

BONUS!
Full-size
Patterns



- The Mission Icebox: A turn-of-the-century American classic
- Another whirligig wonder —complete with full size patterns
- The Caribbean deck table and a great weekend shop project



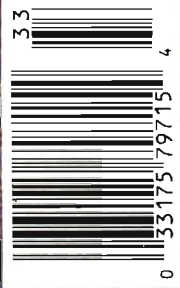
TODAY'S

Issue 33

WOODWORKER®

PROJECTS, TIPS AND TECHNIQUES

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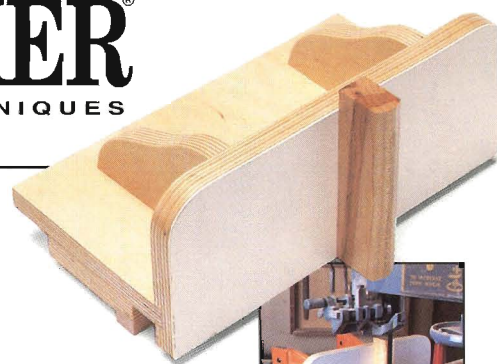




13 The Classic Oak Icebox

By Rick White

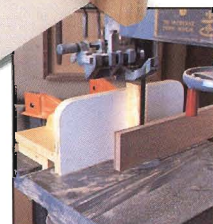
With its distinctive hardware and unique design, this turn-of-the-century classic is bound to stir up some memories.



8 An Adjustable Band Saw Fence

By Dave Olson

An essential shop project. It's easy to build, adjusts in a snap and improves your accuracy.



20 Outdoor Deck Table

By Joel C. Simon

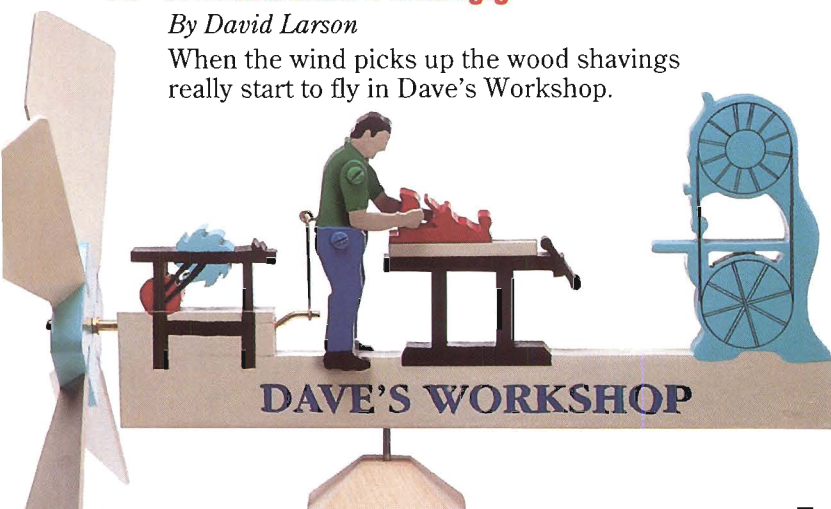
Years in the Caribbean have given Joel a unique perspective when it comes to woodworking projects for the outdoors.



10 A Woodworker's Whirligig

By David Larson

When the wind picks up the wood shavings really start to fly in Dave's Workshop.



3 On the Level

Thanks for your photos —our projects are cropping up all over, and winning an award or two along the way!

4 Tricks of the Trade

A pick of the tricks for making dollhouse shingles, some no cost calipers and a little panel glue-up insurance.

5 Hardware Hints

Try installing Accuride drawer slides the easy way.

6 Today's Shop

A survey of chisels and their uses in the workshop.

22 Finishing Thoughts

A step by step formula to get the classic Mission oak finish.

Safety First

Learning how to properly operate power and hand tools is essential for developing safe woodworking practices. For purposes of clarity, necessary safety guards have been removed from the equipment shown in some of the photos and illustrations in Today's Woodworker. We in no way recommend using this equipment without safety guards and urge readers to strictly follow manufacturer's instructions and safety precautions.

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Today's Woodworker, (ISSN: 1041-8113) is published bimonthly (January, March, May, July, September, November) by Rockler Press, 21801 Industrial Blvd., Rogers, MN 55374-0044. Second class postage paid at Rogers, MN and additional mailing offices.

POSTMASTER: Send address changes to *Today's Woodworker*, PO Box 420235, Palm Coast, FL 32142-0235.

One year subscription price, \$19.95 (U.S. and possessions); \$23.95 (Canada/foreign). Single copy price, \$4.95 (U.S. and possessions); \$5.95 (Canada/foreign). Send new subscriptions to *Today's Woodworker*, PO Box 420235, Palm Coast, FL 32142-0235. Submit project proposals, tips and techniques to the editor, *Today's Woodworker*, Box 44, Rogers, MN 55374.

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ON THE LEVEL

An Award Winning Table

As soon as we saw Dan's dining table design for issue 23, we knew it would be a winner. Your letters and photos soon confirmed this, as did the attention it garnered when Chris entered the table in the annual Minnesota Woodworkers' Guild exhibit.

Now Bill Skinner of Charlotte, North Carolina tells us that the table he built following our plans won an award and helped some needy children at the same time! According to Bill, "Your creative design helped contribute to this table being awarded 'Best of Show' out of over 100 other items at our annual *One Special Christmas* auction. The table sold for \$1,800 and helped supply scores of Christmas toys to needy children." Thanks for the letter Bill, and congratulations on both your award and fine craftsmanship.

Paul Schoessler of Denison, Iowa also completed his trestle table recently and sent us the photo shown above. "Instead of having the complete project made of cherry," Paul said, "I used ash plywood for the table top and cherry for the trim." Now, says Paul, "I'm planning on building the chairs that were featured in issue 24. I'll use cherry for the framework and ash for the splats. Thanks for the help and keep those projects coming!"

The pleasure is all ours Paul. We'll look forward to photos of the chairs.

We also heard from Nick Morgan, a reader from northern Virginia. Nick completed the Budget Workbench featured in issue 25 and, as you can tell from his photo at right, is already hard at work on his next project, the Southwestern Desk from issue 27.

While looking over the desk project (before cutting any wood), Nick caught a couple of errors that he wanted to pass along. First, piece 14 should be 11" long, not 13" and, second, the full size pattern of the through tenon on the side stretcher should be 2 1/4" long. Please make these changes right in your issue. Thanks for the corrections Nick; we're looking forward to a photo of your completed desk.



Paul Schoessler of Denison, Iowa decided to use ash for the trestle table top instead of cherry. By now, Paul should be well into the matching dining chair project featured in issue 24.

Readers always tell us they enjoy photos of projects built by their fellow woodworkers, so keep them coming. We'll make every attempt to include your pictures in upcoming issues.



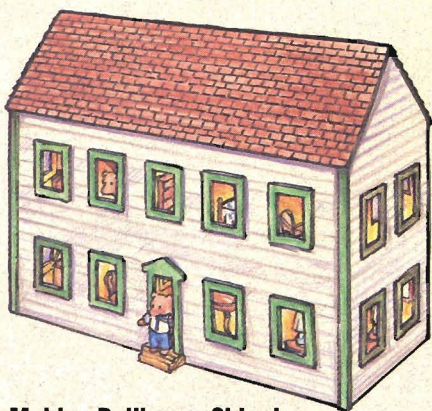
Speaking of workbenches, I'm delighted to announce that we finally have a new source for the vises used on our European style workbench originally featured in issue 7. Many of you were disappointed when the manufacturer went out of business shortly after the article appeared, but now these excellent vises are being produced by a different company. The back cover of this issue features both of the workbenches that we've built and a complete hardware kit to go with each.

Larry N. Storch



Nick Morgan had barely completed the budget workbench from issue 25 when he got busy building the southwest desk in issue 27.

A Few Shop Gems



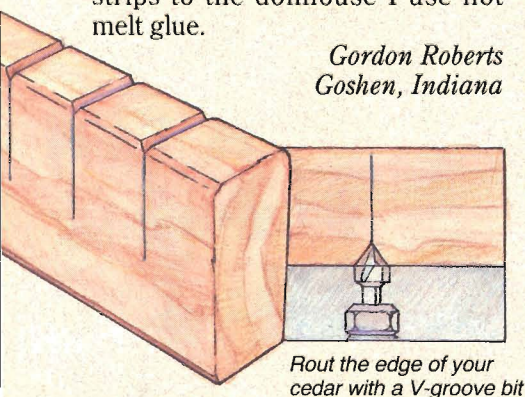
Making Dollhouse Shingles

I enjoyed reading the article on the folding dollhouse, but I want to share my method for making shingles.

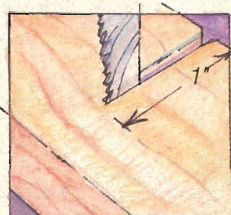
Using scrap cedar, I start by routing V-grooves about 1" apart on one edge of the stock. For consistency I use a router table and a miter gauge, although a moulding head in your table saw also yields excellent results.

Next, I make 1" deep bandsaw cuts into each V-groove, then I set up a single point rip fence on the band saw and slice off 1/8" thick strips. A coarse skip tooth blade is best to get the rough look of real split cedar shakes. To attach the strips to the dollhouse I use hot melt glue.

*Gordon Roberts
Goshen, Indiana*

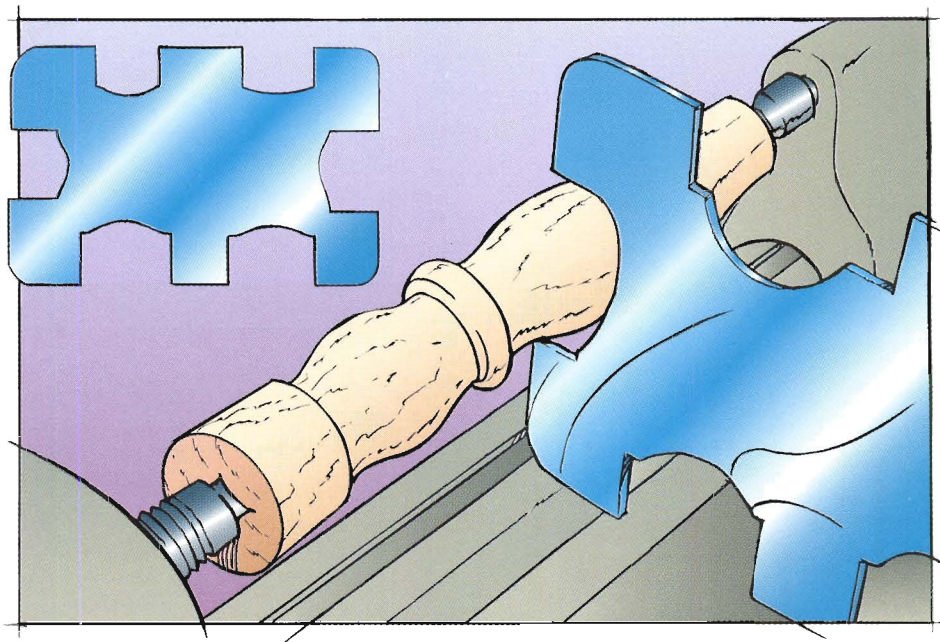
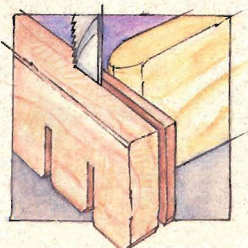


Rout the edge of your cedar with a V-groove bit



Using a miter gauge to support your stock, make 1" deep band saw cuts into each V-groove.

Install a single point fence on your band saw and rip 1/8" thick shingle strips from the cedar board.



Inexpensive Calipers

I've been successfully using homemade calipers for many years. They're accurate, they keep their shape if dropped and, being thin, they fit into the smallest gaps on any spindle turning. Best of all, my homemade calipers don't cost a dime, unlike the many calipers you'd have to buy to make a typical spindle with a variety of different diameters.

The calipers are made from scraps of plastic laminate. I layout the required opening on a scrap piece, then use the table saw and miter gauge to nibble away the waste between the layout lines. It's important to make the cuts deep enough so the caliper can reach past the middle of the turning.

*Boles M. Derenda
West Seneca, New York*

More Uses for Sanding Belts

Because they last an exceptionally long time and take a lot of abuse, I use sanding belts to smooth my turnings while they're still on the lathe. I also tear old belts into strips and use them to sand into the tight places on spindle turnings.

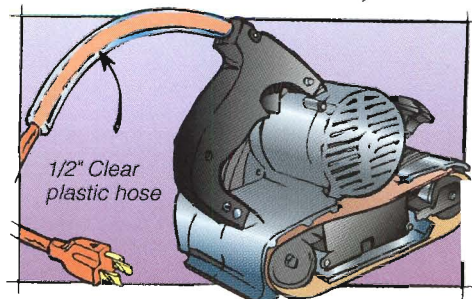
*Norman J. Hines
Terre Haute, Indiana*

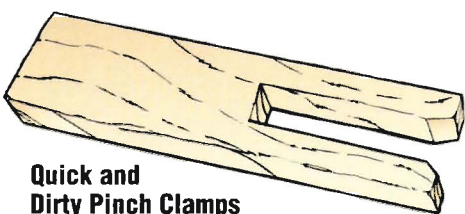
Power Cord Safety

I recently had the misfortune of getting my belt sander's power cord caught between the housing and the belt. Besides the scare it gave me, the cord was damaged, the belt was destroyed and the gears in the sander were stripped.

After having the gears repaired I decided to take steps to prevent the accident from happening again. I replaced the old cord, but before rewiring it to the sander I slipped an 18" section of 1/2" clear plastic hose (available at hardware stores) over the cord. I forced one end of this hose into the sander's handle — tightening up the handle screws keeps the hose in place. Now the stiffened cord stays well away from the belt.

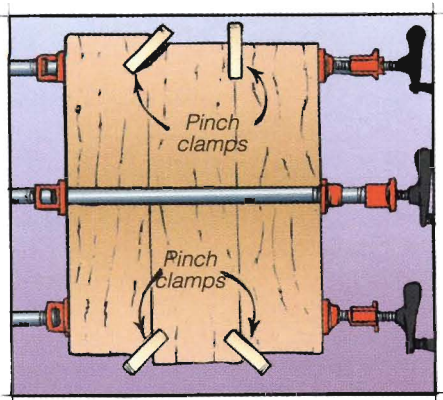
*H.F. Fregly
Tallahassee, Florida*





Quick and Dirty Pinch Clamps

I join boards edge to edge without splines, dowels or biscuits. The problem is that it's difficult to keep all the boards flush while gluing them together. I solved the problem with a set of pinch clamps. I used the table saw to cut a 1" deep opening (which should be a shade narrower than the thickness of the boards in the glue-up) in the end grain edge of a 1" x 6" x 2" piece of scrap, then cut the scrap into the 1" wide clamps.



Once I've applied glue to the boards and placed them together, I slip the pinch clamps over the end of the joints to keep them aligned while tightening the boards in the panel with bar clamps (the ends of the clamps are chamfered so they slide on easier). The pinch clamps work if the boards are of slightly different lengths but they must be the same thickness. Be sure to oil the pinch clamps and slip them off the assembly before the glue dries so they don't get stuck.

*Roopinder Tara
Willow Grove, Pennsylvania*

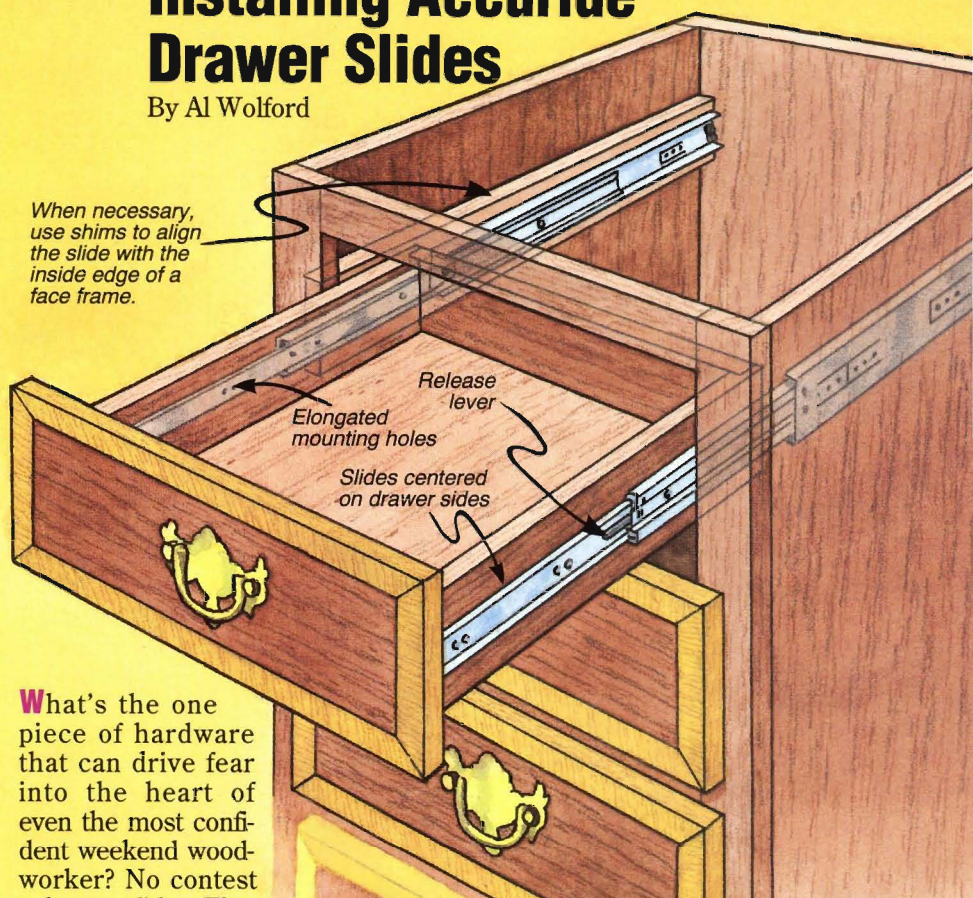
Today's Woodworker pays from \$35.00 (for a short tip) to \$150.00 (for each issue's "Pick of the Tricks") for all Tricks of the Trade published. Send yours to Today's Woodworker, Dept. T/T, Rogers, MN 55374-0044.

