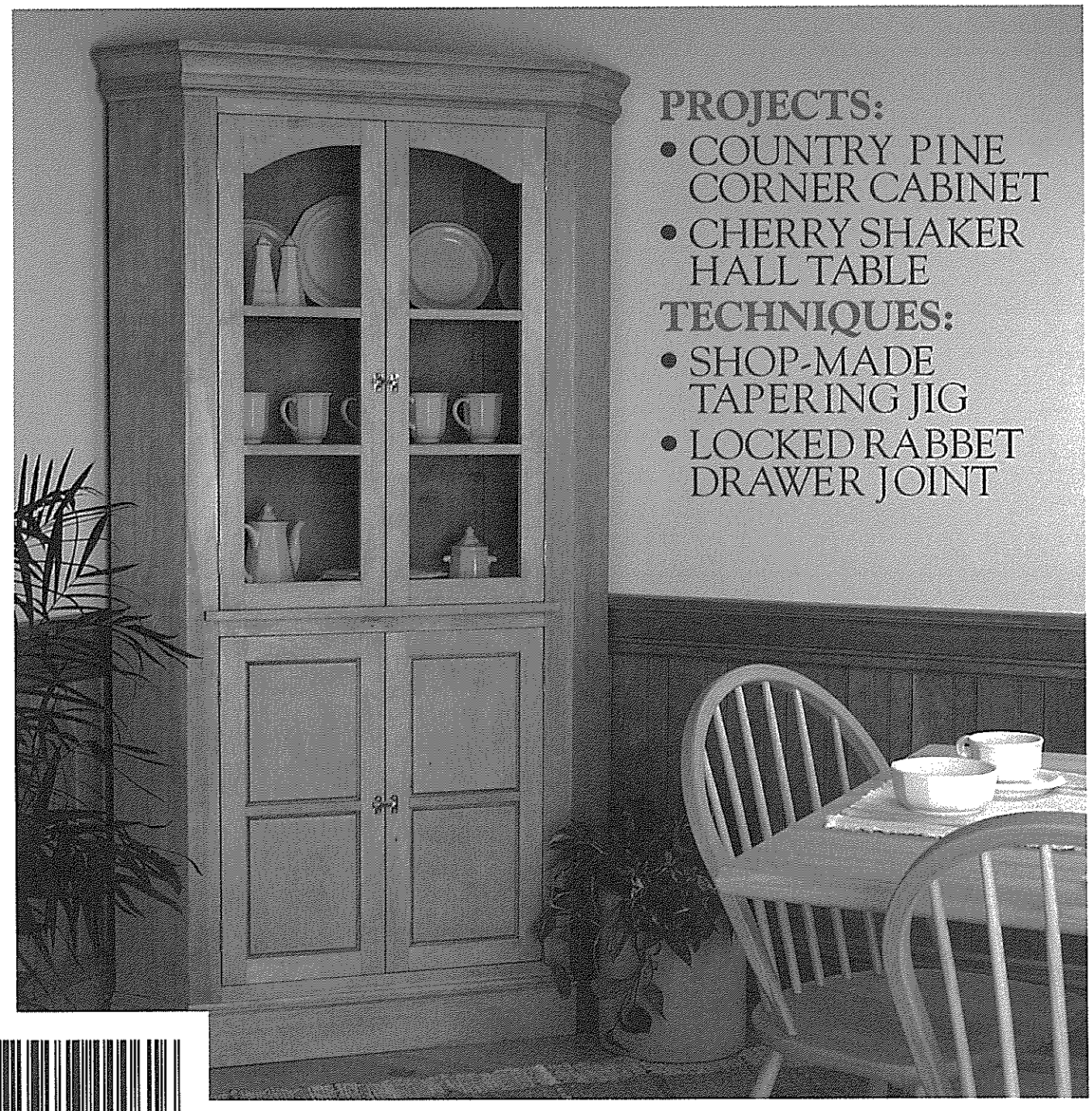
NO. 61 NOTES FROM THE SHOP

Woodsmith®



PROJECTS:
- COUNTRY PINE CORNER CABINET
- CHERRY SHAKER HALL TABLE

TECHNIQUES:
- SHOP-MADE TAPERING JIG
- LOCKED RABBET DRAWER JOINT

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EDITOR'S COLUMN

Sawdust

This issue marks the 10th anniversary of *Woodsmith*. Milestones like this are usually celebrated with great fanfare — including a banner across the front cover. I decided to skip the banner and take this opportunity to make some improvements to the graphics in *Woodsmith*.

Over the years, I've had the chance to talk to a lot of people who subscribe to *Woodsmith*. They're usually not shy about offering comments and advice. One bit of advice I've heard many times is: Don't change a thing, just keep it the way it is.

So, Don, why are you changing things now? Well, I agree that change for the sake of change is probably not worthwhile. But I wanted to make some improvements.

We've actually made a lot of improvements to *Woodsmith* during the past 10 years. There have been gradual (and sometimes subtle) changes in our approach to both the artwork and the copy (text).

The one thing that hasn't changed much is the graphic presentation. That is, the overall look and arrangement of the art and copy on a page. It's been okay. But it needed updating and improving.

THE NEW LOOK. So, what's the purpose of this new look? Most of the changes center around the project articles. Here's what I wanted to do . . .

First, the opening spread (two pages) of each project article is very different than in the past. For example, take a look at page 14, the Shaker Hall Table article.

OPENING PAGE. In the past, the opening page included a limited description of the project. I wanted a broader description that gives an overview of the design (and why it was designed that way). Plus, we will usually include a basic outline of the joinery, the wood used for the project, the type of finish, and any special jigs or techniques we used. In short, all the things that give an overall idea of where this project is headed.

EXPLODED VIEW. The second page of the project article (page 15, for example) represents the most dramatic change. We've always wanted to lead off with a big exploded view. One that shows all the pieces in relation to each other. Now, at last, you can see where you're going with the project right from the start.

STEP-BY-STEP PAGES. Okay, that takes care of the opening spread of a project article. What about the rest of the article? The step-by-step procedure?

Again, I didn't want to just change things, I wanted to make improvements. So, what was the problem before? Well, there wasn't a big problem. The old format was this: each page was divided into three columns. Two columns were given to art, one column was for copy. It worked fine.

Although it worked, there was a somewhat cluttered appearance for the artwork — it was all packed together in two columns. Also, since the copy was in long columns, when you turned your attention away from the copy to refer to the art (when I said, "see Fig. 12") it was difficult to find your place in the long column of copy again.

So, we made some changes in the graphic presentation. The second spread of each project article now presents the step-by-step procedure for building the project in an entirely new way. The project is divided into major steps and the copy is in smaller blocks right along with the art.

We try to show the major steps in self-contained units on the page. I think this will give a better idea of the overall procedure.

STAMP. We've also added a "bug" or "stamp" at the beginning of most sections. This is a small exploded view with the pertinent part shaded dark. For example, on page 16 the section headed **THE LEGS** has a stamp with the legs of the table shaded dark. It's intended to be a quick reference so you know what this section is about and how it relates to other parts of the project.

There are a lot of other smaller changes. But since I'm running out of space, I'll have to talk about them in another issue.

THICKNESS. There is one other change I want to mention briefly. The change has to do with the thickness of lumber. I've talked about it quite a few times in the past because it presents problems.

The problem is this. The National Hardwood Lumber Association says that 4/4 lumber (lumber that's 1" thick nominal or rough) should be $13/16$"-thick when it's "dressed" or planed to final thickness. But if you work with softwood (like the construction pine that most people are used to) 1" lumber (a 1x4 for example) is $3/4$" actual thickness when it's dressed.

We have always used the NHLA standard of $13/16$" for the thickness of hardwood. But it causes confusion. Not all hardwood lumberyards follow the rule. (In fact, all the lumber we get is actually $25/32$" thick.) So, we decided to change.

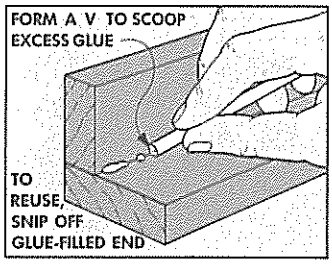
From now on in *Woodsmith*, the thickness of all hardwood lumber will be stated as $3/4$". I think it will make life easier for all of us.

NEXT ISSUE. The April issue of *Woodsmith* (No. 62) will be mailed during the week of April 24, 1989.

Tips & Techniques

GLUE REMOVER

Anyone gluing a corner together is confronted with the chore of cleaning up excess glue that squeezes out. The biggest problem is getting the glue out of the inside corners.



To make this chore easier, I use a plastic straw to get all of the glue out of tight corners quickly, painlessly, and without messing up my fingers in the process.

To use the straw, just slide the straw's tip tight into the corner and push it forward so the straw tip molds itself into the corner. Now push the straw through the glue to scoop the excess inside the straw. To reuse the straw, simply snip-off the filled portion and use the unused portion.

Matt Jackson
Rapid City, South Dakota

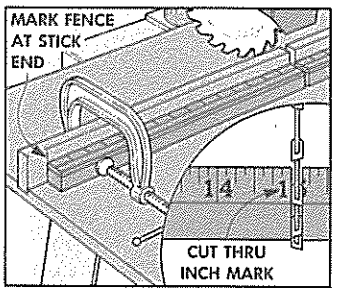
RADIAL ARM MEASURING STOP

Making cuts of the same length repeatedly on a radial arm saw gets tiring because you have to make the measurements on the board, then go to the saw to make the cut. I built a measuring stop for my radial arm saw that simplifies the process.

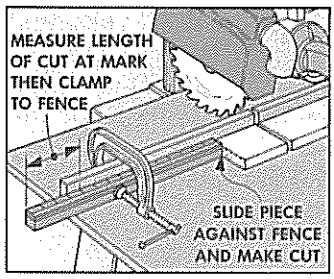
This measuring stop is just a wooden yardstick glued to a piece of stock that's clamped to the saw's fence.

To set up the stop, place it against the fence so the left end (the zero end) is near the left end of the fence. Then adjust it until an even inch mark is in line with the left side of the blade. (The drawing below shows the yardstick aligned so the blade is cutting right on the 15" mark.)

Now clamp the stop to the fence, and mark a reference line on the face of the fence at the left end of the stop. This mark becomes the "0" mark for the stop. Finally, cut off the right end of the yardstick stop.



To use the stop to measure cut-off lengths, align the length you want on the yardstick with the zero mark on the fence.



For example, if you want to cut off a piece 4" long, align the 4" mark on the yardstick with the "0" reference line at the left end of the fence. The right end of the stop will now be 4" from the saw blade. Now, clamp the stop to the fence, push the workpiece up to the stop, and cut it off.

Buddy Jent
Lafayette, Tennessee

Editor's Note: Yardstick measurements can be over 1/16" off, so it's a good idea to only use this type of stop for rough cuts.

CHUCK KEY HANDLE

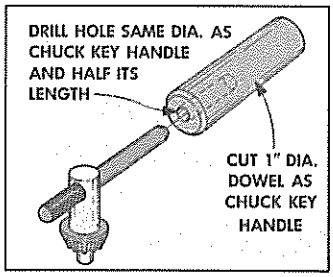
Over the years my knuckles have taken their fair share of nicks and scrapes while tightening or loosening drill chucks. There's been many a time when I thought I had the chuck jaws tight, only to see them spin around a drill bit that was going nowhere.

But this doesn't happen any more since I built a handle for my chuck key. The handle is made out of a short piece of 3/4" or 1"-diameter dowel with a hole drilled in one end to hold the chuck key. (I cut the dowel twice the length of the handle on the chuck key.)

Next drill a hole centered on one end of the dowel, the same diameter as the handle on the chuck key, and half as deep as its length. (If you have chuck keys of different sizes, drill another hole into the other end of the dowel.)

I use the handle (after using the chuck key) for short final turns to give me more leverage to tighten or loosen jaws so my hands stay clear of getting scraped.

To use the handle, first spin the chuck closed with your hand, and then use the chuck key without the handle. (The handle usually gets in the way of making a *full* turn.) When the chuck is fairly tight, attach the handle and gently tighten the chuck. To loosen the chuck just give the handle a slight pull and the leverage will do the rest.



You have a lot more leverage with this handle, so be careful not to overtighten the chuck and damage the jaws.

Fritz Marple
Pollock Pines, California

SANDING BELT CLEANER

Sanding belts and disks always seem to clog up with sawdust and need to be cleaned often. In the past, I cleaned these sanding surfaces with an abrasive cleaner stick made out of a rubber compound. These sticks work well, but they also leave a mess of sawdust-filled rubber bits on the sanding surface, and all over the shop.

One day while sanding some acrylic plastic, I found that the acrylic was actually picking up sawdust from the sanding surface and collecting it in a bead on the edge. Right then, I knew I found a new sanding cleaner.

Now when I want to clean off a sanding disk or belt, I just turn on the sander and press the edge of a piece of acrylic against the sanding surface. The acrylic removes the sawdust and fuses it in a bead on the edge of the acrylic. When a bead builds up on the edge, just break it off to get a fresh cleaning surface.

John Harris
San Leandro, California

SEND IN YOUR TIPS

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

We pay $15 for accepted tips. Please send an explanation and sketch if needed (we'll draw a new one).

Corner Cabinet

With glass and raised-panel doors this country cabinet enhances any corner of a home. It's a classic that uses simple joinery and shop-made moldings.

Corner cabinets usually involve a lot of angled cuts and complex joinery. Typically, you would try to figure out all the angles first, then build the case, and finally add the shelves. But to make construction a little easier, I did it backwards.

I made the shelves and top and bottom first, and then built the sides of the cabinet around them. This way you can lay out and cut the angles on flat pieces.

JOINERY. The design of this cabinet also keeps any complex joinery to a minimum. There are long splines that join the sides and front stiles (vertical pieces). But the rest of the case is simply screwed together. The screws are all hidden by moldings.

MOLDINGS. That brings up another thing I like about this project. You can combine a number of simple moldings (that are cut on the router and table saw) and come up with what looks like rather complex base and top moldings. For example, the top crown molding has a cove that's an easy cut on a table saw.

THE DOORS. One more thing should be mentioned about the design. I added glass upper doors and panel lower doors.

On the top half I was faced with building doors with small panes—including the top panes which had to be cut in an arc to match the top door rail.

To simplify all of this, I took a different approach. The glass in each door is just one big rectangular pane. Then the horizontal muntins (dividers) lay on top of the glass, but they're still tied into the door stiles with an offset mortise and tenon joint. This way the only arc you have to cut is on the top rails (horizontal pieces) of the door, not the glass.

MATERIALS. I built the cabinet out of straight-grained Ponderosa pine (C and Better grade). The pine, gives the project a classic country look. Since the back is made from 1/4" plywood (and pine plywood isn't commonly available), I used birch plywood for the back.

If you were to build the cabinet with a hardwood, such as cherry or oak, it would take on a traditional, formal look. Then you could use plywood for the back to match the rest of the cabinet.

FINISH. Before staining the Corner Cabinet, I brushed on a coat of Minwax Wood Conditioner to help even out the stain penetration.

Then I stained with a coat of Country Pine stain mixed up in the shop. (The recipe is in *Woodsmith* No. 55.) It's similar to Minwax's Early American.

Finally, I brushed on two coats of McCloskey's Heirloom (eggshell) Varnish and rubbed it smooth with "000" steel wool.

