles is applied so the top end of the shingles sticks up above the ridge line, see Fig. 15. Wait for the glue to dry, then trim off the excess with a fine-toothed back saw. After trimming the ridge, repeat the process on the opposite side of the roof.

RIDGE CAP. After all the shingles are in place the ridge cap is put on. Normally, the ridge cap is made of portions of shingles. But, to keep from having to work with tiny pieces, I used strips.

To make the ridge caps, trim the two 1⁄16"-thick strips (made when making the eave boards) to 3⁄8" wide and 5⁄16" wide. Then glue them to the top course of shingles with the 3⁄8" strip overlapping the 5⁄16" strip, see Detail A in Fig. 16.

FLOOR

With the roof finished, the house needs a floor for the nest. To make housekeeping easier, I made the floor removable so old nests and debris (which provide an off-season home for bugs) could be cleaned out for a new family of birds next spring.

CUT TO SIZE. To make the bottom (F) that's the floor, begin by cutting a piece of 3⁄4"-thick stock to 6" long. Next, rip the piece to width (4 7⁄16" in my case) so it fits between the side walls. Then cut a 13⁄16" by 3⁄8" rabbet on each end to fit into the bottom of the house, see Detail B.

LOCKS. To make it easy to remove the floor, I fastened it in place with panel retaining buttons, see Detail C in Fig. 16. Screw in two buttons, one into the bottom wall log on each side of the floor.

MOUNTING

There are two ways to hang the birdhouse. It can be hung from a tree, or set on top of a post or pole.

HANG MOUNTING. To keep the house in the tree (even when rocked by gale force winds), the hangers have to be firmly anchored through the ridge beam into the top gable log, see Fig. 17. To get through both the ridge and gable, we used 1 1⁄4"-long screw eyes, (see Sources, page 24).

POLE MOUNT. To put up a bird house where there are no trees (or to attract birds who like to be in the open), mount the house on a pole. I used a length of galvanized pipe and mounted it to the bottom of the house with a 3⁄4" pipe flange.

ENTRY HOLE. The last step in making the birdhouse habitable is boring an entry hole with a spade bit. (The size of the hole and its location depend on what species of bird you want to attract, see box at right.)

FINISH. Finally, to keep the cedar shingles and logs from absorbing moisture, I laid on two coats of tung oil. Then set the house out to weather for a few months before the birds arrive in the spring.

FIGURE 17

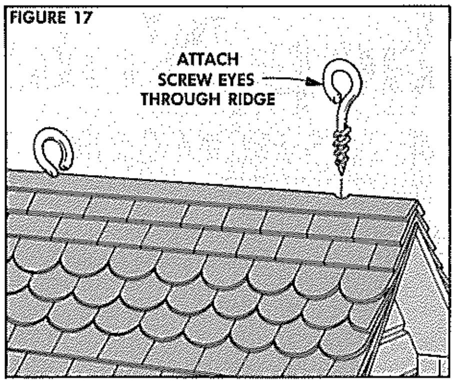
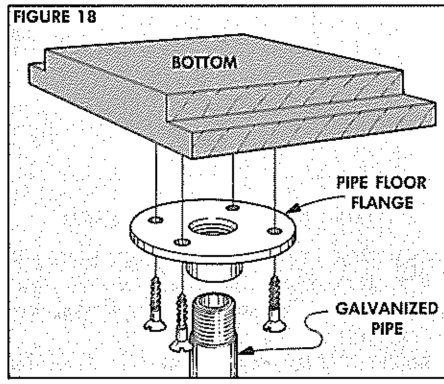