Today's Woodworker May/June 1994

HARDWARE HINTS

Installing Accuride Drawer Slides

By Al Wolford



What's the one piece of hardware that can drive fear into the heart of even the most confident weekend woodworker? No contest ...drawer slides. There are two points I try to impress upon callers getting ready to attempt their first drawer slide installation.

First, if they're working on a fine project like a dining room buffet, I tell them to stay with Accuride, which I think of as the Cadillac of slides. They offer smooth operation, long life and elongated mounting screw holes that allow for small adjustments, even after installation.

And second, I suggest investing in a Jig-it Template. After about a thousand calls from customers, I convinced The Woodworkers' Store development team to come up with a low cost jig to simplify the installation of Accuride slides. They did a great job. With one of these templates, drilling the mounting holes is now as easy as a game of connect the dots.

Al is the technical service manager at The Woodworkers' Store. Send your hardware questions or comments to Al c/o Today's Woodworker, Dept. HH, Rogers, MN 55374-0044.



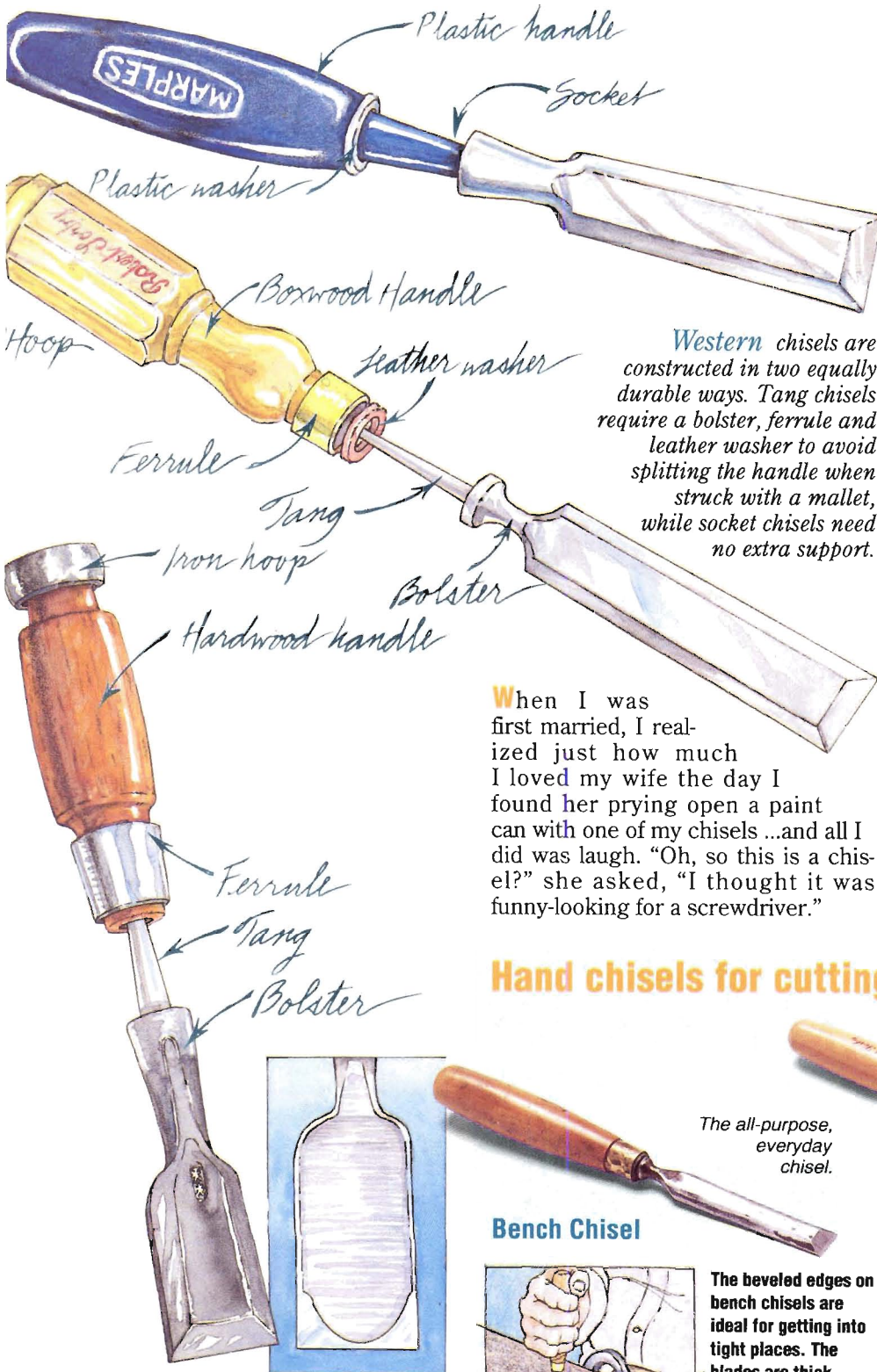
The elongated holes in Accuride slides make it easy to adjust the drawer for a better fit.



Once you determine the drawer spacing, hold the Jig-it to your marks and drill the pilot holes.

Chisels: The Essential Shop Tools

By Peter Korn



Western chisels are constructed in two equally durable ways. Tang chisels require a bolster, ferrule and leather washer to avoid splitting the handle when struck with a mallet, while socket chisels need no extra support.

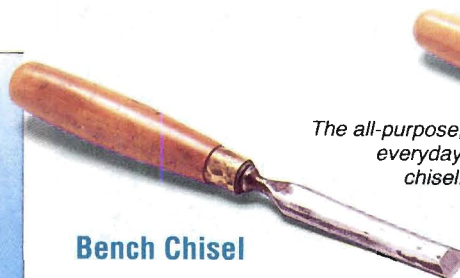
When I was first married, I realized just how much I loved my wife the day I found her prying open a paint can with one of my chisels ...and all I did was laugh. "Oh, so this is a chisel?" she asked, "I thought it was funny-looking for a screwdriver."

The actual uses for chisels are so numerous that I find myself reaching for one every day, whether for chopping out a mortise, trimming dovetails, paring a tenon, squaring the end of a routed dado, or a thousand other mundane tasks. Yet I've met amateur woodworkers who avoid their use. This past summer, for example, one of my intermediate woodworking students said he didn't see what the big deal was about chisels. After working with a razor-sharp one for twenty minutes his attitude changed forever. It turned out that he didn't know how to sharpen a chisel well enough to make it worthwhile.

Western vs. Japanese

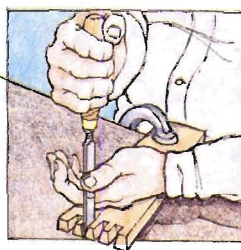
Chisels come from two distinctly different toolmaking traditions —Western and Japanese (shown at left). The important difference is in the blades. Western chisel blades are made from a single piece of steel, of which the last inch and a half or more is tempered to a hardness of 59 - 62 on the Rockwell scale. Japanese chisels, on the other hand, have bi-metal blades. A thin layer of hard steel is welded to a thicker, supportive layer of soft steel and the lamination is then tempered

Hand chisels for cutting, trimming, shaping and

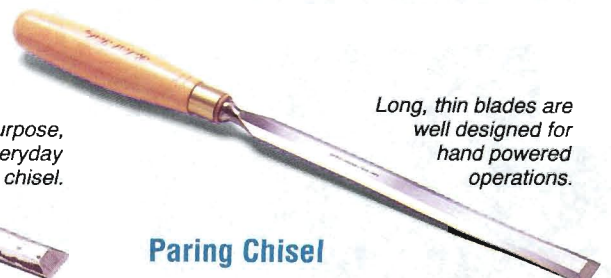


The all-purpose, everyday chisel.

Bench Chisel

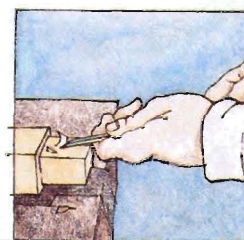


The beveled edges on bench chisels are ideal for getting into tight places. The blades are thick enough to take the blows of a mallet, yet still provide control while paring.



Long, thin blades are well designed for hand powered operations.

Paring Chisel



Paring chisel blades have the same beveled edges as bench chisels, but are longer and thinner for improved hand control. These chisels are not suitable for chopping.

Japanese chisels have a tang reinforced with a socket shaped ferrule, and a hollow ground blade that eases the work of flattening a chisel's back.

Western chisels are typically hollow ground, making it easier to hone the edges at the sharpening stone.

Cutting edge ground at 25°-30° angle

Hollow ground

Japanese chisels are flat ground to support the hard, brittle cutting edges with the softer steel back laminations.

Hard cutting edge steel

Soft steel

to a greater Rockwell hardness of 64-66. The harder a piece of steel is, the sharper the edge it will take, but it also becomes more brittle and prone to nicking.

Both types of chisels are generally ground to a bevel angle of 25 to 30 degrees, but where Western chisels are often hollow-ground, Japanese chisels are flat ground to give their brittle cutting edges a little extra support, as shown above. With either style of chisel, when the cutting edge begins to fracture it often means the bevel is ground too acutely, making the cutting edge too thin.

Chisel blades are secured to their handles with either a tang or a socket, as shown at far left. Both types of construction are durable, however, should you break a handle, it will be easier to replace on a socket chisel than on a tang chisel. On a tang chisel, the bolster, ferrule and leather washer protect the handle from splitting when it's

struck with a mallet. These features aren't needed on socket chisels as the force of each mallet blow is directed into the cone shaped socket.

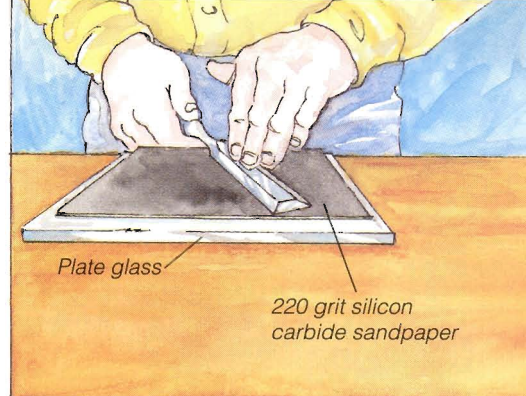
I suspect that Japanese chisels take a better, longer lasting cutting edge than Western chisels, but I've been happily using the same set of Marples Blue Chip bench chisels for twenty years and have no desire to change.

Western chisels divide into several families which differ according to the shape and thickness of the blades. While there are countless variations within each family, developed mostly for very specialized tasks, the styles shown below cover the basic choices.

Buying Chisels For Your Shop

I recommend starting off with good-quality, plastic-handled bench chisels. They're versatile and the plastic handles will last forever. An adequate set includes 1/4", 3/8", 1/2", 3/4", and 1" chisels. Eventually, you may want to purchase a set of mortising chisels, but I have a set that I rarely use and could get along perfectly well without. I've never felt the need to purchase paring or butt chisels.

Avoid buying cheap, thin-bladed, chisels generally sold in hardware stores and lumber yards. These so-called carpenter's chisels are usually made of carbon steel, but better quality chisels are made of high alloy steel, which can be ground with greater precision and are more stable. More than



To get a razor sharp edge on your chisels, flatten and polish the back of the blades with silicon carbide paper that's laid on glass.

once, I've seen students throw cheap chisels away because the blades were so thin that the backs wouldn't stay flat—even the heat of grinding and sharpening was enough to warp them.

When you get a new chisel, the first thing to do is flatten its back, as shown above. Having a flat back is the only way you'll ever reach a razor-sharp cutting edge and it helps guide the chisel when paring. To flatten the back I use a 9" x 12" piece of 3/8" glass with the edges sanded so I won't cut myself. I place a sheet of 220 grit wet/dry sandpaper on the glass, using spray glue or water to hold the paper in place. I then rub the back of the chisel along the length of the paper, using water as a lubricant to keep the abrasive from clogging with steel particles. It's important that the blade remain flat on the sandpaper and doesn't ride up on its bolster. When the entire back is uniformly abraded, repeat the process on a medium grit sharpening stone and then on a fine stone.

Once you've flattened the backs of your new set of chisels, keep the blades razor-sharp at all times. This may mean stopping work to sharpen more often than you're used to, but it's crucial. When your chisel is no longer sharp enough to shave hair off the back of your hand, its performance falls off radically.

Taking the time to care for your chisels will make these some of the most highly valued tools in your shop and, after years of use, you're sure to understand why using a chisel to open a paint can is a sacrilege.

Peter Korn is a contributing editor for *Today's Woodworker* and operates *The Center for Furniture Craftsmanship* in Rockland, Maine (207-594-5611).

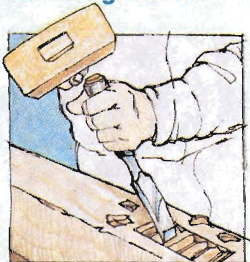
...chopping with a mallet!

Extra thick blades withstand the force of heavy pounding.

Thick blades are ideal for standard mallet work.

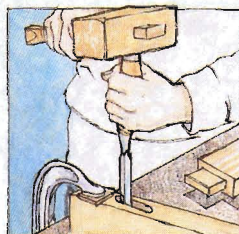
Mortising Chisel

The granddaddy of them all is the mortising chisel. These thick bodied, square-sided brutes are designed for no-nonsense chopping of mortises under a sturdy wood mallet.



Firmer chisels have thicker blades to hold up better under repeated mallet blows. They generally have square edges, although there are bevel edged versions.

Firmer Chisel



A Quick and Easy Band Saw Fence

By Dave Olson

Your bandsawing results are sure to improve when using this easy to build accessory that quickly adjusts for resawing or ripping.

When I began woodworking, one of the first tools I purchased was a used band saw, which came without a fence. Knowing that I needed this essential accessory, I set about building one right away. I made it tall and sturdy to handle resawing wide boards, and added a single point attachment that's good for cutting along a scribed line while making adjustments for blade drift.

The jig has two parts; the base and the fence. Installing the base in the band saw table's groove automatically squares the jig to the blade. The fence is then placed on the base and slides back and forth to set the width of the cut. I find it easiest to hold it all in place with two jet clamps.

Baltic birch plywood is ideal for the jig since it's dimensionally stable, flat and strong. I used hard maple for the guides and glued plastic laminate to the fence to reduce friction and improve wear resistance. My jig is built

for a Rockwell 14" bandsaw, but it's easy to resize it for any brand of saw.

Begin by cutting an extra long piece of plywood 12" wide for the base and fence plate (pieces 1 and 2). By machining these two plates as one piece, you'll guarantee that they match perfectly. In addition, cut plywood to size for the fence and the braces (pieces 3 and 4).

Now install a 3/4" dado blade in your table saw, raise it 1/4" and plough the guide grooves in the plywood for the base and fence plate, as shown in the **groove elevation** on page 9. Cut this plywood into the two pieces for the jig and plough an 1/8" deep rabbet in the base for the band saw slot guide.

To cut a perfect groove in the back of the fence for the fence plate, match your dado blade width exactly to the thickness of your plywood (make two passes with a narrower blade if necessary) and be sure the distance from the groove to the bottom edge of the fence also equals the plywood's thickness (**see fence joint detail**). Getting these measurements dead-on is the key to keeping your completed fence plumb at any position on the band saw table.

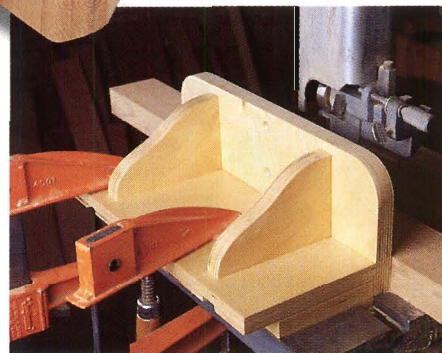
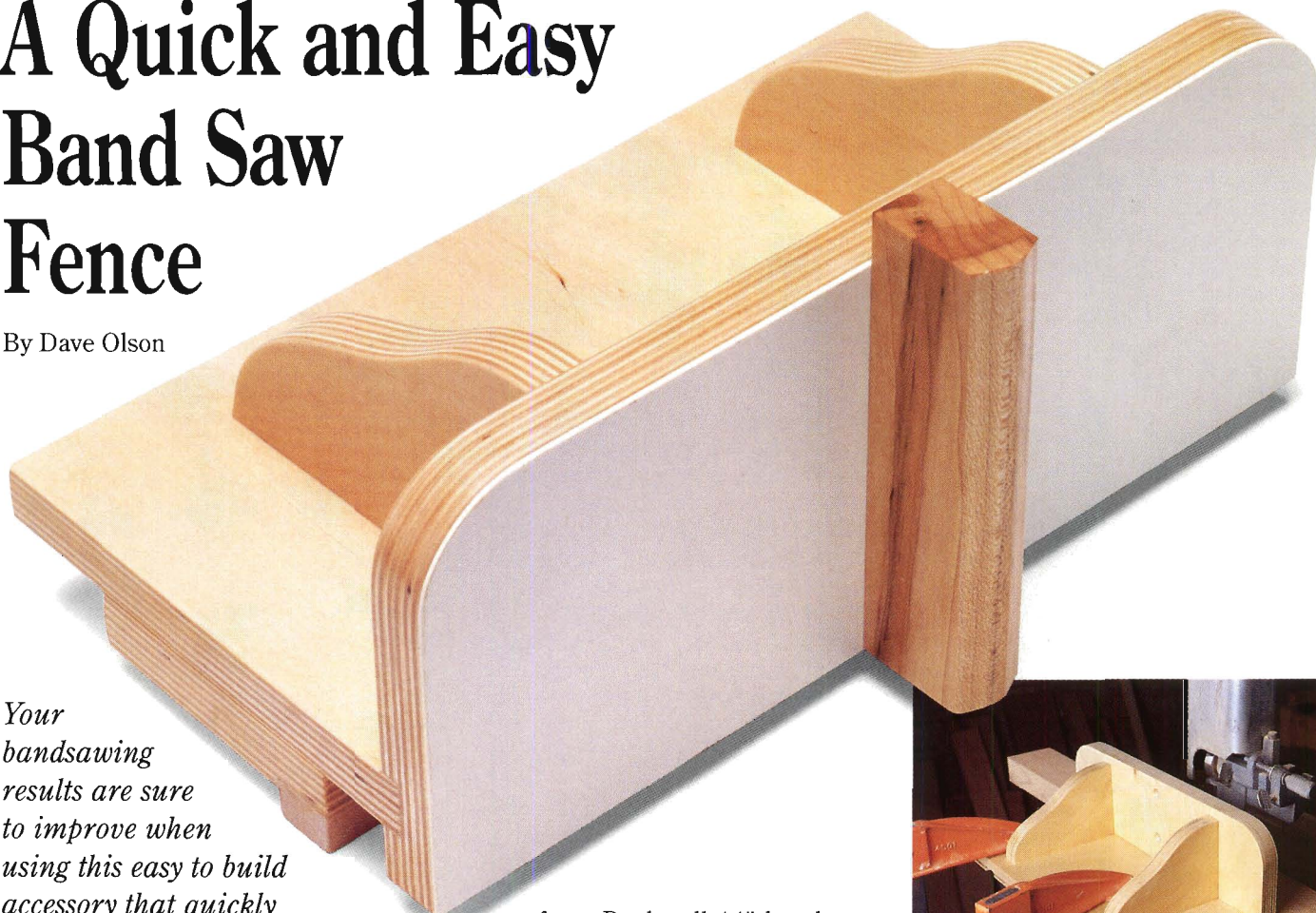


Figure 1: For ripping operations or resawing stock that's been milled four-square, the author recommends using the standard fence.