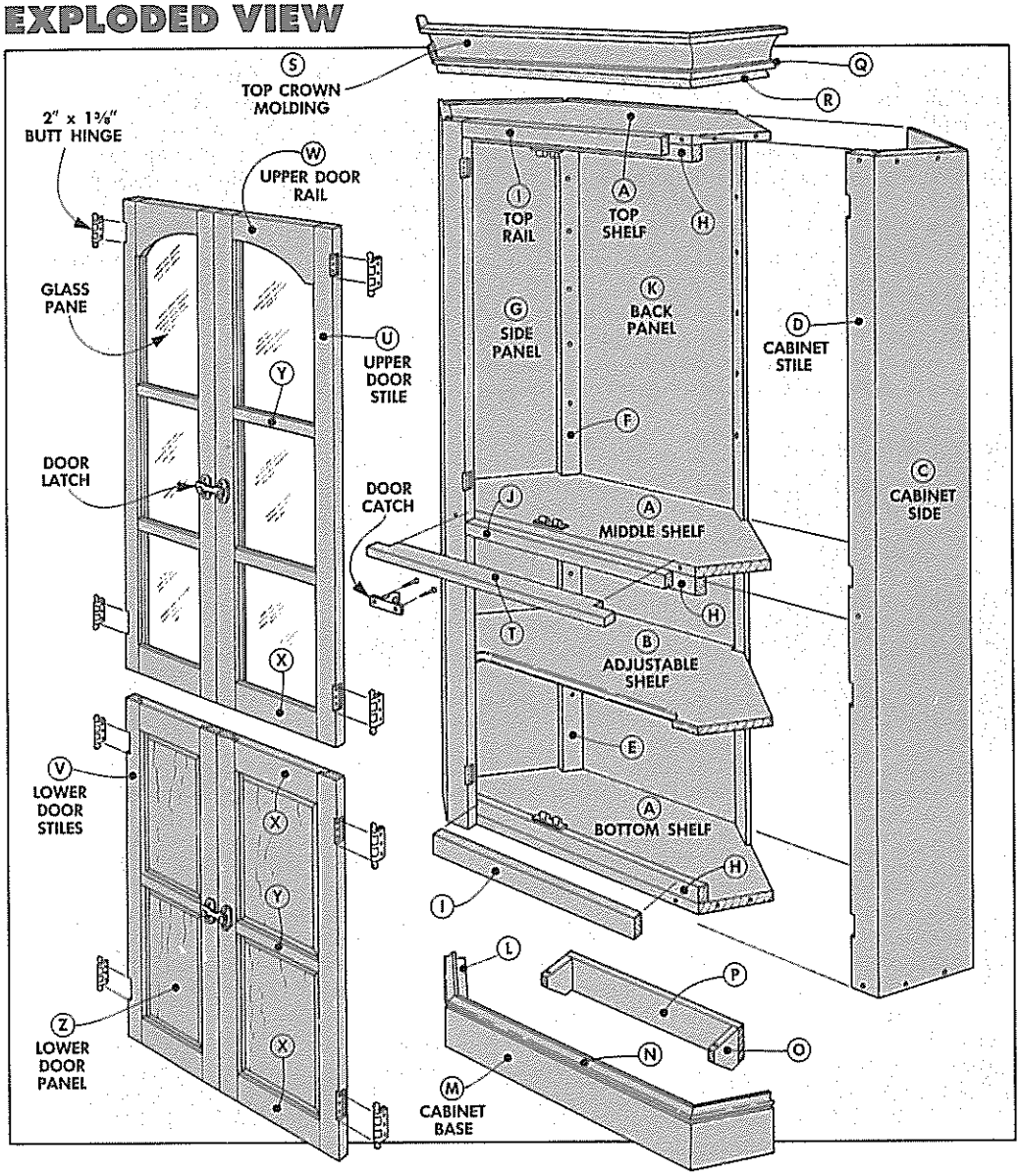
MATERIALS LIST

OVERALL DIMENSIONS: 79⅜"H x 44⅜"W x 16⅛"D

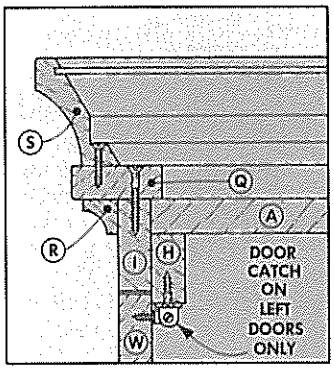
	CASE				
A	TOP/MIDDLE/BTM. (3)	¾ x 13⅜ - 40½	N	BTM. COVE MOLDING (1)	¾ x ¾ - 60
B	ADJ. SHELVES (3)	¾ x 13⅜ - 40½	O	BRACES (4)	¾ x 4¼ - 4¼
C	CABINET SIDES (2)	¾ x 7¼ - 72	P	REAR SUPPORT (1)	¾ x 4¼ - 23¼
D	CABINET STILES (2)	¾ x 2½ - 72	Q	TOP CLEAT (1)	¾ x 2 - 60
E	SHELF STAND. (BTM.) (2)	¾ x 1¾ - 30¼	R	TOP COVE MOLDING (1)	¾ x ¾ - 60
F	SHELF STAND. (TOP) (2)	¾ x 1¾ - 39½	S	TOP CRN. MOLDING (1)	¾ x 3 - 60
G	SIDE PANELS (2)*	¼ x 12 - 72	T	FRONT LEDGE (1)	¾ x 1½ - 29
H	DOOR STOPS (3)	¾ x 1½ - 32⅝			
I	TOP/BTM. RAILS (2)	¾ x 2 - 26¾		**DOORS**	
J	MIDDLE RAIL (1)	¾ x 1¼ - 26¾	U	UPPER DR. STILES (4)	¾ x 2 - 38¼
K	BACK PANEL (1)*	¼ x 23½ - 72	V	LOWER DR. STILES (4)	¾ x 2 - 27¾
			W	UPR. DR. RAILS (TOP) (2)	¾ x 4½ - 11⅜
	BASE/TOP		X	DR. RAILS (6)	¾ x 2 - 11⅜
L	BTM. CLEAT (1)	¾ x 1½ - 60	Y	MUNTINS (6)	⅜ x ¾ - 11⅜
M	CABINET BASE (1)	¾ x 4⅛ - 60	Z	LWR. DR. PANELS (4)	¾ x 9⅞ - 11⅞

* ¼" PLYWOOD — CUT GLASS STOPS AND RAISED PANEL KEEPER STRIPS FROM SCRAP

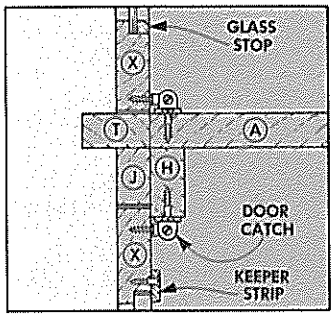
EXPLODED VIEW



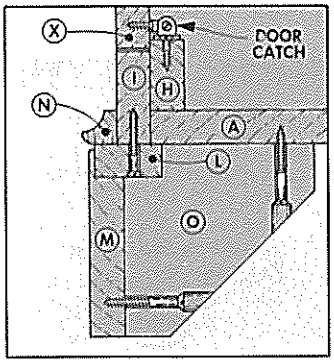
TOP



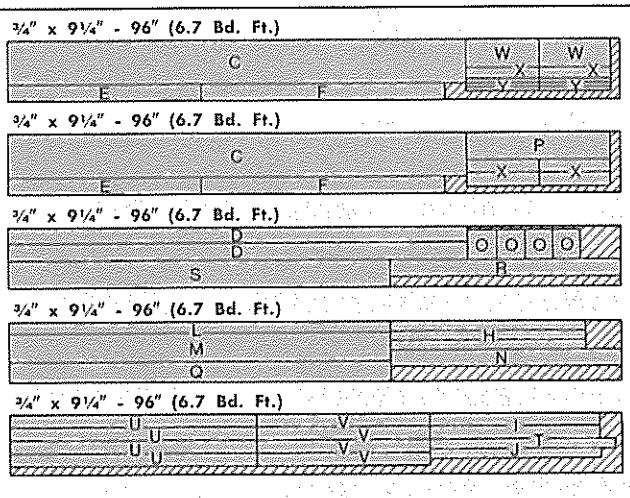
MIDDLE



BASE

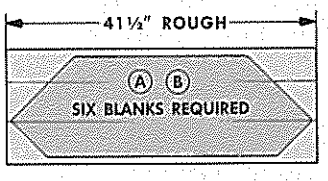


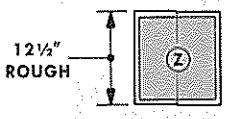
CUTTING DIAGRAM



ALSO REQUIRED:

1. Pieces A, B, and Z (below) are cut from glued-up blanks. To make the blanks, edge-glue 1x6's. You need nine boards ¾" x 5½" x 96" (36 bd. ft. total) to make all the blanks.





2. Pieces G and K are cut from one sheet (4'x8') of ¼" plywood.

SUPPLIES

LUMBER

- 70 Board ft., ¾" thick, Ponderosa pine (C & Btr.)
- ¼" Birch ply. (48" x 96")

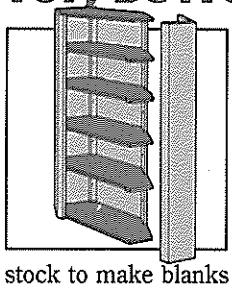
HARDWARE

- Project kit (see page 24)
- Misc. screws and nails
- Two panes of glass

FINISH

- Sealer: Minwax Wood Conditioner
- Stain: Minwax Early American or *Woodsmith* Country Pine (*Woodsmith* No. 55)
- Varnish: McCloskey's Heirloom (eggshell) Varnish

TOP, BOTTOM, AND SHELVES



I started work on the Corner Cabinet by making the top, middle shelf, and bottom (all labelled A), and the three adjustable shelves (B). All six pieces are made by edge-gluing ¾" stock to make blanks 13⅜" wide by 40½" long. (After the case is built, the adjustable shelves are cut to fit in the case.)

LAYOUT. After the blanks are made, you can begin laying out the angles that give these pieces (and eventually the cabinet) their shape, see Fig. 1. (Shop Note: I layed out and cut *one* blank. Then, I used that blank as a template to mark the others.)

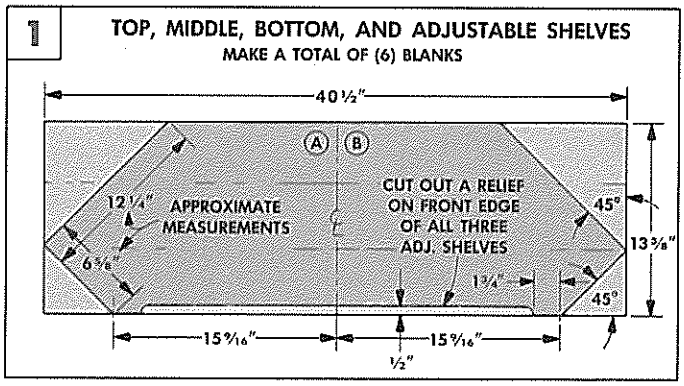
Begin the layout by drawing a center line on the blank, see Fig. 1. Then make reference marks on the front edge 15⁹⁄₁₆" on both sides of the center line.

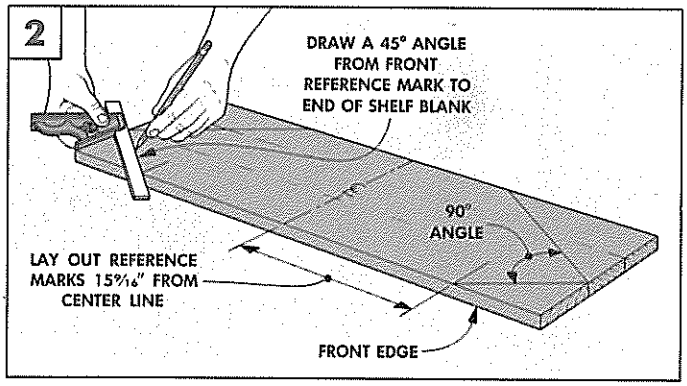
Next, place a combination square along one end to lay out a 45° angle from the reference mark on the front edge to the end of the blank, see Fig. 2. (In my case, this line measured 6⅝" long, see Fig. 1.)

Then flip the square over so it points toward the back edge and lay out another line at a 90° angle from the first line.

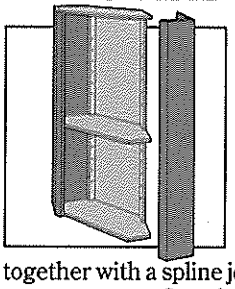
CUT OUT SHAPE. After the lines are layed out on both ends, you can cut out the finished shape. I did this with the miter gauge set at a 45° angle on the table saw.

ADJUSTABLE SHELVES. On the three adjustable shelves, I cut a relief on the front edges, see Fig. 1. (This makes room for the keeper strips on the back of the lower doors.) Then I routed a plate groove (this is optional) along the back edges of two of these shelves (B). (Shop Notes, page 12.)





SIDES AND STILES



Once the top, bottom, and shelves are all cut to shape, work can begin on the cabinet sides and stiles (the vertical pieces on the front of the cabinet). These pieces are joined together with a spline joint.

CUT TO SIZE. Start by cutting two cabinet sides (C) and two cabinet stiles (D) to a common length of 72". Then rip one edge of each piece to create a 22½° bevel. Now, cut the cabinet sides (C) to a width of 7¼", and the stiles (D) to a width of 2½", see Fig. 3.

RABBET. Before cutting the spline joint, I cut a rabbet along the back edge of the cabinet sides (C) to accept the side panels (G). Cut this rabbet so the distance from the short end of the bevel to the rabbet matches the length of the angled front edges on the top and bottom pieces (A). (In my case, this was 6⅝", see Figs. 1 and 3.)

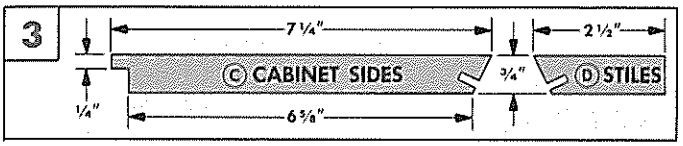
SPLINE JOINT. The purpose of the spline between the sides (C) and the stiles (D) is to help align the pieces when gluing. (It doesn't add significant strength.)

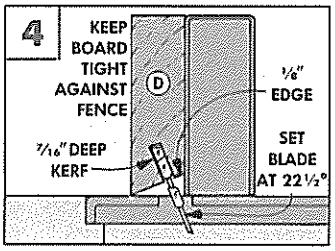
To make the joint, start by cutting a ⅛" kerf into the bevels on the edges of both the cabinet sides (C) and stiles (D). I did this by tilting the blade to 22½° and running the pieces through the saw on edge (with the bevels down), see Fig. 4.

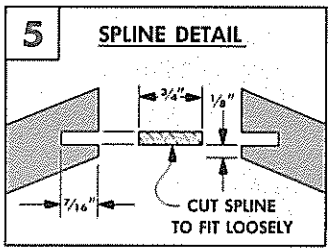
Then cut a spline to fit loosely within the kerf, see Fig. 5. (Shop Note: The spline could be ⅛" Masonite, but if it fits too tight, assembly will be difficult. Also, the spline can be a series of pieces, not one 72"-long piece.)

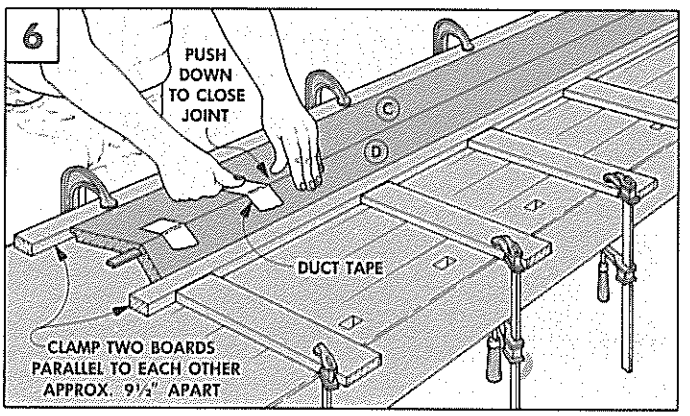
ASSEMBLING THE JOINT. To help assemble the joint, I clamped a couple of straight boards to my bench parallel to each other and about 9½" apart, see Fig. 6. Then wedge a cabinet side (C) and stile (D) together between the straight boards (with the spline in place). When pressure is applied on top of the pieces the joint closes up. (Test clamp dry before gluing. The distance between the straight boards may need adjusting).

Once the joint is tight, glue it up and hold the pieces down with several strips of tape while it dries, see Fig. 6.









ASSEMBLY

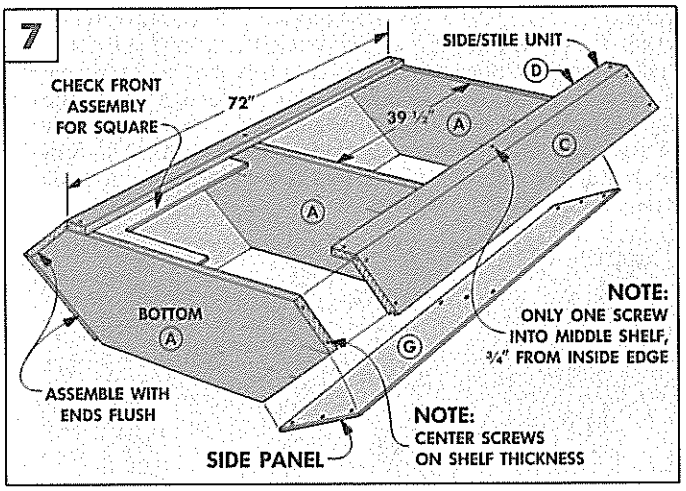
I found it easiest to assemble the case while it was laying on its back, see Fig. 7.

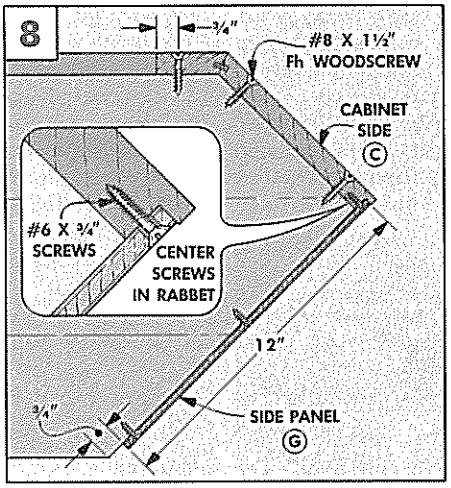
ATTACH FRONT ASSEMBLY. Position the top and bottom pieces flush with the ends of the front assembly (C,D), and the middle shelf 39½" down from the top piece. Then screw through the front stiles (D) and into the edge of the top, middle shelf, and bottom pieces (A), see Fig. 7.

Next, add two screws along the top and bottom of the sides (C). The screws will be hidden later by the top and base moldings. But that's not the case with the middle shelf. There I just used one screw ¾" from the inside edge of the front stile, see Fig. 8. It will be covered later by a front ledge.

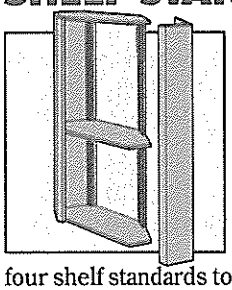
SIDE PANELS. Once the front pieces are screwed down, turn the case over and measure for the plywood side panels (G). Cut the width of the side panels ¾" less than the distance from the inside of the rabbet to the back corner, see Fig. 8.

After the side panels are cut to size, screw them down with No. 6 x ¾" Fh woodscrews, see Fig. 8.





SHELF STANDARDS



The shelves are supported by metal pin shelf supports that fit into holes drilled in shelf standards and in the side of the case, see Fig. 12.

CUT STANDARDS. Start by cutting the four shelf standards to fit in the top and bottom sections of the case. In my case, the two bottom standards (E) were 30¼" long and the two top standards (F) were 39½" long.

Next, cut a 45° bevel off one edge of all four standards (to fit against the back of the cabinet) and then trim them to a common width of 1¾", see Fig. 9. Now cut a ¼"-deep rabbet on the edge opposite the bevel to fit around the side panel, see Fig. 10.

ATTACH STANDARDS. After the rabbets are cut, glue and clamp the standards to the inside back of the cabinet, see Fig. 11a.

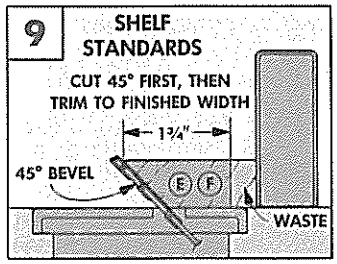
DRILLING TEMPLATE. I found the easiest way to keep all the pin support holes aligned was by making a drilling template, see Fig. 12. To make the template, cut a piece of ¼" plywood to the same width and length as the bottom shelf standard (E). Then drill ¼" holes centered on the width and positioned as shown in Fig. 12.

