

Better Homes and Gardens®

WOOD

DECEMBER 1998 ISSUE 110

THE WORLD'S LEADING WOODWORKING MAGAZINE

Extraordinary Steamer Trunk

Page 56

**Make Raised Panels
without large-diameter
router bits** Page 62



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| MODEL | SHANK | CUTTER DIA. | CUTTER LENGTH | REG. PRICE | SALE |
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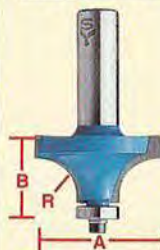
Reversible Stile & Rail - Classical with Guide Bearing



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| 1/2" SHANK | | | | | |
|------------|---------------|---------------|----------|--------------------|------------|
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WOOD®

THE WORLD'S LEADING WOODWORKING MAGAZINE

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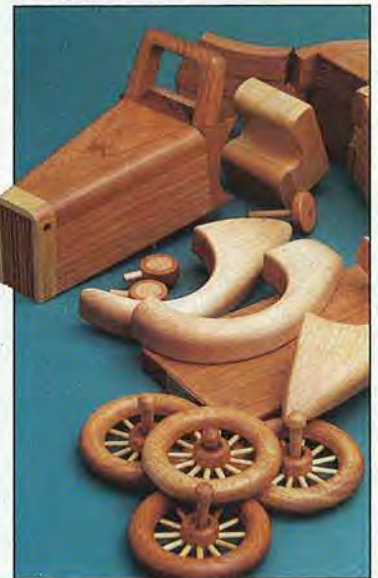
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Get organized with our super shelving system.



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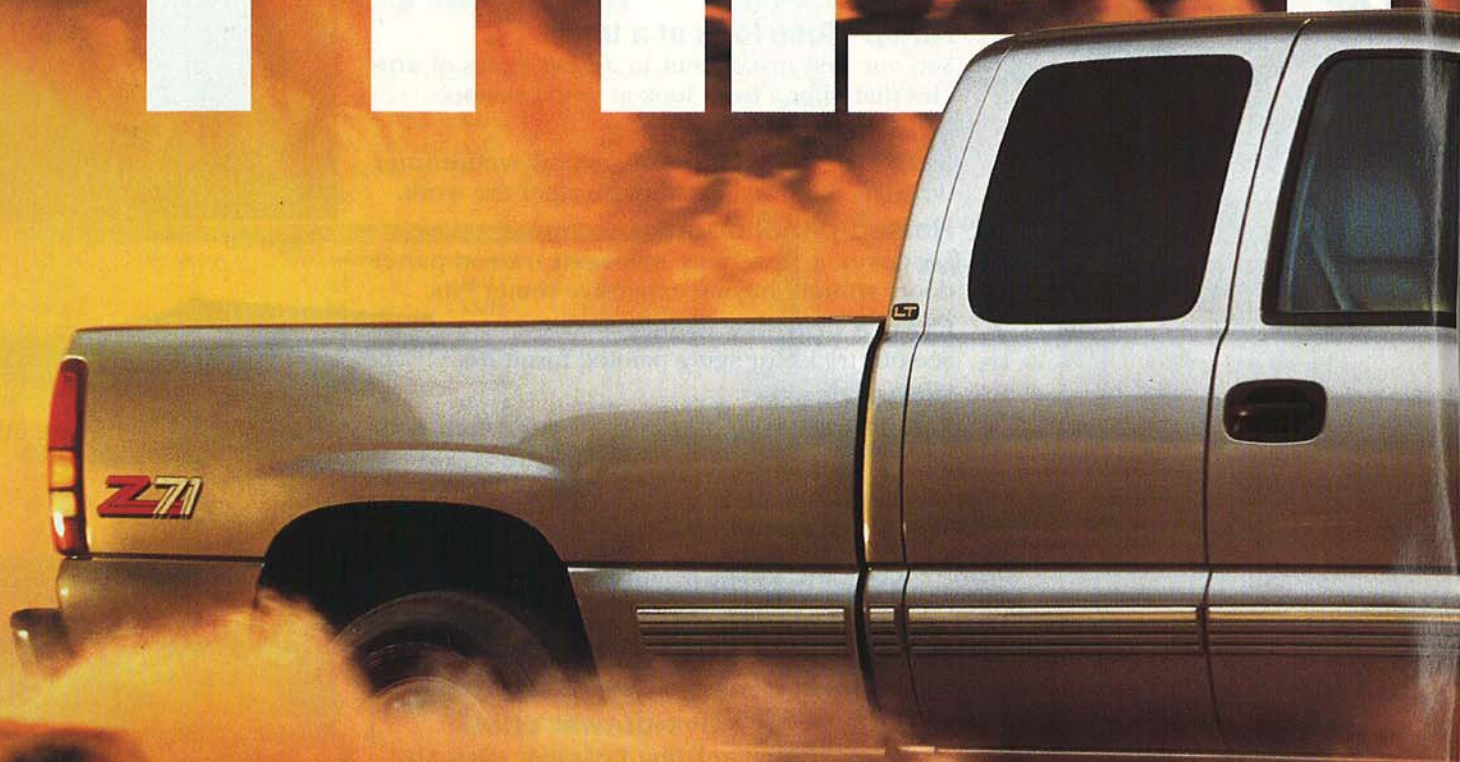
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THE



INTRODUCING SILVERADO. THE

A truck has a job to do. And our truck did the job about as well as could be done. But we knew we could build a better truck.¹ And we did. Its name is Silverado.

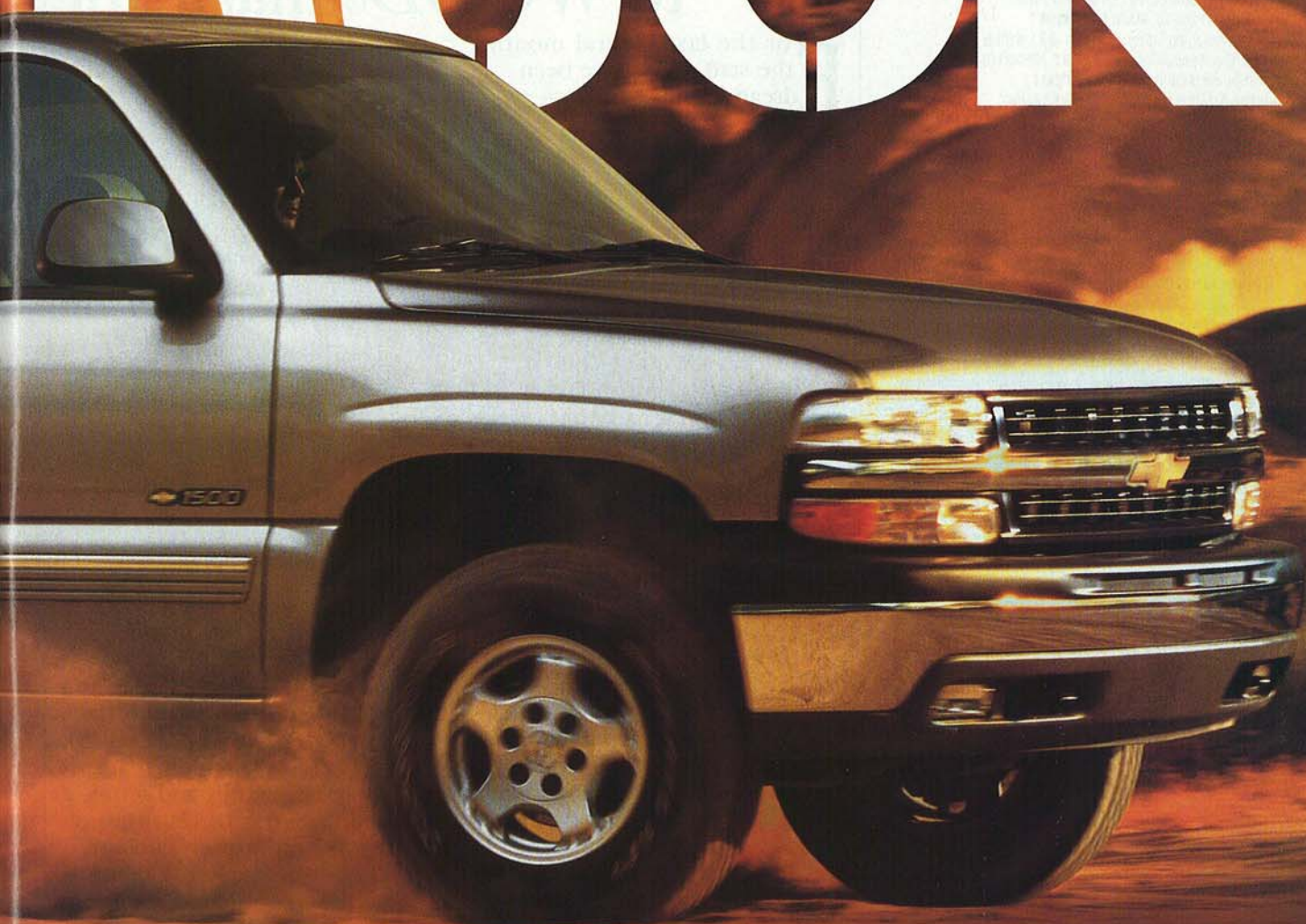
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Better Homes and Gardens®



at www.woodmagazine.com

Regular visits to *WOOD ONLINE* are as much a part of woodworking as sawing boards for many woodworkers. The ten discussion groups, in fact, have become a big woodworkers' club—a place to share ideas, find answers, or just visit with people who share your interest. Now, *WOOD ONLINE* features *WOODWORKING Neighborhood*, where you can tell about yourself and even show your work. Click over to the Neighborhood soon to meet the gang. Then follow the simple steps, and build your own homepage. ♣

THE EDITOR'S ANGLE

Guess What!

We're adding more great articles to **WOOD**® magazine

For the last several months, the staff and I have been dreaming up some exciting new additions to *WOOD* magazine. And beginning with this issue, we're rolling them out for your woodworking inspection.

On page 47 you'll find the first of a new series of articles we're calling "The Story of Wood." This replaces the popular Wood Profile series that we've run since *WOOD* magazine debuted in 1984. For you newer readers not familiar with Wood Profiles, you can find in-depth printable data on the 13 most popular woodworking wood species featured in that series. Just check out our web site at: www.woodmagazine.com

In "The Story of Wood" articles we will focus on what wood is, how it behaves, what affects it, and how all of these factors determine the way we woodworkers use this most versatile material. In this issue's article, titled "An Up-Close Look at a Tree" (see page 47), Features Editor Pete Stephano takes a close look at the anatomy of trees to set the stage for articles that will appear in coming issues. Regular readers of this series will learn about how moisture affects wood, the differences between air-dried and kiln-dried lumber, what causes figure, why wood warps, and a host of other important subjects.

For help in researching these articles, Pete will join forces with the experts at the U.S. Forest Products Lab in Madison, Wisconsin, as well as many other wood technologists and woodworking con-

tacts. You won't want to miss these informative articles.

I'd also like you to take a look at our new "Workshop Puzzler" on page 24. Even if you're not into crossword puzzles, we think you'll find ours, which features woodworking words and terms, a fun and easy way to brush up on your woodworking terminology.

And because we know that lots of you are interested in fixing up old furniture pieces, we've got something else up our sleeves, starting in issue 111. And that something is a series of articles under the heading "The Furniture Repair Shop." Over time, we'll share with you helpful hints on how to repair furniture veneer, deal with warped tabletops, spot fake antiques, tighten loose joints, and much more.

Here's hoping that our new brainstorm suits your woodworking fancy. Let us know what you think of them. ♣

Larry Clayton



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Woodworker's Journal, January/February 1998



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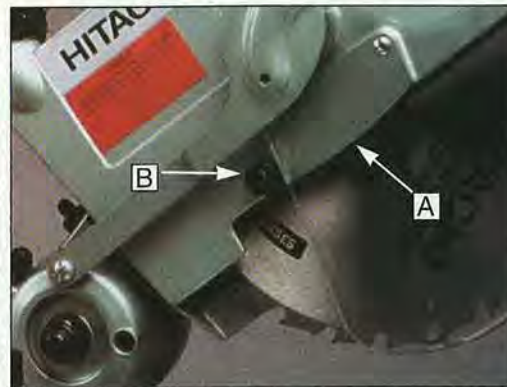
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TALKING BACK

A word of caution from Hitachi

In issue #104 of *WOOD* magazine, we showed a Hitachi compound mitersaw on page 57 with an unsecured plate intended for covering the arbor screw. Our friends at Hitachi notified us that sawing under this circumstance could result in injury. So, always be sure that this plate (A) is securely held in place by the rubber washer and screw (B), as shown at *right*.



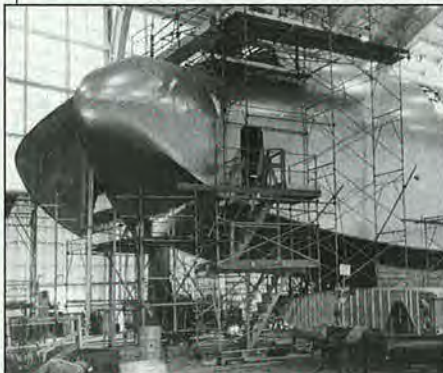
Too early for epoxy

Thanks for the great article and photos of the Spruce Goose in issue #106 of your magazine. Nonetheless, I'd like to offer a correction. The birch plywood panels known as Duramold didn't use epoxy resins as

stated in the article. The first epoxy resins were made in 1949, and the Spruce Goose flew in 1947.

Duramold was invented by Col. Virginius Clark in the early 1930s. Col. Clark, an aeronautical inventor himself, teamed up with Sherman Fairchild who sold Duramold's rights to his friend Howard Hughes in 1939 for use on the the Spruce Goose.

—William Winter, Silver Spring, Md.



Bill, we contacted the Evergreen AirVenture Museum. An official there confirmed that the plywood for the Spruce Goose was made from formaldehyde-based resins that were heat cured, not epoxy.

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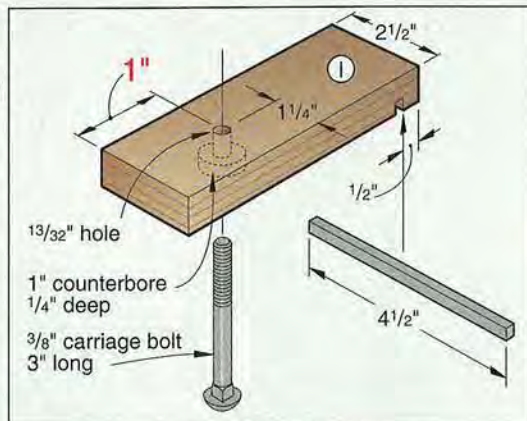
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Box-joint jig drawing correction

The box-joint jig project that appeared in issue #108, needs a revision. On the indexing block (part I), the $\frac{13}{32}$ " hole should be 1" from the end, not 2" as the Adjustment Assembly drawing on page 46 in the magazine showed.



Speak your mind

We welcome your comments, criticisms, suggestions, and yes, even compliments. We'll publish let-

ters of the greatest benefit to our readers. Write to: Talking Back, *WOOD* Magazine, 1716 Locust St., GA310, Des Moines, IA 50309-3023



Woodworking blooper parade

Editor's note: Recently, someone asked fellow woodworkers in our internet site to share their wood-working mistakes. The ensuing discussion made us chuckle, and we thought you might, too.

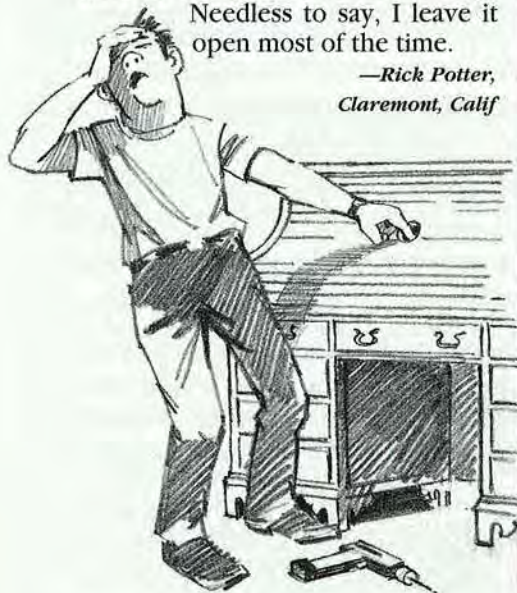
Many years ago my husband bought a mortising attachment for his drill press. But, it didn't work very well. In fact, he had to lean on the handle with all of his strength and still got nothing that looked like a mortise. So, he took it back to Sears. The salesman inserted a drill bit into my husband's hollow chisel and chucked the whole thing into a drill press. He must have noticed my husband turning red and immediately said, "Maybe your bit is dull; take this one and try again." It worked much better with a drill bit.

—Sue Otis, Buffalo, Minn.

We have a \$1,500 solid-oak rolltop desk. I wanted to put a hole in the back for a calculator cord. So I got my holesaw and proceeded. Man, the backboard seemed thick! Oops, I forgot the top rolls up and behind the backboard. Now, I have a 1½" hole in the middle of the rolltop.

Needless to say, I leave it open most of the time.

—Rick Potter,
Claremont, Calif



Did these stories bring back memories for you? Please, drop us a line if you'd like to share.

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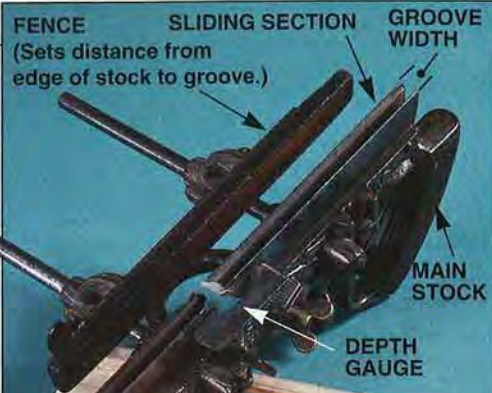
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H111

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SEVEN-WAY WONDER

For versatility, the Stanley 45 was hard to beat



Here's how you would set up a Stanley 45 plane for a typical operation, grooving.



Samuel Colt's .45-caliber revolver may have won the West, but it was the Stanley 45 that helped build it—along with the East, the Midwest, the North, and the South.

The Stanley no. 45 combination plane, introduced in 1883, was a woodworker's wonder. Billed as seven planes in one, it could dado, groove, and rabbet; form edge or center beads; cut tongues and grooves to end- or edge-match boards; shape a sash profile; and rip thin stock with its slitting blade. And unlike some multipurpose tools, it performed every operation well.

Straight out of the box, the 45 looked stupendously complicated, as shown *above*. But the simple instructions (a 12-page, 3½×6" booklet) quickly dispelled any fears, and showed that the 45 was perfectly straightforward.

The three major components—the main stock, the sliding section, and the fence—all slid onto a pair

of steel-rod arms (the plane came with long and short ones). Other parts included several stops and gauges, spurs for cutting across the grain, a cam-shaped front rest for certain operations, and a box of 23 cutters. (The number of irons supplied with the plane varied over the years—the earliest ones came with 18.) Another 23 beading, fluting, and reeding cutters were available.

WOOD® magazine's project builder Chuck Hedlund owns the like-new, in-a-box Stanley 45 plane shown *above*. His grandfather purchased it in the 1940s when he built a new house and barn.

A more timeworn model (*top right*) shows how the parts fit together for grooving or plowing. The plane shown made the cut in the board under it.

Stanley manufactured the no. 45 combination plane until 1962. Over its lifetime, it was Stanley's best-selling combo plane.

Many woodworkers and tool collectors today have a special fondness for the 45. Complete late-model planes (types 12–20 incorporating all of the patent adjustment features, manufactured roughly from 1915–1962) in mint or excellent condition often sell in the \$300–\$500 range to collectors, John Walter, author of *Antique and Collectible Stanley Tools, Guide to Identity and Value*, told us. A complete early plane in its box could bring twice that, he figures.

Many buyers still seek Stanley 45s for their versatility. "Late 45s in good condition often sell in the \$200–\$250 range as user planes," John said. Given their versatility and quality, he considers 45s a bargain at such prices. And those who are willing to work with a slightly raffish-looking tool can find usable 45s for even less. ♣

Photographs: Hetherington Photography
Planes provided by Chuck Hedlund, Larry Johnston
Written by Larry Johnston

22 TEETH
ALTERNATE TOP BEVEL

5/8" A
LASER

REQUIRES LESS POWER

Rip Wood
Crosscut Wood
Chip Board
Plywood
Laminate
Non-Ferrous
Metals



Fair Good Excellent
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COOL CUT.

What is it?

Our new line of Teflon® coated blades. TCS®, short for a new industrial coating by DuPont® that makes our blades run super fast, super smooth and super cool.

How?

- The coating makes these blades more resistant to friction and heat buildup. The blade stays up to 50% cooler than non-coated blades. This helps the wood glide by the blade with a lot less effort compared to conventional blades. So, you get some major benefits.
- This puts less stress on the blade. Studies by DuPont tell us that TCS coated blades last up to 50% longer than conventional blades before sharpening.
- It also causes less pull on the saw, 38% to be exact. Which translates into over 1/3 more cutting power. And as a bonus, the smoother cutting action means less wear and tear on the motor.
- TCS blades won't bind like conventional blades. The self-lubricating, non-stick finish sheds sappy wood residue before it builds up. So you will get a smoother, more professional cut with TCS blades.
- Clean up with these blades is also easy. Pitch and resins just don't stick well to the industrial Teflon. So, even after extensive use, simply wipe clean with hot water.
- Don't be concerned about cleaning the blades with water. The Teflon coating makes the blade rust resistant, in fact, you don't need oils, greases or rust-preventatives.

The industrial Teflon coating gives you a lot of great benefits, but remember that under the Teflon coating is a Freud blade.

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Information courtesy of DuPont Industrial Coatings®.



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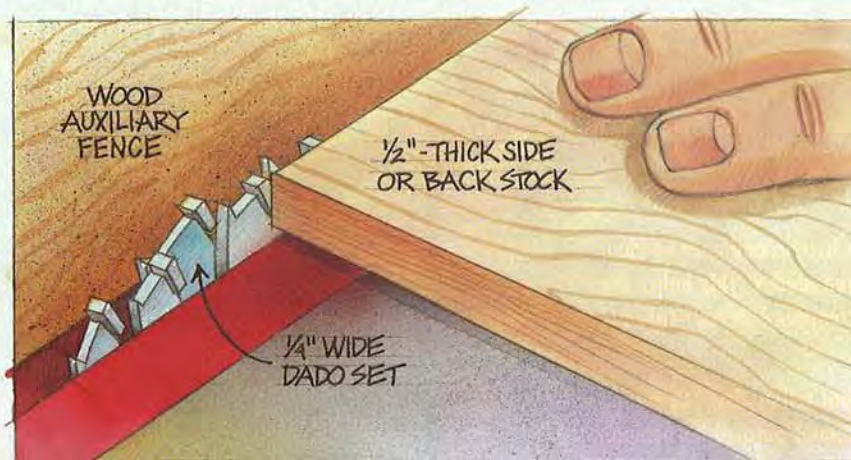
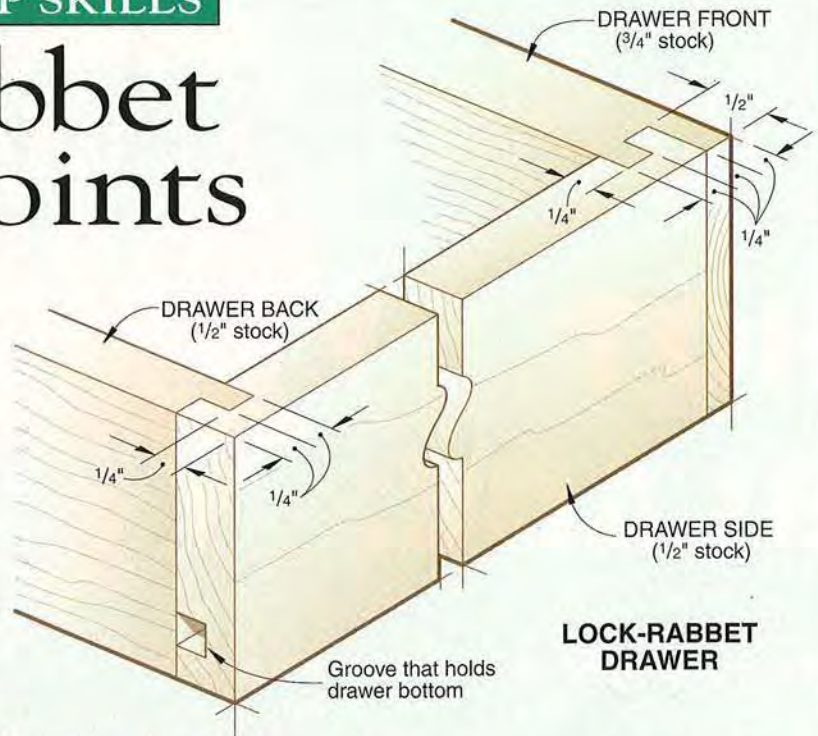
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Lock-Rabbit Drawer Joints

Make 'em quickly and easily with your tablesaw

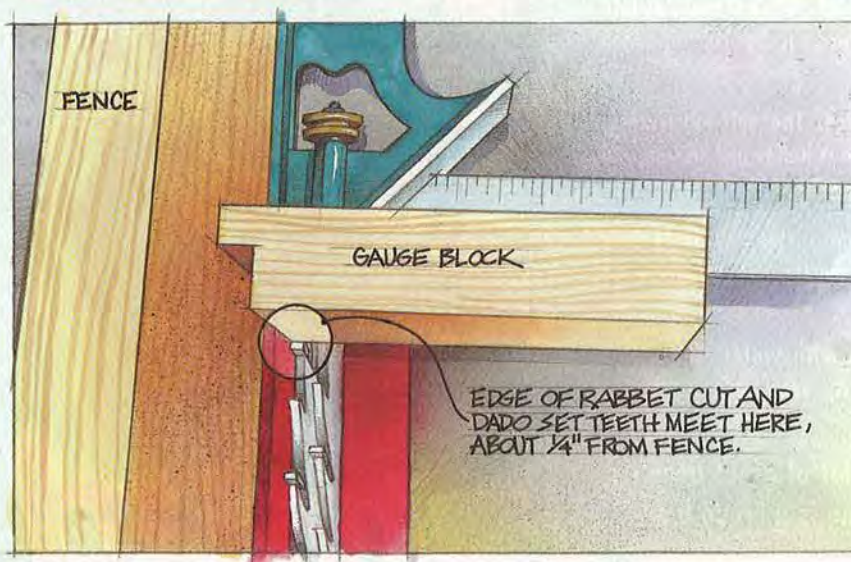
Although you can build drawer joints using any number of methods, we think lock-rabbit joints like the ones *right* make sense for attaching the sides, fronts, and backs of most drawers. Although not as strong as a dovetailed joint, a well-made lock-rabbit joint will hold up fine unless the drawer takes heavy, regular pounding. And, it's much simpler to cut than dovetails.



Note: Before you start, make sure that all of your drawer front stock is the same thickness (about 3/4"). Also, your sides and backs should be identically thick (about 1/2").

1 To protect the face of your tablesaw fence from blade cuts, attach a 6"-high wood auxiliary fence to it. Install a 1/4"-wide dado set, and adjust the fence so the dado set just grazes it.

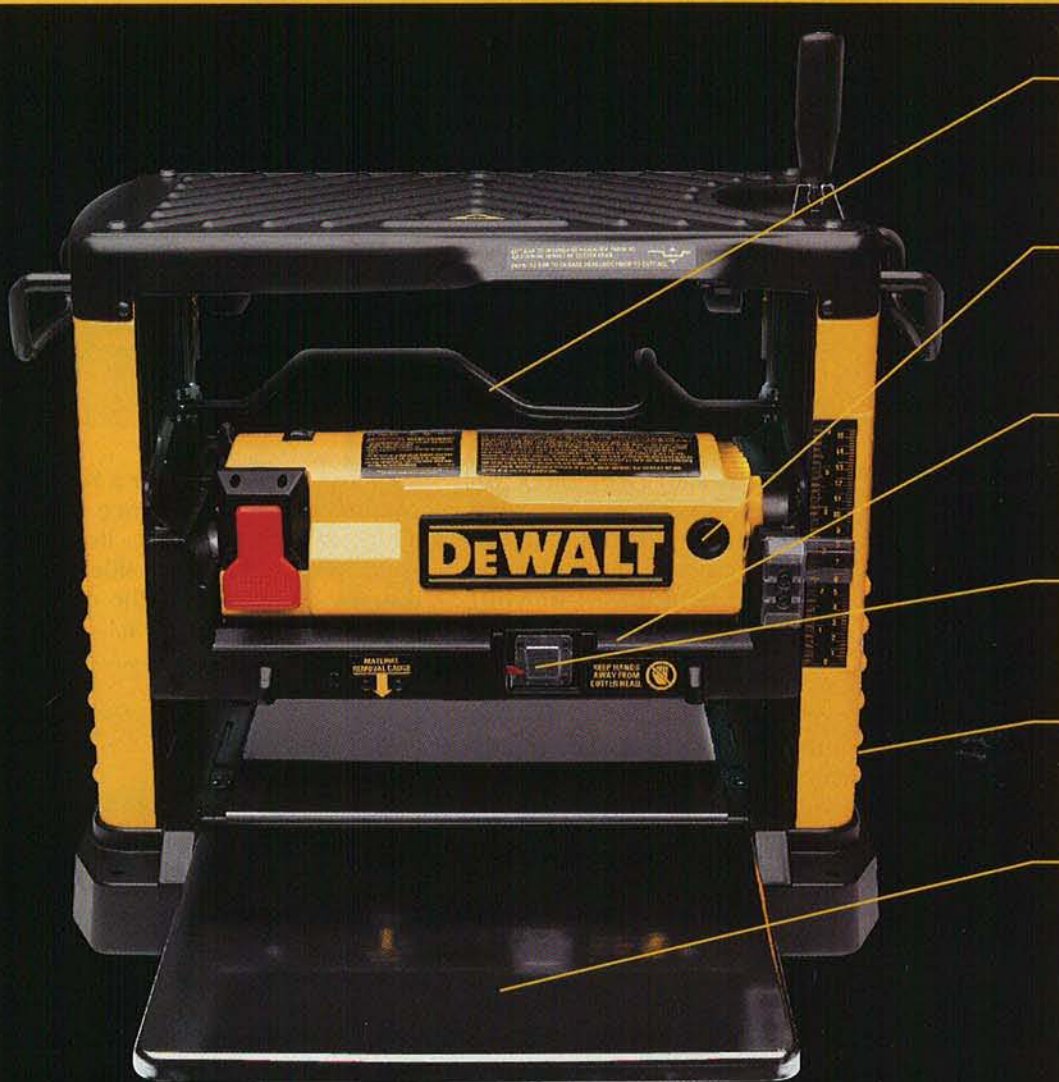
Use your 1/2"-thick stock for the drawer side or back to adjust the height of the dado set to match the thickness of that material as shown in *left top* illustration. Make a 1/4x1/2" rabbet cut in a 3/4x3x3" scrap "gauge block" positioned face down on your saw. Nestle your drawer side or back into the rabbet to double-check that the depth of the cut matches the thickness of the 1/2" stock. Save this gauge block.



2 Readjust the fence-to-dado set distance to match the width of the rabbet cut in the gauge block. As shown in *left bottom* illustration, the edge of the rabbet should meet the dado set teeth closest to the fence. Use a square to hold the gauge block 90° to the fence.

Continued on page 14

THE START OF A PERFECT FINISH.



Four-column head lock secures the cutterhead against four steel posts, providing a snipe-free finish

Powerful 15 amp motor rotates the cutterhead at 10,000 rpm for 64 cuts per inch; 20% more than the competition

Includes an extra set of heavy-duty, M2 laminated high-speed tool steel knives that last up to six times longer

Material removal scale shows how much wood is being removed in a single pass

Adjustable turret depth stop allows user to return to frequently used thickness settings

Large infeed and outfeed tables provide 30% more material support than comparable units

The **DEWALT DW733 HEAVY-DUTY 12-1/2" PORTABLE THICKNESS PLANER** is the finest portable thickness planer on the market. It delivers extremely fine, snipe-free finishes over the entire length of the board. Of course, there's a lot more that makes this the best portable planer on the market, including a unique carriage head lock to aid stability, preventing movement and yielding a snipe-free finish. And the heavy-duty, M2 laminated high-speed tool steel knives last up to six times longer than other knives and can be re-sharpened. All in all, it's the best portable planer available anywhere.

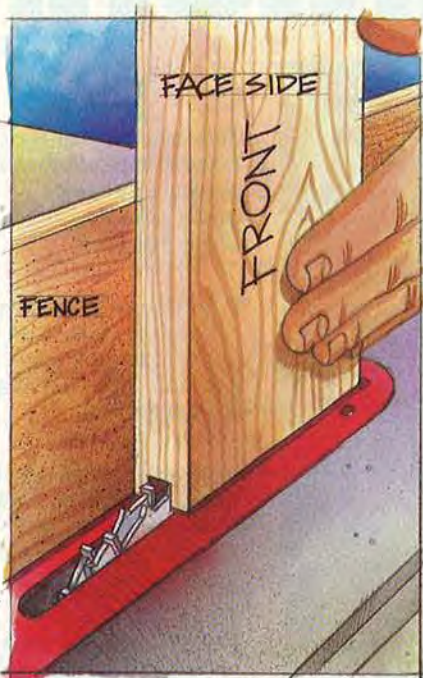
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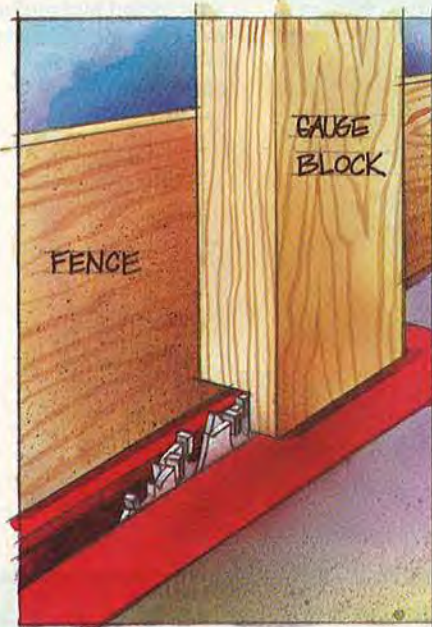
DEVELOP YOUR SHOP SKILLS

Continued from page 12

3 Position a drawer front on edge with its back face against the fence. Now, cut $\frac{1}{4} \times \frac{1}{2}$ " grooves in both ends as shown *below*. Do this to all of your drawer fronts.

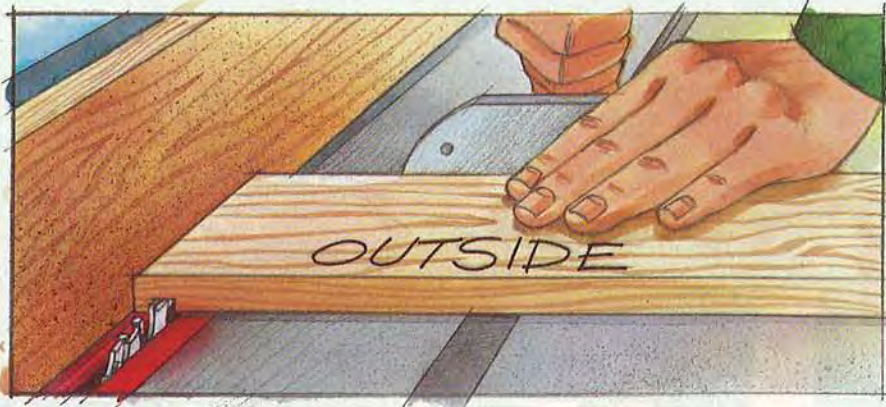


4 Once again, the gauge block helps you precisely set up for a cut. Position it as shown *below* to reset the height of the dado set to $\frac{1}{4}$ " high. Do not change the position of the fence.



Note: For each of the following steps, first make test cuts in scrap stock of the same thickness as your actual workpieces. Check the fit of the scrap pieces with the project pieces cut in earlier steps.

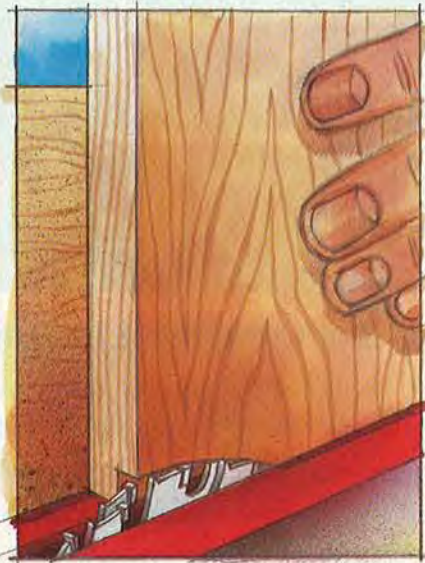
5 Place a drawer side outside face up on the saw, butt either end against the fence, and cut a $\frac{1}{4} \times \frac{1}{4}$ " groove as shown *below*.



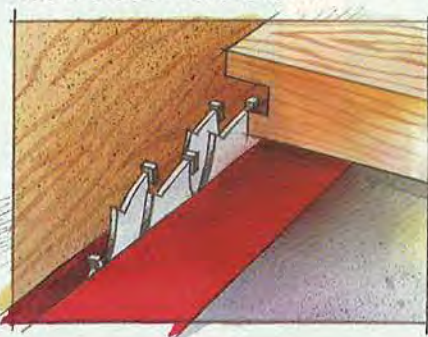
Groove the other end of the drawer side in the same fashion, and repeat these steps on your other drawer sides.

6 Position a drawer back on edge with its inside face against the fence. Cut a $\frac{1}{4} \times \frac{1}{4}$ " rabbet in both ends as shown *below*. Make these cuts on all of your drawer backs.

Now's a good time to cut the $\frac{1}{4} \times \frac{1}{4}$ " groove in each of your fronts, sides, and backs for holding the drawer bottom. Leave the fence and dado set where they are, position your drawer parts inside face down with their bottom edges against the fence, and cut the bottom-holding groove.



7 Raise the dado set for a $\frac{3}{8}$ "-deep cut. Readjust the fence so the dado set just grazes it. Position your drawer fronts face side up on the saw and complete the cuts on their ends as shown *below*.

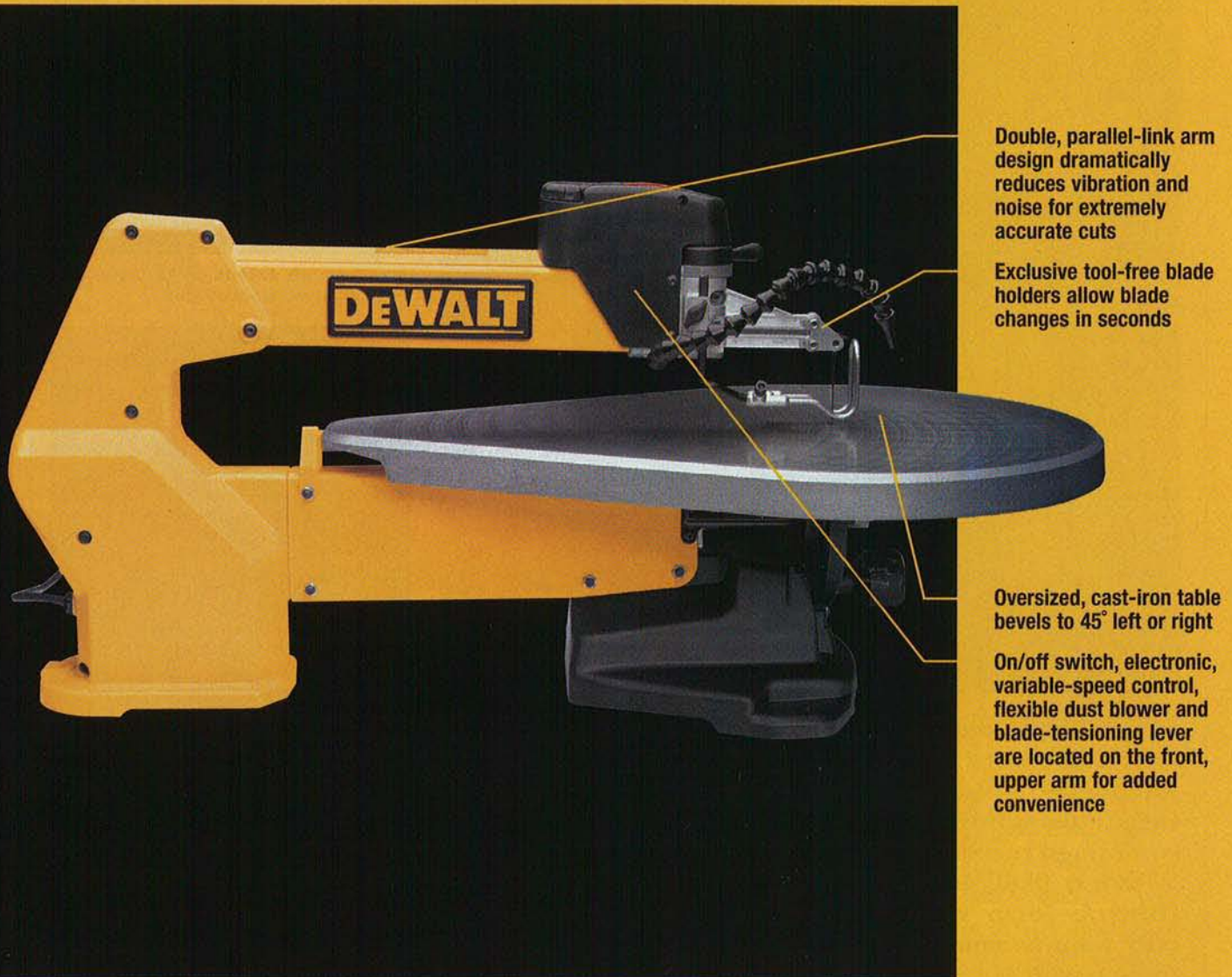


8 To assemble each drawer, first test-fit the parts. Then, apply glue to all of the grooves and rabbets. We suggest you make the bottoms from plywood instead of solid stock. In that way, you can glue the bottom in place without concern about expansion and contraction problems.

Assemble the glued parts, clamp them together, and measure diagonally from corner to corner to check for square. If one diagonal is longer than the other, place a long clamp along that diagonal to bring the drawer into square. ♣

Written by Bill Krier with Jan Svec Illustrations: Kim Downing, Brian Jensen

SMOOTHER. QUIETER.



Double, parallel-link arm design dramatically reduces vibration and noise for extremely accurate cuts

Exclusive tool-free blade holders allow blade changes in seconds

Oversized, cast-iron table bevels to 45° left or right

On/off switch, electronic, variable-speed control, flexible dust blower and blade-tensioning lever are located on the front, upper arm for added convenience

The **DeWALT DW788 20" VARIABLE-SPEED SCROLL SAW** can take even the most complicated curves head-on. The double, parallel-link arm design cuts vibration dramatically, resulting in accurate cuts and less operator fatigue. A 20" throat and a depth capacity of 2" accommodates the largest of materials and the variable cutting speed easily adjusts for different materials. The oversized, cast-iron table provides superior material support and bevels to 45° left or right. Plus, DeWALT's tool-free blade change system means spending less time changing blades and more time making perfect cuts.

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PNEUMATIC SANDERS

A Cushy Way to Smooth Curves



For sanding curves and contours, it's hard to beat a pneumatic sander. These inflatable sanding drums conform to curves, so you're a lot less likely to flatten a flowing form when you only want to smooth it. Use these tips to put a pneumatic drum sander to work in your shop.

You'll get pumped up for sanding with this drum

You'll probably spend in the neighborhood of \$70-\$80 on a pneumatic drum sander. When

you buy the drum, you need to know whether you'll use it on your lathe or drill press. Most drums come with a mandrel for lathe-mounting; some require an adapter kit for drill-press use.

Before you inflate the sanding drum, slide the sanding sleeve onto it. (Replacement sleeves cost about \$15 for five.) Inflate the drum until it feels firm, but not solid-drum hard. Later, you can bleed some air to fine-tune the firmness to the job at hand.

A valve-stem extension (available from an auto-parts store) makes inflation easier on some drums. We sliced about 1/8" off the bottom of the plastic exten-



Screw on an extension to make the valve stem more accessible.



A hand bicycle pump will inflate the drum sufficiently in just a few strokes.

sion so it would screw onto the stem and fit down into the hole around it, as shown *top*. After inflation, remove the valve extension, and cap the valve stem to keep sanding dust out.

A bicycle pump *above* works fine for inflating the drum—it only takes a few strokes. Beware of high-pressure air from your shop's air compressor; you might blow out the drum's air bladder.

Continued on page 20



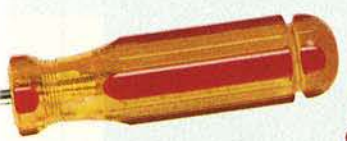
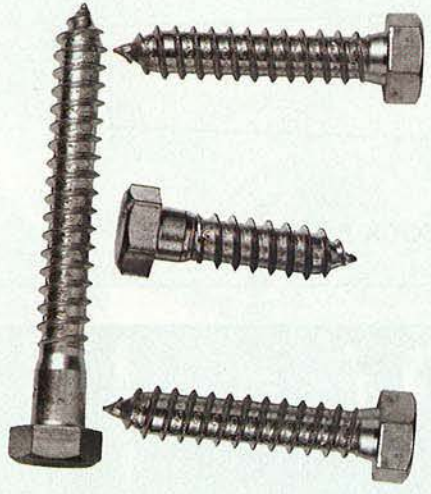
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Ram The New Dodge

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†Depending on model. Always use seat belts. Remember a backseat is the safest place for children.

Continued from page 16

It's simple to set up your new pneumatic sander

You can install a pneumatic sanding drum between centers on a lathe as shown *right* or chuck it in a drill press as shown *opening page, left*. Drum installation is relatively easy, following the manufacturer's instructions.

A typical pneumatic sanding drum comes with a mandrel for lathe mounting. A fitting at one end features diametric kerfs to engage the lathe's two- or four-prong spur drive center.

For the tailstock end of the one shown (from Woodcraft Supply, 800/535-4486), the manufacturer suggests you cut off the tenon on the nylon fitting supplied for the tailstock end, and support the drum end with a rotating tail center. For surer centering of the drum, we turned a simple tailstock fixture to receive the fitting's 3/8"-diameter tenon, shown in the photo *above right* and the Tailstock Bearing drawing. (For continuous or heavy use, using the rotating tail center would be better.)

For drill-press mounting, chuck the tenon on the drum's top fitting into the drill-press. To keep the drum running true, be sure to clamp the bottom support fixture supplied with the drum firmly to the drill-press table. (For our drum, we drilled a hole to receive the drum-end pin in a piece of scrapwood large enough to clamp at both ends, shown *right*.)

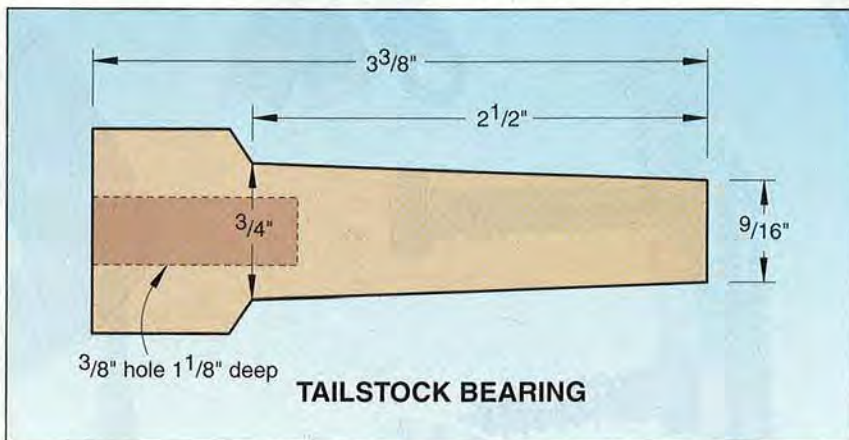
Now, you're ready for some contour sanding

Run the drill press or lathe at 1,200 to 1,400 rpm for sanding with a pneumatic drum. The soft surface can make the drum grabby, so hold the work firmly.