FIGURE 18

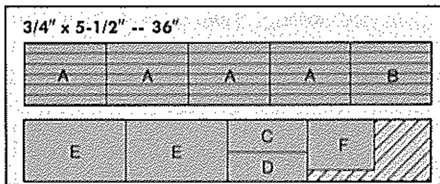


MATERIALS LIST

Overall Dimensions: 8"d x 8 3⁄4"w x 7 1⁄2"h

A	Wall Logs (20)	3⁄4 x 3⁄4 — 7
B	Gable Logs (6)	3⁄4 x 3⁄4 — 7
C	Eave Logs (2)	3⁄4 x 3⁄4 — 7
D	Ridge Beam (1)	3⁄4 x 3⁄4 — 7
E	Shingles (300)	1⁄16 x 3⁄4 — 1 1⁄4
F	Bottom (1)	3⁄4 x 4 7⁄16 — 6

CUTTING DIAGRAM



ALSO NEED PIECE OF 1⁄8" MASONITE 8" x 12 1⁄2"

BIRDHOUSE BASICS

Birds are persnickety about the size of their entry door. They want to be able to slip in comfortably, but they don't want big, noisy neighbors coming in uninvited. And they like the floor level below the doorway so they can build their nest up.

DOOR SIZE

Part of making a birdhouse attractive to specific birds is making the entry door unattractive to others. Size the hole large enough for small birds, but small enough to discourage larger, unwanted birds from making unwelcome appearances.

The first decision to make is what birds you *don't* want. This is usually a pretty short list. Sparrows and starlings are usually on the unwelcome list.

Keeping starlings out is no problem — they require an entrance hole at least 2" in diameter. So making the door 1 1⁄2" would make the house starling-proof.

Sparrows are another story. They can get into all but the tiniest holes. This means that unless you're specifically trying to set up a home for very small birds (like wrens), odds are your tenants are going to be sparrows.

DOOR LOCATION

The location of the entrance is as important as the size. The critical measurement is distance from the hole to the floor.

This is because birds that are attracted to birdhouses are those that usually nest in hollow trees. They're used to hopping down to their living level and having enough room to build their nest up to (or nearer) the level of the hole.

GUIDELINES

On this chart, we've listed some of the most common birdhouse tenants and their housing preferences. The dimensions on the chart below are guidelines, not rules.

A family of wrens has ignored the guidelines and moved into our house — even though the hole is just 2 5⁄8" up from the floor. (If you want to increase the distance, use more logs to make the walls higher.)

In a housing shortage, birds will set up housekeeping almost anywhere. But if there are hollow trees or other birdhouses in your neighborhood, building to these dimensions will increase your odds of attracting feathered tenants.

Bird	Entrance Hole	Above Floor	Floor Space	Ceiling Height	Above Ground
Chickadee	1 1⁄8"	6" to 8"	4" x 4"	8" to 10"	6' to 15'
Downy Woodpecker	1 1⁄4"	6" to 8"	4" x 4"	8" to 10"	6' to 20'
Eastern Bluebird	1 1⁄2"	6"	5" x 5"	8"	5' to 10'
Nuthatch	1 1⁄4"	6" to 8"	4" x 4"	8" to 10"	12' to 20'
Titmouse	1 1⁄4"	6" to 8"	4" x 4"	8" to 10"	6' to 15'
Wren	1" to 1 1⁄4"	4" to 6"	4" x 4"	6" to 8"	6' to 10'

Adapted from Homes for Birds, U.S. Dept. of Interior, Fish and Wildlife Service

Shop Notes

SOME TIPS FROM OUR SHOP

WOOD FOR FOLDING SCREEN

Every time we build a project there's a lively discussion about what's the best wood to use. The shoji folding screen was no exception.

LIGHT BUT STABLE. We were looking for something that was light in weight so it would be easy to move around, but still reasonably strong. Like any project that uses a frame (and in this case a grid of small pieces inside the frame), the wood has to be fairly stable and warp-free.

The final criterion was that the wood be light in color. The folding screen is based on a Japanese shoji, and traditional shoji are made from a variety of light-colored, tight-grained soft woods. (Sometimes, the wood is lacquered black.)

PONDEROSA PINE. We wanted to use Sitka spruce, but because of cost and availability we finally settled on Ponderosa pine. The key is to choose stock that's clear of knots and defects and has grain that's as straight as possible.