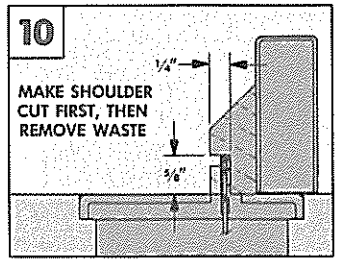
Design Note: Two of the holes are positioned so the shelves will be centered behind the horizontal muntins on the glass doors.

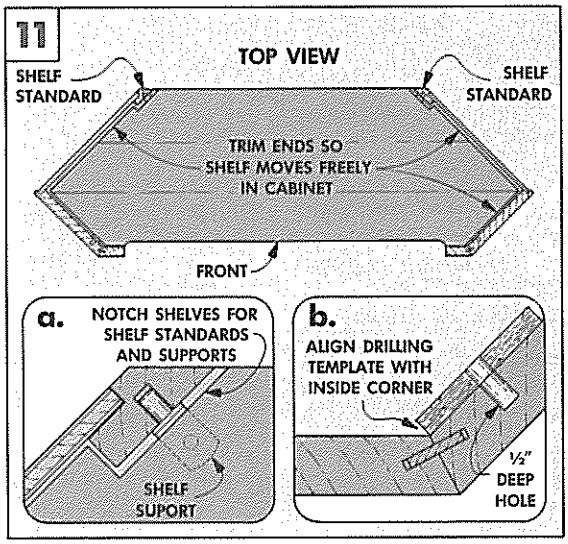
Now, with the bottom end of the template clamped firmly so it sits flush on the top of the shelf, drill through each hole until there's a ½"-deep hole in the shelf standard, see Fig. 12.

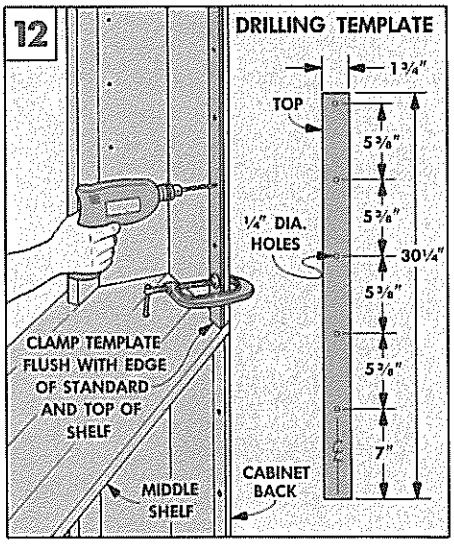
After drilling holes in each of the four shelf standards at the back of the cabinet, I used the template to drill matching holes on the inside of the cabinet sides (C) at the front of the cabinet. If you align the edge of the template on the spline joint, the holes will be located ⅞" in from the joint, see Fig. 11b.

NOTCH SHELVES. Once all of the holes are drilled, insert the shelf supports and notch the three adjustable shelves (B) to fit around the shelf standards. Then trim the ends slightly so the shelves will fit around the shelf supports and move freely within the cabinet, see Fig. 11a.

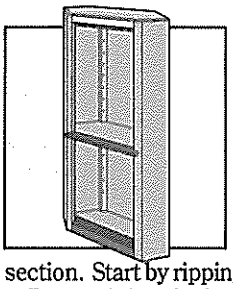








STOPS AND RAILS



The next step on the cabinet is to add the door stops, rails, and a front ledge.

STOPS. There are three door stops (I) — one at the top of the upper section and two in the lower section. Start by ripping the stops 1½" wide.

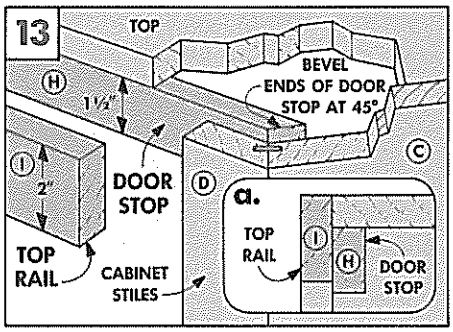
Determining the length of the door stops is a little tricky. The stops fit behind the stiles (D), and I wanted to bevel both ends at 45° to match the angle inside the cabinet, see Fig. 13. The distance between the short points of the bevel has to match the distance from one spline joint (on the inside) to the other spline joint. (In my case, 31⅛".)

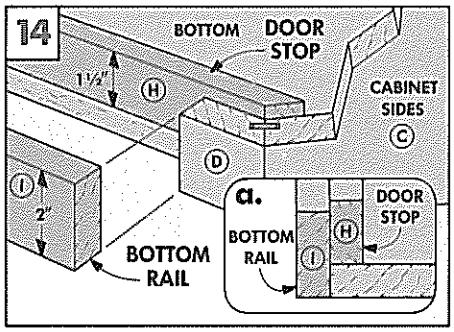
After the stops are cut to length, they can be glued in place behind the cabinet stiles (D), see Figs. 13, 14, and 15.

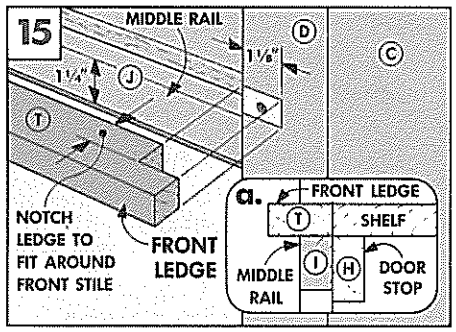
RAILS. Next, cut the three rails. The top and bottom rails (I) are cut to a width of 2". But the middle rail (J) is cut 1¼" wide (which is ¾" narrower) since there's a front ledge added above it, see Fig. 15a.

To determine the length of the rails, measure the distance *between* the cabinet stiles (D). (In my case, 26¾".) After they're cut to length, glue the rails to the front of the stops. The top and bottom rails (I) are mounted flush with the top and bottom of the cabinet, see Figs. 13a and 14a. But the middle rail (J) is aligned with the *bottom* of the middle shelf, see Fig. 15a.

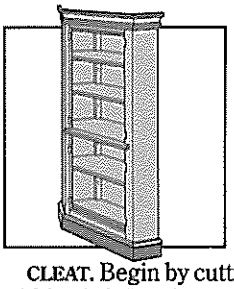
FRONT LEDGE. Next, add the front ledge (T) to the front of the middle shelf, see Fig. 15. (The ledge hides the screws in the cabinet stiles.) First, cut it 1½" wide and 29" long. Then cut notches on both ends so it fits *between* the cabinet stiles. After the ledge is cut to shape, glue it to the front of the shelf, see Fig. 15.







BASE



The base of the cabinet is built using a number of pieces, see Fig. 16. I started by screwing cleats (L) to the bottom of the cabinet to provide a mounting surface for the base.

CLEAT. Begin by cutting the cleats (L) to a width of 1½" and rough length. Then miter both ends of the *middle* cleat at 22½° so the ends align with the joints of the stiles and sides, (see Fig. 17), and it sticks out ½" from the front of the cabinet, see Fig. 16.

After the middle cleat is cut to length, miter the front end of each side cleat and then cut the back end to length (at 90°).

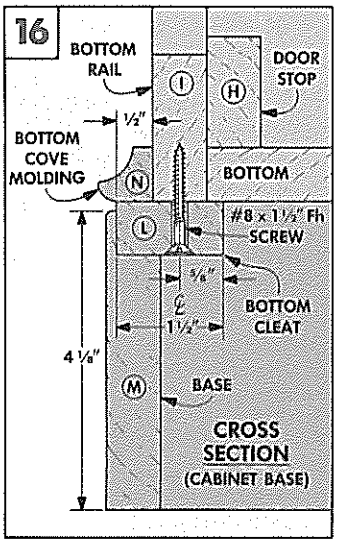
BASE. After the cleats were screwed down, I added the cabinet base pieces (M) to the front. These three pieces have a rabbet cut on the top edge to fit around the cleats, see Fig. 18. After cutting the rabbet, miter the pieces so the miters align with the miters on the cleats.

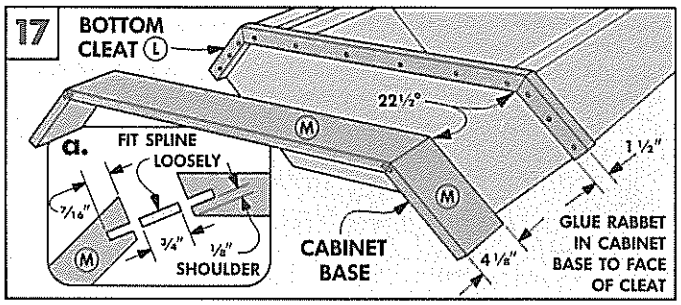
To join the base pieces, I used a spline joint (like the sides and stiles), see Fig. 17a. Then I glued the base pieces to the cleats.

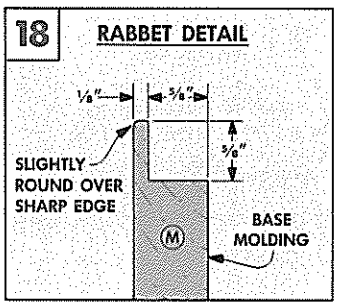
COVE MOLDING. The last step on the base is to add the cove molding (N) which is made using the router and table saw. To make the molding, first rout 1/2" coves along both edges of a 2½"-wide by 36"-long blank, see Fig. 19, Step 1. While I was set up, I routed two pieces this size to make enough molding (R) for the cabinet top as well.

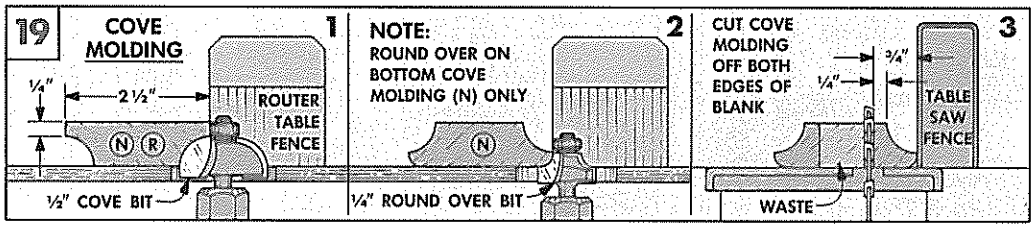
Then round over the bottom edge of the *bottom* cove molding only, see Step 2. Finally trim the ¾"-wide molding off both edges, see Step 3.

Now miter the molding to fit around the cabinet and glue it in place on top of the cleats, see Fig. 16.









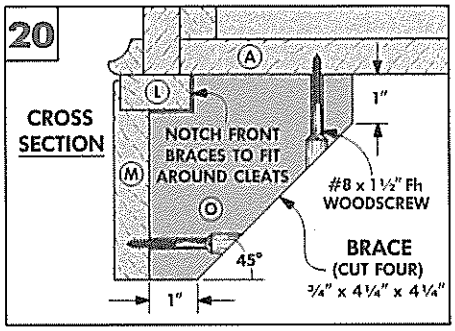
SUPPORT BRACES

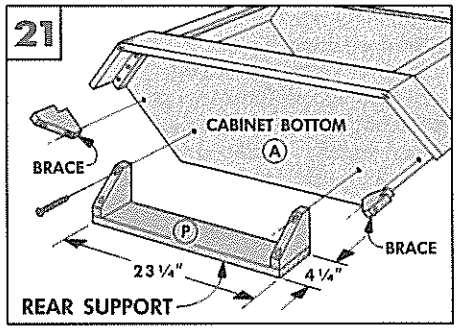
To add strength to the base of the cabinet, I screwed triangular-shaped braces (O) behind the base pieces.

CUT TO SIZE. Start by cutting four braces 4¼" square. (Two of the braces fit behind the front base piece and the other two support a rear support, see Fig. 21.) Then trim one corner off at 45° leaving 1" shoulders along two edges, see Fig. 20.

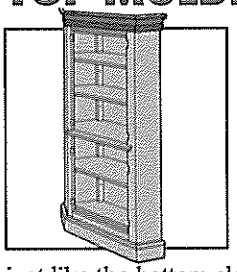
To fit around the bottom cleats (L), cut notches out of the two front braces, see Fig. 20. Then use No. 8 x 1½" flathead screws to screw two of the braces to the back of the base piece (M) and to the bottom of the cabinet (A).

REAR SUPPORT. The back of the cabinet is held up with a rear support (P), see Fig. 21. Cut it to the same width as the braces (4¼") and to the same length as the back edge of the cabinet bottom (A) (23¼" in my case). Then screw the back braces onto the inside face of the rear support. Now screw this assembly to the bottom of the cabinet.





TOP MOLDING



The molding around the top of the cabinet is made from a combination of pieces fastened together.

TOP CLEAT. Begin by making and screwing down three top cleats (Q) just like the bottom cleats, see Fig. 24. The top cleat is a little different though. It's 2" wide and is mounted so it sticks out 1" in front of the cabinet, see Fig. 24.

COVE MOLDING. Next, cut the cove molding (R) (that you made earlier) and glue it underneath the cleats, see Fig. 24.

CROWN MOLDING. To make the crown molding, I started by cutting two blanks 3½" wide. Then cut one to a rough length of 36" (for the front) and one 24" (for the two sides).

To cut the wide cove on the face of the moldings, clamp a straightedge fence to the saw at a 30° angle to the blade, see Fig. 22. Position the fence so the top of the blade is centered on the width of the blank. Now cut the cove by making light passes, increasing the blade height between passes until the cove is ¼" deep.

Next, rip the blank so *one* edge is ⅝" from the cove, see Step 1 in Fig. 23. Then make two cuts on this edge with the blade set at 30°, see Steps 2 and 3.

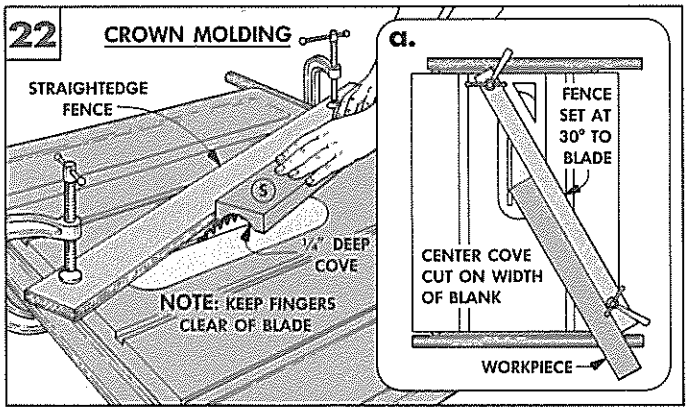
Now lower the blade so it's only ¼" above the table, and cut a slot on the back of the molding for a spline, see Step 4. Finally, cut off the other edge at 30°, see Step 5.

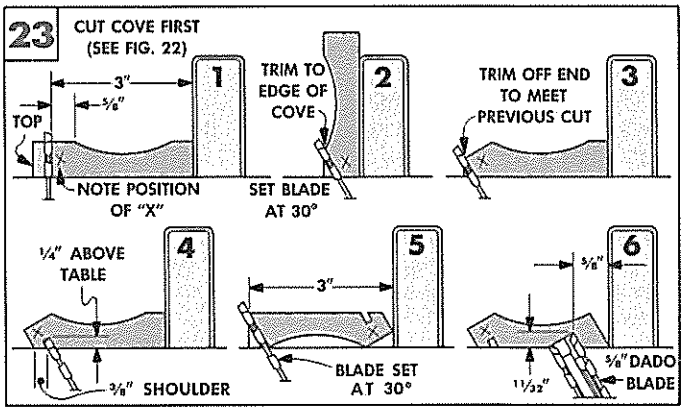
The last step is to cut a pocket for mounting screws (see Fig. 24). To make the pocket, cut a ⅝"-wide angled groove in the back of the molding with a dado blade on the table saw, see Step 6.

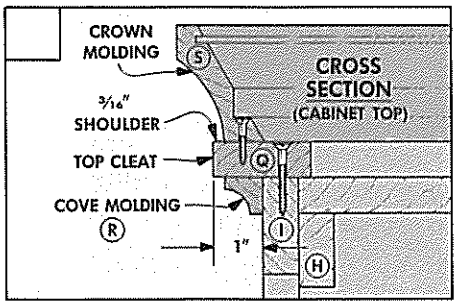
MOUNT THE MOLDING. Now the molding can be cut to fit on top of the cleat. (See Shop Notes, page 13, for an easy way to cut the molding at the correct angle.)

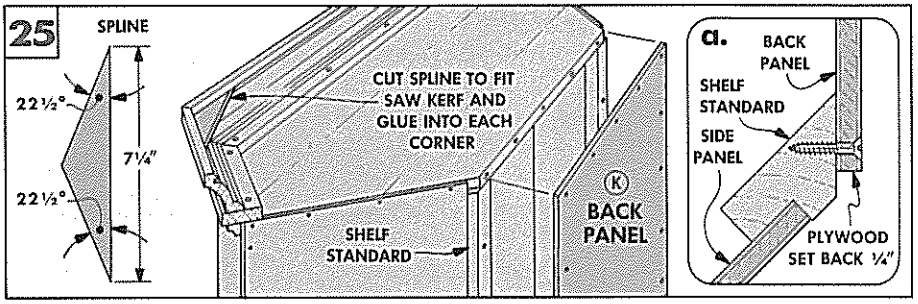
To hold the joints together, I added splines shaped like elongated triangles into the slot in the molding, see Fig. 25.

BACK PANEL. The back panel (K) can now be cut from ¼" plywood so it's the same height as the side panel (72"), but ½" narrower than the distance between the outside corners of the shelf standards (so the back won't stick out beyond the sides), see Fig. 25. Then screw the back panel into place.









DOOR STILES

After the basic case of the cabinet was complete, I built the doors. I made glass upper doors and raised panel lower doors, but you could eliminate the upper doors for a more open appearance.