Sand on the lower front quadrant of a lathe-mounted drum. And remove the lathe's tool rest for sanding; don't try to brace the workpiece against it. 🌲

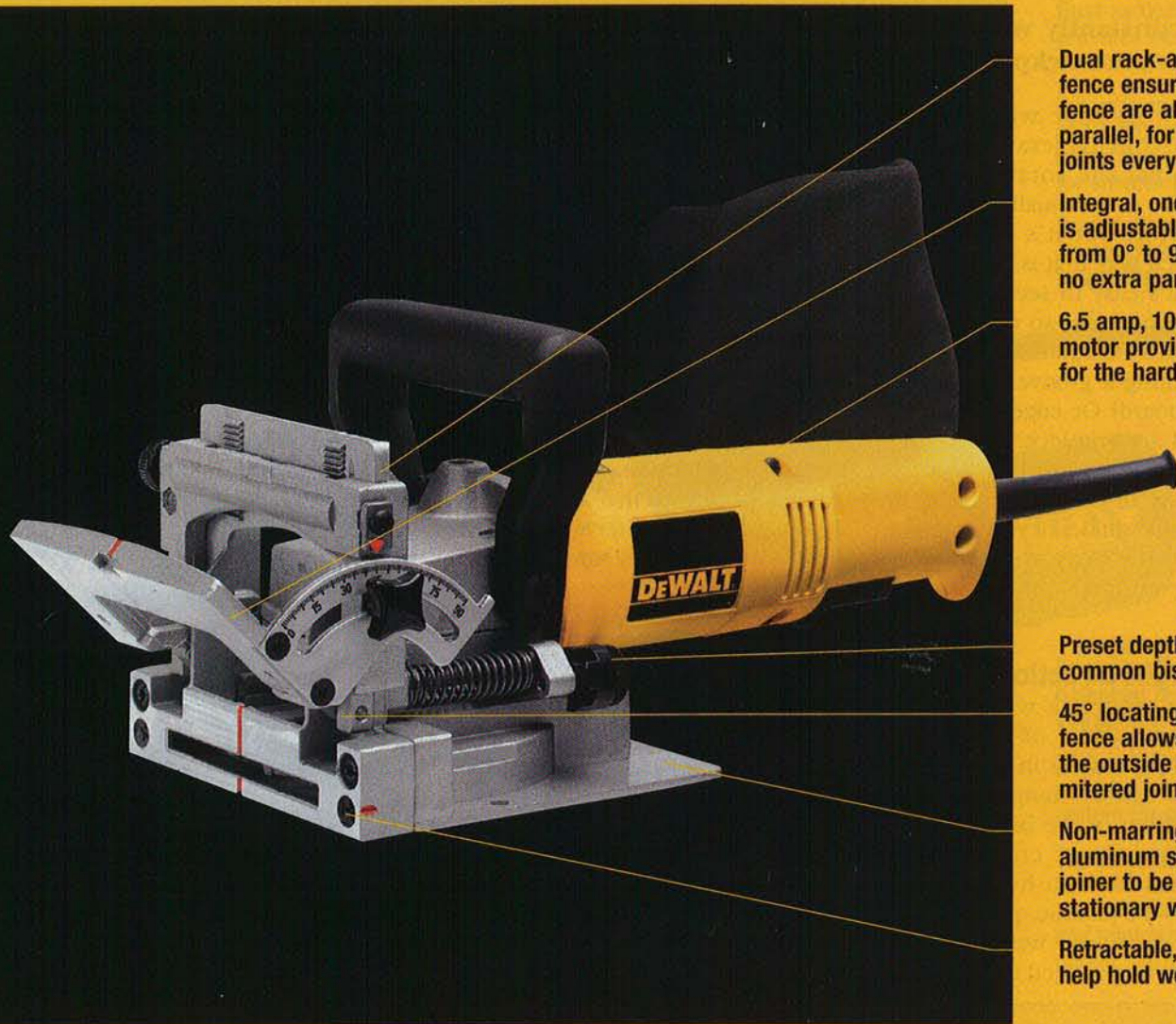


For lathe-mounting the drum, we turned a wooden bearing to fit into the tailstock



A pin on the bottom of the drum fits into a hole for support while sanding.

THE BEST TOOL IN THE JOINT.



Dual rack-and-pinion fence ensures blade and fence are always parallel, for accurate joints every time

Integral, one-piece fence is adjustable and tilts from 0° to 90° requiring no extra parts

6.5 amp, 10,000 rpm motor provides power for the hardest woods

Preset depth stops for all common biscuit sizes

45° locating notch in fence allows indexing off the outside surface of a mitered joint

Non-marring, heavy-duty aluminum shoe allows joiner to be clamped for stationary work

Retractable, anti-slip pins help hold work in place

Only the **DEWALT DW682K HEAVY-DUTY PLATE JOINER** makes it easy to construct a variety of accurate joints. The dual rack-and-pinion fence control guarantees precise vertical adjustments and precise fence alignments. And, for making cuts at any angle, the integral, adjustable fence tilts from 0° to 90°, then locks in place for unparalleled accuracy. Flush cuts can be made at 0° without removing the fence. Together, these advances ensure accurate joints every time. The DeWALT plate joiner also is easy to use and control, thanks in part to the ergonomically designed barrel grip and the extra-wide paddle switch. Because it's so versatile, it can be positioned on the inside or the outside face of a mitered joint. For precision that can't be beat, choose DeWALT. It's built into every one of our plate joiners. Guaranteed Tough.™

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WITH A ROUTER, YOU NEED DIRECTION

If you constantly wonder which way to feed your router into a workpiece, you better read this.



You know the rule when cutting stock on your tablesaw: "Always feed against the rotation of the blade." The same usually applies to your router, but it's not always clear which way that is. When edge routing, it's easy to see which way the router bit spins so that you can feed against its rotation. But what about routing a groove in the middle of a board? Or edge cuts in the middle of a workpiece? Then, even though the rule applies, it's not always easy to remember. Here are some simple guidelines to help you know which way to feed your router for any task.

Make a groove in the right direction

Routing a groove (a with-the-grain cut in the middle of a board or piece of plywood) in the wrong direction can be dangerous. The cutting action of the bit could pull the router out of control. And there's nowhere to hide when it happens—it's just too quick.

But here's an easy way to remember which way to feed for a groove.

Looking down at the top of a hand-held router, the bit rotates clockwise, as shown in the drawing *below left*. With the router's edge guide fixed in position at 6 o'clock, feed toward 3 o'clock. The cutting action of the bit will try to move the router toward 12 o'clock. But this same action pulls the guide against the board, keeping the groove parallel to the edge of the board. If you rout grooves with a straightedge instead of an edge guide, clamp it to the workpiece at 12 o'clock. The router will run parallel to it for the very same reason.

Figuring out inside and outside edges

Routing outside edges and edges on the cutout in the middle of a workpiece isn't all that different from routing straight cuts. Imagine that the workpiece is a piece of toast with the buttered middle gone, as shown in the drawing, *below right*. Going around the workpiece on the outside, you feed your router counterclockwise. For the inside edge, feed the router clockwise.

Simple router-table safety

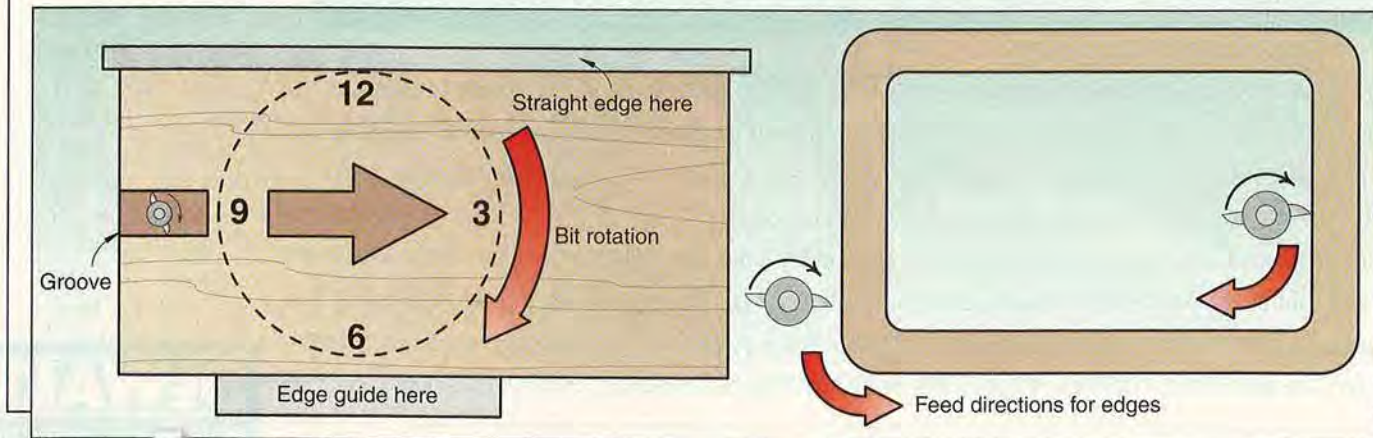
Featherboards add safety as well as accuracy when you rip on a table-saw. Yet, they should be standard on your router table, too. So is a pushstick. That's because the router table enables you to do things you can't do with a hand-held router. But it also places your fingers nearer to the whirling bit, which you are normally feeding from the right side of the table. A featherboard and pushstick solve the problem by keeping the work firmly against the fence and table for a clean and safely done cut. ♣

Photographer: Hetherington Photography
Drawings: Roxanne LeMoine

"Where Safety Begins" is written by Mike Gililand, a lifelong woodworker and an engineer with 25 years' experience designing and working with power tools to make them safer. He owns and runs a safety consulting firm.



Have a safety question? Send it with an SASE to: The Safety Man, WOOD® Magazine, 1716 Locust St., GA310, Des Moines, IA 50309-3023. Not all questions received will be published, but all will receive an answer from the Safety Man.



THE FASTEST FINEST FINISH.



DW411

Heavy-Duty 1/4 Sheet
Palm Grip Sander



DW423

Heavy-Duty 5" Random Orbit Sander
With Electronic Variable Speed



DW431

Heavy-Duty 3" X 21" Electronic
Variable Speed Belt Sander



DW421

Heavy-Duty 5" Random Orbit Sander

Dust-sealed switch
provides increased
durability

2.0 amp motor operates
at 12,000 opm, providing
maximum sanding speed
for smooth finishes

Sealed, 100% ball-bearing
construction delivers
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balanced fan reduces
vibration and user fatigue

3/32 orbit diameter
provides a tight orbital
pattern for smooth finishes

The Controlled Finishing
System™ maintains a
controllable pad speed
and minimizes gouging
during startup

The family of **DeWALT HEAVY-DUTY SANDERS** was designed to produce the fastest, finest finishes possible, on all kinds of materials. Take the DW421 Heavy-Duty 5" Random Orbit Sander, which features the DeWALT-exclusive Controlled Finishing System™ to maintain pad speed and virtually eliminate gouging. Its 2 amp motor provides maximum sanding speed while being extremely comfortable to use. And, features like the dust-sealed switch contribute to longer tool life. If greater control is needed, there's the DW423 electronic, variable-speed sander. It has many of the same features, along with speeds that can be varied from 7,000 to 12,000 opm. For fine finishes, the DW411 orbital sander has a 2 amp motor and moves at 13,500 opm. And, for fast material removal, there's the DW431 belt sander. Its compact, light-weight design permits use in tight spaces or on vertical surfaces. So choose the best sander for the job. Choose DeWALT. Guaranteed Tough.™

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The woodworking tree of knowledge

Across

- 4 This Danish belongs in your finishing area, not your kitchen.
- 7 To crosscut lots of pieces to the same length, you might attach this to your miter-gauge fence.



- 9 This kind of bit bores flat-bottomed holes.
- 14 Stock too thick? This machine thins it.
- 16 A dye family useful for coloring wood.
- 17 A popular softwood for country furniture.
- 18 Many woodworkers consider this the essential shop tool.

- 20 To saw lumber with the grain.

- 21 A strip that divides glass panes in a door or window.

- 22 What is this part of a chisel called?



- 23 What is the name for the interlocking part of a box joint, shown below?



- 25 To lay a decorative strip or feature into a routed recess.

Down

- 1 A flat, thin part of a chair's back.
- 2 A style of carving, and also a woodworking by-product.
- 3 A tree outgrowth prized for veneers and woodturnings.
- 5 Lauan usually goes by this name; the real stuff is a classic furniture wood.
- 6 If you fret a lot, you'll want one of these.
- 8 Figure characterized by numerous round spots; often associated with maple.
- 10 You could rout around this master with a guide bushing.

- 12 Name the cut that runs across the grain in the illustration below.
- 13 You could put honey on this, but you'll get a better joint with glue.
- 15 A coarse file for shaping wood.
- 19 A strip that fits into slots to reinforce a joint.
- 22 A distinctive pattern or design in woodgrain.
- 24 What's the name for the cut that runs along the edge of the board below?

- 11 Thin wood, sometimes highly figured or rare, glued to a substrate.



- DOWN:
 1. SPLAT
 2. CHIP
 3. BURL
 5. MAHOGANY
 6. SCROLLSAW
 8. BIRDSEYE
 10. TEMPLATE
 11. VENEER
 12. DADO
 13. BISCUIT
 15. RASP
 19. SPLINE
 22. FIGURE
 24. RABBIT

- ACROSS:
 4. OIL
 7. STOPBLOCK
 20. RIP
 21. MUNTIN
 22. FERRULE
 23. FINGER
 25. INLAY
 17. PINE
 16. ANILINE
 14. PLANER
 9. FORSTNER
 20. RIP
 18. TABLESAW

ANSWERS:

Print this article

THE PERFECT EDGE.



DW625

Heavy-Duty 3 HP
VS Electronic Plunge Router



DW610

Heavy-Duty 1-1/2 HP Router



DW621

Heavy-Duty 2 HP
Electronic Plunge Router

Exclusive, built-in dust-extraction column attaches to standard shop vacuum to remove 95% of dust

8' rubber cordset

100% ball-bearing construction

2 HP motor provides the power to make the most challenging cuts

Electronic, variable-speed motor runs at 8,000-24,000 rpm with constant speed under load to ensure a quality finish in all materials

Innovative, rubber-coated knobs have plunge-lock and on/off switch built in for maximum control

Rack-and-pinion, micro-fine depth adjuster provides fast and accurate depth settings

Spindle lock button allows one-wrench bit changes

1/4"-1/2" collet capacity for greater versatility

Converts from a fixed-base to a plunge router without extra parts or tools

Precision-machined, 3-position turret stop

The family of **DEWALT HEAVY-DUTY ROUTERS** is the industry standard. These routers provide the highest degrees of accuracy, durability and power you can buy, along with the most innovative features available. For example, the DW621 includes the industry's only built-in dust-collection system. It also can convert from a fixed-base to a plunge router without additional parts or tools. And, its 2-horsepower motor provides the power needed to cut a variety of materials. The DEWALT line also includes the DW625, which boasts 15 amps and a 3-horsepower motor. And our fixed-base router, the DW610, was a 1998 *Wood Magazine* Editors' Choice. So get the best of all worlds, and get a DEWALT heavy-duty router. Guaranteed Tough.™

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DW733K
12 1/2" Portable
Thickness
Planer
\$399



**FREE
Knives
& Hood**

DW682K
Plate Joiner Kit



**FREE
KIT BOX**

\$159



DW744
10" Portable
Table Saw

\$499

DW708K
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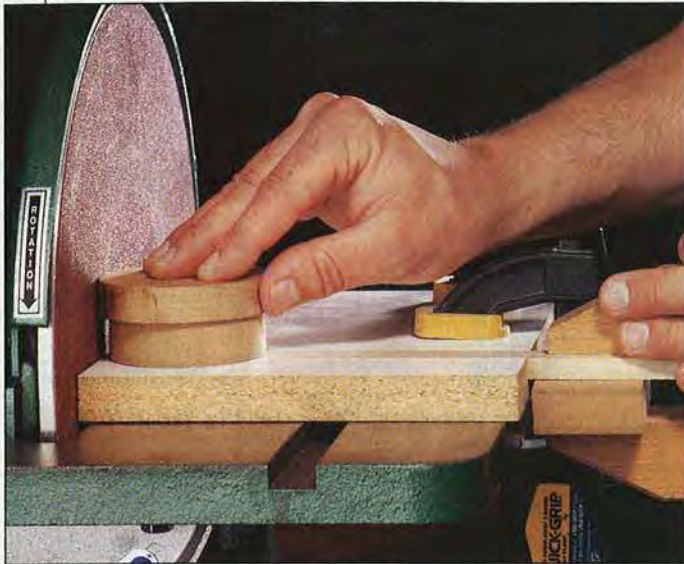
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Hole-in-none CIRCLE JIG

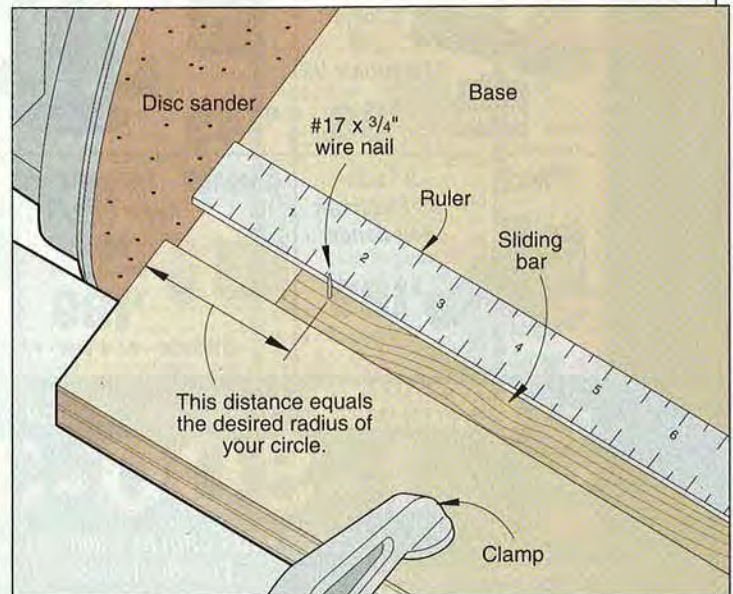
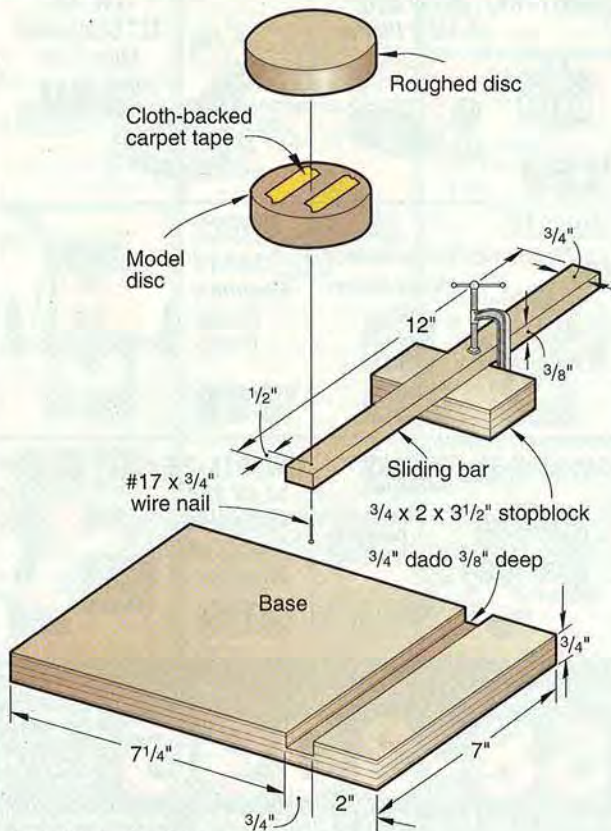


Making perfectly round wood discs in a world of straight, flat saw blades isn't as difficult as it sounds. Holesaws and circle cutters excel at cutting discs with center holes. And that's great if you're making wheels for toys. But, what if you want perfect circles *without* center holes, say for making a set of drink coasters? *WOOD*® magazine Assistant Design Editor/Project Builder Jan Svec came up with the jig shown *at left* that does just that.

Start by clamping the base to your disc-sander table. Position the sliding bar so that the distance from the nail to the sanding disc equals the radius of the circle that you want to make (see the drawing *below*). Lock this measurement in by clamping a stopblock on the underside of the slide bar, as shown *below left*.

On a piece of scrapwood, lay out a circle $\frac{1}{4}$ " larger in diameter than the disc you want. (Use a compass for the layout—you'll want a center mark on this piece.) Rough-cut this circle on your bandsaw. With a clipped-off $\#17 \times \frac{3}{4}$ " wire nail, drill a hole in the center of the disc and slip the disc over the nail on the sliding bar. Sand this scrapwood disc to the size of your finished disc by rotating and feeding it into the sanding disc until the stopblock contacts the jig's base.

Using this scrapwood disc as a model, lay out a slightly oversize circle on your workpiece, and rough-cut it. Now attach your workpiece to the top of the model disc using cloth-backed, double-face carpet tape. Sand this piece the same way you sanded the model disc. You can reuse the model disc to make as many discs as you like. ♣



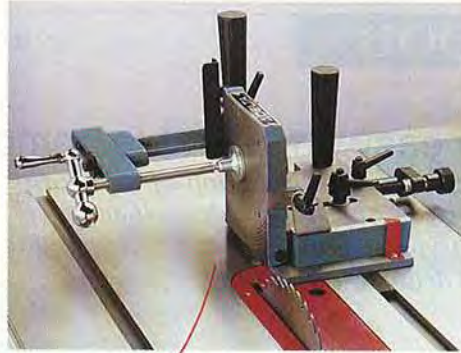
Project Design: Jan Svec
Photograph: Baldwin Photography
Illustrations: Roxanne LeMoine

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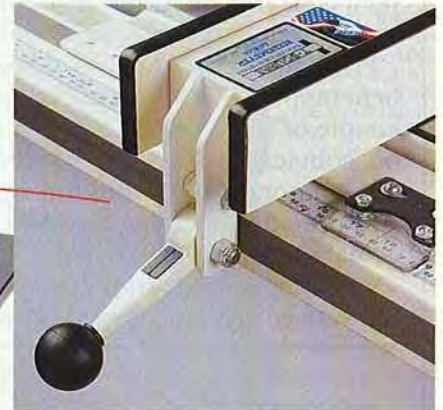


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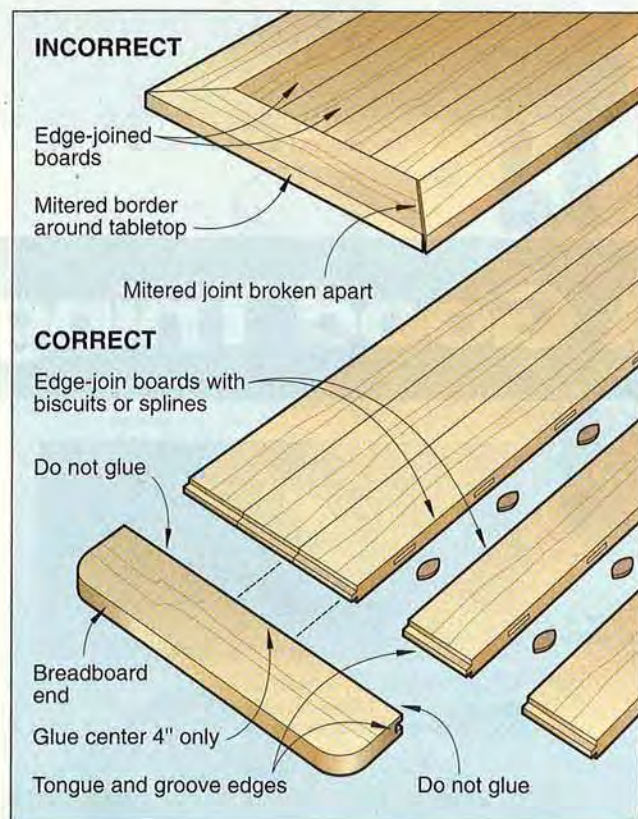
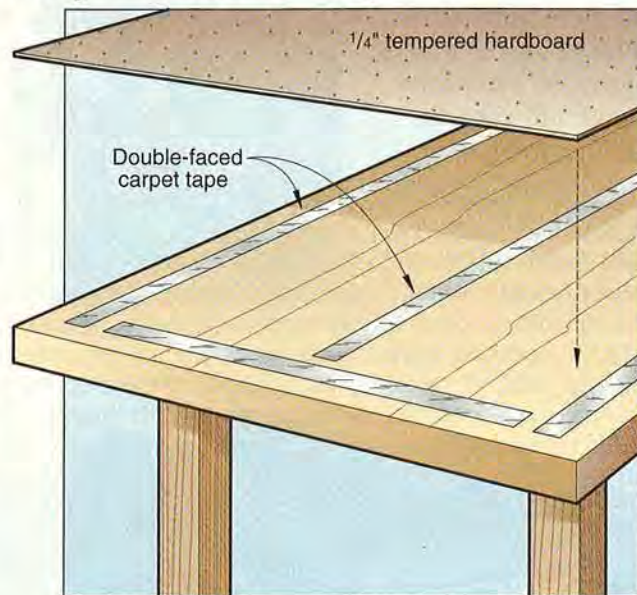
I want to attach plywood to the top of my workbench so I can remove and replace it when it wears out. Can you recommend the best way to do this without drilling holes in my workbench?

—Tom Miles Jr., St. Louis

Instead of plywood, Tom, we recommend that you use 1/4" tempered hardboard. It'll wear better than plywood, and you can use double-faced carpet tape to adhere it tightly to your workbench.

Place the carpet tape in strips the length of the benchtop, one strip for every foot of width. Stick a couple of strips on the end as well. The tape bonds on contact, so align the hardboard carefully. Cut the temporary hardboard top a couple inches over-size in both directions and then flush-trim it to the actual size of the workbench.

When the hardboard wears out, simply pry up the old surface and tape down a new one.



Why did my tabletop pull apart?

I recently made a table for my wife. The 1" solid red-oak top has a border with miter joints at all four corners. I covered all surfaces with three coats of polyurethane to prevent moisture from entering. This summer, one of the miter joints opened up, no doubt due to humidity. What else could I have done to prevent the joint from failing?

—Norm Drenton, Michigan City, Ind.

You're absolutely right to blame humidity for the failed joint, Norm. Even with a protective finish, wood swells and shrinks with the weather, so you need to make design allowances for that movement.

One solution is to use a tongue-and-groove joint where the edge-joined boards and the breadboard end meet. Join these two surfaces by gluing only the center board to the breadboard end as shown at left. Leave the rest unglued so the tabletop can contract and expand across its width without damage.

If you're building in the winter, make the two border boards 1/8" longer than the tabletop width, and in the summer 1/8" shorter. This way, your overlap will never be more than 1/16" on each edge, and will stay flush much of the year.

Have a question?

If you're looking for an answer to a question that you think would interest lots of other readers, we would like to hear from you. Write to: Ask WOOD,

1716 Locust St., GA310, Des Moines, IA 50309-3023. For an immediate answer to your question, try posting it on one of our internet discussion groups at: woodmagazine.com

Continued on page 32

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Is it fly paper or finish?

In the past several years, I have made four or five cedar chests using well-dried cedar. Over time, the inside of the chests become sticky. The problem also affects the finish of stored items. What is causing this, and how do I get rid of it?

—Neil Harshfield, O'Neill, Neb.

Neil, we have built several cedar chests here at *WOOD*® magazine, and we recommend that you leave the inside of your chests unfinished. The lack of ventilation inside a chest creates problems with many finishes. In particular, the fumes of Eastern red cedar work to break down virtually any finish in an

enclosed space, making even shellac or polyurethane become sticky.

To correct your problem, scrape off the gummy finish, and then wipe down the inside with laquer thinner. And, do not refinish the inside. Remember, sealing the inside also seals off the desirable aroma of this unique wood.

Hit-or-miss stock: the key to thicker boards

My hardwood source offers S2S stock planed to 13/16" thick. However, most of my projects call for 3/4" finished stock, leaving me only 1/16" extra thickness for removing bows and other defects—not enough. Am I to assume that everyone else buys flatter boards? How should I select and prepare the stock so I will end up with a flat 3/4" board?

—C. Lloyd Eitzen, Visalia, Calif.

As you suspect, Lloyd, you need to start with thicker stock. For projects in the *WOOD*® magazine shop, we ask our supplier for "hit-or-miss" planed stock. Unlike S2S (fully surfaced two sides) stock, hit-or-miss stock has been planed only enough to expose the personality and grain of the wood, leaving some areas

smooth and others with saw marks.

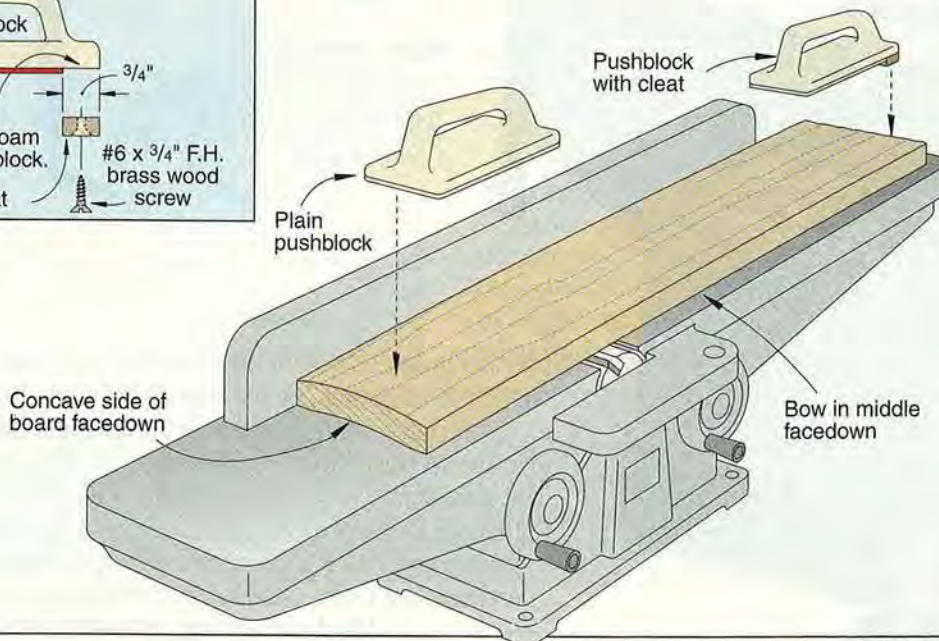
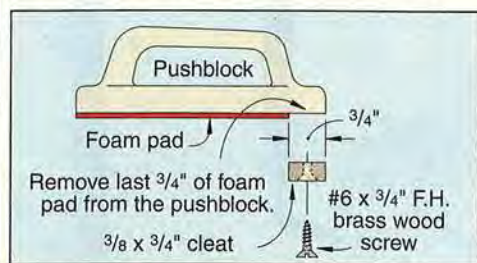
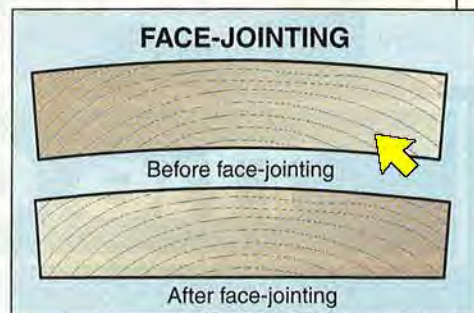
4/4 hit-or-miss stock costs less than S2S stock and generally ranges from 1 1/4" to 3 1/2" in thickness. This extra thickness gives you at least 1/8" more material to work with.

We follow a several-step process to ensure that we end up with perfectly flat 3/4" stock in the finished project. When the stock arrives, carefully store it flat and off the floor, with stickers between the boards. Also, allow it at least 72 hours to stabilize in your shop before working with it. Next, to make jointing easier, cut the stock to rough lengths. Shorter boards mean less material to remove when face-jointing and edge-jointing.

Because the rollers of a thickness planer will temporarily flatten a board before planing, begin by

face-jointing the material to flatten one side. To face-joint, run the piece through a 6" or 8" jointer with the concave side against the table (as shown *below*) until the bow disappears.

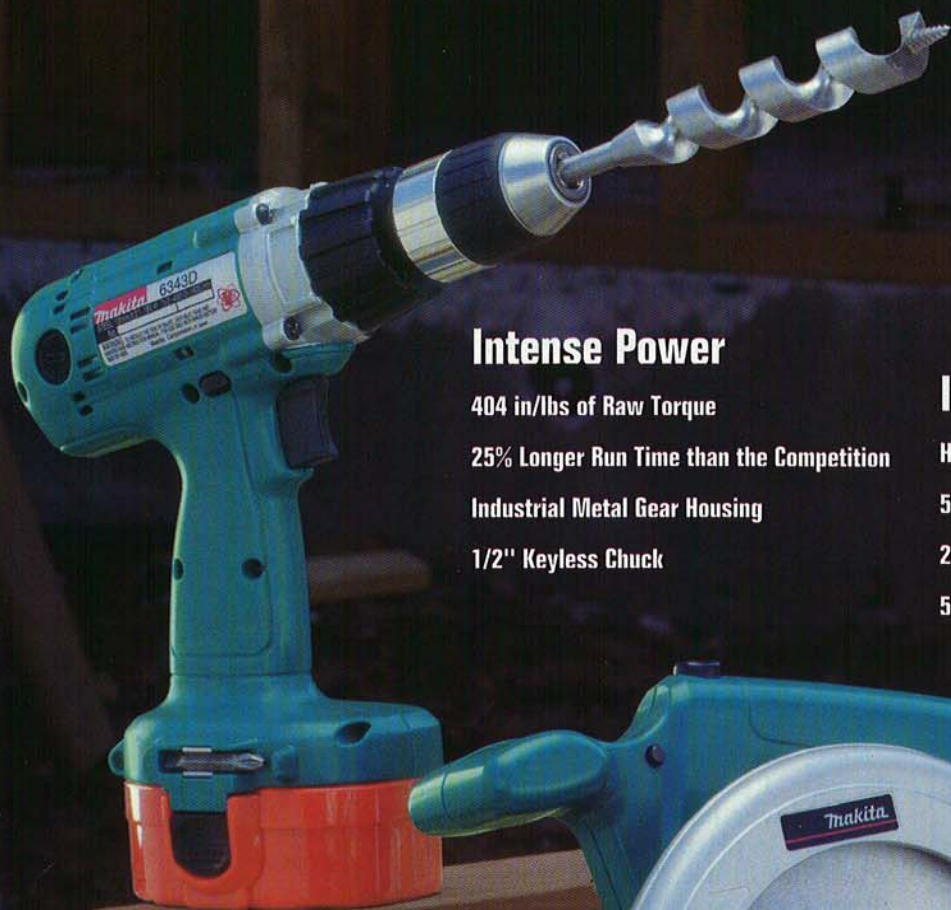
Once you have a flat side to work with, thickness-plane the opposite side flat and to the correct thickness. Remember to place the flat side against the table with the convex side facing the planer's cutterhead. ♣



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David Mattichak's method for making repetitive crosscuts of long stock earns him the Top Shop Tip prize.

You can tell that David Mattichak takes his woodworking seriously. How? Because at the age of 71, he works in a 30×40' workshop that he built last year, complete with an under-the-floor dust-collection system.

In his dream shop, the retired pharmacist has designed and built drop-leaf tables, lecterns, entertainment centers, and step stools. And, he comes up with some darn clever jigs, too, like the prize-winning table saw attachment shown at right.

Your solution to a particular woodworking problem may be worth \$40. If we select it as the Top Shop Tip, you'll win a tool prize valued at \$250 or more. To submit a tip, send a letter, including your daytime phone number, and a photo or drawing of your idea, to:

**Tips From Your Shop
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We try to publish original shop tips, so please send your idea only to *WOOD* magazine. Also note that we cannot return submissions. Thanks!

GENERAL-INTEREST EDITOR

Extending the scope of your table saw

When making repetitive table saw crosscuts, you typically clamp a stop on a miter gauge auxiliary fence and cut with confidence. But what do you do when the length of the cut extends beyond the face of the miter gauge? To solve the problem, I made a telescoping stop for my saw, as shown below.



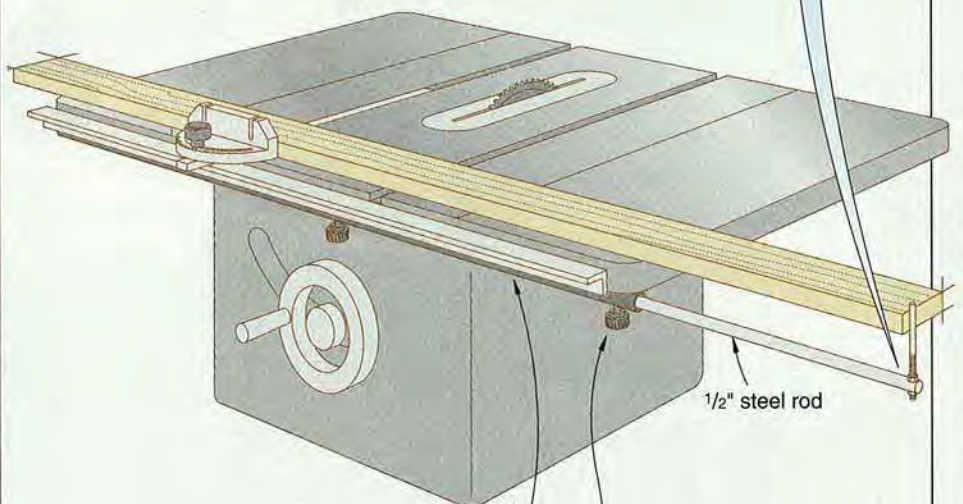
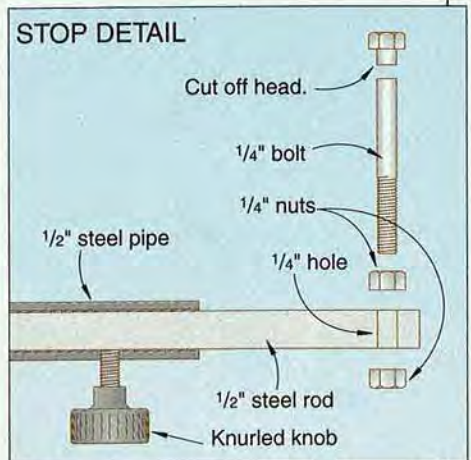
In a length of 1/2" steel pipe, I drilled a pair of holes for the knurled knobs where indicated in the drawing below, tapped them, and threaded a knob in each. Then, in one end of a 1/2" steel rod about the same length as the pipe, I drilled a 1/4" hole and attached a bolt as shown right. I drilled and tapped holes in the bottom of my table saw top and used metal strapping to secure the pipe to the table.

Now, with the rod inserted in the pipe, I can slide the stop out to whatever length I need and tighten it in place with the knobs. When not in use, the stop slides all the way into the pipe.

—David Mattichak, Port Republic, Va.



We extend our kudos—and a Hitachi 3-hp plunge router (model M12V)—to Top Shop Tip winner David Mattichak.



1/2" steel pipe fastened to bottom of table saw table

Knurled knob (threaded into pipe)

Continued on page 36

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Continued from page 34

Tablesaw jig helps cut pivot-hinge mortise for cabinet-door frames

Routing or chiseling out the angled mortise for a semi-concealed pivot hinge on a cabinet door takes time and requires a steady hand. But the tablesaw jig

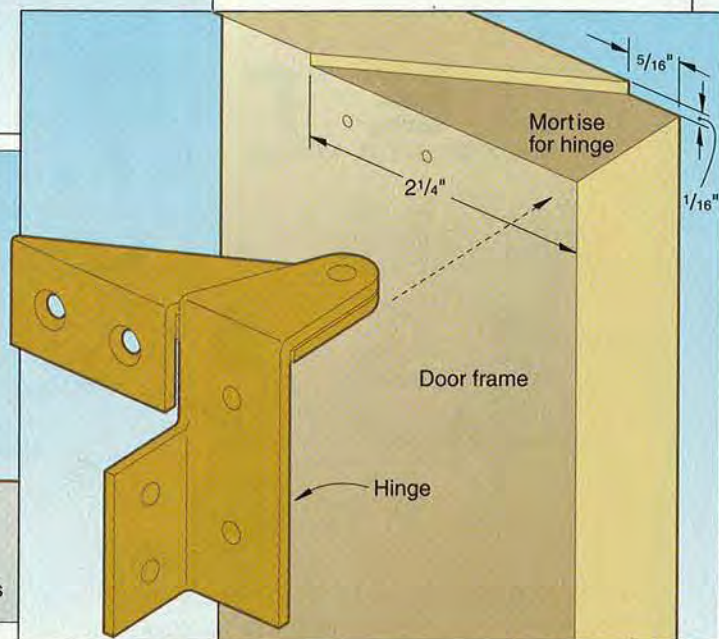
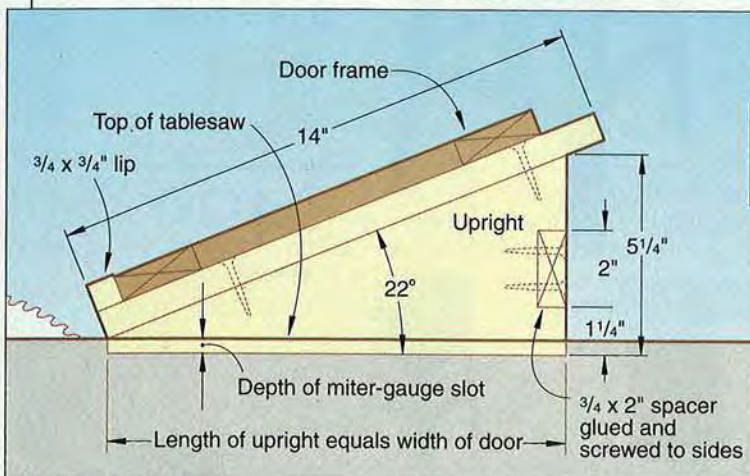
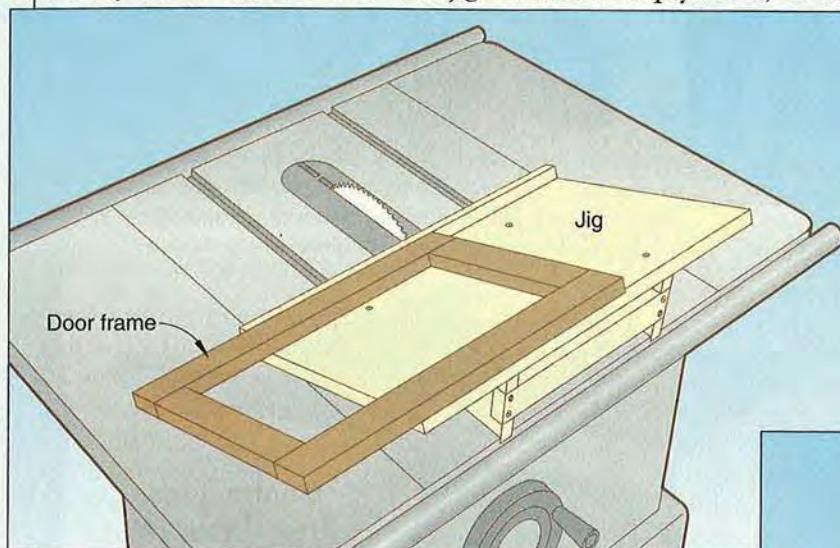
shown *below* turns this into a quick-and-simple operation.

To build the jig, start by cutting out the two uprights from $\frac{3}{4}$ " hardwood plywood, or stock that

fits into your miter-gauge slot without wobbling or binding. Notch the rear of the uprights to accept the spacer, as shown, and glue and screw the spacer to the uprights.

Next, cut the top of the jig from $\frac{3}{4}$ " particleboard or plywood, and make it big enough to hold the length and width of the cabinet door. Glue and screw the top to the uprights, and attach the lip to the front as shown in the drawing *below left*. Now, put a scrap piece on the jig and make a few test cuts. Vary the height of the blade until you get a mortise that fits the hinge.

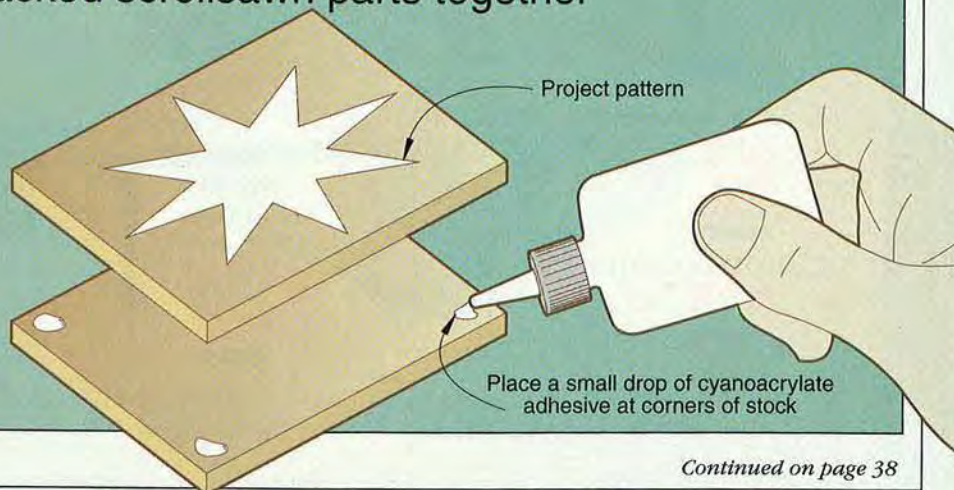
—Bob Colpetzer, Clinton, Tenn.



A dab of glue keeps stacked scrollsawn parts together

The next time you want to scrollsaw a number of identical parts, stack them together and join them with a few dabs of cyanoacrylate (instant) glue in the waste areas. The glue holds the stack firmly, and the project pieces fall out easily after you finish sawing. Use the glue sparingly so it doesn't spread to the parts you want to separate after cutting.

—Jim Dowling, WOOD® Magazine Design Editor



Continued on page 38

MITER STOPS THAT MAKE FINISH WORK AS EASY AS PAINT BY NUMBERS.

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TIPS FROM YOUR SHOP (AND OURS)

Continued from page 36

Knife blade gets you through close scrapes

Sometimes you need an extra-small scraper to clean up an area where the typical cabinet scraper just won't fit. Here's a quick answer to that problem. Take an old blade from a utility knife and grind all the edges flat. You'll end up with a nice burr on all four edges. The two short edges of the blade help you scrape into even the tightest spaces.

—Jan Svec, Assistant Design Editor,
WOOD® magazine



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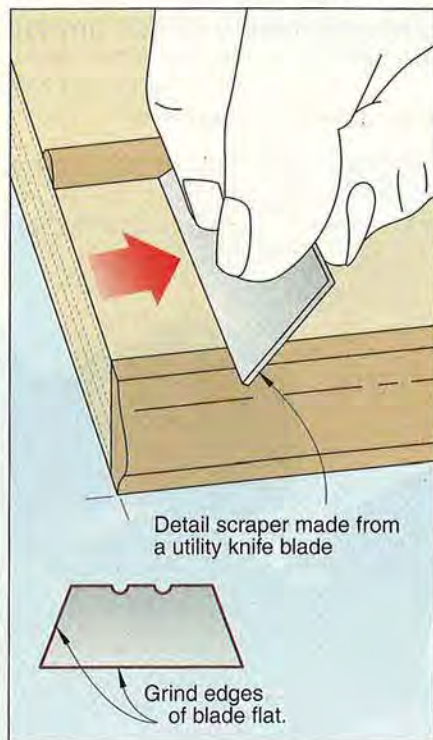
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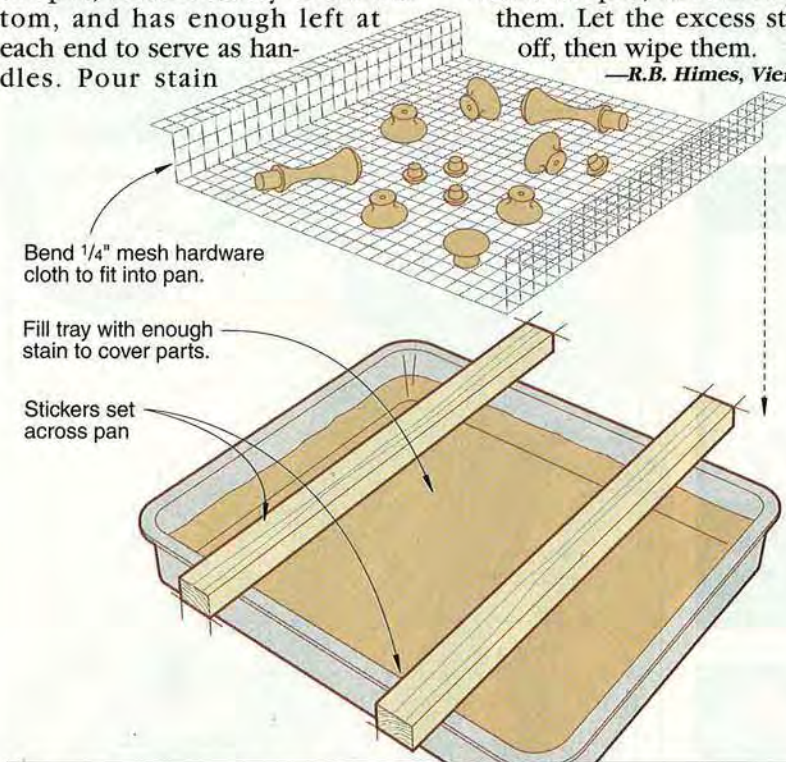
Continued from page 38

Avoid a mess with mesh

Here's a neat and easy way to stain small parts, such as drawer pulls, plugs, and shaker pegs. Start with an old cake pan. Cut and bend $\frac{1}{4}$ " hardware cloth so that it fits inside the pan, reaches nearly to the bottom, and has enough left at each end to serve as handles. Pour stain

into the pan, place the wooden parts on the mesh tray, and lower it into the pan. After the parts are coated with stain, lift the tray, put a couple of scrapwood stickers across the pan, and set the tray on them. Let the excess stain drip off, then wipe them.