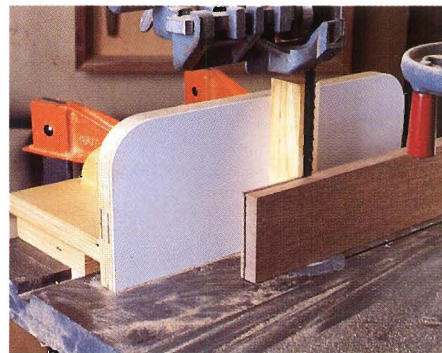
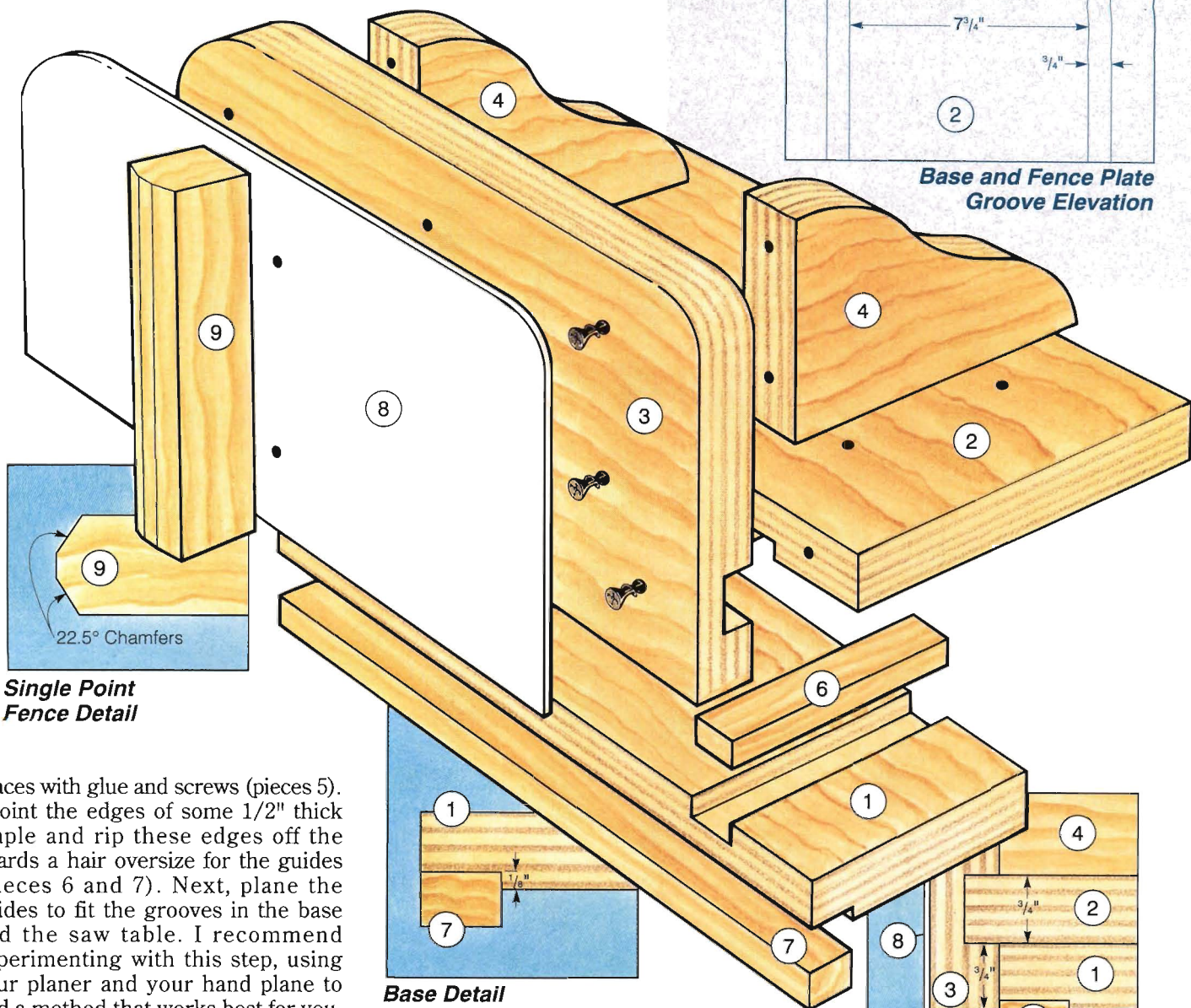


Figure 2: When working with a dull blade that tends to drift or when cutting along a scribed line, the single point fence is often the better choice.

After cutting the fence groove, trace the **full size brace pattern** (between pages 12 and 13) onto your stock, then bandsaw the pieces to shape and round the top corners of the fence as well. Next, drill all the countersunk pilot holes for screwing the pieces of the jig together, as shown at right, then join the fence, the fence plate and the



Base and Fence Plate Groove Elevation

Single Point Fence Detail

braces with glue and screws (pieces 5).

Joint the edges of some 1/2" thick maple and rip these edges off the boards a hair oversize for the guides (pieces 6 and 7). Next, plane the guides to fit the grooves in the base and the saw table. I recommend experimenting with this step, using your planer and your hand plane to find a method that works best for you.

As I mentioned, I covered the front of the fence with white plastic laminate (piece 8), which turned out to be a good color choice because it reflects light well and improves my ability to see the workpiece and blade. Cut your laminate a little larger than the fence and bond it to the plywood with yellow glue. Spread the glue evenly and back up the laminate with a piece of scrap plywood while clamping the assembly tight. After a few hours, trim the laminate with a flush cutting router bit.

For the single point fence attachment (piece 9), cut a piece of maple to size and chamfer one edge, as shown in the **single point fence detail**. Sand the chamfers to improve the tracking of your stock, then clamp the attachment to the fence and extend the pilot holes.

Base Detail

Give the jig a quick sanding, then coat the plywood with polyurethane. Avoid finishing the guides as this may make sliding the fence more difficult. Instead, apply wax to the guides on a regular basis.

The fence works best when using a new blade to cut a flat workpiece. When the blade is worn and no longer tracks accurately, or when you need to follow a line, the single point attachment comes in handy (as long as its crown is 1/8" ahead of the blade). Either way, this jig is bound to improve your band saw's performance.

Dave Olson is a professional woodworker at the Fourth Street Guild in Minneapolis, Minnesota.

Fence Joint Detail

MATERIAL LIST

	T x W x L
1 Base (1)	3/4" x 12" x 3 1/2"
2 Fence Plate (1)	3/4" x 12" x 6 1/4"
3 Fence (1)	3/4" x 12" x 5"
4 Braces (2)	3/4" x 3 1/4" x 5"
5 Screws (13)	#8-1 1/2"
6 Jig Guides (2)	1/2" x 3/4" x 3 1/2"
7 Saw Slot Guide (1)	1/2" x 3/4" x 12"
8 Laminate (1)	1/16" x 5" x 12"
9 Single Point Fence (1)	3/4" x 1 1/2" x 5 1/2"

The Woodshop Whirligig

With our full size patterns and complete hardware kit, building this whirligig is a real breeze.

By David Larson

When springtime rolls around I like to take a break from my usual shop projects. Last year I poked fun at my feverish anticipation of the upcoming walleye opener by building a fisherman's whirligig (as shown below). That project was very popular, so this year I've continued the theme by making a whirligig for another one of my life's passions — woodworking.

Every woodworker knows about blisters and slivers and lower back pain, but on the other side of the coin is the satisfaction of a perfect plane shaving, the thrill of a well fitted joint and the contentment of just being in the shop. The whirligig I designed depicts one of the most enjoyable parts of our hobby, planing a board with a hand plane, although when the wind picks up the action may remind you more of the frantic days just before an important shop deadline.

Getting Underway

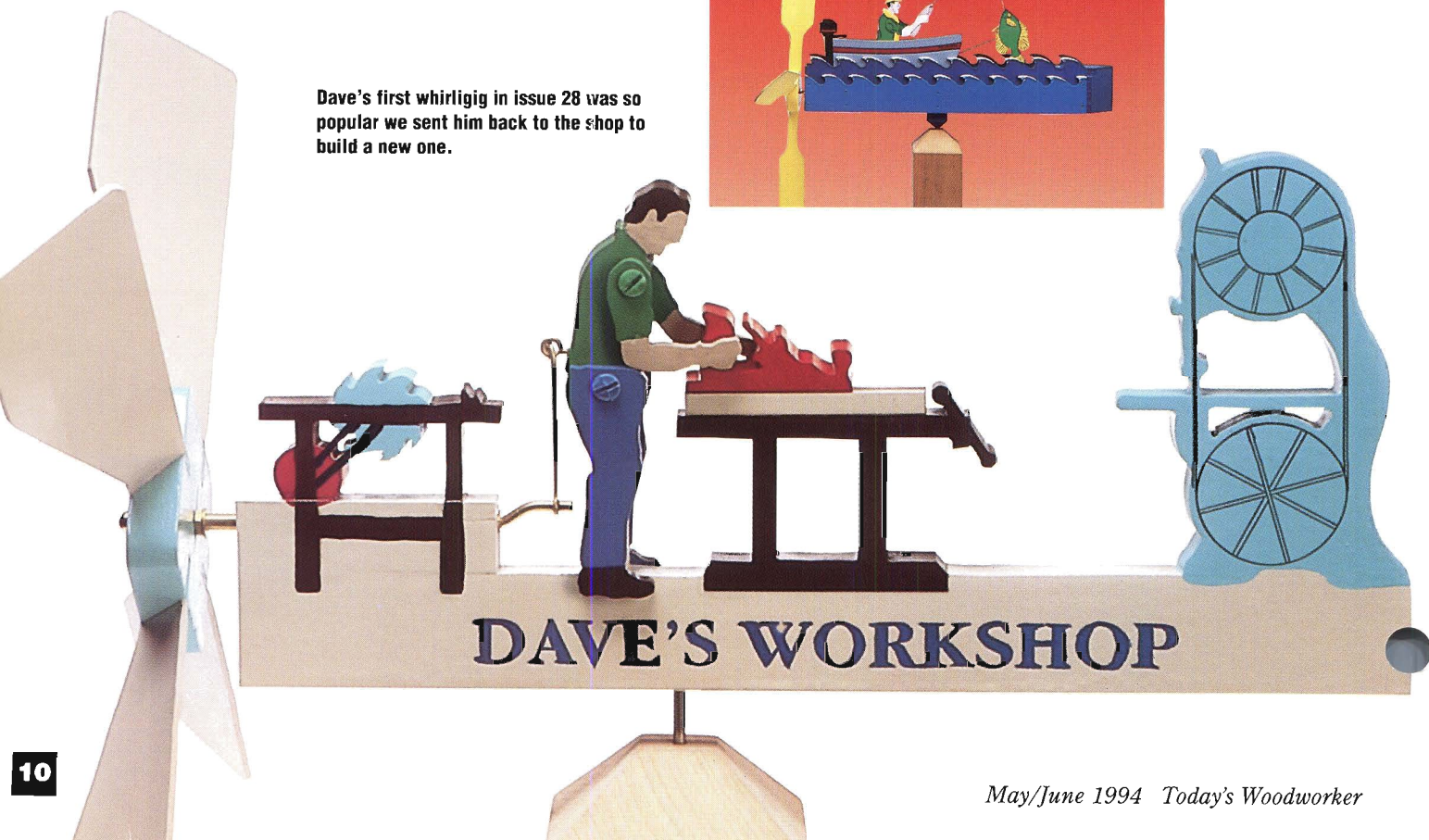
The band saw, bench and base are all parts of the same piece, which greatly simplifies this whirligig's construction. Cut out the **full size whirligig patterns** from the insert between pages 12 and 13, and trace the base, table saw and woodworker's torso patterns (pieces 1, 2 and 3) onto some 3/4" plywood. Be sure to select plywood that's made with water resistant glue or you'll be disappointed when it delaminates after one summer of use. Trace the plane pattern (pieces 4) onto an oversized piece of plywood to allow for machining the 1/4" tongue on its bottom edge. Form the tongue with a 1/4" dado blade, then bandsaw all the 3/4" plywood pieces to shape with an 1/8" blade. Use a coping saw to make any internal cuts after drilling small access holes, as shown at right. When cutting a more fragile part of the pro-

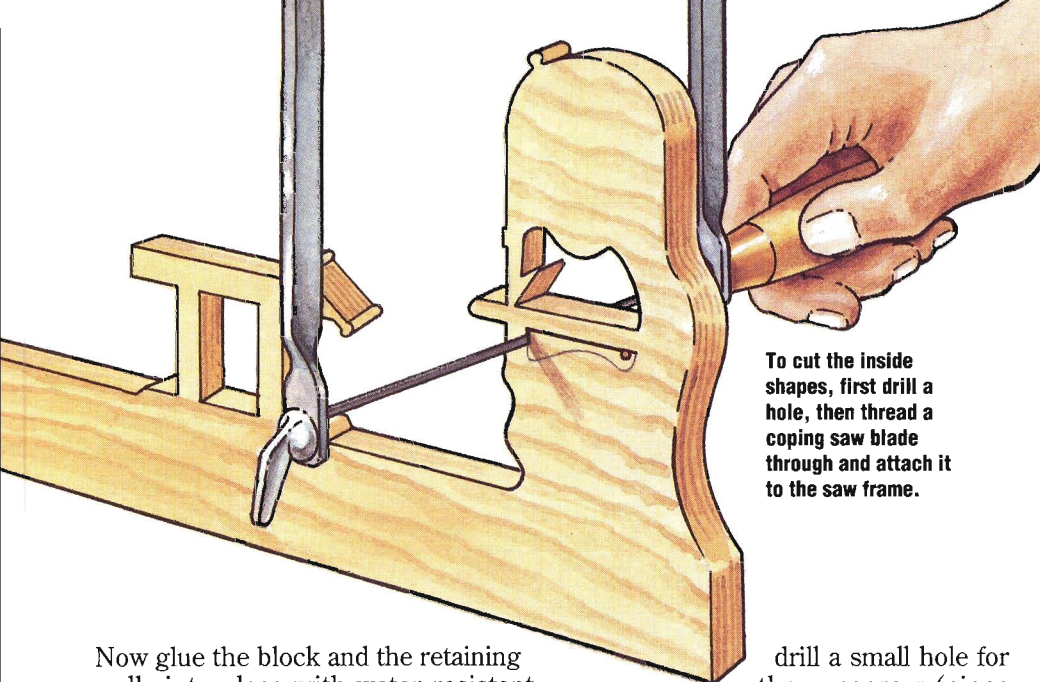
ject, I back-up the workpiece with 1/2" plywood scrap. It's more work sawing through both layers, but the back-up board prevents the saw from snapping off the small details on some of the shapes.

Trace the woodworker's arms and legs (pieces 5, 6 and 7) onto 1/4" plywood and cut them to shape, and do the same thing on 1/8" plywood for the propellers (pieces 8). Sand the pieces smooth, then use a pen to outline the various painted highlights on the figure, the workbench and the saws.

The drive shaft and tube (pieces 9 and 10) are supported by the block (piece 11) at the front of the whirligig. Cut the block to size, then plough a groove down its center with your table saw (see **block detail** on page 12). While you're at it, cut pieces to size for the two retaining walls (pieces 12) that trap the plane on the workbench.

Dave's first whirligig in issue 28 was so popular we sent him back to the shop to build a new one.





Now glue the block and the retaining walls into place with water resistant Titebond II glue. When the glue dries, lay the tube in the slot and glue the table saw to the block.

I used non-rusting, self-lubricating plastic couplings (pieces 13) for the rotating joints of the woodworker's arms and torso. Drill 1/4" holes in the legs, torso and arms for the couplings, as indicated on the full size patterns.

The hub (piece 14) supports the propellers and positions them at the correct angle to catch the wind. When cutting the angled slots in the hub, it's important for balance that they cross the exact center on each edge of the piece (see **hub detail** on page 12). Cut your hub to overall size and layout the cuts. Next, turn your miter gauge 45° and clamp a stop block to the fence to align a slot layout with the blade (See **Figure 1**). Make the four cuts, then drill a hole in the center of the hub for the drive shaft and round the hub's corners with your band saw. Finish up by gluing the propellers into the slots.

Painting and Assembly

You can paint your whirligig as fancifully as you want. My only suggestion is to use exterior enamel paint that will hold up to harsh weather conditions. Apply at least two coats plus a coat of primer, and pay special attention to covering the edges where water can most easily seep in.

To personalize my whirligig I painted my name on the base (see box at right). Stick-on Frisket makes this step a cinch to complete.

Once you've painted the whirligig,

drill a small hole for the eyescrew (piece 15) in the back of the figure, as shown on the torso pattern. Install the eyescrew and reassemble the woodworker with the plastic couplings. Now use superglue to adhere both legs to the tab on the base and to secure the plane between the woodworker's hands. Swing the plane onto the workbench and use the connecting wire (piece 16) to link the eyescrew on the figure to the drive shaft—you'll need to clip the wire to length and bend the ends with a needle nose pliers. Mount the propeller assembly on the other end of the drive shaft using the capnut, washers, lock washers and hex nut (pieces 17, 18, 19 and 20). Complete the assembly by drilling a hole in the base and supergluing the pivot nail (piece 21) into place.

To mount the whirligig, I drilled a hole in the end of a 4" x 4" post for the pivot nail, then sunk the post into the ground. For appearances sake, I chamfered the end of the post.