DESIGN CONSIDERATIONS. The basic construction of both the upper and lower doors is the same. Instead of enclosing the glass or raised panel in a closed frame, I built the doors as open frames, see Fig. 26. Then I put one large pane of glass (or two raised panels) into rabbets in the back of each door. The glass and raised panels are held in place with stops and keeper strips, refer to Fig. 36 on the opposite page.

To build the doors this way, I had to come up with a slightly different mortise and tenon joint, see Fig. 27. Since the muntins are mounted in front of the glass and panels, the mortise and tenon joint for the muntins must be offset slightly towards the front. Once I was set up to cut these offset mortises for the muntins, it was easiest to cut the mortises for all of the door rails this way as well.

CUT OUT STILES. Start making the doors by cutting all of the stiles (vertical pieces) to a common width of 2" from ¾"-thick stock, see Fig. 28.

To determine the length of the stiles, measure the height of the cabinet openings. Cut the stiles (U, V) to length so the doors fit tight in the openings. Then after the doors were built, I planed them down so there was a uniform 1/16" gap all around.

LAY OUT MORTISES. Next, lay out the location of the mortises along the inside edge of the stiles, see Fig. 28. The two mortises at the top and one at the bottom (for the rails) are 1¼" long. The mortises in the center (for the muntins) are ½" long.

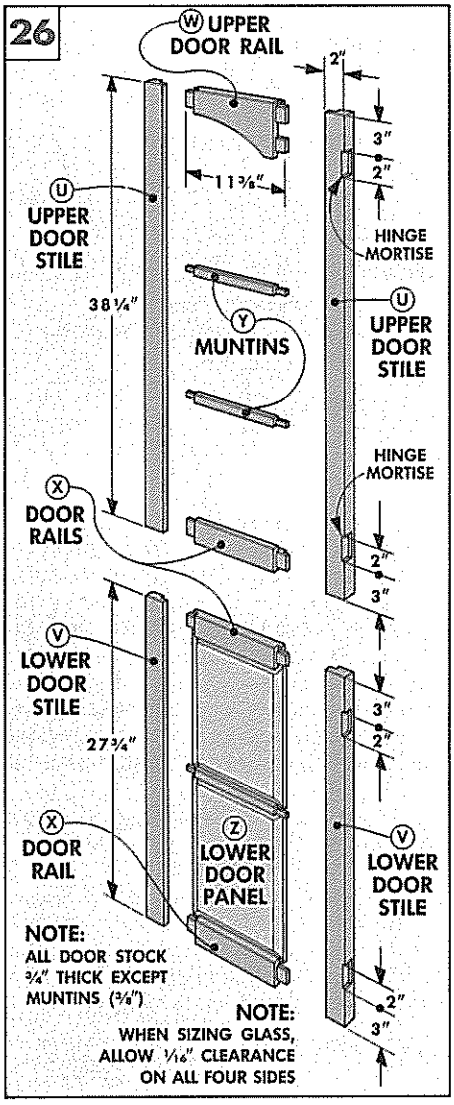
CUTTING MORTISES. I cut the mortises on a drill press using a fence, see Fig. 29. (If you don't have a fence, clamp a straight board to your drill press table as a fence, or build a table and fence like the one shown in *Woodsmith* No. 54.)

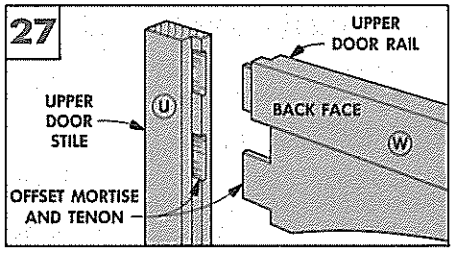
To cut the mortises, first insert a 3/16" brad point bit in the drill press and set the speed to about 2000-2500 RPM. Then tighten the fence down so it's 3/16" from the inside edge of the bit. To get the mortise to be offset toward the front of the stile, keep the *outside face* of the stile against the fence. This will leave room for the ⅜" rabbet on the inside face of the stile (refer to Fig. 31a).

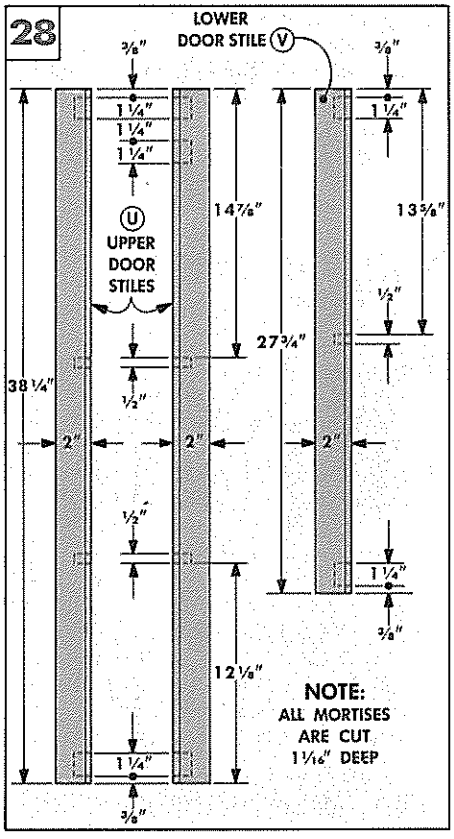
To make the mortise, start by drilling holes at each end. Then drill a series of holes next to each other in a straight line, see Fig. 29. (Don't overlap the holes or the bit can wander into the previous hole.)

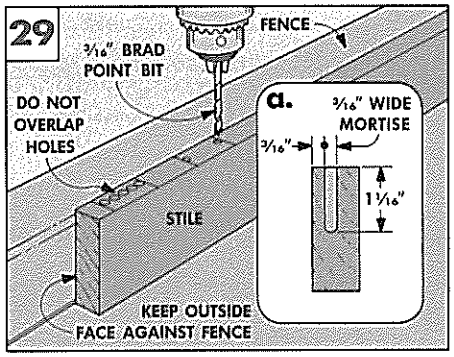
After the initial holes are drilled, I went back and drilled out the areas between the holes. Finally, I used a "milling" action to clean out the remaining ridges, see Fig. 30. Rapidly raise and lower the bit while at the same time slowly moving the workpiece from side to side.

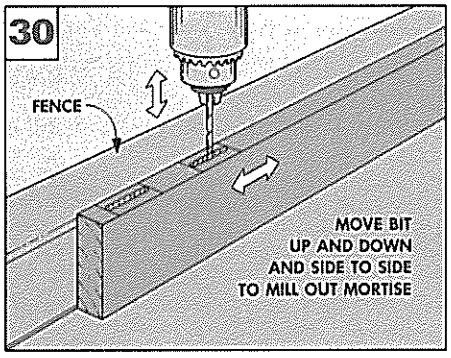
RABBET. After all of the mortises are cleaned out, rout a ⅜" x ⅜" rabbet along the back inside edge of each stile, see Fig. 31.

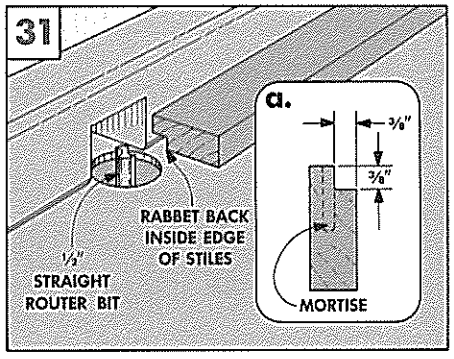












DOOR RAILS

Next, I made the door rails (W, X) and muntins (Y). To determine the length of these pieces, first measure the distance between the *cabinet* stiles (D) and divide by two (for two doors). Then subtract 4" (for the two door stiles), and add 2" (for the 1" tenons on each end.)

As for width, cut the two rails for the top of the upper door (W) to a width of 4½", the other six rails (X) 2" wide, and the six muntins (Y) ¾" wide.

RESAW MUNTINS. The muntins are mounted so they're in front of the glass and raised panels. So they have to be resawn to a thickness of ⅜", see Fig. 32.

CUTTING THE TENONS. To avoid confusion when cutting the tenons on the ends of the rails and muntins, I marked the front and back face of all of the pieces.

Now, on the rails (but not the muntins) cut a ⅜"-deep rabbet at the ends on the *back* face, see Fig. 33.

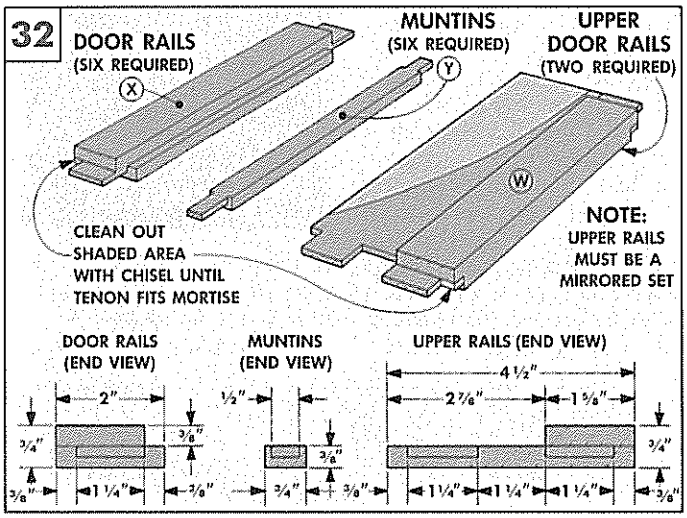
Next, turn the rails over and cut a rabbet on the *front* face to create a 3/16"-thick tenon that fits the mortise, see Fig. 33. Also cut this same rabbet on the front face of the muntins. Note that the rabbet on the front face is wider (1") than the one on the back (⅝") so it fits in the rabbet on the door stiles.

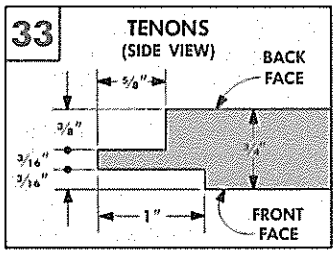
CUT TO WIDTH. To permit the tenons to fit in the mortises, you have to trim them to width. First trim the shoulders by cutting ⅜" from the corner of the rails and ⅛" on the muntins. Then cut a 1¼"-wide notch in the tenon on the top upper door rails to create two tenons, see Fig. 32. (Cut the notch 1" deep to align with the inside shoulder.)

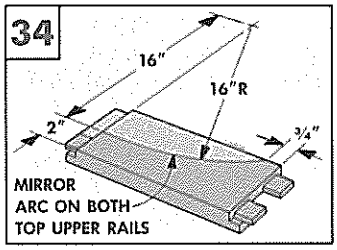
There's one more step. There's a little area under the outside corner of each rail (alongside the tenon) that has to be cleaned out with a chisel, see Fig. 32.

BACK RABBET. After all of the tenons fit the mortises, cut a rabbet on the back inside edges of all the rails (but not the muntins) to accept the glass or panels. This rabbet is ⅜" wide on the six rails (X), see Fig. 32. However, the rabbet on the two top upper rails (W) is 2⅞" wide. (This wide rabbet makes the upper door rails look like difficult pieces to cut. But they're really no different that the six "regular" rails.)

ARC ON TOP RAIL. Next, lay out and cut an arc on the bottom edge of the top upper door rails (W), see Fig. 34. Now assemble the doors checking for square.







PANELS, STOPS

To make the raised panels (Z) that fit in the lower doors, start by edge-gluing enough ¾"-thick stock to make four panels. Then cut the panels to fit in the rabbets on the back of the doors. (Don't fit them too tight. They may expand with changes in humidity.)

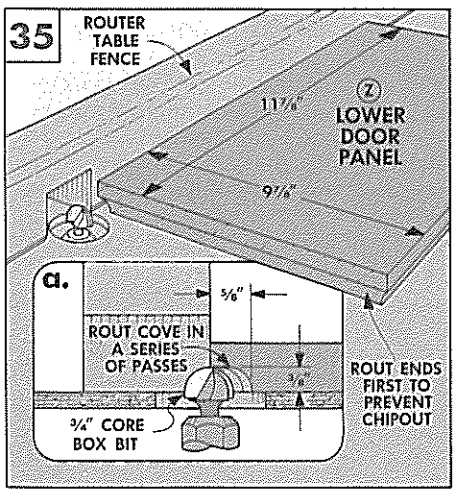
ROUT COVE. I didn't want wide-bordered raised panels in the lower doors — that would dominate the design too much. So I routed a ⅝"-wide cove around the front edge of each panel, see Fig. 35. To do this, make a series of passes (move the fence between passes) with a core box bit until the cove extends to the edge of the panel, see Fig. 35a.

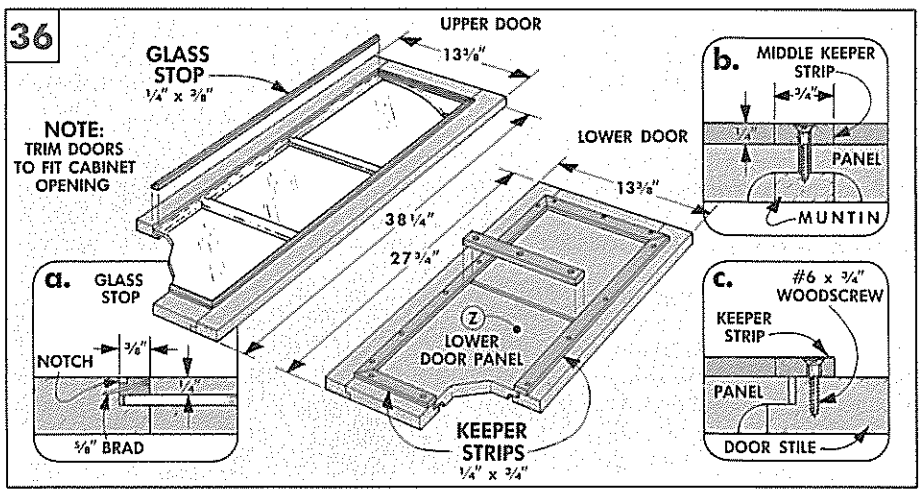
KEEPER STRIP. To hold the panels into the rabbets, I made ¼"-thick keeper strips and screwed them behind the panels, see Figs. 36b and 36c.

GLASS STOP. To hold the glass in the upper doors, I made ¼"-thick stops. Miter the stops at the corners, and then tack them to the stiles, see Fig. 36a. (Shop Note: The notch along the edge of the glass stop makes it easier to remove if the glass should break.)

HINGE MORTISES. Before mounting the glass, I cut matching hinge mortises in the door and cabinet stiles, refer to Fig. 26.

FINISH AND HARDWARE. The only thing that's left is to stain and finish the cabinet. Then mount the door catches and latch, see Exploded View on page 5.





Shop Notes

TIGHT FIT SHOULDERS

When I was cutting the tenons on the aprons for the Shaker Hall Table, I wanted them to fit without gaps. To accomplish this, I undercut the shoulders on all of the tenons, refer to photo at right.

UNDERCUT THE SHOULDERS. Undercutting is simply a matter of paring away a small amount of the end grain (1/64" or less) along the inside corners on the four shoulders of the tenon.

The trick is to undercut the *inside* corners *only*, leaving at least a 1/16" wide border on the end of the shoulder. If you don't leave a border, and cut all the way to the edge, you'll have a gap that shows and the joint will be loose.

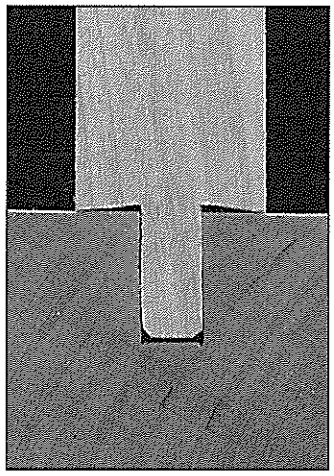
USE SHARP CHISEL. Start by lightly pushing a chisel straight into the corner (with the flat back of the chisel against the cheek of the tenon), see Fig. 1. Do this all the way around the tenon. Then, to remove the waste in the corner, angle the chisel in toward the cheek of the tenon and remove a wedge of material, see Fig. 2.

Shop Note: Besides undercutting the shoulders to get a good fit, I always cut the mortises slightly deeper than the length of the tenons. By doing this, the shoulders are going to "bottom out" before the end of the tenon hits the bottom of the mortise.

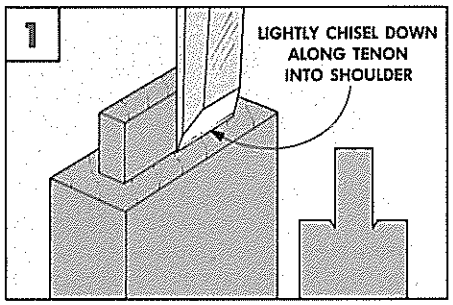
GLUE AREAS. Besides getting the tenons to fit correctly, there's also a little trick when gluing the joint.

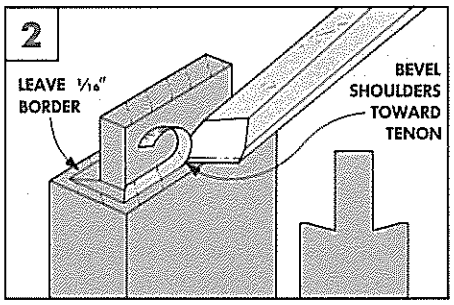
I've found that the square ends of a tenon will actually peel glue away from the inside faces of the mortise and push all the glue to the bottom.

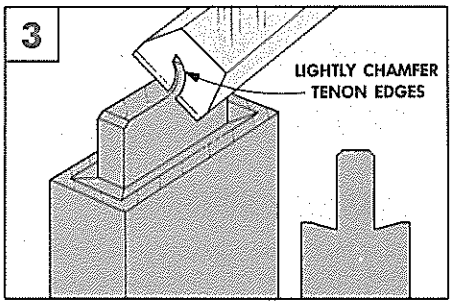
CHAMFER TENON EDGES. To prevent this, cut a slight 45° chamfer along the corners of the tenon with a chisel, see Fig. 3. It doesn't take much of a chamfer, about 1/16" wide will do.