—R.B. Himes, Vienna, Ohio

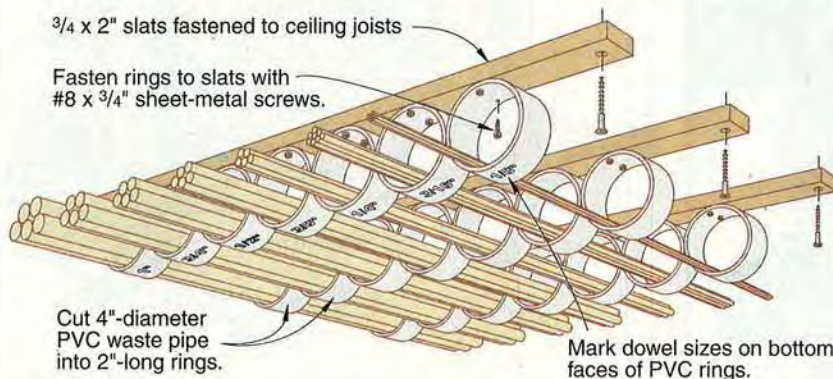


Overhead organizer keeps your dowels rounded up

I've tried various types of storage for dowels, but never was satisfied. Finally, I took some 4" plastic pipe left over from my dust-collection system and cut several pieces into 2"-long rings. Using $\frac{3}{4}$ " sheet-metal screws, I fastened the rings to 2"-wide slats long enough to span a

few ceiling joists. I screwed the boards to the joists, as shown below, spaced so that they hold dowels of 2', 3', and 4' lengths. A label on the bottom of the first ring in each rank tells me what diameter of dowel it contains.

—Austin Jelbert, Welland, Ont.



Continued on page 42

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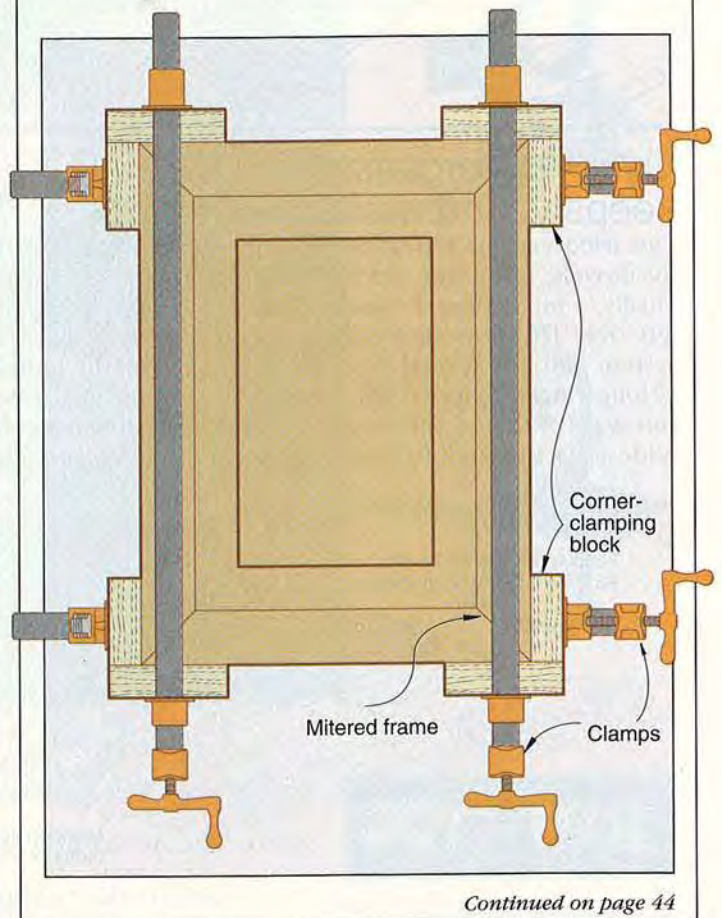
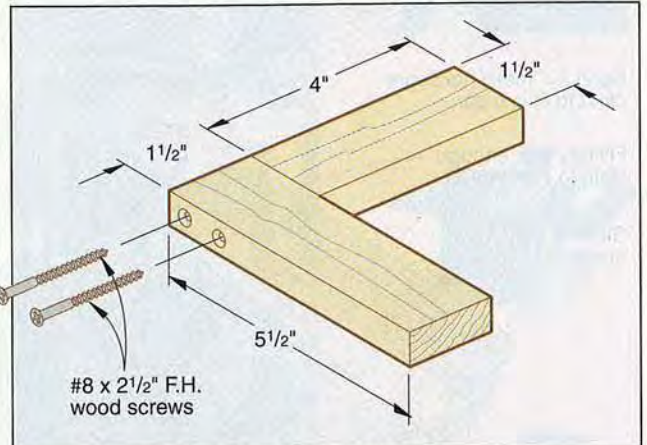
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Continued from page 41

Sure cure for miter-joint double-bypass

It can be tough to make great-looking miter joints because it seems like one piece is always trying to sneak past the other during clamping. These handy corner-clamping blocks eliminate this bypass problem. I place one of these blocks between the clamp and the workpiece in each corner, as shown *bottom*, and tighten the clamps. The blocks protect your workpieces and hold them in perfect 90° alignment to ensure a square assembly.

—Chuck Hedlund, Project Builder, *WOOD® Magazine*



Continued on page 44



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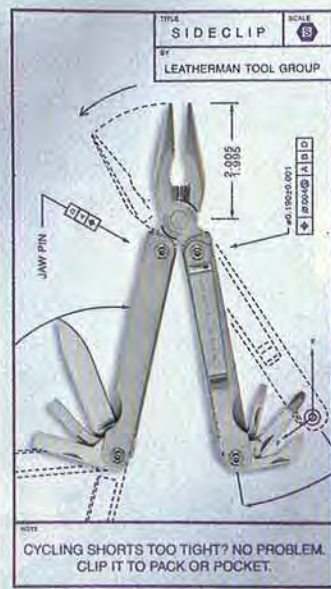
There I was, crossing
Siberia's remote Kilimski
track. Several spokes on my
mountain bike's wheel broke.
I wondered what would happen
when Ravenous Siberian tigers
(not to mention  mosquitoes)
found out I was stranded. Fortunately

I had a Leatherman Tool clipped to my

pack. Using its powerful
jaws, I was able to combine two bicycle spokes
into one. My journey continued,
cheered on by the occasional babushka.

Dave Scherer
South Fork,
Colorado

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TIPS FROM YOUR SHOP (AND OURS)

Continued from page 42

No more clamp pads slipsiding away

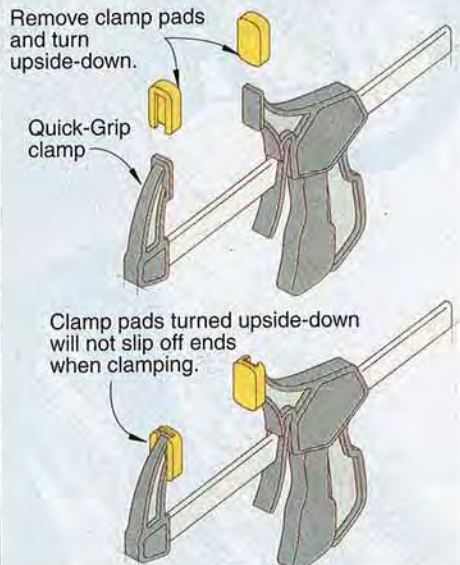
The yellow pads on Quick-Grip clamps have a way of slipping off and getting lost. I've found that if you remove the pads and reverse them—that is, with the closed end toward the bar—they won't fall off and get lost.

—Joseph White, Altus, Okla.

Remove clamp pads
and turn
upside-down.

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clamp

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will not slip off ends
when clamping.



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- Help create a country finish by spattering the flyspecks with an old toothbrush. See how on *page 73*.
- Do you have to stop and think about the proper direction to feed stock into your router? On *page 22*, Safety Man Mike Gilliland gives you some easy-to-remember guidelines on the feeding of your router.
- Pro turner Rex Burningham shares his hints for selecting bowl blanks in "Turnin' and Tossin'." Learn how he makes the call on *page 74*. ♣

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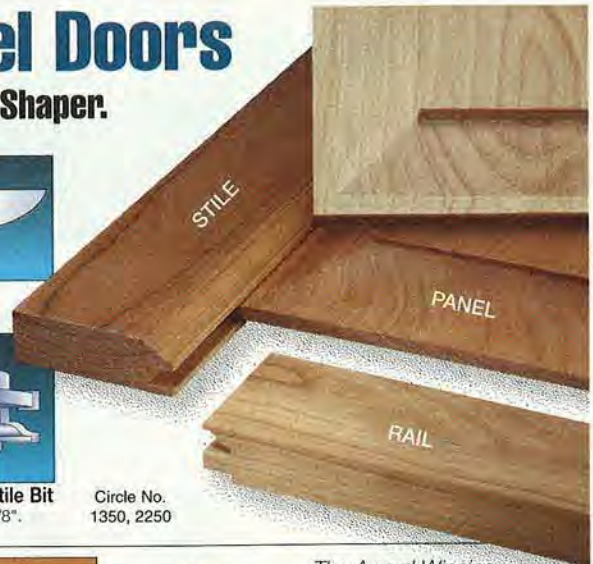
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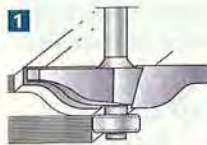
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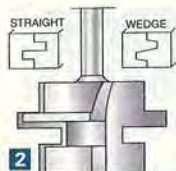
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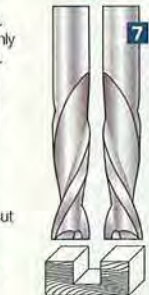
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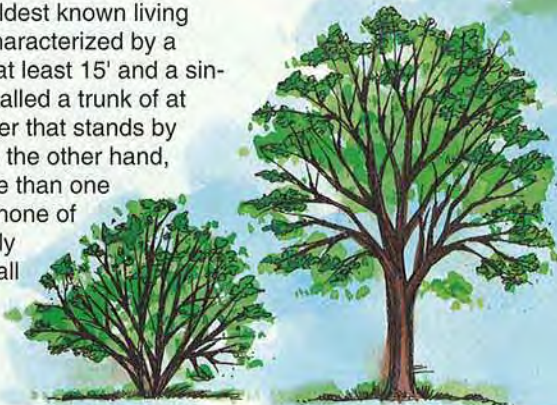
An Up-Close Look at a Tree

Sure, you know what a tree is. Or do you? There's a lot to know. First of all, depending on where they grow, some of the 865 or so tree species native to North America north of Mexico may appear to be shrubs, which aren't trees. And some shrubs can be treelike. Really, then, what is a tree?

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Is it a shrub or a tree?

Trees are the largest living plants. In fact, they're the oldest known living things. They're characterized by a mature height of at least 15' and a single woody stem called a trunk of at least 3" in diameter that stands by itself. Shrubs, on the other hand, usually have more than one woody stem and none of the stems normally grow as thick or tall as a tree.



Two types of trees—broadleaf and needleleaf

Although there are hundreds of tree species (oaks, pines, palms, etc.), foresters and those in the wood products industry refer to only two general types: *broadleaf* trees and *needleleaf* trees.

Botanists also refer to broadleaf trees of the temperate regions as *deciduous*, meaning that most of them annually drop their leaves and grow new ones. They also call needleleaf trees *conifers* or *evergreens* because with few exceptions they retain their green needles all year.



Leaf of broadleaf tree (northern red oak)

Leaf of needleleaf tree (eastern white pine)

Anatomy of a Tree

Crown

With the help of light, heat, and water in the leaves, the crown makes food from nutrients obtained from the air (principally carbon dioxide) and the soil. It's called photosynthesis. The process releases oxygen to the air.

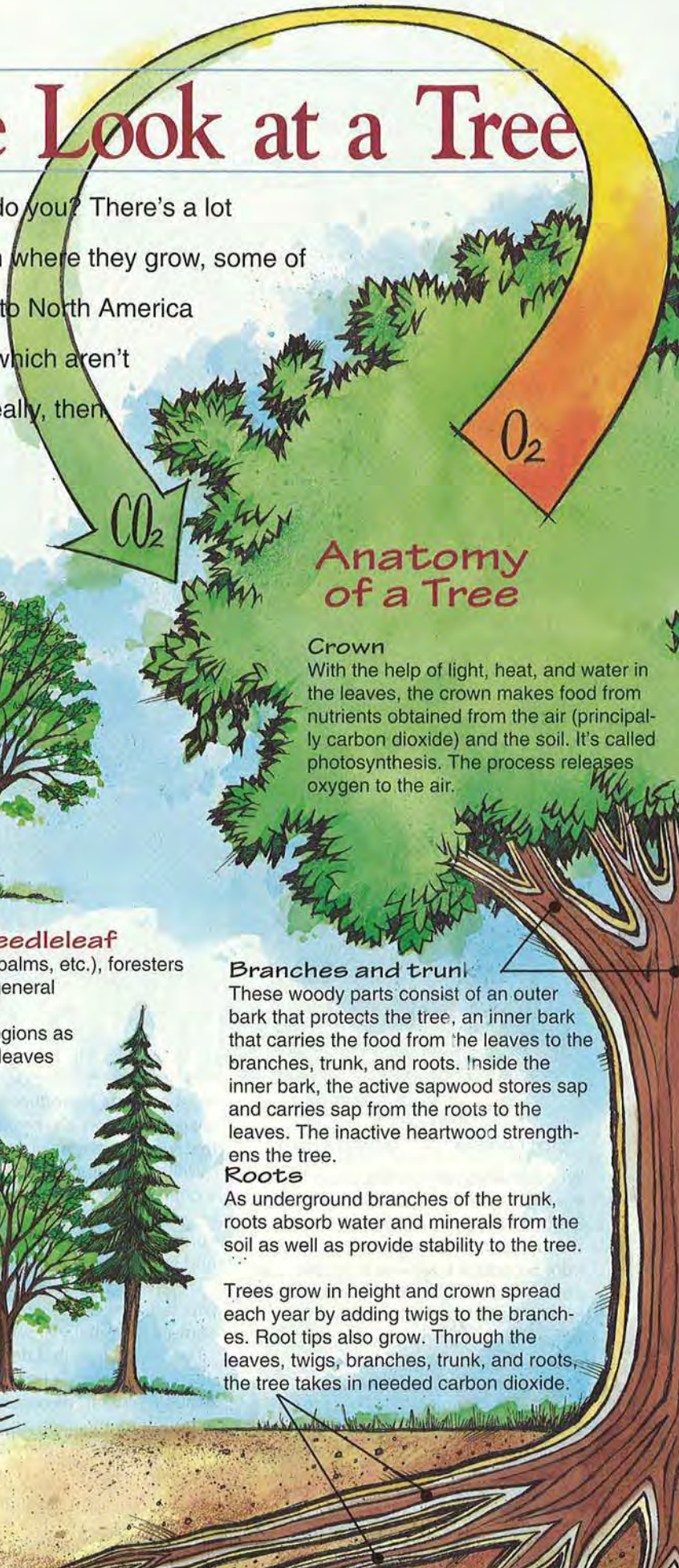
Branches and trunk

These woody parts consist of an outer bark that protects the tree, an inner bark that carries the food from the leaves to the branches, trunk, and roots. Inside the inner bark, the active sapwood stores sap and carries sap from the roots to the leaves. The inactive heartwood strengthens the tree.

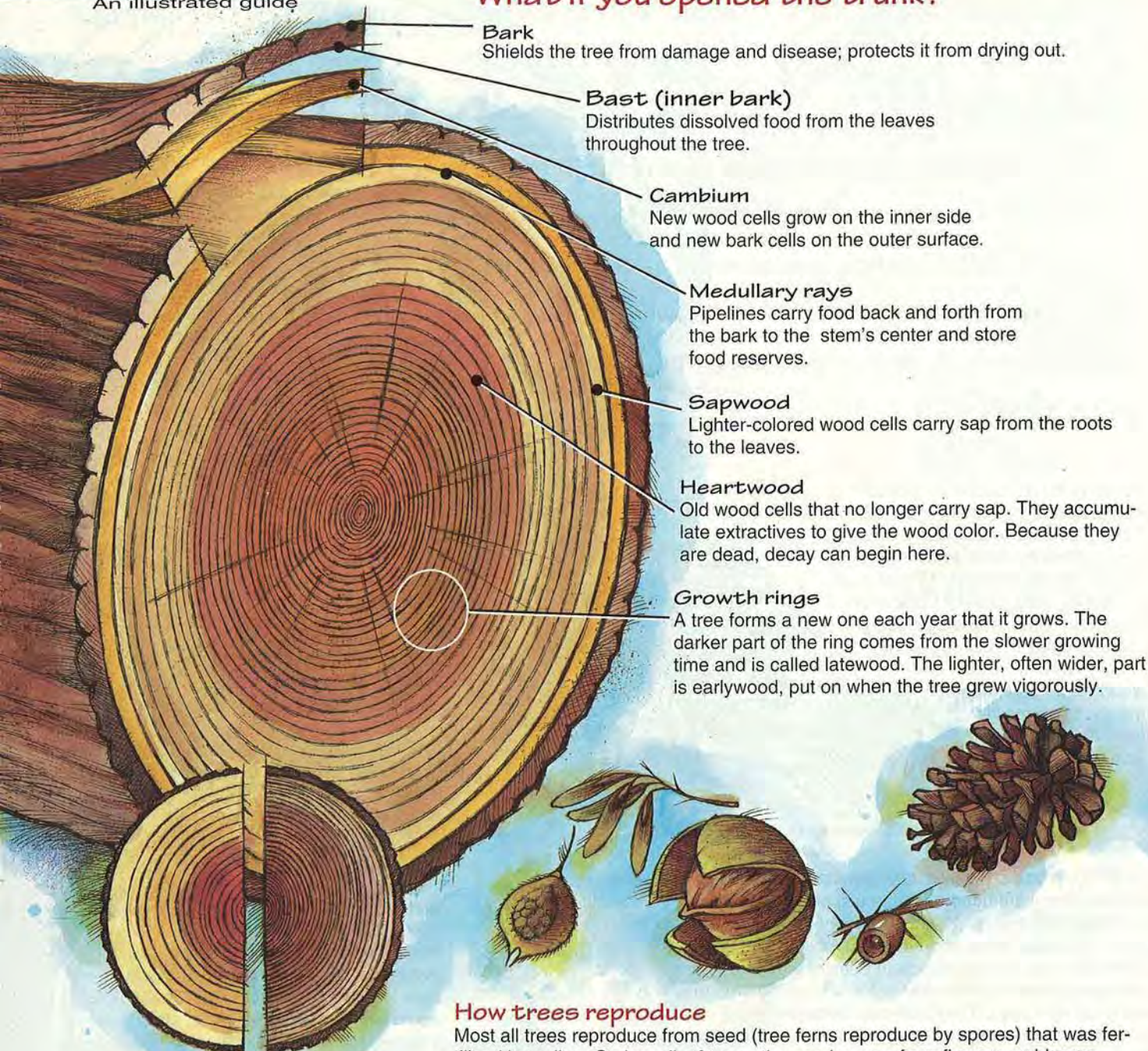
Roots

As underground branches of the trunk, roots absorb water and minerals from the soil as well as provide stability to the tree.

Trees grow in height and crown spread each year by adding twigs to the branches. Root tips also grow. Through the leaves, twigs, branches, trunk, and roots, the tree takes in needed carbon dioxide.



What if you opened the trunk?



Bark
Shields the tree from damage and disease; protects it from drying out.

Bast (inner bark)
Distributes dissolved food from the leaves throughout the tree.

Cambium
New wood cells grow on the inner side and new bark cells on the outer surface.

Medullary rays
Pipelines carry food back and forth from the bark to the stem's center and store food reserves.

Sapwood
Lighter-colored wood cells carry sap from the roots to the leaves.

Heartwood
Old wood cells that no longer carry sap. They accumulate extractives to give the wood color. Because they are dead, decay can begin here.

Growth rings
A tree forms a new one each year that it grows. The darker part of the ring comes from the slower growing time and is called latewood. The lighter, often wider, part is earlywood, put on when the tree grew vigorously.

Softwood **Hardwood**

Woodworkers refer to the wood from the two types of trees, even the trees themselves, as *hardwood* and *softwood*. Hardwood refers to the wood from broadleaf trees—ash, maple, oak, and so forth—which many times is harder than the wood from needleleaf trees—lodgepole pine, white pine, and others. The trunks of some tree species of both types have sapwood that's more valuable than the heartwood. On others, it's just the opposite.

How trees reproduce

Most all trees reproduce from seed (tree ferns reproduce by spores) that was fertilized by pollen. On broadleaf trees, the seeds come from flowers, or blooms, that turn into some type of fruit—a walnut, for instance.

While the fruits of all broadleaf trees don't always resemble a nut or an apple or a cherry, they're still referred to as fruits. Needleleaf trees produce seeds that lie in cones or similar structures, and are released when the cone opens. Seeds are spread by animals, birds, wind, and water. Eventually they find a home in the soil and sprout when the time is right.

Trees also can successfully reproduce by sending up sprouts from a stump that was left after a tree was cut down or blown down, or from root sprouts. These sprouts eventually grow into trees (black cherry and redwood regularly do this).

The young tree that develops from a seed is called a seedling. Once the seedling reaches a height of 6' or more and its trunk grows to 2" thick, it's called a sapling. Most trees reach adulthood when their diameters develop to 16–18", although many, such as a bur oak, do not become fully mature for 200 years or more. Softwoods become "sawtimber" at 9" diameter, hardwoods at 11".



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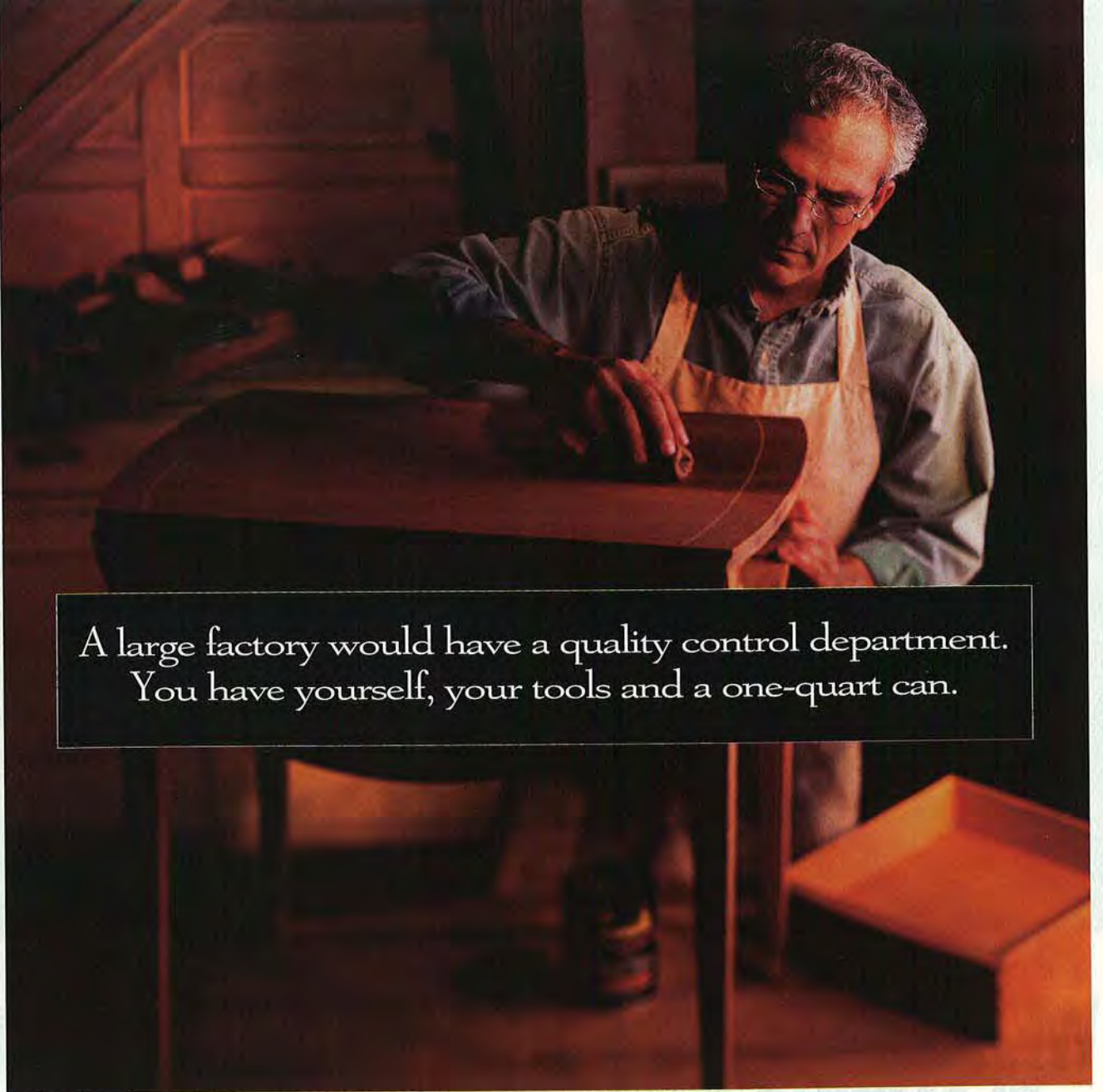
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Ornamental turnery from
the days of Queen Victoria

Turning Back the TIMES

At Fred Armbruster's left is his Holtzapffel ornamental turning lathe. He built the brass-embellished rose engine lathe at his right. Note the overhead drives above each lathe.

Amid computer chips and laser technology, a select few craftsmen are now returning to the mechanical marvels of the industrial revolution. One is New England surgeon Fred Armbruster.

Continued

It takes a special type of person to grasp and enjoy the elements of ornamental turning—a type of turning that requires a very unique lathe. A keen interest in mechanics is important, as well as an eye for detail and a sense of artistry. Unusual combinations? Perhaps. But you'll find these traits in Fred Armbruster, 45, a retina surgeon who makes his home in New England. He has taken to this 150-year-old craft like a Labrador retriever to waterfowl hunting.

Born to tinker with an ornamental lathe

"My parents say that as a little kid I was a constant embarrassment," says Fred, amused at the memory. "I had the run of the neighbor-

hood and regularly visited garages to bring home tools. I had a real cache—at least until I had to give them back. So tools have always fascinated him. I made them when I couldn't afford them. And I made furniture when I couldn't afford to buy it."

With that background, ornamental turning was a natural. "It combines my interest in precision metal work with my fascination with art," explains Fred.

Fred's interest in the craft was sparked by an article he read in a woodworking magazine 20 years ago. It showed the exquisitely decorated chalices, boxes, and vessels that are possible to make on an ornamental turning lathe. But most of all, he was captivated by the machine.

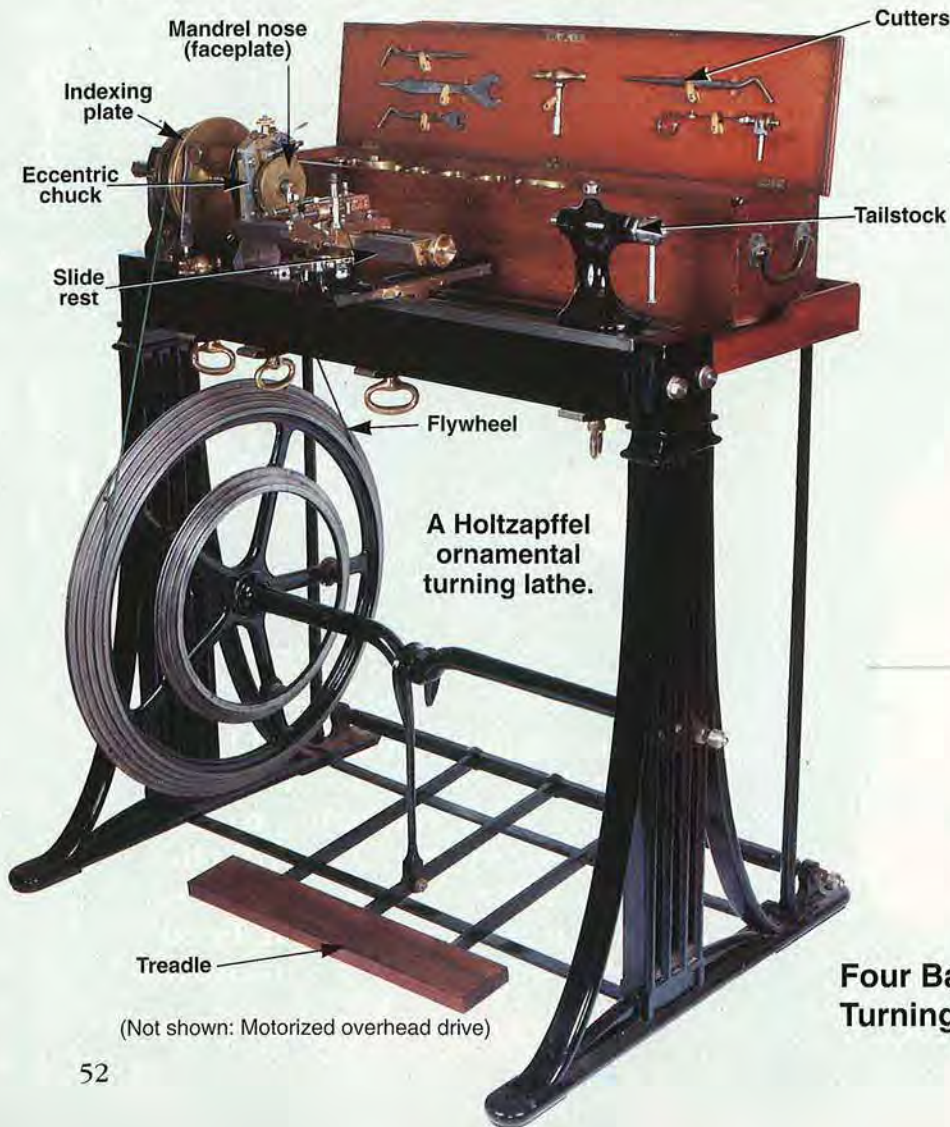
A magical machine with English lineage

An ornamental turning lathe starts out as a simple woodturning lathe. However, the decorative embellishment of an otherwise plain, round object not possible with an ordinary lathe is made possible by loads of attachments. The primary ones are an indexing plate, a slide rest, and an overhead drive for powering cutting tools (see diagram *lower left*).

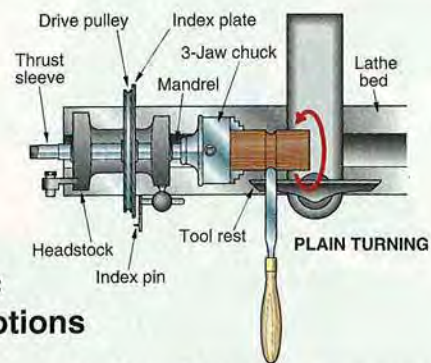
The plate, mounted on the front of the pulley, has rows of holes into which you can insert a fixed pin to hold the mandrel in a given position. You then can make precise cuts on a stationary workpiece, and space them evenly by moving from hole to hole. The slide rest firmly holds the cutting tool and provides a mechanical means of positioning it. The overhead drive allows you to power rotating cutters with any orientation to the work, at any position.

With ornamental turning lathes you can do four basic motions, as shown in the drawings *below*:

1. *Plain turning* with a hand-held, hand-guided tool applied to the rotating workpiece.
2. *Index turning* with the workpiece held at incremental index points while a spinning cutting tool is applied to it.
3. *Cutting as both the work and the tool turn simultaneously* to produce spiral turning, fluting, and other decorative cuts.
4. *Lateral turning* as the work turns and at the same time moves



(Not shown: Motorized overhead drive)



Four Basic Turning Motions

laterally by means of the traversing mandrel while the cutting tool remains fixed or in motion. This produces threads and rosettes.

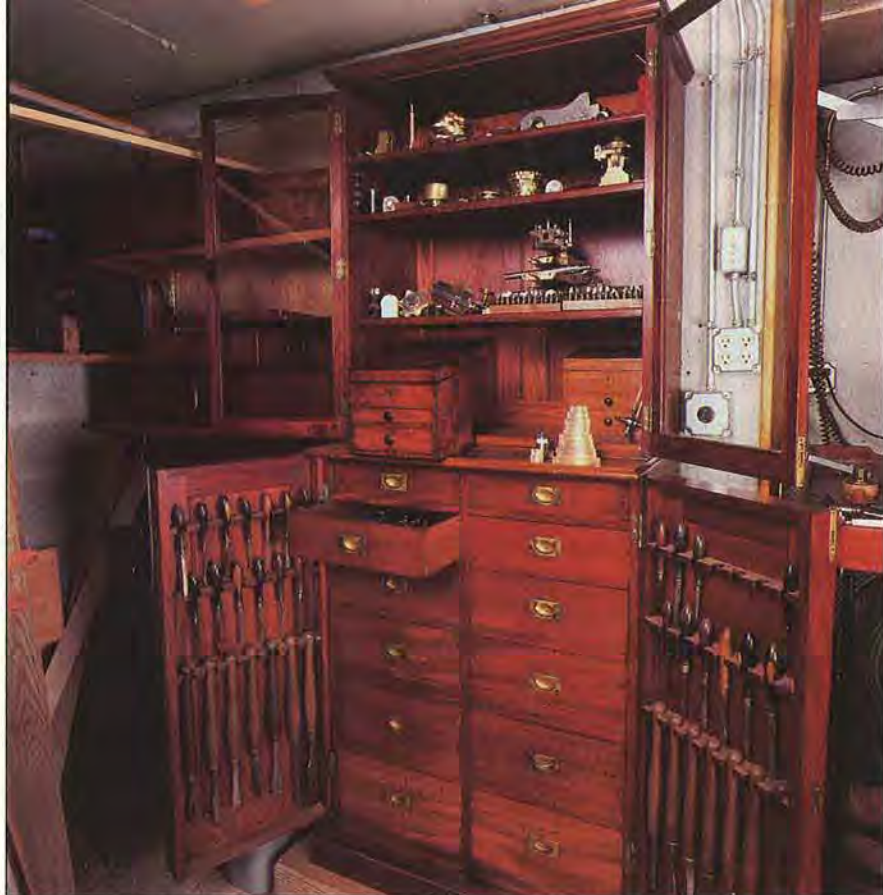
Fred wanted one of the ornamental turning lathes when he first read about them. At the time, though, his intern's salary decreed postponement. A dozen years went by before Fred's dream of the lathe came true. Then a practicing surgeon, he had meanwhile joined the Society of Ornamental Turners to learn more of the machines.

Through the society, he located a lathe for sale in England. It was a Holtzapffel, a brand considered to be the finest ornamental turning lathe ever manufactured.

"Machines like this are from a time when a tool was an end unto itself, not just a means to an end," he says, glancing at his gleaming Holtzapffel. "It's No. 1520, and was built in 1835. The quality of it makes the lathe so fascinating—it's a work of mechanical art."

A Holtzapffel without all the parts

Fred's Holtzapffel was hardly complete when he obtained it. However, with help from people in the society, and by buying items at auction, he was able to restore his to almost its original form. "One of the most complete original outfits I've heard about recently changed hands for almost \$100,000," he says. "Most people can't spend that much on a hobby, particularly at one time.



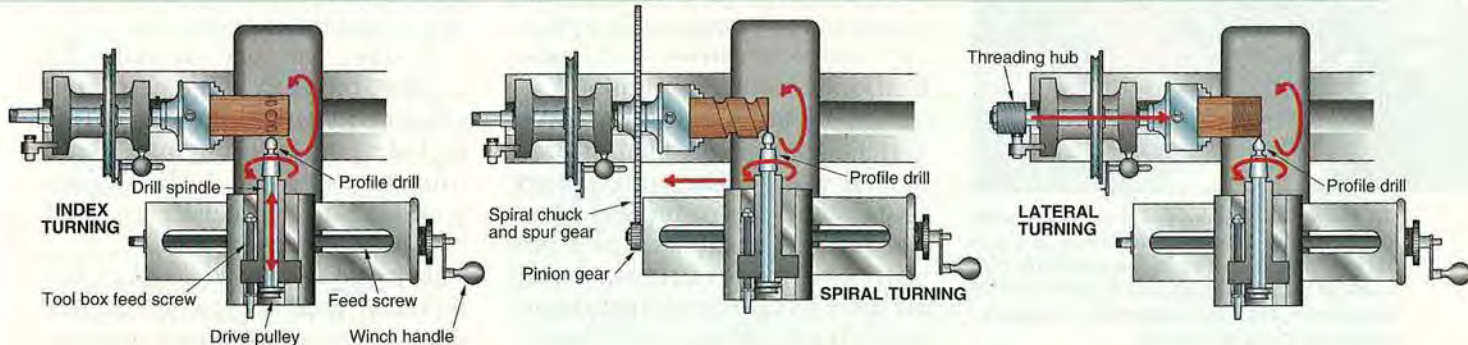
Each ornamental lathe came with an assortment of drills and cutters in a solid mahogany, brass-trimmed cabinet.

I couldn't pay that much either, but with tenacity and patience, I was able to get all original parts over 5 to 6 years."

In 1990, Fred heard about another type of ornamental turning machine called the rose engine lathe, so named because it uses circular cams (called rosettes) to produce decorative patterns. Rose-engine-decorated objects first appeared in the 1500s. Holtzapffel and others built rose engines in small quantities up to recent times. Like all original ornamental lathes of the time, it was powered by a treadle, but differed because the headstock could rock

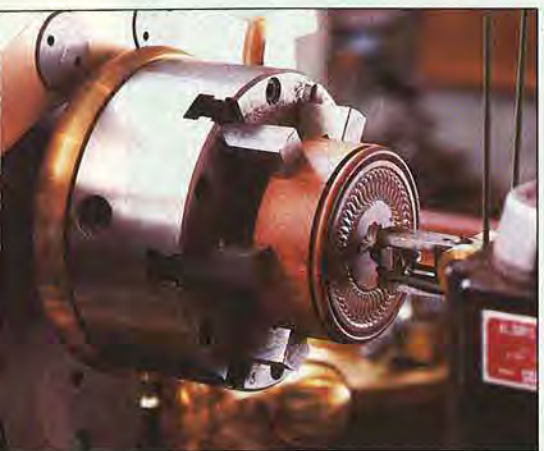
back and forth, and the mandrel could travel to the right and left, following the contours on the face and edge of the rosettes.

A talented metal worker and machinist, Fred set out to make a replica of the rare machine. Patterning it after an original owned by a fellow turner, it took him five years to build. "Rose engine lathes cost about 350 English pounds in the early 1800s," notes Fred, "and for that price you could buy a block of flats in a fashionable section of London. So you can imagine what they're worth today, if you can even find one."





Fred starts by using a form tool to produce a bead molding on the face of the workpiece. He feeds the sharp cutting tool into the work by hand as the lathe mandrel rapidly revolves.



Here, the cutting tool revolves while the workpiece revolves and rocks to the right and left under the control of a circular cam (rosette), which transfers its shape to the workpiece.



To make this border pattern on the side of the workpiece, Fred switches to a different rosette and as in the previous cut, uses a motorized apparatus above the lathe to rotate the cutter as the workpiece revolves and rocks.

Turning Back the Times



Turnings by Fred Armbruster: from left, spiral-lidded box, African blackwood; tall chalice, African blackwood and Corian; small box, African mopane.

Ornamental turning lathes such as Fred's are heavy. But even his —with its solid mahogany and glistening brass—is portable. "Since they were delivered by horse and carriage, then assembled on the premises, they were made to be easily disassembled," he notes. "I put my rose engine lathe together just like Holtzapffel did—with bolts. Even the wood joints are bolted, not glued."

In ornamental turning, accessories were fashionable

Looking around Fred's turning workshop, your eye is drawn to a tall, exquisitely crafted, mahogany cabinet. Anticipating the question, Fred says, "That holds the lathe's accessories."

"Just like buying any major machine today, what came with this one was what you were willing to buy," he continues. "You could go for a plain lathe for ordinary woodturning, or you could opt for the ornamenting chucks—an eccentric chuck, an elliptical chuck, a rectilinear chuck, and a dome chuck. You could purchase an ornamental slide rest with or without attachments to do spirals, curvilinear profiles, automatic feed, and automatic counting."

What about the turning tools, or cutters, as they're called in ornamental work? "The cutters were sold in small sets or big sets," Fred replies. "A typical set was a box with 14 dozen cutters, which means 14 different cutter shapes with a dozen sizes in each shape."



Five turnings by Jon Saver: from left, kingwood; African blackwood and Corian; Osage orange with African blackwood; African blackwood; Diamond wood (laminated birch).

Although his accessory cabinet is impressive, Fred feels certain that it was considered fairly standard. "It would have been a good basic to mid-range outfit. On top-of-the-line cabinets, there was often a mirror in the back to make it look even more impressive."

Materials and techniques for intricate cuts

In Victorian times, there was an infatuation with decoration. The ornamental turning lathe made all kinds of decoration possible on candlesticks, chalices, vases, bowls, and snuff boxes. The materials, though, varied from those used on traditional lathes.

Because the stock must accommodate the intricate cuts made in ornamental turning without splitting or splintering, its texture must be fine and its grain dense. Also, because sanding the delicately decorated surface removes the sharpness of the cuts, it wasn't done. That's one reason that, at the height of its popularity, elephant ivory was the favored material. As newly discovered wood began to be imported, some of it suited the purpose, too.

Today, the use of ivory is banned, but Corian is a good substitute. Popular wood species include grenadillo, lignum vitae, purpleheart, and Indian rosewood. Ebony is usually avoided because it dulls the tools.

"Because the wood or ivory traditionally used in ornamental turning wasn't—and still isn't—always



Rose engine turnings by Dale Chase:
African blackwood with pink ivory.



Rose engine turnings by Paul Fletcher:
left, sycamore with pink ivory inlay;
right, African blackwood.

available in large blanks, most decorated pieces are made up of smaller ones," Fred explains. "A tall chalice may have a separate top, a finial that screws on, and a separate stem and base, but it looks like a single piece. It's a far better strategy to build a vessel from pieces than to try and make it one-piece—it allows you more approaches to each component for the ornamenting tools. Besides, there's the very real chance that you could mess up. Then, you wouldn't lose the whole piece, only a component."

Most ornamental turners, according to Fred, use a regular lathe or a metal lathe to produce the object they'll decorate. "When they transfer it to the ornamental lathe, the round object must be centered on the axis of the lathe mandrel," the doctor comments. "There are countless ways to do that. In fact, a friend has a Holtzapffel that came with 34 different chucks!

"For a cylinder, though, the simplest way is to cut a tapered tenon on one end of the cylinder and tap it into a brass chuck or a matching turned recess in a wooden chuck screwed onto the mandrel nose. It's like a round tenon and mortise."

To demonstrate, Fred selects a small, round box turned from mopane (wood from a South African scrub tree not valuable in commerce). "Because the piece is not very tall, I can turn it like faceplate work, using standard metal chucks to hold it in place," he notes. For what Fred does next at

the lathe, see the photos on the *opposite page*.

So who does ornamental turning?

"The Society of Ornamental Turners attracts doctors, businessmen, tradesmen, housewives, retired bankers, to name a few," Fred says. "I guess they all share a like fascination and interest in

things mechanical. On the other hand, those who seem to produce the most attractive objects have the least mastery of the equipment. They jump through lots of hoops to get what they make."

By Fred's own admission, he jumps through hoops, too. His artistic talent, though, continues to boost him through. ♣

The Amazing Holtzapffel Heritage

German engineer John Jacob Holtzapffel developed his ornamental turning lathe in the late 1700s. Prior to that time, any ornamentation to a turned object—which was popular among the royalty and gentry—had to be applied by fixed tools. But in his London machine shop, Holtzapffel invented a lathe with an overhead drive that operates in a manner similar to today's dental drill. To go with it, he also designed a host of revolving cutters that fit in a sliding rest.

From 1795 to 1914, John Jacob Holtzapffel's firm (later headed by his inventive son, grandson, and other family members) manufactured about

2,400 lathes, but probably most were not ornamental. The Holtzapffels also produced many other metal, everyday objects—from candleholders to pruning shears to fly-tying vises. It was their amazing ornamental lathes, though, that were sought by their wealthy patrons, and which have become so collectible because each was numbered and the name of its purchaser recorded.

The Holtzapffels also customized their lathes for wealthy clients. Fred says, "If you could afford it, one of the Holtzapffel workmen would come to your premises and teach you how to use it—or teach your footman how to sharpen the cutters!"

Interested in learning more about ornamental turning?

Members of the two ornamental turning societies listed can direct you to lathes, lathe parts, and skilled help. Write: Ornamental Turners International, Tom Howard, 1550

Homestead, Walnut Creek, CA 94598-1336; or, Society of Ornamental Turners, Hon. Sec. Nicholas S. Edwards, 188 Bromham Rd., Bedford, Bedfordshire, UK 40 4BP

Written by Peter J. Stephano with Larry Clayton Photographs: John Kane/Silver Sun Studio Drawings: Kim Downing

AT-YOUR-SERVICE Steamer Trunk

You don't have to travel afar to enjoy the good looks of this curvaceous project. Reminiscent of trunks used a century ago, this finely crafted piece offers ample storage. Top it with glass for a stunning coffee table.



Start your trunk with the end panels

1 Cut the two end panels (A) to the size listed in the Bill of Materials from $\frac{3}{4}$ " birch plywood. Mark and cut (we used a bandsaw) a 3" radius on each corner where shown on the Exploded View and End Panel drawings. Sand the round corners.

2 Rout a $\frac{1}{8}$ " rabbet $\frac{1}{2}$ " deep along the inside face of each plywood end panel (A). (We used a rabbeting bit fit with an oversize bearing. See the Buying Guide for our source.)

3 Using the Recess Template drawing on the *WOOD PATTERNS*® insert in the middle of the magazine for reference, make a $\frac{3}{4}$ "-thick template like the one shown.

4 Clamp the template flush with the shoulders of the adjacent rabbets on an end panel where shown in *Photo A*. Fit your router with a $\frac{1}{2}$ " pattern bit, and follow the template with the router bit to rout a pair of recesses on the inside face of the end panel where shown in *Photo A*.



A Clamp the template in place, and rout the recesses. Reposition and rout until all eight recesses have been formed.

5 Clamp the template over another corner of the end panel, keeping the same corner of the template out. Rout another pair of recesses. Continue this process until you've routed all eight recesses.

6 Slide the fence on your tablesaw $4\frac{1}{16}$ " from the inside edge of your saw blade, and rip each end panel in two where shown on the End Panel drawing.

Next, let's add the rib and rails to join the end panels

1 Cut a piece of $\frac{3}{4}$ " birch to $4\frac{1}{4} \times 19\frac{3}{4}$ " for the rib blank (B).



To make this project, I used several thicknesses of solid stock and $\frac{1}{8}$ " bending plywood. For the interior, I choose aromatic cedar. To find this diverse stock, see the Buying Guide for our source of the hardwood kit. We've also listed our sources for the hardware and necessary router bits.

Jan Svec
Assistant Design Editor

Transfer the full-size rib half pattern from the pattern insert. Cut the rib to shape. The top of the rib should be the same shape as the top rabbeted edge of the end-panel tops.

2 Cut the rails (C) to size (same width as the recesses). Cut the half rails (D) to size plus $\frac{1}{4}$ " in width.

3 Rout $\frac{1}{4}$ " round-overs on the inside face of each rail (C, D) where shown on the Carcase drawing.

4 Fit the half rails (D) into the recesses to check the fit. Mark a cutline, and rip each half rail so its top edge is flush with the top edge of the end panel.

5 Clamp the rails (C, D) between the end panels (A). Position the top rib (B), and clamp it in place. Drill mounting holes, and glue and screw the rails and rib in place.

Wrap the frames with bending plywood

1 Cut the skin blanks (E, F) to the sizes listed in the Bill of Materials from a sheet of $\frac{1}{8}$ " birch bending plywood. Lay out the pieces so the grain on the lid will mate with the grain on the base at the trunk front when the lid is closed later.

2 Mark centerlines on the outside (good) face on the ends of each skin blank. Mark mating centerlines on the outside face of the end panels (A) where shown on the Carcase drawing.

3 From $\frac{1}{2}$ " or $\frac{3}{4}$ " plywood or particleboard, cut two clamp blocks to 10×40 " (for the inside of the box) and two more that measure 10×44 " (for the outside of the box).

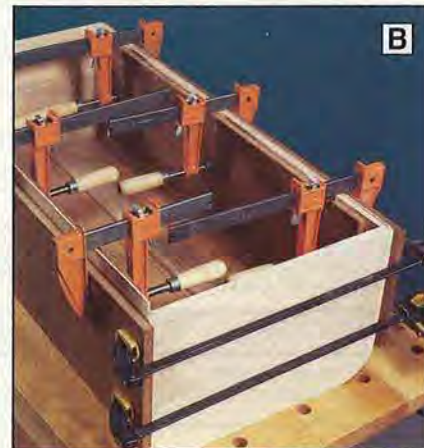
4 Turn the trunk base upside down on a workbench, and spread white glue on the bottom rails and bottom rabbeted edges of the end panels.

(Due to the involved glue-ups, we used white woodworker's glue to extend working time.)

5 Apply the bottom skin (E) to the base frame, aligning the centerlines on the skin with those marked on the frame. Starting from the center and working out, staple the skin to the end panels. (We used a hand staple gun and $\frac{1}{2}$ " staples.) Locate the staples so they'll be covered by the bands later. Turn the base right side up, spread glue on the side ribs and rabbets, and use the clamp blocks to clamp the skin tightly to the frame as shown in *Photo B*. Weight the bottom rails to hold them firmly to the skin while the glue dries. Wipe off any excess glue with a damp cloth.

6 Use the same process to glue the top skin (F) to the lid frame. (We used a pair of 2×43 " clamp blocks clamped along the outside edges of the lid to hold the plywood skin tightly against the half rail.)

7 Later, remove the clamps from both assemblies, and trim the



B Particleboard clamp blocks help hold the bending plywood tightly against the base frame while the glue dries.

