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Thanks again,

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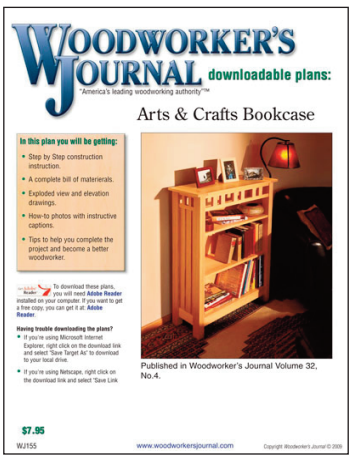

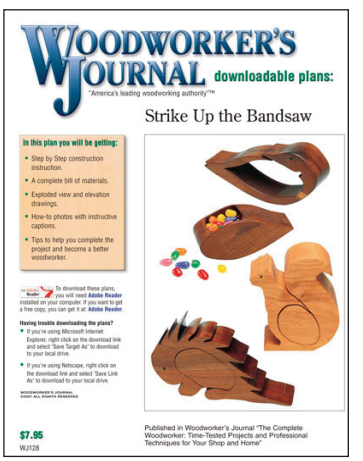

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Arts & Crafts Bookcase

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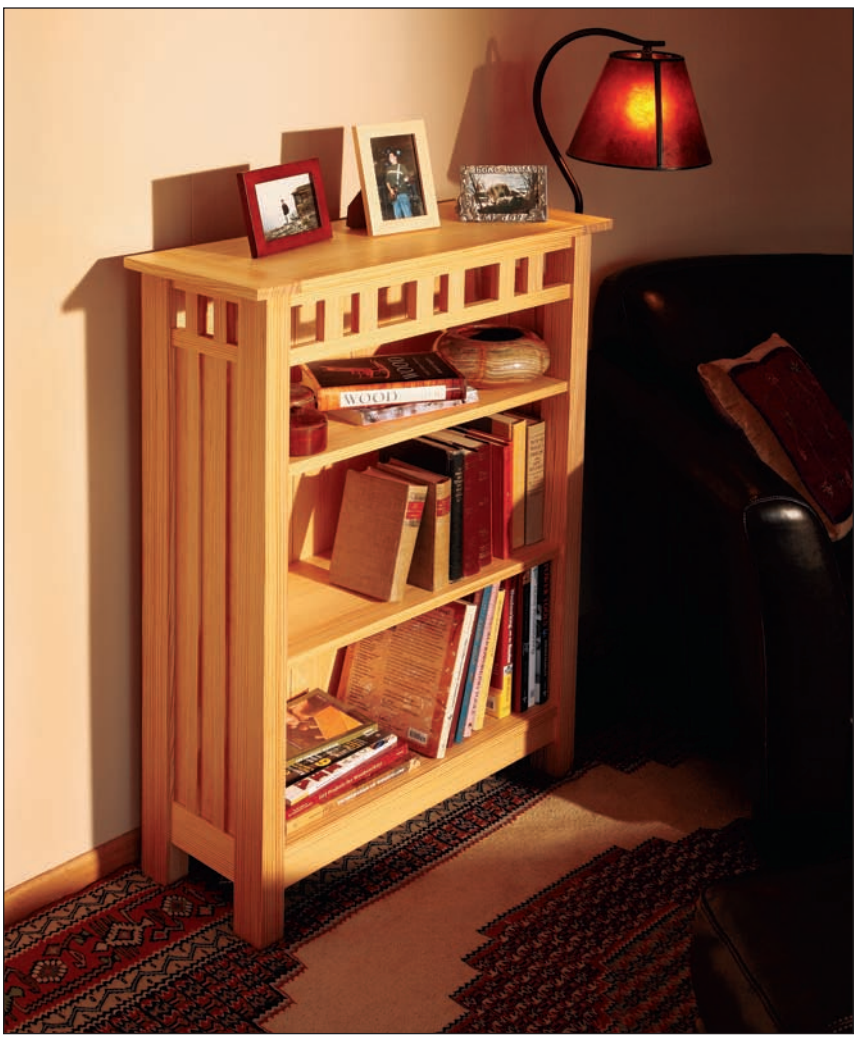

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ARTS & CRAFTS BOOKCASE

By Frank Grant

With its exceptionally long and straight-grained appearance, quartersawn longleaf pine lumber was a perfect selection for this Arts & Crafts inspired bookcase.

I love pine ... its smell, workability, luster; there's a feel to the wood that's hard for me to describe. As a kid growing up in far northern Minnesota, we had a huge white pine in the yard, the tallest tree for miles. Until I saw a real redwood, I couldn't imagine a bigger tree on the planet. It was the first tree I ever hugged, and it wasn't the last, either. The longleaf pine lumber in this bookcase is a bit different, somewhat like red pine but denser and heavier, with a workability similar to Eastern slope Douglas fir. Not the wood you want to do acanthus carving on, but perfect for furniture if you like simple lines with warm tones, lots of luster and straight grain.

I built this project using a combination of hand and power tools as well as Rob Johnstone's new Festool Domino® loose-tenon joinery system. I'll admit to being a bit of a snob when it comes to my joinery methods, but I came away impressed with the Domino Joiner's quality and ease of operation. If you don't own a Domino Joiner, you could use dowels instead to build this bookcase.

Prototyping and Selecting Stock

Prior to even picking lumber, I put together a full-scale MDF prototype. It gives you an ideal chance to figure out what you're trying to create before you start cutting into the good wood. I decided that a simple Craftsman-style design would lend itself well here, and breadboard ends would be a nice decorative touch for the top.

Once I was satisfied with the design, I selected nice 3/4" quartersawn stock from Rob's longleaf stash. One thing about longleaf's straight, parallel grain is that it's easy to lose the details in all those psychedelic grain lines, and the tangentially sawn surfaces have a tendency to look like grain patterns you see in CDX plywood — not the effect I wanted. So, I recommend choosing stock carefully for each of the project parts. For the top and shelving, choose boards with an attractive leading edge grain. On the other parts, find stock with grain angled in relation to the vertical by 20° or so.

Starting with the Posts

Notice in the left *photo* (below) that the bookcase posts are actually three face-glued strips of 3/4" stock with a fourth strip that serves as veneer to cap the "show" edge. I did this to achieve a wraparound quartersawn grain pattern on the three visible sides of each post and hide the glue lines. To make them, glue up four blanks for your posts (pieces 1), with one of the outer pieces on each blank chosen to resaw for the thin veneer cap. Square up your post blanks on the jointer, and resaw

The author created a seamless quartersawn appearance on the show faces of the legs (above left). To do this, he glued up three pieces of lumber, then sliced a 1/4" piece off one face (below). That slice was glued onto the front face of the leg and trimmed flush with a bearing-guided flush-trimming bit (above right).

STRATEGIZING THE MULTI-PANEL BOOKCASE SIDES

them to a thickness of $1^{13}/_{16}$". The offcut should give you a nearly 1/4"-thick veneer piece for each post. Glue the veneer in place and trim off the overhang with a router and piloted flush-trimming bit.

Building the Side Assemblies

Building the bookcase side assemblies is an involved part of this project, but they're not really too tough. You'll see in the *Drawings* on the next page that the top areas of the sides are made up of pairs of short, decorative rails and stiles. The lower areas are filled with two long, grooved stiles that capture three thin side slats. The rails and stiles attach to one another and to the posts with Domino tenons. Follow the *Material List* to make all those rails and stiles (pieces 2 through 5) now.

As I worked through the initial design, I realized that the bottom side stiles would end up flush with the mating rails, so I decided to reduce their thickness to 5/8" to add visual interest and create more shadow lines.

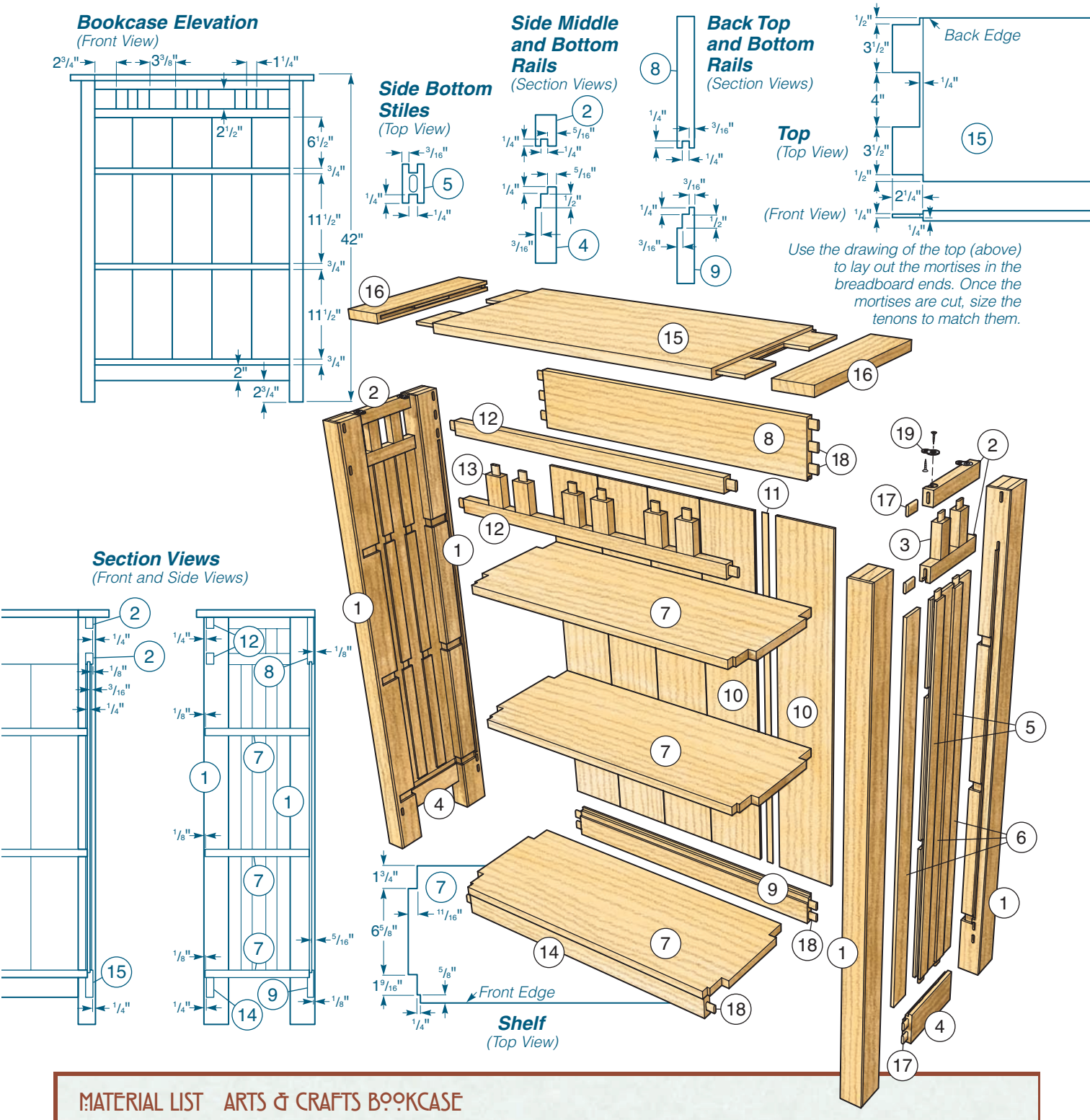
Next, cut grooves along both edges of the bottom side stiles as well as the inside edges of the middle and bottom rails to house the side slats (pieces 6). I cut these centered grooves on the router table using a 1/4" straight bit. Prepare the two groups of side slats by resawing them from the same piece of thicker material. That way, each trio of slats will have consistent grain pattern and color.

Set your side rails and stiles together, mark centerpoints for the Domino tenons and proceed to cut the mortises. Remember to reset your Domino joiner if you make your lower side stiles thinner like I did, to keep the tenons centered on the material thickness. When mortising the bottom stiles and rails, I positioned the machine's cutter to just kiss the back side of the slat grooves (the Domino cutters have metric diameters, and the Domino size I chose was roughly 5/16" thick).

Dry-assemble the rails, stiles and slats so you can mark locations for the slat grooves and rail mortises on each pair of posts. Mill the post slat grooves on the router table, then bore the rail mortises. I indexed my Domino cutter using the slat grooves on the posts. To cut the mortises, I simply folded the fence mechanism down to 90°, then adjusted the height until the cutter met the grooves.

When all the mortising is behind you, it's time to cut the shelf dadoes in the posts and across the insides of the bottom side stiles. I developed an accurate layout on one post before carefully transferring my shelf dado locations to the other three. Note that since the shelves wrap around the insides of the posts and seat in the lower stiles as well, you'll need to dado both the inside face and edge of each post to accommodate the shelves. To make these 1/4"-deep dadoes, I clamped the posts together and used a scrap MDF fence to guide my router and straight bit across the part faces. Unclamp the posts and mill the adjacent dado cuts on their narrow inside edges, stopping these

The side panels are the most complicated subassemblies of this project. To simplify it somewhat, the author used the Domino loose tenon joinery system from Festool.



MATERIAL LIST ARTS & CRAFTS BOOKCASE

	T x W x L
1 Posts (4)	1¾" x 2½" x 41¼"
2 Side Top Rails (4)	3/4" x 1⅛" x 6¼"
3 Side Top Stiles (4)	3/4" x 1⅛" x 2½"
4 Side Bottom Rails (2)	3/4" x 2¾" x 6¼"
5 Side Bottom Stiles (4)	5/8" x 1⅛" x 31"
6 Side Slats (6)	1/4" x 1¾" x 31½"
7 Shelves (3)	3/4" x 10 9/16" x 26⅞"
8 Back Top Rail (1)	5/8" x 4¾" x 25"
9 Back Bottom Rail (1)	5/8" x 2¾" x 25"
10 Back Slats (5)	1/4" x 5 1/16" x 31½"

	T x W x L
11 Splines (4)	1/16" x 1/2" x 31½"
12 Front Rails (2)	3/4" x 1⅛" x 25"
13 Front Stiles (6)	3/4" x 1½" x 2½"
14 Front Bottom Rail (1)	3/4" x 2" x 25"
15 Top Panel (1)	3/4" x 12" x 29½"
16 Breadboard Ends (2)	3/4" x 3⅛" x 12"
17 Domino Tenons (32)	5mm x 19mm x 30mm
18 Domino Tenons (28)	6mm x 20mm x 40mm
19 Desktop Fasteners (4)	3/4" x 1 5/16"

Make the deep cheek cuts for the breadboard tenons on the table saw. Attach a tall auxiliary fence to your rip fence to help stabilize the workpiece during cutting. If your saw has a riving knife that's independent of the guard (the author's didn't), be sure to use it here.

Two shallow passes over the blade create the tenon shoulders. Back up the workpiece with your miter gauge to keep these cuts tracking properly, or use a crosscut sled. For safety's sake, don't guide the narrow end of the workpiece against the rip fence.

The breadboard tenons are separated by a shorter stub tenon. The front tenon stops shy of the front edge, but the stub tenon continues off the back edge. Cut the tenons to final shape on the band saw. Refer to the *Drawings* for dimensions and placement.

cuts at the slat grooves. Dry-fit the side assemblies together again, mark the shelf dado locations on the side bottom stiles (pieces 5), and rout these 3/16"-deep dadoes as well. Glue up and cut your shelf blanks (pieces 7) to size, trim their stepped ends to shape, and make sure they fit the side assembly shelf dadoes.

Making the Bookcase Back and Front

The bookcase back consists of five slats (pieces 10) that fit into centered grooves on the back top and back bottom rails (pieces 8 and 9). Make these two rails first, according to the *Material List*. Cut the slat grooves at the router table or on the table saw with a dado blade. Instead of wasting 3/4" stock on an area that won't receive much stress, I resawed and thicknessed my back slats to just over 1/4", then planed them by hand to fit the rail grooves. Thin splines (pieces 11) between the back slats will keep gaps from opening up when the slats shrink in the winter. I cut my spline slots along the edges of the slats using a 3/32" thin-kerf blade in the table saw. Ash was a sturdy choice for my spline stock. Take care to make sure the splines fit the grooves just right without breaking the fragile slat housings.

After checking the fit of your parts, mark the rails and posts for Domino mortises: three on the ends of the top rail and two on each end of the bottom rail. Mill them now.

Next, measure, cut and assemble the decorative front top rails and stiles (pieces 12 and 13), and make the bottom front rail (piece 14). Cut the appropriate mortises in the rail and stile ends and in the posts for attaching these parts with Domino tenons during final assembly.

Prefinishing Before Proceeding

I switched to finishing prep next, which involved a combination of hand-planing, sanding, finishing and scraping before final assembly. I generally hand-plane flat and straight surfaces before evening them out with a scraper or sandpaper, and I followed that approach here. Then, after sanding with 180-grit paper and a thorough tacking to remove dust, I brushed a coat of wax-free shellac on all surfaces inside and out, except for inside the slat grooves and, of course, the glue joint surfaces. The shellac will add depth to the grain's appearance and seal in any resins that could bleed through the topcoat.

I let everything dry for a few hours before giving all surfaces a light scraping — yep, you read that right. Scraping works like a charm, giving the wood a polished-smooth feel. You will need to hone your scraper

BRING IT TOGETHER WITH CLASSIC BREADBOARD ENDS

carefully: you want a tiny burr, not a big hook. Once you get the hang of it, you won't go back to sanding ... I guarantee it! Build up the final topcoat layer with several more coats of finish.

The author established the mortise locations in the breadboard ends, starting with a centered, stopped groove he cut on the router table.

Assembly

It's finally time to glue up the side rails, stiles, slats and posts to make both side panel subassemblies. Assemble the top front rails and stiles as well so you can install it as a single unit between the side assemblies. After an hour or so of drying time, strip the clamps. With the right side panel lying face-up on your bench, add the front rail/stile assembly, bottom front rail, back rails, shelves and other back pieces to the equation. Drop the left side panel into place, and install clamps and cauls to hold it all together. Tap the back panel pieces with a mallet and block to align them properly.

