

14 TOP ROUTER ACCESSORIES See p. 44

Better Homes and Gardens®

WOOD

THE WORLD'S LEADING WOODWORKING MAGAZINE

JANUARY 1996 ISSUE #85

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See p. 54

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THE EDITOR'S ANGLE

OK, I'll admit it; I'm a tree hugger

There was a time earlier in my life when I really didn't give trees their due. I noticed them, of course, but other than admiring their beauty, I didn't fully appreciate their value either in commerce or to woodworkers.

But WOOD® magazine has changed all that for me. In the course of editing this periodical for more than a decade now, I've done a fair amount of woodworking myself, and I've watched many species of wood take shape under the skilled hands of our project builders. And slowly, I've found myself becoming ever more fascinated by the wonderful diversity of this plant group. Now, I actively seek out new tree species and am genuinely interested in learning as much as I can about the trees I encounter.

This past fall, my wife and I went on an 11-day tour of London, Paris, and Rome to celebrate our 25th wedding anniversary. And in the latter two cities, we ran onto several interesting species in some unexpected places. In Paris, for example, within two blocks of the Eiffel Tower, as well as along some of the city's boulevards, we saw rows of neatly trimmed horse chestnut trees.

Our tour guide told us that their popularity stems from the fact that the species has proven itself resistant to pollution. That's quite a contrast to the American chestnut tree, which years ago was decimated by blight.

And along the roadways in Rome, we kept seeing rows of nicely sculpted pine trees that looked a lot like large umbrellas. They turned out to be stone pine trees, known for their large umbrella-shaped crown.



A row of stone pine trees (also called umbrella pines) lends a sophisticated air to an avenue near Rome's center.

Near the Catacombs (the underground burial site for 174,000 Christians in Rome), we ran across cypress trees, some hundreds of years old. And on the outskirts of Rome, we drove past groves of Russian olive trees, their branches loaded with olives almost ready for the harvest.

Of course, you needn't cross the Atlantic to appreciate the renewable resource that we use to create beautiful wooden objects. In fact, there's probably inspiration right in your own backyard.

If you'd like to learn more about various tree species, purchase or check out from your library one or both of the books listed below. Then, for starters, go outside, make a list of the species you have in your yard, and use your reference source to find out some interesting facts about them. I bet you'll get hooked on this fascinating part of our woodworking hobby. I know I am. 🌲

Collingwood, G.H., and Warren D. Brush. 1979. *Knowing Your Trees*. Washington, D.C.: American Forestry Association.

Peattie, Donald Culross. 1966. *A Natural History of Trees*. Boston: Houghton Mifflin Company.

Larry Clayton

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This issue's cover wood grain: darrab darrab

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THIS SIDE OUT

When we listen to woodworkers, we understand what you mean — after all, we are woodworkers! You told us you needed a dado to cut plywood, solid wood, hardwood veneered plywood, laminates and melamine chip-free. You told us that it needed to cut precise slots and maintain accuracy. And it especially needed to accommodate today's undersized plywoods.

So we engineered a dado that would not only meet your needs, but would surpass your expectations. First we started with our superior tri-metal brazing to bond a special tooth design to an extra stiff blade body. You wanted dados with super smooth flat bottoms so we included 4-wing chippers. You said you hate it when chips build up in the chippers, so we perfected a gullet which ejects the chips. And then we eliminated the hub on the outside blade so chips cannot build up between the blades. The Super Dado will cut all your materials chip-free with a dado so smooth, you'll hate to cover it up.

To make it even better, we added something no other dado manufacturer has...a sixth chipper that is $3/32$ " thick. That doubles the number of possible slot widths (from $1/4$ " up to $29/32$ " wide), and allows you to set the dado to fit today's undersized plywoods. To make it even more flexible, we've included a set of precision steel shims for fine adjustments. Here is a dado that matches the slot width flexibility of an adjustable dado while maintaining the safety and finish of a stacked dado system.

And speaking of safety, we used the same anti-kickback technology associated with our saw blades and router bits. It's the anti-kickback shoulder design that reduces the chance of kickback from over-feeding. This higher level of safety lets you dado with confidence.