Also, when buying the lumber, don't get a "construction" grade pine to save money — it will yield more headaches than savings. "Common" grades (such as No. 1 or No. 2) would work, but you may have to work around knots and defects so extra stock will be needed. The best softwood lumber to get is a "select" grade, such as "D and Better" or "C and Better." (For more on pine, see *Woodsmith* No. 55.)

OTHER POSSIBILITIES. What about other woods? We've built other full-size shojis with Sitka spruce — an excellent choice for this project. The sapwood is creamy white in color and, considering its light weight, is extremely strong and stiff. One of it s most common uses is for aircraft construction. (Howard Hughes' "Spruce Goose" is the classic example.)

Since Sitka spruce is commonly quarter sawn, it has a straight, tight grain and is very stable. It's not readily available, though, except where it's grown in the Pacific Northwest.

Poplar would be another good choice. It's a little stronger, heavier, and more stable than pine, but it can have color streaks throughout it. If I were going to paint the screen, I might use poplar.

I've seen screens made out of ash. It's stable and the light color would fit the design, but ash (and oak) are heavy. Clear redwood and mahogany both have all of the desired strength and planing characteristics, but I think they are a little dark in color for a traditional Japanese screen.

Walnut and cherry also would make beautiful screens, but once again, they aren't traditional (if that's important to you).

A COUPLE NOT TO USE. The two woods I wouldn't recommend for this project are maple and birch. They are light in color, but not as stable as other choices. I've had trouble keeping narrow strips of maple and birch straight after ripping. These two woods also tend to have curly grain that can be difficult to plane without chipout — a real problem if you're planing all the pieces needed for the shoji screen.

SUBSTITUTE PLANERS

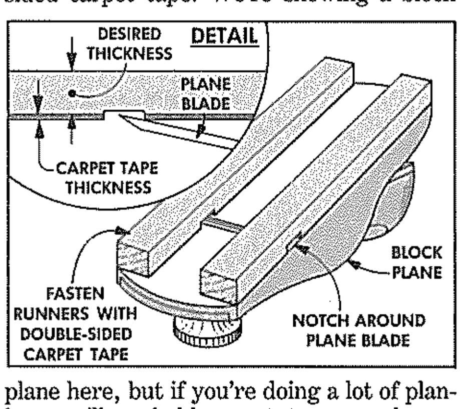
There are a number of thin pieces in the projects in this issue that have to be planed smooth and to a uniform thickness. The logs for the birdhouse and most of the grid pieces on the folding screen have to be perfectly square (that is, the same thickness and width).

If you have a planer, this isn't a problem. Assuming you start with one square edge, you can plane one side of the workpiece, then turn it 90° and send it through the planer again at the same setting. The result is a square blank.

Without a planer, you have to rely on a table saw. Most saw blades have a certain amount of runout (lateral movement) that leaves burns and swirl marks. It's also difficult to rip a thin piece to a perfectly uniform thickness on a saw.

HAND PLANING. There are a couple of other techniques to plane thin pieces without a planer. All of these methods begin by ripping a square workpiece oversize (1/32" to 1/16" in *both* directions).

SOLE RUNNERS. One of the simplest techniques to plane down the oversize strips is to fasten a couple wood runners to the bottom of your plane with double-sided carpet tape. We're showing a block

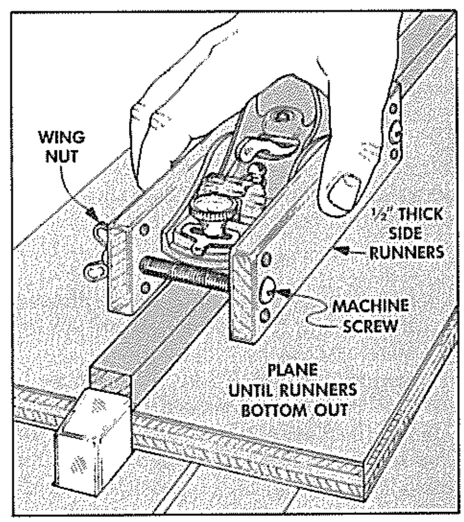


plane here, but if you're doing a lot of planing you'll probably want to use a larger smoothing (No. 4) or jack (No. 5) plane.