Completing the Breadboard Top

While the case joints dry, glue up a panel for the top (piece 15) and create blanks for the breadboard ends (pieces 16). Here's how I cut the joints: First, rout a 1/4" wide x 3/8" deep groove into the breadboard ends, stopping these grooves 1/2" from the front end but running them all the way out the other end. Use this groove to index your mortising machine or drill press for boring two 3½" wide x 2¾" deep mortises that receive the center panel tenons (use the *Drawings* of the top, piece 15, to identify and lay out the mortise locations). Once the mortises are done, lay out the tenons on your panel ends, cutting the cheeks and shoulders on the table saw. Band-saw the tenons to shape. They may require a bit of trial-and-error final fitting to seat correctly.

Assemble the top panel parts, gluing just the deep mortise-and-tenon joints. I hand-planed my top flush, then sanded, sealed, scraped and topcoated it. Attach the top to the case with metal desktop fasteners (shown in the *photo* below) and screws. Now you've got a solid and visually striking little pine bookcase that will provide generations of loyal service.

Frank Grant is a professional woodworker and regular contributor to Woodworker's Journal.

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Early American Dresser

Published in Woodworker's Journal "From Shop to Home: Essential Projects, Tips and Techniques for Today's Home Woodworker"

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WJ017

Early American Dresser

Walk a mile in the shoes of a colonial cabinetmaker and you'll learn a lot about how an heirloom is made.

Building this dresser may mark a number of firsts for you. It may be the first time you'll build early American furniture. It my be your first large solid-wood casework project. And it may be your first shot at cutting dovetails by hand, if you so choose. But jumping these hurdles will surely open up creative possibilities while helping you build a truly classic dresser.

Inspiration for this project came when we visited a small antique shop. Just inside the front door sat an unusual old dresser made of clear pine with an orange shellac finish. It had all the telltale signs of age — fine joinery, nicked feet, a beautiful patina and a crazed finish — although we could tell by all the plugged pilot holes in the drawer fronts that the hardware wasn't original. What really caught our eye was the curved

Planning Ahead: The Early American Dresser Project

Set aside about 60 hours for building and finishing the dresser. You'll need a table saw, router and router table, a drill press and a bandsaw or jigsaw. The recommended finish for this project is Watco Natural Oil.

- *40 board feet of ¾" cherry*
- *6 board feet of 1¾" cherry*
- *38 board feet of ¾" poplar*
- *1¼ sheets of ⅜" birch plywood*
- *Eight early American drawer pulls*

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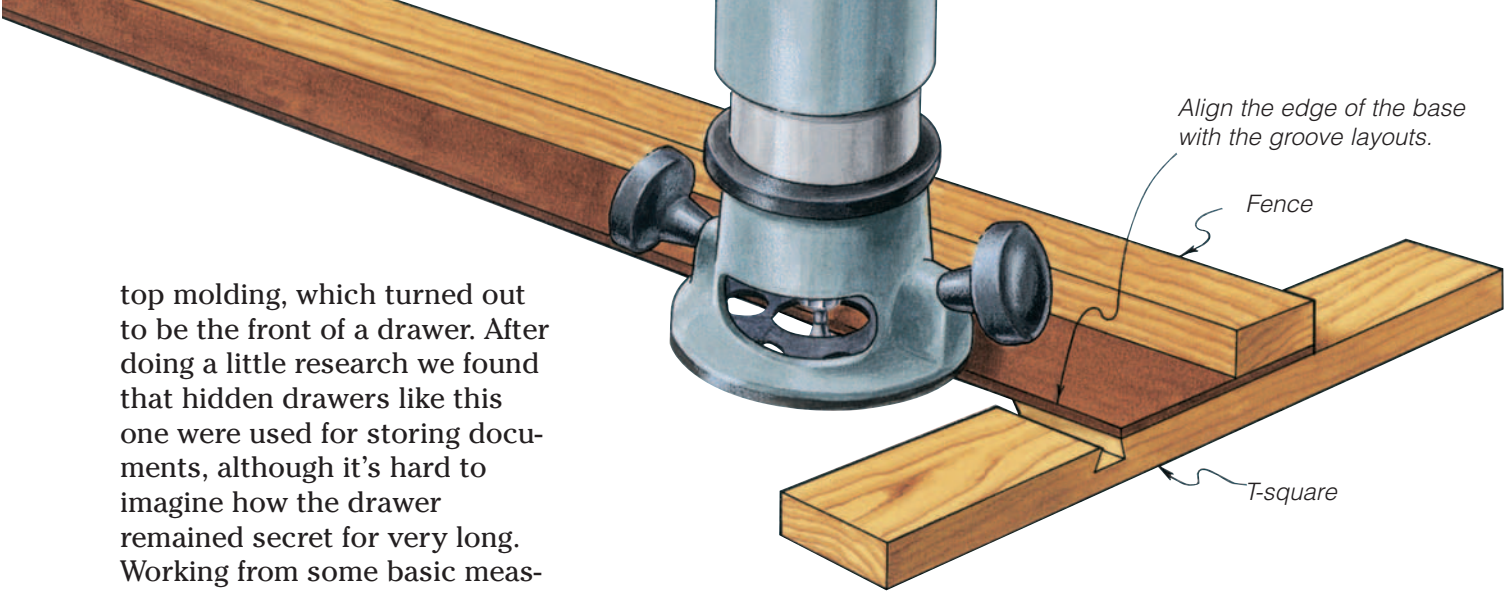

top molding, which turned out to be the front of a drawer. After doing a little research we found that hidden drawers like this one were used for storing documents, although it's hard to imagine how the drawer remained secret for very long. Working from some basic measurements and a photo of the dresser, we made some detailed drawings and set out to construct this dresser just like the original antique.

Figure 1: A T-square is ideal for routing the dovetail grooves. Make the jig using an extra wide piece of ¼" plywood for the base, then trim it to size with your router and a ¼" straight bit. Now you can align the edge of the base with your layouts and rout the grooves using a dovetail bit.

Selecting Wood and Gluing Panels

Country craftsmen traditionally chose local woods for their projects, like cherry and pine, and they left the imported woods to urban cabinetmakers who had rich customers with an appetite for fancier furniture. We chose cherry because it's both a handsome species and also because it's often less expensive than clear pine, another good choice for furniture like this. For the hidden parts of the dresser, like the drawer sides and backs and the internal frames, we chose poplar. The drawer bottoms and the dresser's back panel are made of birch plywood.

Set aside your best cherry boards for the drawer fronts (pieces 18, 21, 24, 27 and 30) and use your next best stock for the top and sides (pieces 1 and 2). Joint and glue your lumber for the top and side panels and, after the glue sets up, remove the squeeze-out with a scraper or chisel. Later, plane the panels flat and sand them to 120 grit.

Cut the side panels to size and lay out the sliding dovetail grooves, the dadoes and the rabbets, as shown in the *Side Panel Elevation* found in the *Technical Drawings* on page 107. Cut the dadoes and rabbets with your table saw and the appropriately sized dado blades, then build a jig like the one shown in *Figure 1* for routing the sliding dovetail grooves. Chuck a dovetail bit in your router and clamp the jig next to a joint layout on a panel. Set

Quick Tip

Blemish Control

If you use wood filler to cover nail holes on prefinished wood, sanding away the excess filler can blemish the surrounding finish. One way to eliminate the problem is to place a short piece of masking tape down where you plan to nail. Hammer and set the nail through the tape. Apply the wood filler over the tape. When you peel off the tape, a perfect round spot is left and there's little or no sanding to do. It's a great technique to use with prefinished trim as well.

Figure 2: Rout tails on the rails with a dovetail bit and a router table, making sure the fit is just loose enough to slide them into the grooves in the sides.

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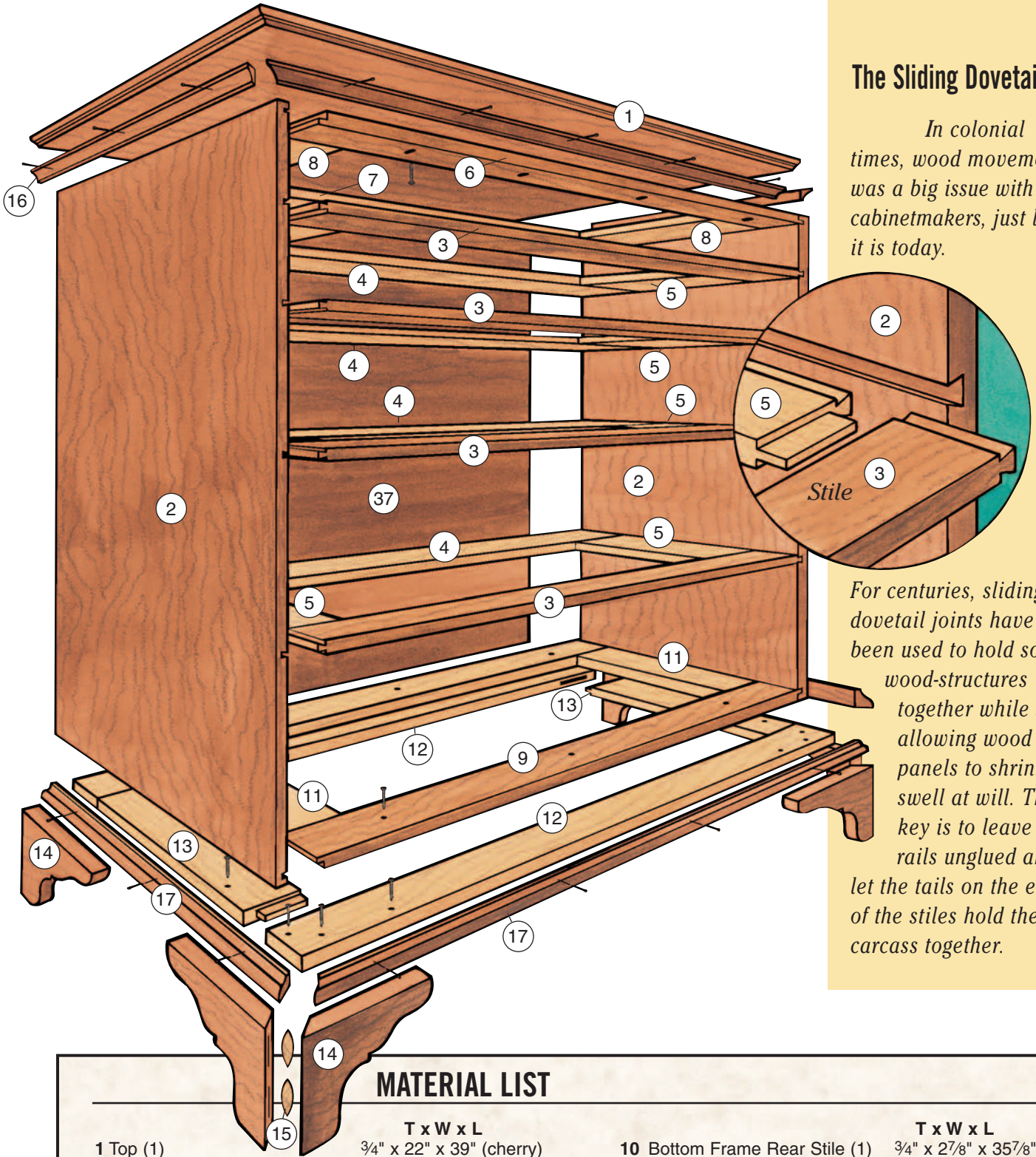

The Sliding Dovetail

In colonial times, wood movement was a big issue with cabinetmakers, just like it is today.

For centuries, sliding dovetail joints have been used to hold solid wood-structures together while still allowing wood panels to shrink or swell at will. The key is to leave the rails unglued and let the tails on the ends of the stiles hold the carcass together.

MATERIAL LIST

	T x W x L
1 Top (1)	¾" x 22" x 39" (cherry)
2 Sides (2)	¾" x 20½" x 32" (cherry)
3 Middle Frame Front Stiles (4)	¾" x 2⅞" x 35⅞" (cherry)
4 Middle Frame Rear Stiles (4)	¾" x 2⅞" x 35⅞" (poplar)
5 Middle Frame Rails (8)	¾" x 3⅜" x 15⅝" (poplar)
6 Top Frame Front Stile (1)	¾" x 2⅞" x 35⅞" (cherry)
7 Top Frame Rear Stile (1)	¾" x 2⅞" x 35⅞" (poplar)
8 Top Frame Rails (2)	¾" x 3⅜" x 15⅝" (poplar)
9 Bottom Frame Front Stile (1)	¾" x 2⅞" x 35⅞" (cherry)
10 Bottom Frame Rear Stile (1)	¾" x 2⅞" x 35⅞" (poplar)
11 Bottom Frame Rails (2)	¾" x 3⅜" x 15⅝" (poplar)
12 Base Frame Stiles (2)	¾" x 2⅞" x 36⅝" (poplar)
13 Base Frame Rails (2)	¾" x 2⅞" x 15⅝" (poplar)
14 Feet (6)	1¾" x 6¾" x 8½" (cherry)
15 Splines/Biscuits (2/4)	¼" splines or #20 biscuits
16 Cornice Molding (2)	¾" x 1" x 48" (cherry)
17 Base Molding (2)	¾" x 1" x 48" (cherry)
18 Top Drawer Face (1)	¾" x 4" x 36⅝" (cherry)

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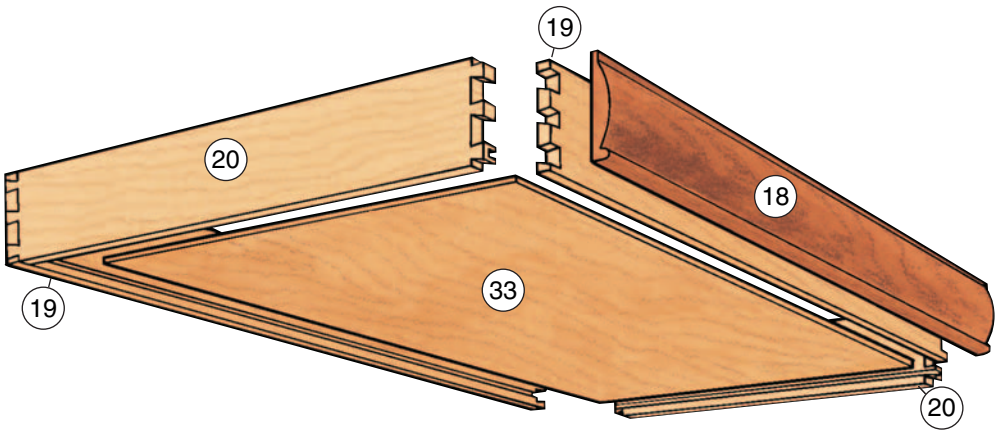
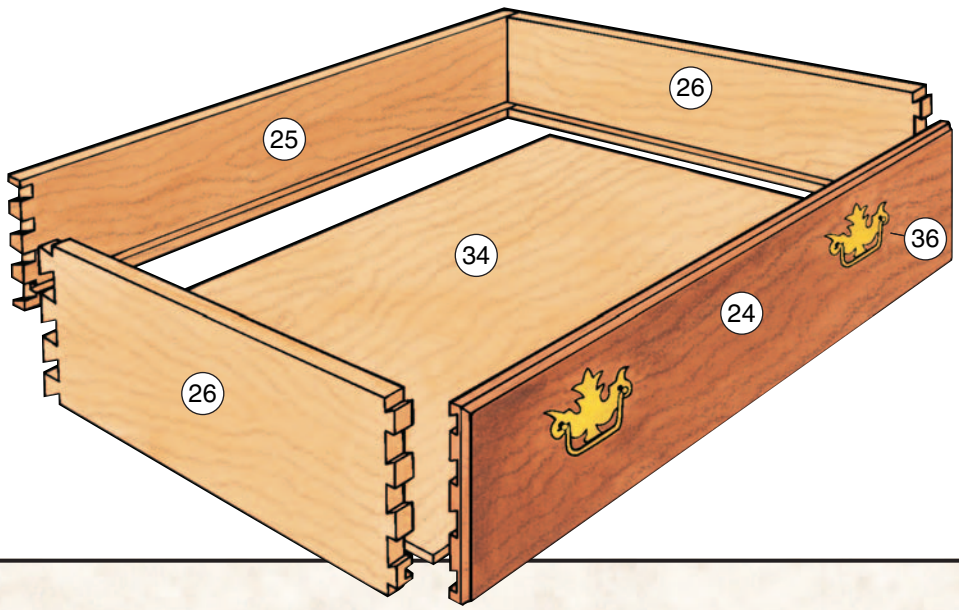


the depth of cut to ⅜" and rout the groove. Repeat this procedure for each of the sliding dovetail grooves.

Building the Carcass

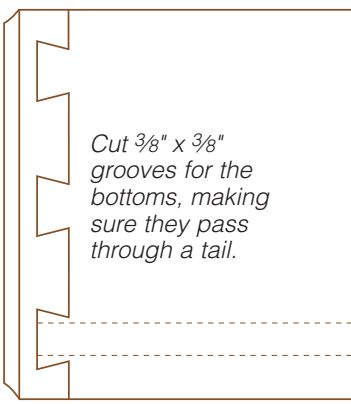
Rip cherry and poplar stock for the middle frames, the bottom frame, the base frame and the top frame (pieces 3 through 13). After cutting the pieces to length, set up your router table with the same dovetail bit you just used for the grooves. Clamp a fence near the bit and cut a dovetail on the edge of some poplar scrap wood to fit in the side panel grooves (see *Figure 2*). You want a snug fit, just tight enough to require a few taps with a mallet before it slides into place. Adjust your set-up until you get the fit just right, then rout tails on one edge of the rails for the middle frames (see the *Sliding Dovetail Groove Detail* on page 104). Once you've finished routing tails on the rails, cut a tail on the end of another scrap piece of poplar and test its fit in a

Figure 3: Clamp a set-up block to your fence to align the shoulder of your tenon layout with the ½" dado blade. Make two passes to cut each cheek.



Dovetail Joint Detail

Use this layout as a guide, varying the number, spacing and size of the dovetails on each drawer. Begin and end each joint with a half pin.