Continued

Steamer Trunk

excess plywood skin flush with the half rails. (We used a router with a flush-trim bit to do this.)

Say no to raw plywood edges with banding strips

1 To hide the plywood edges on the mating edges of the base and lid, cut and miter-cut the eight banding strips (G, H) to size. Make sure the width of the front and back banding (G) is equal to the thickness of parts D and E, and that the side banding is as wide as the thickness of the plywood panels A.

2 Glue the solid-stock banding to the base and lid where shown on the Carcase drawing.

Cut and add the trim pieces

1 Cut the trim pieces (I, J) to the sizes listed in the Bill of Materials.

2 Cut the vertical trim pieces (I) in two; one for the base and another for the lid. Number the mating pieces I so the grain will match from one piece to the next when you apply the pieces.

3 Glue the trim (I, J) in place flush with the outside edges of the trunk.

Trim and sand the ends of trim pieces (I) flush with the end panels (including the radiused ends).

Build a form, and laminate the curved banding

1 Build the form shown on the Band Bending Form drawing on the pattern insert in the middle of the magazine. Mark a centerline on the top outside face.

2 To keep the laminations from sticking to the form, seal the porous edges of the form with polyurethane. After the poly dries, sand lightly and apply waxed paper or plastic wrapping tape to the edges.

3 Cut 16 $\frac{1}{16} \times 2 \times 48$ " birch strips for the bottom banding (K) and 16 $\frac{1}{16} \times 2 \times 33$ " birch strips for the top banding (L). See the resawing technique article in the previous issue for reference. Mark a centerline on one edge of each strip.

4 Spread a thin even coat of glue on the mating surfaces of four strips. Stack them together, and position them on the bending form, keeping the centerlines on the strips within $\frac{1}{4}$ " of the centerline on the form.

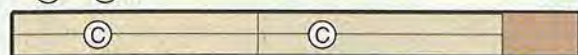
Continued

CUTTING DIAGRAM

$\frac{3}{4}$ " x $5\frac{1}{2}$ " x 48" Birch



*Plane or resaw to the thicknesses listed in the Bill of Materials.



$\frac{1}{2}$ " x $7\frac{1}{4}$ " x 96" Birch



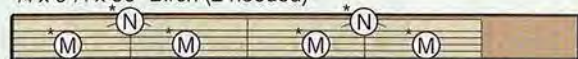
$\frac{1}{2}$ " x $9\frac{1}{4}$ " x 96" Birch



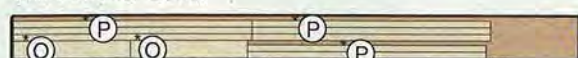
$\frac{3}{4}$ " x $7\frac{1}{4}$ " x 96" Birch



$\frac{3}{4}$ " x $9\frac{1}{4}$ " x 96" Birch (2 needed)



$\frac{1}{2}$ " x $7\frac{1}{4}$ " x 96" Cedar



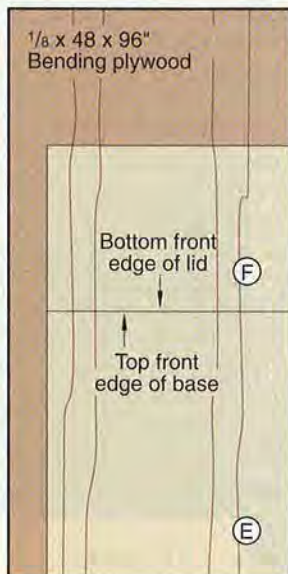
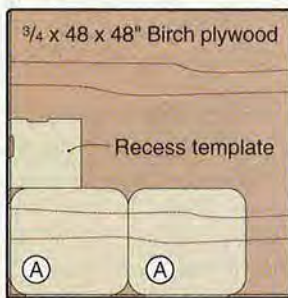
$\frac{1}{2}$ " x $7\frac{1}{4}$ " x 96" Cedar



$\frac{1}{2}$ " x $5\frac{1}{2}$ " x 96" Cedar



$\frac{1}{2}$ " x $7\frac{1}{4}$ " x 96" Cedar



| Bill of Materials | | | | | |
|----------------------|------------------|---------------------|--------------------|--------|------|
| Part | Finished Size | | | Mater. | Qty. |
| | T | W | L | | |
| CARCASE | | | | | |
| A end panels | $\frac{3}{4}$ " | 18" | 20" | P | 2 |
| B top rib | $\frac{3}{4}$ " | $4\frac{1}{4}$ " | 19 $\frac{3}{4}$ " | B | 1 |
| C rails | $\frac{1}{2}$ " | $3\frac{1}{2}$ " | 41 $\frac{1}{2}$ " | B | 6 |
| D* half rails | $\frac{1}{2}$ " | 11 $\frac{1}{16}$ " | 41 $\frac{1}{2}$ " | B | 4 |
| SKIN AND BANDING | | | | | |
| E* bottom skin blank | $\frac{1}{8}$ " | 41 $\frac{1}{2}$ " | 46" | BP | 1 |
| F* top skin blank | $\frac{1}{8}$ " | 41 $\frac{1}{2}$ " | 29" | BP | 1 |
| G banding | $\frac{1}{16}$ " | $\frac{5}{8}$ " | 42" | B | 4 |
| H banding | $\frac{1}{16}$ " | $\frac{5}{8}$ " | 20" | B | 4 |
| TRIM | | | | | |
| I* vert. trim | $\frac{1}{4}$ " | 3" | 18" | B | 4 |
| J horz. trim | $\frac{1}{4}$ " | 3" | 14" | B | 4 |
| K* btm. bands | $\frac{1}{4}$ " | 1 $\frac{3}{4}$ " | 48" | LB | 4 |
| L* top bands | $\frac{1}{4}$ " | 1 $\frac{3}{4}$ " | 33" | LB | 4 |
| LINING PIECES | | | | | |
| M lining pieces | $\frac{3}{8}$ " | 1 $\frac{1}{16}$ " | 19 $\frac{7}{8}$ " | C | 16 |
| N lining pieces | $\frac{3}{8}$ " | 2" | 19 $\frac{7}{8}$ " | C | 4 |
| O lining pieces | $\frac{3}{8}$ " | 3" | 19 $\frac{7}{8}$ " | C | 2 |
| P lining pieces | $\frac{3}{8}$ " | 1 $\frac{1}{16}$ " | 40 $\frac{1}{2}$ " | C | 8 |
| Q lining pieces | $\frac{3}{8}$ " | 2" | 40 $\frac{1}{2}$ " | C | 4 |
| R lining pieces | $\frac{3}{8}$ " | 3" | 40 $\frac{1}{2}$ " | C | 3 |
| S front & back lips | $\frac{1}{4}$ " | 1" | 40 $\frac{1}{2}$ " | B | 2 |
| T side lips | $\frac{1}{4}$ " | 1" | 18 $\frac{3}{4}$ " | B | 2 |

*Initially cut parts marked with an * oversize. Trim to finished size according to the instructions.

Materials Key: P—birch plywood, B—birch, C—cedar, BP—bending plywood, LB—laminated birch.

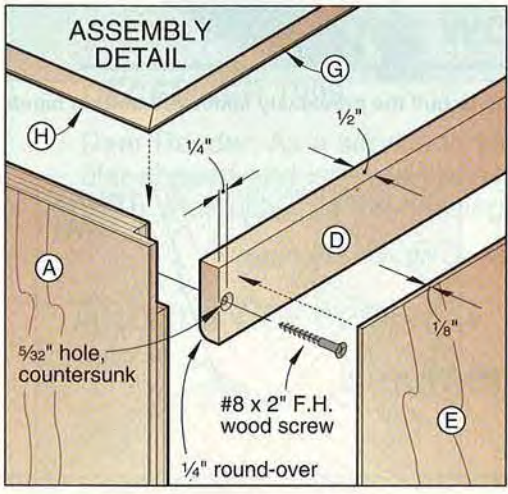
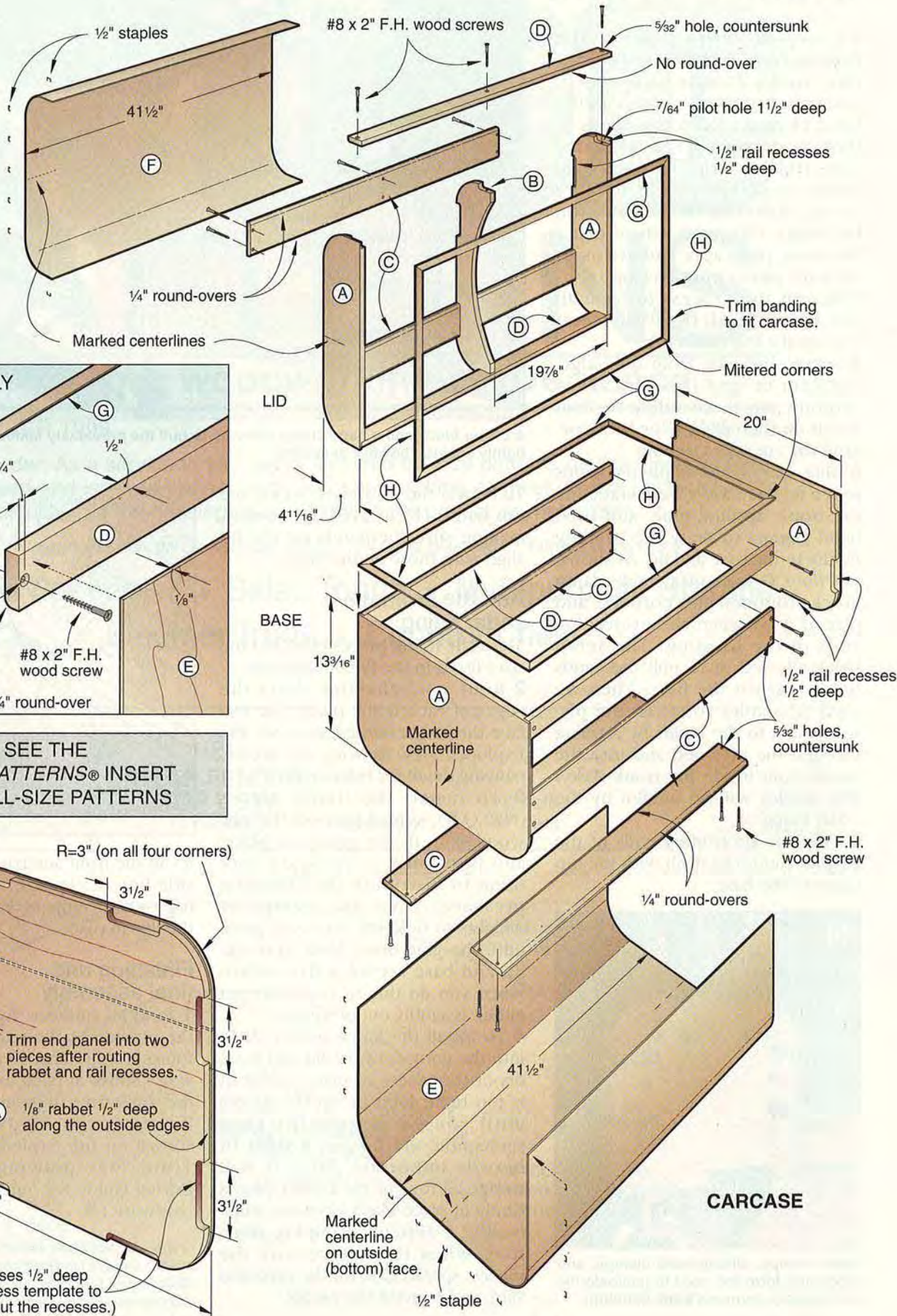
Supplies: 32—#8x2" flathead wood screws, 20—#8x $\frac{1}{2}$ " roundhead brass wood screws, 20—#8x $\frac{3}{4}$ " roundhead brass wood screws, 22—#8x $\frac{3}{4}$ " flathead brass wood screws, 10—#8 brass finish washers, $\frac{1}{4}$ " staples, $\frac{1}{2}$ " staples, and clear finish.

Buying Guide

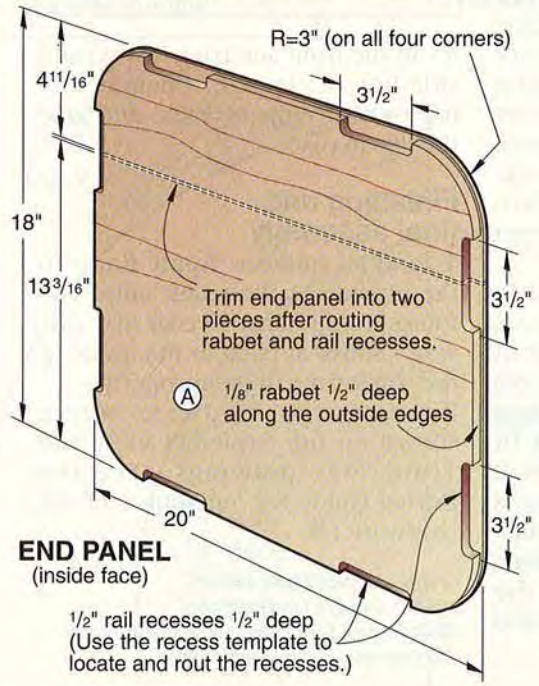
Router bits. Rabbet Master plus rabbeting set (includes 7 bearings and one bit), $\frac{1}{4}$ " shank, #600-639, \$38.90 or $\frac{1}{2}$ " shank, #600-640, \$39.90; $\frac{1}{2}$ " top-bearing pattern bit, #612-127B, $\frac{1}{4}$ " shank, \$27.30; $\frac{1}{4}$ " round-over bit, $\frac{1}{4}$ " shank, #638-254, \$29.90; chamfer bit, $\frac{1}{4}$ " shank, #636-190, \$27.40. Jesada Tools, 310 Mears Blvd., Oldsmar, FL 34677 or call 800/531-5559. Internet access at www.jesada.com

Hardware kit. 4 bump glides, S1768B, \$.60 each; 2 handles, S3671N, \$2.15 each; 4 handle loops with pegs, S3605B, \$1.15 each; 4 stop hinges, S1769B, \$1.41 each; 1 lift pull, S3679N, \$4.35 each; 2 draw bolts, S1772B, \$2.77 each; 2 trunk stays, S527B, \$1.31 each. Van Dyke Supply, 4th Avenue and 6th Street, Woonsocket, SD 57385 or call 800/558-1234.

Hardwood kit. All the individual pieces shown on the Cutting Diagram cut oversized from the thickness and species listed in the Bill of Materials. Kit No. W1102, \$269.95 ppd. Heritage Building Specialties, 205 North Cascade, Fergus Falls, MN 56537. Call 800/524-4184 to order.



SEE THE WOOD PATTERNS® INSERT FOR FULL-SIZE PATTERNS



Steamer Trunk

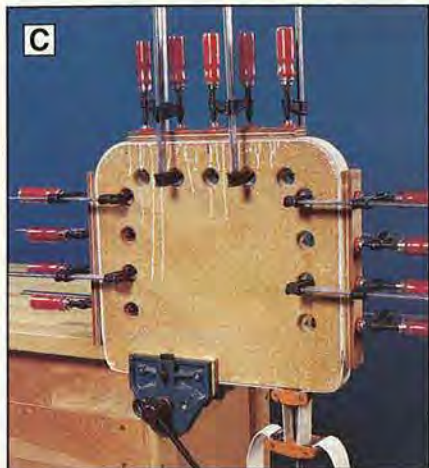
5 Clamp the strips firmly to the bending form as shown in *Photo C*. (We used a 2"-wide band clamp; you also could use two 1"-wide band clamps.) Keep the edges as flush as possible. Then add three cauls (thicker strips of wood) and sliding head-type clamps to more evenly distribute the pressure on the strips. (We used waxed paper between the cauls and strips to keep the pieces from sticking.)

6 Repeat the process to form all four bottom bands (K). Then repeat to form the top bands (L).

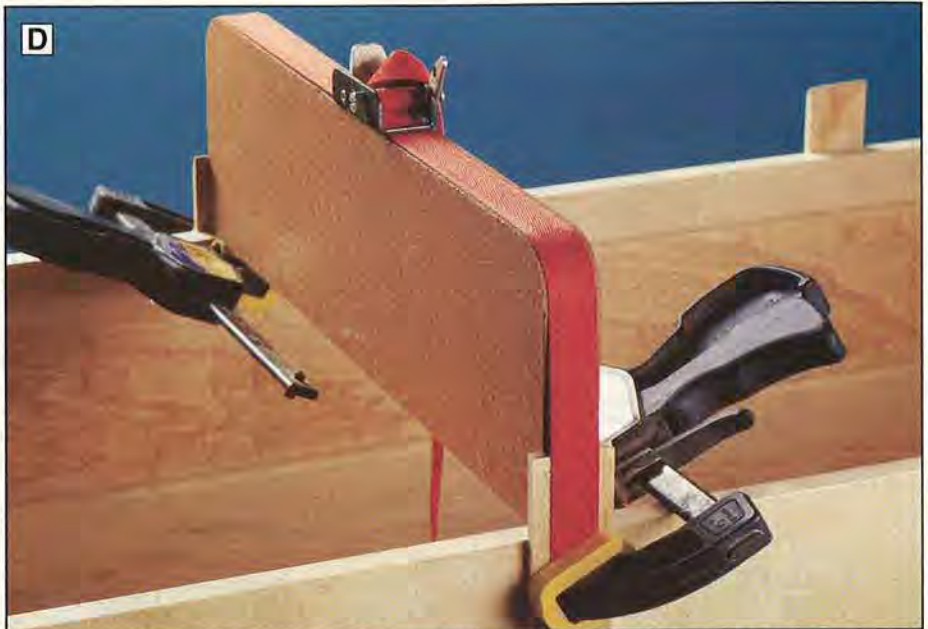
7 Scrape the glue from one edge, and joint or sand that edge. Then carefully rip the banding to final width on the tablesaw or bandsaw. Sand the cut edges smooth.

8 Glue, clamp, and staple the bands to the lid and base. (We marked the locations, applied glue, and used band clamps to draw the banding tightly to the base and lid. As shown in *Photo D*, we cut a scrap clamp block, rounded the corners, and placed it between the protruding ends of the banding. The scrap block allowed us to pull the bands tightly against the base. Then we used $\frac{1}{4}$ " staples to fasten the plywood skin to the bands by stapling through the plywood and into the bands from inside the trunk base.) The staples will be hidden by the cedar lining.

9 Trim the protruding ends of the bottom bands (K) flush with the top edges of the base.



Band clamps, sliding-head clamps, and a bending form are used to laminate the thin strips to form the trunk banding.



A clamp block and a band clamp allow us to pull the previously laminated bottom bands tightly against the base assembly.

10 Repeat the process to secure the top bands (L) to the lid assembly, making sure the bands on the lid align with those on the base.

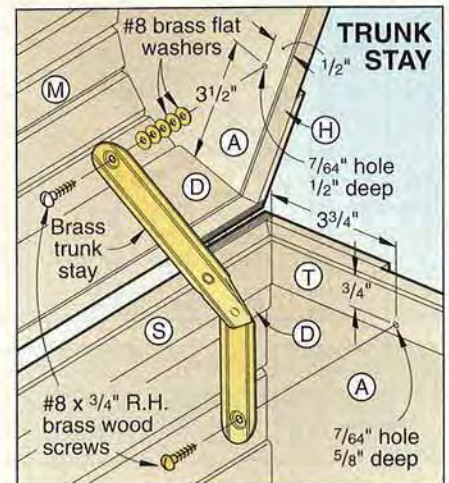
Add the aromatic cedar lining

1 Cut the lining pieces (M-R) to the sizes listed in the Bill of Materials.

2 Rout a $\frac{1}{8}$ " chamfer along the edges of each lining piece that will face the inside of the trunk. See the Exploded View drawing and accompanying detail for reference.

3 To install the lining pieces (N,O,Q,R), spread glue on the plywood skin, fit the pieces in place, and position a scrap board over them to distribute the clamping pressure. Then use clamps or weights to hold the pieces in place until the glue dries. Make sure the lid and base are on a flat surface when you do this so you don't get either assembly out of square.

4 To install the lining pieces (M,P) into the corners of the lid and base, dry-fit the pieces in place. If the fit is too tight, joint or rip the pieces until you get a tight fit. Then rechamfer the pieces. A tight fit here is important since it will wedge all four of the corner pieces firmly in place like a keystone, eliminating a difficult clamping situation. When they fit, remove the pieces, spread glue on the plywood skin, and reinstall the pieces.



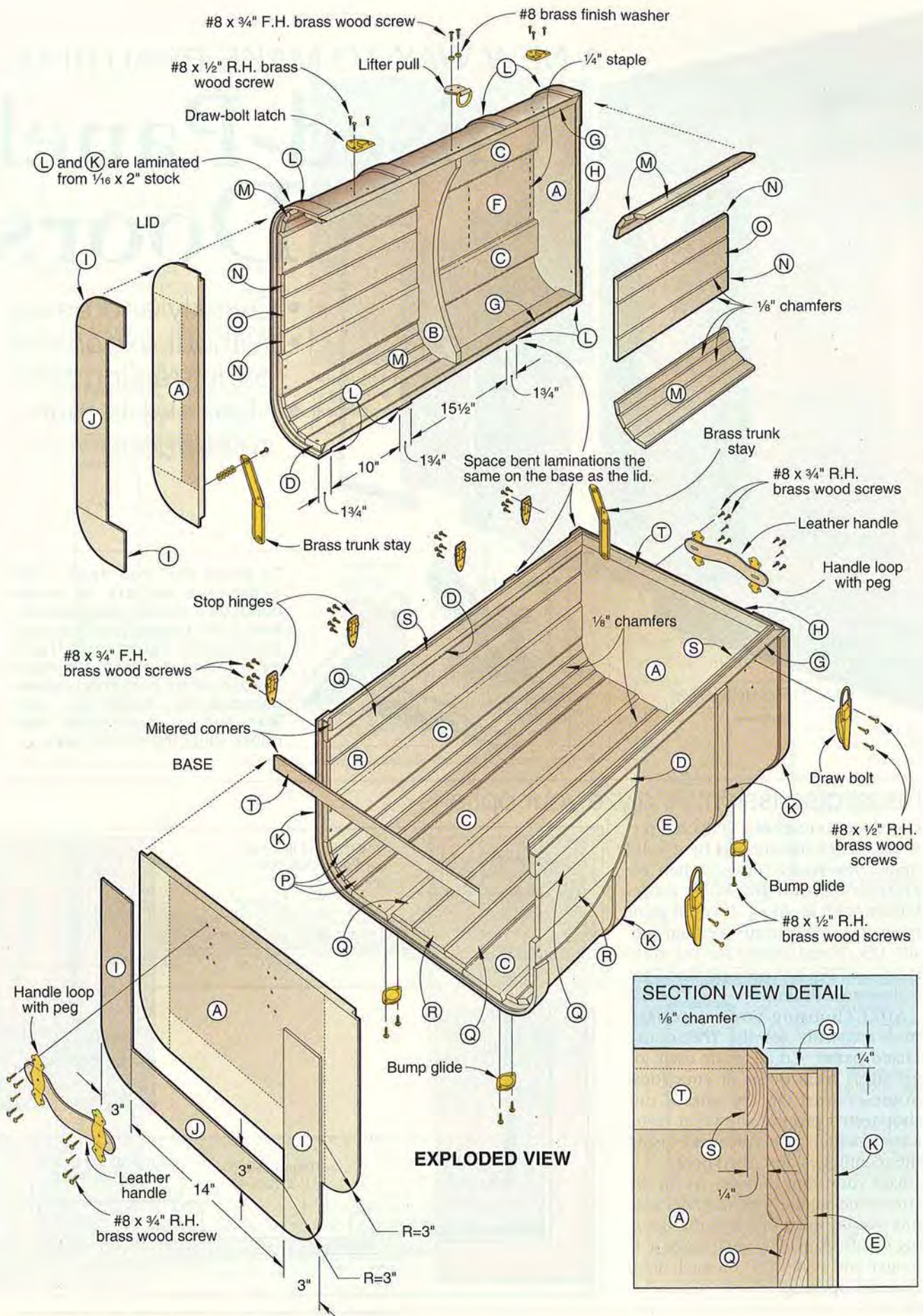
5 Cut the front and back lips (S) and side lips (T) to size. Chamfer the top outside edge of each, and glue the lips in place.

Finishing and final assembly

1 Sand all surfaces. Apply finish to the outside of the trunk only. The fumes from aromatic cedar may prevent a finish applied to the inside of the trunk from drying properly.

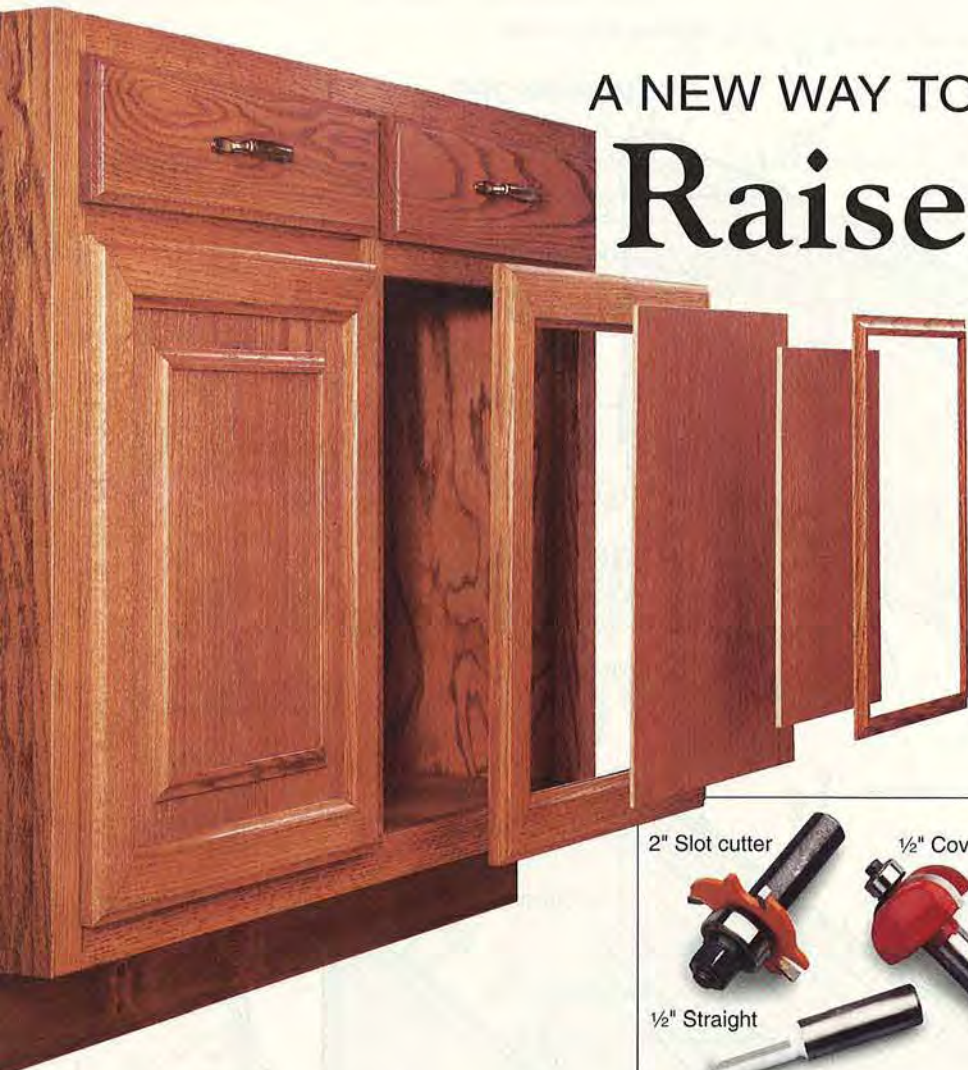
2 Attach the hardware where shown on the Exploded View and Trunk Stay drawings. (See the Buying Guide for our source of the hardware.)

Written by Marlen Kemmet
Project Design: Jan Hale Svec
Illustrations: Kim Downing; Lorna Johnson
Photographs: John Hetherington



A NEW WAY TO MAKE BEAUTIFUL Raised-Panel Doors

- Quickly and easily
- Without expensive panel-raising bits
- More stable than solid doors



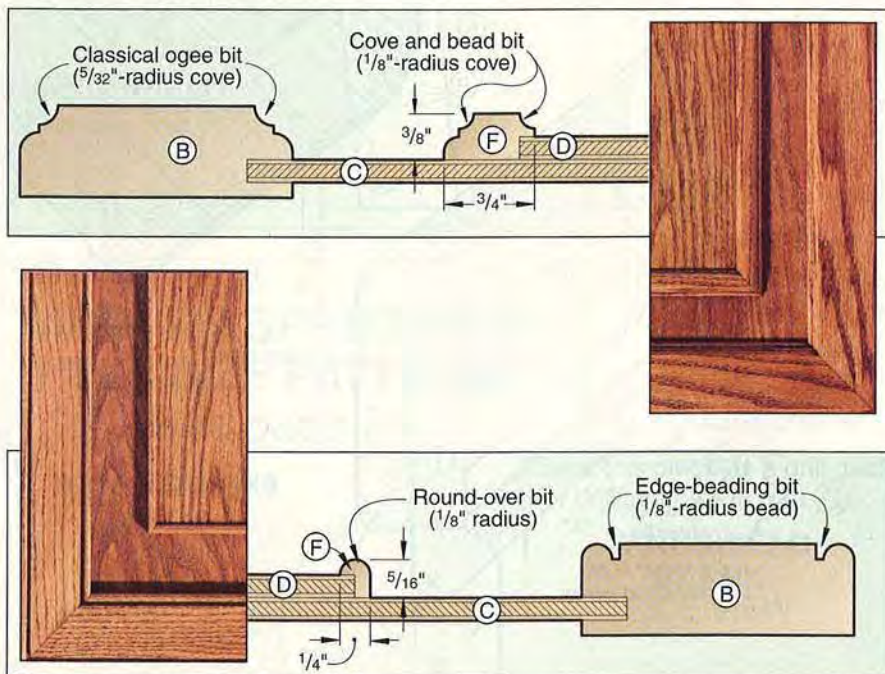
To prove that you don't need expensive cutters to make handsome doors, we made the beautiful raised-panel doors *above left*, using only three common router bits. Because the panels are hardwood-veneer plywood, they weigh less, cost less, and are more stable than doors made from solid stock.

Panel discussion: Analyze your options

Our door consists of a veneered plywood panel surrounded by a solid frame. The panel "raises" when we apply a second plywood panel framed with molding. If you'll paint your doors, substitute medium-density fiberboard (MDF) for the solid stock and birch-veneer plywood for a glass-smooth finish.

After choosing your materials, pick a profile for the frame and raised panel. Create your own, or get ideas from doors at your local home center. Or, try one of our shop-tested profiles shown at *right*, any of which you can make using the techniques described here.

Base your door dimensions on the size of the cabinet opening. Because our overlay door overlaps the opening on all four sides, we'll make it 1" longer and wider (1/2" on each side) than the opening.



Start with the frame

- 1 From $\frac{3}{4}$ " stock, rip to $2\frac{1}{4}$ " enough material for parts A and B. Don't cut them to length yet.
- 2 Set up your router table as shown in the Machining the Frame drawings below, and make Cuts 1 and 2.
- 3 Measure the exact thickness of your main panel (C), and make Cuts 3 and 4 on your tablesaw.
- 4 Cut the rails and stiles to length. Make them about $\frac{1}{2}$ " oversize first, then miter-cut to finished length. For repetitive cuts, use a stop on your fence, as shown at right.

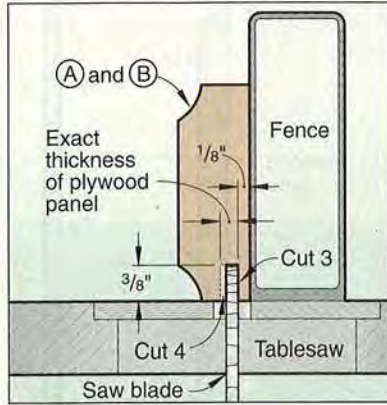
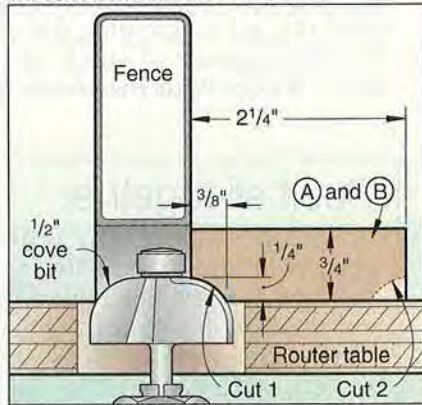


You'll get more accurate results on repetitive miter cuts if you cut a matching miter on your stop.

Now size and raise the panel

- 1 Subtract $3\frac{11}{16}$ " from the frame height and width to find the size of part C, and cut it to size. Now, calculate the dimensions of part D by subtracting $8\frac{1}{4}$ " from both frame dimensions. Cut part D to size.
- 2 On the face of part C, mark an outline $2\frac{1}{4}$ " in from each edge. Glue part D to part C, just hiding the outline. Clamp or weight the assembly, and set it aside.

MACHINING THE FRAME

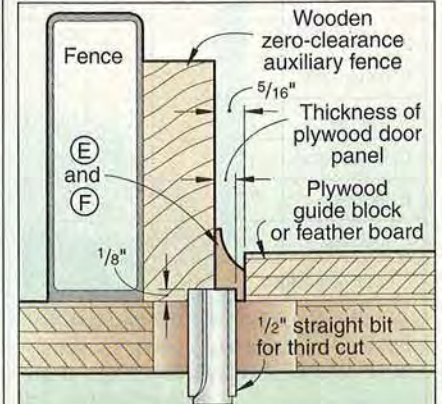
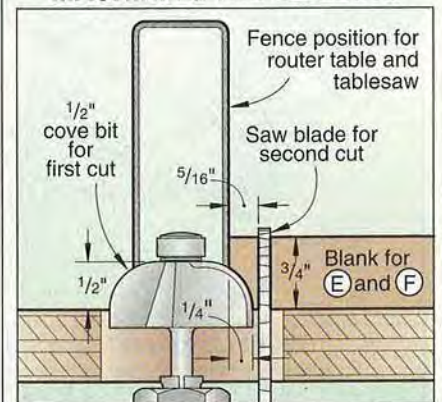


Let's make the molding

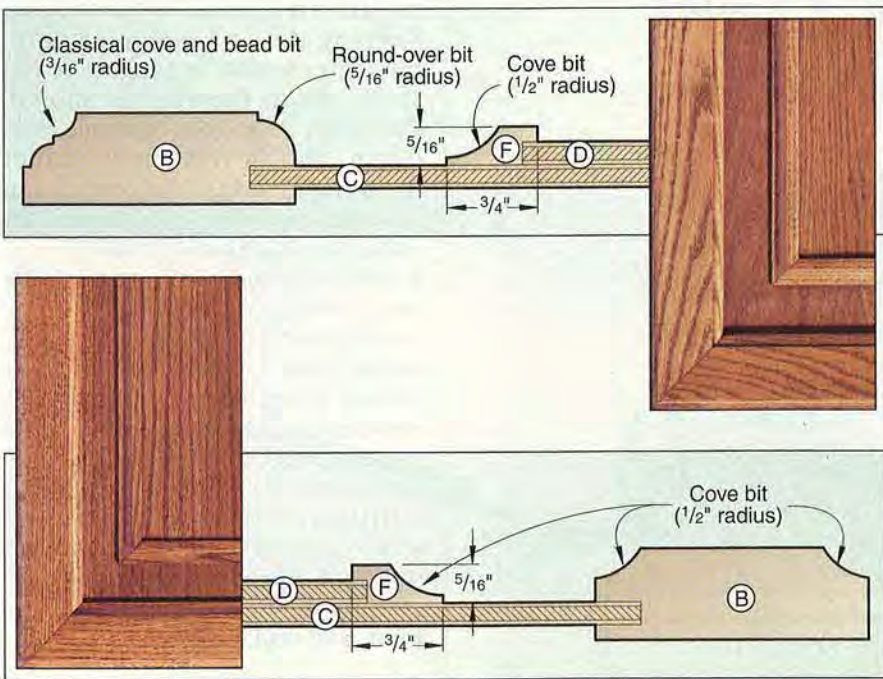
For safety reasons, mill the moldings (parts E and F) from a blank of stock, then rip off the molded edge. When the blank gets too small to handle comfortably (about 2" wide), continue with a fresh blank, or use a feather board to hold the blank against the rip fence.

- 1 Set up your router table as shown in the Machining the Molding drawings below, and mill one edge of your $\frac{3}{4}$ " blank. With your tablesaw,

MACHINING THE MOLDING

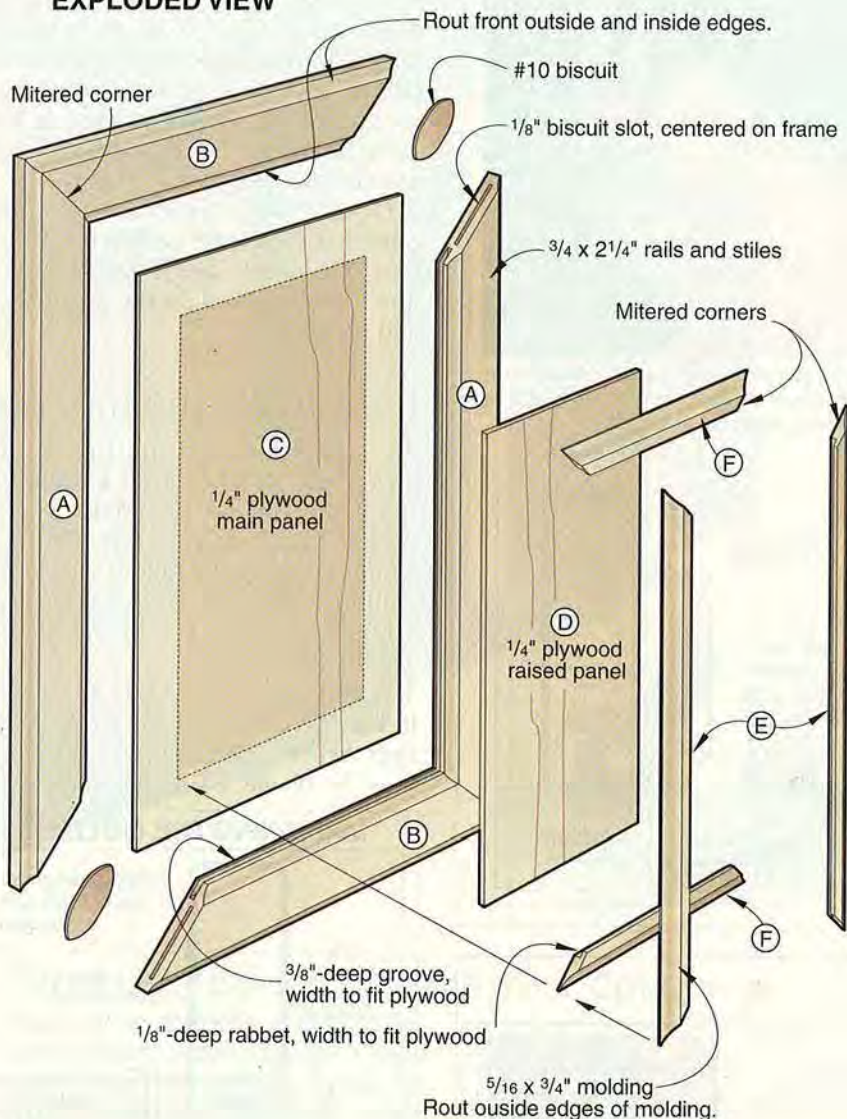


Continued



Raised-Panel Doors

EXPLODED VIEW



rip the molded edge, cove side down, to $\frac{3}{16}$ " (as shown in the photo at right). Use a zero-clearance insert and splitter on your table saw to keep the thinly cut molding in close contact with the outfeed end of the fence. Repeat this step until you have enough molding for your doors. (See "How to Make a Zero-Clearance Insert" in our October 1998 issue. For the splitter, continue the insert's kerf through the outfeed end of the insert. Sand a piece of hardboard to the thickness of the kerf, then sand a taper on the leading edge. Glue this piece into the end of the kerf.)

2 Set up your router table as shown in the bottom Machining the Molding drawings (on the *previous page*). Make the zero-clearance fence by attaching a piece of stock to your table's fence. With the router run-

Put it all together

1 Set up your router table as shown in the Biscuit-Slot Setup drawing at right. Sometimes you'll cut the biscuit slot with the stock faceup and sometimes facedown, so it's critical that the slot be dead-center on your stock. Make a few test cuts on scrap before you cut your door parts.

Feed part A into the slot cutter as shown *opposite far right*. Keeping the end in contact with the cutter's pilot bearing, slide the stock out to the stop as shown. Turn part A end-for-end and face-down, and in the same manner (short side against the fence), cut a slot in the other end. Repeat for the remaining parts A and B.

2 Glue #10 biscuits into the slots you just created. Complete the assembly by capturing the plywood panel in the four frame pieces. Using bar clamps and corner clamping blocks (see the Shop Tip on page 42), carefully clamp the assembly. Tighten each clamp a little at a time, keeping each joint perfectly aligned. If a joint slips out of alignment, loosen the clamps on that joint, adjust the joint, and reclamp. ♣

Bill of Materials

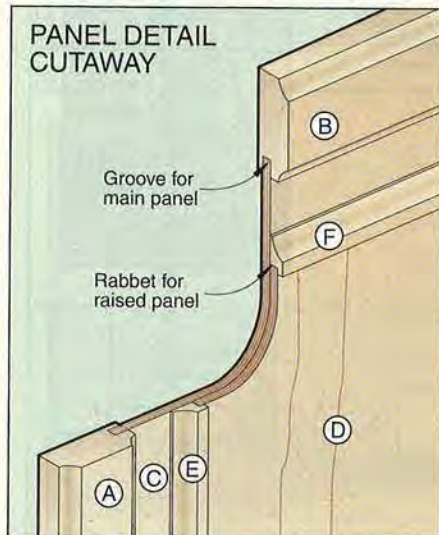
| Part | Finished Size | | | Matl. | Qty. |
|----------------|------------------|------------------|---|-------|------|
| | T | W | L | | |
| A frame rails | $\frac{3}{4}$ " | $2\frac{1}{4}$ " | * | SS | 2 |
| B frame stiles | $\frac{3}{4}$ " | $2\frac{1}{4}$ " | * | SS | 2 |
| C main panel | $\frac{1}{4}$ " | * | * | HP | 1 |
| D raised panel | $\frac{1}{4}$ " | * | * | HP | 1 |
| E moldings | $\frac{5}{16}$ " | $\frac{3}{4}$ " | * | SS | 2 |
| F moldings | $\frac{5}{16}$ " | $\frac{3}{4}$ " | * | SS | 2 |

* To be determined

Materials Key: SS—Solid stock, HP—Hardwood plywood. For painted panels, use medium-density fiberboard (MDF) for all solid-stock parts.

Supplies: 4—#10 biscuits, stain, clear finish.

PANEL DETAIL CUTAWAY





A tall, narrow pushstick keeps your fingers far away from the blade when ripping thin molding from the blank.

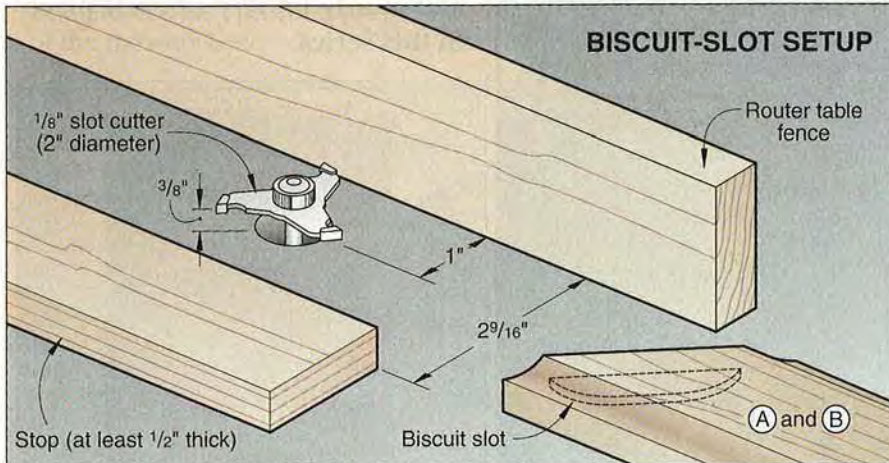
ning, slowly move the fence into place, just cutting into the wooden fence. Rout the rabbet in parts E and F. To keep the molding firmly against the fence, clamp a feather board or guide block as shown in the photo at *right*.

3 Subtract $\frac{1}{4}$ " from the length of part D. Miter-cut parts E using this length for the "short" dimension. Again, if you're making several panels of the same size, use a stop block to make consistent cuts. Repeat for parts F, subtracting $\frac{1}{4}$ " from the width of part D.

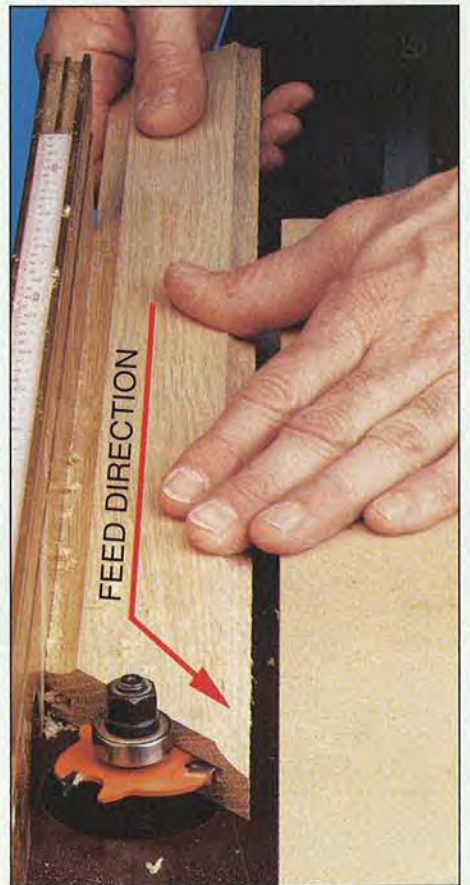
4 Glue and clamp parts E and F to part C, covering the edges of part D. We used two spring clamps on each piece of molding, keeping the mitered joints tight. Remember to put a dot of glue in each of the miter joints.



The guide board extends past the router bit to prevent chatter and keep the workpiece in contact with the fence.



You'll find the clamping process less clumsy if you use a pair of bar or pipe clamps with extended-reach jaws.

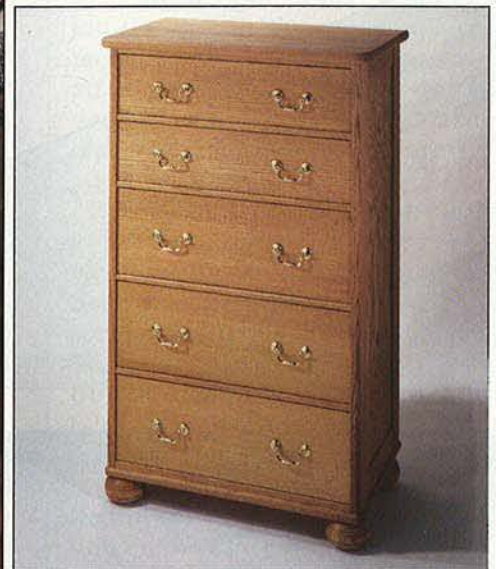


Keep your workpiece parallel to the fence and tight against the pilot bearing as you guide it out to the stop.

COUNTRY- FRESH

Is it time for a new bedroom set at your house? If so, here's the start of a five-piece ensemble we plan to showcase over the next year. In upcoming issues, we'll feature a dresser with mirror, a queen-size bed, and matching nightstands. Depending on the finish and hardware you select, these designs can work in both country and traditional decors. See the photo of the chest *below* for the latter version.

You'll appreciate the straightforward construction procedures and sturdy joinery of each piece in this series.



 Print this article

Five-Drawer Chest

Let's start with the plywood carcass

1 From $\frac{3}{4}$ " oak plywood (walnut or cherry would be equally attractive), cut the sides (A) and top, bottom, and shelves (B) to the sizes listed in the Bill of Materials and laid out on the Cutting Diagram.

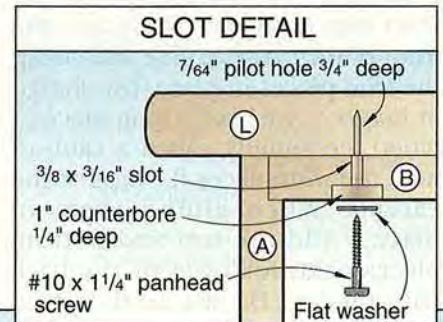
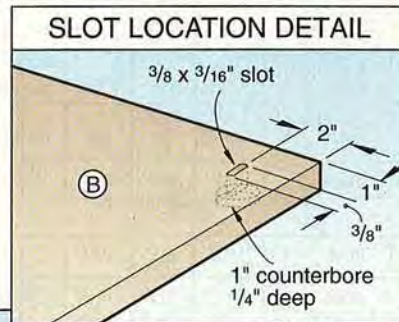
2 Cut all the rabbets and dados in the sides (A) where dimensioned on the Side drawing on the Parts View in the *WOOD PATTERNS*® insert in the center of the magazine. (We cut the dados in the plywood sides on our tablesaw using the fence to ensure that the dados in the right-hand side piece aligned perfectly with those in the left-hand side piece. This ensures a proper fit of the drawers later.)