To help get a tight joint line, undercut the shoulders. I also cut the mortise just slightly deeper than the length of the tenon.







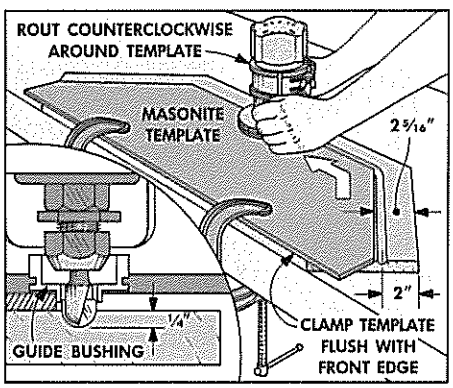
ROUTING A PLATE GROOVE

After making the adjustable shelves for the Corner Cabinet, I decided to rout what's called a "plate groove" along the back edges of two of the shelves. This groove holds plates upright to display them.

CORE BOX BIT. After some tests, I found that a 1/2" core box bit routs the best groove. When the groove is centered 2" from the back edge, it holds plates at a nice angle.

TEMPLATE. The problem was to rout a groove that turns the corners and runs along all three back edges. I did this by mounting a guide bushing attached to the base of the router and used it to follow a 1/4" Masonite template that's firmly clamped to the top of the shelf.

Shop Note: Router guide bushings fit onto the base of a router and are designed to follow a template. You can buy bushings for your specific router, or you can buy a universal base with bushings, see *Woodsmith* No. 42.



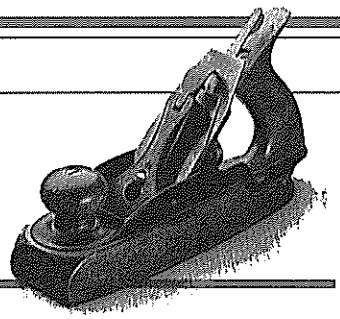
The trick when using this technique is figuring out the exact size of the template. Since I wanted the plate groove to be centered 2" from the back edge of the shelf, the template had to be cut *at least* 2" short of the back of the shelf.

But you also have to take into consideration the diameter of the guide bushing. In this case I used a guide bushing with a 5/8" outside diameter (5/16" radius). This meant I had to cut the template a total of 2 5/16" short of the back edges of the shelf.

FLUSH WITH FRONT. After making the template, I clamped it flush to the front of the shelf and 2 5/16" from the back.

ROUT THE GROOVE. Next, mount the guide bushing and core box bit in the router and lower the bit so it takes a 1/4"-deep cut.

Once everything is set up, rout in a counterclockwise direction around the template. To rout a smooth, "burn-free" groove, press the bushing up tight against the template. Make one continous pass and don't slow down while routing.

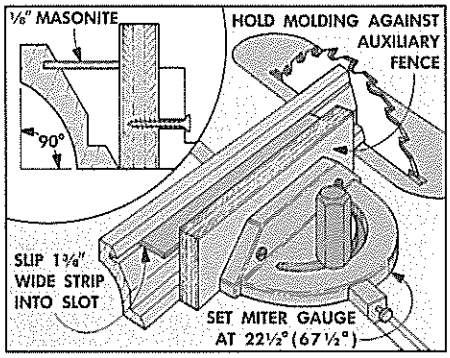


MITERING CROWN MOLDING

■ Fitting crown molding around the top of a project such as the Corner Cabinet in this issue usually means cutting a compound angle. One way to do this on a table saw is to angle the miter gauge *and* tilt the blade. These two angles are not that easy to figure out without referring to a chart.

But if the molding can be tilted to the angle it will be when attached to the project, the blade can stay at 90°, and only the miter gauge need be angled.

AUXILIARY FENCE. To do this for the Corner Cabinet, I screwed an auxiliary plywood fence to the miter gauge. The auxiliary fence has to be high enough to support the molding when it's standing up as it will appear on the Corner Cabinet, see Detail in drawing.



DOUBLE-DUTY KERF. The back of the molding for the Corner Cabinet has a ⅛" kerf cut in it. This kerf is intended to accept a spline when the top is assembled (see page 9), but I found it can be used for another purpose.

If you slip a narrow (1⅜"-wide in my case) strip of ⅛" Masonite in the kerf, and then hold the Masonite against the auxiliary fence, it helps support the molding in the correct position while it's being cut.

MAKING THE CUT. Now, to miter the crown molding for the front on the cabinet, rotate the miter gauge to 22½° (this reads 67½° on some miter gauges). Then bring the molding (with the Masonite strip in the kerf) tight against the auxiliary fence so the base of the molding is flat on the table. And make the cut.

To cut the other end of the front piece, I just moved the miter gauge to the opposite slot and turned it to the opposite 22½° setting.

One end of the side pieces of crown molding are cut the same way, but have a 90° cut on the other end.

ROUTING DOWN THE CENTER

■ When routing the mortises for the legs on the Shaker Hall Table, there are three basic steps to set up the router table: 1) setting the height of the bit, 2) centering the width of the piece, and 3) setting the length of cut.

SET BIT HEIGHT. I set the height of the bit by using a combination square, see photo. We found the combination square works best because it sits flat against the top of the router table while you set the height.

(Always set the height on the bit first. If you were to center the bit first, and then raise it, you might move the bit off center.)

CENTERING WIDTH. After the height is set, I set the fence to rout down the center of the workpiece. The method I used works well, as long as you have a scrap piece exactly the same width as the workpiece.

ROUGH CENTER. First, set the end of the scrap against the bit, and then adjust the fence to the "rough center" on the width of the piece. Now make a test cut through the scrap, see Fig. 1.

OFF CENTER AMOUNT. To see if you're off center, turn the scrap piece around and rout into the *opposite* end about 1". If the second cut touches either shoulder, you have to adjust your fence.

FINE TUNING. To find out how far off center the cut is, measure the depth of the second cut to the edge of the shoulder on the first cut. Then move the fence *half* that amount. (It's usually a pretty small distance.)

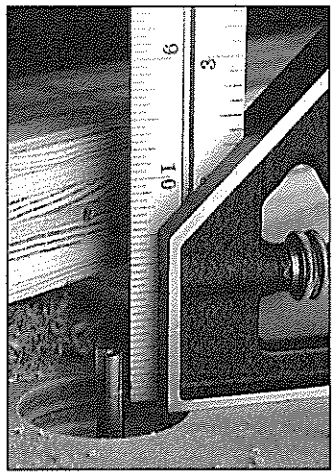
If on the second cut, the bit cuts on the *back* of the groove (away from you), move the router fence back. If it cuts on the *front* of the groove (toward you), move the fence forward.

SET CUT LENGTH. The last thing to do is to set the length of the cut with a stop block. I used the combination square again.

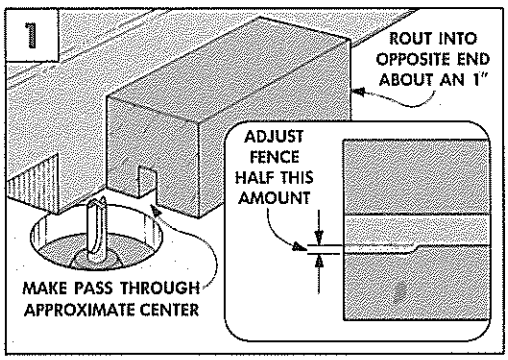
Set the ruler in the square to the right length needed. Now place the flat edge of the handle against the cutting edge of the bit, see Fig. 2.

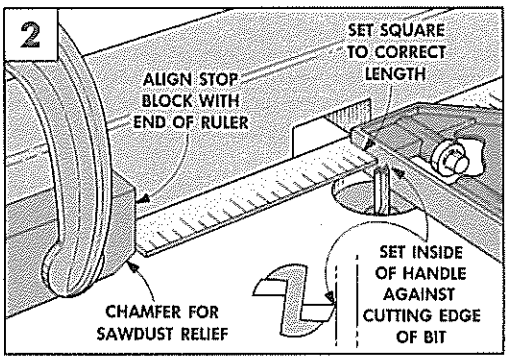
The trick here is to set the flat edge of the handle against the *cutting edge* on the bit and not against the shank.

Once set, clamp the stop block to the fence at the edge of the ruler. Make a test cut first, if it's okay, cut the mortises.



To set bit height, flush the edge of the ruler to the bottom edge of the handle. Now set ruler next to the bit, then adjust the height.





Shaker Hall Table

The Shakers are known for designing furniture with clean, uncomplicated lines. This solid cherry hall table is based on the timeless quality of Shaker design.

Traditionally, Shaker tables have tapered legs — sometimes turned (round), sometimes square. This version has legs with a square taper cut on a table saw. It's a relatively simple technique that's made even easier with a sliding platform jig (page 20). While we were at it, we also tested the technique of tapering the legs on a jointer (page 22).

The overall flow of work for this table starts by making the legs. Then the aprons and the front assembly (with the two openings for the drawers) are added to form the basic shape of the table.

All of these pieces are joined together with traditional mortise and tenon joints. If you haven't tried this type of joinery, it's not as difficult as it sounds. It can all be done on a router table (for the mortises) and on a table saw (for the tenons).

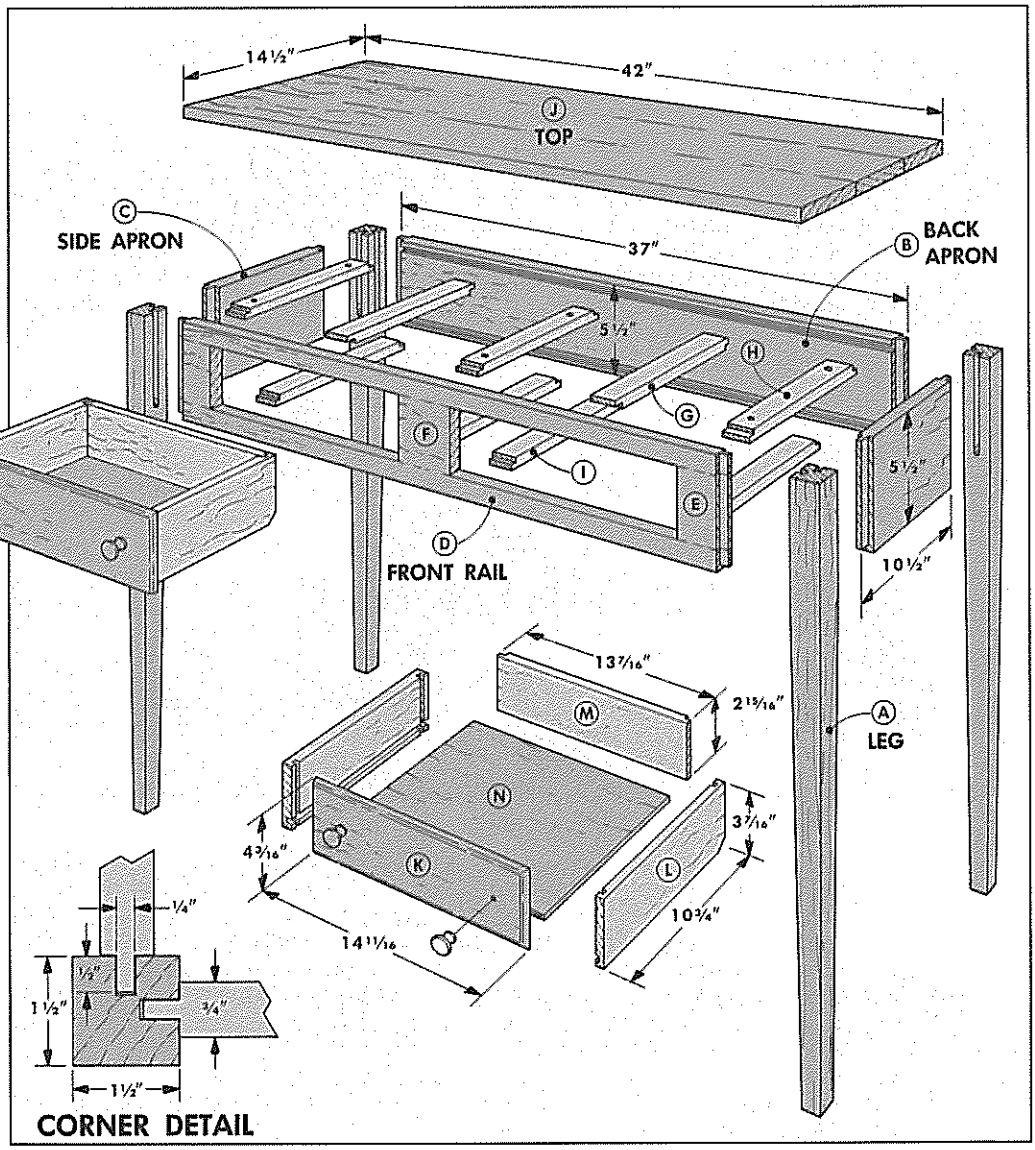
The table top is made by edge-gluing boards together to form a large blank. As with all edge-glued pieces, the selection of the stock is important. I try to match the grain patterns and the color as closely as possible. With a good match, the joint lines are almost impossible to see.

THE DRAWERS. For the drawers on this table, you have a choice of joinery: dovetails, or a locked rabbet joint. We used the locked rabbet (page 19). But if you opt for the dovetail joint, one easy method is to use a router and special jig (*Woodsmith* No. 58). By the way, the drawers are sized so routed dovetails will work out evenly.

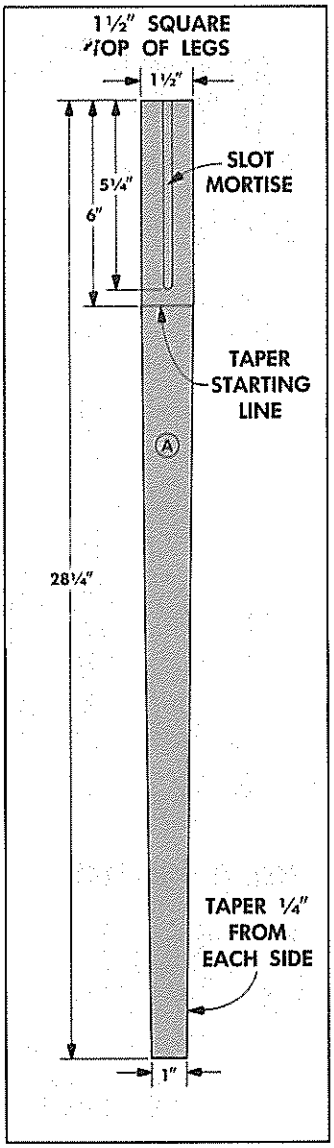
FINISH. I built this table out of cherry. One of the keys to success when finishing a project made of cherry is patience. It takes time for the wood to reach the rich red color that cherry is known for.

When it comes from the lumberyard, cherry is usually a light pink or salmon color. There's no need to stain it to get the dark color. As soon as the finish is applied, the wood will darken somewhat. With time (about six months) and continued exposure to sunlight, it will turn a rich, dark red. It's well worth the wait.

EXPLODED VIEW



THE LEGS

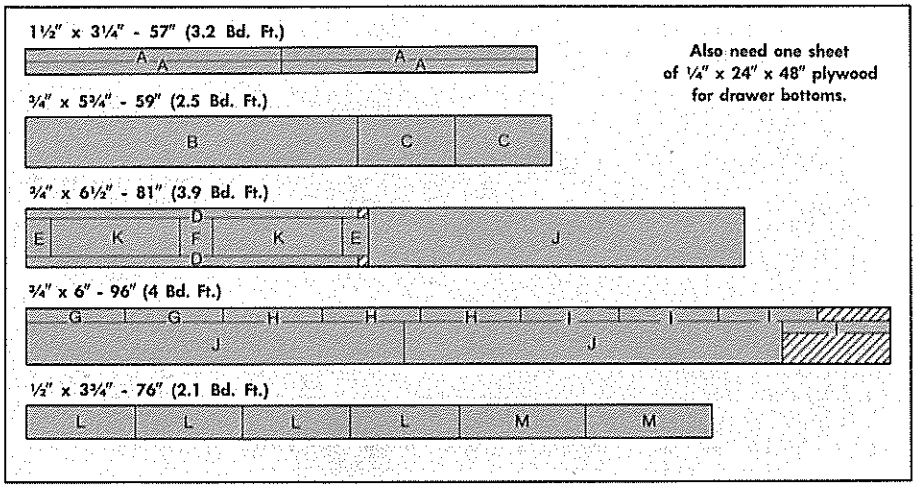


MATERIALS LIST

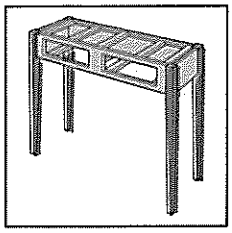
Overall Dim.: 42"W x 14½"D x 29"H

A Legs (4)	1½ x 1½ - 28¼
B Back Apron (1)	¾ x 5½ - 37
C Side Aprons (2)	¾ x 5½ - 10½
D Front Rails (2)	¾ x 1 - 37
E Front Ends (2)	¾ x 3½ - 2¾
F Front Centers (2)	¾ x 3½ - 3½
G Drawer Guides (2)	¾ x 1½ - 10¾
H Top Mounts (3)	¾ x 1½ - 10¾
I Drawer Runners (4)	¾ x 1½ - 10¾
J Top	¾ x 14½ - 42
DRAWERS	
K Fronts (2)	¾ x 4³⁄₁₆ - 14¹¹⁄₁₆
L Sides (4)	½ x 3⁷⁄₁₆ - 10¾
M Backs (2)	½ x 2¹⁵⁄₁₆ - 13⁷⁄₁₆
N Bottoms (2)	¼" Ply. 10⅝ x 13⁷⁄₁₆

CUTTING DIAGRAM



THE LEGS



This project starts by making the tapered legs. Begin by cutting four leg blanks (A) from 8/4 cherry stock (which is 1¾" thick actual). Each leg blank is then trimmed down to 1½" square, by 28¼" long, refer to the Exploded View.