The distance from the cutting edge of the plane blade to the bottom of the runner must equal the desired finish thickness of the workpiece. (Note: The cutting edge of the plane blade sticks out from the plane sole. But since this amount just about equals the thickness of a layer of carpet tape, for all practical purposes you can make the runner thickness equal to the desired workpiece thickness.)

To use the plane with runners, hold the workpiece against a stop on a flat surface. Then straddle it with the runners and start planing. Once the runners "bottom out," you've reached the desired thickness.

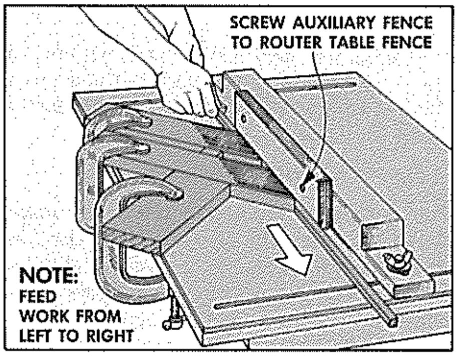
SIDE RUNNERS. Another method uses side runners and a block plane. The runners are simply a couple of scraps of ½"-thick stock that ride along both sides of the plane. The plane is pinched between the runners with two bolts and wing nuts. The advantage of this method over the sole runners is that you can adjust the plane for any thickness.



ROUTER TABLE. Hand planing can be fun, but the thought of planing all 108 grid pieces for the shoji screen was a little overwhelming. So I used a different technique similar to a tip we received from Jim Serratore, of Hatboro, Pennsylvania. Jim uses a router table like a miniature planer.

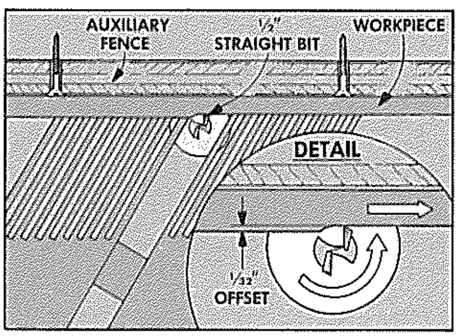
The trick here is to push the workpiece from left to right *between* a straight bit and the router fence. (Note: If your router takes ½"-shank bits, use them. They help cut vibration for a smoother cut.)

Since most router table fences have a bit opening, start by screwing an auxiliary plywood fence to the regular fence to cover up the opening. Next, adjust the fence so the distance from the cutting edge of the bit to the auxiliary fence is equal to the desired stock thickness. (Note: Don't try to plane off more than 1/32" in one pass.)



There's always a danger of kickback any time you push a piece of wood between the bit and the fence (that is, from left to right into the rotation of the bit). To prevent this, and to hold the pieces tight against the fence for a smooth cut, I clamped two featherboards to the router table.

The featherboards have to be clamped to the bench in slightly offset positions. The left (infeed) featherboard holds the workpiece tight against the fence *just before* the router bit cuts the workpiece. The right (outfeed) featherboard is a little closer to the fence to hold the finished workpiece tight against the fence *after* the cut.



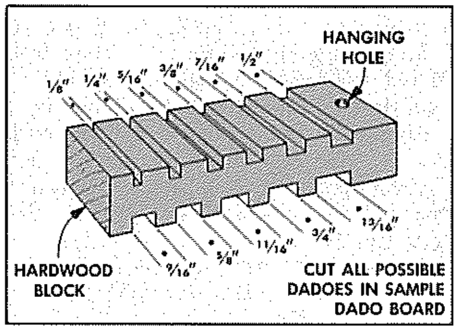
Clamp the featherboards to the table and use support blocks to hold them in place, see top drawing. Then, you're ready to "plane" from left to right. Always start with a test piece since getting the fence and featherboards set up correctly may take some fine tuning.