3 Using the Carcase Top Shelf on the Parts View drawing for reference, drill the holes and form the slots in the uppermost B. The slots allow the screws that secure the top (L) to the top shelf (B) to move as the solid-stock top expands and contracts. See the two details *below* for reference. Also drill the holes for the stops (T) now.

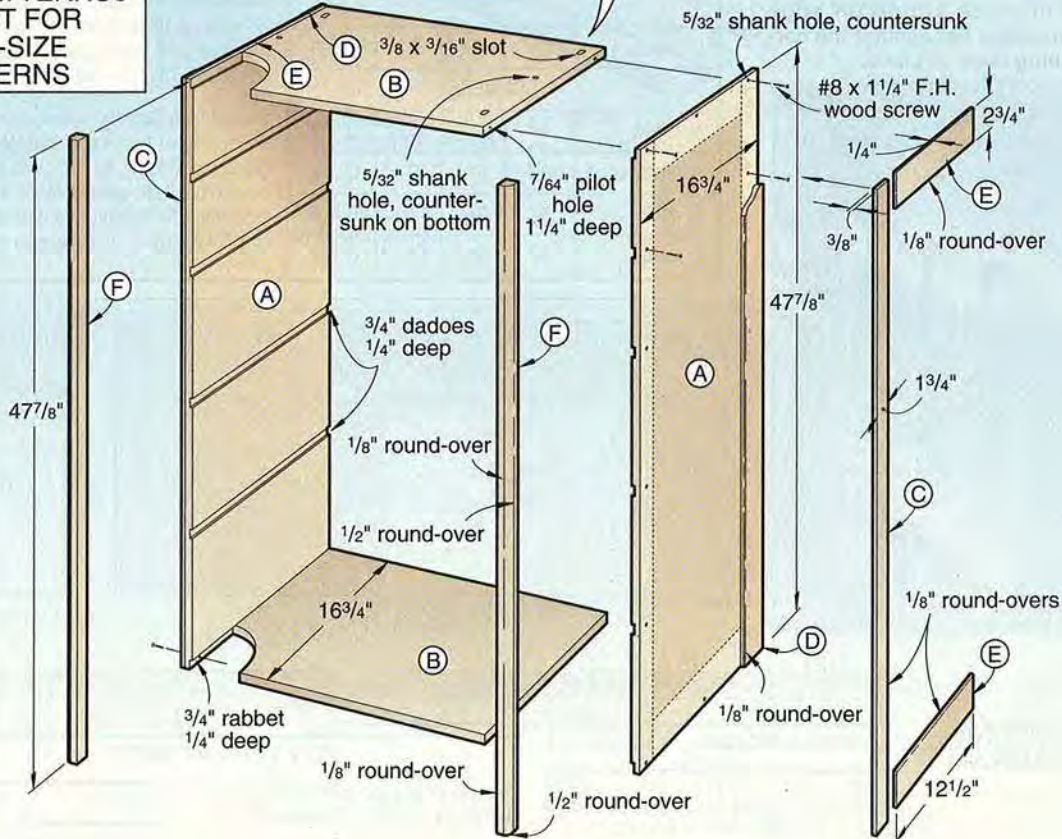
Countersink each hole slightly for ease in locating it later.

4 Dry-clamp the carcass (A, B) together, checking for square. Drill and countersink the mounting holes centered over the rabbets and dados where shown on the Side drawing on the pattern insert. The trim will cover the screw holes later.

Continued



SEE THE *WOOD PATTERNS*® INSERT FOR FULL-SIZE PATTERNS



Five-Drawer Chest

5 Glue the carcass together, checking for square and that the edges are all flush. Drive the screws to further reinforce the assembly. Make sure the sides remain flat (front to back) and that they don't bow out in the middle. Wipe off any excess glue with a damp cloth.

Add the trim, and cover the screw holes

1 Cut the front and back trim pieces (C, D) to size from $\frac{3}{8}$ " stock. Cut the top and bottom trim pieces (E) to size from $\frac{1}{4}$ " stock.

2 Rout $\frac{1}{8}$ " round-overs along the edges of the trim pieces (C, D, E).

3 Keeping the front edges of the front trim pieces (C) flush with the front of the carcass, glue and clamp the trim pieces in place. (As shown in *Photo A*, we used a long piece of wood, commonly called a caul, to hold the trim pieces flat against the carcass when gluing them in place.) Add the top and bottom pieces next, followed by the back trim pieces (D) last as shown in *Photo A* below.

A flat piece of stock sitting on edge holds the trim pieces flat against the carcass when gluing them in place.



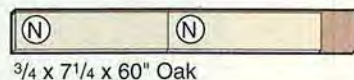
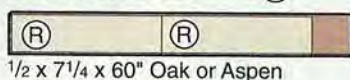
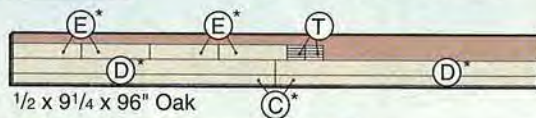
4 To cover the plywood edges on the front of the carcass, cut the front trim pieces (F) to size. Before cutting the pieces, measure the width of the carcass sides (A) plus front trim (ours measured $1\frac{1}{8}$ "), and

cut the trim pieces (F) to match. See the Top Section View on the Parts View drawing for reference. With the edges flush, glue and clamp the pieces in place.

Continued

| Bill of Materials | | | | | | | | | | | |
|--------------------|-----------------------|-------------------|--------------------|-------|------|---|-----------------|--------------------|-------------------|-------|------|
| Part | Finished Size | | | Mati. | Qty. | Part | Finished Size | | | Mati. | Qty. |
| | T | W | L | | | | T | W | L | | |
| CARCASE | | | | | | DRAWERS | | | | | |
| A sides | $\frac{3}{4}$ " | $16\frac{3}{4}$ " | $47\frac{7}{8}$ " | OP | 2 | Q backs | $\frac{1}{2}$ " | $9\frac{3}{4}$ " | $27\frac{3}{8}$ " | C | 3 |
| B shelves | $\frac{3}{4}$ " | $16\frac{3}{4}$ " | $28\frac{1}{2}$ " | OP | 6 | R backs | $\frac{1}{2}$ " | $6\frac{3}{4}$ " | $27\frac{3}{8}$ " | C | 2 |
| C front trim | $\frac{3}{8}$ " | $1\frac{3}{4}$ " | $47\frac{7}{8}$ " | O | 2 | S bottoms | $\frac{1}{4}$ " | $16\frac{1}{16}$ " | $27\frac{3}{8}$ " | OP | 5 |
| D back trim | $\frac{3}{8}$ " | $2\frac{3}{4}$ " | $47\frac{7}{8}$ " | O | 2 | T stops | $\frac{3}{8}$ " | $\frac{3}{4}$ " | 3" | O | 10 |
| E top & btm. trim | $\frac{1}{4}$ " | $2\frac{3}{4}$ " | $12\frac{1}{2}$ " | O | 4 | *Cut parts marked with an * oversize. Trim to finished size according to the how-to instructions. | | | | | |
| F vert. front trim | 1" | $1\frac{1}{8}$ " | $47\frac{7}{8}$ " | O | 2 | Materials Key: OP-oak plywood; O-oak; LO-laminated oak; EO-edge-joined oak; C-choice of oak, aspen, soft maple, or poplar; P-plywood. | | | | | |
| G horz. front trim | $\frac{7}{8}$ " | $\frac{3}{4}$ " | 28" | O | 6 | Supplies: #8x1", #8x1 $\frac{1}{4}$ ", #8x1 $\frac{1}{2}$ " flathead wood screws; #10x1 $\frac{1}{4}$ " panhead screws with flat washers; 4- $\frac{3}{16}$ " T-nuts; $\frac{3}{16}$ -18x3" hanger bolts (not necessary if you buy the pretumed feet); stain, clear finish. | | | | | |
| H back | $\frac{1}{4}$ " | $29\frac{1}{2}$ " | $47\frac{7}{8}$ " | P | 1 | Buying Guide | | | | | |
| BASE | | | | | | Hardware. For the country version we used 10-2" oak knobs, #61710. For the traditional version we used 10-3 $\frac{1}{2}$ " brass bail pulls, #35402. Self-adhesive and self-lubricating nylon tape, 10 mil. thick by $\frac{1}{2}$ " wide by 10' long (4 rolls needed), #70615. The Woodworkers' Store, 4365 Willow Drive, Medina, MN 55340. To order, call 800/279-4441. | | | | | |
| I front | $1\frac{1}{16}$ " | $3\frac{1}{2}$ " | $30\frac{3}{4}$ " | O | 1 | Turned feet. Country version, four 3 $\frac{1}{2}$ " diameter by 5"-long oak bun feet, catalog #A0557HB5. Traditional version, four 5" diameter by 3"-long oak beaded bun feet, catalog #A0551HB. Adams Wood Products, 974 Forest Drive, Morristown, TN 37814. Or call 423/587-2942 to place an order. | | | | | |
| J sides | $1\frac{1}{16}$ " | $3\frac{1}{2}$ " | $14\frac{7}{8}$ " | O | 2 | | | | | | |
| K* feet | $3\frac{1}{2}$ " dia. | | 5" | LO | 4 | | | | | | |
| TOP | | | | | | | | | | | |
| L* top | $1\frac{1}{16}$ " | 19" | $32\frac{1}{4}$ " | EO | 1 | | | | | | |
| DRAWERS | | | | | | | | | | | |
| M fronts | $\frac{3}{4}$ " | $9\frac{3}{4}$ " | $27\frac{7}{8}$ " | O | 3 | | | | | | |
| N fronts | $\frac{3}{4}$ " | $6\frac{3}{4}$ " | $27\frac{7}{8}$ " | O | 2 | | | | | | |
| O sides | $\frac{1}{2}$ " | $9\frac{3}{4}$ " | $17\frac{3}{16}$ " | C | 6 | | | | | | |
| P sides | $\frac{1}{2}$ " | $6\frac{3}{4}$ " | $17\frac{3}{16}$ " | C | 4 | | | | | | |

CUTTING DIAGRAM



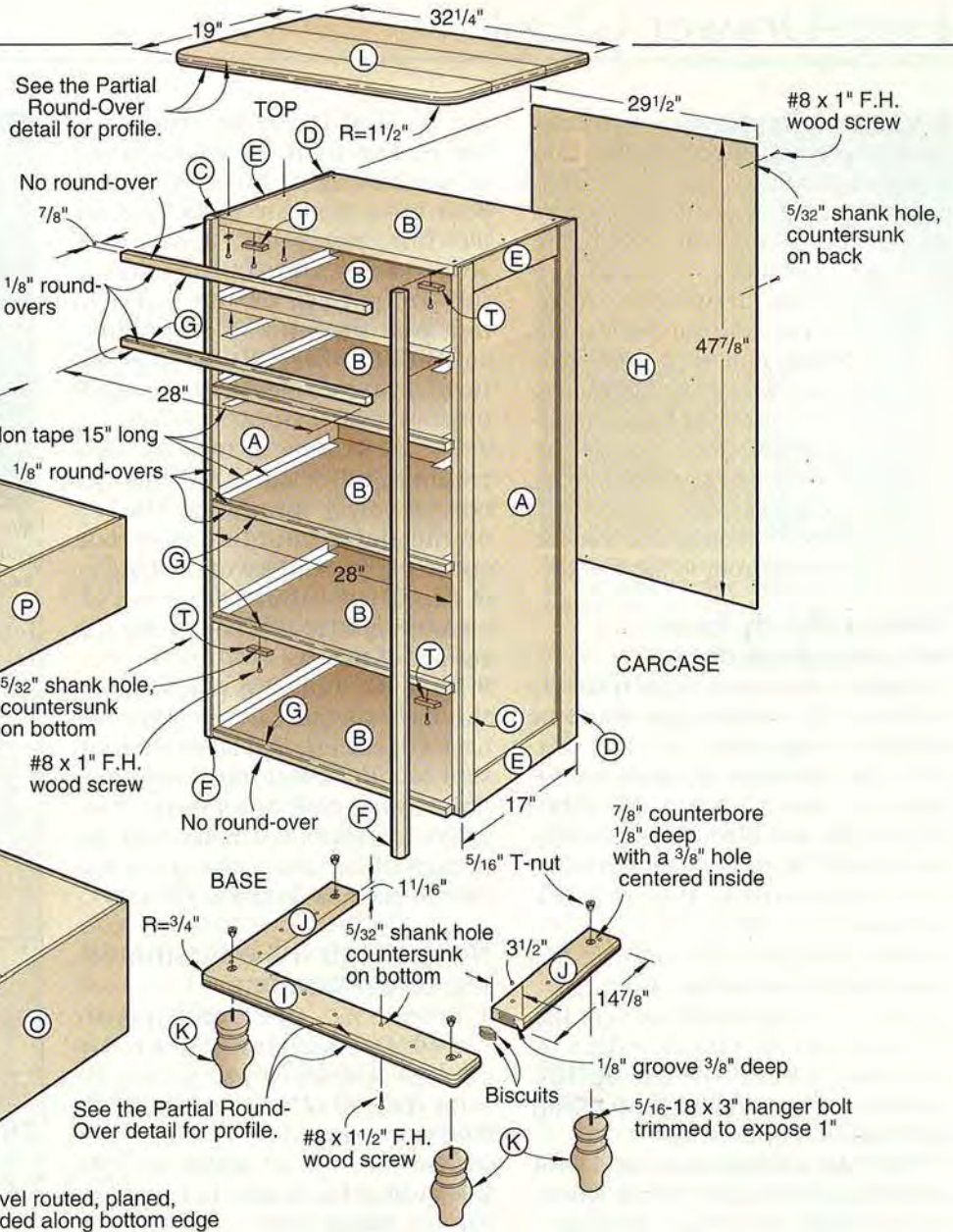
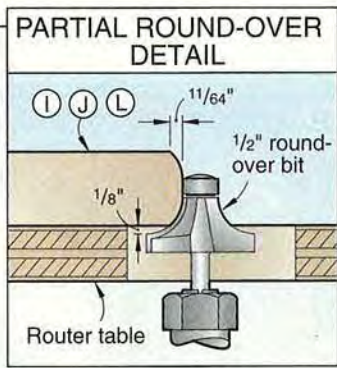
*Plane or resaw to thicknesses listed in the Bill of Materials.



$\frac{3}{4}$ x 48 x 96" Oak plywood



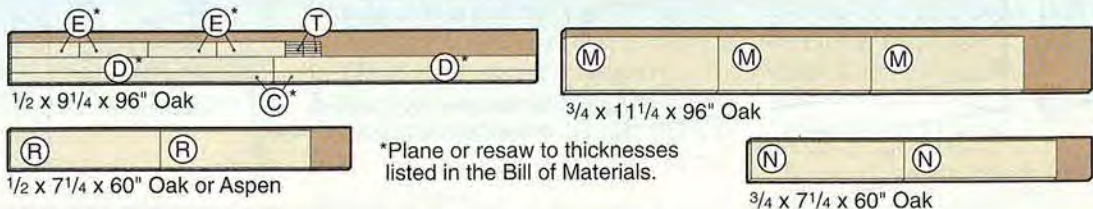
$\frac{1}{4}$ x 48 x 48" Plywood



Cutting diagram duplicated from page 68. See issue 111, page 8, for the cutting diagram. Click here to view.



CUTTING DIAGRAM



Five-Drawer Chest

5 Measure the distance between the trim pieces (F), and cut the trim pieces (G) to fit.

6 Rout the $\frac{1}{8}$ " and $\frac{1}{2}$ " round-overs on parts F where shown on the Carcase drawing. Using the Exploded View drawing for reference, rout the $\frac{1}{8}$ " round-overs on parts G where indicated. Note that there's no round-over along the top edge of the top G and no round-over along the bottom edge of the bottom G. Glue and clamp the front trim pieces (G) in place.

7 Measure the opening, and cut the back (H) to size from $\frac{1}{4}$ " plywood.

Make a sturdy base for a stout carcass

1 Cut the solid-stock base front (I) and sides (J) to the sizes listed in the Bill of Materials.

2 To join the base sides (J) to the front (I), use a biscuit or spline joint. Glue and clamp the sides to the front, keeping the outside edges and surfaces flush. Check for square.

3 Mark and cut a $\frac{3}{4}$ " radius on the front corners of the base front (I).

4 Rout a partial round-over on the top and bottom outside edges of the base where shown on the Exploded View and accompanying Partial Round-Over detail.

5 Mark the centerpoints, and drill the holes in the base pieces where shown on the Parts View drawing.

6 For the feet (K), you can either turn your own using the pattern on

the pattern insert or order pre-turned feet from the source listed in the Buying Guide. If you turn your own, laminate stock to form feet that measure $4\frac{1}{4}$ " square ($3\frac{1}{2}$ " after turning). Then, refer to the full-size pattern on the insert to turn your own. Drill a center hole, and add the hanger bolt (the pre-turned feet come with a hanger bolt installed).

7 Use a hacksaw to trim the protruding end of each foot hanger bolt so only 1" protrudes. The top of the bolt shouldn't protrude above the top surface of the base.

8 Tap a $\frac{5}{16}$ " T-nut into each $\frac{7}{8}$ " counterbore (four total) in the top surface of the base.

9 With the T-nuts in place, clamp the base to the carcass with the back edges flush and centered from side to side. Using the previously drilled mounting holes in the base as guides, drill pilot holes into the bottom of the chest and screw the base in place as shown in *Photo B*.

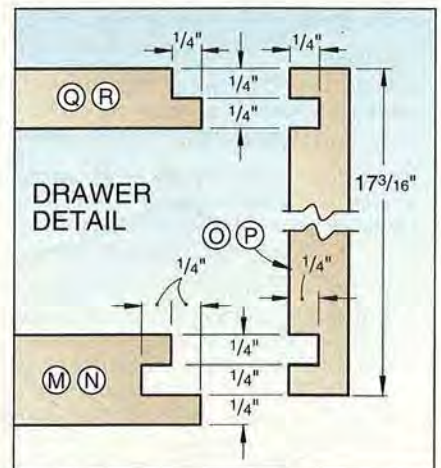
Now, attach the edge-joined top to the carcass

1 From $1\frac{1}{16}$ " stock (commonly called five-quarter stock), rip enough narrower pieces to form the top (L). Your initial lamination should be 1" longer than needed and $\frac{1}{2}$ " wider.

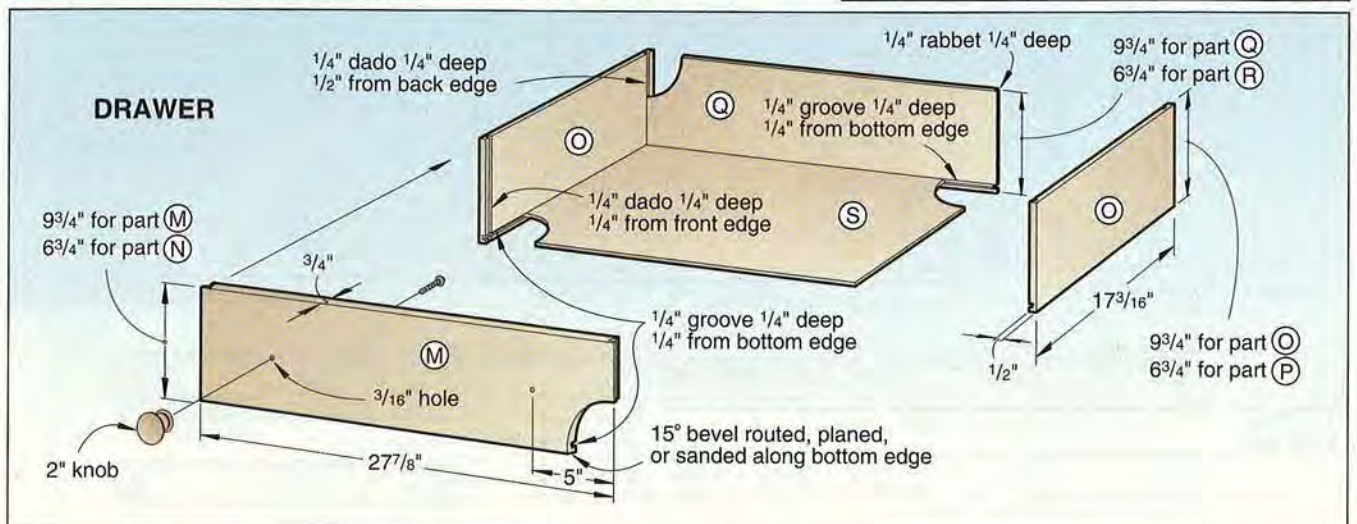
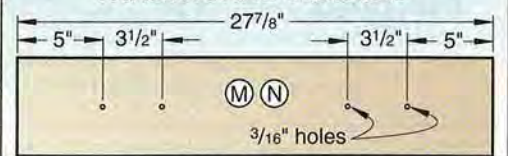
2 Edge-glue the boards to form the top blank. Later, trim the top to the finished size listed in the Bill of Materials.



With the back edges flush and an equal overhang along each side, screw the base to the bottom of the carcass.

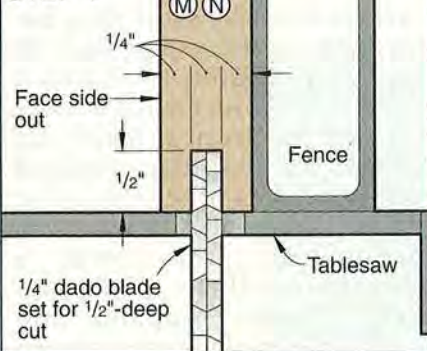


PULL LOCATION FOR TRADITIONAL VERSION

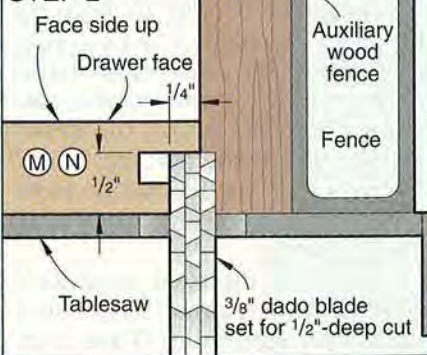


CUTTING THE DRAWER JOINTS

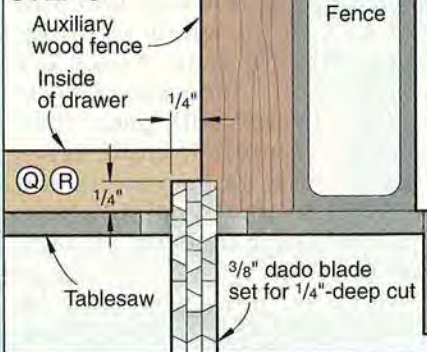
STEP 1



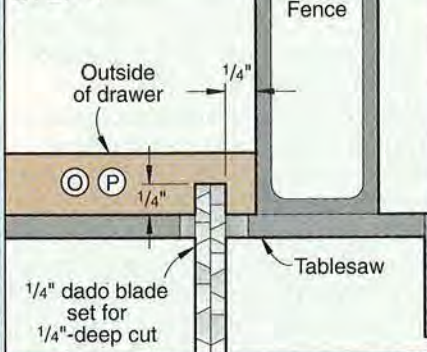
STEP 2



STEP 3



STEP 4



3 Mark and cut a $1\frac{1}{2}$ " radius on the front corners of the top. Cut and sand the corners to shape. Rout the partial round-overs along the front and sides of the top. See the Partial Round-Over detail for reference.

Build the five drawers to complete the construction

Note: Measure the drawer openings before constructing the drawers. The drawers need to be $\frac{1}{8}$ " less in height and width than the opening. Also, the fronts of the drawers should sit $\frac{1}{8}$ " back from the fronts of the front trim pieces (G).

1 Cut the drawer fronts (M, N) to size from $\frac{3}{4}$ "-thick straight-grained oak. Then, from $\frac{1}{2}$ " stock, rip and crosscut the sides (O, P), and the backs (Q, R) to the sizes listed in the Bill of Materials.

2 Follow Steps 1 and 2 of the four-step drawing at left to machine the ends of the drawer fronts (M, N).

3 Follow Step 3 on the drawing to cut a $\frac{1}{4}$ " rabbet $\frac{1}{4}$ " deep along the ends of the drawer backs (Q, R).

4 Refer to Step 4 on the drawing to machine the mating dadoes on the drawer sides (O, P).

5 Cut the remaining grooves in the drawer fronts and sides where dimensioned on the Drawer drawing to house the plywood bottoms (S). Make sure the groove width is the same as the thickness of the plywood you'll be using for the drawer bottoms.

6 Cut the drawer bottoms (S) to size from $\frac{1}{4}$ " plywood.

7 Dry-clamp (using no glue) each drawer together to check the fit, and check for square. To assemble each drawer, use white glue; it dries slower, giving you more working time. Glue one front piece to one side piece. Add a drawer back, slide the bottom in place, and then glue the other side in place. Clamp the assembly together, taking opposing diagonal measurements from the corners as shown in *Photo C* to check for square.

8 Mark the centerpoints, and drill the mounting holes in the drawer fronts (M, N) to accept your particular hardware.



Measure diagonally from outside corner to outside corner. When the measurements are identical, the drawer is square.

9 To create the look of an equal reveal on the top and bottom of each drawer when slid in place in the cabinet, rout the bottom of each drawer front with a 15° chamfer bit (we used a CMT 857.503.11). You also could sand or plane the 15° chamfer along the bottom edge. The key is to keep the chamfered edge straight.

10 Cut the drawer stops (I) to size, and drill a mounting hole in each. Set them aside for now.

Finishing and final assembly

1 Finish-sand the carcass, drawers, and top. Finish the cabinet as desired. See the country finishing article on *page 72* for the finishing process we used. Or stain the cabinet and drawer fronts, and protect them with a clear finish to achieve the look of the chest on the inset photo on *page 66*.

2 Attach the self-adhesive, self-lubricating nylon tape (see the Buying Guide with the Bill of Materials for our source) where shown on the Exploded View drawing.

3 Slide the drawers into their respective openings, and screw the stops in place.

4 Mark the locations, drill the countersunk pilot holes, and screw the back (H) in place. ♣

Written by Marlen Kemmet
Project Design: Jeff Hayes
Illustrations: Roxanne LeMoine; Lorna Johnson
Photographs: Hetherington Photography

Craft a Country

When the time came to apply an authentic-looking old-time country finish to our newly designed oak bedroom furniture set, we turned to our own Robby Pederson to provide the special touch. In addition to Robby's expertise in answering reader correspondence here at *WOOD*® magazine, he works as the hands-on demonstrator in the cabinet shop at Living History Farms in Des Moines, Iowa. That explains his 1800s attire shown in the photos. A student of things past, Robby proved to be the right person to show us how to create a time-worn country look using a modern-day approach.

Start the process by sanding and staining the furniture pieces as you would any fine-furniture project. We sanded through 220-grit and then applied Zar 137 White Oak stain. For better contrast between the stained areas and those you'll paint later, we applied the stain lightly.

Color the pieces by brushing on Zar Antiquing Wedgewood Blue latex paint. Almost immediately, use a clean cloth to wipe off enough of the paint so the stained grain shows through. Paint just one section at a time. If you wait too long to start wiping, the paint will dry and cannot be removed. Because you'll be finishing a large piece of furniture in small segments, watch closely that you remove the same amount of paint from each area.

Antiques usually show their fair share of wear. But before you rub through any paint, think about where the object would have received the greatest wear, and distress only those areas. Sand off paint at spots likely to have become worn, and then blend the surrounding areas with a ScotchBrite pad. To do this, we used 150-grit sandpaper and ScotchBrite medium pads (green in color). For a natural "worn" look, remember to rub the edges unevenly from spot to spot as shown in *Photo A*. For example, on the dresser, we scuffed the corners of the cabinet, the rail edges, and spots where the drawers rub against the carcass. Don't overdo it. If a surface would have received little wear over the years, leave it alone.

To simulate the aged, used look referred to as "patina," wipe on a coat of Zar Antiquing Glaze over the blue paint, and immediately wipe away most of it with a lint-free cloth, as shown in *Photo B*. Just as you do when staining, wipe with the grain. You'll get better results once the cloth is partially loaded with glaze than when it's completely clean. Leave deposits of glaze in crevices and other areas that wouldn't have received wear or been cleaned over the years.

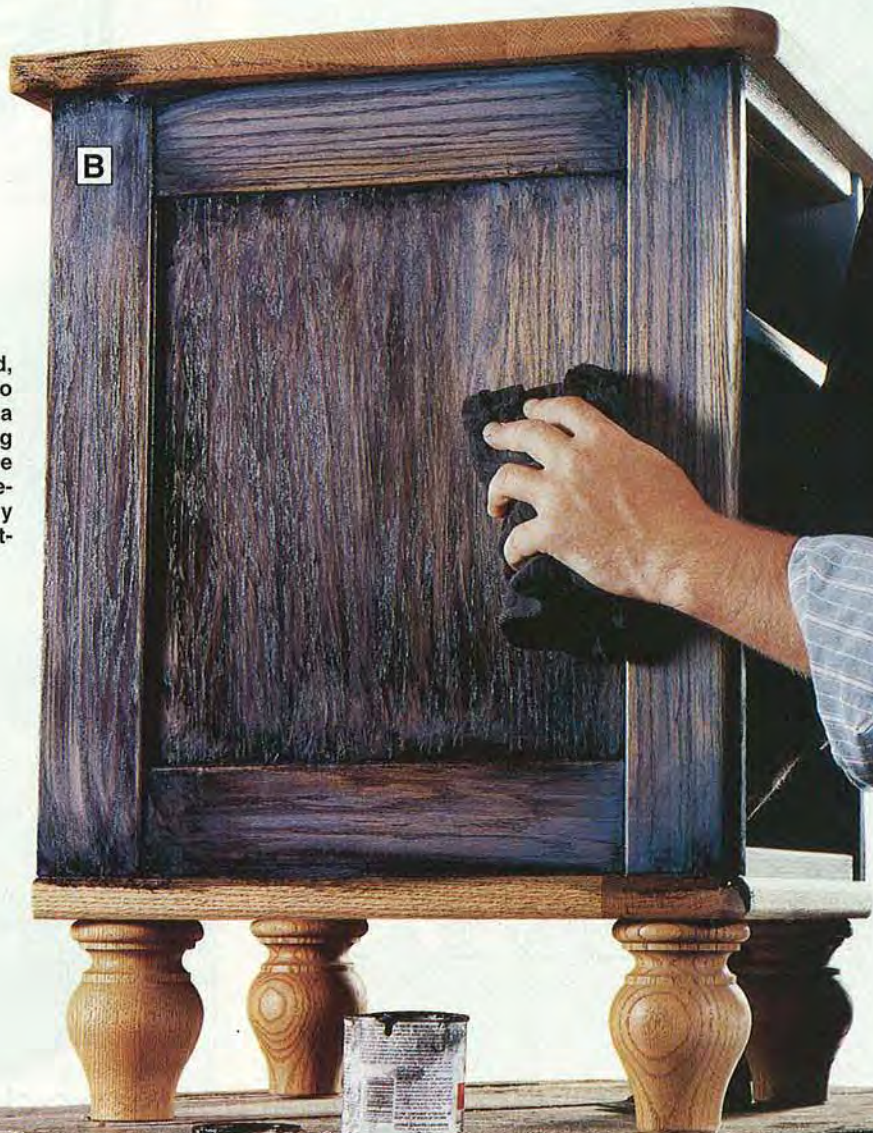
Add a bit more character by spattering the surface. To achieve this accent (sometimes called "fly-specking"), pour a small amount of the Zar Black Antiquing Glaze in a shallow container. Then, dab an old toothbrush, or a paintbrush with its bristles trimmed to ½" long, into the black glaze. Practice your spattering technique on a piece of paper before trying it on your project. Hold the brush about 6" from the paper, and run your finger through the bristles to determine the amount of spattering produced. Once you have the right touch, add a uniform spatter-

For a natural "worn" look on our country pieces, Robby rubbed the edges unevenly from spot to spot with 150-grit sandpaper and ScotchBrite medium pads.



Finish We'll show you how!

To simulate the aged, used look referred to as "patina", wipe on a coat of Zar Antiquing Glaze Coat over the blue paint, and immediately wipe away most of it with a lint-free cloth.



ing of fine speckles to the piece as shown in *Photo C*. Again, don't overdo it. A little spattering goes a long way.

Finally, apply a clear, protective coat to all the pieces (painted and unpainted). Using a quality finish brush, we applied Zar satin polyurethane, rubbing between coats with ScotchBrite super-fine pads (grey in color). We repeated

To add a uniform spattering of fine speckles, hold the brush about 6" from the project, and run your finger through the bristles.

the process until we had three coats of the clear finish applied.

Buying Guide


Zar products. 137 White Oak Stain, Black Glaze Coat Antiquing, 216 Wedgewood Blue Antiquing Base Coat, and Satin Polyurethane. For the entire bedroom set, we used one quart of stain, three pints of Wedgewood Blue latex paint, and three half-pints of the Black Glaze. For more information on UGL ZAR products, call 1-800-272-3235 or 1-800-845-5227. ♣



Turnin' and Tossin'

Turn a great set of bowls for your tossed greens

Simple things well designed and executed bring a special joy to life. This salad-bowl set from Provo, Utah, woodturner Rex Burningham is a perfect example. Here's how to turn Rex's bowls, along with some of his tips for turning success.

 [Print this article](#)

Project setup

Stock: 4×11×12" (approximately) bowl blank for the large bowl, 2½×7×7" blank for each individual serving bowl.

Lathe equipment: Four-jaw chuck, screw center.

Turning tools: ½" deep-fluted bowl gouge, ½" skew, 1⅜" heavy, round-nose scraper.

Lathe speeds: For the 12" bowl—roughing, 400 rpm; finish-turning and sanding, 700 rpm.

Start with a beautiful blank

A bowl 11-12" in diameter turned from a blank 4-5" thick will hold plenty of salad and fit well on most tables. To make a complete set, turn matching individual serving bowls. You can turn those individual salad bowls, which can be 6-7" in diameter, from blanks 2-2½" thick.

And which wood should you turn your bowls from? "Choose one that will be relatively stable in the drying process," Rex says.

BOWL BLANKS

(End grain shown)



Evenly balanced blank



Quartersawn blank



Unbalanced blank

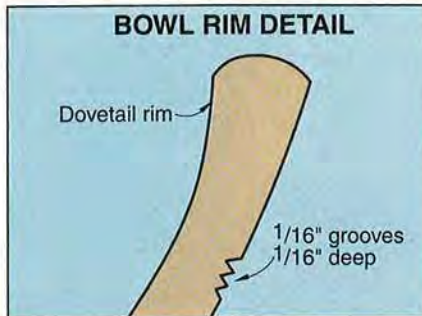
"Many American hardwoods such as ash, cherry, walnut, and hard or soft maple fill the bill and make excellent salad bowls," he adds. For the bowls shown at *left*, Rex selected his favorite salad-bowl wood, Oregon myrtle.

Avoid bowl stock with knots, checks, bark inclusions, and other defects. "If you're turning green wood (20 percent or higher moisture content), select an evenly balanced blank or a quartersawn one," Rex advises. Bowls from such blanks will maintain symmetry as the wood dries. Identify balanced or quartersawn blanks by the end grain; the illustrations *above* show what to look for.

How a dovetail at the rim makes a salad bowl better

Thin-wall turnings may be fine for exhibition pieces, but Rex takes a different approach with functional bowls. "I give my bowls a thicker rim with a dovetail shape," he says (see the illustration *above right*). "Dovetails are well known in woodworking—they look good and provide a lot of holding power." They offer similar advantages in bowls:

- Thickening the rim gives the bowl a more substantial look.
- You can get a better grip on the bowl when you pick it up.



- The salad stays in the bowl better with the wall angled inward.
- Cracks are less likely. "Bottom-heavy, rim-thin salad bowls usually crack at the rim after time due to uneven wood movement from moisture loss," Rex explains. The dovetail adds wood to the rim, bringing it more into balance with the bowl bottom.

The turning begins on the outside of the bowl

Draw diagonal lines on the top of the blank to locate the center. Set

your compass to half the diameter of the bowl, and draw a circle around the centerpoint. Drill a pilot hole for your screw center, then bandsaw the blank.

Mount the blank and center on the lathe. Bring up the tailstock to help stabilize the blank while you turn it true and shape the outside of the bowl. "Always give the blank a few turns by hand after you mount it to make sure it clears the tool rest," Rex suggests.

Start with the lathe at a slow speed—about 400 rpm is good for the 12" bowl. "As a general rule, the larger the chucked wood, the slower the lathe speed," Rex says. With a 1/2" bowl gouge, cut away the bottom corner and out-of-round parts on the side of the blank to bring it into balance. Once the piece is in balance, increase the lathe speed for a better cut. Slide back the tailstock to true the face.



A screw center holds the bandsawn blank for turning. We'll bandsaw a blank for a small bowl from the smaller block.



Lay your skew chisel flat on the tool rest to form a dovetail mortise for the bowl chuck. For turning on a wasteblock, form a flat gluing face here.

Turn the bowl's exterior to rough shape, about $\frac{1}{4}$ " larger overall than the finished form. Form a flat about one-third of the bowl's diameter on the bottom. Then, referring to the full-size half-pattern for the large bowl on the *opposite page*, shape the bowl.

Make a shearing cut with the bowl gouge to develop a smooth curve along the bowl's side from the foot to the rim. Stop the lathe to check for hidden stock defects you may have uncovered.

Turn a recess in the foot to receive the expanding jaws of your lathe chuck. To do it easily, measure the diameter of the jaws, and draw a circle that size around the center on the bowl bottom.

Then, inside the circle, cut a flat-bottom recess about $\frac{1}{8}$ " deep (or as required by your particular chuck). Form a dovetail on the inside edge to give the chuck jaws a solid grip. Rex lays his skew flat on the tool rest to cut the dovetail recess, as shown *above*.

With the bowl gouge, make the finishing cut on the outside of the bowl to establish final shape and size. The full-size pattern shows the shape of the bowl Rex turned.

Note: If you don't have a woodturning chuck, turn a flat surface on the bottom of the foot. Sand and finish the bowl's exterior (except for the bottom of the foot) as described below. Then, glue a wasteblock the same diameter as your 3-4" faceplate to the foot. Using the tail center as a centering aid, screw the faceplate to the wasteblock.

Finish the outside before you turn to the inside

Sand the bowl with progressively finer grits from 100 to 320. Rex prefers power-sanding with a 3" foam sanding disc like the one shown *above right*. Hook-and-loop material on the sander and the abrasive disc makes changing grits easy, and the resilient pad conforms to the bowl's curves.



Power-sanding with a resilient foam pad smooths the bowl's curve.

Chuck the sander in a reversible portable drill, preferably a variable-speed model that runs in the range of 1800-2500 rpm.

Sand with the lathe running and the drill rotating forward (clockwise). When sanding near the foot, reverse the drill rotation to prevent rounding over the corner. Sand by hand inside the foot so you won't round over the dovetail for the chuck.

Make the three decorative V-cuts where shown. For accurate spacing, first draw light pencil lines on the bowl by holding a pencil against the side with the lathe running. Then, make the cuts with the point of your skew.

Apply a clear finish to the outside, including the foot, before rechucking the bowl to turn the inside. For a rich-looking, salad-safe finish, Rex gives his bowls a coating of mineral oil (available at drugstores). "First, I put on a heavy coat with a rag. Then, I wipe away the excess with a



Here's inside information on completing your bowl

Remove the screw center, and chuck the bowl by the foot recess. To ensure secure chucking, clean all chips, sawdust, and excess finish from the foot recess before attaching the bowl to the chuck. Afterward, check for tightness by grasping the bowl at the rim and attempting to wobble it.

True the top surface. Mark $\frac{5}{8}$ " in from the edge with a pencil, then cut in with the bowl gouge just inside the line to define the rim.

Shape the curved rim face. Turn it to finished shape now rather than going back later. "You should complete this area while all the waste wood is still inside to help support the rim," Rex says.

Clear out the center of the bowl, and shape the inside wall. "Do this in a series of gouge cuts, starting from the center and working outward," Rex says. Work toward a uniform wall thickness from just under the rim to the foot area, with a smooth curve across the bottom. After achieving rough shape, make a finishing

gouge cut to form a smooth curve from just under the rim to the center of the bowl.

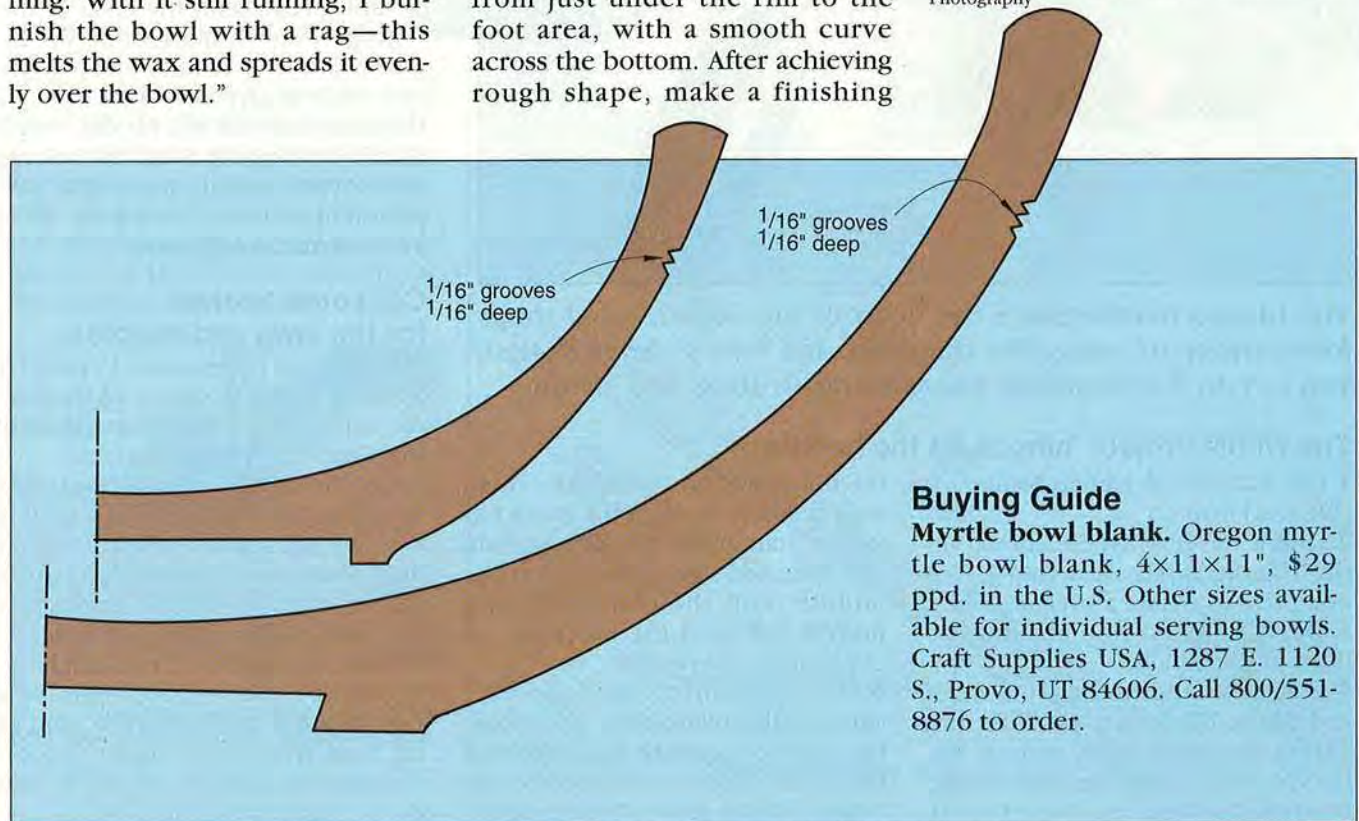
Clean up any ridges and grain tear-out with a heavy, roundnose scraper. Make a light cut from the center toward the rim.

"The scraper cuts most cleanly on the flat grain in the center of the bowl," Rex says. "On the sidewall, you'll be cutting both end grain and flat grain. This almost always leads to a catch with the scraper. You'll do better to clean up tear-out on the sidewall with the bowl gouge," he says.

Sand the inside as you did the outside. Work carefully at the rim to maintain crisp separation between the rim face and the inside and outside bowl walls. Finish the inside of the bowl and the rim as you did the outside. Follow the same procedure to turn the individual salad bowls. ♣

Project Design: Rex Burningham
 Illustrations: Roxanne LeMoine; Lorna Johnson
 Photographs: Marty Baldwin; Hetherington Photography

clean rag and let it dry. For a little more gloss," Rex adds, "I apply beeswax while the lathe is running. With it still running, I burnish the bowl with a rag—this melts the wax and spreads it evenly over the bowl."



Buying Guide

Myrtle bowl blank. Oregon myrtle bowl blank, 4×11×11", \$29 ppd. in the U.S. Other sizes available for individual serving bowls. Craft Supplies USA, 1287 E. 1120 S., Provo, UT 84606. Call 800/551-8876 to order.

Salad Tongs With A Twist



The hinged handle that's the heart of our stylish salad tongs looks tricky to make. But thanks to Jan Svec's clever design, you can do it with simple bandsawing, drilling, and sanding.

The whole project hinges on the handle

- 1 Cut a $\frac{3}{4} \times \frac{3}{4} \times 14$ " handle blank (A). (We used maple.)
- 2 Drill a $\frac{3}{16}$ " hole where shown on the Handle Blank drawing. Use a drill press to ensure a straight hole.
- 3 Draw a pencil line around the blank at the middle.
- 4 Bandsaw lengthwise from each end of the blank to the middle, orienting the kerfs as shown on the Handle Blank drawing. For sawing, position the bandsaw fence to cen-

- ter the blade on the blank. Then, with the hole through the blank facing up, start at the end farthest from the hole, and saw to the line at the middle. Roll the blank 90° , and make a cut from the other end of the blank to the middle.
- 5 Now, by boring into opposite sides of the blank with a Forstner bit, you can separate the piece into two parts, which will become the hinged handle. Here's how to do it.

Chuck a $1\frac{1}{4}$ " Forstner bit into your drill press. Lay the sawn blank on the drill-press table, the hole facing up. Adjust the fence on the drill-press table to position the kerf in the blank so it is tangent to the rim of the bit that's nearest the fence, as shown at 1, *opposite page bottom*.

Slide the blank along the fence to center it end-to-end under the bit. Position a stopblock at the right end, and clamp it to the fence.

Center the end of a piece of $\frac{3}{4}$ "-thick scrapwood at least 2" wide on the handle blank to press the blank against the fence. Clamp the piece (2 in the photo) to the table.

Now, bore halfway through the handle blank. Stop boring as soon as the bit breaks into the horizontal bandsaw kerf (3 in the photo).

6 Rotate the workpiece 180° , and bore from the opposite side to the bandsaw kerf. The handle blank should separate into two pieces.

7 Sand the bandsaw marks from the inside faces of each part. (Hand-sanding with a sanding block worked best for us.)

8 With a $1\frac{1}{2}$ " drum sander in the drill press, sand the ends of the hinge cuts to matching curves. You won't have to sand much at the two ends where the drum runs in the same axis that the bit did. You'll do more reshaping at the two places where your sanding drum runs perpendicular to the bit's axis. Sand away all machining marks.

Cut some circles for the jaws and handles

- 1 Resaw and plane stock 4" wide by 13" long to the thickness of the handle sides, which should be slightly less than $\frac{3}{8}$ ". (We used walnut.)
- 2 Cut three $3\frac{1}{2}$ "-diameter circles from the thin stock. You can do this with an adjustable circle cutter and drill press since the pilot-bit hole will lie within a $\frac{3}{4}$ "-wide strip across the middle that will become waste.
- 3 Mark a $\frac{3}{4}$ "-wide strip across the middle of each circle. Bandsaw slightly inside the strip, then sand to the lines with a disc sander to form the segments for the grips (B), top jaw (C), and bottom jaw (D).

4 Glue and clamp the segments to the handle sides (A) where shown. Note that the handle grips (B) go on the end that's nearest the $\frac{3}{16}$ " hole. (We used moisture-resistant Tite-Bond II glue.)

5 Transfer the full-size patterns to the handle grips, top jaw, and bottom jaw. (You'll find the patterns in the *WOOD PATTERNS*® insert in the middle of the magazine.)

6 Drill the 1", $\frac{3}{8}$ ", and $\frac{1}{4}$ " holes where shown. Before drilling the $\frac{1}{4}$ " holes, check the actual diameter of the dowel stock you'll be using for parts E. Size the holes to fit the dowel stock.

7 Rout a $\frac{1}{8}$ " round-over along the outside edges of each tong half and on both sides of the finger holes in the handle grips (B). Sand to break the sharp inside edges. Chamfer both sides of the $\frac{3}{8}$ " holes with a countersink bit.

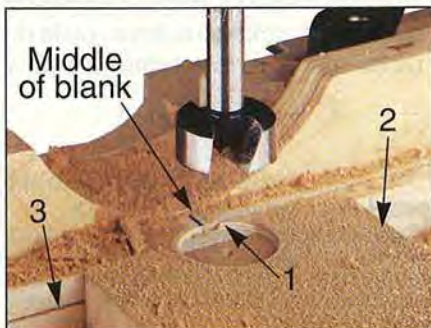
Finish the parts, and assemble the salad tongs

1 Finish-sand the tong halves with progressively finer abrasives from 150 to 320 grit.

2 Cut seven $\frac{5}{8}$ " lengths of $\frac{1}{4}$ " dowel rod. Chamfer one end, and glue the unchamfered ends into the $\frac{1}{4}$ " holes.