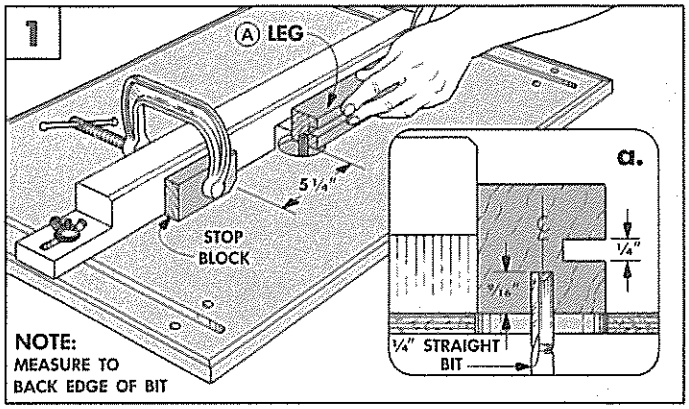
MORTISES. After cutting the legs to size, mark two adjacent sides where the mortises will be cut. (It's best to cut the mortises before tapering the legs.) The mortises are easy to cut on a router table with a ¼" straight bit, see Fig. 1a.

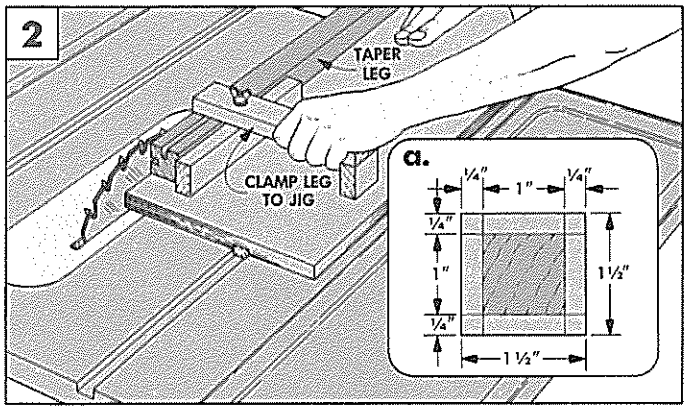
SET UP ROUTER. To set up the router table for the mortises, start by raising the bit 9/16" high. (This is 1/16" more than the length of the tenons on the aprons to allow a little glue relief at the bottom of the mortise). Then move the fence until the bit is centered on the thickness of the leg. (There are some tricks to setting up the router table, see Shop Notes, page 13.)

The length of the mortise is set by clamping a stop block to the fence 5¼" from the *right* side of the bit, see Fig. 1. Now you can cut mortises on two adjacent sides, automatically stopping the leg using the stop block.

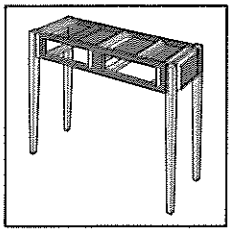
TAPER LEGS. After the mortises are routed, the next step is to taper all four sides of each leg. To cut the tapers, I used a sliding platform jig on the table saw, see Fig. 2. (This technique is shown in detail in the article on page 20. Also, the method for tapering the legs on a jointer is shown on page 22.)

Whatever method you use, the point is to cut a taper on each side of the leg that starts 6" from the top end and tapers down so the bottom end is 1" square. This means cutting ¼" off each side, see Detail in Fig. 2.





THE APRONS



After the tapers are cut on the legs, the next step is to cut the front apron assembly. This apron assembly consists of five pieces glued together to form two drawer openings, see Fig. 3. To make the front apron, start by ripping two pieces 1" wide by 37" long for the top and bottom rails (D).

To make the three dividers for this front assembly, rip a blank 3½" wide. Then cut off two end dividers (E) 2¾" long, and a center divider (F) 3½" long. (This insures that the grain will run the same direction as the top and bottom rails.)

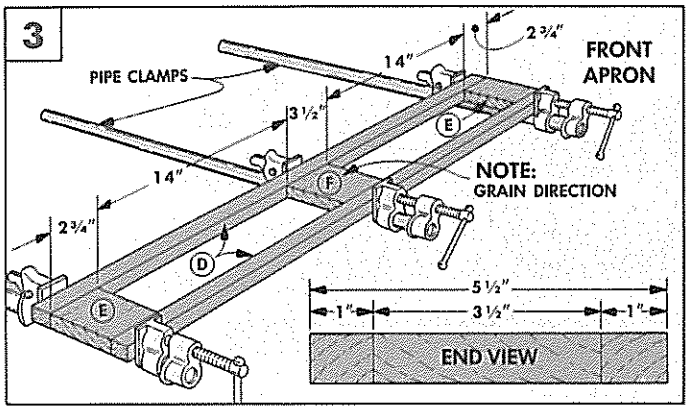
ASSEMBLE FRONT APRON. After cutting all five pieces for the front apron, glue and clamp the dividers between the top and bottom rails, see Fig. 3. Make sure the center divider (F) is centered on the length, and the end dividers (E) are flush with the ends.

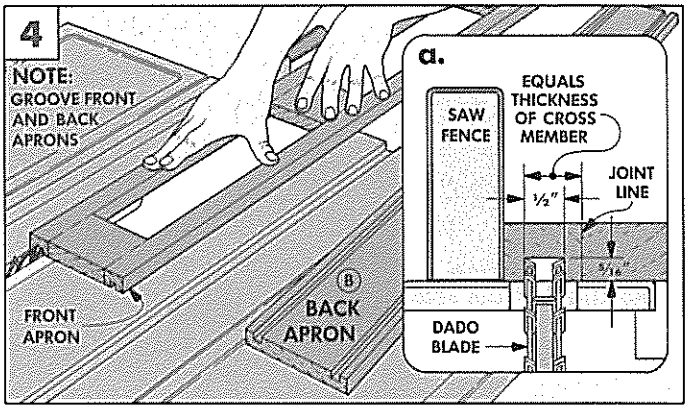
APRONS. While this assembly is drying, cut the back and side aprons. Start by ripping the stock for these pieces to a common width of 5½". Then cut the three pieces to finished lengths of 10½" for the sides, and 37" for the back. (The back apron should be exactly as wide and as long as the front assembly.)

CUT GROOVES. To support and guide the drawers, cross members (G,H,I) are mounted into ½"-wide grooves that are cut along the inside face of the front and back aprons, refer to Fig. 11.

POSITION OF GROOVE. The position of this groove is critical. It has to be cut so when the drawer runners (I) are mounted, they're flush with the bottom rail of the drawer opening, refer to Fig. 11c.

To set up the saw for this position, adjust the fence so the distance from the inside edge of the rail (the joint line shown in Fig. 4a) to the *inside edge* of the dado blade equals the thickness of the stock for the drawer runner. (This means you measure from the joint line, not the rip fence.) Then cut grooves in the front and back aprons, see Fig. 4.





THE APRONS CONTINUED

Now tenons can be cut on the ends of the aprons to fit the mortises in the legs. I cut them on the table saw, see Fig. 5.

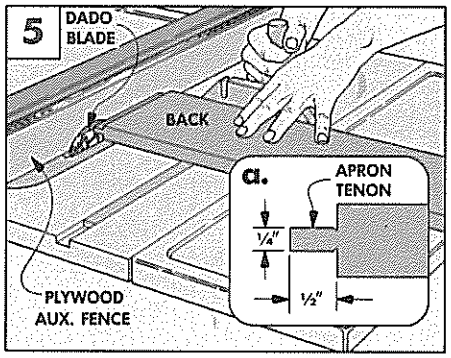
TENONS. The tenon is formed by cutting ½"-wide rabbets on both faces of the aprons. To do this, I used a ¾"-wide dado blade and moved a wooden auxiliary fence over the blade so only ½" was exposed, see Fig 5.

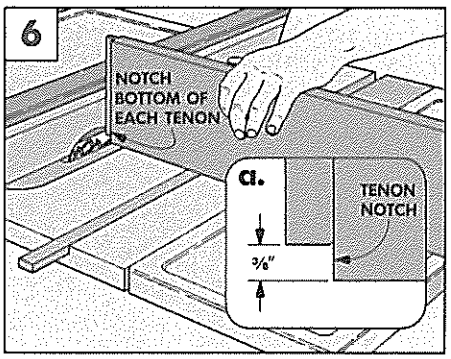
Sneak up on the final height of the blade by raising it and making a pass on both faces of a scrap piece until the tenon fits the mortise in the legs. Once set, cut rabbets on both ends of all four aprons to produce tenons centered on the thickness of the stock.

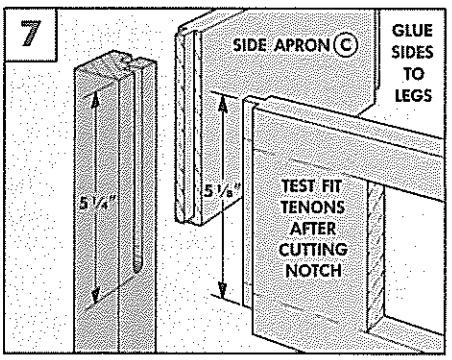
Shop Note: I undercut the shoulders of each tenon to get a tight fit against the leg. (See Shop Notes, page 12 for more on this.)

NOTCH TENONS. The bottom end of each tenon has to be notched to fit the mortise, see Fig. 7. Since the mortises are rounded on the bottom, I cut the tenon a little shorter so I didn't have to square-up the bottom of the mortise. This means cutting a ⅜" notch on the bottom of each tenon, see Fig. 6.

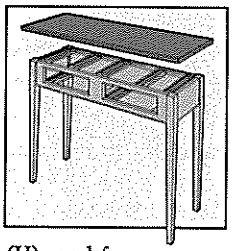
END PIECES. To make assembly easier later, I glued a pair of legs to the side aprons to produce two complete end units. But don't glue on the front or back aprons yet.







CROSS MEMBERS, TOP, AND ASSEMBLY



Next, the nine cross members are cut to fit between the front and back aprons. Two of these pieces are for the drawer guides (G), three are used to mount the top (H), and four are used for the drawer runners (I), see Fig. 10.

CUT TO SIZE. First rip enough stock 1½"-wide to make the nine pieces. Then to determine the length, dry assemble the table and measure the distance between the front and the back apron to get the *shoulder-to-shoulder* length for the cross members. Now add ½" for the two ¼"-long tenons. (Although the grooves are 5/16" deep, the tenons are only ¼" long to allow for adjusting.)

After cutting the pieces to length, form the tenons by cutting ¼"-wide by ¼"-deep rabbets at both ends, see Fig. 8.

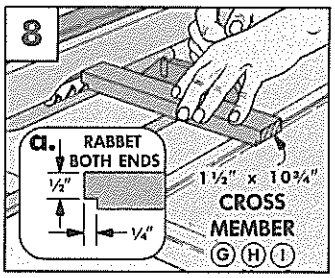
DRAWER GUIDES. The two drawer guides (G) also have a groove cut down the center, see Fig. 9. This groove guides a pin that's mounted on the back of the drawer.

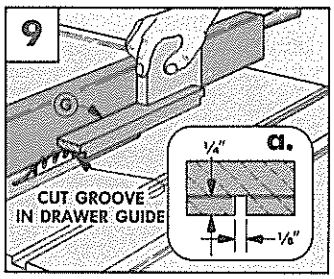
TOP MOUNTING PIECES. To allow the table top to expand and contract, I drilled oversized shank holes (⅜"-dia.) on the three top mounting pieces (H). These holes are centered on the width and drilled 1¼" from each end on all three pieces, see Fig. 11b.

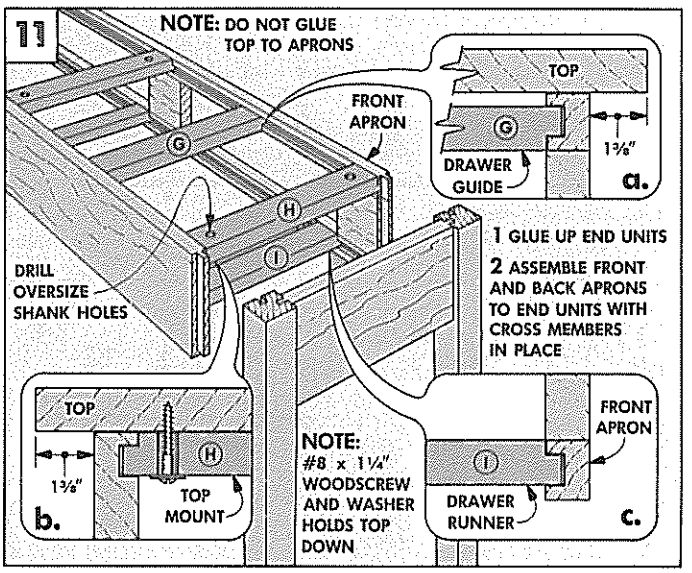
TABLE TOP. Now glue up a blank for the table top (J). Then cut this blank to final size so it overhangs the side aprons by 1⅞" and the front and back aprons by 1⅜".

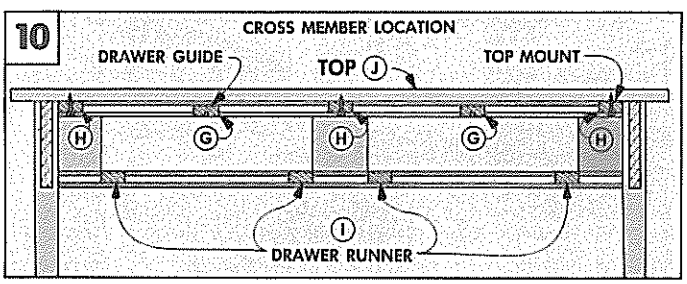
ASSEMBLY. After the parts are cut, dry-assemble the table. If everything is okay, glue and clamp the front and back aprons to the leg units — making sure the cross members are in position but *not glued* in. (Tack them in after assembly.) There's one important thing to watch. Refer to Fig. 11 to see how the rabbets on the cross members face *down* on the drawer guides (11a), but *up* on the top mount (11b), and drawer runners (11c).

TOP. Now center the table top on the aprons and screw (don't glue) it down to the mounting cleats, see Fig. 11b.









THE DRAWERS

The first step in making the drawers is to cut the pieces for each drawer to size.

FRONTS. The drawer fronts (K) are cut from ¾"-thick stock. The length of the front is 1 1/16" more than the width of the drawer opening. This 1 1/16" measurement allows a ⅜" lip on both ends (¾" total), *minus* 1/16" for clearance. As for the height of the drawer front, measure the height of the opening, add ¾" for the lips, and subtract 1/16" for clearance.

SIDES. The sides (L) are cut from ½"-thick stock. Cut them to width (height) to match the height of the drawer opening, minus 1/16" for clearance. As for the length of the sides, measure the depth of the table (from the front of the drawer opening to the back apron). Then subtract about ¼" from this measurement.

THE BACK. The back (M) is cut to rough width to match the drawer sides and to rough length to match the drawer front. (It's trimmed to final size after the joint is cut.)

LOCKED RABBET JOINT. After cutting the pieces to size, rabbets are cut on the top and bottom edges of the drawer front to form lips, refer to Step 1 on the next page.

Then the locked rabbet joint can be cut on the ends of the drawer front. This procedure is shown in Steps 2 and 3 on the next page.

DRAWER SIDES. After cutting the tongue on the drawer front, the companion dado is cut in the drawer sides to complete the joint, refer to Step 4 on the next page.

DRAWER BACK. A variation of this joint is used to join the drawer back to the sides. First, trim the back to final length. To get this length, measure the distance from *end to end* of the tongues on the drawer front and cut the back to equal this measurement.

To cut a locked rabbet joint to join the back to the sides, first cut a rabbet on both ends of the back to leave ⅛"-thick tongues, see Fig. 13. Then cut a ⅛"-wide dado in the drawer sides to accept this tongue.

DRAWER BOTTOM. Before assembling the drawer, cut a groove for the plywood bottom (N). This groove is located ¼" up from the bottom edge *of the lip* on the drawer front, see Fig. 14. On the drawer sides, it's ¼" from the bottom edge, see Fig. 15.

After the grooves are cut, dry assemble the drawer and cut the drawer bottom to fit. Then trim the back to width so it rests *on top* of the plywood bottom.

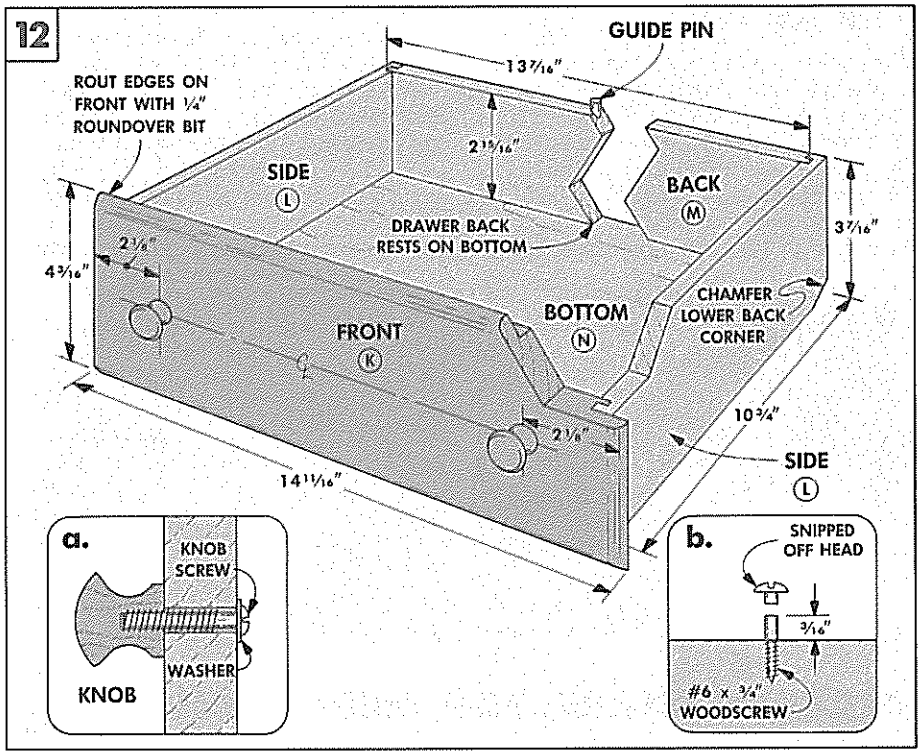
All the basic parts for the drawer are cut, but there are a few details to take care of.