SAMPLE DADO BOARD

When cutting the lap joints for the log cabin birdhouse and the grid on the shoji screen, it's important that the pieces fit tightly together. To do this, you have to cut and plane the pieces to the exact same width as the cross dadoes that they're going to fit into.

The problem is that you usually have to cut and plane the pieces to final width *before* you cut the dadoes. Though most stack dado sets are fairly accurate, you never know exactly how wide to cut and plane the workpiece until you have a dado to test it in.

To keep from having to mount the dado set on the saw every time I needed a test dado, I spent a few minutes and made a sample dado board from a thick block of hardwood. I cut all of the different sizes on it that my stack dado set will cut. Then I keep it hanging right next to my saw to



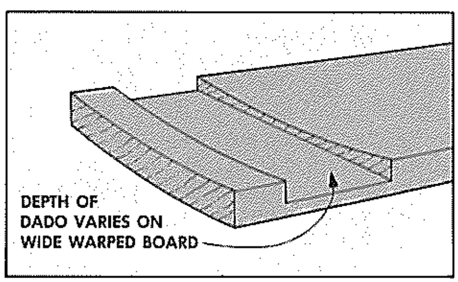
easily test fit any workpiece that's going to fit into a dado or groove.

DADO BEFORE OR AFTER CUTTING?

While I was cutting the lap joints for the shoji screen and birdhouse, a couple folks came through the shop and asked why I didn't cut dadoes across a wide board first, and then rip the wide board into narrow pieces.

I'll admit that the "dado first/then cut" method can be an efficient way of making the pieces. I didn't use it on these projects because of a problem I've run into in the past using that technique.

If you start with a wide board, it has to be perfectly flat. If you dado across a cupped (warped) board, the depth of the dado will vary from the beginning to the middle and end of the cut, see drawing.



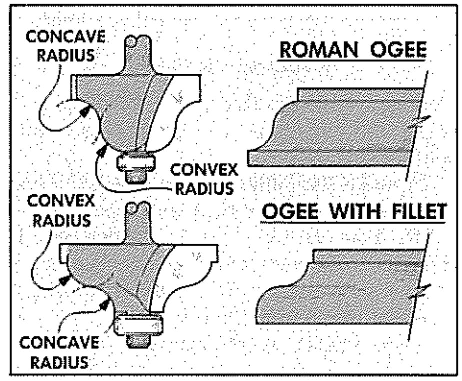
By cutting the strips first, the warp disappears and all the strips stay tight to the table. The result is even dadoes.

On a lap joint, the depth of the dado is critical. It has to be *exactly* half the thickness of the workpiece and both pieces have to be uniform in thickness. If they aren't, the joint won't go together flush.

That's only part of the reason for my approach. The other part is not quite as logical. I've always felt more comfortable cutting joints on a piece that's the finished size rather than on an oversized piece.

ROMAN OGEE BITS

Why does a 5/32" Roman ogee router bit (like the one used on the mirror frame on page 10) take a 5/16"-wide cut out of the edge of a board? If it's a 5/32" bit, why doesn't it take a 5/32"-wide cut?



Roman ogee bits have two radii (a concave and a convex) that are the same size. The nominal size of the bit (5/32") refers to the size of each radius rather than the overall cut of the bit. There are two common sizes of Roman ogee bits: 5/32" and 1/4".

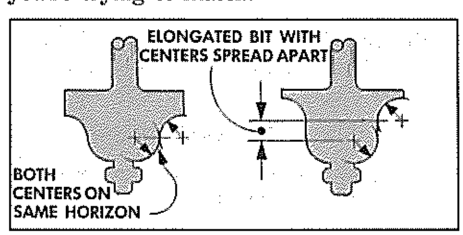
OTHER DESIGNS. The 5/32" and 1/4" radii are common sizes, but there are other design features on a Roman ogee bit that vary from manufacturer to manufacturer.