3 Apply two coats of penetrating oil finish, and let the oil dry thoroughly.

4 Assemble the tong halves with a binding post and two brass washers. (We bought the binding post at an office-supply store.) Apply a drop of Loctite to the threads to keep the binding post tight. 🛠️

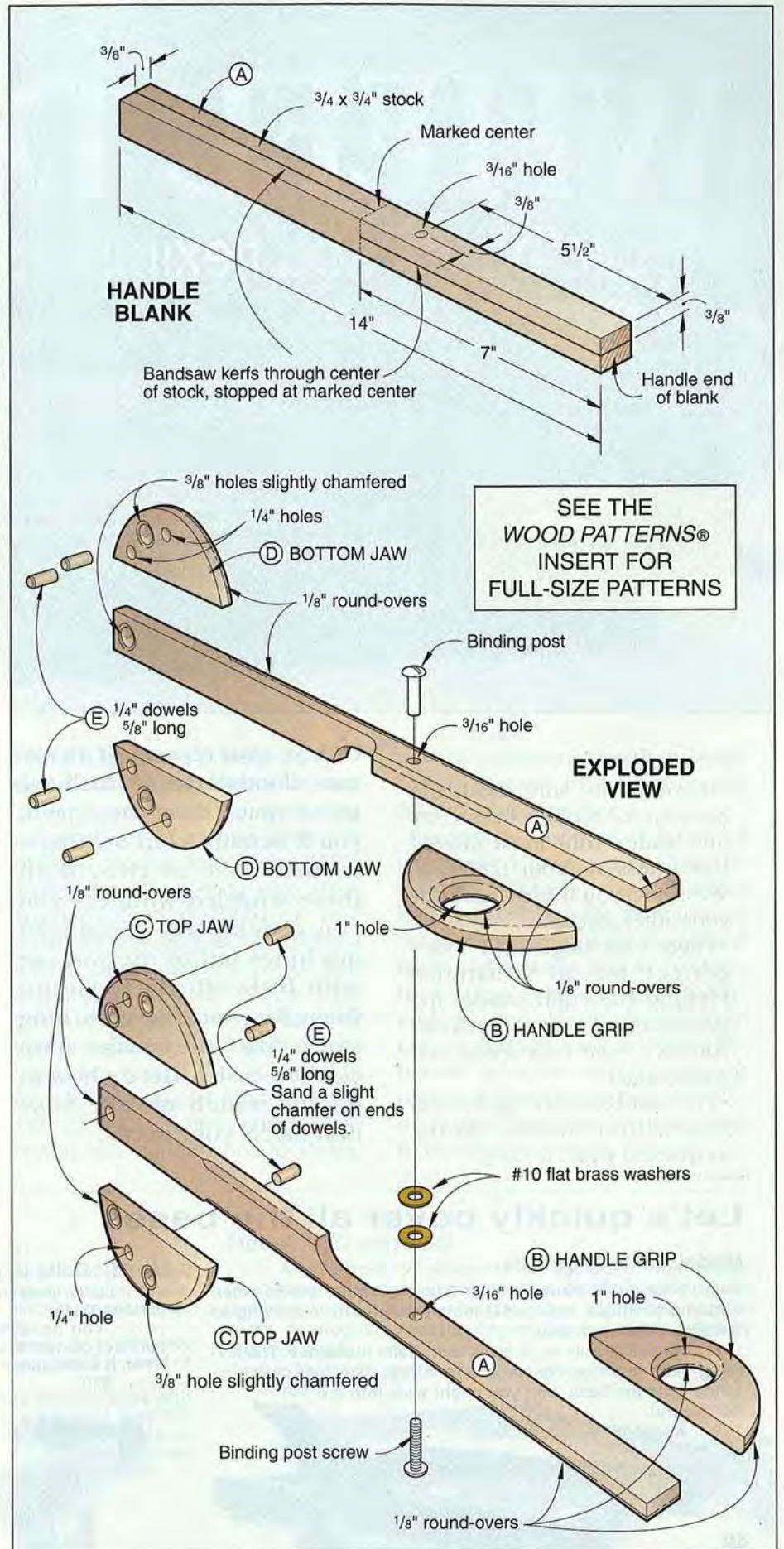


Bore into the bandsawn blank at the center to make the handle sides. The numbers refer to Step 5 on the opposite page.

Project Design: Jan Svec

Photographs: Marty Baldwin

Illustrations: Kim Downing; Lorna Johnson



SEE THE
WOOD PATTERNS®
INSERT FOR
FULL-SIZE PATTERNS

WHEEL DEALS

Mobile bases add flexibility and convenience



FAST FACTS

- If you're not sure about the benefits of mobile bases, try one under your most moved tool—possibly your tablesaw. We think you'll buy more for your other machines.
- There's no single base that's perfect for all situations. Picking the right model depends on the type of machines you own, your floor space, and your budget.
- The best bases are rigidly constructed for stability during moves and while resting.

Unless you're one of those rare woodworkers who have more space than they need, you'll benefit from owning a mobile base or two. With these wheeled wonders you can quickly move unused machines out of the way, or with little effort reposition them for working with long stock. Also, they make shop cleanup easier. Here's how to decide which mobile base best meets your needs.

A quick overview of the mobile base market

HTC created the mobile base market in 1980. For more than a decade, your only choice in a manufactured mobile base was an HTC all-steel version in a fixed size that rolls and rests on three wheels. But, as the woodworking world came to realize the benefits of mobile bases, competitors looked for ways to carve their own niche in this market.

Delta came out with a fixed-size base that rests on four points. Delta also unveiled an economy

Let's quickly cover all the bases



Model: Delta fixed-size

Pros: Four-point stance makes this base quite stable when stationary. Single foot pedal makes switch from moving to stationary fast and easy.

Cons: Available only in 18 sizes to fit Delta machines. The leveling pads are time-consuming to adjust. The foot pedal extends from the base, and you might walk into it if not careful.

Price: About \$95 for most sizes.



Model: Delta universal

Pros: Lower cost than fixed-size bases. Adapts to machines of various sizes.

Cons: You need to supply 1½"-square hardwood rails that connect corner brackets. Base twists and becomes unstable when it encounters a floor obstruction.

Price: \$70



to your shop



base that changes in size when you add your own wooden rails in various lengths.

Vega, too, has universal bases that fit various machines—one model line has all-steel components, and a less-expensive version has wooden rails. With the Vegas, you *pull* the machine with the help of a wheeled, levered handle. (With the other bases, you *push* the machine.)

In answer to this competition, HTC recently unveiled its own all-steel universal base. It rests *and* rolls on four points.

Here's how we'll help you decide between these bases

To lend you a hand in navigating the small sea of mobile bases, we ordered models from Delta, HTC, and Vega. We tested two sizes from each manufacturer: one about 21" square that we loaded a 400-pound table saw onto, and one about 17½×27" for a 150-pound bandsaw. And, for those of you considering making your own base, we tested the homemade mobile base project found in issue 100 of *WOOD*® magazine. (The testing was done by Bob McFarlin,

an independent consultant who has no interest in promoting the *WOOD* magazine base.)

For testing purposes, Bob moved the loaded bases over smooth, uneven, level, and slightly inclined surfaces. He maneuvered them through tight areas, parked them along walls and in corners, took them through tight turns, and passed them over floor cracks, bumps, and sawdust. He tested them for stability during moves and while resting. Finally, he loaded each base with weights to determine carrying capacity.

Continued

Model: HTC fixed-size

Pros: Solidly made with the highest-quality wheels of the tested bases. Three-point stance requires no leveling on uneven floors. Stock versions available to fit nearly every machine made today. Other sizes available on a custom-made basis.

Cons: More prone to tipping than four-point bases, but this rarely presents a problem. To lock base in position you need to bend or squat down and turn two thumbscrews.

Price: About \$95 for most sizes. Larger bases for table saws with extension tables or heavy-duty versions for equipment over 475 pounds may cost two to three times more.



Model: HTC universal

Pros: Adapts from 12" square to 36" square, or from 30×42" to 20×52" in rectangular configuration. All-metal construction makes it sturdier than universal bases with wood components. Four-point contact during moves and while stationary makes it stable.

Cons: Leveling pads are time consuming to adjust.
Price: \$80



WHEEL DEALS

Considerations that make a difference between bases

• *Universal versus fixed-size.*

Four of the bases Bob tested fall into the universal category. That means you can change their size to fit the footprint of various leg stands or machine cabinets. You do this either by making different wooden rails (the parts that stretch the span between the wheel brackets) or by reassembling metal rails and brackets.

Universal bases give you two key advantages. If you upgrade a machine, you can keep the base and reconfigure it to fit the new machine's base. And universal bases offer a low-cost entry into mobile bases (see discussion of individual bases for pricing).

On the other hand, fixed-size bases prove more stable than some universal bases with wooden rails. That's because fixed-size bases do not twist. This twisting happens when a wheel encounters debris or a floor crack. Then, when turning a tall machine, you could tip the machine if you don't have a firm grip on it.

This twisting was more pronounced in the 17½×27" bases than in the 21" square bases. So we don't recommend universal bases with wood rails for machines with footprints greater than 21" in either direction.

Tip: To improve the rigidity of a universal base with wood rails, bolt the machine to the base.

• **Number of points in contact with the floor.** All of the bases have three wheels in contact with

the floor while moving except for the HTC universal base and the WOOD® magazine base—both of which have four wheels. The three-wheel bases have two non-swiveling wheels in back and one swiveling caster in front. These bases turn on a dime.

The four-wheel bases have two swiveling casters in front and require slightly more pushing force, especially in tight turns. However, the four-wheelers give you added stability during moves—something that comes in handy with top-heavy tools such as drill presses.

Note: We classify the Vega bases as having three points in contact with the floor during moves, and four points while stationary, although they differ somewhat from other bases with three and four points in these respective categories. See discussion of the Vega bases for more explanation.

When you bring a machine to a rest and position it for use, all of



By pressing down or lifting up on a foot pedal you can quickly convert some bases from mobile to stationary.



Leveling pads on the Delta and HTC (universal only) bases require that you bend down and use a wrench for adjustments.

the bases (except for the HTC fixed-size model) have four points in contact with the floor. With these you operate a foot pedal (see photo left) to switch the weight of the machine from the front caster to two leveling pads and vice versa. These pads adjust up or down to bring the base in firm contact with the floor on all four points. This setup proves stable, but adjusting the pads can be a small hassle if you frequently reposition the tool on an uneven floor (see photo above).

With an HTC fixed-size base, you don't level it because its three points make contact with any surface. And there's no foot pedal to push. But you do have to bend over to turn the thumb-screws that lock the rear wheels.

Although the three-point stance of the HTC base does not provide as much stability as four points in the stationary position, we've had no stability problems with HTC fixed-size bases placed under a

Model: WOOD magazine mobile tool base made from plan and kit.

Pros: Four-point contact during moves and while stationary makes it stable. Offers a pleasing wood look.

Cons: Soft rubber wheels won't support machines weighing in at more than 200 pounds. Requires several hours to make.

Price: \$40 for the hardware kit (does not include angle iron or wood, which may add \$10 to \$40 to cost of stand, depending on your source).



Model: Vega utility series

Pros: The lowest-cost way to buy a mobile base. You can adapt the base to machines of various sizes by adding ¾×1½" wood rails. Like other Vega model, no locking



variety of machines in the *WOOD* magazine shop for more than 10 years. But the potential for the base to rock does exist if you put a top-heavy, unbalanced machine on a three-point base. In that case, simply kick a pair of wood wedges on either side of the caster before using the machine.

•Weight capacity. We loaded each base with up to 500 pounds to see how they held up. All of them handled this weight with two exceptions. The metal corners on the Delta universal stand flexed at 350 pounds, and the soft rubber wheels on the *WOOD* magazine base became difficult to roll with 200 pounds aboard.

Although the Vega Utility model passed our 500-pound test, the manufacturer conservatively rates its capacity at 300 pounds. HTC rates the capacity of its universal base at 400 pounds.

If you have a machine that weighs in excess of 500 pounds, look to Vega or HTC. Vega rates its MMK/MMB series of bases at 800 pounds, and HTC will build you a custom base to handle nearly any load.

We'll put these bases under our machines any day

If you want to mobilize a machine that you plan to keep for a while, buy an HTC fixed-size base. They were the smooth-

est and sturdiest fixed-size bases in our test.

For tools that you plan to upgrade, a universal base may save you money in the long run because it will adapt to your new machine. Among the universals, we liked the HTC best.

The Vega models were the only bases capable of surmounting a wide floor crack or

hump without the operator having to bend over to pick up the base. And the universal models give budget-conscious shoppers a chance at becoming mobile. But, because of the space required for using the handle, we recommend the Vegas only for shops with plenty of floor space. 🐘

Written by Bill Krier
Product testing: Bob McFarlin
Photographs: Doug Hetherington

Model: Vega MMK/MMB series

Pros: Basic version adapts to machines 13–28" wide and 17–29" long, and you can buy two other versions that extend to 29–50" long and 50–71" long. No locking required because this base rests on steel plates front and back. You can avoid lifting the machine onto the base by assembling the base under the machine.

Cons: Requires a levered handle with wheels that must be stored when not used (only one handle required for multiple machines). Using the handle requires maneuvering space.

Price: \$110 to \$140 depending on length, without handle. Handle costs \$10.

WHAT TO KNOW BEFORE YOU GO MOBILE

| MANUFACTURER/ IMPORTER | TYPE (1) | MODEL | POINTS IN CONTACT WITH FLOOR | | | | PERFORMANCE EVALUATION (4) | | | | | | | | | | ASSEMBLY TIME | PRICE | |
|---------------------------|----------|------------------|------------------------------|------------|---------------------|---------------------------------------|----------------------------|-----------|-----------------------------------|----------------------------|--|-----------------|--|---------|-----------------------------------|---|---------------|-------|--|
| | | | MOVING | STATIONARY | FRAME MATERIALS (2) | MACHINE HEIGHT ADDED BY BASE (INCHES) | LOCKING MECHANISM (3) | STABILITY | | | | | EASE OF MOVING OVER 1/2" HIGH BUMP (7) | | | | | | |
| | | | | | | | | TURNING | RESTING (LOCKED AND LEVELLED) (6) | HITTING AN OBSTRUCTION (6) | EASE OF MOVING OVER 1/2" HIGH BUMP (7) | MANEUVERABILITY | EASE OF LEVELING | TURNING | RESTING (LOCKED AND LEVELLED) (6) | HITTING AN OBSTRUCTION (6) | | | EASE OF MOVING OVER 1/2" HIGH BUMP (7) |
| DELTA | F | VARIABLES | 3 | 4 | S | 3/4 | A | E | E | E | G | P | E | F | 10 minutes | SEE DISCUSSION OF THE INDIVIDUAL MACHINES | | | |
| | U | 50-345 | 3 | 4 | S/W | 3/4 | A | E | G | E | F | P | E | P | 1 hour | | | | |
| HTC | F | VARIABLES | 3 | 3 | S | 1 | B | E | E | G | G | P | E | E | 1 minute | | | | |
| | U | 2000 | 4 | 4 | S | 1/2 | A | E | E | E | G | P | E | F | 20 minutes | | | | |
| VEGA | U | MMK/MMB SERIES | 3 | 4 | S | 1/16 | C | E | E | E | E | G | F | G | 10 minutes | | | | |
| | U | UTILITY | 3 | 4 | S/W | 1/16 | C | E | G | E | E | G | F | G | 20 minutes | | | | |
| WOOD MAGAZINE | F | MOBILE TOOL BASE | 4 | 4 | S/W | 1 | A | E | E | E | E | P | E | F | 6 hours | | | | |

NOTES:

- (F) Fixed-size
(U) Universal-size
- (S) Steel
(S/W) Steel and wood
- (A) Foot-operated pedal with flip-up caster
(B) Hand-operated thumbscrews lock two wheels (bending over or squatting required)
(C) Lift handle lowers base onto floor

- E** Excellent
G Good
F Fair
P Poor
- Obstruction was a small screw
E No base twisting, no tool tipping
G Some base twisting
F Machine can tip over -- maintain firm grip on machine for stability

- E** Base sits rock solid on four points
G Machine can tip slightly
- G** With tool mover handle you can pull tool over bump
P You must bend over and lift front wheel over bump

Where to call for more information:

| | |
|-----------------------|-------------------------------|
| Delta 800/433-2486 | Vega 800/222-8342 |
| HTC 800/624-2027 | WOOD magazine 800/374-9663 |

required, and you can assemble the base under the machine.

Cons: The base twists, but this did not create insta-

bility in moves because the handle keeps the front of the base off the floor. Handle creates the same limitations described for the other Vega model.
Price: About \$45

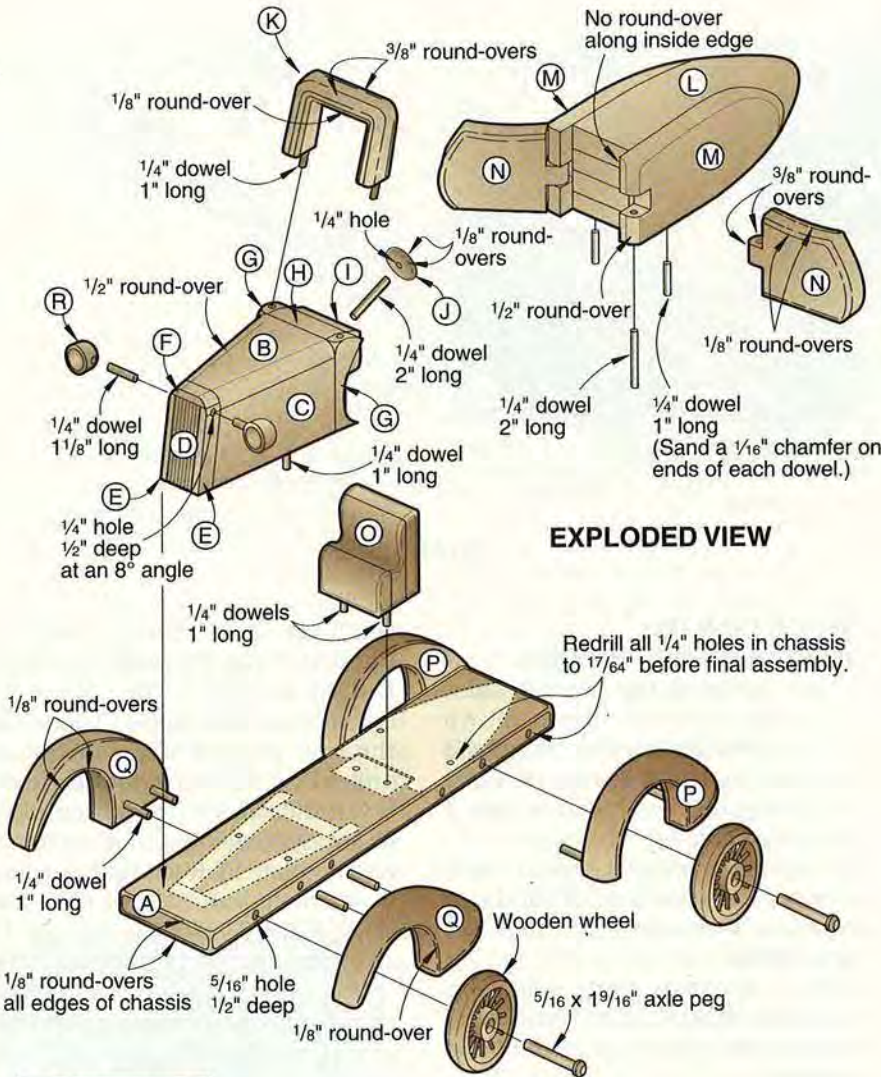


Auburn "Boattail" Speedster



We don't often say this, but this beautiful automobile, with its boat-shaped trunk and carefully contoured parts, is more of a challenge to build than you might imagine. But oh, the results are incredible. If you decide to build one of these take-apart gems, and if you send us a photo of your finished model, we'll send you a free engraved, sequentially numbered license plate. Number one is taken, but we've got several hundred to go.

Continued



EXPLODED VIEW

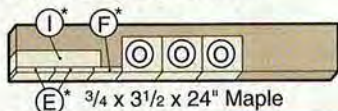
Redrill all 1/4\" holes in chassis to 17/64\" before final assembly.

SEE THE
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FULL-SIZE
PATTERNS

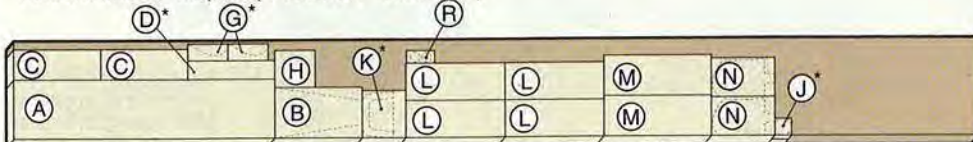
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To order, just send us a photograph of your completed Auburn and a self-addressed, stamped envelope to
I Built an Auburn
WOOD® Magazine
1716 Locust, GA310
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CUTTING DIAGRAM



*1 1/16 x 3 1/2 x 48" Maple (*Plane to 1" thickness.)



3/4 x 7 1/4 x 72" Cherry *Plane or resaw to thickness listed in the Bill of Materials.

Bill of Materials

| Part | Finished Size | | | Mati. | Qty. |
|------------------------|---------------|--------------|---------|-------|------|
| | T | W | L | | |
| CHASSIS AND HOOD | | | | | |
| A chassis | 3/4" | 4 3/8" | 19 1/2" | C | 1 |
| B hood top | 3/4" | 3 3/4" | 6 1/2" | C | 1 |
| C hood sides | 3/4" | 2 1/4" | 6 1/2" | C | 2 |
| D* grille | 5/8" | 1 3/8" | 2 7/8" | C | 1 |
| E grille sides | 5/8" | 3/8" | 2 7/8" | M | 2 |
| F grille top | 5/8" | 3/8" | 2 1/8" | M | 1 |
| G* sides | 5/8" | 1 1/4" | 3" | C | 2 |
| H firewall | 3/4" | 2 3/4" | 3" | C | 1 |
| I* dash | 5/8" | 1 1/4" | 2 3/4" | M | 1 |
| J* steering wheel | 3/8" | 1 1/4"-diam. | | C | 1 |
| K* windshield | 3/4" | 3 1/2" | 3 1/4" | C | 1 |
| TRUNK, DOORS, AND SEAT | | | | | |
| L trunk | 3" | 2 3/4" | 7 3/8" | LC | 1 |
| M sides | 3/4" | 3" | 8" | C | 2 |
| N doors | 3/4" | 2 15/16" | 4 3/4" | C | 2 |
| O eat | 2 1/4" | 2 5/8" | 3" | LM | 1 |
| FENDERS AND HEADLIGHTS | | | | | |
| P* rear | 1" | 3" | 7 1/8" | M | 2 |
| Q* front | 1" | 3 1/8" | 8" | M | 2 |
| R headlight blank | 3/4" | 1 1/2" | 3" | C | 1 |

*Initially cut parts marked with an * oversized. Then, trim to finished size according to the how-to instructions.

Materials Key: C—cherry, M—maple, LC—laminated cherry, LM—laminated maple.

Supplies: 1/4" dowel stock, clear finish.

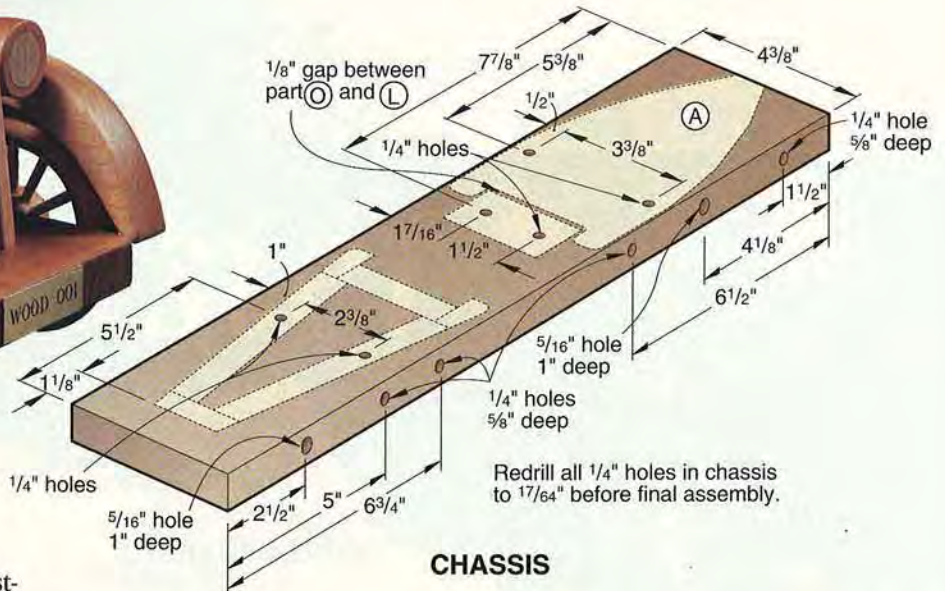
Buying Guide

Spoked wheels. Four 1 3/16 x 3 1/2"-diameter, #508 spoked wheels with axles. Key #WD1298, \$9.95 ppd. Cherry Tree Toys, Inc., P.O. Box 369, Belmont, OH 43718 or call 800/848-4363 to order.

Hardwood Kit. All the individual pieces shown on the Cutting Diagram cut oversized from the thickness and species listed in the Bill of Materials. Kit no. W110, \$39.95 ppd. Wheels not included. Heritage Building Specialties, 205 North Cascade, Fergus Falls, MN 56537. Or call 800/524-4184 to order.

Toy catalog. For a plan and kit catalog of other toys from the designer of this project, send \$3 to Baldwin Toy Company, P.O. Box 390484, Omaha, NE 68139.

Speedster



OK, model builders, let's start with the chassis

1 Cut the chassis (A) to the size listed in the Bill of Materials. Mark the six centerpoints for the $\frac{1}{4}$ " holes on the *top surface* of the chassis where dimensioned on the Chassis drawing. Using a brad-point bit in your drill press, drill the $\frac{1}{4}$ " holes through the chassis where marked.

2 Mark the four $\frac{5}{16}$ " axle-hole centerpoints on the *edges* of the chassis where shown on the Chassis drawing. Drill them 1" deep. (We used a large handscrew clamp to hold the chassis steady and square to the drill-press table when drilling the holes.) Then, mark the centerpoints for the $\frac{1}{4}$ " holes for mounting the fenders, and drill them $\frac{5}{8}$ " deep where marked.

3 Rout $\frac{1}{8}$ " round-overs along all edges of the chassis.

Here's how the hood parts go together

1 Cut the hood top (B) and sides (C) to the sizes and shapes shown on *step 1* of the Forming the Hood drawing. Glue and clamp the three pieces together as shown in *step 1* of the drawing.

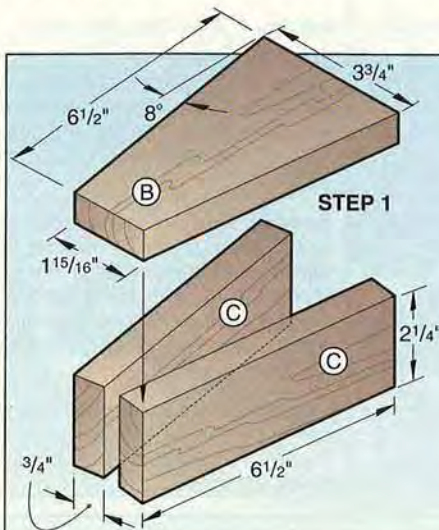
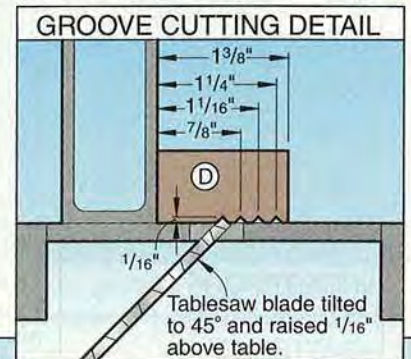
2 Angle your miter gauge 8° , and crosscut the back end of the hood assembly where shown in *step 2* of the drawing.

3 With the miter gauge still at 8° , angle the blade 8° from vertical and crosscut the front end of the hood assembly.

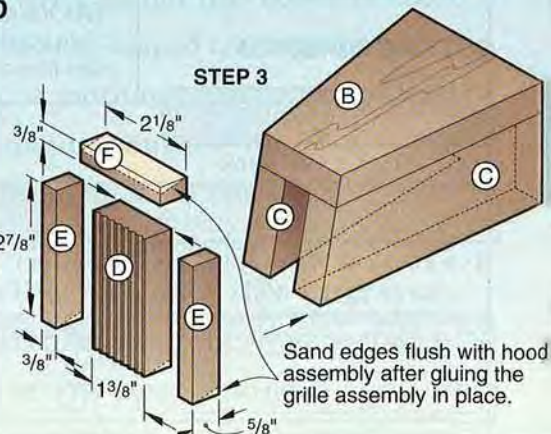
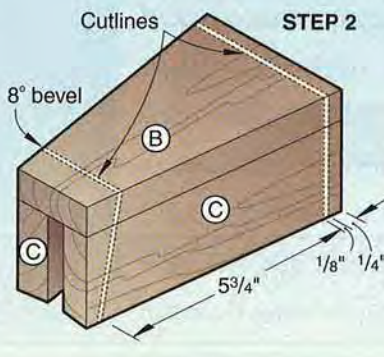
4 Cut the grille (D) to size plus 4" in length. Groove the front surface of the grille as shown in the Groove Cutting detail accompanying *Step 3*. Crosscut the grille to length.

5 Cut parts E and F to size, and glue the parts onto the grille (D) where shown in *step 3*. Glue the grille assembly to the hood. Then, trim the top, bottom, and sides of the grille (D, E, F) flush with the hood.

6 Cut the sides (G) and firewall (H) to size and shape. Cut the dash (I) to size plus 4". Rout the $\frac{1}{2}$ " round-overs along one edge of the piece,



FORMING THE HOOD



and then crosscut the dash to final length. Glue and clamp the pieces (G, H, D) together as shown in Step 4. Drill the angled $\frac{1}{4}$ " steering-column hole through I and H at 10° .

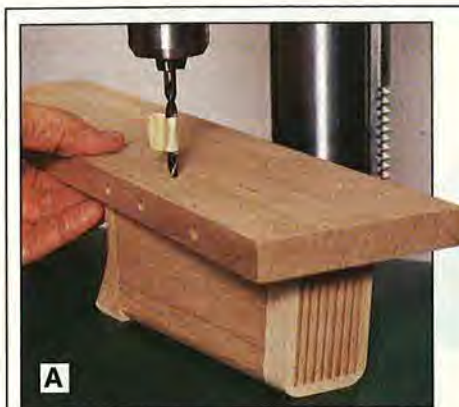
7 Rout $\frac{1}{2}$ " round-overs along the top edges of the hood/grille assembly where shown in *step 5* of the drawing.

8 Glue the assembly (G, H, D) to the hood as shown in *step 5*. Later, sand the edges of the firewall sides (G) flush with the sides of the hood. Sand the top edge of the dashboard (I) flush with the top of the hood.

9 To form the steering wheel (J), use a compass to mark a $1\frac{1}{4}$ "-diameter disc on a piece of $\frac{3}{8}$ "-thick cherry stock. Drill a $\frac{1}{4}$ " hole through the center of the marked disc, and then cut and sand it to shape.

10 Glue a 3"-long piece of $\frac{1}{4}$ " dowel stock into the hole in the steering wheel. Chuck the steering-wheel dowel into a drill press, turn the drill press on, and sand $\frac{1}{8}$ " round-overs along the edges of the steering wheel. Trim the steering-wheel dowel to 2" long.

11 Using cloth-backed double-faced tape, locate and adhere the hood assembly to the chassis where dimensioned on the Chassis drawing. Turn the chassis and hood assembly upside down and position it on your drill-press table. Using the previously drilled $\frac{1}{4}$ " holes in the chassis as guides, drill $\frac{1}{4}$ " holes $\frac{1}{2}$ " deep into the hood as shown in *photo A*.



A Use the previously drilled holes in the chassis as guides to drill holes into the hood assembly.



B Use the bottom of the windshield blank as an alignment guide to drill a pair of mating holes into the hood assembly.

12 Separate the pieces and remove the tape. Redrill the holes in the chassis to $\frac{1}{64}$ ". Cut two $\frac{1}{4}$ " dowels to 1" long, and glue them in place in the bottom of the hood.

Shaping the windshield won't take you long

1 Cut a piece of $\frac{3}{4}$ "-thick cherry to $3\frac{1}{2}$ " wide by $3\frac{1}{4}$ " long. Transfer the Front View pattern of the windshield (K) from the pattern insert to the windshield blank where shown on the *WOOD PATTERNS*® insert in the center of the magazine.

2 Mark the $\frac{1}{4}$ " hole locations on the bottom end of the windshield blank. Use your drill press to drill $\frac{1}{4}$ " holes $1\frac{3}{4}$ " deep into the blank where shown on the drawing.

3 Tilt your tablesaw blade 25° from vertical (or make this cut on your mitersaw), and bevel-cut the blank

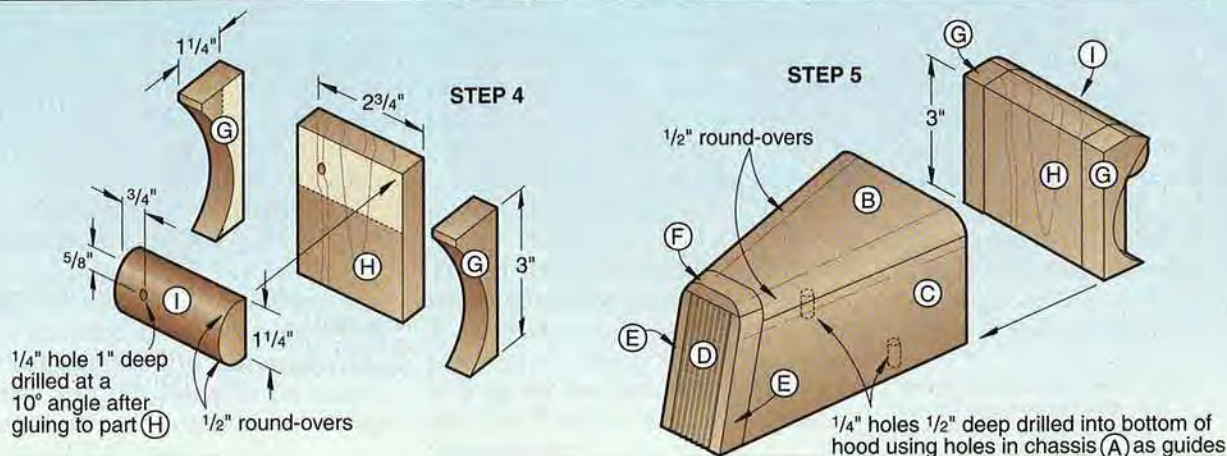
in two where shown on the drawing. Save the bottom piece.

4 Bandsaw the outside edge of the windshield to shape. Sand to the line. Then, rout $\frac{3}{8}$ " round-overs along the outside edges (not the bottom) of the windshield.

5 Bandsaw and sand the inside of the windshield to shape. Rout $\frac{1}{8}$ " round-overs along inside edges of the windshield. Now, hand-sand the windshield smooth.

6 Clamp the hood assembly to a flat surface as shown in *photo B*. Use double-faced tape and a hand-screw clamp to secure the hole guide in place where shown in the photo. Now, use the guide for alignment to drill a pair of $\frac{1}{4}$ " holes in the hood as shown in the photo. Do not glue the windshield (K) in place yet.

Continued



Speedster



OK, it's time to add the trunk and swinging doors

1 Using the Trunk drawing for reference, cut the trunk body pieces (L), and glue them together in the configuration shown on the drawing. (We cut the pieces a bit oversized, allowing us to trim the laminated block to the exact size shown on the Trunk drawing.)

2 Cut the trunk sides (M) and doors (N) to the sizes listed in the Bill of Materials.

3 Rout $\frac{1}{2}$ " round-overs along the front outside end of each trunk side

(M) where shown on the Trunk and Exploded View drawings along with the full-size patterns on the pattern insert. Switch bits, and rout $\frac{3}{8}$ " round-overs along the back end of each door (N) where shown on the same drawings.

4 Transfer the full-size patterns to the doors and trunk sides. Cut mating notches in the doors and trunk sides. Note on the pattern insert that the bottom edge of the doors is $\frac{1}{16}$ " above the bottom edge of the trunk assembly.

5 Using your drill press and fence, carefully align the pieces, and drill a $\frac{1}{4}$ " hole through the bottom of the trunk side (M) and through the door (N) where shown on the full-size pattern. (For clearance when opening and closing the door, we left a $\frac{1}{16}$ " gap between the pieces.) Repeat for the other trunk side and door. Now, for the door to swing on the dowel later, redrill the hole in each door to $\frac{1}{16}$ ".

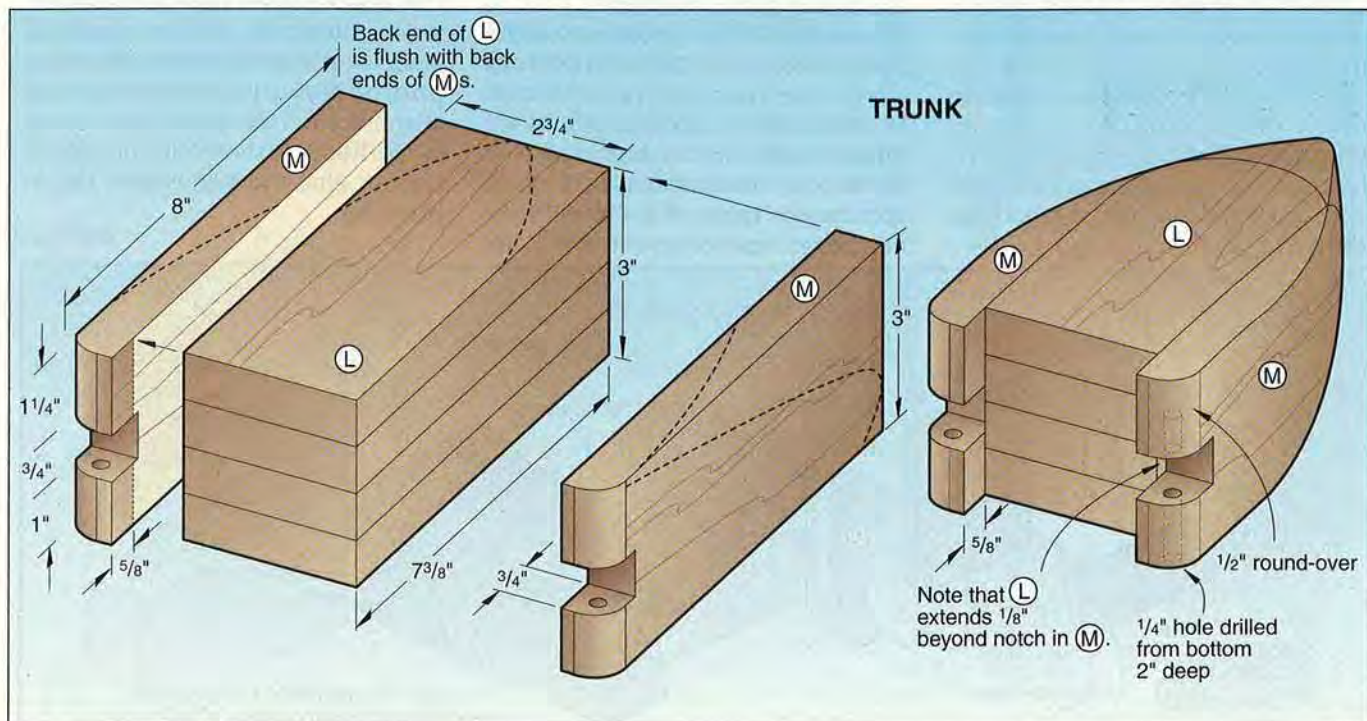
6 Cut and sand the doors to shape. Cut and sand the front edge of each door carefully; you'll want an even gap between the doors and the sides G later.

7 Keeping the back ends flush, glue and clamp the trunk sides (M) to the trunk lamination (L). The front ends of the trunk sides should protrude $\frac{5}{8}$ " beyond the front end of the trunk lamination where shown on the Trunk drawing.

8 Attach the Top View pattern of the trunk to the trunk lamination (L, M). The Side View pattern should still be attached. Bandsaw along the lines of the Top View pattern first. Then, using double-faced tape, stick the two cut-away side pieces back in place.

9 As shown in *photo C*, cut along the lines on the Side View pattern to cut the top and bottom of the trunk to shape. Use a stationary belt/disc sander to sand away any cutlines on the trunk.

10 Round over the top edges on the trunk. (To do this, we used a flat bastard 10" Nicholson file. Do not try to do this with a router. We filed and sanded until we had a $\frac{1}{2}$ " round-over to match the round-over on the hood.) As a guide for the round-overs, cut the $\frac{1}{2}$ " template on the pattern insert to shape. See the photo *above left* for reference when shaping the trunk.





Cut along the top-view lines, tape the two waste pieces back in place, and then cut along the side-view lines to shape the trunk.

Add the doors, and locate the trunk/door assembly

- 1 Place the hood on the chassis.
- 2 Attach the doors to the trunk with two $\frac{1}{4}$ " dowels 2" long. Put glue in the upper hole in the trunk sides (M) only. Be careful not to get glue on the door, which must swing freely on the dowel.
- 3 Place double-faced tape on the bottom side of the trunk. Position the trunk with doors attached on the chassis until you have an even $\frac{1}{16}$ " gap between the doors (N) and parts G. Then, press the trunk against the chassis. Using the holes in the chassis as guides, drill mating holes into the trunk.
- 4 Separate the pieces, and glue a pair of $\frac{1}{4}$ " dowels 1" long into the holes in the trunk. Then, redrill the holes in the chassis to $\frac{1}{16}$ ".

Comfortable, contoured seating is a must

- 1 Laminate three pieces of $\frac{3}{4}$ " maple to form a blank for the seat (O). Transfer the seat pattern from the pattern insert to one end of the blank, and cut the seat to shape. Rout or sand $\frac{1}{8}$ " round-overs along all edges of the seat.

- 2 Position the seat on the chassis, and use the existing holes in the chassis as guides to drill a pair of holes into the bottom of the seat. Then, redrill the holes in the chassis to $\frac{1}{16}$ ". Add a pair of dowels to the seat.

The shapely maple fenders set off your stylish car

- 1 Cut four fender blanks (P, Q) to the sizes listed in the Bill of Materials. (We planed five-quarter stock to 1" thick.)
- 2 Place the chassis on $\frac{1}{8}$ " spacers. Fit $\frac{1}{4}$ " dowel centers into two of the front-fender holes. Position the front-fender blank so it protrudes $\frac{1}{8}$ " beyond the front of the chassis. Squeeze the fender against the chassis to indent the dowel-hole centerpoints on the inside face of the fender. Repeat for the other front fender.
- 3 Drill $\frac{1}{4}$ " holes $\frac{1}{2}$ " deep on the inside of each front-fender blank.
- 4 Adhere the Top View patterns to the front fenders, and cut along the short, curved cutline (cut 1). Using double-faced tape, stick the waste piece back on, and cut the outside (not wheel opening) to shape on each front fender (cut 2). File and sand a $\frac{1}{2}$ " round-over along the top curved edge of each fender. Now, cut the wheel opening to shape (cut 3), and sand a $\frac{1}{8}$ " round-over along this curve.
- 5 Cut the front-fender dowels to length, and glue them in place in the fenders.
- 6 Repeat the process to form the rear fenders. As shown in the photo *in the upper left-hand corner of the opposite page*, the rear fenders should protrude $\frac{3}{16}$ " beyond the back end of the chassis.
- 7 Redrill the fender mounting holes in the chassis to $\frac{1}{16}$ ".

You'll need some headlights for nighttime driving

- 1 To make the headlights, cut a piece of $\frac{3}{4}$ " cherry to $1\frac{1}{2}$ " wide by 3" long for the headlight blank (R). See the *WOOD PATTERNS*® insert for reference.

- 2 Mark the centerpoints on one surface, and bore a pair of $\frac{3}{4}$ " holes $\frac{1}{8}$ " deep. Then, drill a pair of $\frac{1}{4}$ " holes $\frac{3}{8}$ " deep centered in each counterbore. Finally, mark the centerpoints on one edge of the headlight blank, and drill a pair of $\frac{1}{4}$ " holes $\frac{3}{4}$ " deep.

- 3 Bandsaw (we used a $\frac{1}{8}$ " blade) the headlights to shape from the block. Then, cut two $\frac{1}{4}$ " dowels 4" long each, and use hotmelt adhesive to temporarily adhere them into the $\frac{1}{4}$ " holes inside the $\frac{3}{4}$ " counterbores. Chuck the $\frac{1}{4}$ " dowel into your drill press, turn the drill press on, and sand the back end of the headlight to shape. Repeat with the other headlight. Remove both $\frac{1}{4}$ " dowels.

- 4 Using a $\frac{3}{4}$ " plug cutter, make two $\frac{1}{8}$ "-thick maple plugs, and glue them into the counterbores in the front of both headlights. Align the grain of the plug with that of the headlight. Later, sand the front of the headlights flush.

- 5 Tilt the table on your drill press or make an 8° angle support, and drill the $\frac{1}{4}$ " holes for the headlight dowels into part E of the hood.

- 6 Cut a pair of $\frac{1}{4}$ " dowels $1\frac{1}{8}$ " long, and glue one into the side of each headlight.

Get out the driving gloves—you're almost finished

- 1 Finish-sand all the pieces, and add the finish, being careful not to get finish into the holes. (We used Minwax Antique Oil Finish.)
- 2 If children under the age of three will be playing with the finished car, we recommend gluing the headlights and steering wheel in place. It eliminates the chance of a child swallowing them. For older children or for a display/puzzle model, leave the parts removable.
- 3 Using the axles supplied with the wheels (see the Buying Guide for our source), secure (no glue) the wheels to the chassis. 🚗

Written by Marlen Kemmet
Project Design: ©Steve Baldwin
Illustrations: Roxanne LeMoine
Photographs: Hetherington Studio

AS-NEAT-AS-IT-GETS

Multipurpose



Note: We used Rubbermaid HiTop Storage Boxes for our shelves. See the Front View for the stock numbers of the boxes we used. Purchase locally or see the Buying Guide for a mail-order source. Due to the wide range of storage containers available, you may wish to customize our design. We allowed for 1/4" clearance on each side of each box and 1/2" clearance on top. The fronts of the storage boxes sit flush with the front of the assembled unit.

1 Rip and crosscut the sides (A), partition (B), top and bottom (C), and shelves (D, E) to the sizes in the Bill of Materials.

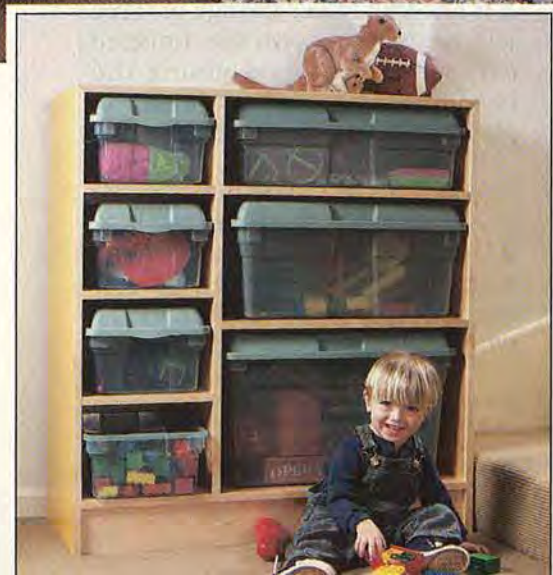
2 Mark the locations, and cut the dadoes and rabbets in the sides and partition where dimensioned on the Parts View drawing on the WOOD PATTERNS® insert in the center of the magazine. Double-check the marked locations of the shelf dadoes in the sides (A) and partition (B) before cutting.

3 Dry-clamp the assembly together, and drill the mounting holes. Then, glue and screw the assembly together, checking for square. Make certain that all the parts are flush on the front and back.

4 Cut the front and back base pieces (F) to size, and glue and screw them in place. The outside surface of each base piece should be flush with the edges of the plywood carcass.

5 Cut the stock for the banding and cleats (G-L) to size plus 1" in length. Cut and miter-cut the side banding (G) and top banding (H) to length, and glue and clamp them in place. Add banding pieces I and J next, followed by the banding (not cleats) K and L.

6 Fill all counterbores and the exposed plywood edges. Sand the



Crafts, toys, woodworking supplies, you name it, and you probably can store it in this simply made shelving unit. Designed around plastic, lidded containers found at most home centers, this dustproof storage system is an organizer's dream come true.