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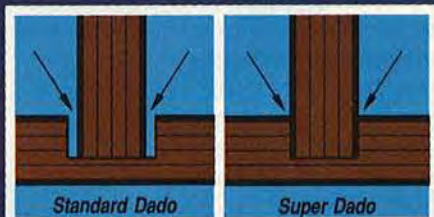
We also packaged all this in a sturdy carrying case. Once you use this new dado, you'll agree that it really is a *Super Dado*.



4 teeth per chipper for super smooth flat bottom dados.



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Exclusive $3/32$ " Chipper lets you perfectly adjust the width of the cut for today's undersized plywood.

What
woodworkers
need to know

A few points on nails



Nails rank among the oldest of fasteners. Today they're one of the most widely used methods for joining wood and fastening things to it.

The Big Four of nails

Of all the kinds of nails, four account for most use: common nails, box nails, casing nails, and finishing nails. Of these, you'll probably use box nails and finishing nails most frequently.

Common nail. This is the basic flat-headed steel nail. The largest-diameter nail, it's used for rough construction and general carpentry. Because it's so fat, it's more likely to split your stock. More on avoiding that later.

Box nail. Thinner than a common nail of the same length, the box nail doesn't split the stock as readily as a common nail, but it also generates less holding power. Resin-coated (called cement-coated, or CC) and vinyl-coated box nails grip better than plain ones. For outdoor projects, use galvanized box nails.

Casing nail. Essentially a box nail with a small, inverted-cone head, the casing nail is intended for attaching interior and (in its galvanized version) exterior trim on buildings. You can either drive the small head flush or countersink it with a nailset.

Finishing nail. This thin, small-headed nail comes into play for installing moldings and other interior trim. Finishing nails come in handy for assembling boxes and other projects, too. Usually, you countersink the head and fill the hole with putty to hide the nail.

What's this penny deal?

While you might get away with asking for "number-8 nails" or even holding your index finger and thumb an appropriate distance apart while asking for "some nails about this long," talking pennies makes more sense to the hardware dealer. That's because the sizing unit for nails is the *penny*, abbreviated, as with British money, by the small letter *d* (8-penny or 8d).

Today, the penny designation refers solely to the length of a nail. Sizes from 2d to 60d cover a range of lengths from 1" to 3½" in ¼" increments, then on to 6" in ½" steps, as shown on the chart, *opposite page*.

Some say that penny designations centuries ago referred to the weight of a quantity of nails. Others hold that the number stood for the price of 100 nails (if 100 nails sold for 8 pence, they were 8d nails).

Some ways to avoid splitting headaches

Driving a nail into wood has much the same effect as driving in a wedge. The sharp point of the nail forces the wood fibers apart, often causing the wood to split. The tactics below will minimize chances of splitting.

•**Use thinner nails.** Choosing box nails instead of common nails lessens the likelihood of splitting. For better holding power use CC or vinyl-coated ones.

•**Blunt the point.** Before you drive a nail, stand it on its head and rap the point with your hammer. The blunted tip then tears through wood fibers rather than wedging between them.



•Stagger nails.

Instead of placing nails for tidy looks, drive them through different grain lines, as *below*. Nail as far from the end of the stock as possible, taking both pieces of wood into account.

•**Avoid knots.** Driving a nail into a knot or the hard area adjacent to one will almost certainly split the wood. It's the surest way to end up with that standard item of woodworking cartoons—a split board with a bent nail stuck in it.

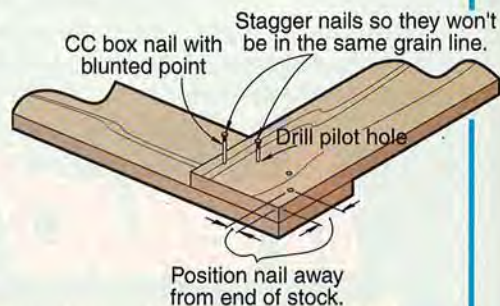
•**Drill a pilot hole.** Make it about 85 percent of the nail's diameter and around half to two-thirds its length. For a 6d box nail, that's a ⅝" hole 1⅝" deep; an 8d box, ⅜"×1⅜"; a 16d box, ⅞"×2¼".

For smaller nailing jobs

Use wire nails or brads when the smallest penny-sized nails are too large. Wire nails, which have flat heads, and brads, with heads like finishing nails, generally come in boxes or tubes of a few ounces.