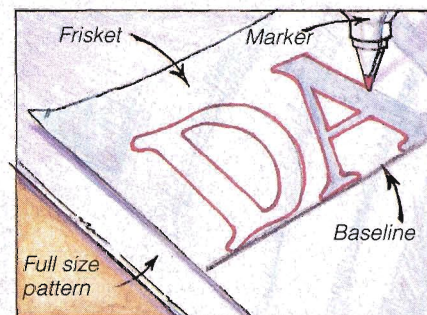
Wrapping it Up

After a long, hard winter of full-blown furniture projects, it's refreshing to build something in a single weekend. And given the kind of winter most of us have had—record snowfalls and near arctic temperatures—it seems fitting to celebrate spring with an outdoor project. It's just the right cure for a severe case of cabin fever.

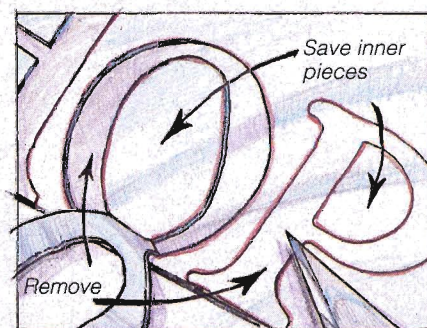
David Larson is an amateur woodworker who spends much of his spare time building a houseful of furniture.

Labeling Your Whirligig

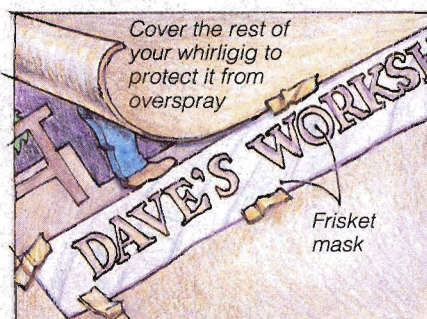
Making your whirligig truly unique can be as easy as adding your John Hancock to the base. With a product called Frisket (carried by most art supply stores) it's a nearly fool-proof operation.



Using a felt marker, spell your name above a baseline on the Frisket, tracing the letters off the full size pattern.



Cut out the letters with a sharp exacto-knife, being careful to cut through the top layer of film and not the paper backing. Peel away the letters, leaving behind the inner portions on characters like "O"s, to form a mask.



Carefully peel away the paper backing as you press the mask onto the painted whirligig, making sure to position the inner portions of the letters correctly. Rub the mask's edges with the back of a spoon until they're well stuck to the surface, then cover the rest of the whirligig with paper. Spray several coats of paint onto the mask and let them dry, then peel the mask away to reveal your nameplate.

The Whirligig Hardware Kit

A hardware kit is available for this project that includes all the nuts and washers, drive shaft and tube, piston wire, eyescrew, pivot nail and two plastic posts and screws.

Item #98617 (use order form) ...\$5.95

Hub Detail

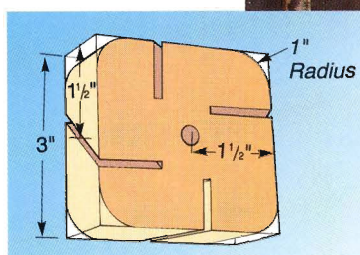
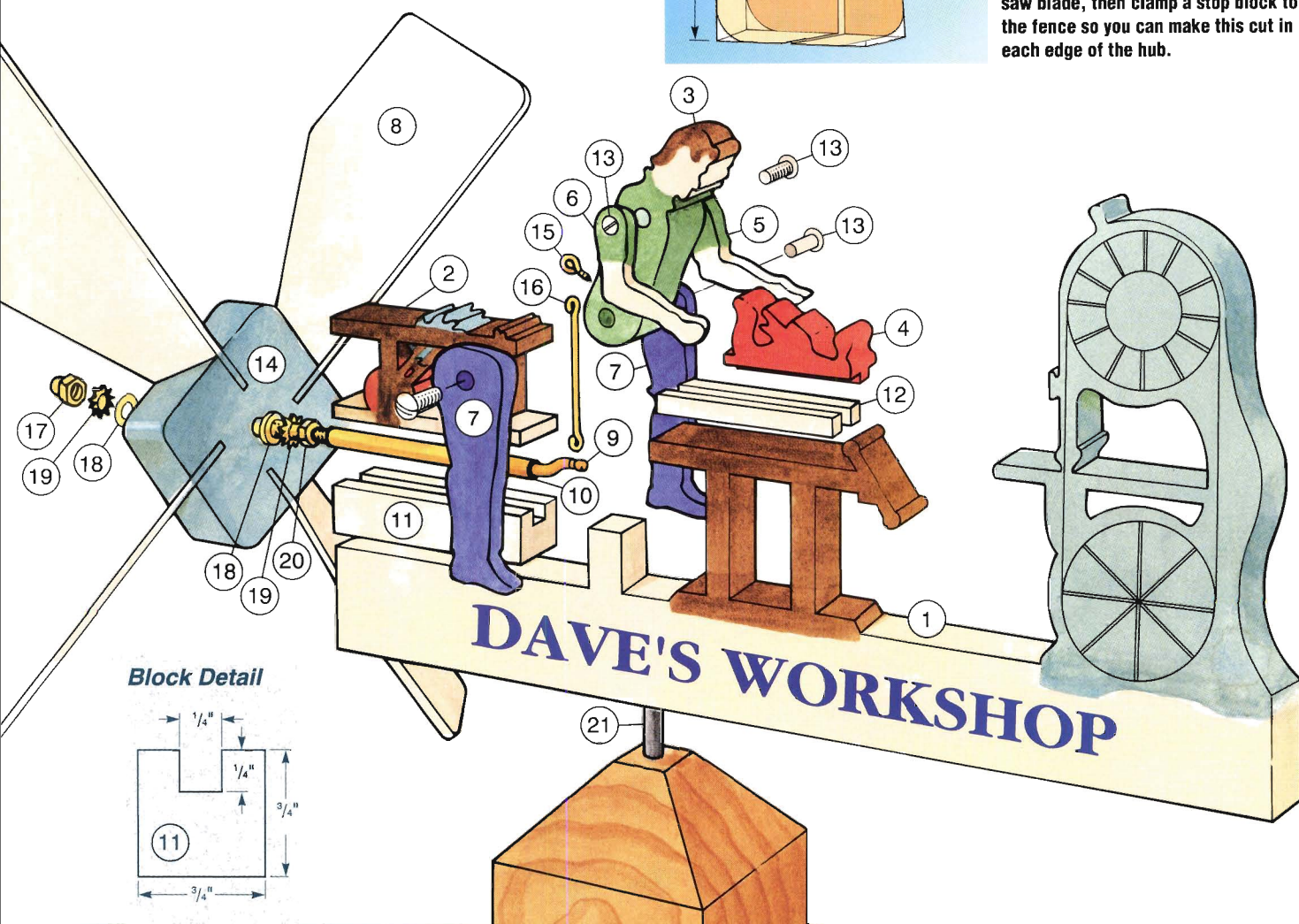
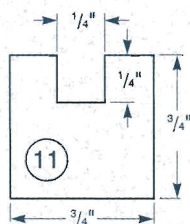


Figure 1: Center a slot layout on the saw blade, then clamp a stop block to the fence so you can make this cut in each edge of the hub.



Block Detail



MATERIAL LIST

	T x W x L		T x W x L
1 Base (1)	3/4" x 8" x 16"	12 Retaining Walls (2)	1/4" x 3/8" x 3"
2 Table Saw (1)	3/4" x 2 1/4" x 3 3/4"	13 Couplings (2 sets)	1/4" x 1 1/2", plastic
3 Woodworker's Torso (1)	3/4" x 1 3/4" x 3 1/4"	14 Hub (1)	3/4" x 3" x 3"
4 Plane (1)	3/4" x 1 1/2" x 2 3/4"	15 Eyescrew (1)	7/8" long; brass
5 Woodworker's Left Arm (1)	1/4" x 1" x 3"	16 Connecting Wire (1)	3 3/4" long; brass
6 Woodworker's Right Arm (1)	1/4" x 1 3/4" x 2 1/4"	17 Capnut (1)	#10-32; brass
7 Woodworker's Legs (2)	1/4" x 1 1/2" x 4 3/4"	18 Washers (2)	Brass
8 Propellers (4)	1/8" x 2 1/2" x 7 1/2"	19 Lock Washers (2)	Brass
9 Drive Shaft (1)	6" long; brass	20 Hex Nut (1)	#10-32; brass
10 Drive Shaft Tube (1)	1/4" x 3 3/4"; brass	21 Pivot Nail (1)	5" long; stainless steel
11 Drive Shaft Block (1)	3/4" x 3/4" x 3 3/4"		

An Old Time Icebox

Nostalgia buffs and woodworkers alike will warm up to our reproduction of this truly American classic.

By Rick White



A century ago, the Whiteclad Company manufactured the most highly regarded iceboxes in America. Many of these durable cabinets are still in use today, making it clear why we associate quality with their distinctive trademark.



If I had to choose one cabinet that stands out as the most recognizable American classic of all time, it would be the oak icebox. These sturdy relics were our first refrigerators, and they remind me of a time when cars mixed with horsedrawn wagons on city streets and knickers were all the rage. Blocks of ice were placed in the top compartment of the icebox to cool the other two spaces. The largest compartment was the refrigerator, and the smaller, colder area was the freezer. As electric appliances took over, however, the old iceboxes were often hauled into the basement or garage to serve out their remaining days as storage closets.

While their original function has long since been updated, iceboxes are still appealing, and with a little ingenuity you'll find many new uses for one. I built mine as a liquor cabinet, but other possibilities include a stereo cabinet, kitchen cupboard or linen closet.

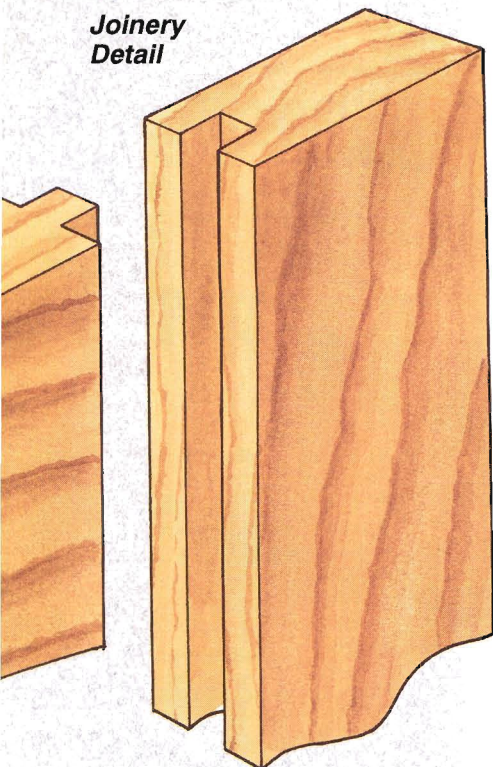
What makes an authentic icebox reproduction possible is the availability of quality hardware. Icebox hardware has a very unique look and is

Planning Ahead: The Old Time Icebox Project

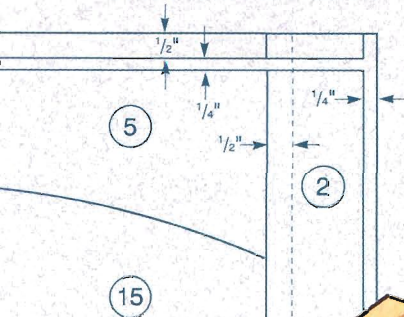
Building the icebox will require a table saw, band saw, router and saber saw. The project will take about 45 hours to complete, and the recommended finish is varnish or lacquer after staining it like the Mission originals (see page 19). As always, have your hardware on hand before cutting any lumber to size.

- ☐ 45 board feet of 3/4" thick quarter-sawn white oak
- ☐ One sheet of 3/8" thick quartersawn white oak plywood
- ☐ One sheet of 3/4" thick plain-sawn white oak plywood
- ☐ One icebox hardware kit

Joinery Detail



Side Frame Elevation



Joinery Detail

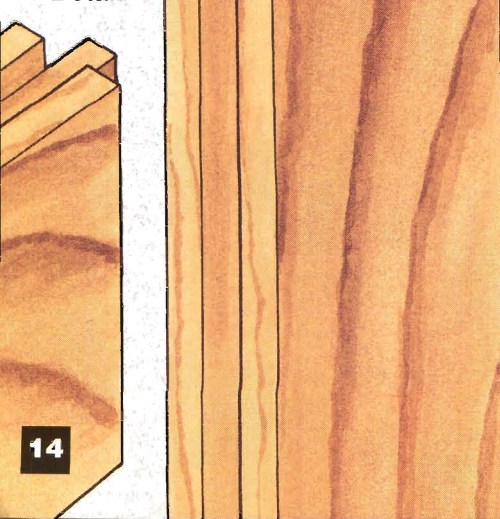


Figure 1: To safely cut tenons with your table saw, clamp a set-up block to the fence and use the miter gauge to support the stock.

designed for 3/8" lipped doors (see **hinge offset detail** on page 17). Since the hardware is surface mounted, and because the door lips hide any gaps around the frame, installing the doors is easy.

In the tradition of the best iceboxes, I built mine out of quartersawn white oak. Plain-sawn white oak was also widely used, as was ash. Finding 3/8" quartersawn white oak plywood for the icebox's panels may sound tricky, but if you have a local source for plywood take a look through the stacks of plain-sawn material. Often there are sheets with quartersawn veneer on one side. If this doesn't pan out, consider covering 1/4" plywood with quartersawn veneer (available from The Woodworkers' Store).

Making the Frames

The old iceboxes were built with frame and panel construction, and this is still the best choice today. Begin working on your icebox by cutting stock for the carcass and door frames (pieces 1 through 14), keeping in mind that the lengths in the material list include any tenons. I recommend cutting the door stiles a little longer than the dimensions in the material list, then cutting them to length after assembling the doors.

Once you've cut the rails and stiles, chuck a 3/8" straight bit in your router table and prepare to rout grooves in the side and door frame pieces for holding the plywood panels, as shown in the **joinery details** at left. Hold off routing grooves in the curved rails, however, until after forming the tenons and bandsawing the pieces to shape. Set the fence so the bit is centered on the stock, then rout the grooves by taking several passes to reach the full 1/2" depth. Test your set-up in scrap wood to ensure that

the grooves are centered on the stock.

Lay out the front frame mortises on your stock at the locations shown in the **front frame elevation** on the full size pattern between pages 12 and 13. Mark the bit's cutting area on your router table and make your drop cuts. Rout about 1/8" deep with each pass until you reach the 1/2" depth, then square the mortise ends with a chisel.

Now install a 1/2" dado blade in your table saw and clamp a set-up block to your fence for cutting tenons on the rails and the front center stile (**See Figure 1**). Align the set-up block with the edge of the blade and raise the blade 3/16". Cut the tenon cheeks, then turn the front rails and center stile on edge and cut the tenon shoulders.

Once you've formed the tenons, cut out the **full size patterns** of the curved rails and trace the shapes onto your stock. Carefully bandsaw just outside the layout lines, then use a drum sander to smooth the edges right to the line.

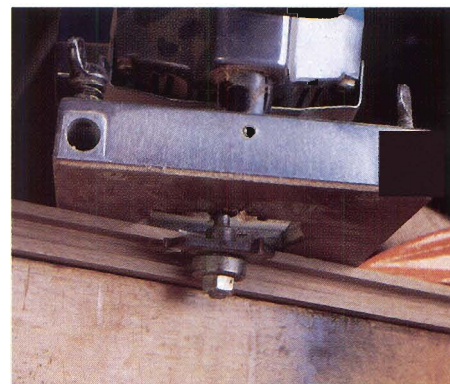


Figure 2: When you get around to routing grooves in the curved rails with a slot cutting bit, set the bit to match a groove in a straight rail.



Figure 3: You'll need a handsaw to cut off the small tips that remain on the curved rail tenons after routing the grooves with a slot cutting bit.

Outfitting Your Icebox

To cut grooves in the curved edges of the side and door rails, use your router and a slot cutting bit. Most slot cutting bits have a 1/4" cutting width, so you'll need to make two passes to rout the grooves 3/8" wide. I suggest using a groove in a straight piece as a model for adjusting the bit before each pass (See Figure 2). When you reach the ends of each curved rail, you'll find that the slot cutting bit can't cut the entire tenon shoulder. Just use a hand saw to remove the tips that remain (See Figure 3).

Joining the Frames

Making panels is a snap compared to all the work you just completed on the frames. Cut your sheet of 3/8" plywood into the cabinet and door panels and the back (pieces 15 through 18), then cut out the **full size patterns** of the panel curves, trace them onto your plywood and bandsaw them to shape.

Run through a trial assembly of each frame and door to make sure the panels fit properly. After making your adjustments, take the pieces apart, sand the panels to 150 grit and glue them back together. Be sure to check for squareness by measuring the diagonals of each frame. Remember, the outcome of the final assembly depends on the accuracy of these frames.

While the glue dries on the frame assemblies, cut 3/4" plywood for the bottom, divider and shelves (pieces 19 through 22), and glue banding (pieces 23) to the front edge of each adjustable shelf.

More Joinery Details

A common challenge with a large cabinet like the icebox is keeping the assembly square during the glue-up. To reduce the chance of an out of square assembly, I joined the side frames to the front frame with tongue and groove joints. In addition, I used two top inside rails (pieces 24) to help align the carcass and provide a foundation for the hold down screws (pieces 25) that secure the top to the cabinet.

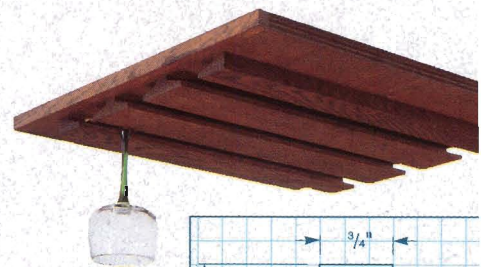
Cut stock for the top inside rails, then switch gears to cut the tongue and groove joints

(see **tongue and groove detail** on page 16). First, set up a 1/4" dado blade in your table saw, raise it 1/4" and clamp a protective wood face to the fence while cutting rabbets on the front edge of both side frames to form the tongues. Once the tongues are completed, reset the fence and cut 1/4" deep grooves in the front frame stiles.