 Print this article

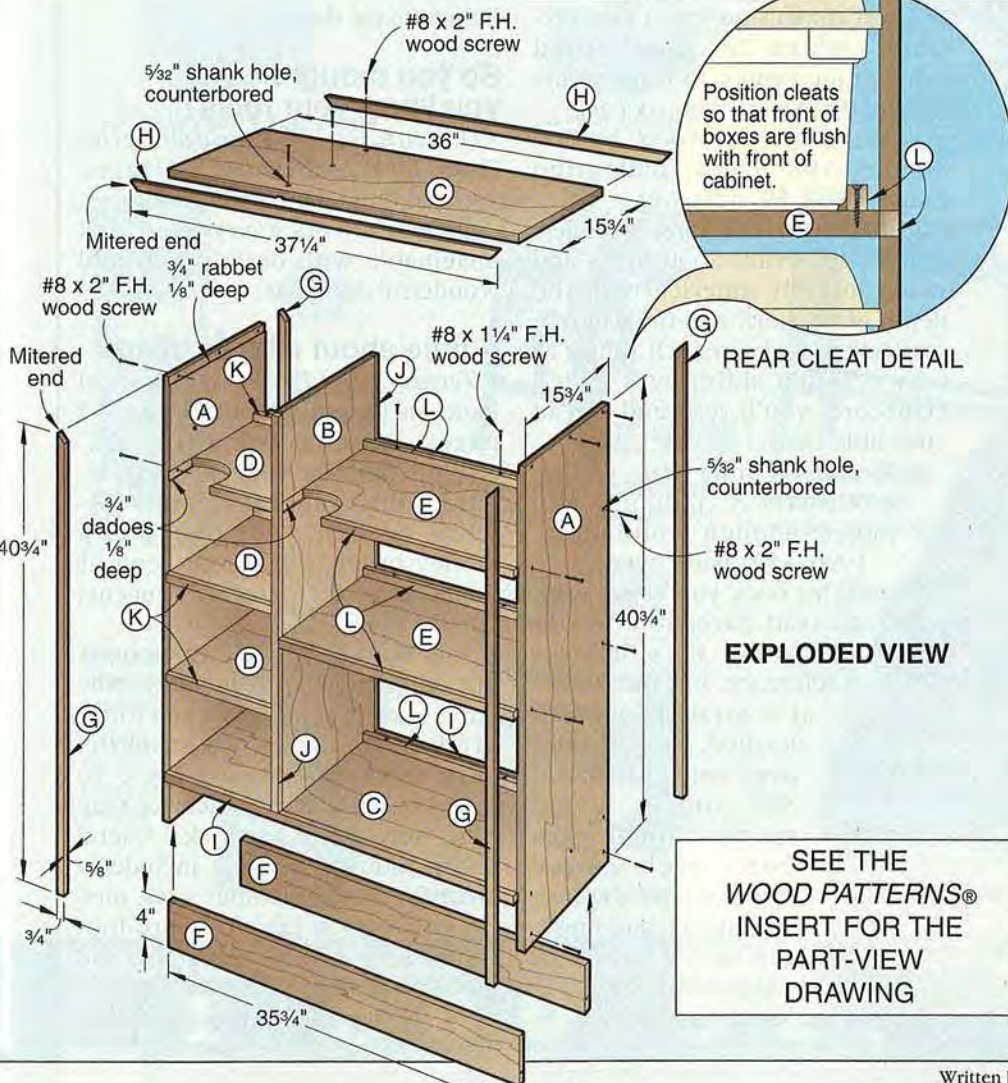
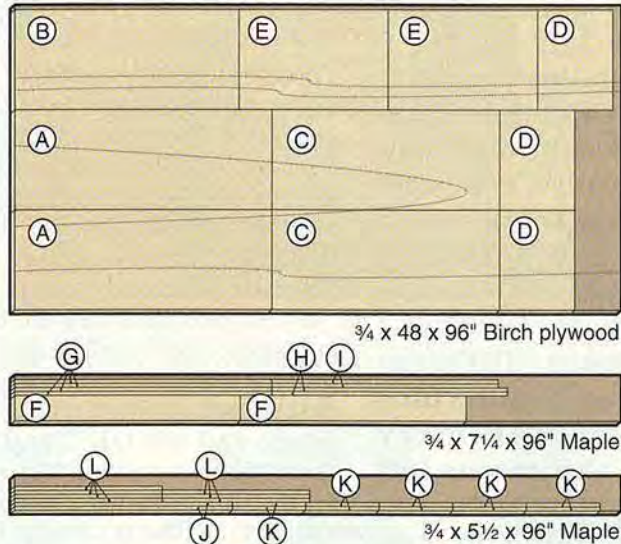
Storage

assembly and filled areas smooth. Mask the plywood surfaces at the joint between the plywood and banding.

7 Apply two coats of polyurethane to the banding and base where shown in the opening photo and to the cleats (still unattached). Then, mask the clear coated areas, and prime and paint the plywood pieces (we used yellow enamel).

8 Position the storage boxes flush with the front of the unit. Screw the cleats (K, L) in place where shown on the Rear Cleat detail. 🌲

CUTTING DIAGRAM



Bill of Materials

| Part | Finished Size* | | | Mati. | Qty. |
|---------------------|----------------|---------|---------|-------|------|
| | T | W | L | | |
| A sides | 3/4" | 15 3/4" | 40 3/4" | BP | 2 |
| B partition | 3/4" | 15 3/4" | 35 1/2" | BP | 1 |
| C top & bottom | 3/4" | 15 3/4" | 36" | BP | 2 |
| D shelves | 3/4" | 15 3/4" | 11 7/8" | BP | 3 |
| E shelves | 3/4" | 15 3/4" | 23 3/8" | BP | 2 |
| F base | 3/4" | 4" | 35 3/4" | M | 2 |
| G* banding | 5/8" | 3/4" | 40 3/4" | M | 4 |
| H* banding | 5/8" | 3/4" | 37 1/4" | M | 2 |
| I* banding | 5/8" | 3/4" | 35 3/4" | M | 2 |
| J* banding | 5/8" | 3/4" | 35 1/4" | M | 2 |
| K* banding & cleats | 5/8" | 3/4" | 11 7/8" | M | 10 |
| L* banding & cleats | 5/8" | 3/4" | 23 3/8" | M | 7 |

*Cut parts marked with an * oversized. Trim to finished size according to the how-to instructions.

Materials Key: BP—birch plywood, M—maple.

Supplies: #8x1 1/4" and #8x2" flathead wood screws, primer, paint, clear finish.

Buying Guide

Rubbermaid HiTop Storage Boxes. Available in Agean (light green) or white. Check your local retailer or contact Everything Rubbermaid, 115 South Market Street, Wooster, OH 44691. Or call 330/264-7119 to order.

SEE THE
WOOD PATTERNS®
INSERT FOR THE
PART-VIEW
DRAWING

Good Reads

Terrific books for your holiday gift list



The books on this page may not all rank as best-sellers. They do, though, represent some informative, enjoyable reading about trees, wood, tools, woodworkers, and woodworking. As *WOOD*® magazine's features editor, I research many different subjects for each of the nine issues we publish every year. Often that means lots of reading. Here's hoping that some day you can spend a few hours with each of my selections.

Peter J. Stephens

Trees tell many a story

- *A Natural History of Western Trees*, 600 pages. *A Natural History of Trees, Eastern and Central North America*, 750 pages. Both by Donald Culross Peattie, Houghton Mifflin Company, 1991. \$20 each, softcover.

If you love trees and their place in history, you'll really enjoy these references. The author cites descriptive characteristics, anecdotes, and tall tales, and spins them all into fascinating stories perfect for armchair reading. For instance, of the sycamore Peattie writes, "So the pioneer cut trunks of great dimension into cross sections, which he then bored through the center, to make primitive solid wheels for his ox cart."

- *A Reverence for Wood*, by Eric Sloane, 108 pages, Ballantine Books, 1989. \$9, softcover.

Talk about romancing a reader! Eric Sloane writes about trees and wood in early America with the depth of a scholar and the flair of a storyteller. To learn such things as why wooden siding was called clapboard, you'll read and reread this little book.

- *World Woods in Color*, by William A. Lincoln, 320 pages, Linden Publishing, 1996. \$50, hardcover.

This book you won't want to read cover to cover in one sitting. It's strictly for reference, but the material is straightforward, detailed, and includes large color photos of 300 or so wood species. You'll learn how each wood behaves in drying, machining, and finishing. An expensive but informative shop reference volume.

Here's how they did it back then

- *Old Ways of Working Wood*, by Alex Bealer, 256 pages, Book Sales, 1996. \$10, hardcover.

Have you wondered how our pioneer forefathers managed to build all they did without power tools? Well, author Bealer tells and shows you in this superb book. Pen-and-ink illustrations are simple but effective. This rates as a highly interesting text that helps you gain new appreciation for everything from a split-rail fence to a post-and-beam barn and the tools that helped make them.

So you thought you knew your tools?

- *Dictionary of Woodworking Tools*, by R.A. Salaman, 546 pages, Astragal Press, 1997. \$40, softcover.

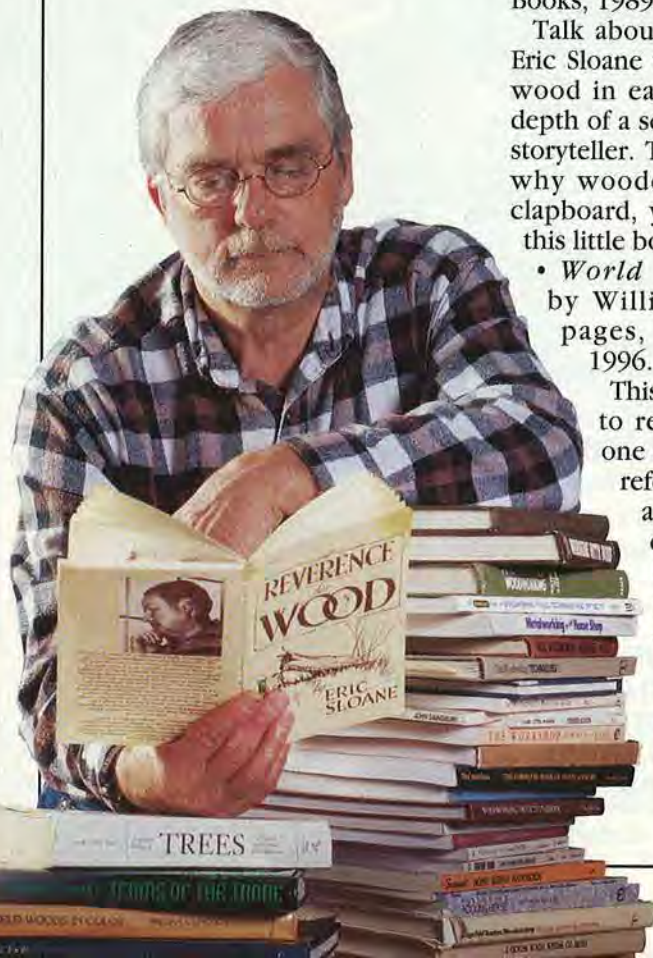
Salaman covers every hand tool imaginable with descriptions and wonderful drawings.

A little about a lot of things

- *Terms of the Trade*, by editors of Random Lengths Publications, 352 pages, Random Lengths, 1993. \$39.95 ppd. in U.S., hardcover. (Order direct by calling 541/686-9925, or send your check or a money order to Random Lengths Publications, P.O. Box 867, Eugene, OR 97440-0867.)

This book is really a dictionary, but unique in that it includes only terms used in the logging and forest products industry. An example: "Pig iron. Hardwood logs, so called because they're heavier than pine, spruce, or hemlock." Useful information in the back includes a chart for dressed lumber sizes, metric conversion tables, board-foot volumes for dimensional stock, and much more. 🌲

Photographs: Hetherington Photography



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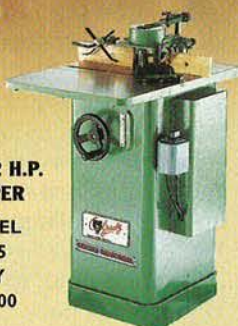
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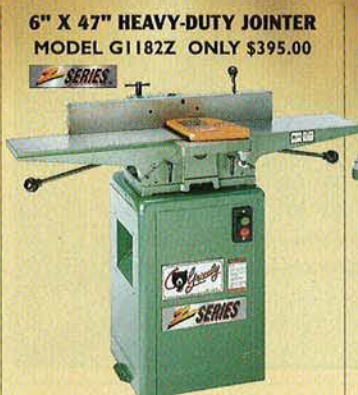


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PRODUCTS THAT PERFORM



Low-priced lathe shows mettle in machining

If you want to try metal turning but balk at spending \$1,000 or more for the lathe, here's a low-buck route into metal machining. For about \$400, Central Machinery's 7x10" mini metal lathe gives you big-lathe capabilities on a small scale.

PRODUCT SCORECARD

Central Machinery 7x10" precision mini lathe no. 33684-1

| | |
|-------------|-----------|
| Performance | ★ ★ ★ ★ ☆ |
| Price | \$369.99 |
| Value | ★ ★ ★ ★ ★ |

Harbor Freight Tools, 3491 Mission Oaks Blvd., Camarillo, CA 93011-6010, call 800/423-2567, fax 800/905-5220. <http://www.harborfreight.com>

With over 1,000 hours' experience on a big metal-turning lathe, I was curious to see what this little machine could do—and how well.

The lathe offers adequate capacity for lots of small jobs—turning metal or plastic wheels for toys or outdoor projects, bushings for wheels and pivots, or pulls and knobs, for instance. You could turn straight-bodied wooden pens and pencils on it, too.

The three-jaw chuck features interchangeable inside and outside jaws. The 3"-diameter chuck takes stock up to 3" in diameter, but works best with materials 1½" or smaller. Instead of threading onto the spindle, the chuck bolts to an integral flange on the spindle. The tailstock bore carries a standard no. 2 Morse taper.

On first inspection, the cast-iron machine appeared to be solid and well built, although a few components seemed somewhat crudely finished. The chuck ran true with no runout when I checked it with a dial indicator. Hand controls worked nicely, though they weren't as silky smooth as the ones on my big metal lathe.

I was amazed by the number of features on this little tool—forward and reverse power feed, forward and reverse rotation, thread-cutting capability with changeable gears, variable-speed motor with high- and low-range gearing, and more.

I turned steel, aluminum, and wood, and achieved excellent results on all. The mini lathe made cuts as clean and accurate as my big lathe. It was fun to work with, too. If you need—or just want—to turn small metal parts, you'll enjoy this tool very much.

—Tested by Bob McFarlin



Print this article

Continued on page 96

GET MORE

The new MultiMaster is three tools in one: detail sander, scraper and flush-cut saw.

Detail Sander

The MultiMaster's patented oscillating motion and special triangle sanding pad permit aggressive sanding along delicate edges and in tight corners.



Flush Cut Saw Blade

Smoothly undercuts door jambs for floor coverings. Plunge cuts into wall board. Cuts wood, plaster and PVC. But because it oscillates, it won't cut you.



Rigid Scraper

Easily removes old putty, caulking and flooring adhesives. Great for scraping paint and varnish or lifting linoleum.



Oscillation

Only the MultiMaster oscillates at a rate of 21,000 strokes per minute in a 3.2 degree arc.



GET MORE

Detail sander, power scraper and oscillating saw all in one tool.

DO MORE

Scrape. Sand. Saw.

SPEND LESS

The new MultiMaster. Best pricing ever.

Until now, a Fein detail sander plus scraper and flush-cut saw would have cost you over \$300. Now, while supplies last, the MultiMaster package includes all of these accessories, and the price

is under \$200*. It's the best Fein value ever. Want a MultiMaster now? Simply call for immediate delivery from a participating Fein dealer near you. To learn more about the MultiMaster, ask for our free brochure and poster.



CALL 1-800-441-9878

Circle No. 37

*Participating Fein dealers only

OPTIONAL ACCESSORIES

Get even more. The optional Professional Kit includes a carbide rasp, a grout-cutting saw blade, and a segment knife.

Carbide Rasp

Quickly grinds paint, mastic, stone and concrete. Won't load up.



Grout-Cutting Saw

Blade cuts grout to remove damaged tile without breaking surrounding tiles or creating excessive dust.



Segment Knife

Easily slices rigid materials like floor tiles, linoleum, carpet, plastic and leather.



The Fein MultiMaster is a true multi-purpose tool that saves hours of time. With the MultiMaster, finishing is just the beginning.



Finishing is just the beginning.



Kitchen designs: Lee Wannaefer, CKD. Kitchens by Design. Plainview, NY/Photo: Carol Bartz

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Terrco provides a full line of machine carving and sign carving equipment. Beginning models are the T-110 single spindle bench carver and our CM614 single spindle sign carver.

Intermediate models include the K-Star, a two-spindle heavy duty bench model, and the Northstar, a heavy duty floor model available in one to eight spindles.

Our advanced model is our Master Carver series, which is an extremely heavy duty floor model with from eight to forty spindles.

Write or call for more information.

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USA
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Model T-110 Dupli-Carver



Model CM614 Sign Carver



Multi-Spindle Carving Machine

Circle No. 2175

PRODUCTS THAT PERFORM



Continued from page 94

PowerGrip Clamps work one-handed

Bessey recently added a squeeze-grip lever for one-handed adjustment to its traditional all-steel bar clamp. That's great, but the engineers at Bessey also managed to give the PowerGrip Clamp all the clamping force of the original.

Each squeeze of the lever on the PowerGrip Clamp moves the clamping head $\frac{1}{4}$ ", and you can exert enough pressure with just the lever for most properly joined glue-ups. However, if conditions require additional force, a twist of its traditional handle increases the pressure considerably.

In fact, I couldn't get the clamp to let go until I backed off the handscrew, then pressed the red release button. Pushing this button also lets you quickly slide the clamping head into position without squeezing the lever.

The 4" clamping depth should provide enough reach for most projects. While the PowerGrip Clamp carries a fairly high price tag, I feel the quality and capabilities of this tool justify the cost.

—Tested by Dave Henderson



PRODUCT SCORECARD

Bessey PowerGrip Clamps

| | |
|-------------|--|
| Performance | ★ ★ ★ ★ ★ |
| Price | About \$35 to \$40 for 12" model About \$40 to \$45 for 24" model |
| Value | ★ ★ ★ ★ ☆ |

American Clamping, 50 Franklin St.,
P.O. Box 399, Batavia, NY 14021.
Call 800/828-1004.

Continued on page 98

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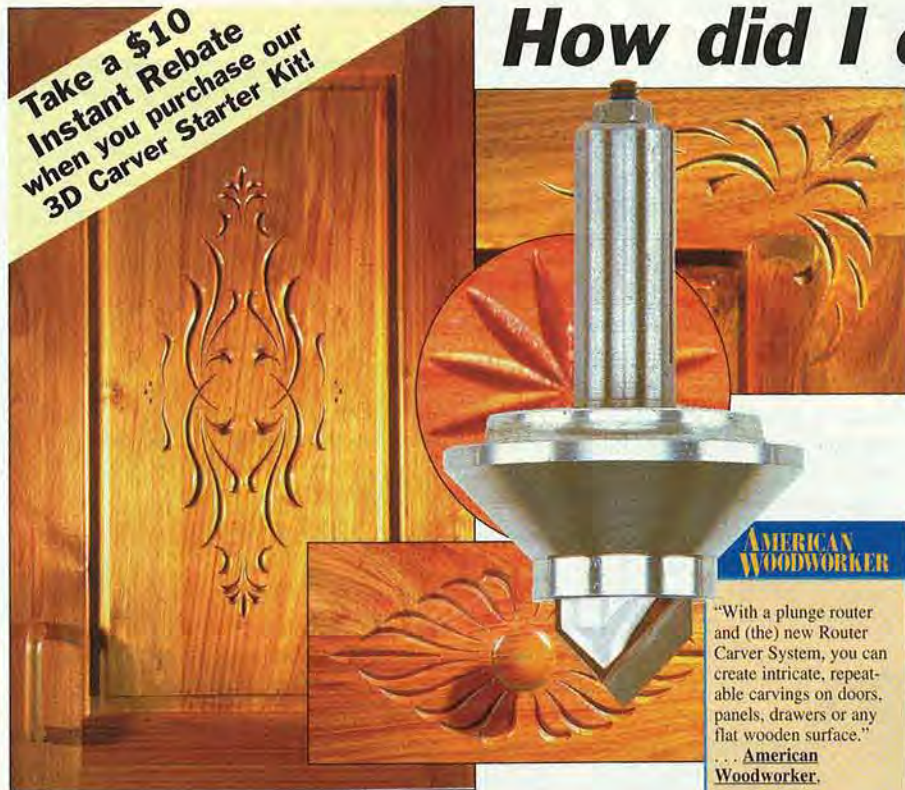
TOOLS



KNOW HOW

Take a \$10
Instant Rebate
when you purchase our
3D Carver Starter Kit!

How did I carve these?



I love the look of hand carved wood, but hand carved cabinets, doors and furniture have always been beyond my budget and quite frankly, intricate carving has always been beyond my skills. Besides the expense and skill required, traditional hand-carving has another limitation: it's very difficult to exactly duplicate a carving.

The 3D Carving system solves all of these problems, allowing any woodworker to produce perfect designs once, twice or a hundred times! With the 3D System, cabinet and furniture makers can add rosettes, corner designs and "hand carving" to their pieces.

Best of all, the 3D Carving System is very affordable, providing woodworkers with an excellent opportunity to add distinctive touches to their work.

Sincerely,
Carlo Venditto, President.

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"With a plunge router and (the) new Router Carver System, you can create intricate, repeatable carvings on doors, panels, drawers or any flat wooden surface."

... American
Woodworker.

Popular
Woodworking

"... thanks to an exciting new product called 3D Router Carver, anyone with a plunge router can produce handsome results in far less time than would be required using chisels to carve by hand."

... R.J. DeCristoforo,
Popular Woodworking

WOOD®

"In my tests of this system, I found it no more difficult than routing any pattern with a bearing- or bushing-guided bit. What really impressed me is that it took just 6 to 7 minutes to complete the pattern..."

... Dave Henderson,
WOOD® Magazine

With Jesada's 3D Router Carver™ System

What is the 3D Router Carver™ System?

The 3D Router Carver System is a unique patented method of producing intricate carvings quickly, economically and with complete repeatability. With the Carver Bit, Carver Templates and your 1/2" collet plunge router you can carve any flat wooden surface with designs that rival the work of a professional carver. In fact, the 3D Carver System's speed, accuracy and economy make it attractive to the professional or the serious amateur. Besides your router, the system requires three key elements:

1) **The 3D Carver Bit:** A 1/2" shank, carbide tipped V-Groove Bit is enclosed in a 45° guide bushing. A threaded shaft within the bit's shank allows precise depth adjustment of the tip of the V-Groove bit.

Bit Specifications: Shank: 1/2" Cut diam.: 3/4" Cut Angle: 45° Cut depth: 5/8" Guide bushing diam.: 1-7/8"

2) **Template Holding Frames:** Clamped or tacked to your workpiece, these frames hold the 3D Templates securely in place.

3) **Carver Templates:** A total of over 50 templates produce a host of designs for cabinet doors, panel doors, door rails and corners, drawer fronts and many other applications. Can you make your own templates? You'll find it pretty difficult unless you are a skilled patternmaker. Our templates feature intricate designs cut on computer-controlled machinery with precision that's difficult to match in the shop.

How does the system work?

Using the 3D Carver is easy. The bit is installed in the router (1/2" collet only) with the plunge mechanism unlocked so that the router can move up and down as you rout. The 45° bushing follows the slots in the template. As the slot gets wider, the router moves downward, so the v-groove gets wider. As the slot narrows, the router moves up and the groove gets narrower. That's it!

How do I get started? With our 3D Carver Starter Set!

This popular kit includes everything you need to get started with the 3D Router Carver. It includes the templates and holding frames to make the Classical Cabinet Door and Drawer designs shown at right, plus a 3D Router Carver™ Bit, complete instructions and a copy of the 3D Carver video.

499-010X

3D Carver Starter Kit: Classical Door

& Drawer with 3D Carver™ Bit and a video!

List: \$202.10 SALE: \$174.⁹⁰

After your
Instant Rebate: \$164.⁹⁰

Classical Door.
Carving size: 17-3/4" x
7-1/4", approx. carv-
ing time: 5 minutes

Classical Drawer.
Carving size: 8-1/4" x
2-3/4", approx. carv-
ing time: 4 minutes



Where can I learn more?

Order our 3D Carver Pattern Set or the Carver video! The Pattern Set includes full-size reproductions of all 52 designs printed on heavy paper stock that can be quickly removed from the binder.

3DC-900
Pattern Set, List: \$20.00 SALE: \$14.90

The 3D Carver Video is the perfect introduction to this exciting tool. You'll see the system in action as the narrator offers a complete step-by-step explanation.

3DC-999
3D Carver Video List: \$13.00 SALE: \$10.00

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310 Mears Boulevard, Oldsmar, FL 34677

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In Australia: 1300 301335

The 3D Carver System™ & Templates are protected by U.S. patent #5,146,965 & international patents.



Continued from page 96

Portable air filter gobbles sawdust at the source

Breathing sawdust-laden air isn't healthy. Plus, it settles all over you, your tools, and your projects. Now, Craftsman has another weapon in the war against workshop dust—a portable air filter.

With an air flow of 200 cubic feet per minute (CFM) the Craftsman Portable Air Filtration System grabs dust in a two-stage filter. A woven pad on the intake end catches most of the particles before the air then passes through a 5-micron filter bag and out the back. I found both filters easy to clean.

To test the machine's air-cleaning capabilities, I ran it while sanding drywall joints in a 10×15×8' room. This generated about as much dust as sawing with a tablesaw, and most of it went airborne. Even in this relatively small space, I found the portable filter less effective than a standard whole-shop air cleaner, which would handle about twice the volume of air.

But, airborne dust is difficult to capture with any filter. So the best approach is to trap dust at the source, before it gets into the air. With this in mind, I set the filter on my workbench, then raised some dust by sanding and power-carving nearby. Here,



PRODUCT SCORECARD

Craftsman no. 16995 Portable Air Filtration System

| | |
|-------------------------|-----------|
| Performance | |
| Whole-shop air cleaner | ★ ★ ☆ ☆ ☆ |
| Benchtop dust collector | ★ ★ ★ ★ ☆ |
| Price | \$159.99 |
| Value | |
| Whole-shop air cleaner | ★ ★ ☆ ☆ ☆ |
| Benchtop dust collector | ★ ★ ★ ★ ☆ |

Available through the Sears Craftsman Power and Hand Tools catalog. Call 800/377-7414.

I found the filter easily caught up to 90 percent of the dust generated.

The built-in handle and compact size (12" diameter × 29" long) make the filter easy to carry right to where you're making dust. The machine can also be ceiling- or wall-mounted.

For whole-shop air cleaning, you can find better choices. But, the Craftsman Portable Air Filtration System proves ideal for situations where ducted dust collection isn't available.

—Tested by Bob McFarlin
Continued on page 108

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Do the work of 10 tools with 1 compact, affordable machine

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the perfect partner to help
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| Drill press | | |

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—Edward Zych (TN)

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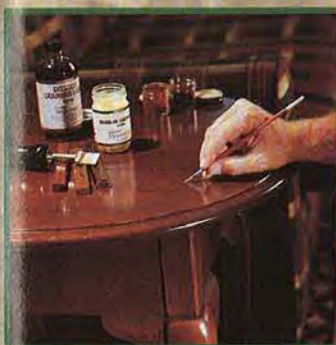
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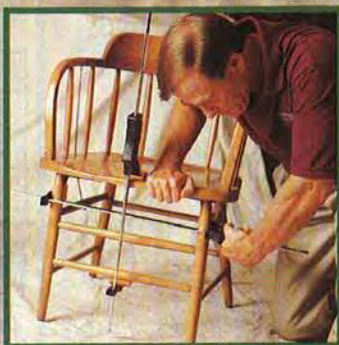


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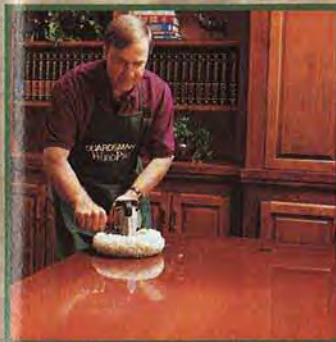
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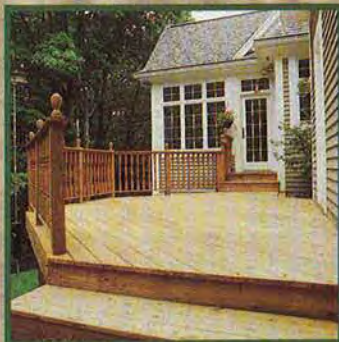
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\$75⁹⁹

ITEM 51646-5MGA

3/8", 14.4 VOLT CORDLESS DRILL/DRIVER Bosch 3610K-146
 • 0-450, 0-1200 RPM, variable speed reversible
 • Includes: 2 amp hour battery, 1 hour charger, & case
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 THE MOST USER FRIENDLY TAPE MEASURE YOU WILL EVER FIND!

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1" x 33 FT. **\$8⁹⁹**
 ITEM 38262-1MGA

1" x 25 FT. **\$4⁹⁹**
 ITEM 37570-3MGA

3/4" x 16 FT. **\$3⁹⁹**
 ITEM 38261-2MGA

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16" SCROLL SAW

• Precision milled 14-1/2" x 8" cast aluminum table tilts 0° to 45°
 • Uses pin end blades, 5-1/2" long
 • Heavy duty cast iron frame and base reduce vibration
 • 1/8 HP, 110V, 83 amps
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 • 7/8" blade stroke

~~\$69⁹⁹~~ **\$49⁹⁹**

ITEM 37908-2MGA

FOOT SWITCH WITH GUARD
 Ready to use. Steel housing and 8 ft. cord.

ITEM 37784-1MGA **\$9⁹⁹**

CENTRAL MACHINERY

12" DIRECT DRIVE BENCH TOP DISC SANDER

Get sharp, accurate finishes without burning or marring. Direct drive disc won't slip. Table tilts to 45°; 2" dust collection outlet; fan-cooled brushless motor; miter gauge, base pads prevent creeping; safety switch. Includes 60 grit, 12" sanding pad.

• 1 HP, 120V, 14.0 amps
 • No load speed: 1793 RPM
 • Wheel diameter: 12" • Base: 13" x 10"
 • Shipping wt.: 92 lbs.

~~\$99⁹⁹~~ **\$89⁹⁹**

ITEM 37297-3MGA

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| GRIT | ITEM | PACK OF 2 |
|------|------------|-------------------------|
| 36 | 38001-1MGA | \$6⁹⁹ |
| 60 | 37958-1MGA | \$6⁹⁹ |
| 120 | 37959-1MGA | \$6⁹⁹ |
| 240 | 37960-1MGA | \$6⁹⁹ |

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2 PC. 3/4" HEAVY DUTY PIPE CLAMP

Constructed from heat-treated cast iron, these durable clamps keep your work rock steady. Just screw the handle side onto a 3/4" threaded pipe and slide the spring loaded end on. You're ready to go! Pipe not included.

• Handle screw operating range: 2-1/8"
 • 1-1/2" throat depth
 • Weight: 2-7/16 lbs.

ITEM 31255-1MGA **\$3⁹⁹**

1/2" PIPE CLAMP

• 1-1/2" throat depth
 • Weight: 1-4/5 lbs.

ITEM 37056-2MGA **\$2⁹⁹**

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3" BOSCH STYLE JIGSAW BLADES

High performance blades with Bosch style shanks. Gives maximum quality cuts every time (Not shown). ~~\$7⁹⁹~~ PK. **99¢**

ITEM 36339-3MGA OF 5

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Contains a grab bag selection of saw blades for your reciprocating saw. Contents vary for each package. ~~\$3⁹⁹~~ PK. **\$19⁹⁹**

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High speed steel. Types vary. All have 1/4" universal shanks. ~~\$7⁹⁹~~ **99¢**

ITEM 50518-2MGA

CENTRAL MACHINERY

6" INDUSTRIAL RABBETING JOINTER

INCLUDES STAND

• Infeed table size: 22-1/2"
 • Outfeed table size: 19-1/2"
 • Motor: 1 HP, 110V, 4 amp, 4900 to 5900 RPM cutter head speed
 • Maximum depth of cut: 3/8"

~~\$279⁹⁹~~ **\$199⁹⁹**

ITEM 30289-4MGA

REPLACEMENT BLADE SET

ITEM 33271-2MGA **\$15⁹⁹**

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18 GAUGE AIR BRAD NAILER

This unit has the features you need: safety trigger, durable aluminum magazine, easy jam clearance, stainless steel driver and cylinder.

• 55-95 operating PSI
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 • 100 brad maximum capacity
 • Tool weight 2-3/4 lbs.

~~\$45⁹⁹~~ **\$29⁹⁹**

ITEM 31308-8MGA

18 GAUGE BRADS (PACK OF 5000)

| LENGTH | ITEM | PRICE |
|---------|------------|-------------------------|
| 1" | 33206-1MGA | \$5⁹⁹ |
| 1-3/16" | 33207-2MGA | \$6⁹⁹ |

50 FT. X 3/8" AIR HOSE

1/4" NPT; 150 PSI working pressure, 200 PSI burst

ITEM 00667-2MGA **\$9⁹⁹**

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 • 3/4 HP

12" BANDSAW

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ITEM 01629-3MGA **\$89⁹⁹**

BANDSAW BLADE

• 6 TPI

ITEM 31236-5MGA **\$4⁹⁹**

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 • Individually organized storage cases

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ITEM 31164-5MGA **\$29⁹⁹**

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ITEM 33078-7MGA **\$15⁹⁹**

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| TEETH | ITEM | PRICE |
|-------------------------------------|------------|-----------------------------------|
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ITEM 52880-7MGA



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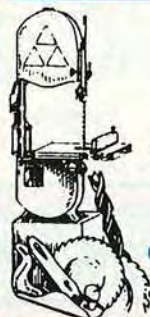
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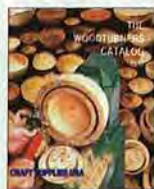
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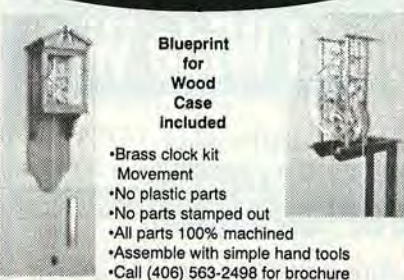
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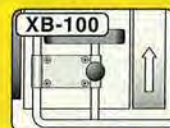
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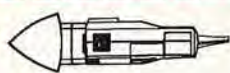
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| WL-1041 | 1/8" | \$9. |
| WL-1042 | 3/16" | \$9. |
| WL-1043 | 1/4" | \$9. |
| WL-1044 | 5/16" | \$10. |
| WL-1045 | 3/8" | \$11. |
| WL-1046 | 1/2" | \$13. |
| 1/2" Shank | | |
| WL-1049 | 1/8" | \$9. |
| WL-1042-5 | 3/16" | \$9. |
| WL-1050 | 1/4" | \$9. |
| WL-1044-5 | 5/16" | \$10. |
| WL-1051 | 3/8" | \$12. |
| WL-1052 | 1/2" | \$13. |
| WL-1053 | 5/8" | \$16. |
| WL-1054 | 3/4" | \$18. |
| WL-1055 | 7/8" | \$25. |
| WL-1056 | 1" | \$27. |
| WL-1057 | 1-1/8" | \$30. |
| WL-1058 | 1-1/4" | \$30. |

Cove Bits (continued)

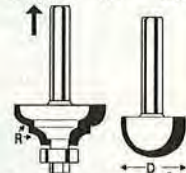
| 1/2" Shank | | |
|------------|------|-------|
| WL-1169 | 1/8" | \$10. |
| WL-1170 | 1/4" | \$11. |
| WL-1171 | 3/8" | \$13. |
| WL-1172 | 1/2" | \$14. |
| WL-1173 | 5/8" | \$18. |
| WL-1174 | 3/4" | \$20. |

Chamfer Bits

| 1/4" Shank • Degree | | |
|-----------------------------|---------|-------|
| WL-1180 | 15° | \$10. |
| WL-1181 | 25° | \$10. |
| WL-1182 | 45° | \$12. |
| WL-1183 | 45° | \$14. |
| (for up to 3/4" material) | | |
| 1/2" Shank | | |
| WL-1184 | 45° | \$10. |
| WL-1185 | 11-1/2° | \$12. |
| WL-1186 | 15° | \$12. |
| WL-1187 | 22-1/2° | \$12. |
| WL-1188 | 30° | \$14. |
| WL-1189 | 45° | \$15. |
| WL-1190 | 45° | \$22. |
| (for up to 1-1/4" material) | | |

Classical Ogee Bits

| 1/4" Shank • Radius | | |
|---------------------|-------|-------|
| WL-1250 | 5/32" | \$18. |
| WL-1251 | 1/4" | \$20. |
| 1/2" Shank | | |
| WL-1252 | 5/32" | \$18. |
| WL-1253 | 1/4" | \$20. |

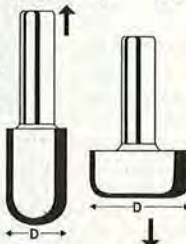


Core Box Bits

| 1/4" Shank • Diameter | | |
|-----------------------|------|-------|
| WL-1370 | 1/8" | \$10. |
| WL-1371 | 1/4" | \$8. |
| WL-1371-1 | 3/8" | \$9. |
| WL-1372 | 1/2" | \$10. |
| WL-1373 | 3/4" | \$12. |

Roundnose/Core Box

| 1/2" Shank • Diameter | | |
|-----------------------|------|-------|
| WL-1375 | 1/4" | \$8. |
| WL-1375-1 | 3/8" | \$11. |
| WL-1376 | 1/2" | \$12. |
| WL-1377 | 3/4" | \$14. |
| WL-1378 | 1" | \$16. |

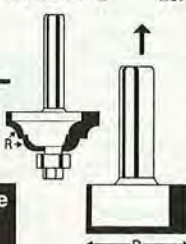


Bowl & Tray Cutter

| 1/4" Shank • Diameter | | |
|-----------------------|--------|-------|
| WL-1380 | 7/16" | \$13. |
| WL-1381 | 3/4" | \$15. |
| 1/2" Shank | | |
| WL-1385 | 3/4" | \$15. |
| WL-1386 | 1-1/4" | \$18. |

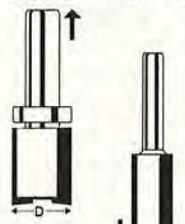
Dado & Planer Bit

| 1/4" Shank • Diameter | | |
|-----------------------|--------|-------|
| WL-1390 | 3/4" | \$12. |
| 1/2" Shank | | |
| WL-1391 | 3/4" | \$12. |
| WL-1392 | 1" | \$14. |
| WL-1393 | 1-1/4" | \$15. |
| WL-1394 | 1-1/2" | \$16. |
| WL-1394-1 | 2" | \$28. |



Pattern Cutting Bit

| 1/4" Shank • Diameter | | |
|-----------------------|--------|-------|
| WL-1400 | 1/2" | \$12. |
| WL-1401 | 5/8" | \$12. |
| WL-1402 | 3/4" | \$12. |
| 1/2" Shank | | |
| WL-1405 | 3/4" | \$15. |
| WL-1406 | 1-1/8" | \$16. |



Straight Bits

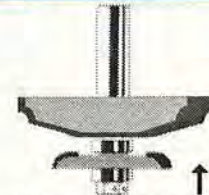
| 1/4" Shank • Diameter | | |
|-------------------------------|--------|-------|
| WL-1001 | 1/8" | \$10. |
| WL-1002 | 3/16" | \$5. |
| WL-1002-5.5 | 5.5mm | \$5. |
| (for undersized 1/4" plywood) | | |
| WL-1003 | 1/4" | \$5. |
| WL-1004 | 5/16" | \$5. |
| WL-1005 | 3/8" | \$5. |
| WL-1006 | 15/32" | \$5. |
| (for undersized 1/2" plywood) | | |
| WL-1007 | 1/2" | \$6. |
| WL-1008 | 9/16" | \$6. |
| WL-1009 | 5/8" | \$7. |
| WL-1010 | 23/32" | \$8. |
| (for undersized 3/4" plywood) | | |
| WL-1011 | 3/4" | \$9. |
| WL-1012 | 1" | \$10. |
| 1/2" Shank | | |
| WL-1020 | 15/64" | \$5. |
| (for undersized 1/4" plywood) | | |
| WL-1021 | 1/4" | \$5. |
| WL-1019 | 5/16" | \$5. |
| WL-1022 | 3/8" | \$5. |
| WL-1023 | 7/16" | \$5. |
| WL-1024 | 15/32" | \$5. |
| (for undersized 1/2" plywood) | | |
| WL-1025 | 1/2" | \$6. |
| WL-1027 | 5/8" | \$8. |
| WL-1028 | 23/32" | \$8. |
| (for undersized 3/4" plywood) | | |
| WL-1029 | 3/4" | \$9. |



Corner Lock Mitres

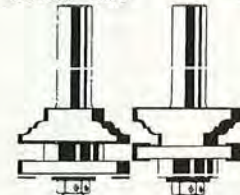
| | |
|-----------------------------|------------------|
| For up to 5/8" material | |
| WL-1420-2 | 1/4" shank \$25. |
| For 1/2" to 3/4" material | |
| WL-1420-1 | 1/2" shank \$30. |
| For material 3/4" to 1-1/4" | |
| WL-1420 | 1/2" shank \$38. |

For the Shaper Lock Mitre WL-1581 \$40.



Horizontal Panel Raiser - 3 1/2" Dia. with Undercutter • 1/2" Shank

| | | |
|---------|--------------------------------|-------|
| WL-1346 | Ogee | \$49. |
| WL-1347 | Traditional | \$49. |
| WL-1348 | Convex (Cove) | \$49. |
| WL-1359 | 12" Facecut with Quarter Round | \$49. |
| WL-1363 | Wave | \$49. |



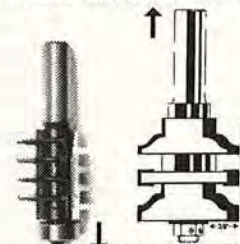
2-piece Rail & Stile Cutter Sets

| 1/2" Shank | Set | |
|------------|--------------|-------|
| WL-1360 | Ogee Profile | \$59. |
| WL-1361 | Roundover | \$59. |
| WL-1362 | Cove & Bead | \$59. |

1-piece Rail & Stile Cutter Sets

Just raise the cutter to make the matching cut. No changing or reversing.

| 1/2" Shank | | |
|------------|---------------|-------|
| WL-1365 | Ogee Profile | \$49. |
| WL-1366 | Roundover | \$49. |
| WL-1367 | Cove & Bead | \$49. |
| WL-1368 | Wedge | \$49. |
| WL-1374 | Dbt Roundover | \$49. |



Finger Joiner Router Bit

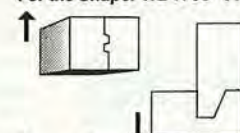
| | |
|---------|-------|
| WL-1429 | \$39. |
|---------|-------|

For the Shaper WL-1580 \$89.

Reversible Glue Joint

| | | |
|---------|-------------|-------|
| WL-1430 | 1-3/4" Diam | \$35. |
|---------|-------------|-------|

For the Shaper WL-1706 \$35.



Drawer Corner Lock

Makes drawer side separation virtually impossible

| | |
|------------|-------------------------|
| 1/2" Shank | |
| WL-1435 | For 1/2" material \$30. |

SHAPER CUTTERS

3/4" BORE

Corner Round

| | | |
|---------|--------|-------|
| WL-1509 | 1/8" | \$22. |
| WL-1510 | 1/4" | \$24. |
| WL-1511 | 3/8" | \$26. |
| WL-1512 | 1/2" | \$26. |
| WL-1513 | 3/4" | \$30. |
| WL-1514 | 1" | \$32. |
| WL-1515 | 1-1/4" | \$38. |

Bead

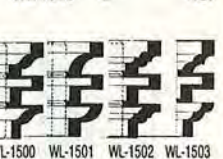
| | | |
|---------|------|-------|
| WL-1520 | 1/4" | \$24. |
| WL-1521 | 3/8" | \$26. |
| WL-1522 | 1/2" | \$26. |
| WL-1523 | 3/4" | \$28. |
| WL-1524 | 1" | \$30. |

Flute

| | | |
|---------|------|-------|
| WL-1530 | 1/4" | \$24. |
| WL-1531 | 3/8" | \$26. |
| WL-1532 | 1/2" | \$26. |
| WL-1533 | 3/4" | \$28. |
| WL-1534 | 1" | \$30. |

Rabbeting/Straight

| | | |
|---------|--------|-------|
| WL-1540 | 1/4" | \$24. |
| WL-1541 | 3/8" | \$26. |
| WL-1542 | 1/2" | \$26. |
| WL-1543 | 3/4" | \$28. |
| WL-1544 | 1" | \$30. |
| WL-1545 | 1-1/2" | \$32. |
| WL-1546 | 2" | \$48. |



SHAPER CUTTERS 3/4" BORE

1-piece Rail & Stile

Just raise the cutter to make the matching cut. No changing or reversing.

| | | |
|---------|---------------|-------|
| WL-1500 | Roman Ogee | \$89. |
| WL-1501 | Roundover | \$89. |
| WL-1502 | Cove & Bead | \$89. |
| WL-1503 | Dbt Roundover | \$89. |

| | |
|---------|--|
| WL-1600 | |
| WL-1601 | |
| WL-1602 | |
| WL-1603 | |
| WL-1604 | |
| WL-1605 | |

Panel Raisers (Shaper Cutter)

3/4" Bore

| | | |
|---------|--------------------------------|-------|
| WL-1600 | Ogee | \$59. |
| WL-1601 | 15° Facecut | \$59. |
| WL-1602 | 18° Traditional | \$59. |
| WL-1603 | Convex (Cove) | \$59. |
| WL-1604 | 12° Facecut with Quarter Round | \$59. |
| WL-1605 | Wave | \$59. |

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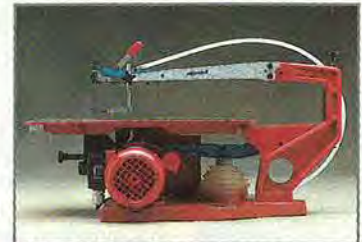


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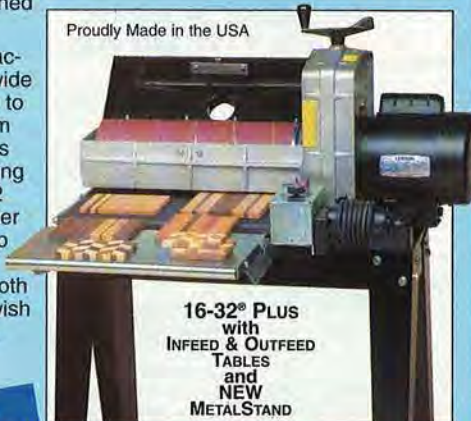
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PORTER CABLE Table with columns: Model, Description, List, Sale. Includes items like Profile Sander Kit, 1-1/2 HP Router, etc.

NEW PORTER CABLE CORDESS NAILERS Table with columns: Model, Description, List, Sale. Includes items like Angle Finish Nailer, Finish Nailer, etc.

PORTER CABLE Pneumatic Nailers Table with columns: Model, Description, List, Sale. Includes items like Brad Nailer, Brad Nailer, etc.

PORTER CABLE Compressors Table with columns: Model, Description, List, Sale. Includes items like 1 HP, 4 gal. Pancake, 1-1/2 HP, 4 gallon Side Stack, etc.

PORTER CABLE Cordless Drills Table with columns: Model, Description, List, Sale. Includes items like 1 1/2" Drill Kit, etc.

Call About The Christmas Tree

A bit of holiday history and tradition

- Ancient Egyptians brought palm leaves into their homes on the shortest day of the year in December (the 21st) as a symbol of life's triumph over death.
- In the Middle Ages, evergreens were hung with red apples to celebrate the feast of Adam and Eve on December 24.
- The first recorded reference to Christmas trees was in 16th-century Germany where trees were draped with colored paper, fruits, and sweets. The tradition was brought to America during the Revolutionary War by German mercenary soldiers who fought for the British.
- Franklin Pierce, the United States' 14th president, brought the Christmas tree tradition to the White House in 1855. In 1923, President Calvin Coolidge inaugurated the National Christmas Tree Lighting Ceremony on the White House lawn.

We bet you didn't know that:

- This year alone, over 33 million American families will celebrate the holidays by decorating a real Christmas tree. Source: National Christmas Tree Association (NCTA), 314/205-0944.
- According to the NCTA, the top states in Christmas tree production are Oregon, Michigan, Wisconsin, Pennsylvania, California, and North Carolina.
- The United States claims about 15,000 Christmas tree growers who, in total, have approximately 1 million acres in tree production. About 100,000 people work in the Christmas tree industry.
- The NCTA claims that the top-selling trees for the holidays are balsam fir, Douglas fir, Fraser fir, noble fir, Virginia pine, and white pine.

How to select and care for a Christmas tree

- Test for freshness by gently grasping a branch between your thumb and forefinger and pulling the needles toward you. Very few needles should come off if the tree is fresh.
- Until you're ready to decorate it, keep the tree in a sheltered, unheated area to protect it from drying wind and sun.
- Choose a stand that holds a gallon or more of water (it will absorb that much or more in the first 24 hours). Before setting the tree in the stand, make a new cut across the base about 1/4" above the original.
- Keep the stand filled with water. If the new cut is exposed, sap will seal it closed in 4 to 6 hours.
- To keep your tree fresh longer, shield it from fireplaces, heat ducts, and television sets.