		T x W x L
19	Top Drawer Front/Back (2)	¾" x 3½" x 35⅛" (poplar)
20	Top Drawer Sides (2)	¾" x 3½" x 18½" (poplar)
21	#2 Drawer Front (1)	¾" x 4½" x 35⅛" (cherry)
22	#2 Drawer Back (1)	¾" x 4½" x 35⅛" (poplar)
23	#2 Drawer Sides (2)	¾" x 4½" x 18½" (poplar)
24	#3 Drawer Front (1)	¾" x 5½" x 35⅛" (cherry)
25	#3 Drawer Back (1)	¾" x 5½" x 35⅛" (poplar)
26	#3 Drawer Sides (2)	¾" x 5½" x 18½" (poplar)
27	#4 Drawer Front (1)	¾" x 6½" x 35⅛" (cherry)

		T x W x L
28	#4 Drawer Back (1)	¾" x 6½" x 35⅛" (poplar)
29	#4 Drawer Sides (2)	¾" x 6½" x 18½" (poplar)
30	#5 Drawer Front (1)	¾" x 7½" x 35⅛" (cherry)
31	#5 Drawer Back (1)	¾" x 7½" x 35⅛" (poplar)
32	#5 Drawer Sides (2)	¾" x 7½" x 18½" (poplar)
33	Top Drawer Bottom (1)	⅜" x 34¼" x 17⅝" (plywood)
34	Drawer Bottoms (4)	⅜" x 34¼" x 18" (plywood)
35	Drawer Stops (10)	¾" x 3/4" x 2" (poplar)
36	Drawer Pulls (8)	Antique brass
37	Back (1)	⅜" x 36" x 33" (plywood)

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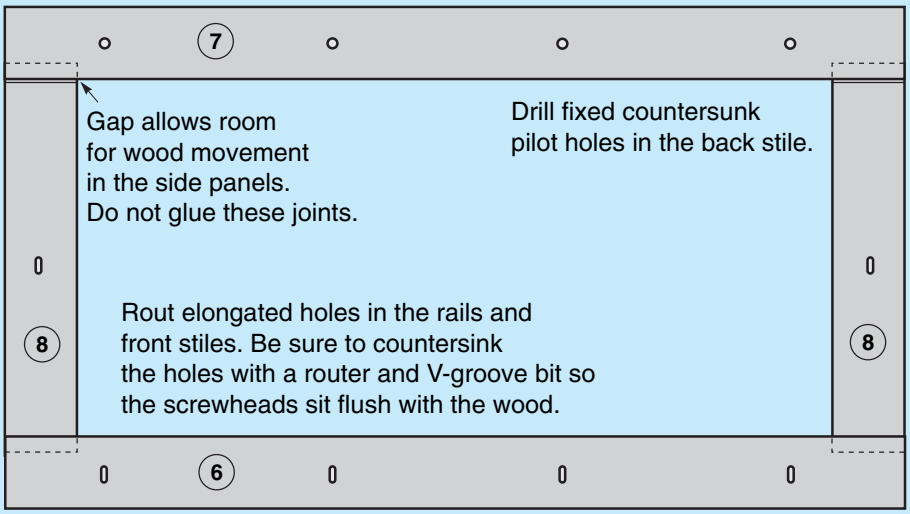
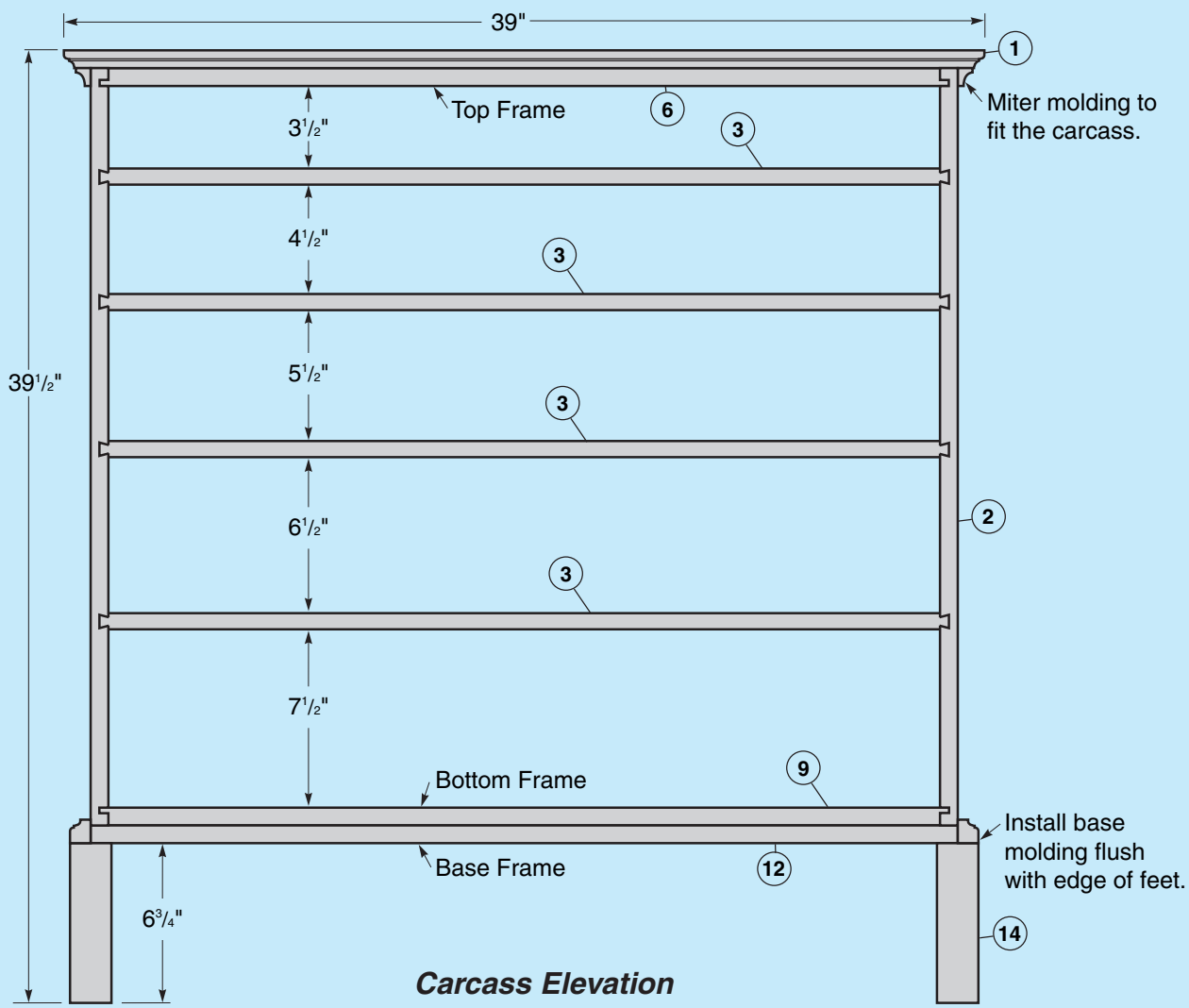
Top Frame Elevation





Carcass Elevation

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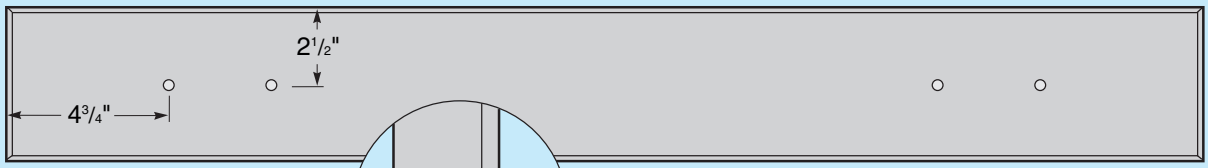
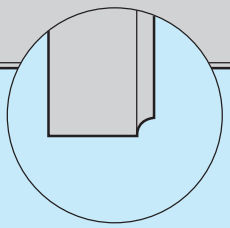
Drawer Elevation

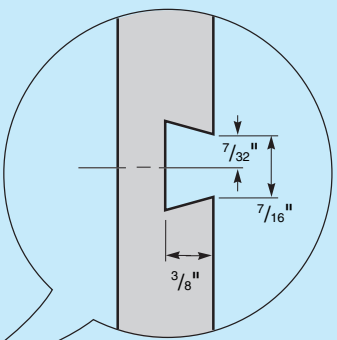


Install all drawer handles at the same locations.

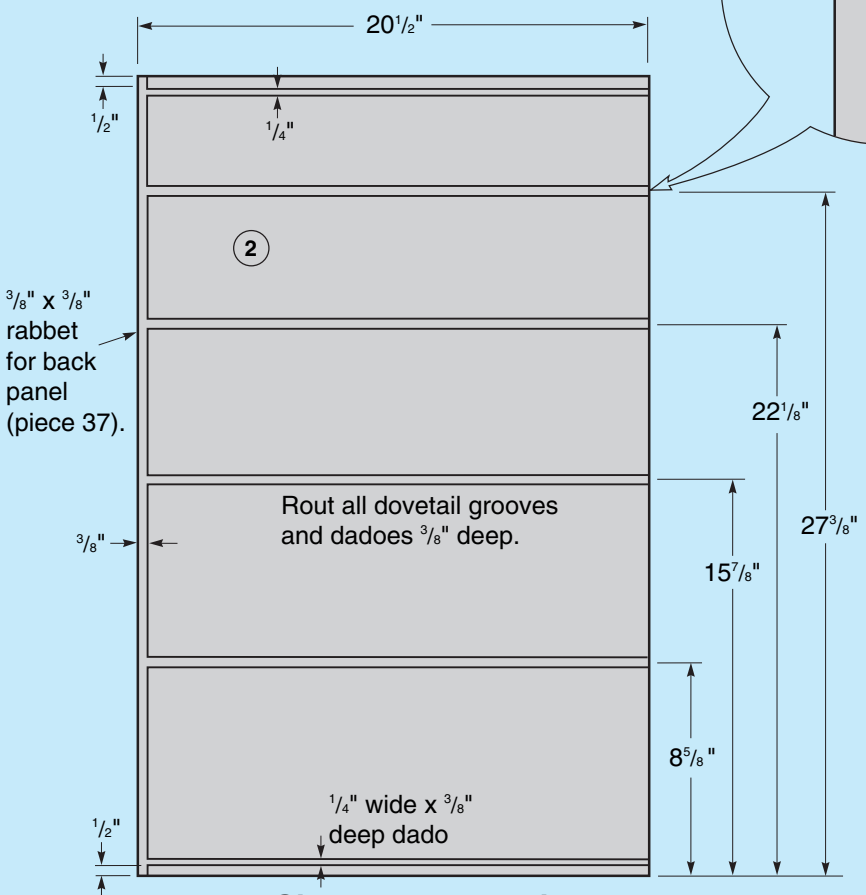
Drawer Front Cove Detail



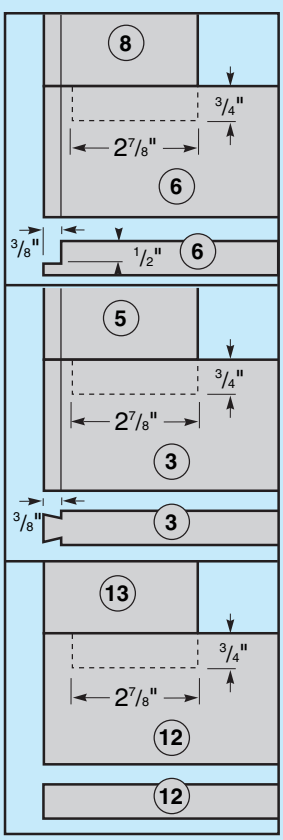
Sliding Dovetail Groove Detail



Note: All dovetail locations shown on the *Side Panel Elevation* indicate the center of the grooves. Lay out the center lines, then use the detail at left to lay out the full width of each groove. Use your router and the jig shown on page 103 to make two passes for each groove with a ½" diameter, 14° dovetail bit.



Side Panel Elevation



Top and Bottom Frame Elevation

Middle Frame Elevation

Base Frame Elevation

Frame Elevations

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groove to ensure a good fit. If necessary, readjust the router table set-up to get a good fit on a test piece, then rout the ends of the rear middle frame stiles. Next, test cut the end of a cherry scrap piece (the fit might change again) and rout the front middle frame stiles.

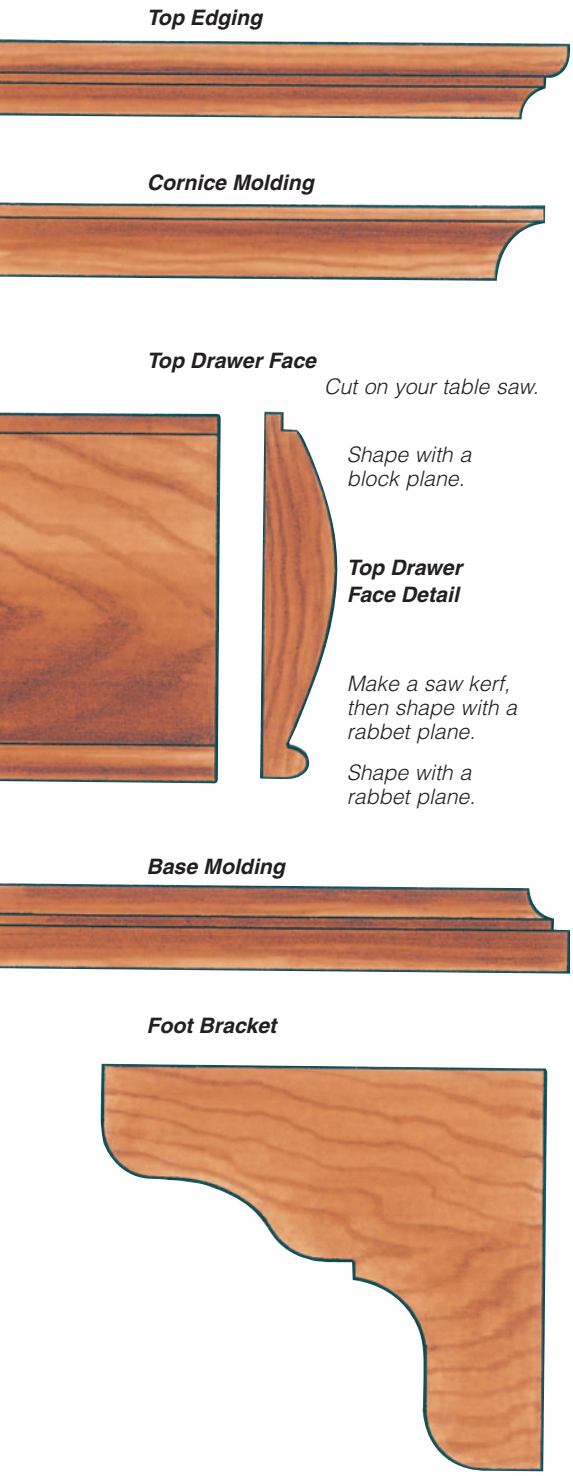
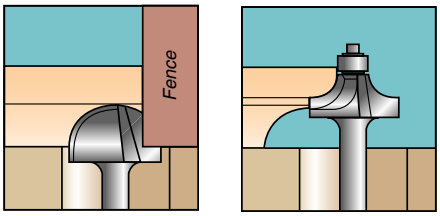


Figure 4: After mitering the front feet, cut slots with a biscuit joiner and join the pieces with biscuits. If you don't have a biscuit joiner, use splines.

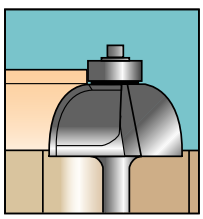
Since there isn't room for well-supported sliding dovetail joints at the ends of the side panels, join the top and bottom frames to the sides with tongues and dadoes. Install a ⅜" dado blade in your table saw and raise the blade ½" to form the ¼" tongues on the ends of the stiles and one edge of each rail.

Now lay out mortises on all the frame stiles for the rail to stile joints, as shown in the *Frame Elevations* on the *Technical Drawings*. Use a 3⁄16" drill bit and your drill press to rough out the mortises, then clean them up with a chisel. Next, form tenons on the ends of the rails to fit the mortises, using a table saw and a ½" dado blade (see *Figure 3*).

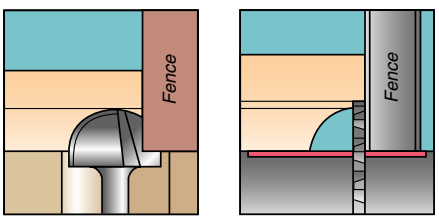
Assembling the carcass will go a lot more smoothly if you recruit an extra pair of hands for the task, and we recommend installing one frame at a time to keep the process manageable. Start by spreading glue in the first 3" of one set of dovetail grooves in the side panels, then slip a front stile into place. Next, set the carcass on its face, brush some glue into the front stile mortises and slip the rails into the dovetail grooves from the back of the side panels. Be careful to avoid gluing



Top Edging Detail
Step 1: With a router table and core box bit, form a cove at the edges of a board.
Step 2: Install a roundover bit in your router table to complete the molding.



Cornice Molding Detail
Rout the edges of a board with a piloted cove bit, leaving a ⅛" wide fillet along the top of each edge.



Base Molding Detail
Step 1: With a router table and core box bit, rout a cove along the edges of your board.
Step 2: Cut rabbets with your table saw.

the rails to the sides or you'll restrict the seasonal movement of the panels. Press the rails as far forward as you can to seat the tenons in the front stile mortises. Now brush glue in the last 2" of each dovetail groove and tap the rear stiles into place, stopping when the rails sit flush with the rabbets in the sides. Do not put glue in the rear stile mortises so the side panels can move. Clamp the carcass together, then repeat the installation procedure for the rest of the frames, including the top and bottom frames.

Constructing the Base

Glue the base frame together, then select thick cherry stock

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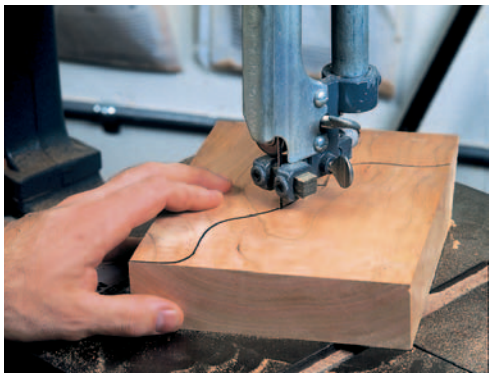

Figure 5: Use a 1/4" or narrower bandsaw blade for making the tight cuts along the outline of each foot. Set the saw guides just above the wood to keep the blade from wandering.