While you've got the 1/4" dado blade set up, cut a 1/4" deep groove near the top of each side frame for the top inside rails, as shown in the **side frame elevation** at left. Next, raise the blade to 1/2" and cut a 1/4" thick by 1/4" long tongue on the ends of each top inside rail (these tongues are flush with one face of the rail stock). Finally, adjust the blade one more time and make two passes to cut a 3/8" wide by 3/8" deep rabbet on the back edge of each side frame for installing the back panel.

For rigidity, the fixed interior parts of the icebox are dadoed into each other and into the side frames. Switch to a 3/4" dado blade and cut 3/8" deep grooves in the side frames for holding the bottom; in the front frame, the bottom and the top inside rails for securing the divider; and in the left side frame and the divider for supporting the fixed shelf (see **details** on page 16).

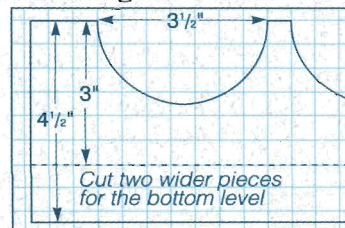
I installed standards (pieces 26) for the adjustable shelves in both sides of the icebox. Each standard requires a 5/8" wide by 3/16" deep groove.



If you choose to design your icebox as a liquor cabinet, you may want to add our wine bottle rack and goblet holder to your project.

The key to making the goblet holder is the special moulding shown above (available from The Woodworkers' Store). We ripped two pieces of moulding for the outside holders and spaced the strips 1" apart—space your strips to fit your glasses. To gain as much flexibility as possible, the moulding was screwed to an adjustable shelf so it could be placed anywhere in the cabinet.

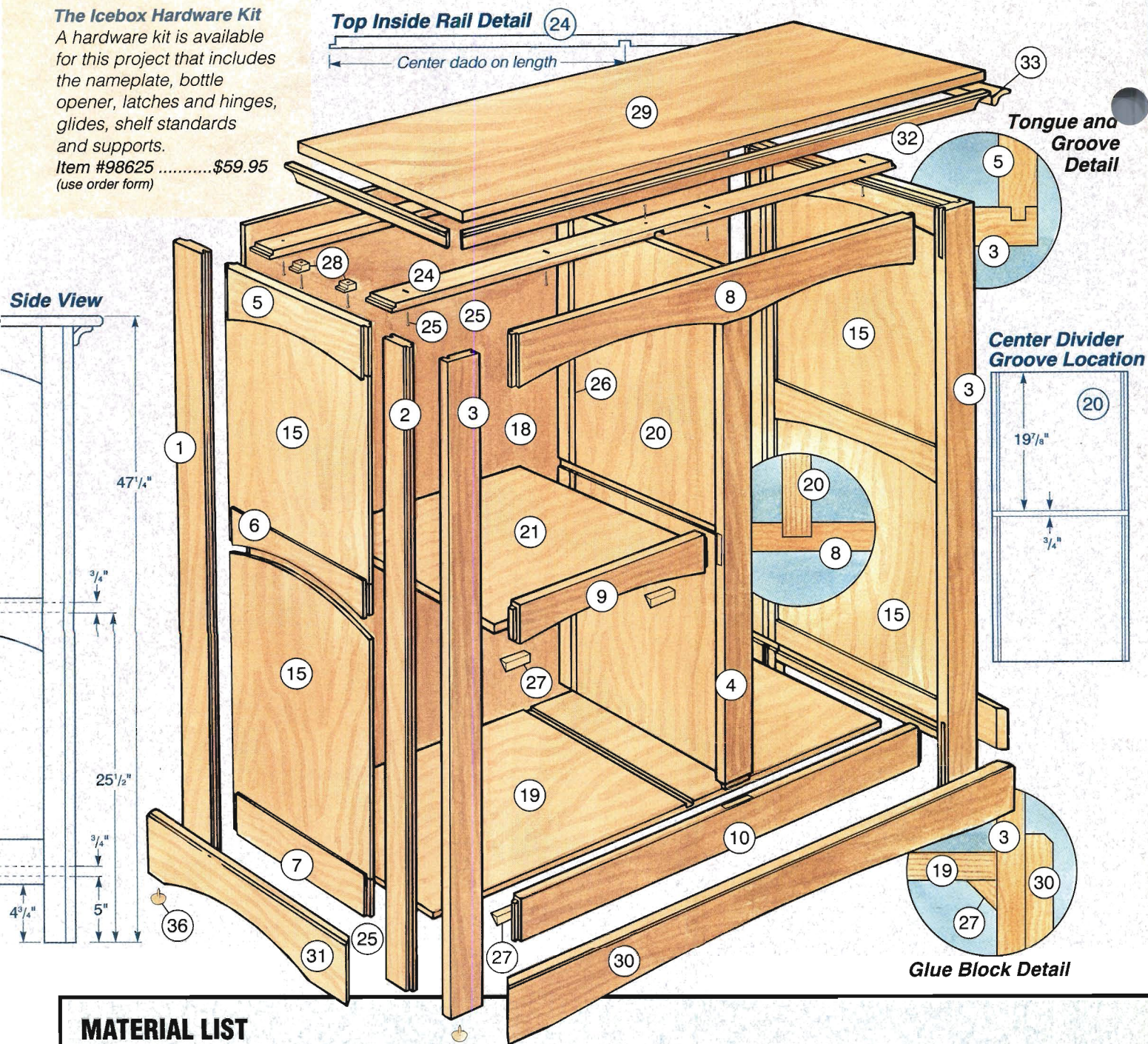
The bottle rack is made of oak scraps with screw and plug joinery. The completed assembly measures 18 1/4" wide x 16" high x 9" deep to support standard wine bottles. Since the rack is too big to fit through the face frame on the icebox, be sure to install it before securing the back to the cabinet.



The Icebox Hardware Kit

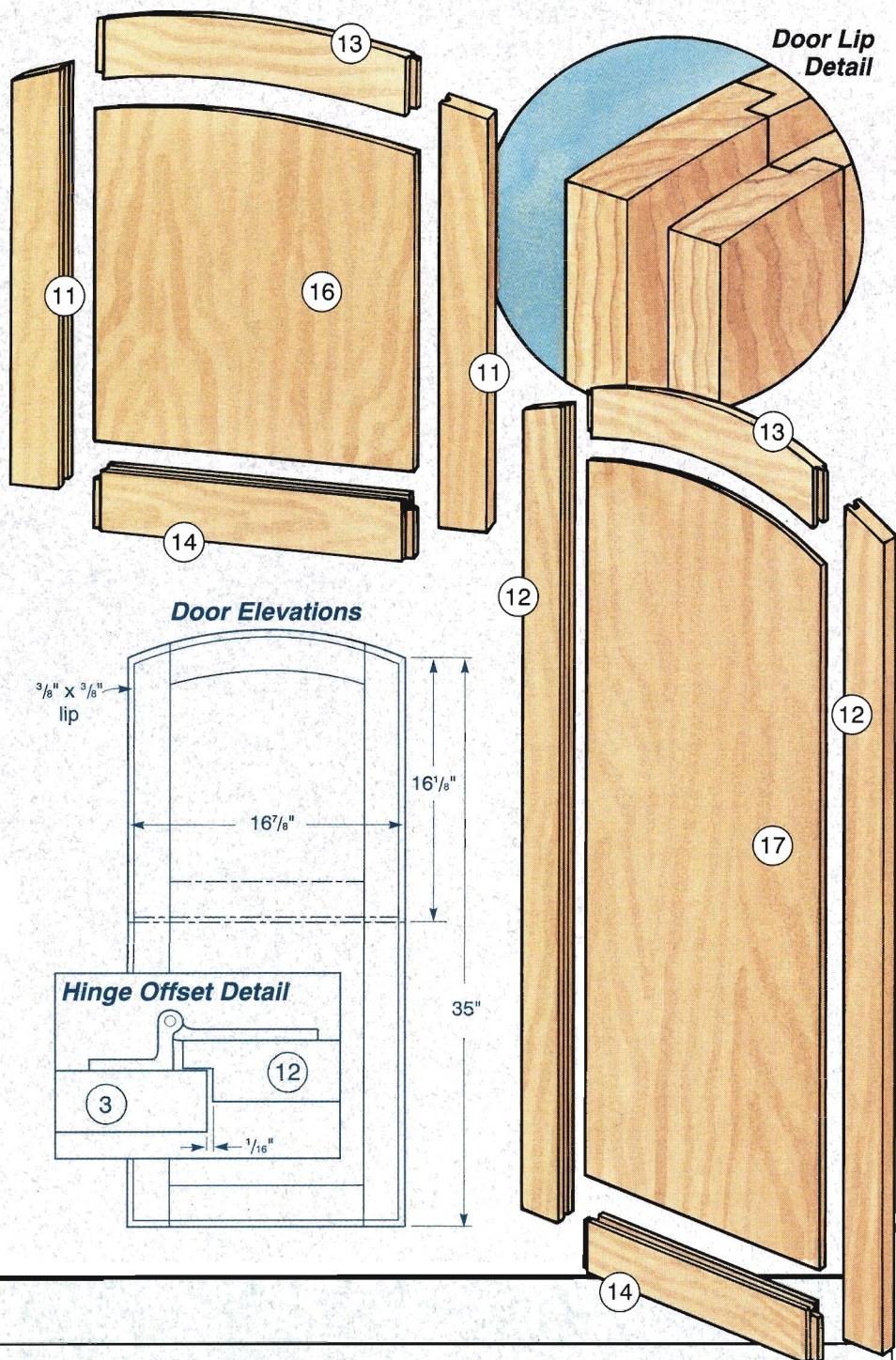
A hardware kit is available for this project that includes the nameplate, bottle opener, latches and hinges, glides, shelf standards and supports.

Item #98625\$59.95
(use order form)



MATERIAL LIST

	T x W x L		T x W x L
1 Side Stiles (2)	3/4" x 2 1/2" x 46 1/2"	13 Top Door Rails (3)	3/4" x 3 1/2" x 13"
2 Side Stiles (2)	3/4" x 2" x 46 1/2"	14 Bottom Door Rails (3)	3/4" x 2 1/2" x 13"
3 Front Stiles (2)	3/4" x 2 1/2" x 46 1/2"	15 Side Panels (4)	3/8" x 15 7/8" x 17 7/8"
4 Center Stile (1)	3/4" x 2 1/2" x 35 1/2"	16 Short Door Panels (2)	3/8" x 12 7/8" x 13 5/8"
5 Top Side Rails (2)	3/4" x 4 1/4" x 16"	17 Tall Door Panel (1)	3/8" x 12 7/8" x 32 1/2"
6 Center Side Rails (2)	3/4" x 3" x 16"	18 Back (1)	3/8" x 39" x 46"
7 Bottom Side Rails (2)	3/4" x 3" x 16"	19 Bottom (1)	3/4" x 18 7/8" x 39"
8 Top Front Rail (1)	3/4" x 4 1/4" x 36"	20 Divider (1)	3/4" x 19 1/4" x 40 3/4"
9 Middle Front Rail (1)	3/4" x 3" x 17 1/4"	21 Fixed Shelf (1)	3/4" x 18 7/8" x 19 1/2"
10 Bottom Front Rail (1)	3/4" x 3" x 36"	22 Adjustable Shelves (3)	3/4" x 18 1/4" x 18 5/8"
11 Short Door Stiles (4)	3/4" x 2 1/2" x 17 1/8"	23 Shelf Banding (3)	3/4" x 1/2" x 18 5/8"
12 Tall Door Stiles (2)	3/4" x 2 1/2" x 35 1/2"	24 Top Inside Rails (2)	3/4" x 3" x 38 7/8"



Plough grooves in the stiles of the side frames and in both sides of the divider with a 5/8" dado blade (see joinery details), but leave the standard installation until after the finishing is completed.

Pulling the Carcase Together

With all of your clamps at your side, get ready to start the glue-up. I like to break down large assemblies like this into smaller, more manageable segments. But before you even begin, cut glue blocks (pieces 27) for reinforcing a couple of joints in the assembly (see **glue block detail** at left).

Now spread glue along the tongue and groove joint of the front frame and one side frame, then force these two pieces tightly together with pipe clamps. Next, add the bottom, the second side frame and the top inside rails to the assembly. Be sure to spread glue on the front edge of the bottom piece and check to see that its back edge is flush with the rabbet shoulders on the side frames. In addition, make sure the grooves for the divider in the bottom piece and the front frame line up. After measuring the diagonals on the cabinet for squareness, use four of the glue blocks you just cut to reinforce the joint between the bottom and the front frame (see glue block detail at left). Spread glue on the square sides of each block, then hold them in place along the joint for a few minutes while the glue sets.

In the morning, remove the clamps and glue the divider and the fixed shelf into place. Be sure to glue the front edge of the shelf to the front middle rail, and add two glue blocks to reinforce the joint. Secure the bottom piece and the top inside rails to the divider by driving screws (pieces 25) into the joints.

As I mentioned, the top inside rails not only help keep the cabinet square but also provide the means for securing the top to the carcase. Drill tight fitting pilot holes in the back rail to hold the top fixed along one edge of the icebox. In the front rail, to allow for wood movement, rout elongated holes with an 1/8" straight bit (see **exploded view**). Clamp a straight edge to the cabinet to guide the router during these cuts. To hold the top down between the rails I installed a pair of

	T x W x L
25 Hold-down Screws (21)	#8-1 1/4" flathead
26 Shelf Standards (8)	3/16" x 5/8" x 40"
27 Glue Blocks (6)	3/4" x 3/4" x 3"
28 Cabinetmaker's Buttons (4)	3/4" x 1" x 1 1/2"
29 Top (1)	3/4" x 22" x 43 1/2"
30 Front Base (1)	3/4" x 6" x 44"
31 Side Bases (2)	3/4" x 6" x 22"
32 Front Cove Moulding (1)	3/4" x 3" x 44"
33 Side Cove Mouldings (2)	3/4" x 3" x 22"
34 Hardware Set (1)	Solid Brass Icebox Kit
35 Back Screws (15)	#6-1" flathead
36 Glides (4)	1/2" diameter Nylon tip with nail

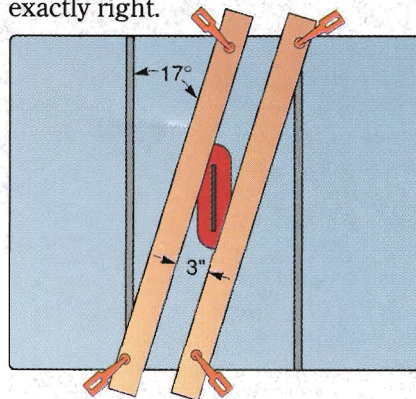
Cutting the Cove

Typically, when a project calls for moulding, we turn to the local lumberyard for a readymade product. If it's cove moulding we need, however, there's an alternative.

You can make cove moulding on your table saw by passing the stock over the blade at an angle. Changing the angle affects the diameter of the cove, and angling the blade will further alter the arc of the cut.

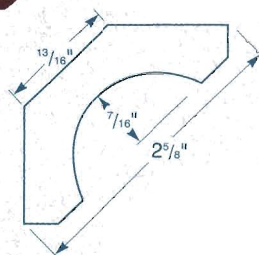
To make the icebox cove moulding, as shown in the **cove detail** below, clamp a fence at a 17° angle to the blade, as shown below. Next, lay the cove stock against the fence and add a second fence. Two fences make this operation safer.

Raise the blade in 1/8" increments and slowly feed the cove stock through until the arc reaches its full depth. Smooth the moulding profile with a gooseneck scraper and sandpaper. It's a good idea to practice this on scrap wood to get the fences and blade set exactly right.



Set up your table saw for cutting cove moulding by clamping two fences at a 17° angle to the blade, centering the blade between them.

Top Detail



Cove Detail

cabinetmaker's buttons (pieces 28) along each side. Make the buttons from scrap oak to fit the grooves in the sides, and screw them to the top after it's installed (See **Figure 4**). Next, rout a chamfer on the corners of the front frame, as shown in the **front frame detail** on page 16.

Making the Base and Top

The top (piece 29) is made of several oak boards glued edge to edge. Pick boards that are similar in color and grain or, better yet, use boards from the same plank. Once the boards are jointed and glued together, plane and sand the panel smooth (for tips on planing a panel see *Techniques* in issue 32). Cut the panel to size and chamfer its front and side edges, as shown in the **top detail** at left. Next, position the top on the case and drill the pilot holes for the hold down screws.

Rip stock for your base and cove moulding (pieces 30 through 33), but don't cut them to length yet. Shape the cove on your table saw, as described in the box at left. Once the cove is completed, cut out the **full size patterns** of the base pieces and trace them onto your stock. Bandsaw the baseboards to shape and rout a chamfer on their top edges. Now cut the base and cove to length, mitering the appropriate ends, and glue them to the case. I drove screws (pieces 25) through the back of the frame stiles into the baseboards to give the assembly more strength, and used brads to hold the cove moulding while the glue dried.

Completing the Doors

Except for completing the top curves and rabbetting the edges, the doors are nearly finished. Extend the curve of each top rail across the door stiles and cut just outside the line with a saber saw. Next, use a belt sander to refine the curves right to the lines.

Now rabbet the edges of the doors to fit into the front frame openings. Chuck a rabbeting bit in your router and make the cuts 3/8" deep. Try routing a sample first to test its fit with a hinge on the cabinet. You may need to adjust the router bit depth a hair to get a perfect fit.

After routing the door edges, lay the cabinet on its back and install the doors and hardware (pieces 34). Be

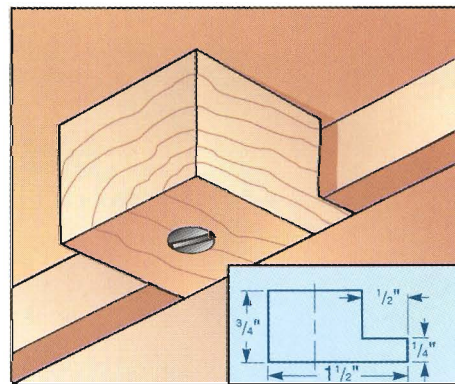


Figure 4: Equip your table saw with a 1/2" dado blade and a set-up block to cut two cabinetmaker's buttons for each side of the case.

sure to leave a 1/16" gap between the shoulder on the hinged side of each door and the door frames (see **hinge detail** on page 17). Failing to maintain this gap will cause the doors to bind.