What to do with your old tree

- Because Christmas trees are biodegradable, you can turn the trunk and branches into mulch for walkways and gardens. Check with your local public works department to see if they operate a community mulching program. (And remove all tinsel from the tree before pickup.)
- Christmas trees make effective sand and soil erosion barriers on beaches and river beds. Groups, such as the Izaak Walton League, often sink trees in lakes and ponds as refuge and feeding areas for fish.
- Before recycling as described above, use the tree as a temporary yard or garden bird feeder to supplement your other feeders. Hang fruit slices, suet, and seed from the branches. Birds will come for the food and stay for the welcome new shelter.
- Save a thicker portion of the trunk to dry and later carve or turn it into a meaningful memento of a wonderful holiday season.
- NEVER burn your Christmas tree in the fireplace or a woodstove. Doing so greatly contributes to creosote buildup. ♣

Illustrations: Brian Jensen and Jim Stevenson

Eleven new reasons to park your car in the driveway.



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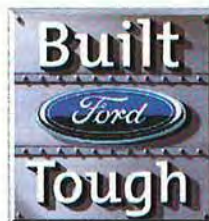
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*Based on MSRP comparison of Chevrolet and Ford base models.

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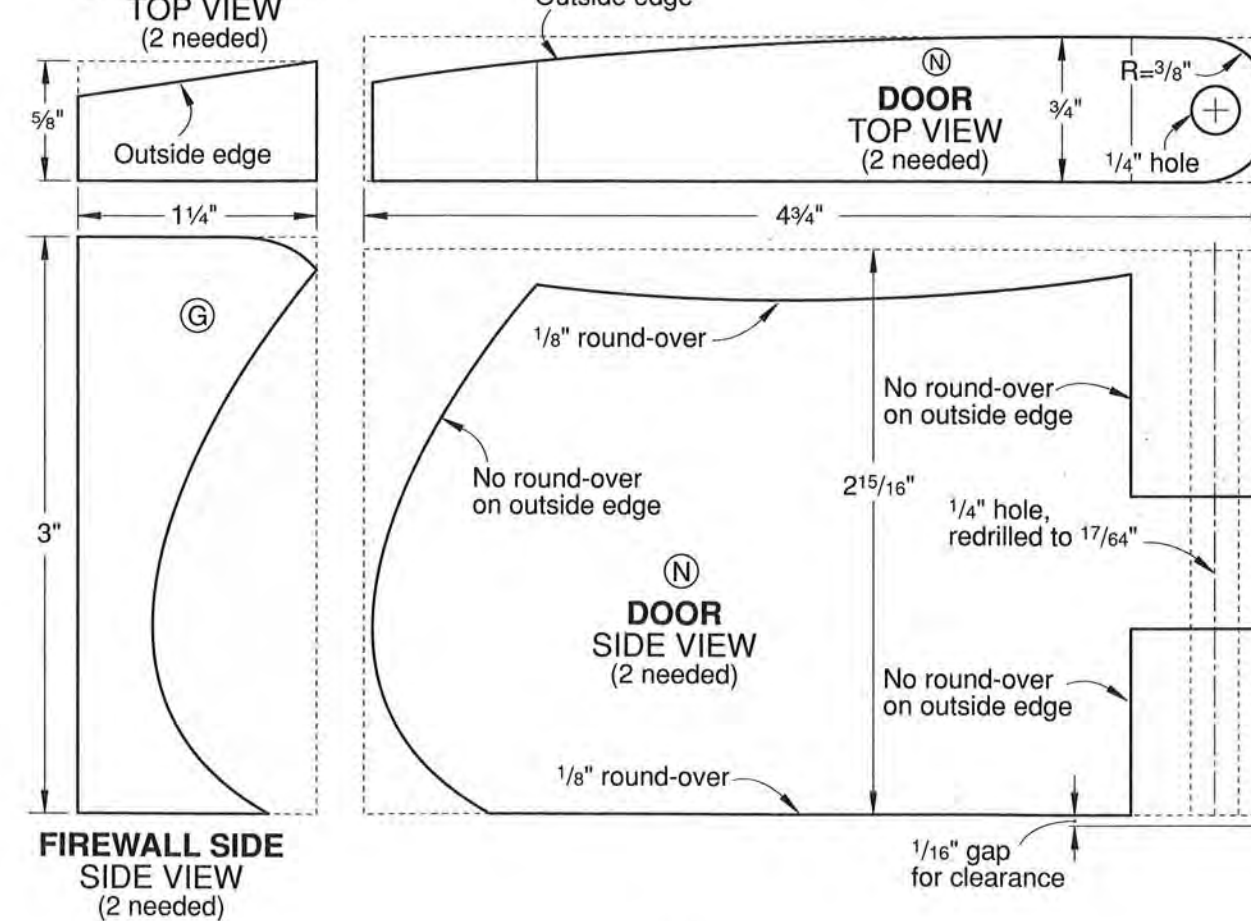
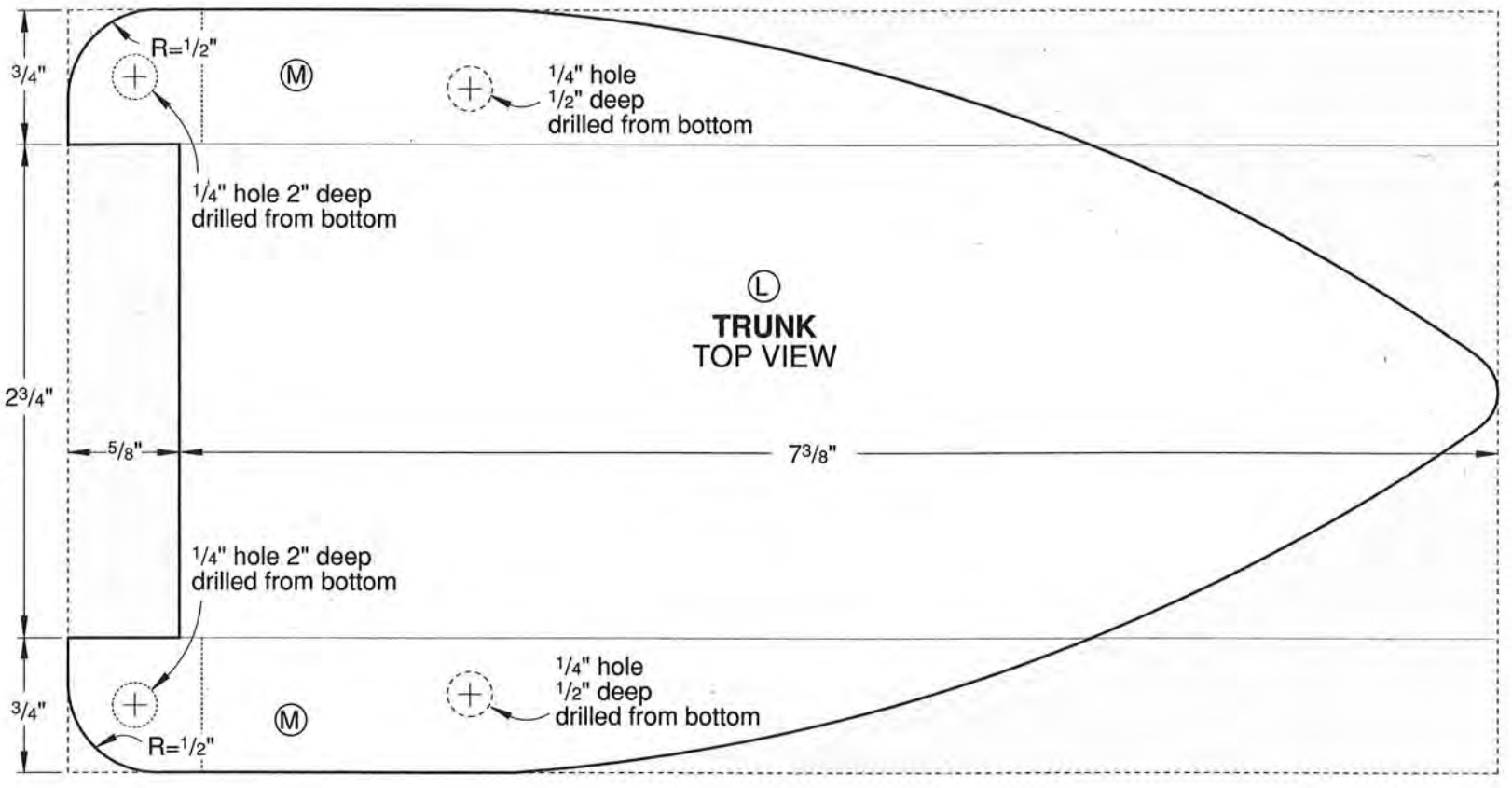
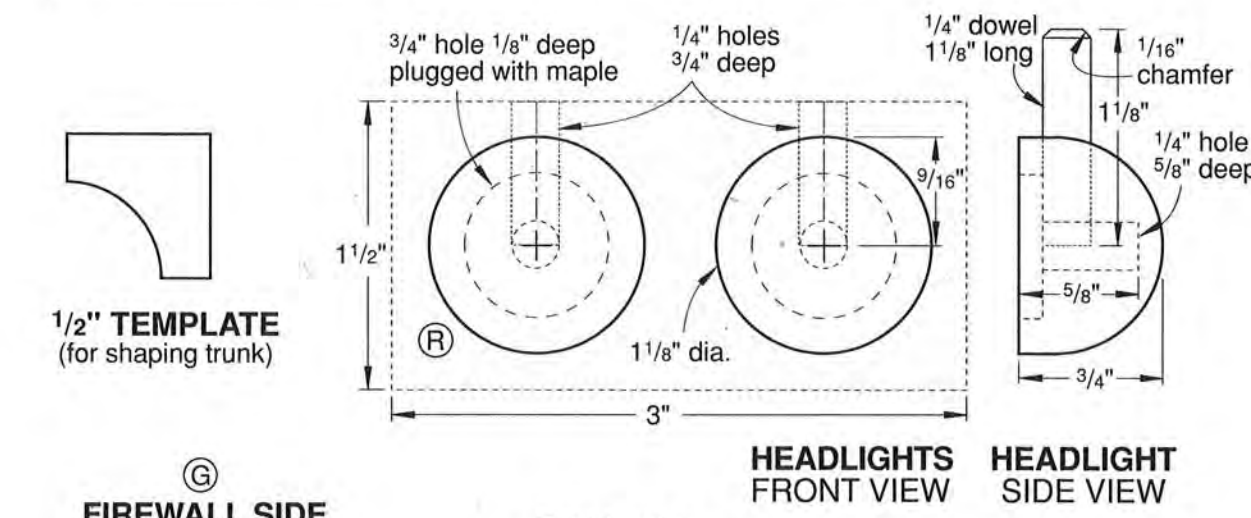
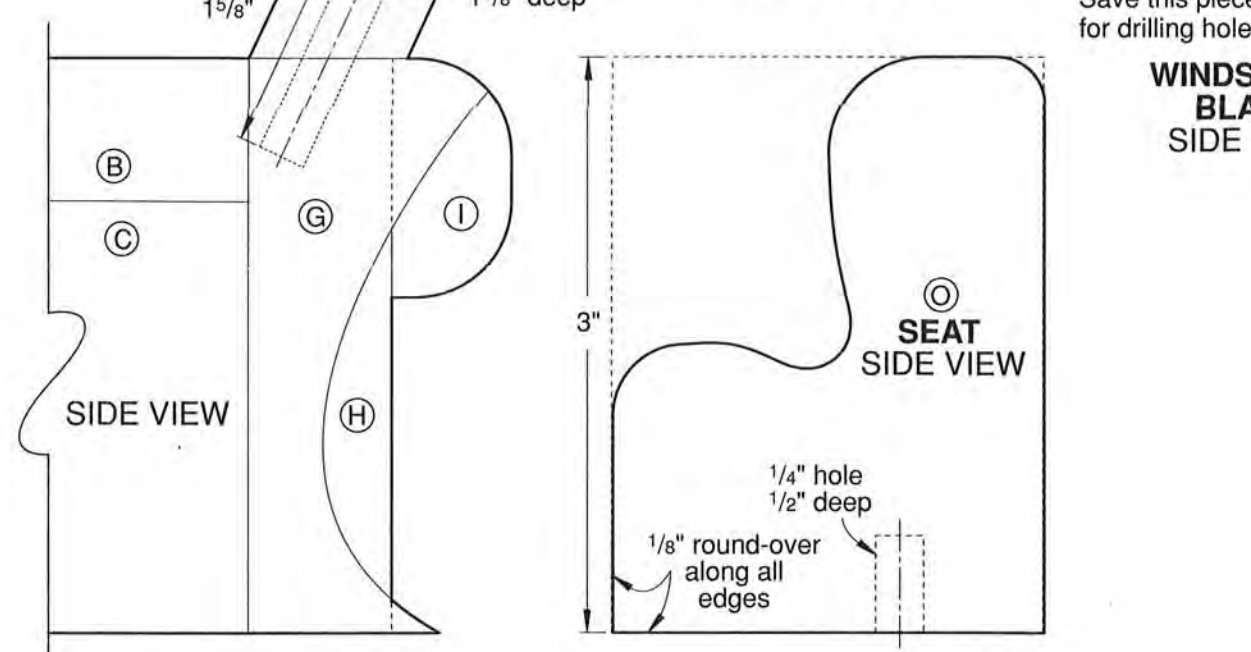
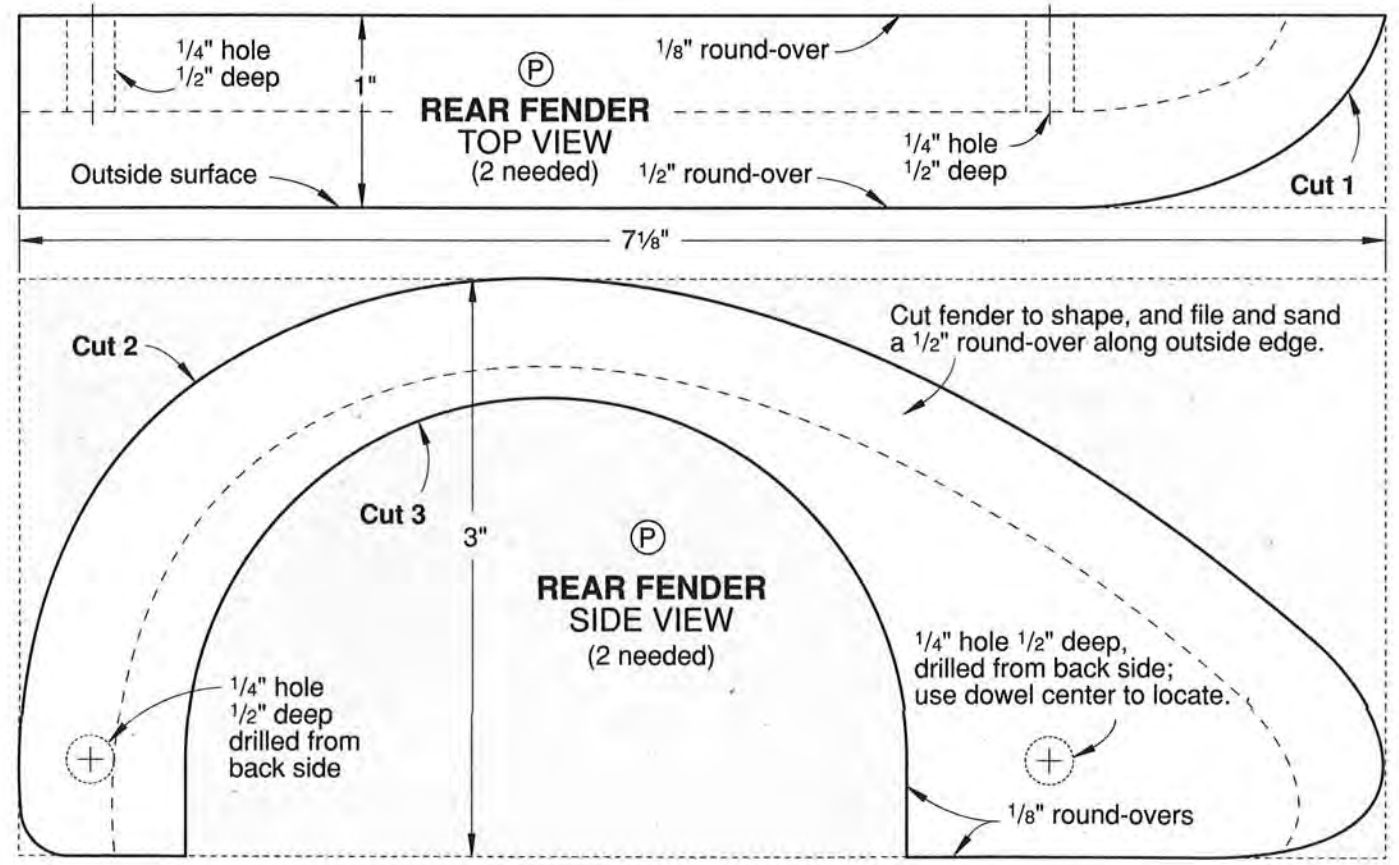
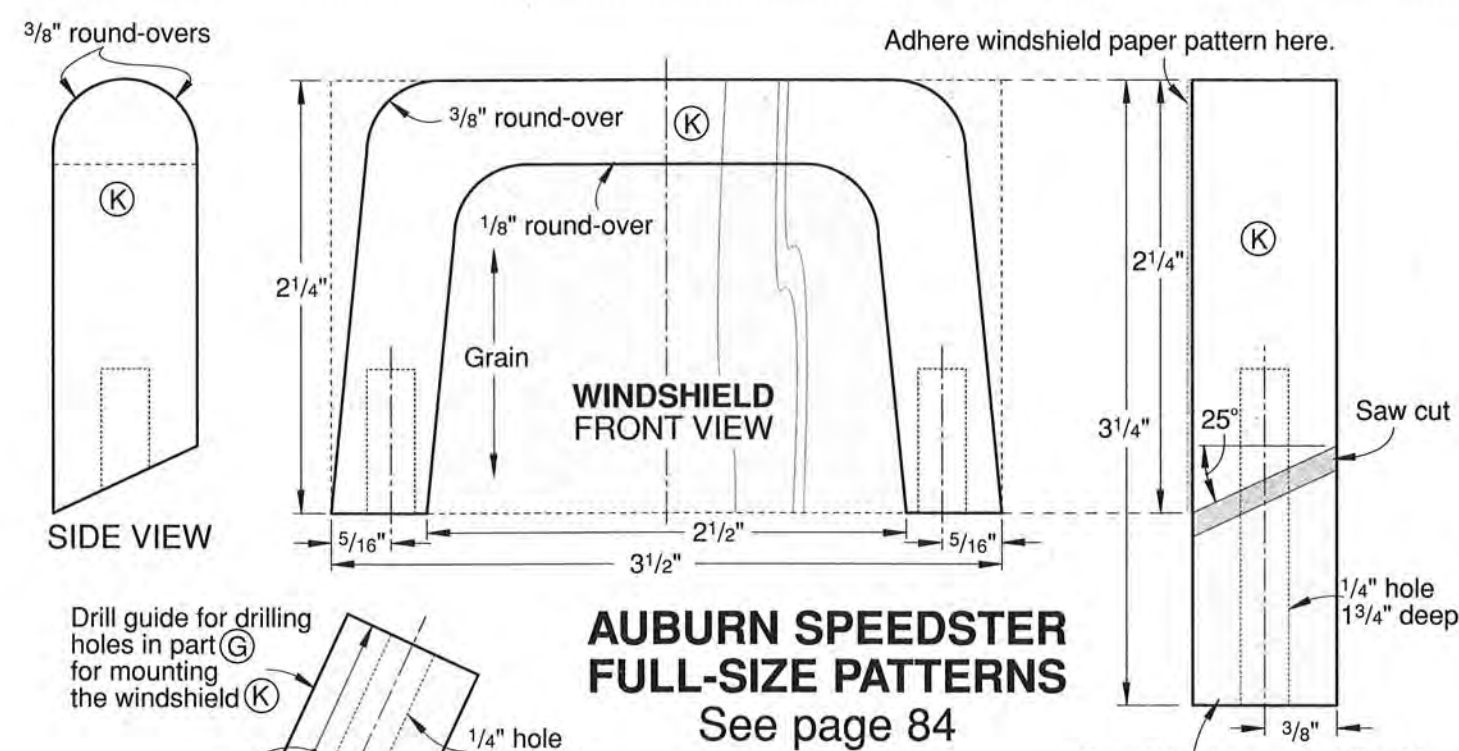
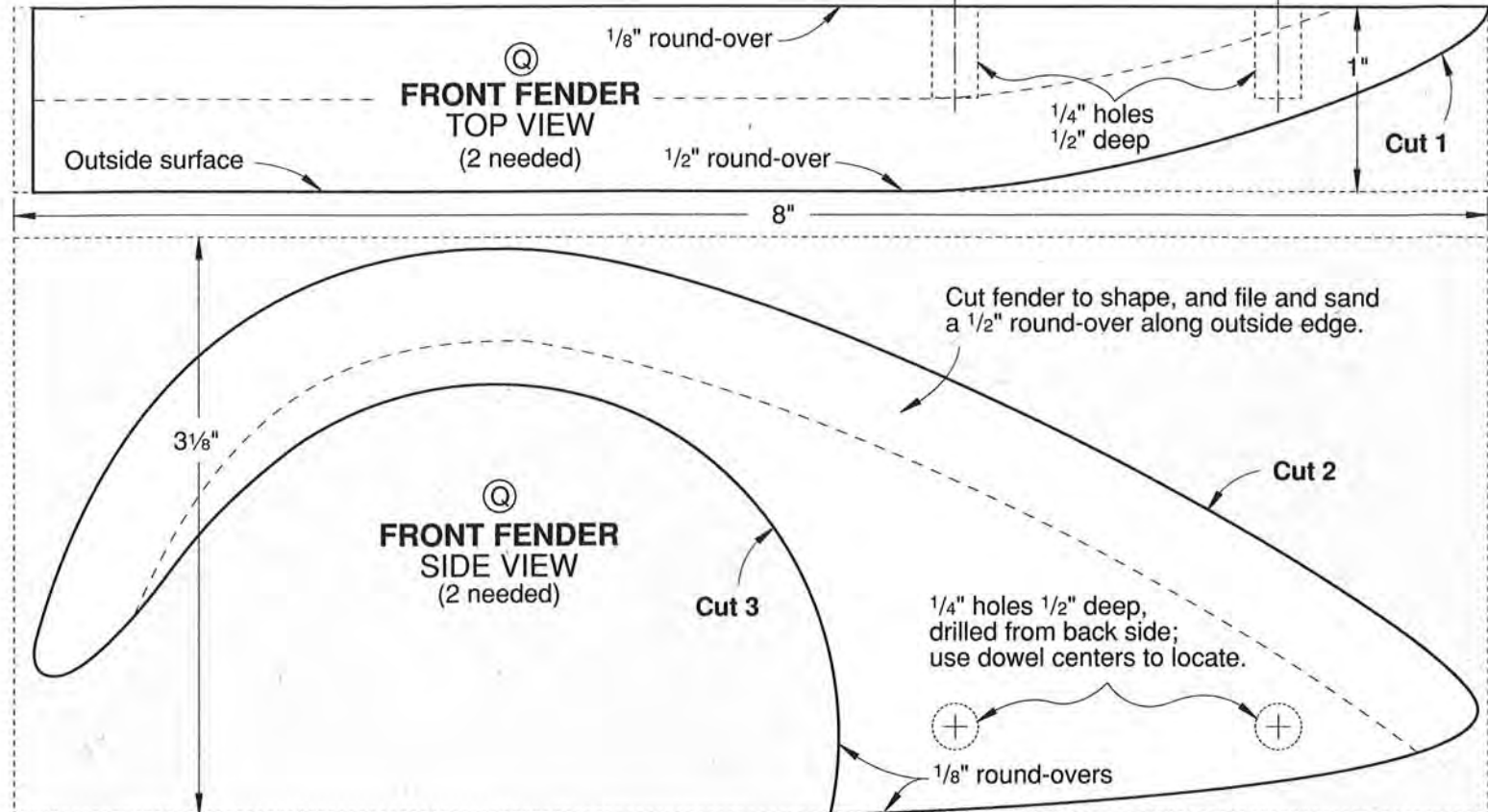
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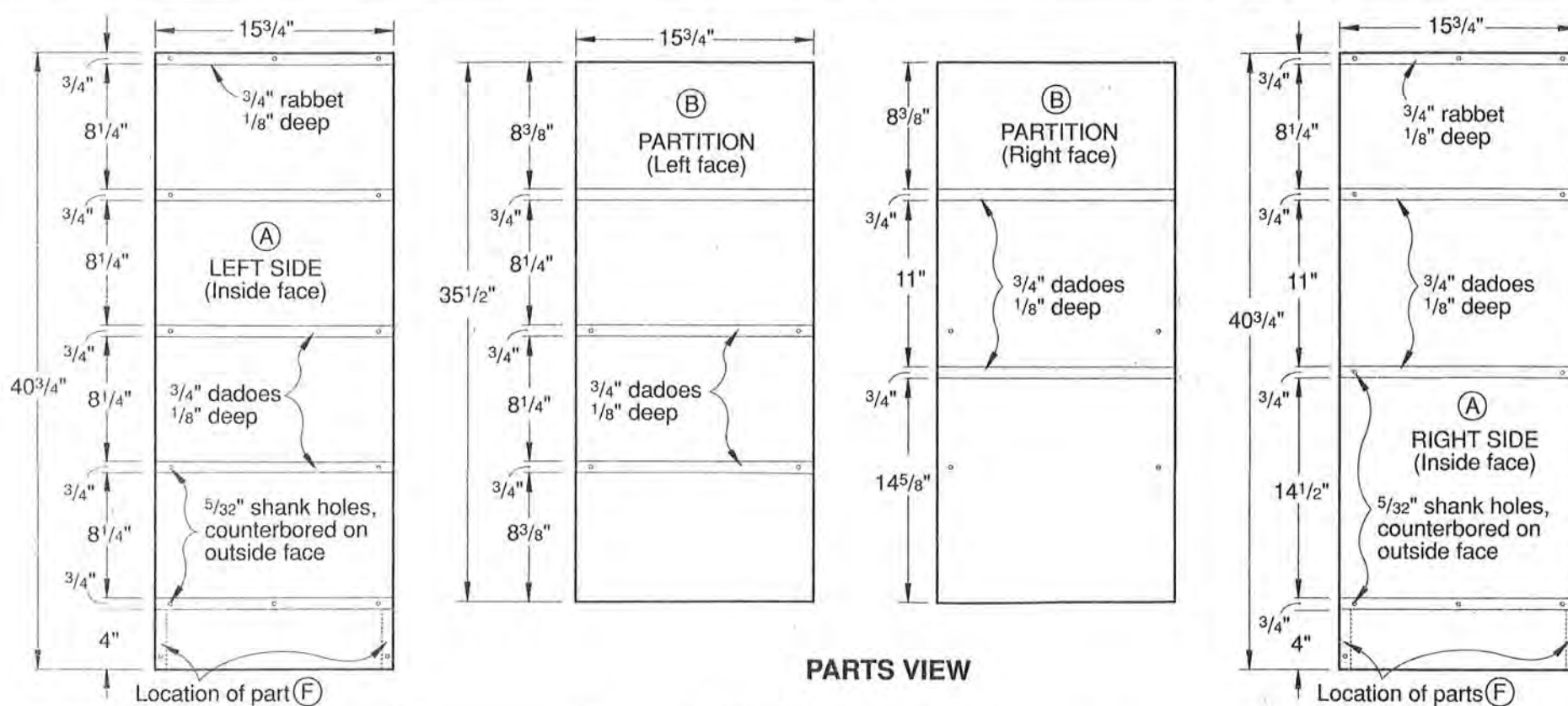
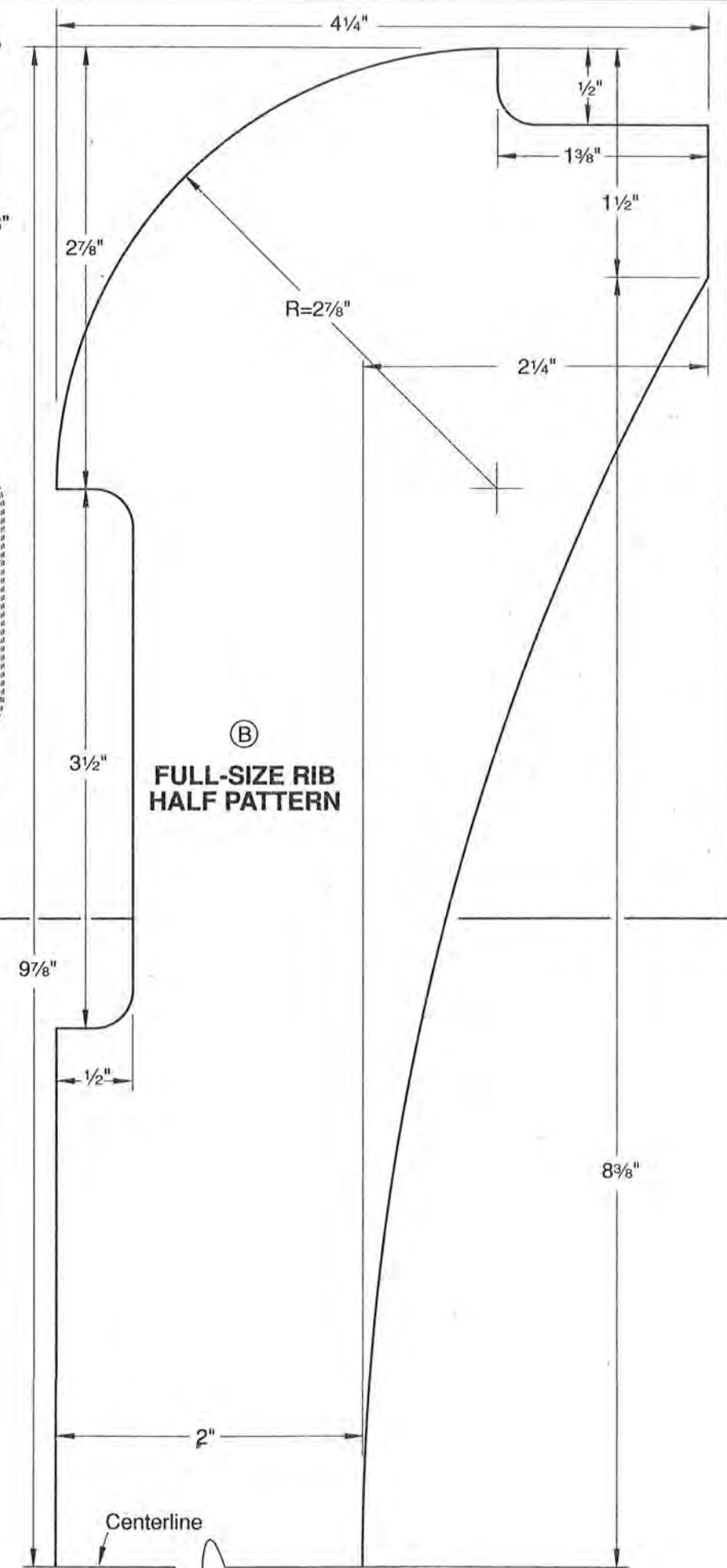
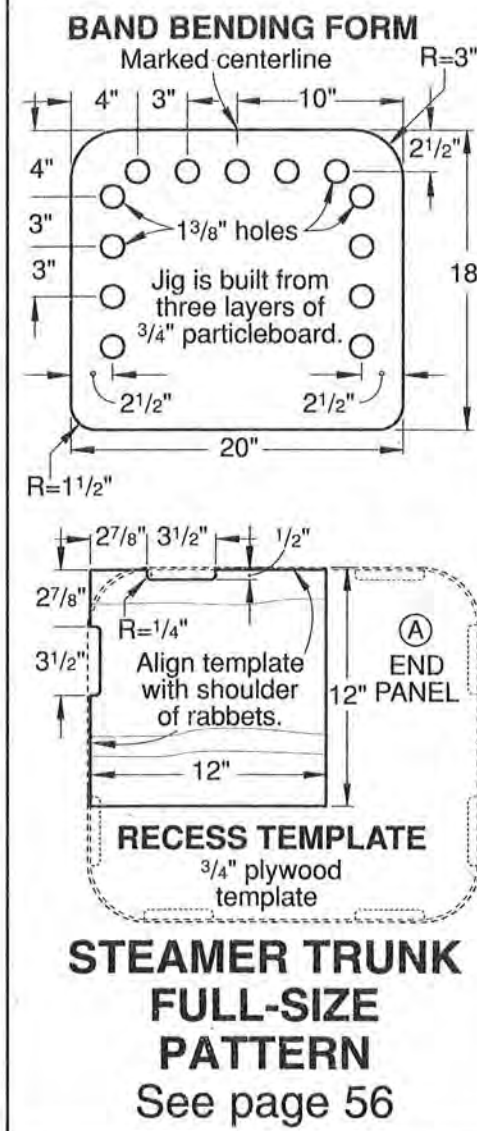
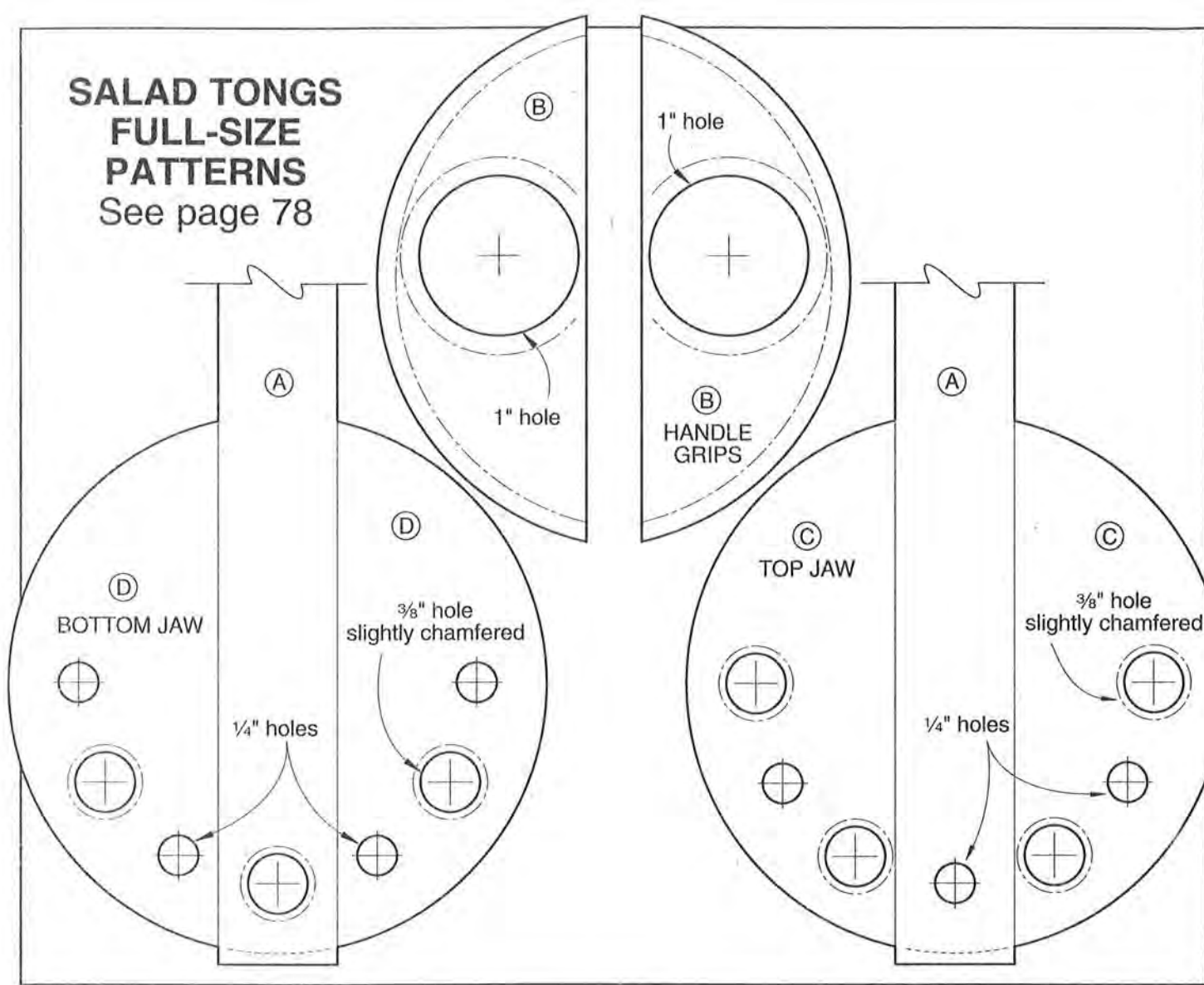
Dear Reader: As a service to you, we've included full-size patterns on this insert for irregular-shaped and intricate project parts. You can machine all other project parts using the Bill of Materials and the drawings accompanying the project you're building.

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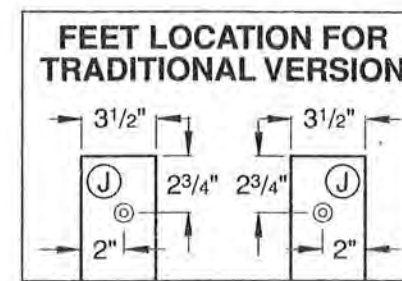
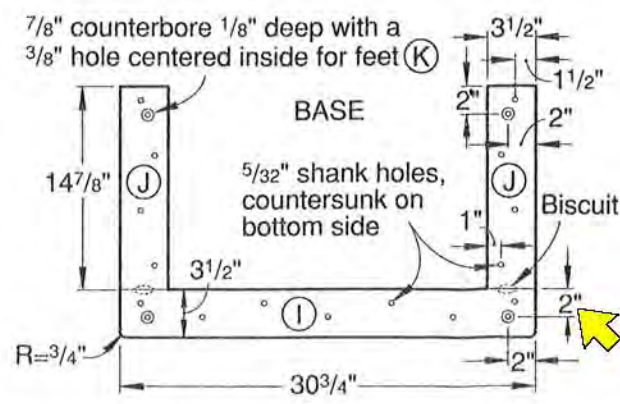
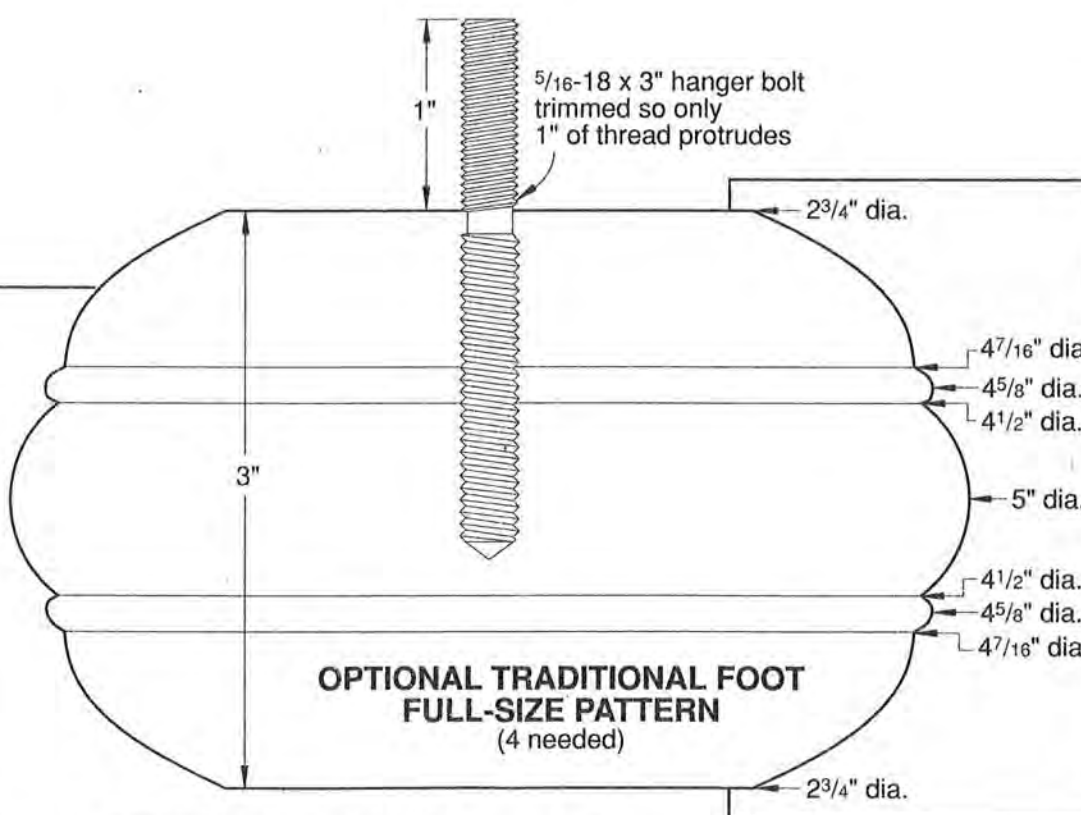
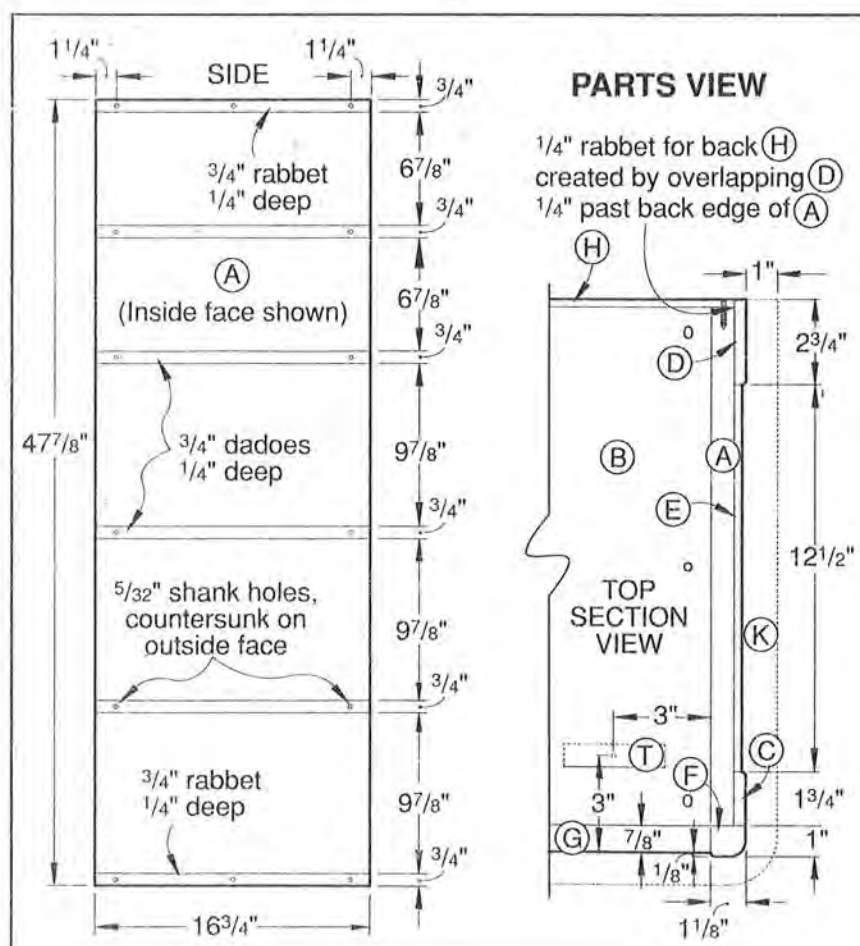
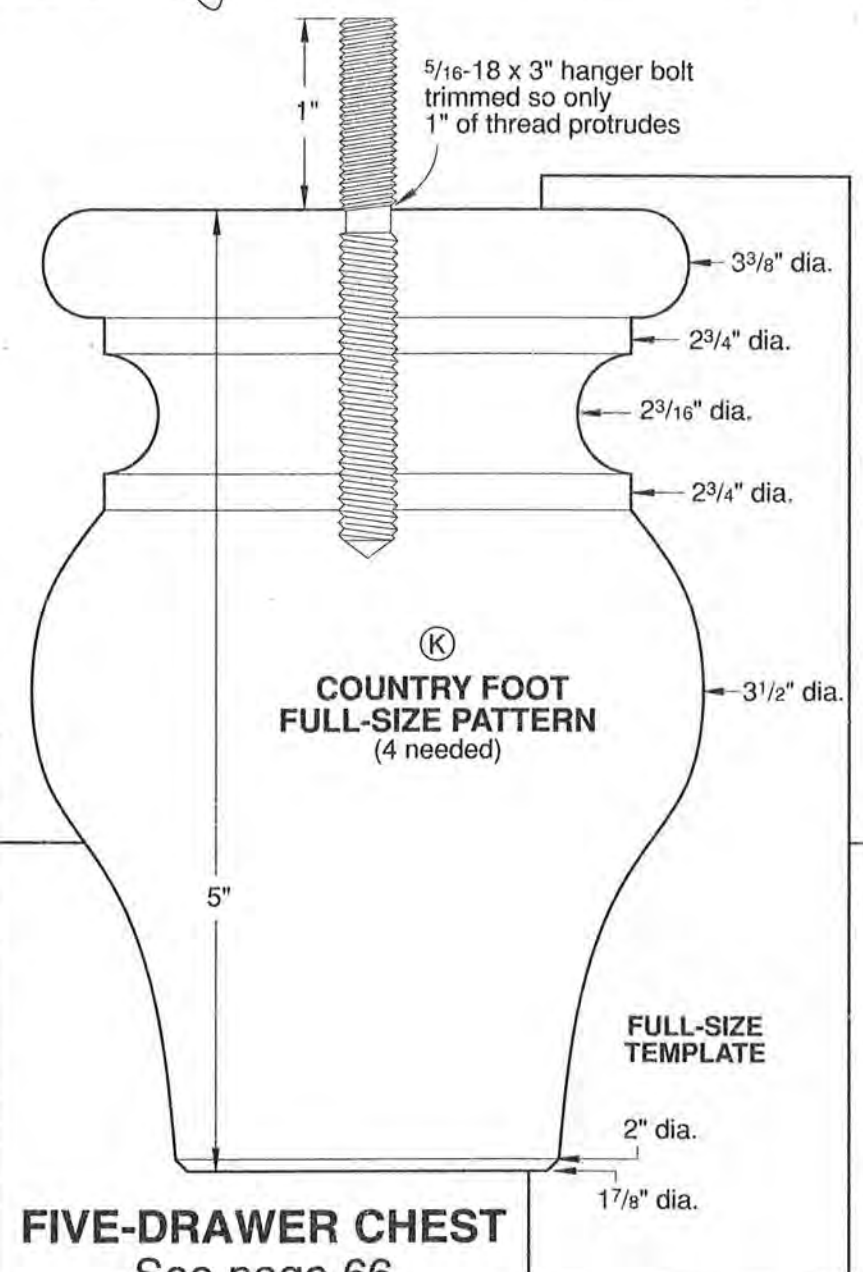
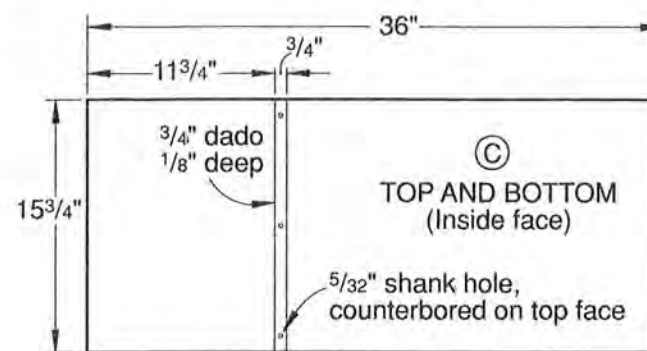
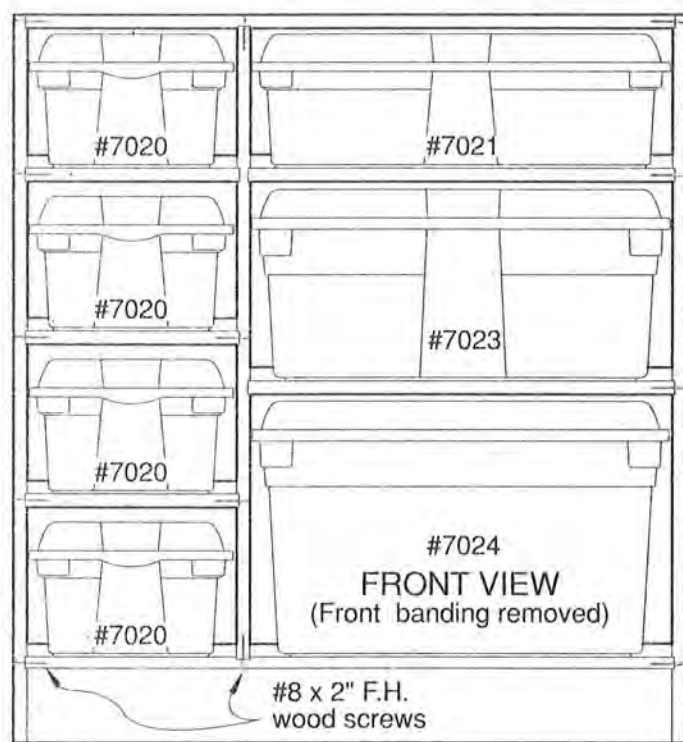
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**SALAD TONGS
FULL-SIZE
PATTERNS**
See page 78



**MULTIPURPOSE
STORAGE**
See page 90



FIVE-DRAWER CHEST
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