Sizes such as ½"×19 designate the length (½") and wire gauge, or diameter, (19). A larger wire-gauge number indicates smaller diameter. Thus, a ½"×17 wire nail is fatter than a ½"×19 wire nail. ♣

See nail chart on page 6



Plane and simple.

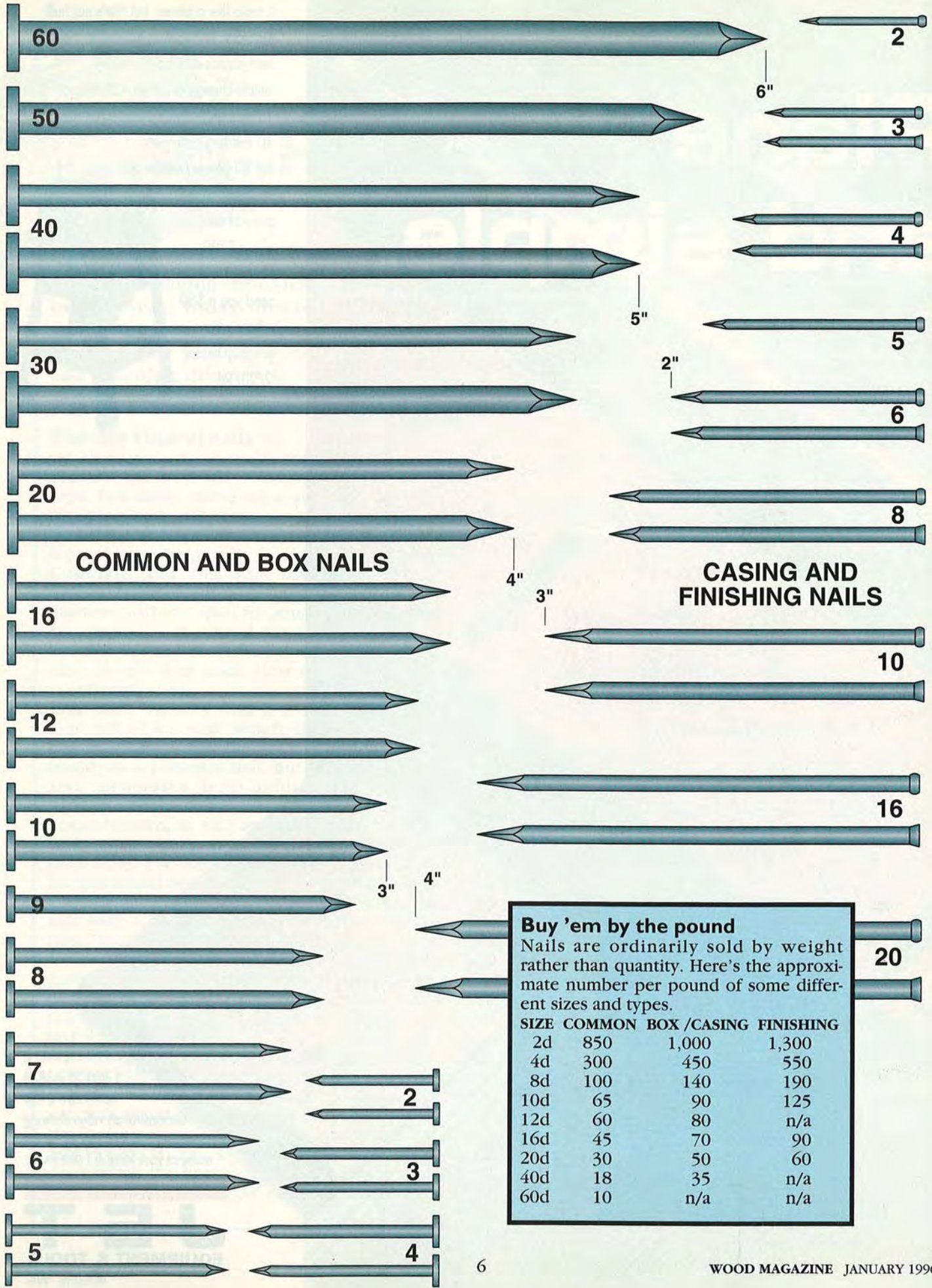
It looks like a planer, but that's just half the story. JET's new combination tool both planes and molds—with a simple change of cutters. Offering a 13" planing capacity and more than 40 molding cutter sets, the JET planer/molder is two tools for the price of one: about \$799. Plus, JET will send you a \$50 rebate when you buy before 2/28/96.