Figure 6: Trace the pattern of the top drawer face on the end of your stock and remove some of the waste with your table saw. Shape the face with a rabbet plane and block plane.

for the feet (pieces 14). Cut the stock for the feet to size and miter one end of four pieces for the front foot assemblies. Make sure the miters are square to the edges of the stock. Next rout a spline slot or cut biscuit slots in the miters (see *Figure 4*). Adding splines or biscuits (pieces 15) to the miter joints will greatly reinforce the foot assemblies. Now make a full-size pattern of the foot using the *Technical Drawings* as a guide, and trace it onto your stock. Bandsaw the feet to shape (see *Figure 5*) and smooth the edges with a drum sander. Make plywood splines (if you need them) and glue the mitered feet together.

After blending the corners of the two front foot assemblies with a palm sander, draw a line on the top of each foot ¾" back from the front edge. Glue and screw the base frame to the feet, aligning the outside edges of the frame with the lines you just drew on the feet — make sure the back edge of the frame is flush with the back edge of the rear feet. The ¾"-wide ledge now formed on the top of each foot will support the base molding that conceals the joint between the carcass and the base.

Adding the Moldings

To make the cornice molding (pieces 16), rout the edges of a 3" or wider board with a cove bit and roundover bit following the *Cornice Molding Detail* illustration on the previous page. Miter the molding to length, then glue and pin the front piece to the cabinet with #17 wire brads. For the side pieces, glue the first 3" only, then pin the remaining length to the side panels with brads to allow for wood movement. Use a nail set to drive the brad heads below the wood surface, and fill the holes with a matching wood putty.

Rout a 3" or wider piece of stock for the base molding (piece 17) with a cove bit, then trim the leftover waste on your table saw, as shown in the *Base Molding Detail illustrations*, previous page. Use a rabbet plane and sandpaper to round over the filet on the front edge of the molding, and rip the molding off the board. Miter the molding to length, then glue and nail the pieces to the base assembly.

Now rout ⅛"-wide elongated holes in the front stile and rails of the top frame, and drill fixed holes in the back stile as shown in the *Top Frame Elevation* (see *Technical Drawings*). Countersink all the holes with a V bit and router to recess the heads of your screws. These pilot holes will allow the top to move after it's screwed to the carcass.

Secret drawers were common in Eighteenth century furniture and often contained a family's most important documents. Today, they serve better as sock drawers than document hideaways.

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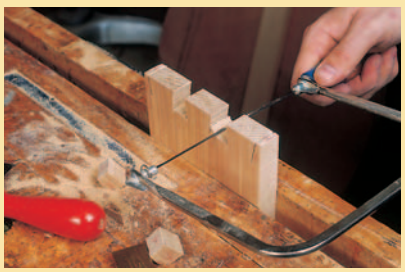
Cutting Dovetails

Cutting dovetail joints isn't hard, it just takes practice and patience. Although, using quality tools definitely helps. A marking gauge with a knife point, for instance, will lay out crisp joint shoulders that give your chisels a positive starting point, and a well-tuned bevel gauge will keep your pin and tail angles consistent. Stiff-bladed saws make it easier to keep your pins and tails square and sharp chisels are essential.

Use a fine-toothed tenon saw with a back stiffener to cut the pins and tails, always stopping just shy of the shoulder lines.

Sharp chisels make fine tuning your dovetails possible. Without them you'll get more tear out and sloppier fitting joints.



A coping saw will speed up the repetitive work of removing the waste after the pins and tails are defined with the tenon saw.

Cut the top to size and rout its front and side edges with the bits shown in the *Top Edging Detail* illustrations on page 108. Sand the top to at least 120 grit, then position the panel on the carcass. Mark all the pilot hole locations, drill them with a 3/32" bit and secure the panel to the cabinet with #8 screws.

Complete the cabinet assembly by placing the carcass on the base and drilling countersunk pilot holes through the bottom frame and into the base frame. Now drive screws to hold the two subassemblies together.

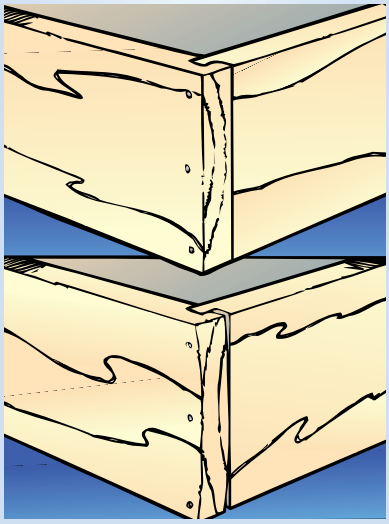
Making the Drawers

Select a board for the top drawer front (piece 18) and rip it to width. Cut it a little longer than needed and trace the shape of the top drawer face profile (see *Technical Drawings*) onto the ends of the board. Begin the shaping process by ripping a kerf to define the inside edge of the bottom bead, as described in the *Top Drawer Face Detail*. Next, remove some of the waste at the top of the drawer face by tilting the table saw blade 15° and running the stock on-edge through the blade. Straighten the blade to cut the small rabbet along the top edge, then form the hump and bead of the molding by hand with a rabbeting plane and smoothing plane (see *Figure 6*). Wrap up the shaping with a palm sander.

Rip and crosscut the rest of your drawer fronts to size, as well as all the sides and backs (pieces 19 through 32), then lay out the dovetails — half-blind dovetails on the fronts and through dovetails on the backs and top drawer box (see *Exploded Views,* page 105). Use a marking gauge with a knife point to define the back shoulder of each joint and a utility knife for laying out the side shoulders of the pins and tails. Be sure to begin and end each joint with a half pin, as shown in the *Dovetail Joint Detail* on page 105. Cut the pins first, then use them to trace the tail locations. A fine-toothed tenon saw works well for cutting the joints, and paring them to final fit is only possible with a very sharp chisel (see the *Cutting Dovetails* sidebar, previous

Growth Ring Joinery

To make tight corners on boxes, drawers, or chests, take a close look at your wood before doing any milling. Arrange the parts so that all the end grain has the annual rings curved out toward the ends. Wood tends to cup in the direction opposite the rings curve, so if you crown the board the wrong way the rings might draw the joinery apart over time.



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page). Or, rout the dovetails with a router and dovetail jig.

After completing the dovetail joints, rout the ⅜" wide by ⅜" deep grooves for holding the drawer bottoms (pieces 33 and 34), as shown in the *Drawer Elevation* on page 107. Notice that these grooves will run through a pair of tails in the drawer sides, but the resulting holes won't show on the back of the drawers.

Assemble the drawers, making sure to check for squareness as you go. Allow the glue to dry, then trim the joint ends flush with the drawer sides and backs. Use a hand plane to carefully shave the top edges of the drawers until they fit the cabinet openings — if it's winter, leave a 3/32" gap; in summer, a 1/32" gap.

Next, screw the top drawer box to the drawer face. Be sure to align its ends with the sides of the dresser and leave a 1/16" gap between the top of the drawer face and the cornice molding.

Use a cove bit to rout the edges around all the drawer faces except the top one, then slide the drawers into the cabinet and install the stops (pieces 35). Screw the stops to the rear stiles on each frame. Now drill pilot holes in the drawer fronts for the pulls (pieces 36).

Cut plywood for the back (piece 37) and set it into the cabinet, then drill countersunk pilot holes and screw the back to the rabbets in the side panels.

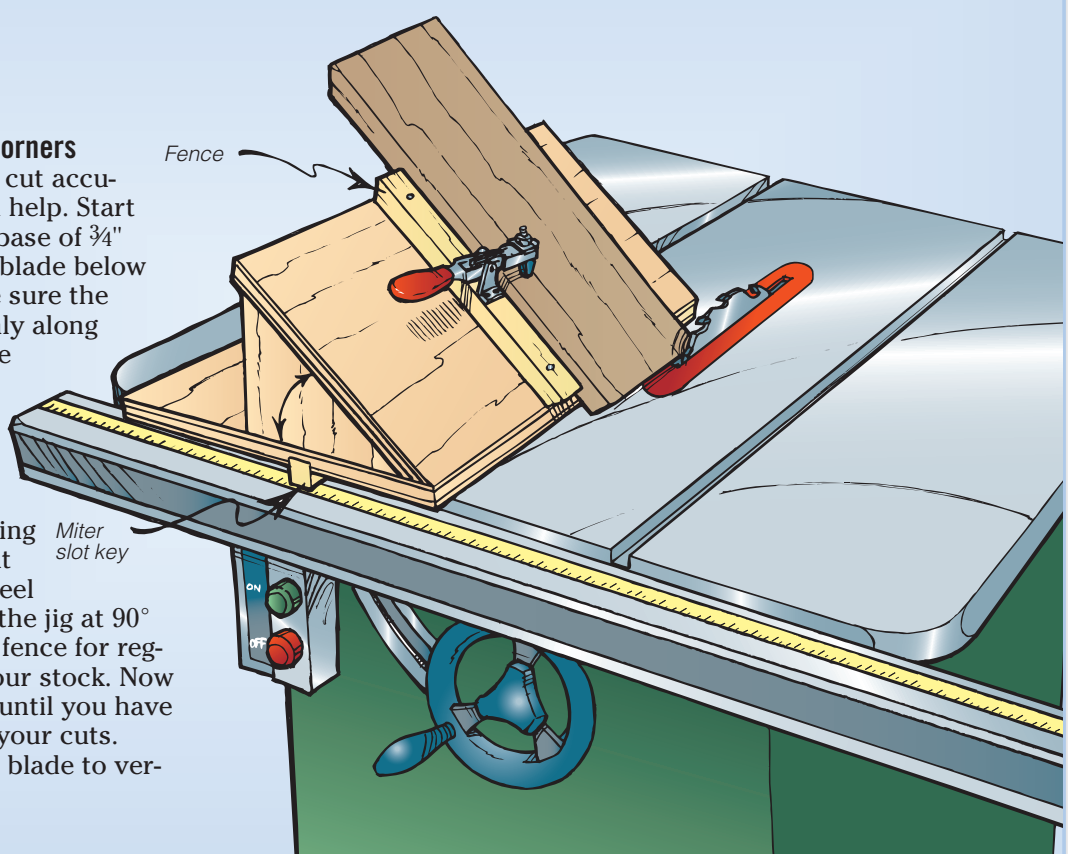
Now that you've spent all this effort putting your dresser together you get to take it apart again. Remove the back, base and top, and pull out all the drawers so you can sand everything to 220 grit before applying an oil finish. With the first coat of finish you'll see the cherry begin to mellow, which will continue for years until the piece looks like an antique. Apply three more coats of oil finish and polish off the project with a coat of paste wax.

There's a wealth of woodworking knowledge hidden in this dresser. By building it, you've now stepped into the shoes of the craftsman who built the original some 200 years ago. Perhaps no one else will fully recognize your achievements — except of course another woodworker.

Quick Tip

Jig for Cutting Mitered Corners

If your table saw won't cut accurate miters, this jig can help. Start with a keyed plywood base of ¾" thick stock. Lower the blade below the table top and make sure the plywood slides smoothly along the miter slot. Raise the blade and cut the side absolutely parallel to the blade. Cut two matching sides to about 48° and glue these to the base, holding their tips to the saw-cut parallel edge. With a steel square, mark a line on the jig at 90° to the blade and add a fence for registering the edges of your stock. Now tilt the blade just a bit until you have a perfect 45° angle for your cuts. Remember to reset the blade to vertical after using it.



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A Table for Four... with a View

Published in Woodworker's Journal "Woodworking Secrets: Essential Methods and Projects for Fine-Tuning Your Shop Skills"

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A Table for Four… with a View

One of the best ways to spend more time on the deck or patio is to build a picnic table and benches. Made of redwood, our design easily seats four adults. The pedestal style provides ample leg room, and everyone gets a generously sized bench. With a little seasonal care, here's an outdoor project that will easily last for decades.

Spring and summer are natural elixers for creating outdoor projects. As the temperature rises, the urge to spend as much time as possible outdoors can be overwhelming. It's time to clean up the barbeque, sweep off the deck and think about building a sturdy picnic table and benches.

Most picnic sets are designed for larger groups of people. They're big and bulky, and when it comes to Memorial Day or July 4th celebrations, they're perfect. But most of us, when you think about it, spend our summer evenings with four or fewer people, and ideally this calls for a smaller, more intimate table. Our design makes no pretension about handling large crowds, fits easily on an average-sized deck and provides a perfect view the yard.

A pedestal table like this allows lots of room for knees, and no one ends up straddling a leg. Our picnic set is made of redwood for its exceptional resistance to harsh weather conditions and for it's beautiful color. The base is sturdy while still being simple to construct. The joinery is simple, requiring only a couple of half laps in the base and spline joints for the top. Most concealed joints, like mortises and tenons, would eventually come apart due to humidity changes and stress on such soft wood.

Redwood is still available at some lumberyards, or you can substitute cedar if you prefer. The table and four benches require 18 eight foot 2" x 4"s, one eight foot 2" x 6" and two six foot 1" x 4"s. You'll also need a quantity of non-corrosive wood screws, lag screws and washers as specified in the *Material Lists* on pages 107 and 111.

Constructing the Pedestal

Begin building the table from the bottom and work upward. The *patterns* on pages 106 and 107 outline the four pedestal feet and detail the construction of the base. Be sure to remember that all the lumber sizes are nominal, meaning that a 2" x 4" is actually 1½" x 3½" so always measure your stock to check it against the measurements in this project. Each foot is comprised of a 2" x 4" core sandwiched between two smaller 1¼"-thick pieces. Begin by cutting two

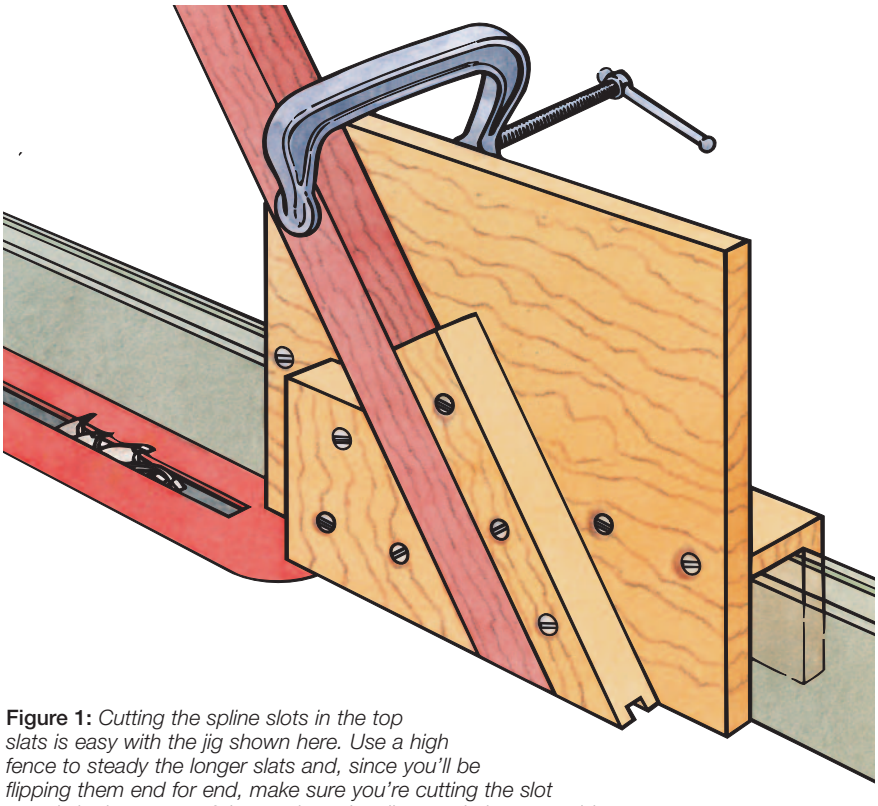

Figure 1: *Cutting the spline slots in the top slats is easy with the jig shown here. Use a high fence to steady the longer slats and, since you'll be flipping them end for end, make sure you're cutting the slot exactly in the center of the stock so they line up during assembly.*

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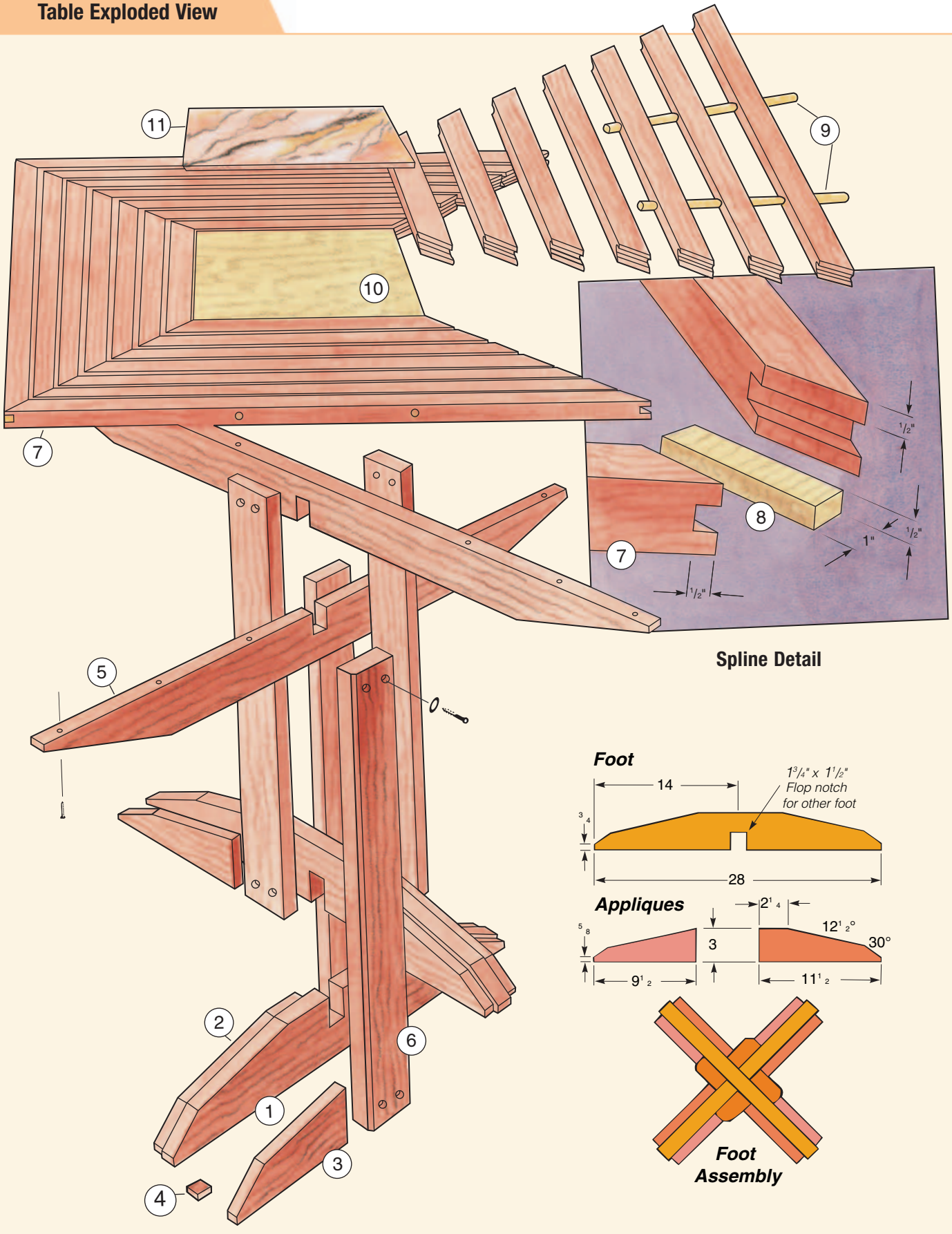
Table Exploded View