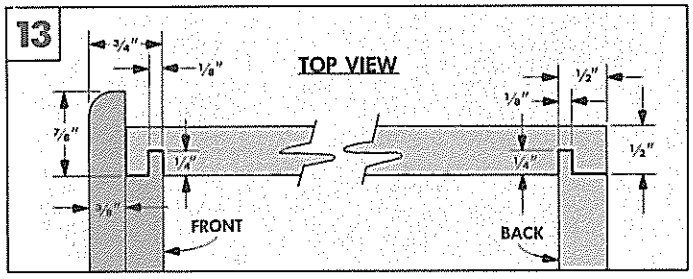
ROUND OVER EDGES. First, round over the front edges of the drawer front with a ¼" round-over bit, see Fig. 13. Now glue the drawer together, making sure it's square.

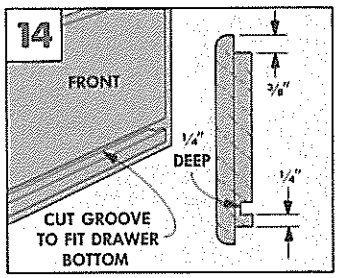
GUIDE PIN. When the glue is dry, I added a guide pin on the top edge of the back, see Fig. 12b. This pin is a No. 6 x ¾" brass screw that's screwed part way into the back. Then cut off the head to leave a guide pin.

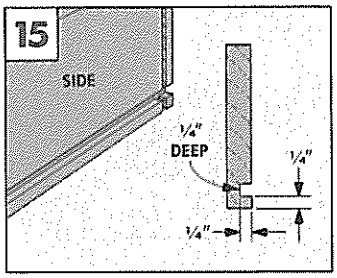
One other detail is to cut a slight chamfer on the back edge of the drawer so it can be tilted into the opening, see Fig. 16a.

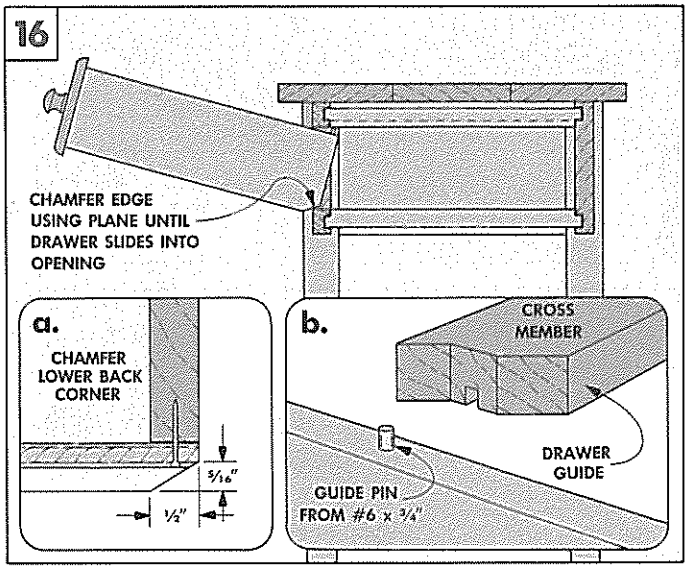
KNOB. Finally, I drilled ¼" holes 2⅛" from each end of the drawer front and mounted two knobs to each drawer, see Fig. 12a.



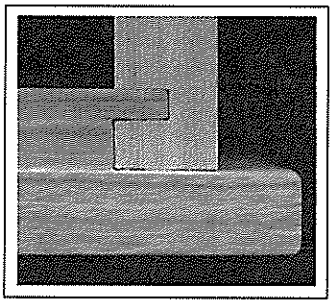








Locked Rabbet Joint



There are probably a dozen joints that can be used to join the four corners of a drawer. One of the easiest (and strongest) is a locked rabbet. It doesn't require any fancy equipment — all that's needed is a table saw and a combination blade.

The version of the joint shown here is for a drawer that has a lipped edge all the way around the drawer front.

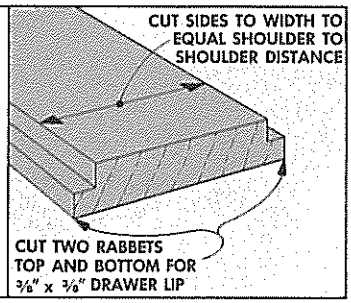
RABBETS. The first step is to cut rabbets (lips) on the top and bottom edges of the drawer front, see Step 1.

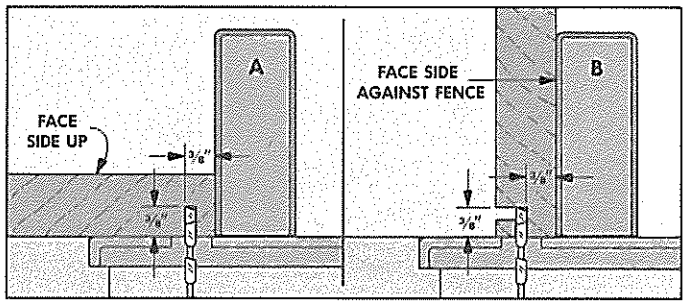
TONGUE. Then a tongue is cut on both ends of the drawer front. When cutting this tongue, stand the drawer front on end and cut a groove on the end of the stock, see Step 2. Then widen it to leave a ⅛"-wide tongue. (The ⅛" thickness of the tongue is based on the width of the kerf left by the saw blade.)

The tongue is completed by trimming it to a length of ¼", see Step 3.

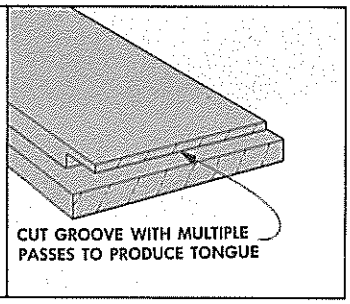
DADO. To complete the other half of the joint, a ⅛"-wide dado is cut on the inside face of the drawer side, see Step 4.

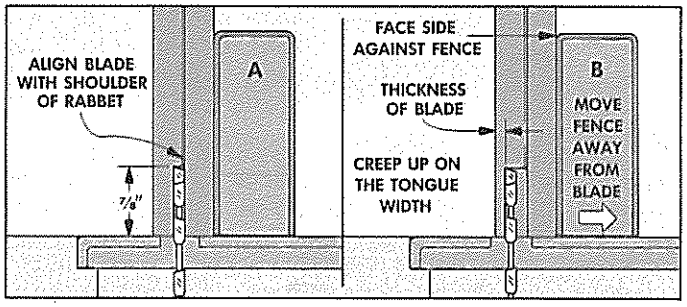
1 *After cutting the drawer front to width and length, cut the lips (rabbets) on the top and bottom edges. Set the blade ⅜" high and adjust the fence ⅜" from the outside of the blade. To complete rabbet, set fence ⅜" from inside of blade and adjust blade height to match the first cut.*



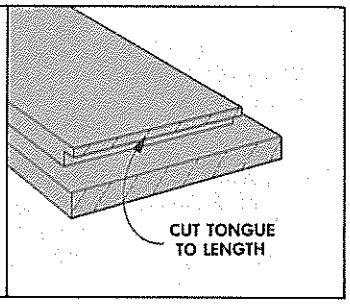


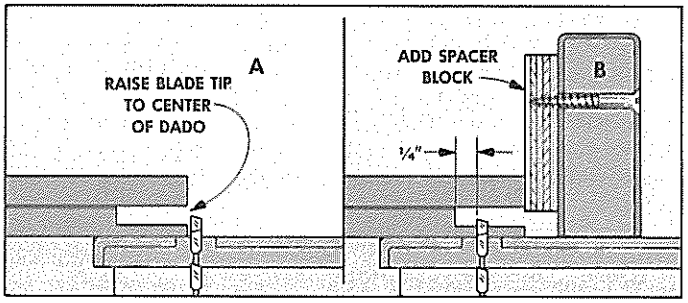
2 *To cut the tongue, set the blade height to ⅞" to account for the thickness of the side (½") plus the lip (⅜"). Then move fence so the inside of blade is on shoulder of the rabbet. Make the first cut, and then move fence away from the blade to leave a tongue the same width as the blade.*



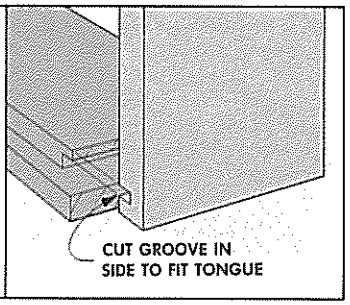


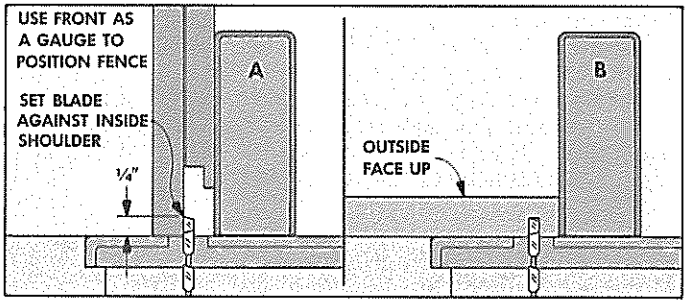
3 *To complete the tongue, raise the blade so it clears the tongue. Then cut the tongue to length by clamping a spacer to the fence so it rides against the lip. (This prevents kickback of the waste piece when tongue is cut.) Now, adjust the fence to leave a tongue that is ¼" long.*





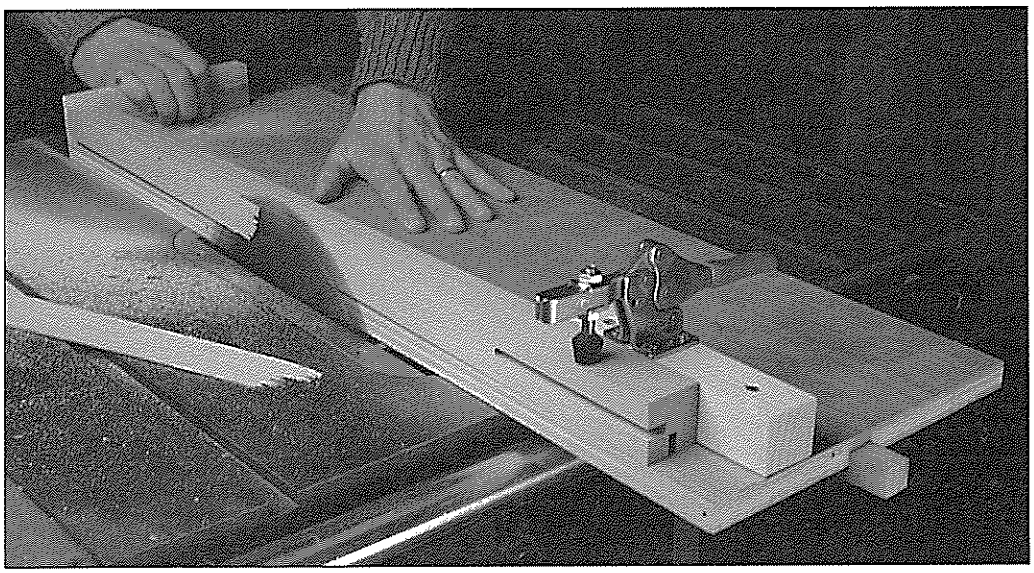
4 *To complete the joint, a dado is cut in the drawer side. To align this cut, use the drawer front as a gauge. Raise the blade to a height equal to the length of the tongue (¼"). Then push the end of the side piece against the fence and use the miter gauge to cut the dado across the side.*





Tapered Legs

There are several ways to taper legs. One of the methods we like best is using a sliding platform on a table saw. It holds the leg securely and sets the angle for all four sides automatically.



One of the most common ways to taper legs is with a jig that has two arms hinged at one end, see the inset drawing below right. Although this jig works okay, I've always found it a little unsettling to use.

It doesn't hold the workpiece (leg) very well — so you wind up in an awkward position trying to hold the workpiece tight against the jig, while at the same time trying to push it through the saw blade.

You also have the problem of changing the angle of the jig's arms. That is, the first two sides of the leg are cut at one angle. Then the angle of the arms has to be doubled to cut the other two sides.

SLIDING PLATFORM

Considering the difficulty of using this jig, we wanted to come up with a new method. The jig we settled on is a sliding platform for a table saw. This platform solves the problem of holding the workpiece securely.

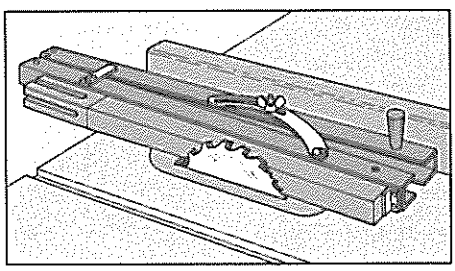
INDEXING METHOD. We also came up with a way to index the four tapered cuts on each side of the leg. The theory behind this procedure is to work around the centerpoint on the end of the leg.

To do this, draw lines on the bottom of the leg, connecting opposite corners, see Step 4. At the point where the lines cross (the centerpoint of the leg) drill a ¼"-dia. hole with a brad point bit and push in a ¼" dowel.

END FENCE. When the leg is mounted to the jig, this dowel slides into a hole in the end fence on the jig, see Step 5. One of the initial problems we had was getting the hole in the fence in exactly the right position. Then we discovered a trick — actually two tricks.

To make the end fence, cut it to width (height) to match the thickness of the leg. Then draw out the same "X" pattern on the face of the fence, see Detail in Step 3. (This duplicates the pattern on the end of the leg.) Now drill a ¼" hole at the crosspoint.

The second trick has to do with mounting the fence to the platform. In order to get a ¼" taper on each side of the leg, the centerpoint on the end fence has to be shifted ¼" closer to the edge of the sliding platform (the path of the blade). So all you do is shift the whole end fence so it extends ¼" over the edge of the platform, see Step 3.

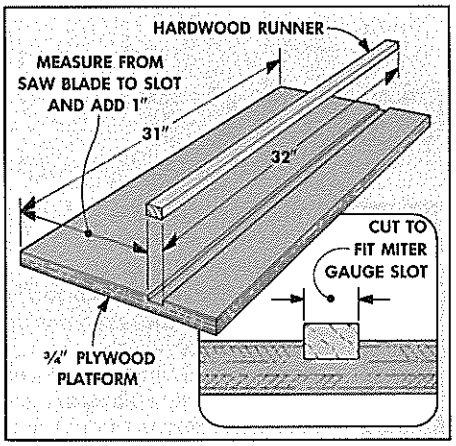


SIDE FENCE. There's another fence mounted on the platform to hold the top end of the leg. To position this fence, draw a line on the leg to indicate the starting point of the taper. (For the Shaker Hall Table, this is 6" down from the top end.)

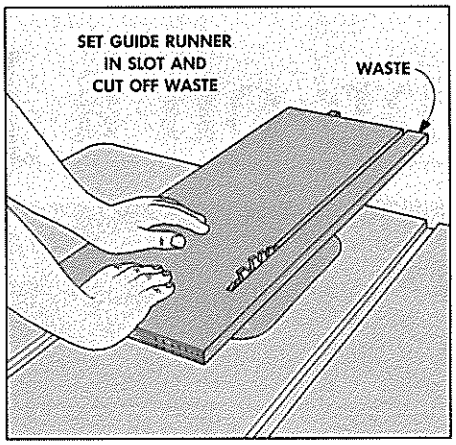
Place the leg on the platform with the dowel (in the bottom end) mounted in the end fence, see Step 5. Then position the taper start line (near the top end of the leg) on the edge of the platform, see Step 6. Now draw a line along the back edge of the leg to indicate the position of the side fence. Then screw the fence to the platform, see Step 7.

HOLD DOWN. To complete the jig, I added a hold-down clamp. You can make this hold down with a few scraps of wood, as shown in Step 8. However, I like the ease of using a quick-release clamp, as shown in the photo above. (See Sources, page 24.)

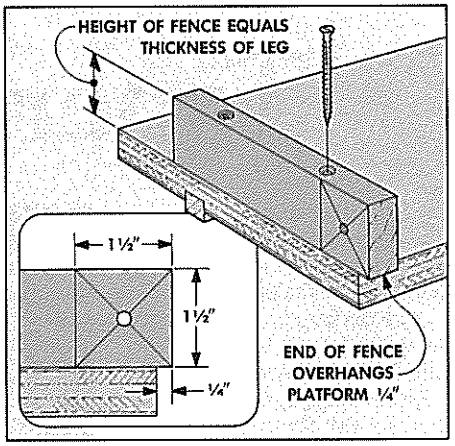
PROCEDURE. To cut the tapers on the leg, mount the leg on the platform and push it through the blade, see Step 9. Then loosen the clamp, rotate the leg, and cut the next side. There's no need to change the angle because you're working off the centerpoint on the end of the leg. It will automatically cut four even tapers on each side of the leg.