Finishing

Remove the hardware so you can give the project its final sanding to 180 grit. Once this is done, finish the cabinet as you choose. Since the original iceboxes are closely tied to the Mission style furniture from the turn of the century, I decided to color my project in the dark brown finish that's typical of that era. I followed Bob Flexner's recipe for a mission style finish (see next page) that takes advantage of modern materials and avoids the danger and unpredictability of the ammonia fuming process.

After staining the wood, putting the nail holes and brushing on three coats of varnish, reattach the doors and install the shelf standards. Set the back in the cabinet and drill the countersunk pilot holes, then screw (pieces 35) it into place. Add the nameplate and bottle opener to round out the authentic appearance of your project and drive the glides (pieces 36) into the bottom corners of the carcass.

To outfit my icebox for use as a liquor cabinet, I built the accessories described in *Design Options* on page 15. Of course, there are many possibilities for equipping the inside of the icebox, however, the exterior will remain tied to tradition. You may not have the good fortune to inherit an icebox, but now you can have one that looks just like the originals.

Rick White, a professional woodworker, serves on the editorial advisory board of Today's Woodworker.

The Mission Oak Finish

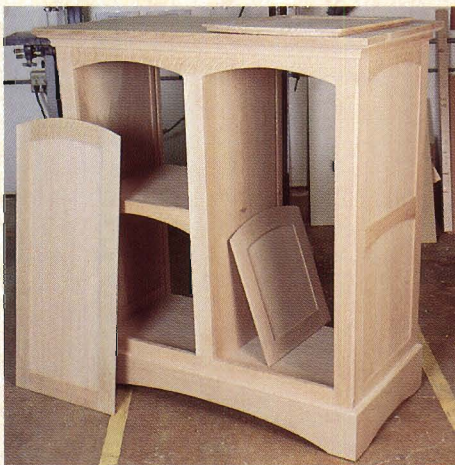
By Bob Flexner

Mission oak furniture is in the midst of a revival, and a lot of people are trying to imitate the look of the originals in their own furniture. Contrary to popular belief, the dark finish on most Mission furniture is not caused by aging varnish or ammonia fuming. While Gustav Stickley, the best known of the Mission style builders, may have preferred the dangerous and somewhat uncontrollable fuming process, most of his contemporaries did not.

Mission furniture was stained dark when it was made and then topcoated with shellac, which doesn't darken with age. Any light colored Mission furniture that you find has probably been stripped and not restained to match the original color.

If you're interested in matching a Mission finish, go to an antique store and study an original piece in good light. Besides being dark, an original finish will feel rough to the touch and have countless tiny cracks from age. The dense wood between the pores will be dark orange or dark yellow, while the pores themselves will be black. You'll also notice that most Mission furniture was made with quarter-sawn white oak, often nicknamed "tiger-striped oak." This is significant, for no matter how hard you try, you can't finish a piece made of plain-sawn oak to look like quartersawn oak.

Reproducing the Mission oak color requires two steps. First stain the dense wood to the background color, usually a dark orange, dark yellow or something in between, then follow with a black pigment stain. On the first step, you'll find that orange creates a warmer tone and yellow causes the wood to look cooler. The only type of stain that will color the dense areas of oak effectively is a dye stain (see *Rediscovering Aniline Dyes* in issue 30). The particles in pigment stains are too large for the microscopic pores of the oak, and you'll surely remove most of the color when you wipe off the excess stain. Once the dye stain dries thoroughly, darken the pores with a black pigment stain.



Step-by-Step Procedure

As with many finishing procedures, there are different ways to arrive at similar results. You may discover a better approach than the one described below, so treat this step-by-step outline as a starting point in your search for a Mission finish.

1. Sand the wood to 180 grit, remove the dust, and wipe over the wood with a water-soaked cloth or sponge. Let the wood dry for at least eight hours (depending on the humidity), then sand off the raised grain using 220-grit sandpaper. Sand only enough to make the wood feel smooth again, and remove the dust.

2. Dissolve one ounce of Golden Amber Maple dye stain (available from *The Woodworkers' Store*) into one quart of warm water and apply the mixture to your wood. Wipe off the excess dye stain before it dries, and then allow the wood to dry for at least eight hours. The color of the wood will probably appear redder than you want, but the next step will balance this out.

3. Apply a black, oil-based pigment stain or glaze to the wood. If you can



Varying the Color

Experiment with the color by using one or more of the following variations:

- Use a different color dye stain.
- Don't wipe off all the excess dye.
- Wipe off less pigment stain.
- Seal the wood with a thinned coat of finish between applications of dye stain and glaze.
- Finish with orange shellac to add warmth.
- Use black pigmented paste wood filler instead of black stain or glaze to fill and color the pores. The pores were filled on most original Mission furniture.

find it, try a Penchrome stain called Flemish Black, otherwise, use a similar substitute or have black pigment mixed with a neutral oil-stain base at a paint store. Lightly wipe off the surface, but leave it looking wet — enough pigment will remain to reach the brownish-orange color you're looking for. Allow the stain or glaze to cure for a day or two, then topcoat with varnish, polyurethane or lacquer.

If the color you get following these steps isn't exactly what you had in mind, try varying the recipe by experimenting with the options listed above.

Bob Flexner makes and repairs furniture in Norman, Oklahoma. He is the author of a new book titled *Understanding Wood Finishing* (Rodale Press, 800-848-4735).

The Caribbean Deck Table: Nautical Joinery Comes Ashore

A decade of woodworking in the tropics and sailing the Caribbean tradewinds left its mark on this author, who's finding new applications for his nautical know how.

By Joel C. Simon

For most people the dream of quitting their 9 to 5 job, buying a sailboat and escaping to the Caribbean is only an elusive fantasy. For me, it became reality and led to the beginning of my professional woodworking career. As I quickly learned, however, sailing in the Caribbean was easy compared to making a living from a bag of tools.

Nevertheless, work as a boat carpenter kept me going for sev-

eral years, until I settled down on St. John, in the U.S. Virgin Islands, and opened a woodworking shop. By the time I left the island ten years later I had learned a great deal about boats and furniture, and how wood behaves when exposed to the elements.

Perhaps the most impressive example of nautical joinery is the cockpit grate, the quick draining platform on which the helmsmen and cockpit crew stand. The grate is exposed to constant damage from the tropical sun, monsoon rains and heavy foot traffic, surviving through it all without noticeably shrinking, swelling or warping. I built and repaired many of these grates, so I know how durable they are. When I was asked to build a set of deck tables recently, I saw a wonderful opportunity to incorporate this key nautical element into my design.

If built out of decay resistant mahogany or teak, these tables will last many years with only minimal care. Teak is the best choice for projects exposed to the elements, but at one third the cost, mahogany is more than adequate. My tables can be completed in a weekend and the design can be altered easily to suit other shapes and sizes.

Making the Grate

Cutting all the half-laps in the strips that make up the grate assembly (pieces 1) depends on a simple, but very accurate jig (see **sled detail** above right). Using the jig will ensure that the half-laps align perfectly and guarantee a square tabletop. Remember, even small errors add up rapidly with repeating joints like



these. To make the jig as accurate as possible, cut sled runners to fit your table saw miter gauge slots snugly and install the back fence precisely at a 90° angle to the blade. In addition, make sure the width of the indexing stop matches the cut of your 3/4" dado blade and is secured exactly 3/4" from the dado cut, as shown at right.

I recommend that you cut your dadoes in wide stock and then rip the boards into the strips. Cut four pieces of 6" wide by 15 3/4" long mahogany and plane them to exactly 3/4" in thickness. Next, install a 3/4" dado blade in your table saw and set your jig into position. Raise the blade 3/8" above the sled surface and butt one end of a mahogany board up to the indexing stop. Make the first dado cut in the board, then slip the dado over the indexing stop and make a second cut, and so on until you reach the end of the board (See **Figure 1**). I like to tap the board down with a mallet each time I slip a dado onto the indexing stop. The sound made by the tapping tells me whether the board is flat on the jig or hung up on a wood chip. Continue this operation until the four boards are dadoed from end to end.

Now switch to a standard blade and rip each board into 13/16" wide strips. This will yield 24 strips, four more than you need for the grate. I make it a practice to cut extra strips just in case I have a problem with tear-out or somehow ruin a piece. If the strips are still around after the grate is assembled, you can make handy trivets to go with the table. Plane 1/32" off each edge of the strips to clean up the saw marks and bring the stock to its final width. Proceed slowly with this step, and test fit the pieces as you go—it's more important that the pieces fit together snugly than match the final dimensions listed in the material list. You should be able to push the parts together by hand, but just barely.

Once the strips are sized, glue them together to make up the grate assembly. Watch out though—it's easy to use too much glue on this assembly. For one thing, if the half-laps fit tightly you hardly need glue at all, and for another, if you put more than a dab of glue on each half-lap you'll end up with a real mess in all the openings.

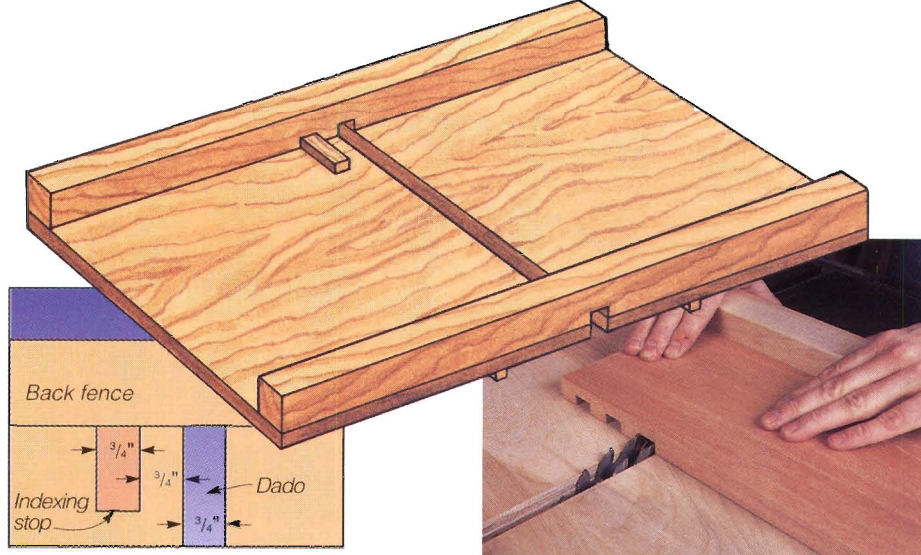


Figure 1: Use a sled equipped with an indexing stop to position the wide mahogany boards while cutting all the equally spaced dadoes.

(I've seen the glue fail on many boat grates, yet they were still quite serviceable for years afterward.)

Since this is an outdoor project, using water resistant glue is a must. Titebond II works well for mahogany, but epoxy is best for oily woods like teak. Be sure to have all your clamps and pads ready, because Titebond II sets up fairly quickly.

Put glue in the half-laps and tap the strips together with a mallet. When all the pieces are joined, clamp the assembly between pieces of 3/4" plywood.

Making the Frame

While the glue dries in the grate assembly, machine stock for the top frame (pieces 2). Rip four pieces to width and let them run long for now (you'll miter them to length later to fit the grate exactly). Next, install a 3/8" dado blade in your table saw and machine one edge of each piece, as shown in the **frame detail** on page 23.

Remove the clamps from the grate and choose its best side for the top surface. Now trim the grate to 14 1/4" x 15" and prepare to cut tenons on two edges of the assembly, as shown in

the **grate detail** below. Be sure to cut away the waste on the correct edges or your tenons will fall off the assembly (see inset detail below). Install a 3/8" dado blade and clamp a wood face to your saw fence (See **Figure 2**). Raise the blade 3/8" and push the fence right next to the blade, then run the two edges over the blade.

With the tenons cut, go ahead and miter the frame stock to fit around the grate. I reinforced each miter joint with a biscuit (pieces 3), although a spline would work just as well (see **spline option detail** on page 23). If you do use splines, be sure the grain runs across the joints and not parallel with them.

The grate provides a luxury seldom found with solid wood construction—it isn't affected by airborne moisture like a solid wood panel is. Glue the frame and grate together without worrying



Figure 2: Cut tenons on the assembled grate after clamping a protective wood face to your fence.

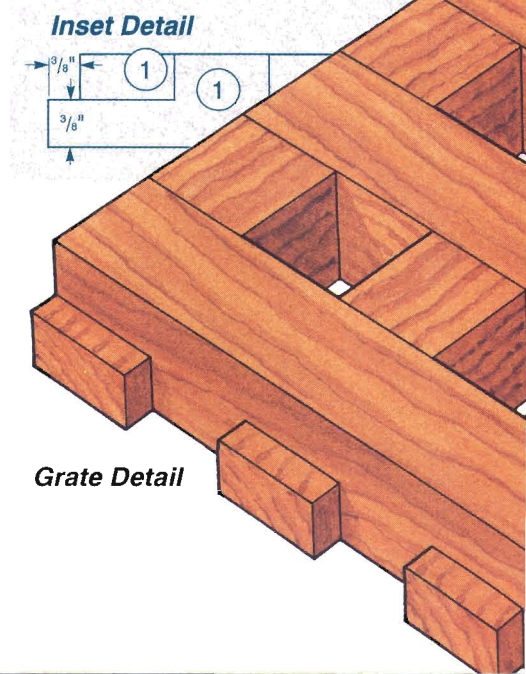




Figure 4: Pare the tenons with a 3/4" chisel. At the point when you can slip a dollar bill between the tenon and the mortise you'll have a perfect fit.

about wood movement, then use a belt sander to flatten the top. Finish up with an orbital sander and 120 grit paper.

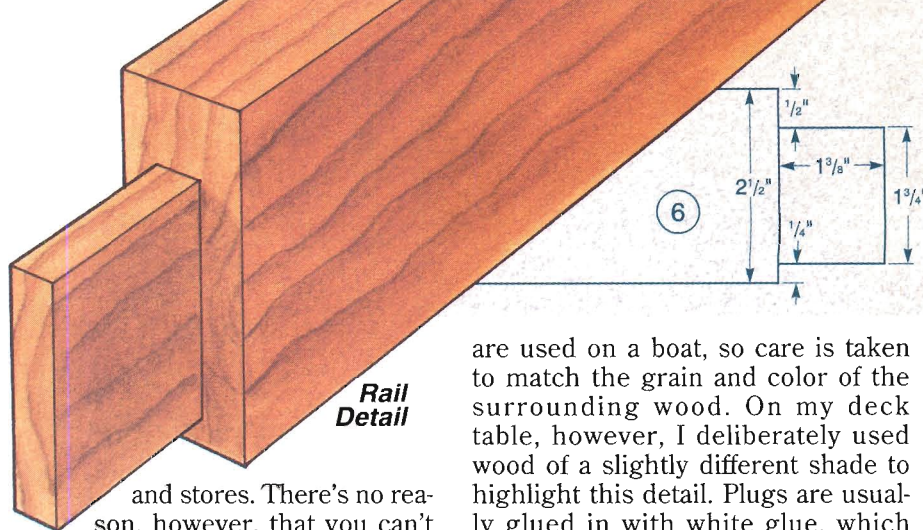
On a boat, it's customary to round-over the corners and edges of any woodwork to save the crews' shins on a turbulent sea. In keeping with this tradition, I routed the tabletop edges with a 1/4" roundover bit.

Constructing the Base

The table base construction is about as straightforward as can be. Start by gluing the leg parts (pieces 4 and 5) into pairs, as shown in the **leg detail** below, carefully choosing well matched pieces for each assembly. While the glue dries cut your rails (pieces 6) to size.

Once you've cleaned the glue off the legs, cut them 20 3/4" long and layout the mortises for the rail tenons. To form the 1 1/2" deep mortises, I use a hollow chisel mortising attachment in my drill press (See **Figure 3** below). These attachments are easy to use, they're inexpensive and the results are very good. You'll find them in most woodworking supply catalogs

Leg Detail



and stores. There's no reason, however, that you can't rout or drill the mortises and clean them up with a chisel if you prefer.

Next, install a 1/2" dado blade in your table saw, raise the blade 7/16" and cut the rail tenon cheeks, as shown in the **rail detail** above. Be sure to clamp a set up block to your fence while making these repetitive cuts. After cutting the cheeks, adjust the blade and cut the edge shoulders.

Pare the tenons to fit the mortises, as shown in **Figure 4** above, then glue the legs and rails together. Sand the base and rout its edges (except along the top) with the 1/4" roundover bit. I always rout the bottom of each leg to prevent chipping when the table is dragged across the floor.

Assembling the Top and Base

In keeping with the nautical theme, I secured the top to the base with screws and plugs. Drill the counter-bored pilot holes, as shown in the **screw and plug detail** at right, then drive in the non-corrosive deck screws (pieces 7). Next, make your own mahogany plugs (pieces 8) using a 3/8" plug cutter in your drill press, and glue them into the counterbores. Thousands of wood plugs

are used on a boat, so care is taken to match the grain and color of the surrounding wood. On my deck table, however, I deliberately used wood of a slightly different shade to highlight this detail. Plugs are usually glued in with white glue, which isn't water resistant, so that someday the plugs can be removed to get at the screws if the piece needs repairing. Even after years of exposure, white glue bonds well enough to hold the plugs.

Sanding and Finishing

Pare the plugs flush with the tabletop using a wide, very sharp chisel. To avoid tearout during this process, I recommend testing each plug to determine which way the grain runs. Next, sand the entire table to 220 grit.

When you first consider finishing your new table you may reach for Spar varnish, but I recommend a marine wiping varnish called *Deks Olje* (pronounced "decks olya" —for the name of a local supplier call the manufacturer at 1-800-321-3444). I used this product on my boat for over ten years with good results. Spar varnish provides the maximum UV protection and will last the longest, but it must be stripped off before refinishing every couple of years. A project finished with *Deks Olje* will require regular maintenance, but it's easy to apply after a light sanding. If you live in northern climates I recommend wiping on a coat each spring, and in the southern states you'll want to recoat every four months. The thin viscosity of this product allows it to penetrate deeply, which means that the initial application will require many coats for an adequate build up.

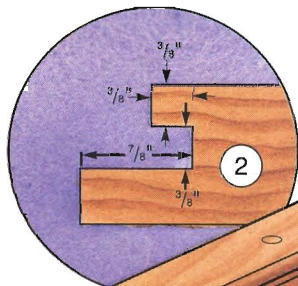
So what's left to do? Set yourself up with a cool drink, relax on your deck and dream about sailing the Caribbean. But be careful, the last time I tried this I didn't return for 10 years!