Dust hood removed for illustration.

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COMMON AND BOX NAILS

CASING AND FINISHING NAILS

Buy 'em by the pound
 Nails are ordinarily sold by weight rather than quantity. Here's the approximate number per pound of some different sizes and types.

SIZE	COMMON	BOX /CASING	FINISHING
2d	850	1,000	1,300
4d	300	450	550
8d	100	140	190
10d	65	90	125
12d	60	80	n/a
16d	45	70	90
20d	30	50	60
40d	18	35	n/a
60d	10	n/a	n/a



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TIPS FROM YOUR SHOP (AND OURS)



This month's prizewinner took our idea and made it better.

Most shop tips come through the mail. Occasionally, though, they walk in the front door.

When Joe Ransom visited our offices in Des Moines last winter, he brought along a few jewelry boxes he had made based on an article in the December 1993 issue of *WOOD*® magazine. But rather than use a 1/4" dowel for the pivot hinge, Joe grabbed a finish nail and cut some screw threads on the pointed end with a die. This enabled him to make much smaller boxes than a 1/4" dowel would allow.

We liked Joe's idea so well we awarded him the top shop tip of the month. If you have a good shop tip, we want to hear from you, too—in person or via the mail. Just send (or bring) a description of the idea and a drawing or photo to:

Tips From Your Shop (and Ours)

WOOD® Magazine
1912 Grand Ave.

Des Moines, IA 50309-3379

We try to publish original shop tips, so please send your idea to only one magazine. Also note that we cannot return your submissions. Thanks, and keep those shop tips coming.

Tom Jackson
General-Interest Editor

Finish nail provides pivot hinge for small projects

You need a long, narrow pivot hinge for a pair of stacked trays or other projects that open horizontally. But screws won't do, and an ordinary nail won't stay in place. What do you do?

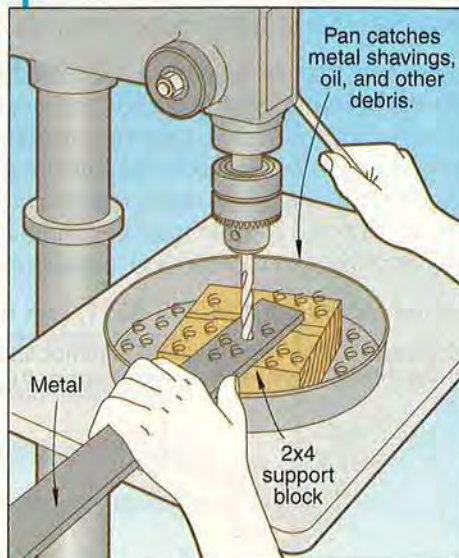
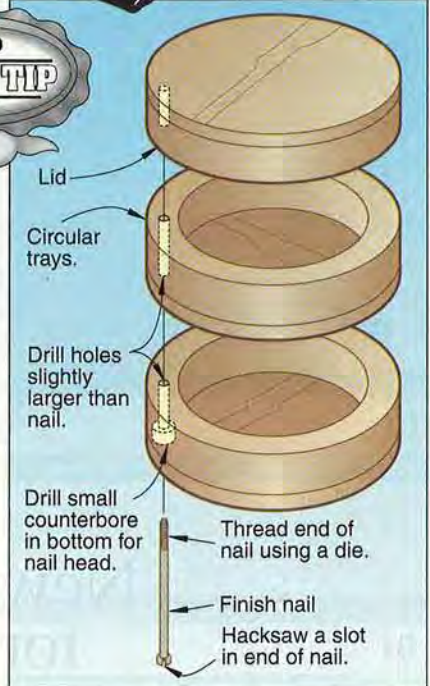
With a metal die you can turn a finish nail into the perfect pivot hinge. Cut enough threads onto the end of an 8d finish nail to penetrate two-thirds of the way into the lid of the stacked trays. Then, use a hacksaw to make a kerf in the head of the nail that will fit a slotted screwdriver tip.