Manufacturers usually list the overall height of the cutting edge from the top of the shoulder section to the bottom of the bit (not counting the bearing). This measurement varies from one manufacturer to another.

In reality, this measurement isn't important. You can increase the size of the shoulder by lowering the bit and making repeat passes. What is important (and isn't usually listed) is the location of the centers of the two radii in relation to each other.

Some Roman ogee bits have the two centers on the same horizon, see the bit on the left in the drawing below. Other manufacturers design an elongated bit with the centers spread apart, as on the right.

This effects the finished appearance of the cut and can be critical if you're trying to match an existing Roman ogee molding. It's a good idea to always check that the cut made by your bit is the same as the one you're trying to match.



OGEE BITS. One last note. In addition to the Roman ogee, there are two other bits in the "ogee" family. A standard ogee is similar to a Roman ogee, but the location of the concave and the convex curves are reversed, see top drawing. If an extra shoulder is added to the ogee bit, it is called an ogee with a fillet.

Sources

FOLDING SCREEN

You can order the fiberglass sheets or rice paper and hinges from *Woodsmith* as a kit, see box below.

To make the folding screen you will need three sheets of fiberglass that measure 16" x 48". You can also use rice paper, but it comes in narrower widths so you will have to join it under a grid piece. Shoji screen material can be ordered from:

MIYA SHOJI & INTERIORS, INC., 109 West 17th Street, New York, NY 10011; 212-243-6774. *Fiberglass*, 48" x 1 yd., $10.00 (two pieces are needed). Miya also offers a *Plastic Laminated Rice Paper* (36" x 96") for $60.00 and a *Plastic Laminated Silkan Material* (48" x 96"), $65.00.

HINGES. We used three pairs of wide, brass hinges to connect the three sections of the screen. They can be ordered from:

THE WOODWORKERS' STORE, 21801 Industrial Boulevard, Rogers, MN 55374; 612-428-2199 (Catalog: $2.00. Note: Minimum cash order $7.50, credit card order $15.00. Add $2.50 handling and insurance.) *Desk Butt Hinge*, solid brass, 1½" long x 2" wide, Order No. D1238, $3.10 pr.

FRAMED WALL MIRROR

You can probably find wall hangers for the mirror at a local hardware store. We found some for 30¢ each. Those shown on page 13 are available from The Woodworkers' Store (see address above, note minimum order), *Hanger*, brass plated, screws included, Order No. D3008, $2.50 per 10.

You can also order hangers from:

MEISEL HARDWARE SPECIALTIES, P.O Box 70, Mound, MN 55364-0070; 800-441-9870 (Catalog: $1.00. Minimum order $25.00. Add $3.50 shipping and handling.) *Picture Hangers* (2), brass plated, screws not included, 1⅞" long, Order No. S23-20, $1.48 per 20. *Heavy Hangers*, nickel-plated steel, 1¾" long, screws not included, Order No. 7246, $1.95 per 20.

MIRROR. I used ⅛"-thick mirror cut to 18" x 24" for a loose fit. It cost $12.00 at a local glass shop.

LOG CABIN BIRDHOUSE

You can find most of the hardware and supplies needed for the birdhouse at a local hardware store. To hang the house from a tree, I bought a package of eight 1¼"-long screw eyes for 89¢.

For pole mounting, a galvanized floor flange for ¾" pipe costs about $3.00 and a 10-foot length of threaded galvanized pipe costs about $11.00.

RETAINING BUTTONS. The buttons that hold the bottom in place can be shop-made or you can buy *Plastic Retaining Buttons* from The Woodworkers' Store (see address and minimum order information above): Order No. D3802, $1.30 per 10. You can also order these buttons from Meisel Hardware Specialties (see address above): Order No. 214-20, $1.49 per 20.

SHINGLES. We explained in the article how to make your own miniature shingles. To overlap the shingles as we have shown you will need about 250 shingles that measure ¾" x 1¼".