Joel Simon is now building furniture for a living in that famous tropical paradise, Minneapolis, Minnesota.

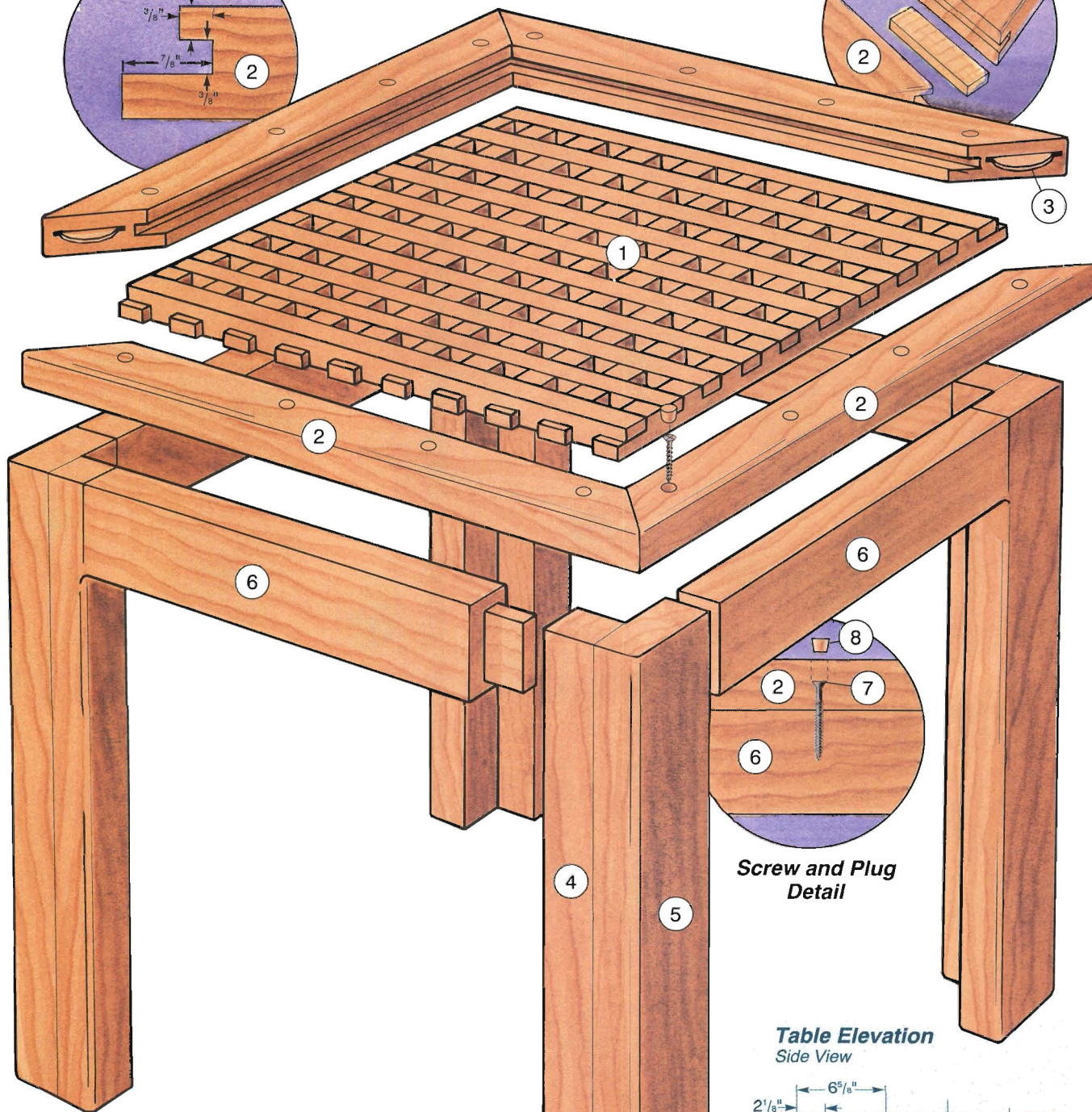
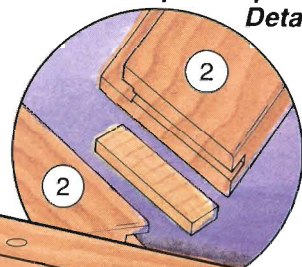


Figure 3: A drill press attachment will make short work out of mortising the legs. As the coarse drill bit removes most of the waste, the chisel shapes each hole into a square.

Frame Detail



Spline Option Detail



Screw and Plug Detail

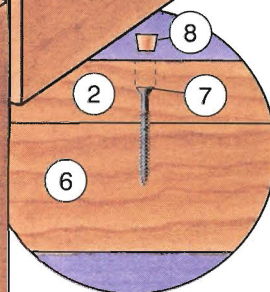
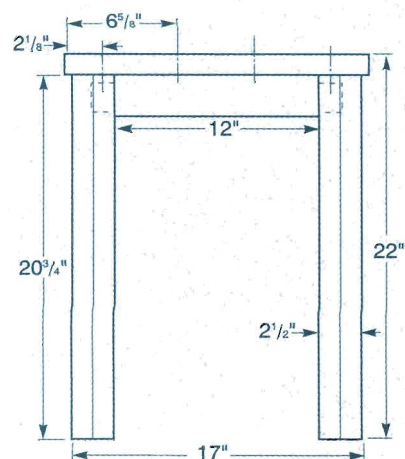


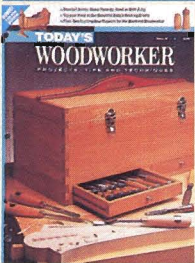
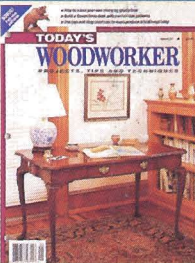
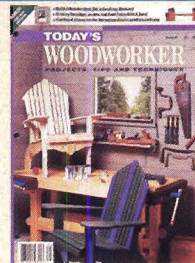
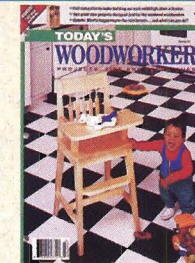
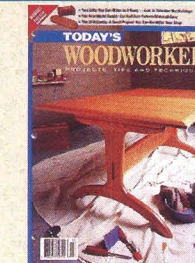
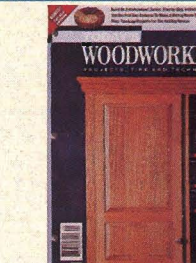
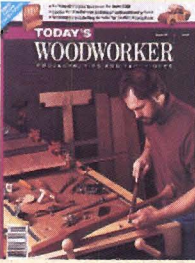
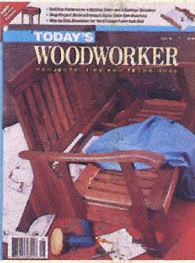
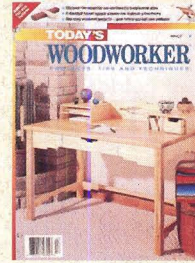
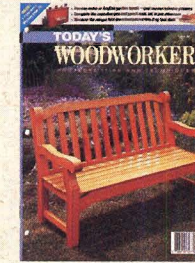
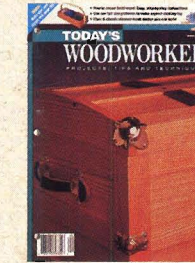
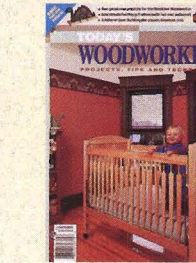
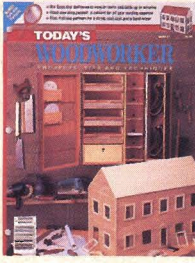
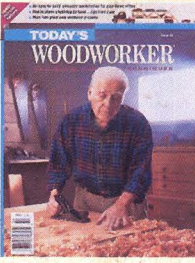
Table Elevation Side View



MATERIAL LIST

	T x W x L
1 Grate Strips (20)	3/4" x 3/4" x 15 3/4"
2 Frame (4)	1 1/4" x 2 1/2" x 17 5/8"
3 Biscuits (4)	#10 wafers
4 Legs (4)	1 1/4" x 1 1/4" x 22"
5 Legs (4)	1 1/4" x 2 1/2" x 22"
6 Rails (4)	1 1/4" x 2 1/2" x 14 3/4"
7 Screws (16)	#8-1 1/2" coated deck screws
8 Plugs (16)	3/8" diameter

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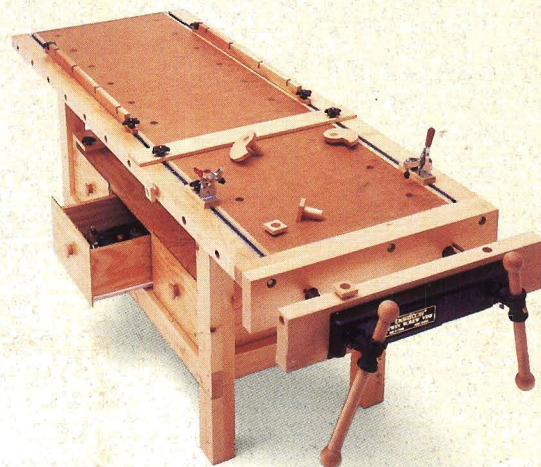
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Full-Size Patterns

- Open staples carefully, remove pattern and fold staples back in place.
- Use graphite paper (available at most art supply stores) or cut and trace the pattern onto your stock.

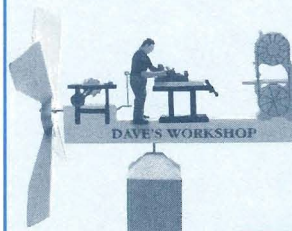
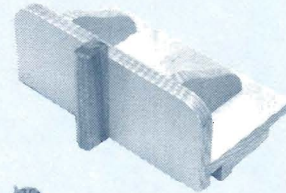


The Classic Oak Icebox

Includes all the curved rails and panels, the cove and base mouldings, and elevations of the side and front frames.

An Adjustable Band Saw Fence

You'll find the full size pattern of the brace.



A Woodworker's Whirligig

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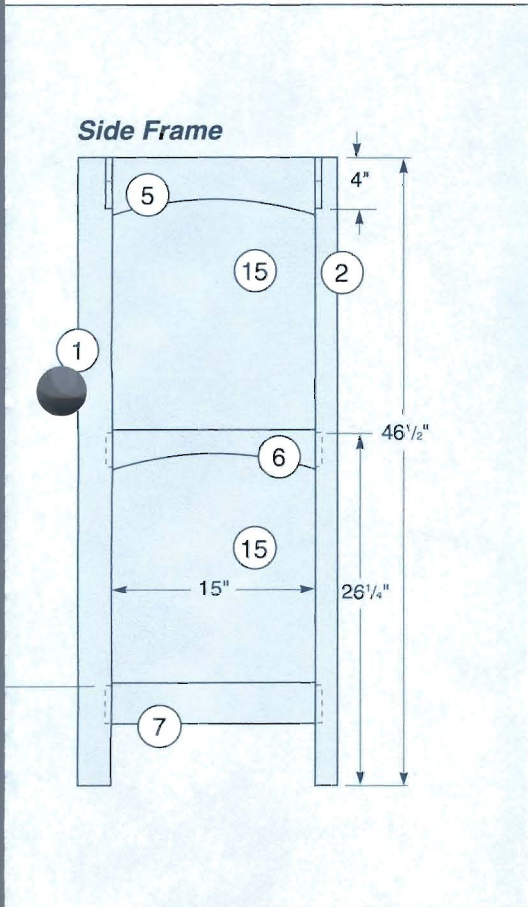
*Rout 3/8" wide
x 1/2" deep
grooves in
both edges
of pieces 6.*

6

Center Side Rails

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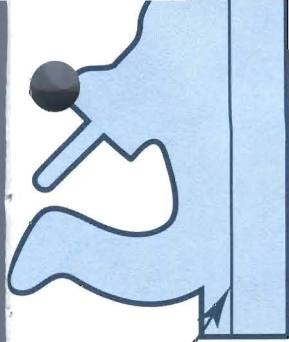
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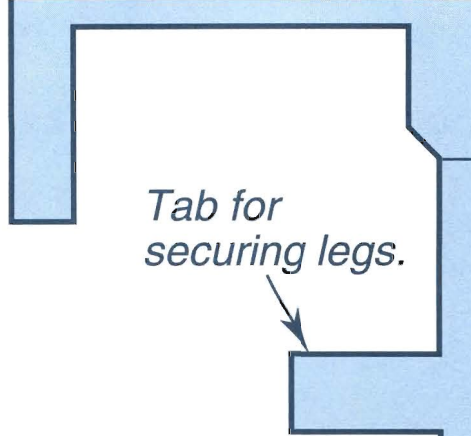
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Propellers

*Cut four Propellers
for Whirligig project.*



oversize piece
Plane and form
x 1/4" tongue on
edge before
to shape.

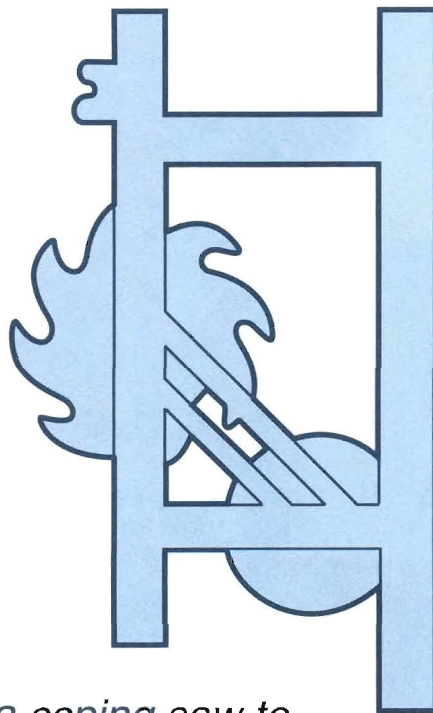


Pivot Nail
location



2

Table Saw

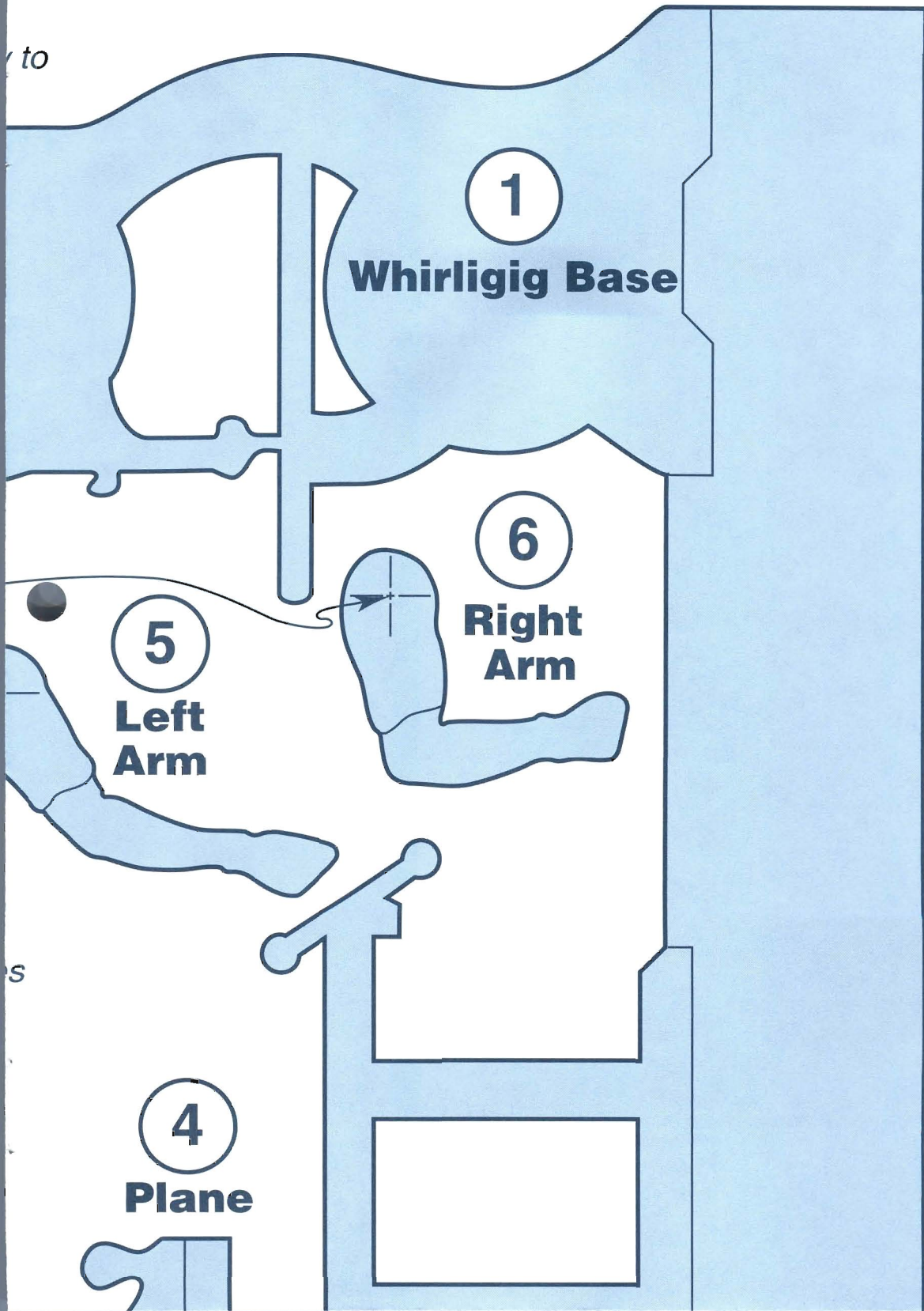


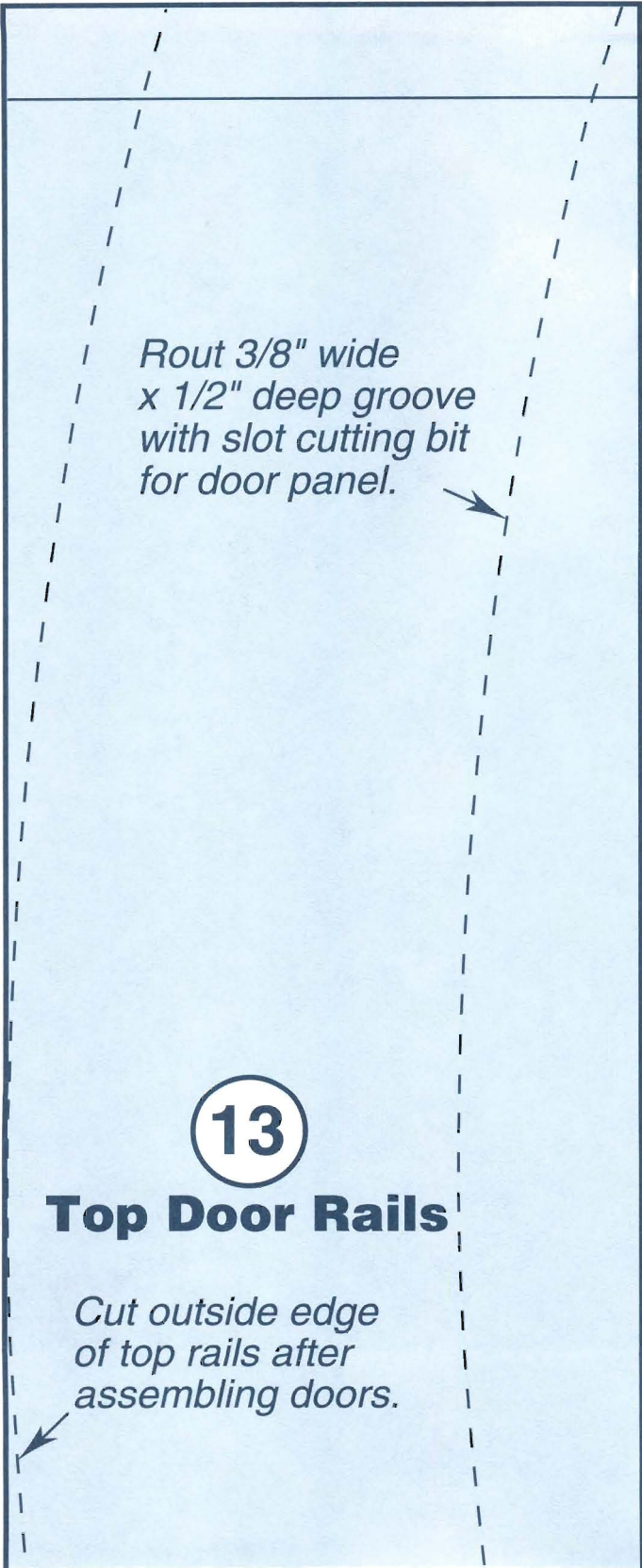
Use a coping saw to
cut interior areas.