Spline Detail

Foot Assembly

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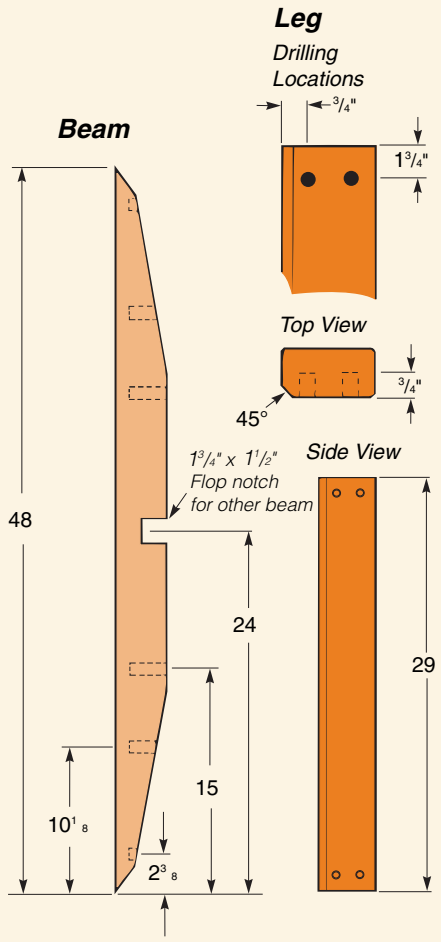

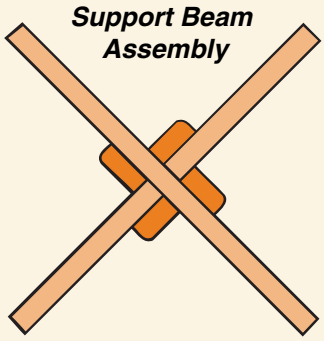

MATERIAL LIST – *Table*

		T x W x L
1	Foot Cores (2)	1½" x 3½" x 28"
2	Foot Appliques (Left) (4)	1¼" x 3" x 11½"
3	Foot Appliques (Right) (4)	1¼" x 3" x 9½"
4	Foot Pads (4)	1/4" x 1½" x 2"
5	Support Beams (2)	1½" x 3½" x 48"
6	Legs (4)	1½" x 3½" x 29"
7	Top Slats (28)	1½" x 1½" (for lengths, see pg. 106)
8	Splines (28)	1/2" x 1" x 2" (White Oak)
9	Dowels (8)	3/4" x 14" (White Oak)
10	Plywood Base (1)	1/2" x 12¾" x 12¾"
11	Marble Center Piece (1)	3/8" x 12" x 12"
12	Lag Screws (16)	5/16" x 2"

2" x 4"s to a length of 28" for the foot cores (pieces 1), then cut four 2" x 4"s to a length of 11½" for the left foot appliques (pieces 2) and four more 2" x 4"s to a length of 9½" for the right foot appliques (pieces 3). In two passes, rip the applique pieces to a thickness of 1¼". Then cut the four foot pads (pieces 4) so they're ready to glue onto the assembly later.

Cut the two table support beams (pieces 5) to a length of 48" and lay out the half lap joint at the midpoint (see *Beam Elevation* above). While you're at it, cut the half laps on the foot cores, remembering that for each pair, one member is notched on its top edge, while the other is notched on its bottom edge. Mount a 1/2"-wide dado blade in your table saw and raise it 1¾", then, using a miter gauge for support, remove the waste in the dadoes by taking three passes with each piece. A snug fit is best for these joints.

One edge on the foot cores, the appliques and the support beams must now be cut at an angle on the band saw. Follow the *Elevations* to lay out each of these angles and, once the shapes are cut, belt-sand the surfaces smooth. Next, rout a 3/16" roundover on the bottom edges of the beams, the top edges of the two foot cores and the outside top edge of the foot appliques.

The foot core and beam pieces are now ready for assembly. Epoxy is an excellent waterproof glue that provides a long set-up time and good gap filling properties, making it the best choice for this application. Mix only the amount you can use in a short period of time, then spread it into the half laps. Secure the half laps by driving two non-corrosive screws up into each joint.

For the legs (pieces 6) cut four 2" x 4"s to a length of 29", and rout a 1/2" chamfer on one edge of every leg. Now prepare the legs for joining with the foot and beam assemblies by drilling counterbored pilot holes at the locations indicated on the *Leg Elevations* shown above. First drill 1/2"-deep by 3/4"-diameter counterbores and follow with 5/16" pilot holes.

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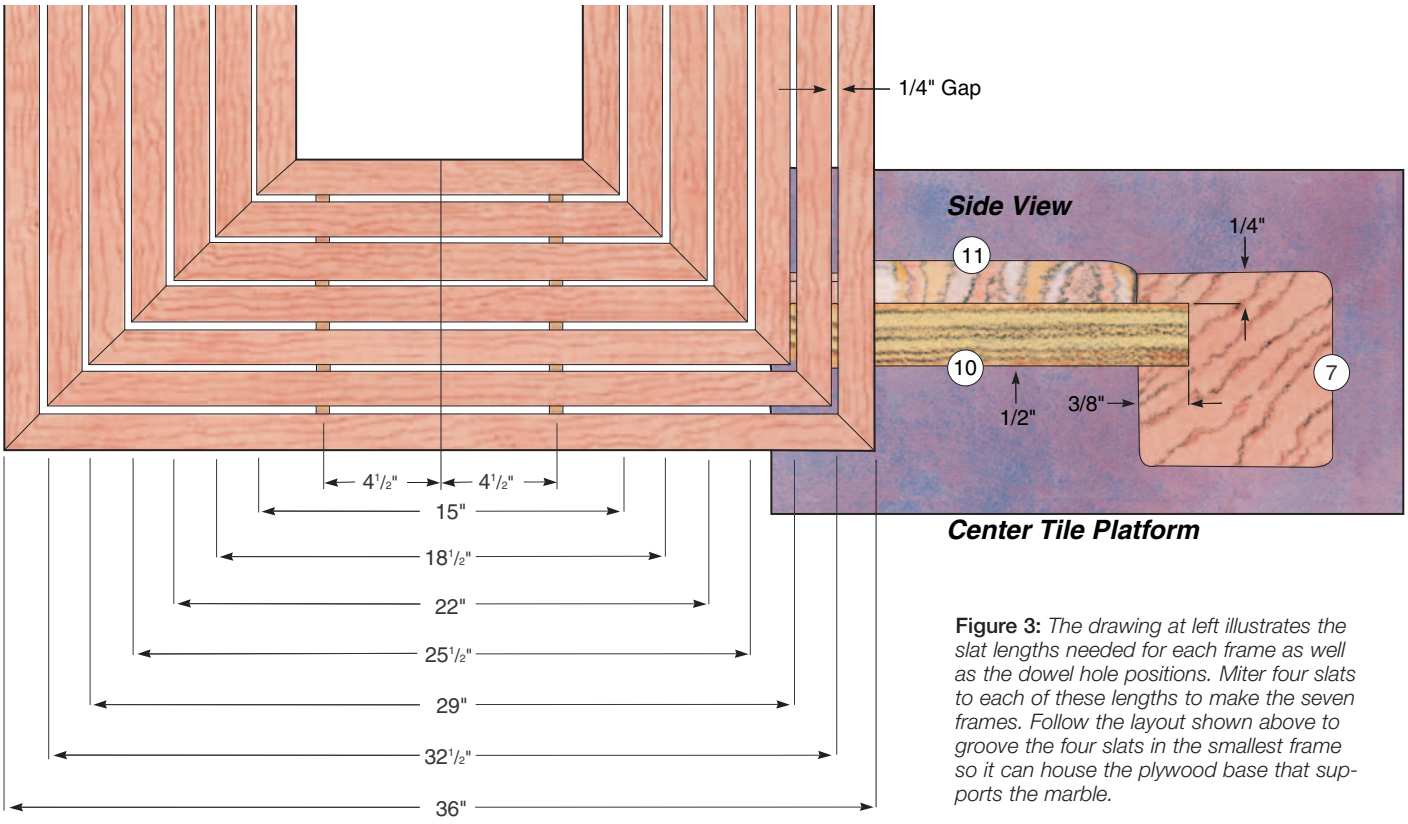

Figure 3: *The drawing at left illustrates the slat lengths needed for each frame as well as the dowel hole positions. Miter four slats to each of these lengths to make the seven frames. Follow the layout shown above to groove the four slats in the smallest frame so it can house the plywood base that supports the marble.*

Slip the legs into position with the feet to mark the screw locations, then remove the legs and drill 1/4" pilot holes in the feet. Repeat this last procedure with the legs and the beams.

Now mix a new batch of epoxy and spread it on the legs where they join the feet and beams. Place the legs into position and secure the joints with lag screws (pieces 12), remembering to put a washer on each one. Spread epoxy on the eight foot appliques as well and clamp them to each side of the foot core pieces. Clean up as much glue as possible with a damp rag and later, when the glue has dried, scrape off any remaining epoxy residue.

Machining the Table Top

You'll need 64 lineal feet of 1½"-by-1½" stock (pieces 7) to make the seven frames of the top. Each frame is joined at the corners with splines (pieces 8), and the frames are then joined to one another with dowels (pieces 9). The center frame is filled with a piece of marble backed by 1/2"-thick plywood.

Rip 4 eight foot 2" x 4"s into 1½"-square stock for the slats that make up the top. Once this is done, roundover all the edges on the eight-foot-long strips with a 3/16"-radius bit. Next, miter the pieces to length with a power miter saw, a table saw or a radial arm saw. Follow the measurements shown above in the *Top Elevation,* to cut four slats of equal length for each frame.

The slats are splined together at their mitered ends to give the top extra rigidity and to minimize any gaps that might occur due to the effects of humidity. A typical table saw jig for this operation is shown in *Figure 1* on page 105. The jig, which looks like a lower case "h" from the end, is made of plywood to wrap over the rip fence. Cut two pieces of 2" x 4" scrap to the shapes shown in the *drawing* and screw them to the jig at a 45° angle for supporting the slats as they pass over the blade.

Install a 1/2"-wide dado blade in your table saw and raise it 1/2". Now clamp the rip fence so the face of the jig is 3/4" from the center of the blade and you'll get perfectly centered dadoes.

Next, drill two 3/4" holes into every slat for inserting the dowels that reinforce the top assembly. Chuck a 3/4"-diameter bit in your drill press and, to ensure accuracy, make the alignment jig shown in *Figure 2* by screwing a 1½" x 12" fence to a piece of scrap 1" x 8". Clamp the jig to your drill press table so the center of the bit is 3/4" from the fence. Draw lines on the drill press fence 4½" to the left and right of the bit's center and put center lines on the longest edge of each slat. Match the center line of the slat with the mark on the left side of the fence and drill the first hole, then slide the slat to the right to align the marks and drill the second hole.

The slats for the smallest frame must be grooved on their inside edge to house the plywood base (piece 10) that supports the marble (piece 11). Set up a 1/2"-wide dado and raise it to 3/8".

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Plow the groove so it is set back 1/4" from the top surface of the slats (see *Figure 3*, facing page).

The splines (pieces 8) are made of white oak for strength and weather resistance. Rip a 1/2" x 6" x 20"-long oak board into 2½"-wide strips. Next, cut the strips into 1"-long pieces. You'll notice that the grain runs the short way on these splines, which is correct for this application. If the grain of the splines runs parallel with the joint they are much more likely to break. You'll need a total of 28 splines.

The dowel rods (pieces 9) are also made of white oak. Cut four 36" dowels in half and sand them vigorously with 100-grit paper to slightly reduce their size so they fit into the slat holes easily. Now chamfer one end of every dowel with a belt sander.

Making the Top Assembly

Assembling the frames isn't difficult at all if you make yourself the special framing jig shown in *Figure 4* on the next page. Make four blocks from scrap 2" x 4" material, cutting each block 3½" square. Mark the center of the blocks and drill a 1½"-diameter hole through each one. Next, cut in from two sides to form a 90° inside corner. Place one of these blocks outside each corner of a frame and use a band clamp, running around the entire assembly, to pull the frame and blocks tight.

Glue up each frame by spreading epoxy in the spline grooves and on the mitered ends of the slats. Next, put the splines in place and assemble the frame. Now set up the band clamp and corner blocks to pull the frame together while the glue dries. Check for squareness by measuring diagonally across each frame, adjusting the frame until the two measurements are equal. Remember that the plywood base (piece 10) for supporting the tile should be installed at this time in the smallest frame.

The top is designed with 1/4" gaps between each frame. In order to maintain this spacing, make a bunch of 1/4"-thick spacers to place between the frames while you drive the dowels through the holes. Put some epoxy in the holes in the smallest and largest frames, then lay all the frames and 1/4" spacers in sequence on your bench. Tap the chamfered ends of the dowels into the frames and continue until they contact the plywood center plate. Once all the dowels are driven, turn the assembly over and pin the dowels in every frame with a 1¼"-long brad. Drill pilot holes before driving the brads and, after countersinking them slightly, fill the hole with wood putty to minimize the effects of moisture. Finally, cut off the ends of the dowels and sand them flush with the outside frame.

Center the pedestal on the overturned top and mark three screw locations in each support beam where they solidly cross the frames (see *Exploded View* on page 106). Use a 1/2"-diameter bit to counterbore these positions. Since the width of the beams vary from one screw location to another, drill your counterbores deep enough to leave 1" of stock remaining from the bottom of the hole to the top edge of the beam. Now drill 1/8" pilot holes through the beam and 1/2" into the top. Join the assemblies with #10-2" non-corrosive wood screws. It's also convenient at this time to glue and pin the foot pads (pieces 4) onto the bottom of each foot core.

Figure 2: *Once the drilling jig is clamped to the drill press table, align the center mark on the slat with the left line on the fence to drill the first hole. Next, slide the slat along the jig to line up its center line with the right location mark on the fence and drill the second hole.*

Set the table upright to install the marble. Run a thin bead of silicone caulk on the plywood where it meets the redwood frame, and add four evenly spaced dollops of caulk on the interior area of the plywood. Set the marble in place, wipe away any squeeze-out with a damp rag and let the caulk cure overnight.

Building the Benches

The benches are designed in a trestle style that incorporates many of the same elements as the table. As you did with the table, make the feet and support beams first. The *patterns* for these pieces are on page 111, so go ahead and cut out eight feet (pieces 13) and eight support beams (pieces 15) from 2" x 4" stock, and sixteen appliques (pieces 14) for the feet from 3/4" redwood. Roundover all the top edges of the feet, the outside top edges of the appliques, and all the bottom edges of the beams with a 3/16"-radius bit. Prepare the beams and feet for joining the legs by drilling 1/2"-deep by 3/4"-diameter counterbores as shown in the *Elevation Drawings* on page 111. Follow the counterbores by drilling 5/16" pilot holes. Each beam also requires two 1/2"-diameter by 1¼"-deep counterbores on the bottom edge for securing the outside slats in the seat assembly (see page 111). Follow these counterbores with 1/8" pilot holes.