Next, clamp the segments of the box together in the closed position, and drill the pilot holes and a counterbore near the edge of the stack as shown *right*. The first two pilot holes should measure slightly larger than the nail and penetrate the base and middle tray. The second pilot hole should measure about 25 percent smaller in diameter than the shaft of the nail and penetrate two-thirds of the way through the lid of the box only. Now, push the modified nail through the larger pilot holes and screw the threaded end tight into the lid.

—Joe Ransom, Camarillo, Calif.



For submitting the best shop tip in this issue, Joe will receive a new Sears model 17706 16-gallon wet/dry vacuum.



Trap troublesome metal shavings with a pan

Even a tiny sliver of steel, iron, or other metals will leave an ugly stain if allowed to sit for long on top of a piece of unfinished wood. And metal shavings hidden in your sawdust can do serious damage if they get pulled into your dust-collection system and strike the impeller blades.

To prevent these problems, put a shallow pan under your workpiece any time you drill into metal. In the middle of the pan, support the workpiece with a backer block the same height as the edge of the pan.

—Joe Seibert, Bryan, Ohio

Continued on page 10

Craftsman's Most Powerful Vac... Wet or Dry



With six peak horsepower, Craftsman's new wet/dry vac is the most powerful, detachable blower vac on the consumer market.

It's at home in your workshop, kitchen, garage... even in the yard, thanks to the detachable blower that cleans up leaves and yard debris with a 200 MPH blowing velocity.

To complement its power, we developed a sturdy vac caddy supported by oversized wheels to resist vac tipping. There's an extra-long 20-foot cord and convenient on-board accessory storage so tools are always right at hand. The large 16-gallon capacity, built-in drain and reusable filter make cleanup a breeze. Accessories include two extension wands, four nozzles, blowing diffuser and blower adapter.

Check out this new detachable blower vac with 6 peak horsepower at your Sears store, or for convenience, call the "Sears Shop at Home" service, 1-800-377-7414.



TIPS FROM YOUR SHOP (AND OURS)

Continued from page 8

Hold grinder to benchtop with a scrap of plywood and some angle iron

You can double the usefulness of an angle grinder by attaching it to a stationary surface. Once mounted, you can use the grinder to sharpen cutting edges on tools and to polish or de-burr small pieces of metal.

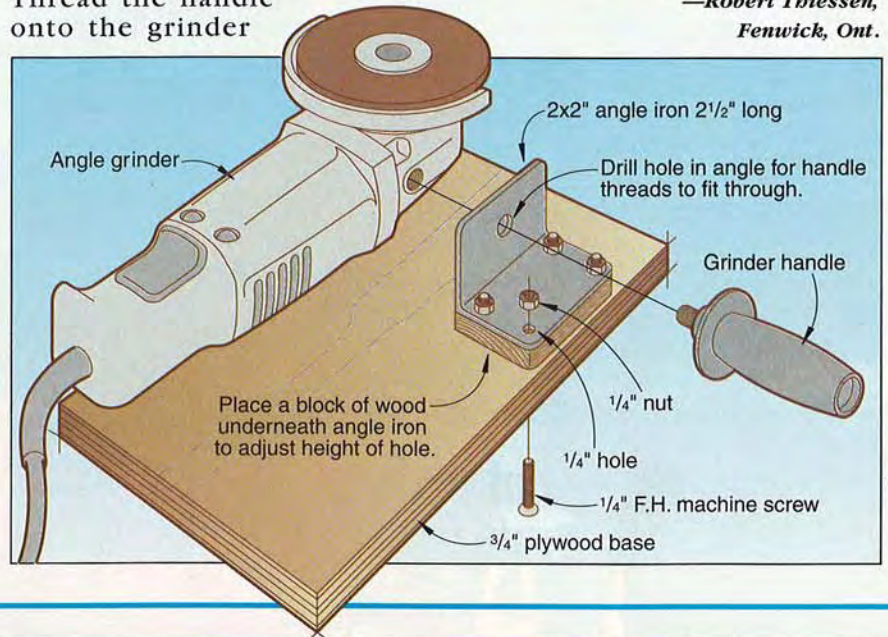
First, remove the handle from the angle grinder and lay it upside down on a piece of plywood as shown. Place a piece of angle iron alongside the grinder, and mark the location where the handle attaches to the body. If necessary, elevate the angle iron with a small block of wood. Depending on the make and model of your grinder, you may need to modify the shape of the angle iron to gain access to the switch.