Glue into



y to





*Rout 3/8" wide
x 1/2" deep groove
with slot cutting bit
for door panel.*

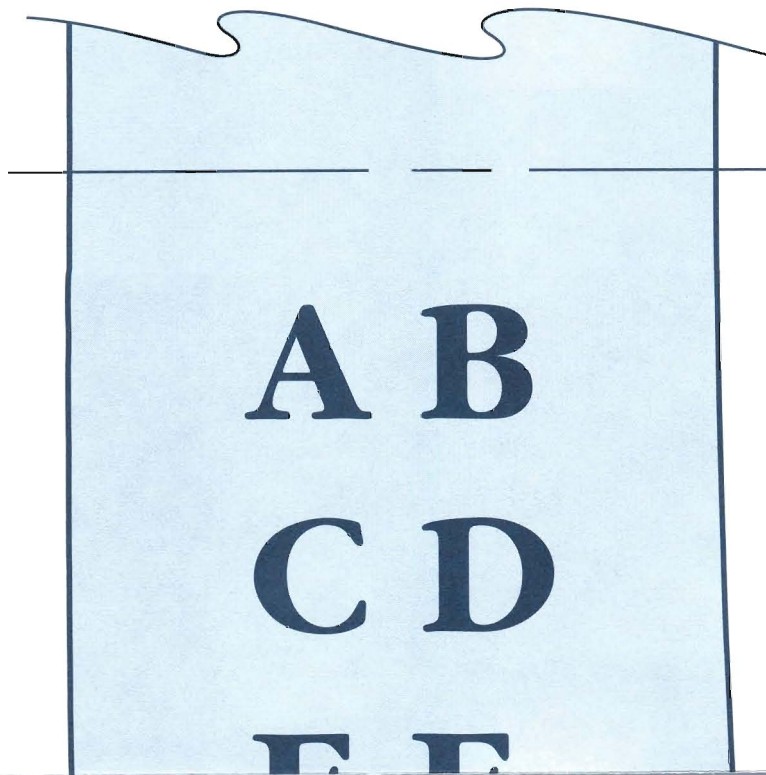
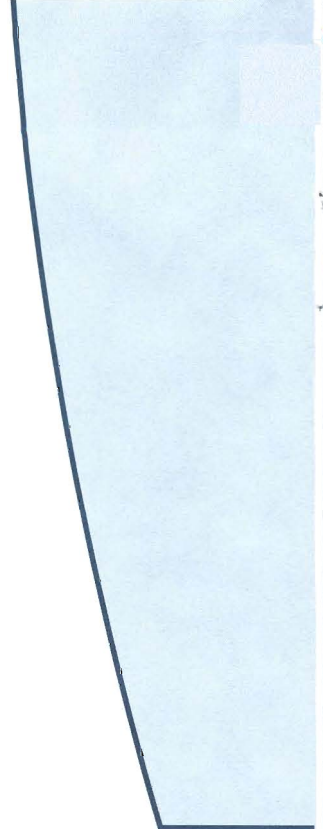
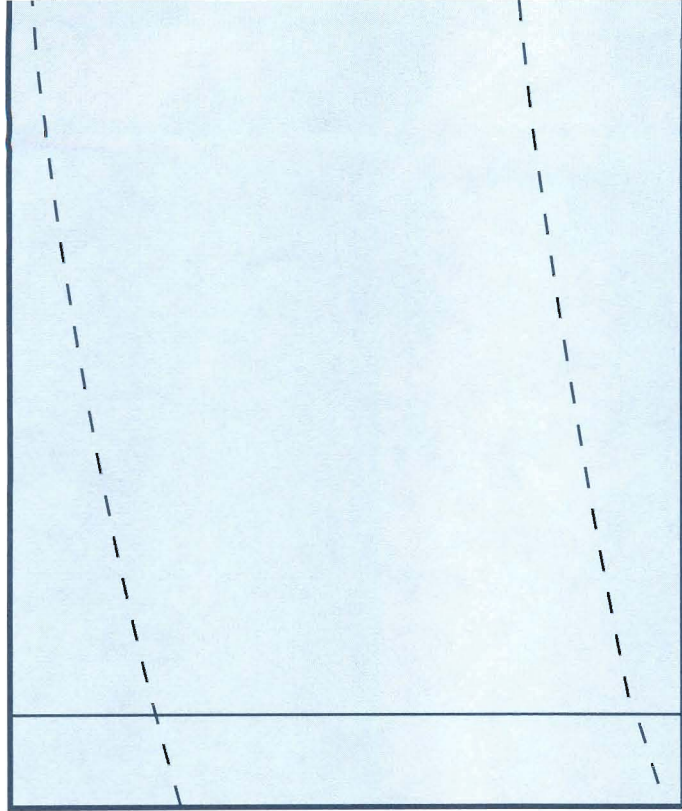
The diagram shows a light blue rectangular area representing a door panel. Two dashed lines run vertically, slightly inward from the left and right edges, defining a central area. An arrow points from the text to the right dashed line.

13

Top Door Rails

*Cut outside edge
of top rails after
assembling doors.*

The diagram shows a light blue trapezoidal shape representing a door rail. It has a curved left edge and a straight right edge. Two circular callouts are on the right side, labeled '10' and '11'. A small black dot is located on the right edge. An arrow points from the text to the left curved edge.



£

E F

G H

I J'

K L

M N

O P

Q R

S T

Front Base Moulding

Chamfer top edge.

U V

W X

Y Z

*Miter both ends of front
base moulding.*

Use a coping saw
cut interior areas.

Braces

es for
jig.

Drill 1/4" holes
for couplings.

3 Torso

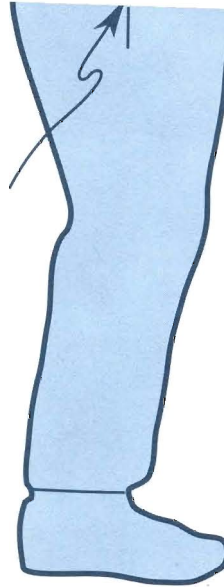
Drill pilot hole
for eyescrew.

Drill 1/4" hole
for couplings.

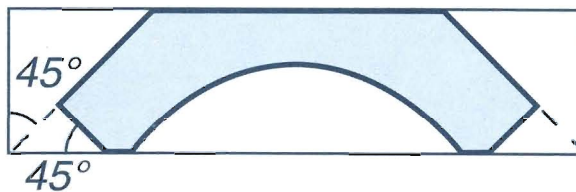
7

Legs

*Drill 1/4" hole
for couplings.*



*Cut an
for the
a 1/4" x
one ed
cutting*



32

Front and Side Cove Mouldings

33

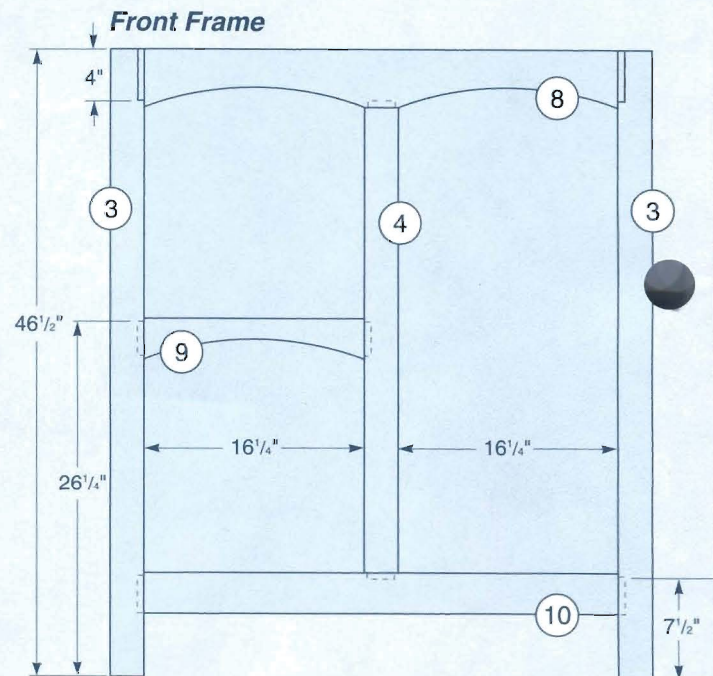
*Form arch on table saw
following procedure
described on page 18.
Cut 45° edges
after forming arch.
Miter both ends of
front cove moulding
and one end of each
side cove moulding.*

5
annels

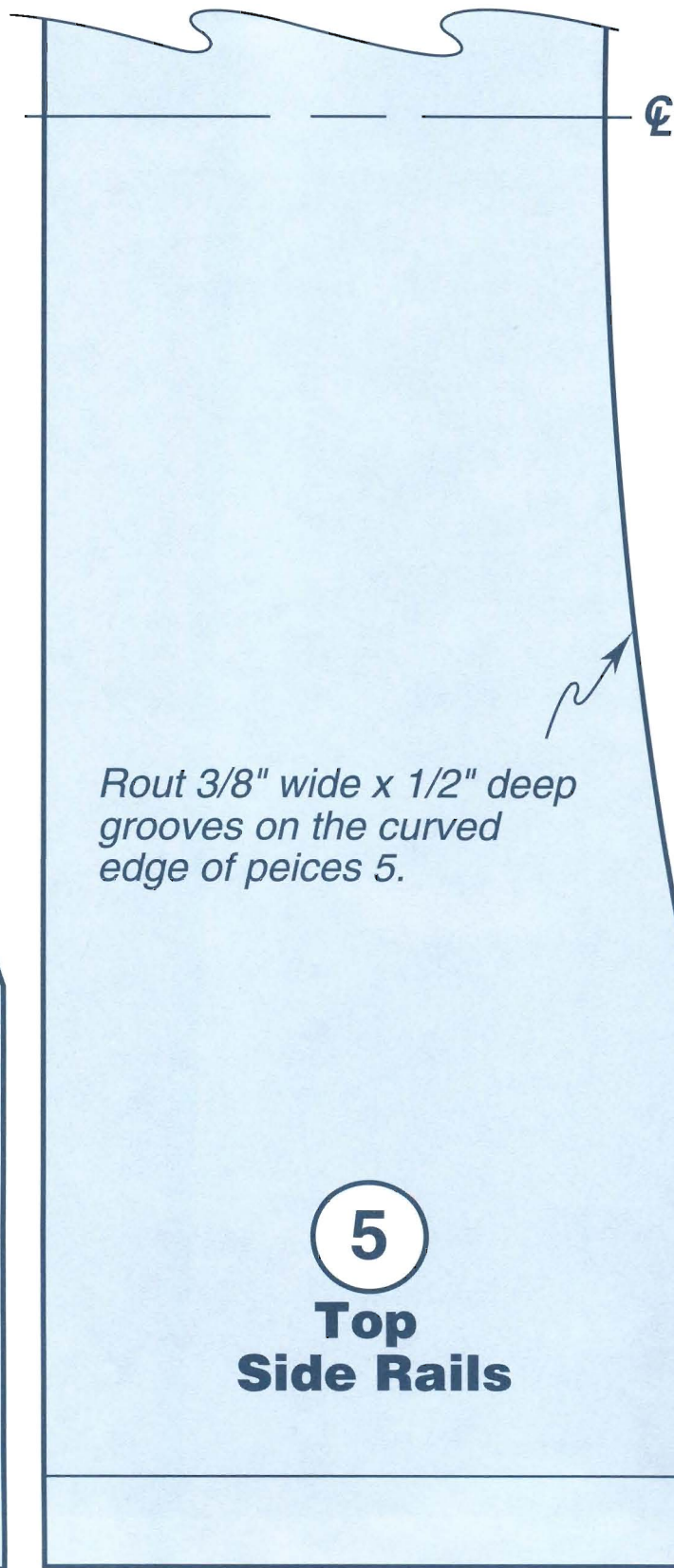
attern for

the top
e panel.

Mortise and Tenon Locations



⌘



6

Short and Tall Door Panels

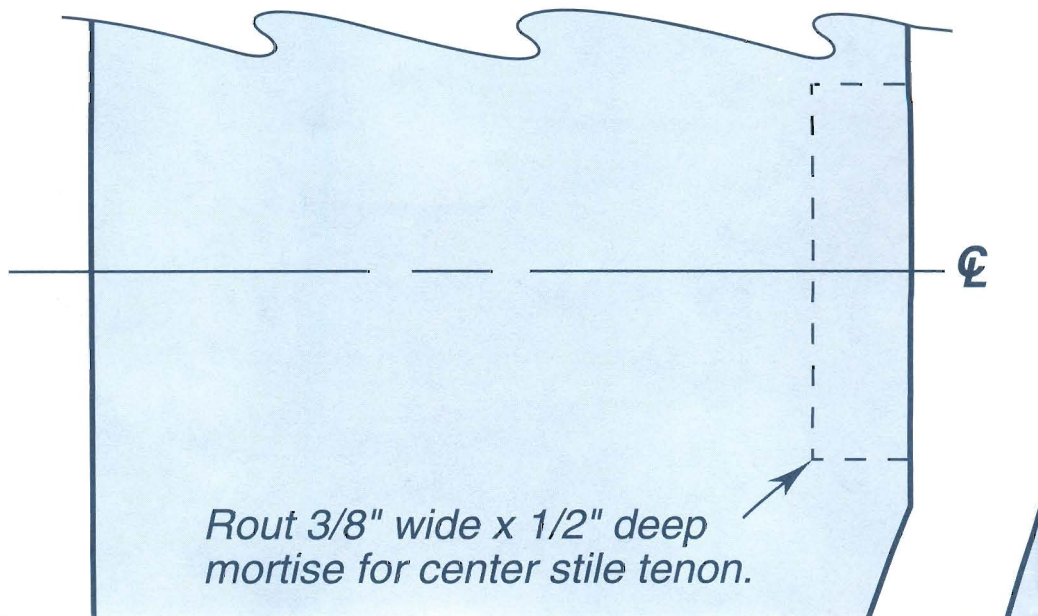
7

*Use this pattern for
laying out the top
of each door panel.*

4

Band Saw Fence

NOTE: Cut two braces
your band saw fence



*Use same curve for
middle front rail (piece 9).*



15

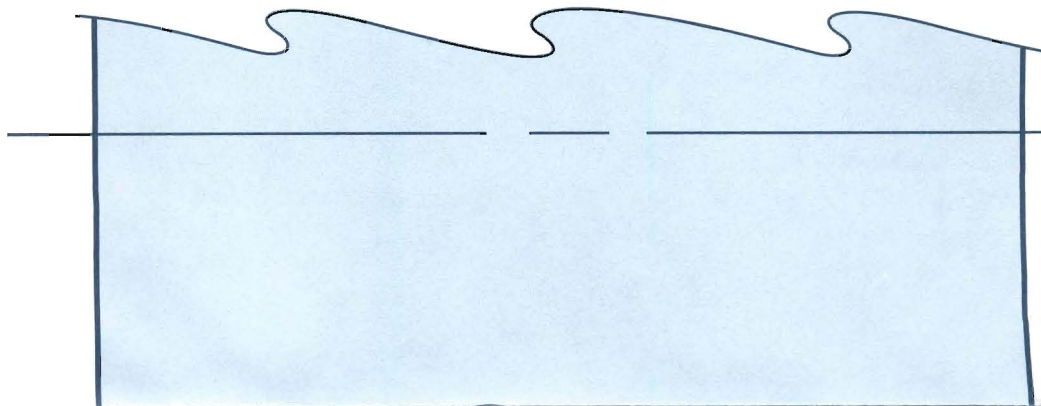
Side P

Use this pa

8

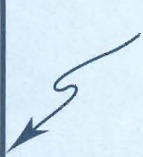
Top Front Rail

laying out the
of each side



Side Base Mouldings

Chamfer top edge.



*Miter the appropriate ends,
then cut the side base
mouldings to length.*