All the legs (pieces 16) are cham-

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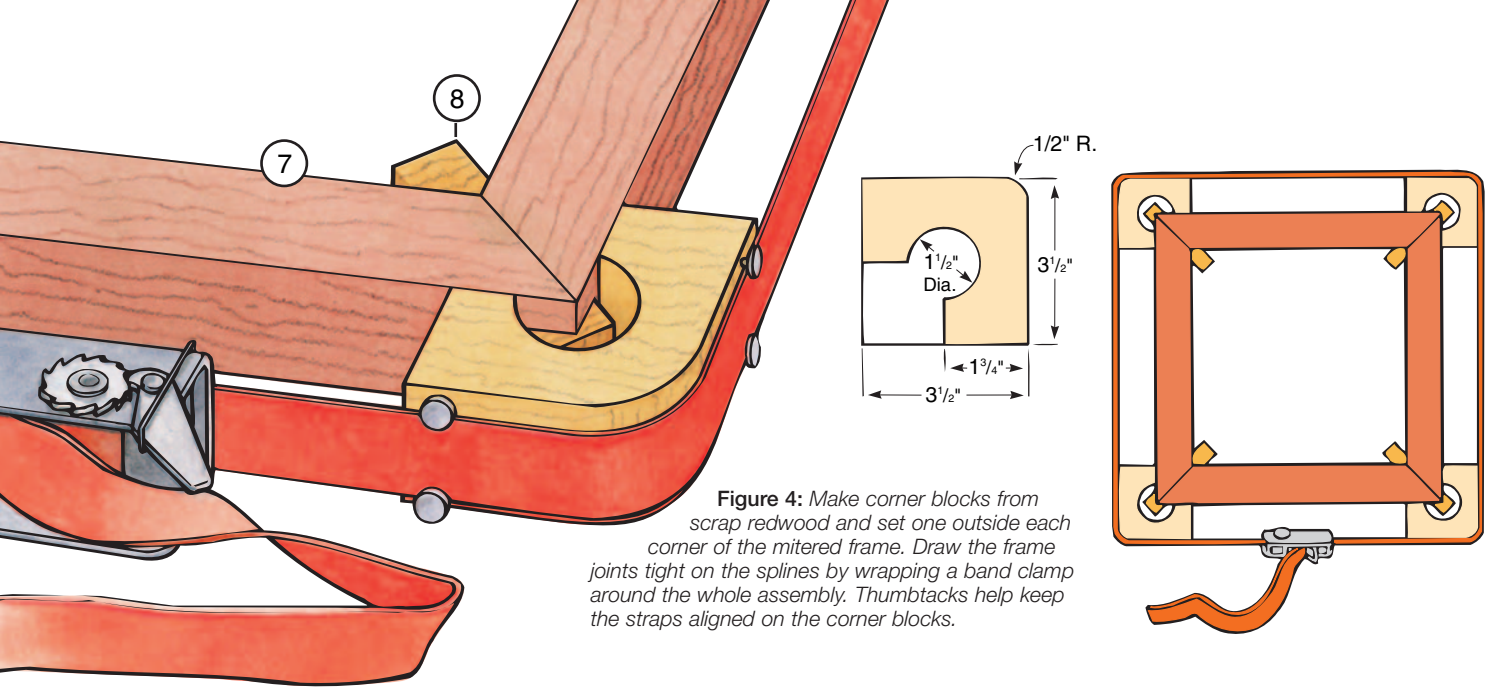

Figure 4: *Make corner blocks from scrap redwood and set one outside each corner of the mitered frame. Draw the frame joints tight on the splines by wrapping a band clamp around the whole assembly. Thumbtacks help keep the straps aligned on the corner blocks.*

fered on their bottom edges and notched at the top to join with the stretchers. Cut the legs to length and chamfer their bottom edges on the table saw. Lay out the notches following the *elevation* on the next page and remove the waste with a jigsaw. Lay the feet and beams on the legs, then drill the pilot holes and join the pieces together with lag screws (pieces 20). Use epoxy to adhere the appliques to each foot.

The stretchers (pieces 17) span between the legs, giving the benches their strength and acting as the middle slat in the seats. Use the *pattern* on the next page to lay out the stretchers, including the dowel hole locations. Cut them out with a jigsaw and round over the top and bottom edges with a 3/16"-radius bit. Slip the stretchers into the leg notches and equip your portable drill with a 1/4" bit. Now extend the center lag screw hole from each support beam into the stretchers for 2".

The slats (pieces 18) that make up the seat are the same as those on the table top, so you can rip four eight foot 2" x 4"s into 1½" x 1½" strips and cut them into 24" lengths. Round over all the slat edges with the 3/16"-radius bit. Now use the same drill press jig you made for the table top and drill two dowel holes 4½" off center on each slat. Remember to drill these holes through the slat portion of each stretcher also.

Cut two 13"-long dowels (pieces 19) for each seat and sand them with 100-grit paper so they slip into the slat holes easily. Now put epoxy in the stretcher holes and slip the dowels in place, leaving about 5¼" stick out on each side. Wipe the glue from the dowels and add two more slats on both sides of the stretcher. Be sure to use 1/4" spacers between every piece and pin these slats with brads. Now put epoxy into the holes in the two outside slats and mount them onto the dowels. The finished width of the seat should be 12". When the glue is dry, cut off the ends of the dowels and sand them flush with the slats.

Set the seat assembly onto the legs, dropping the stretcher tenons into the notches and securing the joints with 3" lag screws (pieces 21). Now flip the entire bench over and drive #10-2" wood screws (pieces 22) through the beams into the outside slats to completely secure the seat to the leg assembly.

Redwood, as it ages, turns from its original red color to silvery grey. The only way to maintain the original reddish tone is to color the wood with an exterior wood preservative. Reapply this finish every season.

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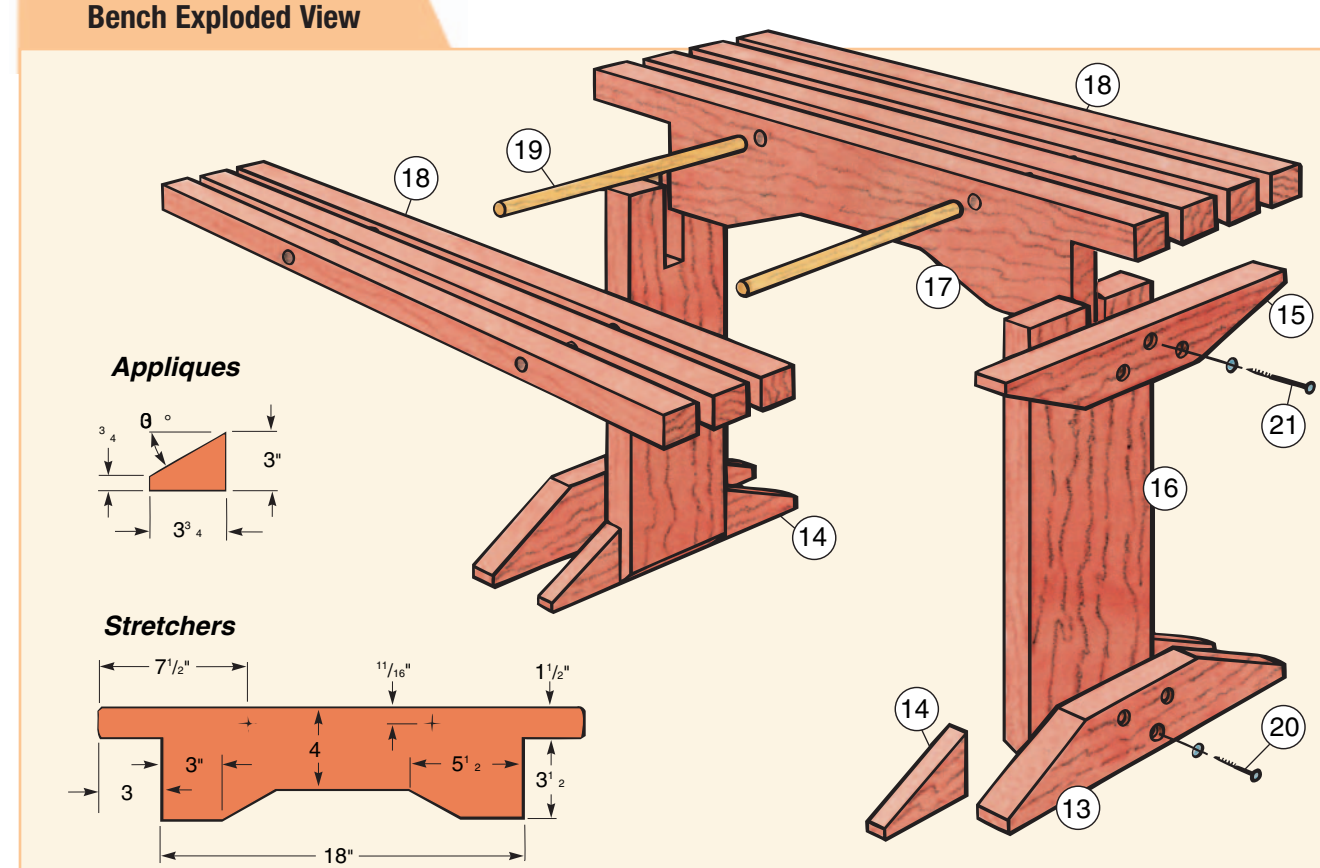
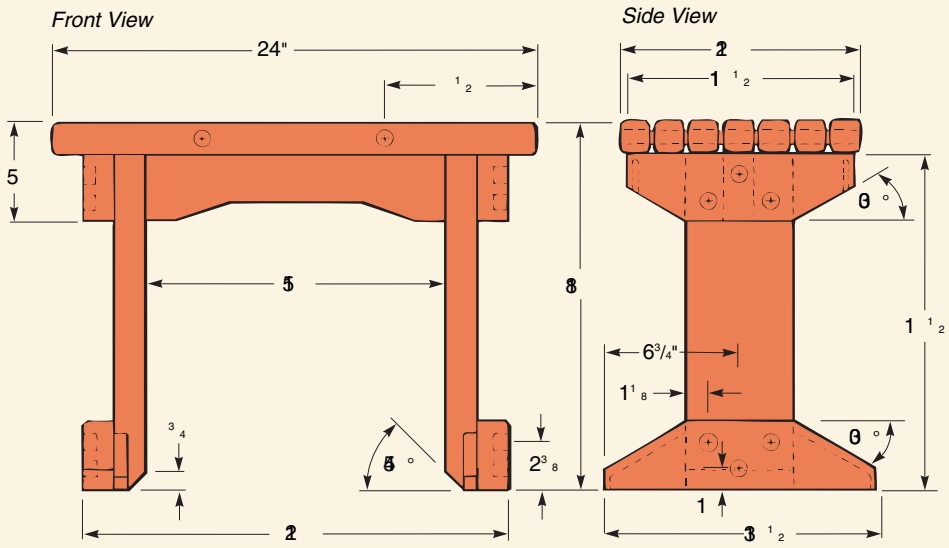
Bench Exploded View



Appliques

Stretchers



MATERIAL LIST – *Four Benches*

	T x W x L		T x W x L
13 Feet (8)	1½" x 3½" x 13½"	18 Seat Slats (24)	1½" x 1½" x 24"
14 Appliques (16)	3/4" x 3" x 3¾"	19 Dowels (8)	3/4" x 13"(White Oak)
15 Support Beams (8)	1½" x 3½" x 11½"	20 Lag Screws (40)	5/16" x 2"
16 Legs (8)	1½" x 5½" x 16½"	21 Lag Screws (8)	5/16" x 3"
17 Stretchers (4)	1½" x 5" x 24"	22 Wood Screws (16)	#10 - 2"

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Weekend Toy Box

In this plan you will be getting:

- Step by Step construction instruction.
- A complete bill of materials.
- Exploded view and elevation drawings.
- How-to photos with instructive captions.
- Tips to help you complete the project and become a better woodworker.

Published in Woodworker's Journal "Woodworking for the Home Hobbyist: 27 Great Projects and Techniques for your Woodshop"

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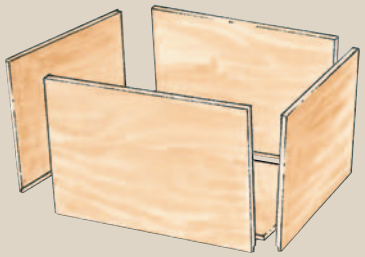
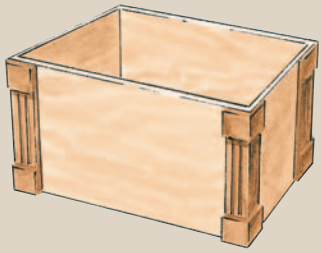
Weekend Toy Box

Safe and sturdy, stylish and practical, this weekend project is easy to build. Butt joints covered by simple fluted moldings create a classic toy box that stores tons of fun, even if it all tends to stay in the living room and in full view. Eventually, this project transforms easily into a keepsake chest and even doubles as extra seating.

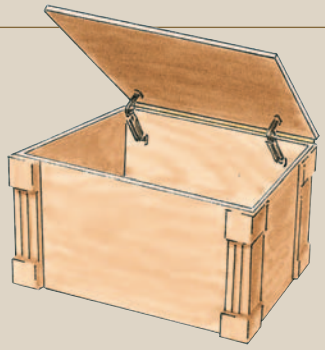
AS EASY AS 1-2-3...4



Step 1: *Cut the plywood panels to size, machine four rabbets and test the fit.*



Step 2: *Add the edge banding, fluted molding and plinth blocks.*



Step 3: *Attach the lid and add the hardware: two child-safe lid supports and a simple piano hinge hold it securely.*

Step 4: *Add the finish of your choice, a few strips of Velcro® and a nice cushion.*

Toys are a lot more than mere playthings. They represent everything from a child's dreams for the future to a parent's paradise lost. But even with such wonderful esoteric values, the reality is that most of the time they're just a huge mess all over the house. That's particularly true nowadays, when a kid seems to own every toy that's ever appeared on TV.

The rules are a little different these days, too. Kids are often allowed to set up fun shops in the middle of the living room. On the other hand, you may have memories of your old toy box relegated to a bedroom because it didn't "go" with mom's decor.

So, here is a toy box for today. It's designed to look great in the living room or basement, featuring basic construction with elegant results. Purchase or have the cushion made, and you have a toy box that will easily convert to a blanket chest or perhaps an extra seat for the big game.

Whether you're an old hand at woodworking or a raw recruit, this project is manageable with just the barest array of tools. All you'll need are a table saw, router and a few basic hand tools. A circular saw might come in handy, but it isn't absolutely essential.

Keep two things in mind when choosing the wood for your toy box. First, look for a species your lumberyard stocks in both 3/4"-thick hardwood stock and 3/4" veneered plywood. We found both in cherry for the box shown here. Second, think about how your choice will match your room decor.

Cutting Major Components to Size

Dimensions for the top, sides, front and back (pieces 1, 2 and 3) are given in the *Material List* on page 145. All five parts can be cut from a single sheet of

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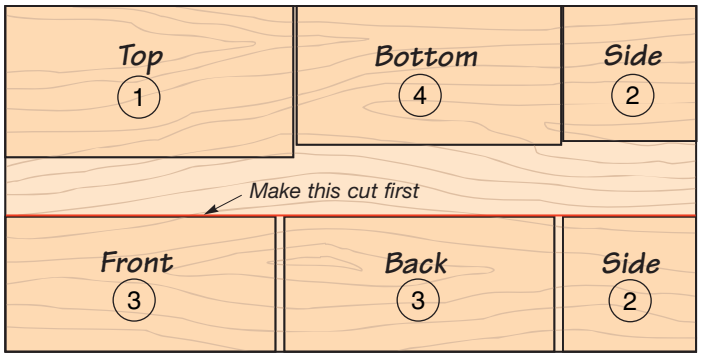
Plywood Cutting Guide
(Note: You don't have to cut the bottom piece from your expensive plywood.)



veneered plywood, as shown in the *Plywood Cutting Guide*, above. When laying out these cuts, pay special attention to grain direction, so the lines run horizontally around the box. You'll find some helpful pointers on handling large sheets on page 148. The bottom (piece 4) can be squeezed out of your nice plywood, but since it won't be seen, you're better off cutting it from any halfway respectable-looking sheet stock you have laying around.

Most hardwood veneered sheets come with an A (or A2) and a B side. The A side is a better quality veneer, and it should be facing out on the finished project. Make sure the blade always enters the good side and exits the B side, to avoid splintering. So, if you're using a circular saw to cut a full sheet to size, the A side should be facing down. On the table saw, the orient it so the A side faces up instead. Either way, use a sharp, fine-toothed blade.

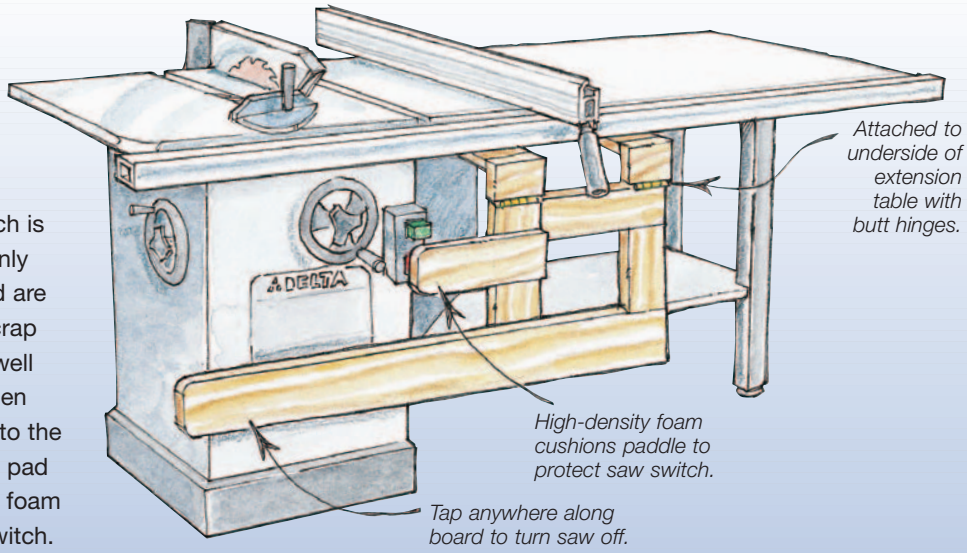
Milling Rabbets for the Bottom

The bottom is secured to the sides, front and back by setting it in matching rabbets. These can be cut on the table saw using a dado head, or with a router using a 1/2" straight bit. For the table saw method, just set the fence and blade according to the dimensions shown in the *Rabbet Detail Drawing* on the next page, and make the cuts. If you choose to go with a router (either portable with a clamped-

QuickTip

Table Saw Safety Switch

This table saw safety switch is simple to make, and the only hardware items you'll need are two 3" butt hinges. Any scrap hardwood will do equally well to build the framework. Then screw the swinging frame to the underside of the table and pad the "off" paddle with extra foam to ease pressure on the switch.