Now, drill a hole in the vertical surface of the angle iron that's large enough for the threaded handle stud. Also drill four holes

in the horizontal surface to mount the angle iron to the plywood. Attach the angle iron to the base with machine screws. Thread the handle onto the grinder

through the hole in the angle iron and you're in business. When using the grinder, wear protective goggles or a face shield.

—Robert Thiessen,
Fenwick, Ont.



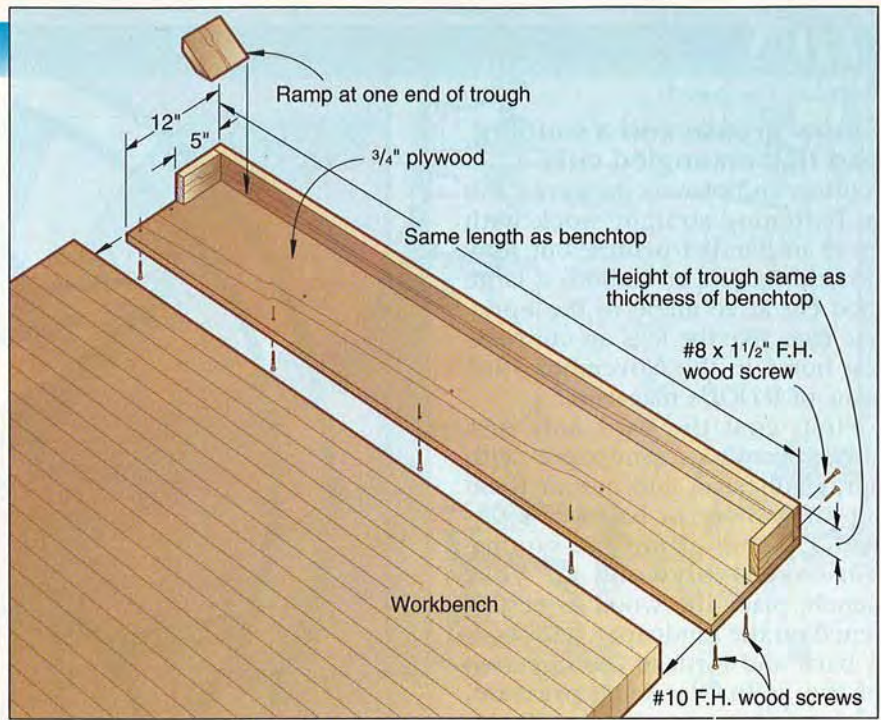
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If bargain tools do less than you bargained for, and high-end tools cost more than you want to at affordable prices. Ryobi – so much precision and performance for your money. Suddenly,

Old-World carver's trough works on modern benches

A trough like the one on many European-style workbenches can provide modern woodworkers with a lot of convenience, too. When your bench gets too crowded with screws, brads, and hardware, you can simply sweep them into the trough rather than stop to clean and sort through everything. The best news of all is that you don't have to buy an expensive bench to get one of these troughs. Just add one to the bench you have now. To make this workbench add-on, size the sides and front edge of the trough to match the depth of your benchtop. Glue and screw the sides and front edge of the trough together, and then glue and screw these to a piece of $\frac{3}{4}$ " plywood as shown. Now, fasten the plywood to the underside of your benchtop with



glue and screws. Pare down the edges of the box with a handplane if necessary to ensure that it sits level with the top of your

bench. You also can add an angled ramp at one end to make cleaning easier.

—From the **WOOD®** magazine shop
Continued on page 12

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TIPS FROM YOUR SHOP (AND OURS)