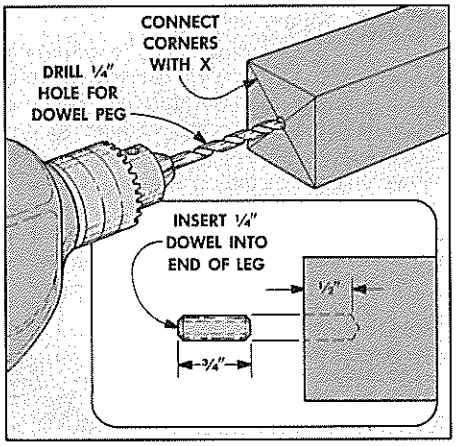
1 *The sliding platform is a piece of plywood about 9" wide by 31" long. Cut a groove to hold a strip that fits in the miter gauge slot on your table saw.*



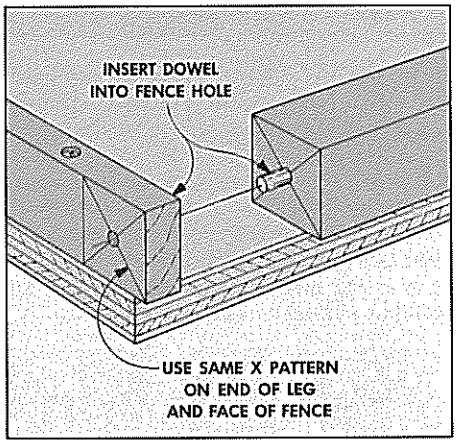
2 *Place the platform on the table saw and cut off the edge. This way you know the edge of the platform is exactly in line with the cutting path of the blade.*



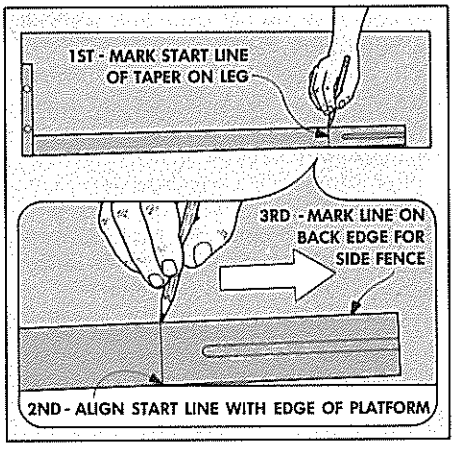
3 *Rip the end fence to same height as leg. At one end of fence, draw an "X" and drill a ¼" hole at crosspoint. Screw down fence so it overhangs edge by ¼".*



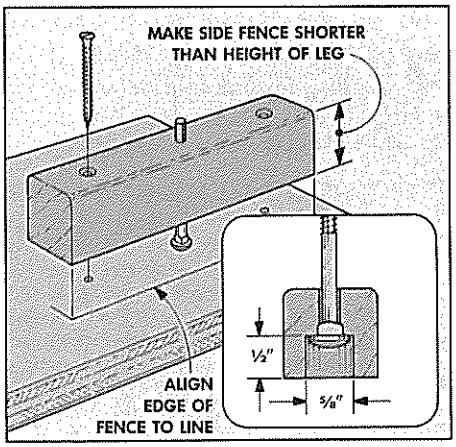
4 *To find the center of the leg, draw an "X" on the bottom end of the leg (connecting the corners). Then drill a ¼" hole at the crosspoint for a ¼"-dia. dowel.*



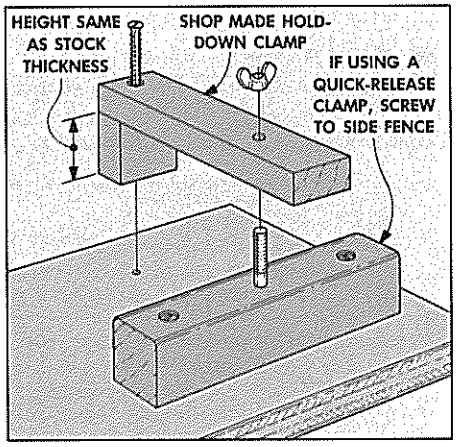
5 *Insert a ¼"-dia. dowel in the end of the leg. (It can be trimmed flush later to plug the hole.) Then insert the other end of the dowel into the hole in the end fence.*



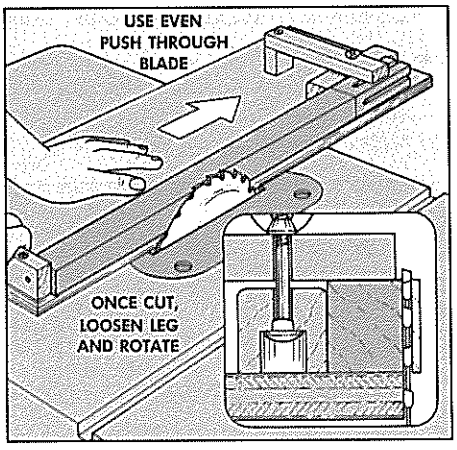
6 *To position the side fence, mark a line on the leg where the taper starts. Place this line on the edge of platform. Then mark the back edge on the platform.*



7 *Cut the side fence so it's shorter than height of leg, then screw it to the platform. For a shop-made hold down (next step), add a carriage bolt from the bottom.*



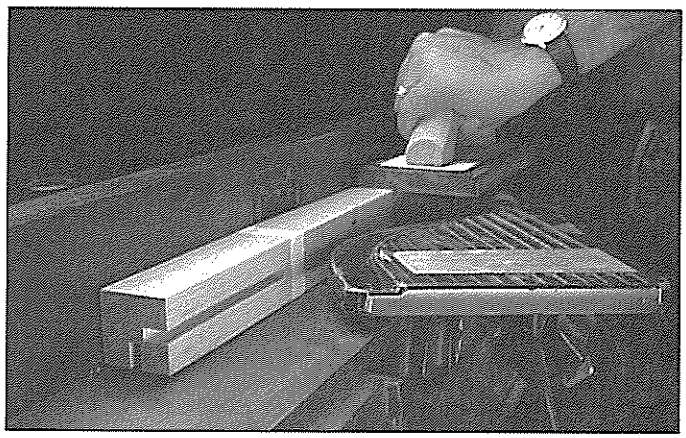
8 *This is a simple way to make a hold-down. Use scrap pieces to form an arm. If a quick-release clamp is used (see photo), the fence should be 1½" wide.*



9 *To cut the tapers, push the sliding platform past the saw blade. Then loosen the hold down and rotate the leg to cut tapers on the other three sides.*

Tapering on a Jointer

If you have a jointer, tapering a leg is a snap. There are just two steps: 1) set the depth of cut, and 2) make the cuts.



DEPTH OF CUT. If you want to taper the legs ¼" on each side, and your jointer will make a ⅛" depth of cut, the process is easy. Just set the depth of cut to ⅛" (see Step 1), and then make two passes on each side of the leg.

OTHER TAPERS. For other tapers, divide the total amount of taper you want (at the bottom of the leg) by the number of cuts you want to make (allowing for the maximum depth of your jointer). For example, if you want to taper the sides of a leg so the bottom is 3⁄16" less on each side, set the jointer to a 3⁄32" depth of cut and make two passes on each side of the leg.

PROCEDURE. The basic procedure begins by marking a line where the taper starts. Then turn on the jointer and carefully lay the leg down so the start line is right on the front edge of the outfeed table, see Step 5.

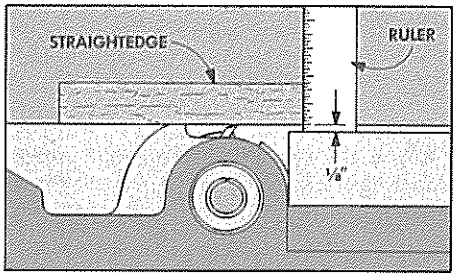
Be careful here. You have to move the guard out of the way to lower the leg. Practice with the motor off to get the feel of lowering the leg with your hands out of the way.

Although the procedure is easy, there are a couple problems you can run into. Since the jointer knife (blade) starts cutting about ½" in front of the edge of the outfeed table, the taper won't start exactly on the line. This is okay because it allows a little room for sanding without crossing over the line.

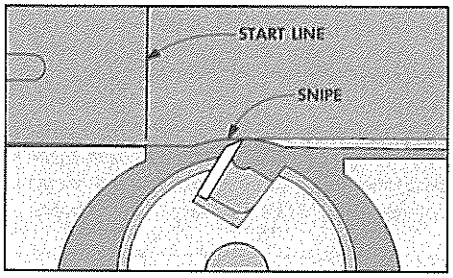
ELIMINATING SNIPE. Another problem you run into when tapering on a jointer is *snipe*. Snipe is the indentation that's usually seen at the beginning or end of a jointed board.

Typically, a snipe is caused when the jointer knives are set too high in relation to the outfeed table. But even if your jointer is set up exactly right, you can still have a little snipe appear at the beginning of a taper cut because the leg is angled as it's lowered onto the jointer, see Step 2.

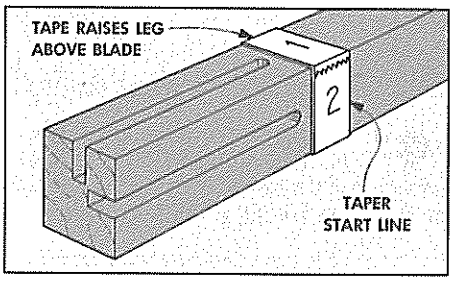
The easiest way to eliminate this problem is to wrap two layers of masking tape around the leg at the start line, see Step 3. This raises the leg just enough so the jointer knife doesn't make contact as the leg is lowered onto the table. As the leg is moved forward, the cut starts without making a snipe, see Step 4. (The masking tape is also handy for numbering the sides of the leg to help you keep track of the cutting sequence, see Step 3.)



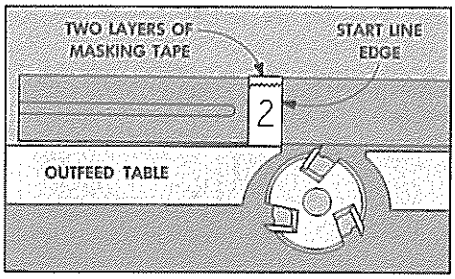
1 *To make a ¼" taper on each side of a leg, place a straightedge on the jointer's outfeed table and a ruler to adjust the infeed table to make a ⅛"-deep cut.*



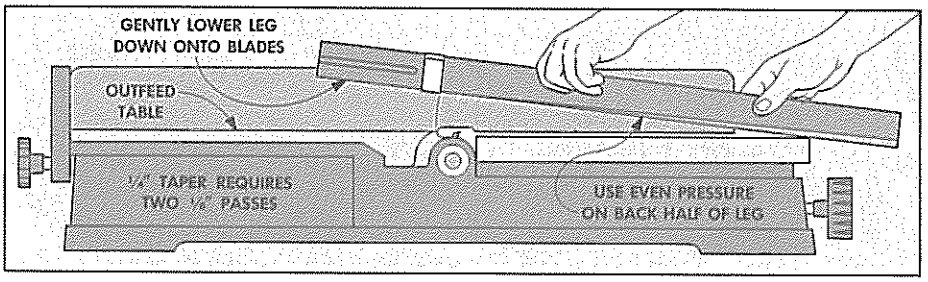
2 *Since the leg is angled when it's placed on the jointer, the knife (blade) will cut a shallow indentation, called snipe. (Snipe is exaggerated for clarity.)*



3 *To avoid snipe, wrap two layers of masking tape around the leg, aligning edge of tape with the start line on the leg. Mark the sides for cutting sequence.*



4 *By wrapping masking tape at the start line, it will raise the leg just slightly above the knife (blade) so it doesn't cause a snipe at the beginning of the cut.*



5 *Carefully lower leg onto the jointer so the edge of tape (start line) aligns with front edge of the outfeed table. Now push leg forward, making a complete pass. This first pass creates a taper on the side of the leg and removes ⅛" by the time it gets to the bottom of the leg. A second pass is needed to create a full ¼" taper at the bottom.*

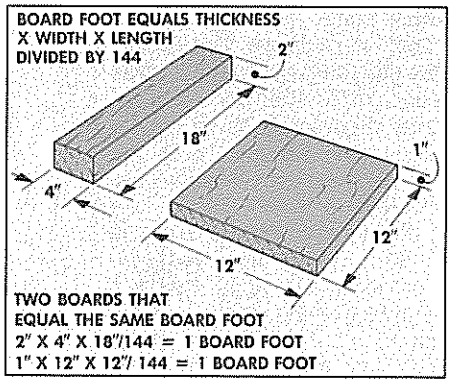
Talking Shop

BOARD FEET

There's something new on the cutting diagrams in this issue. We've added the amount of board feet per board so you can calculate the cost of the wood for the entire project.

COST OF WOOD. The price of hardwoods (and some higher grade softwoods) is usually calculated in dollars per board foot. So you have to know the number of board feet to determine the total cost.

A board foot is a volume measurement that includes thickness and width as well as length. The easiest way to visualize *one board foot* is as the amount in a piece that's 1" thick, 12" wide, and 12" long. But there's also one board foot in a piece that's 2" thick, 4" wide and 18" long, see the drawing.



CALCULATIONS. To determine the board feet in a piece of lumber, start by measuring the piece in inches (not feet), and convert the fractions to the next inch. For example, 6½" becomes 7", and 5 feet 4⅜" becomes 65".

In figuring board feet, anything less than 1" in *thickness* is figured at the full rough dimension. (¾"-thick or 13/16"-thick lumber is figured as 1" thick.)

After determining the dimensions, multiply the thickness of the piece times the width times the length. Then divide by 144.

For example, the first board shown on the cutting diagram for the Corner Cabinet (page 5) is ¾" thick, 9¼" wide, and 96" long. To determine the board feet, multiply 1 x 10 x 96 = 960. Then divide 960 by 144 = 6.67 (or 6⅔) board feet.

COSTS. Once you know the total number of board feet, multiply that number times the cost per board foot to get the total cost. The Corner Cabinet, for example, uses about 70 board feet of stock. Our dealer charged $2.40 per board foot (for "C and Better") pine. So the total cost for the Ponderosa pine for this project is about $168.

THICKER WOOD. Also be aware that thicker stock, such as the 1¾"-thick stock used for the legs on the Shaker Hall Table may cost more per board foot. So you have to calculate the board feet of ¾" stock separately from the board feet of the 1¾" stock. Then multiply each number by the cost per board foot.

IDEAL AND REAL. There's one other thing. The cutting diagrams that we show in *Woodsmith* are "ideal" situations. They assume the boards are of uniform width and all of the pieces fit neatly on the board.

But that's rarely the case when buying wood. Select the boards you want, and determine the number of board feet in them. Then add 15% to 20% *extra* for defects and any problems fitting pieces on the boards.

DRAWER SIDES

I am planning to build the seven-drawer Lingerie Dresser shown in Woodsmith *No. 53. You mentioned that you used cherry for the main parts, but what type of wood did you use for the drawer sides? Using cherry for all parts of the drawers would get expensive.*

George Di Giulio
Sonoma, California

We used yellow poplar for the drawer sides and backs on the lingerie dresser. Poplar is light, but reasonably strong. It is easy to work, has little odor, and is reasonably inexpensive. It's also fairly warp and knot-free.

YELLOW POPLAR. Though it's correctly called "yellow" poplar, the sapwood is usually a creamy white color. The heartwood can be tan or greenish-brown, but may contain streaks of purple, black, and yellow. It's the creamy white sapwood that I look for when building drawers. It makes the drawers look clean on the inside and, if a darker drawer front (cherry or walnut) is dovetailed to the sides, the contrast highlights the joint.

OTHER CHOICES. Sometimes, I do use other woods. If there aren't many sizeable drawers in a project, you can often cut the drawers from the scrap stock left over from building the project.

Using left-over stock for drawer sides is a good way to use a piece with a knot that you wouldn't want on the outside of a project, but would be acceptable on the inside. Don't try to save money, though, by using a *warped* piece for a drawer side. The drawer will be out-of-square and bind in the cabinet.

I also wouldn't use poplar for drawers that will have to stand up to a lot of abuse or are held into a cabinet with metal drawer slides. Poplar dents easily and doesn't hold screws well. On a kitchen drawer, for example, I would use a harder wood such as maple, birch, or oak.

STATEMENT OF OWNERSHIP, MANAGEMENT AND CIRCULATION
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F. Copies not distributed		
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2. Returns from news agents	240	331
G. Total	276,122	271,202

11. I certify that the statements made by me above are correct and complete.
(signed) Donald B. Peschke, Publisher/Editor

Sources

CORNER CABINET

Woodsmith Project Supplies is offering all of the hardware needed to build the Corner Cabinet featured on page 4.

Corner Cabinet Hardware

761-400 Corner Cabinet Hardware Package
- (8) Solid Brass Hinges with Screws
- (4) Adjustable Brass Ball Door Catches with Screws
- (12) Pin Type Shelf Supports
- (2) Brass Door Latches with Screws

TAPER JIG CLAMP

The quick–release hold–down clamp shown on page 20 is one we have found useful on many types of jigs.

These clamps are available in a variety of types and sizes. There are different shapes and sizes that can be used to clamp horizontally and vertically.

Quick–release clamps are available from the Mail Order Sources listed below. They may also be available at local hardware stores.

SHAKER HALL TABLE

The hardware needed to build the Shaker Hall Table featured on page 14 is available from the Mail Order Sources listed below. These items may also be available at local hardware stores or craft supply stores.

FINISH

Usually we don't stain cherry. If you're patient, it ages to a deep, rich patina. But if you can't wait, you can stain the wood. But some stains are better for cherry than others.

One problem with staining cherry is that it can absorb stain unevenly. This causes a blotchy appearance and uneven color. One of the easiest ways to combat this problem is by using a gel stain.

Gel stains are thicker than other stains (about the consistency of pudding). This means the end grain can't soak it up as quickly. The stain doesn't penetrate the wood as deeply, but it penetrates more evenly. The result is a consistent color and less blotching.

The key to staining cherry is finding a stain that would be close in color to "aged" cherry. I found a product available in art supply, craft, and hobby stores that does as good a job as any I've seen. It's called Liquitex Wood Stain. This is a water–based gel stain.

ROUTER BITS FOR PROJECTS

The router bits used to build the projects in this issue are available from the Mail Order Sources listed below.

WOODSMITH PROJECT SUPPLIES

BY PHONE

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

Before calling, please have your VISA, MasterCard, or Discover Card ready.

1-800-444-7527

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

MAIL ORDER SOURCES

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

Woodcraft
800–225–1153
Cabinet Hardware, Hold–Down Clamps, Table Hardware, Gel Finishes, Router Bits

The Woodworker's' Store
800-279-4441
Cabinet Hardware, Hold–Down Clamps, Table Hardware, Gel Finishes, Router Bits

Woodworker's Supply
800–645–9292
Cabinet Hardware, Hold–Down Clamps, Table Hardware, Gel Finishes, Router Bits

Cherry Tree Toys
800–848–4363
Table Hardware