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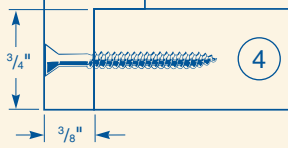
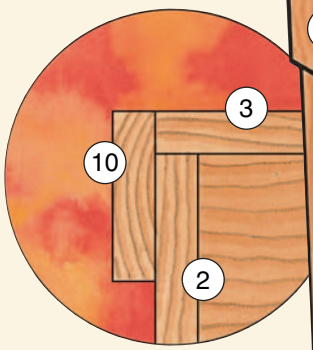
Toy Box Exploded View

Rabbet Detail *(Section View)*

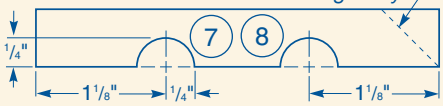


Back Corner Detail *(Top View)*

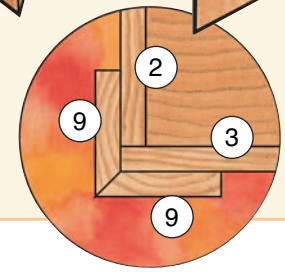


Fluted Moldings *(Top View)*

45° miters cut on front fluted moldings only



Front Corner Detail *(Top View)*



MATERIAL LIST

		T x W x L
1	Top (1)	3/4" x 21" x 40"
2	Sides (2)	3/4" x 18¾" x 18½"
3	Front & Back (2)	3/4" x 18¾" x 37½"
4	Bottom (1)	3/4" x 19¼" x 36¾"
5	Edge Banding (1)	3/4" x 1/4" x 238"
6	Screws (32)	#6 x 1½"
7	Front Fluted Moldings (4)	1/2" x 3½" x 13"
8	Rear Fluted Moldings (2)	1/2" x 3½" x 13"
9	Front Plinth Blocks (8)	3/4" x 3¾" x 3"
10	Rear Plinth Blocks (4)	3/4" x 3½" x 3"
11	Lid Hinge (1)	36" Piano Hinge
12	Lid Supports (2)	Rear-mount

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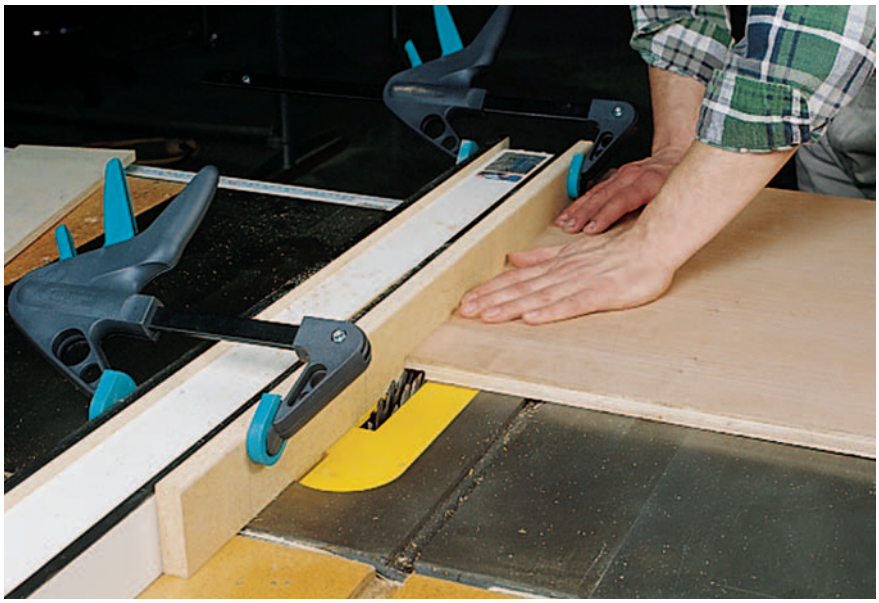

Figure 1: *Form a simple rabbet at the bottom of the sides, front and back for the bottom piece. There's no need to stop the cuts, since molding will cover the corners.*

on guide, or table mounted), make each rabbet in two passes to lessen the strain on the router bit.

Disguising the Plywood Edges

Although veneered plywood is an excellent building material, and it does a wonderful job of replicating wide boards, it has one minor drawback: The edges of a cut sheet reveal the alternating layers or plys within the board. There are a couple of ways to deal with this. One is to apply an iron-on veneer tape, but with the usage this toy box may see over the next several decades, strips of hardwood edge banding (piece 5) would be a much more durable edging.

Rip enough 1/4"-thick stock to cover both the top edges of the carcass and the outer edges of the lid. This stock should be the exact width of the plywood thickness. Trim it to length (create mitered corners on the lid pieces), and apply it with glue and clamps. If you're short of clamps, you can use 1¼" hardened trim nails, predrilling the trim every six inches so it won't split (chuck one of the nails in your drill and use it instead of a drill bit). Set the nail heads after the glue dries, then fill and sand them.

If the trim is minutely wider than the plywood, make sure the outsides (appearance sides) are absolutely flush. You can belt-sand the inside faces with 220-grit after the glue dries. Go slow: you don't want to sand through the veneer.

Assembling the Box

The box carcass is held together with glue and screws driven through simple butt joints. Refer to the *Exploded View* on page 145 to orient the parts properly. With the bottom in place, butt the joints together and hold them temporarily with clamps (or an extra pair of hands if they're available). As you work, make sure the carcass is square and plumb. Measure diagonally across the top in both directions: when these measurements are identical, your assembly is

Figure 2: *Rout the flutes in your stock before cutting it to length to ensure uniformity.*

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square. Adjust clamping pressure to tweak the box for squareness.

Pre-drill for the screws (pieces 6), using a bit about half the thickness of the screws in the second piece, and the full thickness of the screws through the first piece. This will ensure the screws pull the joints tight as they are driven home. Be sure to countersink for the heads so they'll lie flush with the wood. Apply glue to both joint surfaces, set the bottom in its rabbet, and drive the screws home.

Keep a damp cloth handy to wipe off any excess glue. If you miss some glue spots, wait until they become rubbery, then clean them up with a sharp chisel, using the blade as a scraper.

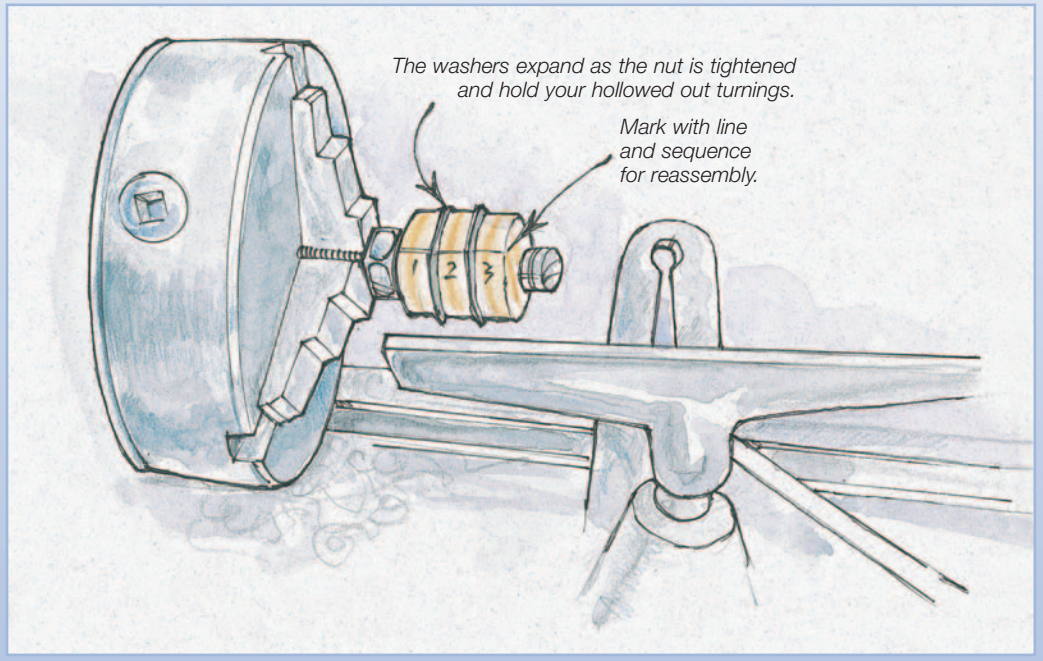
Adding Fluted Corners

A simple molding application takes this project from a mundane cube to an elegant toy box. We used a fluted molding, created by milling a pair of large grooves (called flutes) in one face of 1/2"-thick pieces of stock (pieces 7 and 8). The best way to do this is with a table-mounted router (see *Figure 2*),

QuickTip

Create Your Own Expanding Mandrels

If you like to make napkin rings and other hollow turnings, here's a way to hold your work securely: cut a number of plywood discs—depending on the length of the mandrel—then thread them on a hex-headed machine bolt and turn them to the exact inside diameter required. Now cut discs from an old inner tube and re-assemble the mandrel as shown below. Tightening the nut squeezes the rubber discs so the mandrel expands and grips the turning. If the mandrel is longer than about 2" it will need end support. Create this by countersinking the exact center of the bolt head, and then mount a live center in the tailstock. You may find it best to draw a reference line on the plywood discs so they can be re-assembled in the original order.



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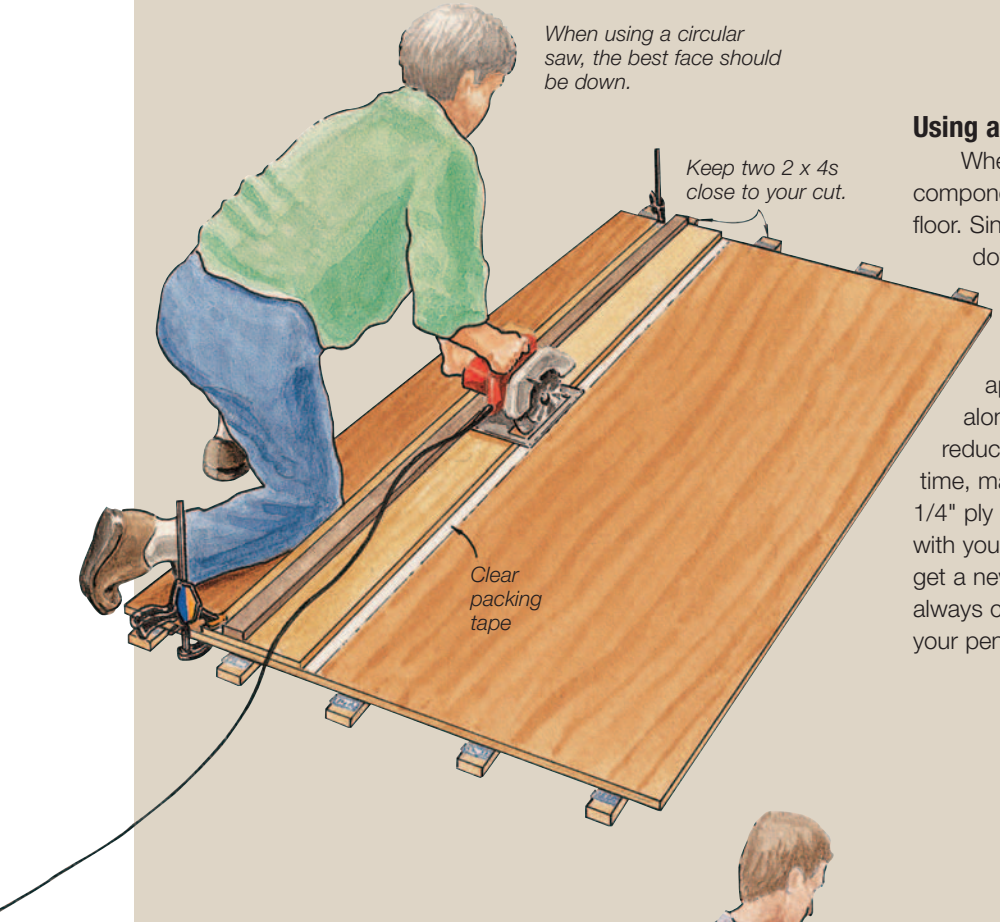
SPLINTER-FREE CUTS ON LARGE SHEET STOCK

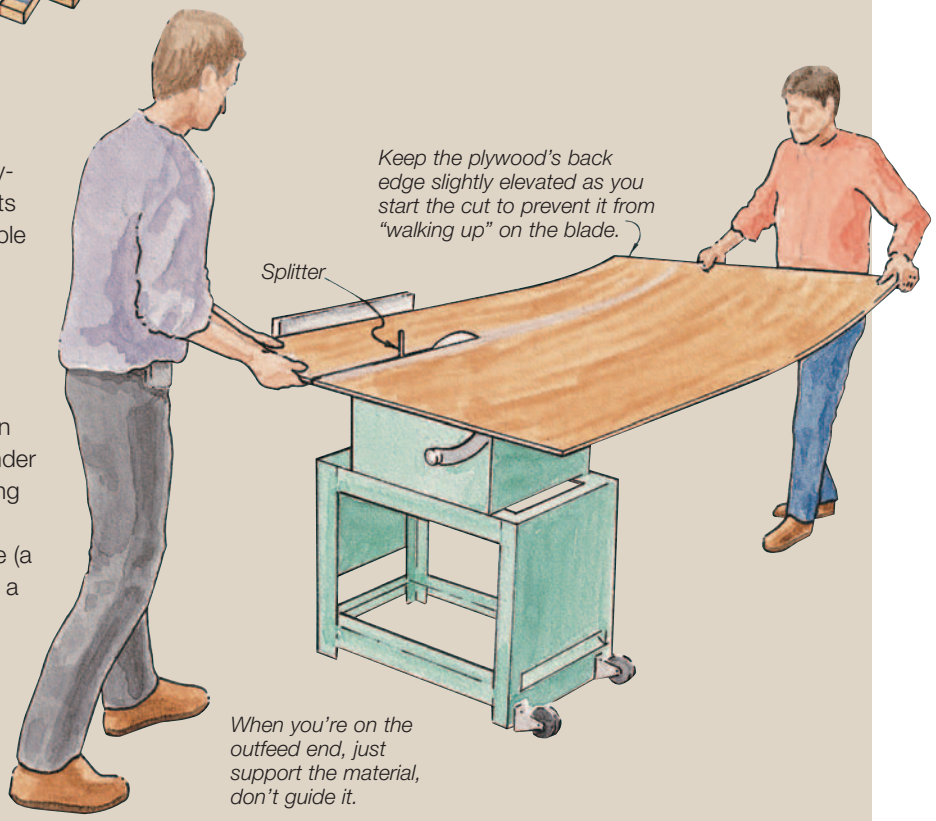


Using a Circular Saw

When cutting a full sheet of plywood into components, lay a few 9'-long 2 X 4s on the floor. Since the best face of the stock should face down (the exit side of a cut is more likely to splinter), glue thin carpet to one face of each of the 2x4s to protect the plywood's veneer. We also recommend applying 3M-brand clear packing tape along the path of the cut (both sides) to reduce splintering. To get a perfect cut every time, make a jig by gluing an 8"-wide length of 1/4" ply to a straightedge. Trim through this piece with your saw against the straightedge. Until you get a new saw, that's where your blade will always cut. Just line up that trimmed edge with your pencil mark and clamp the jig in place.

Using a Table Saw

In this case, the best face of your plywood must face up as you cut. Full sheets shouldn't really be handled alone on a table saw—you're just a bit too far from the shut-off to be safe. And if your stock is more than a couple of feet long, be sure to provide a solid outfeed support; roller stands or a large outfeed table are two good options. Take care when cutting thin sheet stock like laminate…it may slide under the fence and go out of alignment, causing binding on the blade. And speaking of blades, a blade with a reverse hook angle (a melamine blade) works much better than a crosscut version on veneered panels. Score through the veneer on cross-grain cuts, setting the blade at about 1/32" for the first cut, then turn the sheet over and raise the blade to about one and a half times the thickness of the stock for your second cut.



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Keep those little fingers safe with a quality support like the one used for this project, approved for use on toy boxes by the Consumer Product Safety Commission.

using an inexpensive 1/4"-radius core box bit to form 1/2" flutes. Refer to the *Elevation Drawing* on page 145 for the dimensions, and make the cuts in two passes.

After the grooving is complete, use your table saw to create a 45° chamfer on one edge of each piece of the front molding. The rear moldings need not be chamfered. Now use the same saw angle to chamfer one edge of each of the front plinth blocks (pieces 9). Again, since the back is flush, it's not necessary to chamfer the rear plinth blocks (pieces 10). Glue and clamp the blocks in place, using the *Exploded View* for orientation. Now trim the lengths of molding to fit snugly between the blocks and glue and clamp them in place. Clean up any glue squeeze-out, and set the project aside to dry.

Applying a Finish

The most important step in any finish is the preparation that goes into it. Fill all the nail holes and any minute gaps that appear in the mitered joints, then let the filler dry thoroughly. Sand the entire project with 120-, then 180-, and finally 220-grit paper. Chisel out any minor accumulations of glue in the corners and you're ready to apply a finish. Many furniture builders like to wipe on a matching stain (in our case, medium cherry), to even out any tonal differences between the plywood veneers and the solid hardwoods. This is also a great way to achieve instant aging—that magnificent patina cherry develops over the years due to exposure to light and air.

Since this toy box will receive heavy usage over the generations, we suggest applying three or four coats of non-toxic clear finish over the stain, sanding all but the final coat with 400-grit wet/dry sandpaper.

Installing the Hardware

After the finish is dry, attach the lid with a continuous piano hinge (piece 11), pre-drilling for the screws. Piano hinges are durable, strong and will provide years of service for a reasonable price. You can rout a mortise for this in the bottom of the lid if you like, but it isn't necessary. To save little fingers from getting pinched (a real hazard with large doors or lids), install a pair of child-safe lid supports (pieces 12) which regulate the speed at which the lid closes. Installation instructions are included with this hardware.

Now all that's left to do is to convince a houseful of boisterous kids that those scattered toys belong in their brand new, fluted, cherry toy box when not in use. You're on your own for that job!