If you don't want to make your own shingles, try a dollhouse supply store or hobby shop. We found some scale shingles for $2.25 per 100. (Note: Though these shingles are the same size as ours, they don't call for as much overlap in their instructions. This affects the "square foot coverage" figure given on the package.) Shingles can also be ordered from:

CHERRY TREE TOYS, INC., Belmont, OH 43718-9989; 614-484-4363 (Catalog: $1.00.) *Wood Shingles*, specify rectangular, octagonal, or fishscale, $4.95 per package of 300.

EPOXY. We used a two-part, fast-setting epoxy to glue on the shingles. It took two small resin/hardener packages to fasten down the shingles.

EDGING TOOLS

The cornering tools and the Radi Plane shown on page 14 are available through most woodworking mail order catalogs. One catalog that has both of these tools, plus the Japanese chamfer plane is:

GARRETT WADE COMPANY, INC., 161 Avenue of the Americas, New York, NY 10013-1205; 800-221-2942 (Catalog: $4.00). *CTI Cornering Tool*, ¹⁄₁₆" and ⅛" radii, Order No. 46P01.01, $4.25; *CT2 Cornering Tool*, ³⁄₁₆" and ¼" radii, Order No. 46P01.02, $4.25 (or order both tools for $7.95, Order No. 46P01.03). *Radi Plane*, Order No. 44P02.01, $19.95 (replacement cutters, Order No. 44P02.02, $4.95). *Japanese Chamfering Plane*, Japanese red oak, Large plane (7⅞" long), Order No. 49P03.01, $56.95; Small plane (4" long), Order No. 49P03.02, $49.50.

WOODSMITH KITS

Woodsmith is offering kits of fiberglass sheeting or rice paper and hinges for the folding screen shown on page 4:

KIT 57A ($14.95) includes:
- (3) sheets of fiberglass, 16" x 48".

KIT 57B ($22.95) includes Kit 57A *plus:*
- (3 pair) Brainerd No. 8150XC solid brass hinges, 1½" long, 2" open width, with brass screws.

KIT 57C ($14.95) includes:
- (1) roll of rice paper 11" x 30 ft. This is more than enough paper to cover the three sections of the screen.

KIT 57D ($22.95) includes Kit 57C *plus:*
- (3 pair) Brainerd No. 8150XC solid brass hinges, 1½" long, 2" open width, with brass screws.

FIBERGLASS OR RICE PAPER. We're offering the kits with either fiberglass sheeting ("Synskyn") or rice paper. They're both transluscent and white in color. We made our screen with the fiberglass sheeting since it's durable, water resistant, and easier to keep clean. But rice paper is more traditional and decorative.

The rice paper we're offering is an oriental fiber paper made in Japan. It's actual name is "Unryu" or "cloud-dragon paper" named for the long swirling fibers that float throughout the paper. Though these papers are called rice papers, very few Oriental papers are made from rice. The strong, coarse fibers in "Unryu" are actually from the Kozo plant.

Since the rice paper only comes in 11" widths (and the grids are 16" wide), you will have to glue the paper down to the back of the grid with a joint under the center vertical strip.

To do this, staple the paper down to the back of the grid at the top (the same as for the fiberglass sheet). But with the rice paper, line up one edge of the paper halfway over the center vertical strip. Then fold the paper back and spread a thin layer of white glue down the vertical center and around the outside. Next, lay the paper back down and press it into the glued surface. After the paper is glued down, trim the excess off along the outside edges with a sharp knife or razor blade.

KIT PRICES. The prices listed for the kits include postage and handling. (Iowa residents add 4% sales tax.) Prices good through December, 1988.

HOW TO ORDER. To order a kit, just write your order and name and address on a piece of paper. Be sure to specify which one of the kits you want (57A , 57B, 57C, or 57D).

Send your order and payment (no charge cards or phone orders, please) to:

Woodsmith Kits
P.O. Box 10350
Des Moines, IA 50306

Please specify the kit number on the outside of the envelope. Allow 4-6 weeks for delivery.