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Strike Up the Bandsaw

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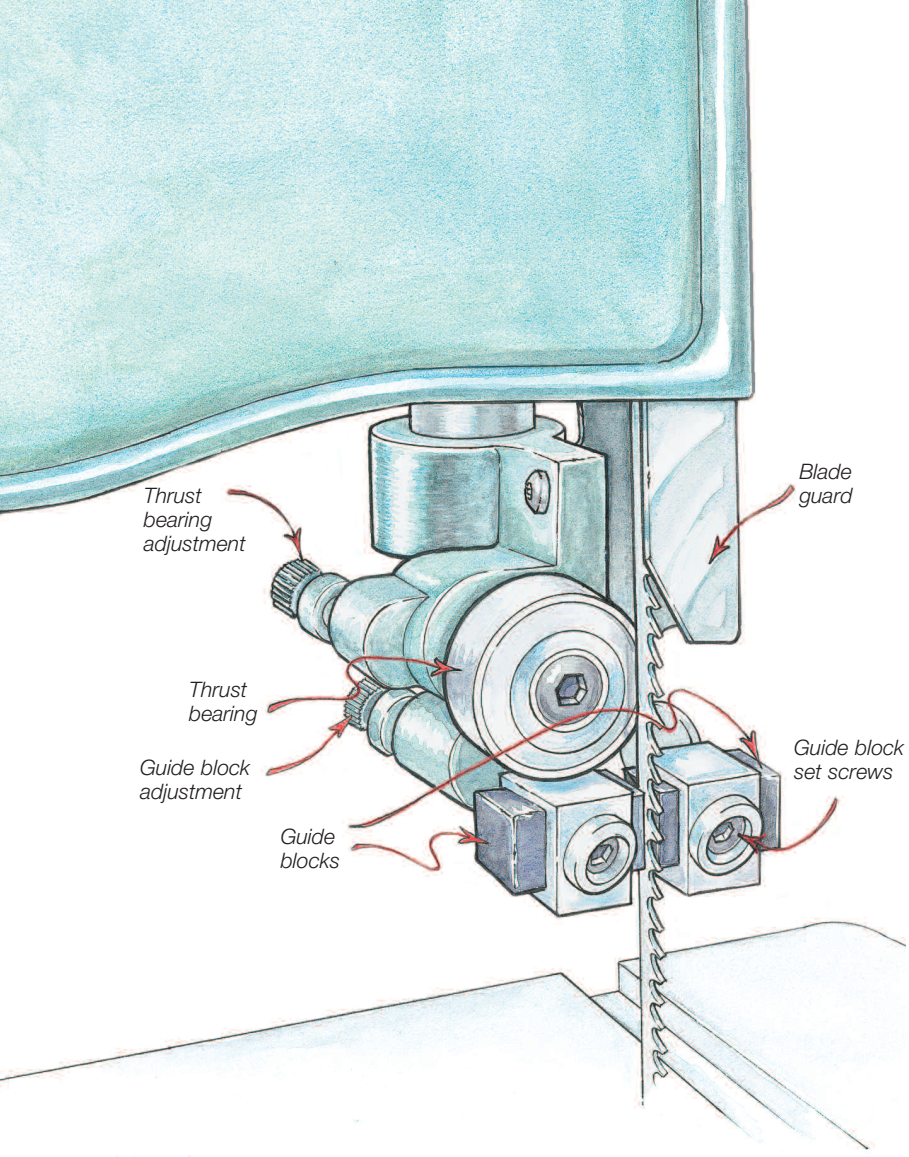


Strike Up the Bandsaw

Bandsaws are wonderfully quiet to operate and don't pose the same kickback threat as tablesaws. They're ideal for making straight or curved cuts, and the saw kerf creates much less airborne dust. But if your bandsaw isn't tuned properly, you'll be the one singing the blues. Here's how to get your saw adjusted and back on track.

A bandsaw is a tremendously versatile and useful tool—but only if it's running well. Properly set up, it allows you to create poetry out of wood. Out of adjustment it can cause vocabulary usage that would impress the most seasoned boatswain's mate.

Tuning up your bandsaw is not a huge undertaking. A couple of quick steps to better align and control your blade will have you cutting smoothly in just a few minutes.

Most modern bandsaws have a system of thrust bearings (those little metal wheels that the blade's back edge bumps into) and guide blocks that hold the blade in proper alignment. Start by unplugging the saw, then loosen the set screws that hold the guide blocks; back them out so they no longer touch the blade. Next, turn your attention to the thrust bearings, backing them off the saw blade a 1/4" or so. Center your saw blade on the drive and idle wheels by rotating the top wheel by hand. While you turn the wheel, use the tracking control to shift the blade to the crown (top of the arch) of whichever wheel adjusts the tracking. Then adjust the thrust bearings forward so they just barely touch the back edge of the blade. Ideally, when the saw is running, your blade will just tick the thrust bearings until you start to cut; the pressure of that action will drive the blade back to press against the bearings fully.

Blocking Is the Key

While adjusted thrust bearings keep the blade from moving front to back, guide blocks control blade twisting and limit side-to-side movement. If your guide blocks are showing wear, replace them. Worn blocks ruin good saw blades. The best replacements are Cool Blocks™, which are phenolic resin guides imbedded with graphite. They are superior to metal or wooden guide blocks in preventing wear and overheating. The most important thing to remember in adjusting the guide blocks is that their position changes with the size of the saw blade you are using. The blocks must be set so they capture the

sides of the saw blade, but they should not engage the saw teeth even when the blade is under cutting pressure. You also need a sharp blade of correct width to match the job at hand. For resawing or long straight cutting operations, a wider blade is exactly what you need. Tight curves call for narrow 1/8" or 1/4" blades. Blade tension is also important; start by adjusting the tension to the blade manufacturer's specifications. Increase tension further if the blade deflects excessively.

Just these few steps will make a huge difference in how well your bandsaw cuts. Attention to detail will provide for easier cutting and a milder vocabulary.

Go Wild with Boxes!

Try out your newly tuned up bandsaw on these three bandsaw boxes. They are great gifts and fun to make. Set up your bandsaw with an 1/8" blade and use the full-size patterns on the *Pinup Shop Drawings*. Follow the steps shown in the photos at right and enjoy your new smooth-cutting bandsaw.

MAKE A BANDSAW BOX CRITTER

Figure 1: *Glue the pattern (see the* Pinup Shop Drawings*) onto stock that is thick enough to create a box section in the animal. Plan your cuts first so you don't "cut yourself into a corner". After cutting the outline of the piece, cut out the center box section.*

Figure 2: *Reset the saw for the depth of the next cut. Carefully slice 1/4"-thick pieces off of each side of the center box section. Hold these cuts as straight and true as possible as these pieces will become the sides of the sliding box.*

Figure 3: *Put the side pieces away for now and again reset the saw to the next depth of cut. Draw lines to guide your cut as you remove the waste from the box. Make the opening as large as possible to allow for the greatest access to the box after you glue the sides back on .*

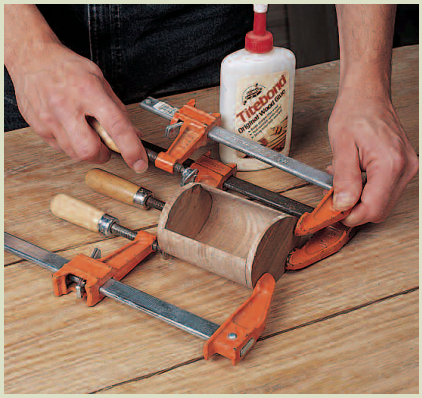
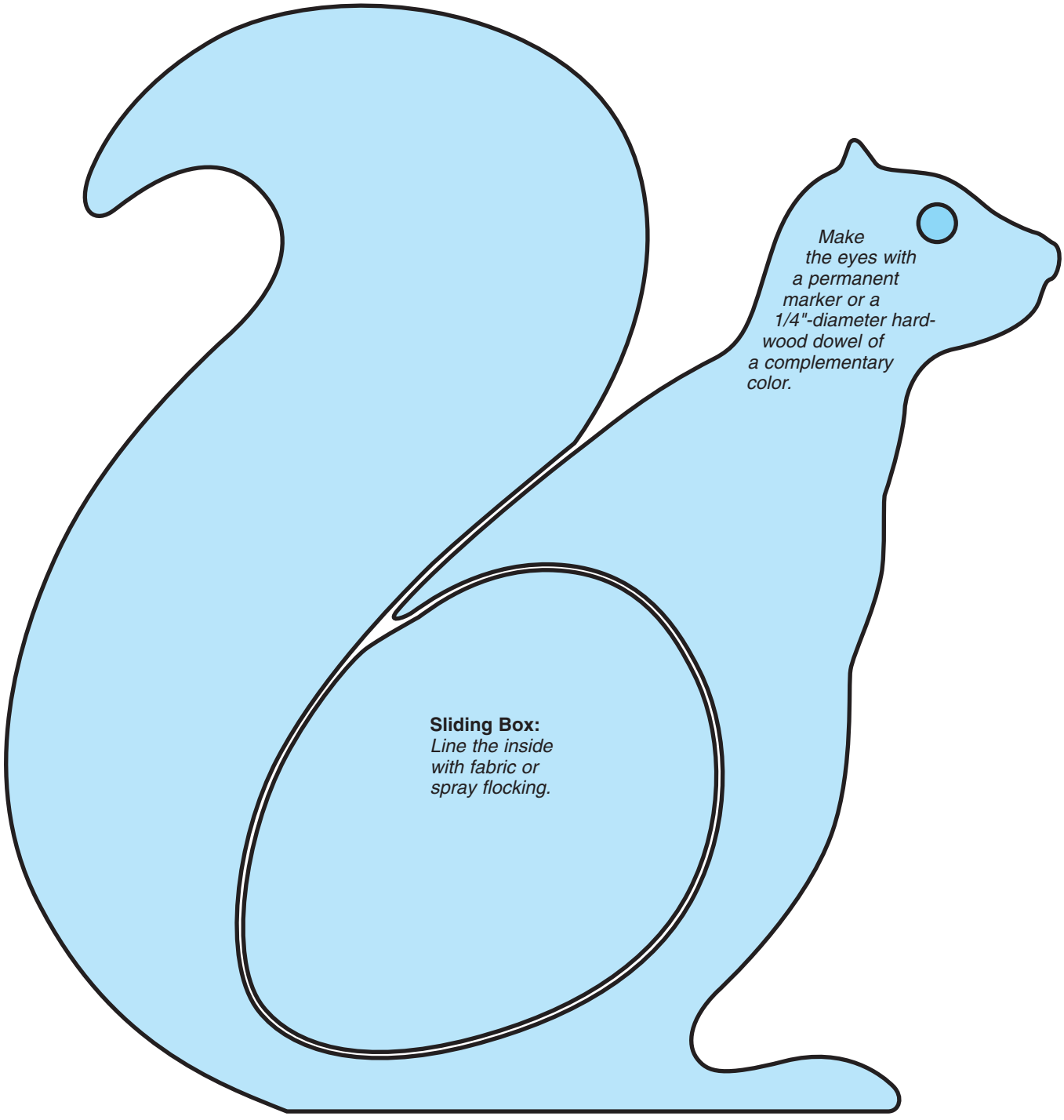
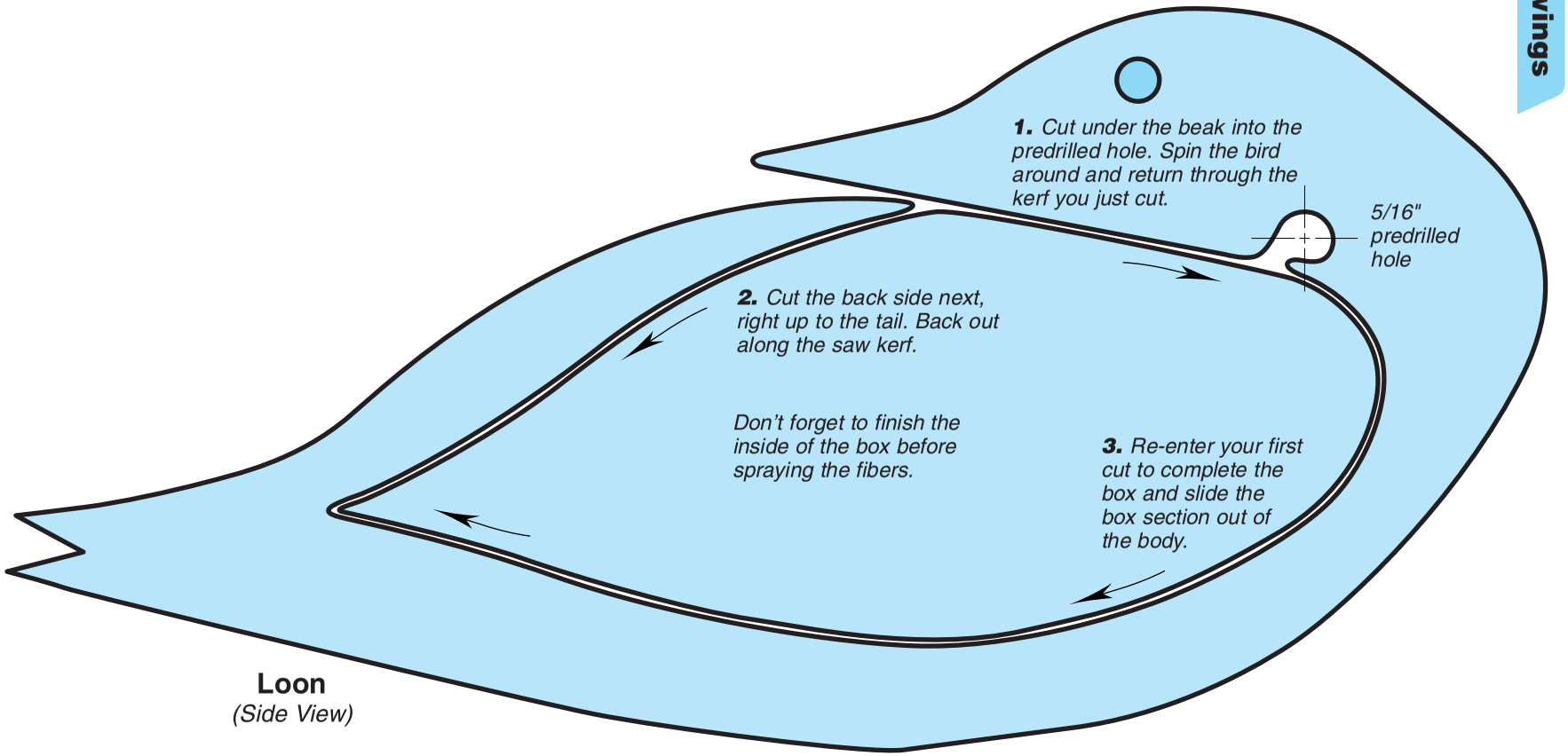


Figure 4: *Glue the sides back onto the center section. Sand the project smooth and use a marker or 1/8" dowel of contrasting color to make the eyes. Apply an oil or clear finish. Flock the inside of the box section for a finishing touch.*

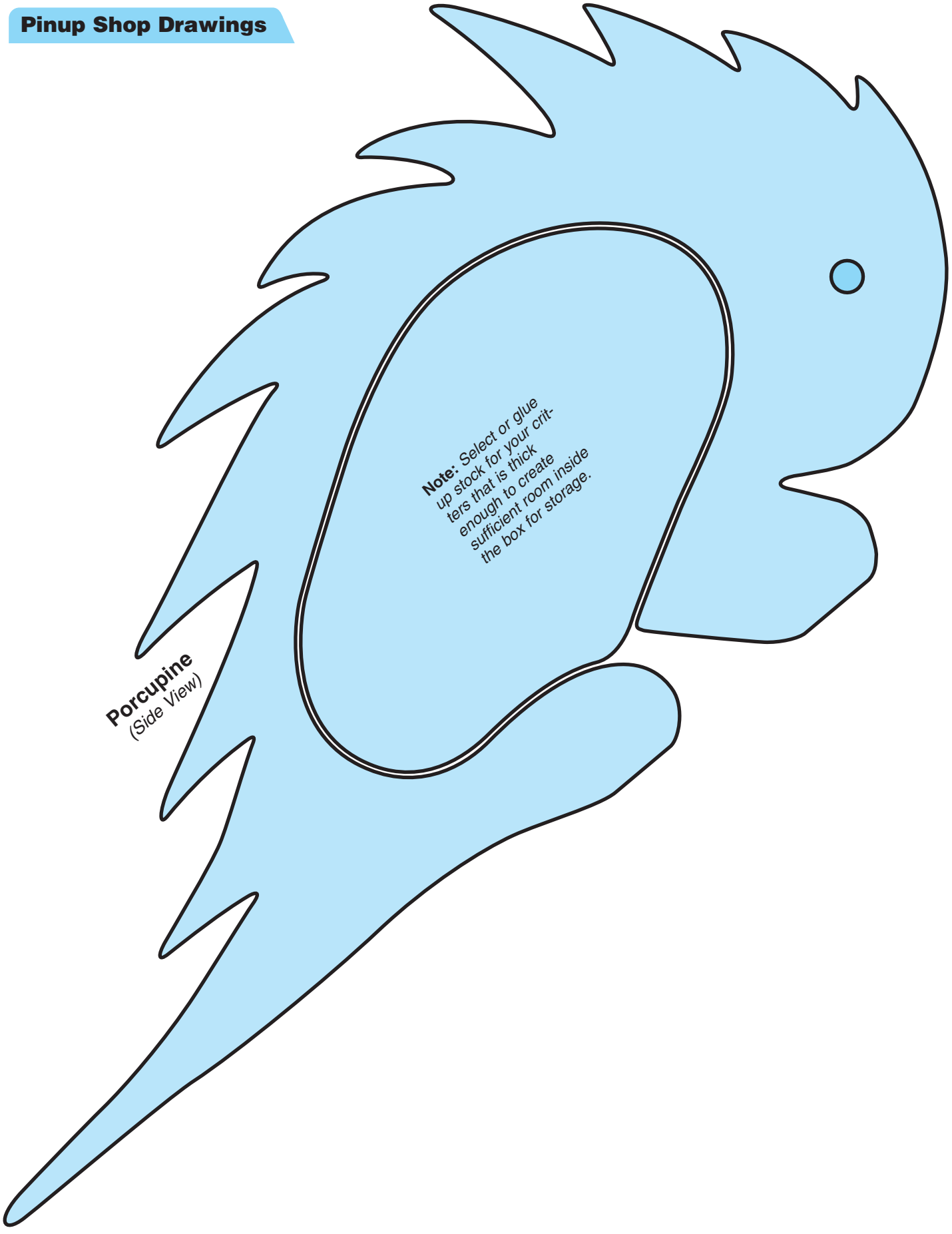
Tune up your bandsaw and then test drive it on these northwoods critter boxes.



Squirrel
(Side View)



Loon
(Side View)


Note: Select or glue up stock for your critters that is thick enough to create sufficient room inside the box for storage.
Porcupine
(Side View)