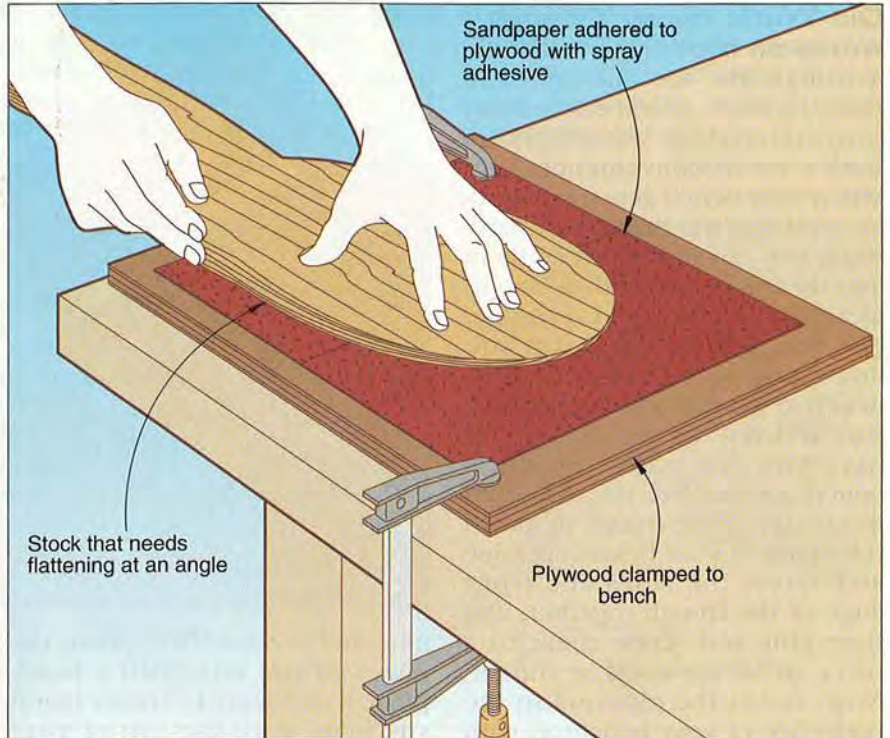
Continued from page 11

Elbow grease and a sanding pad flatten angled cuts

Jointers and planers do a great job of flattening straight stock with faces in parallel planes. But how do you flatten or smooth a large face cut at an angle to the opposite face, like the legs on our rocking horse in the November 1995 issue of *WOOD*® magazine?

First, coat the back side of a sheet or two of sandpaper with spray adhesive, and mount them on a flat piece of hardwood plywood. Then, clamp the sandpaper-coated plywood to your bench, place the wood to be flattened on the sandpaper, and work it back and forth in the direction of the grain. Use even pressure, and take care not to rock the workpiece. With careful sanding you can level the workpiece as flat as the surface of the plywood.

—From the *WOOD* magazine shop



Continued on page 14

Give Yourself Some Breathing Room.



Recent medical studies show that breathing wood dust can be hazardous to your health. The JDS AIR-TECH 2000 will dramatically improve the quality of the air in your workshop.

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Model 350

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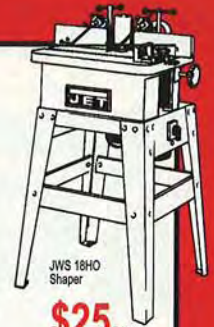
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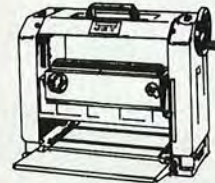


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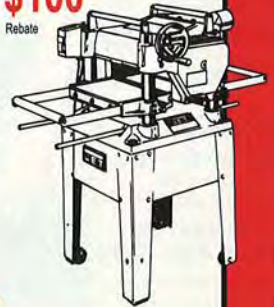
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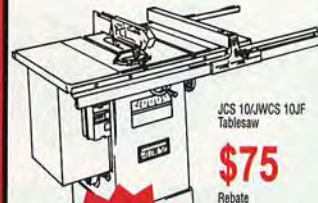


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Auburn, WA

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TIPS FROM YOUR SHOP (AND OURS)

Continued from page 12

Do your doweling with all-thread rod and epoxy

For a super-strong joint that doesn't require a lot of precise fitting, try using epoxy and all-thread rod as a substitute for dowels and woodworker's glue. Drill your holes in the same location as you would for a dowel assembly, but make the holes about 1/16" larger than the diameter of your all-thread rod.

Now, thoroughly coat your all-thread "dowel" and fill each hole about a third of the way to the top with 5-minute epoxy. Assemble the joint so that the excess epoxy fills the gaps between the hole and the all-thread rod, align the pieces, and clamp. The gap between the all-thread rod and the sides of the hole gives you a margin of error so you can reposition pieces for a better fit. And since epoxy can fill gaps while retaining its structural integrity, the strength of your joint is not compromised.

—Gordon Little, Duvernay, Quebec

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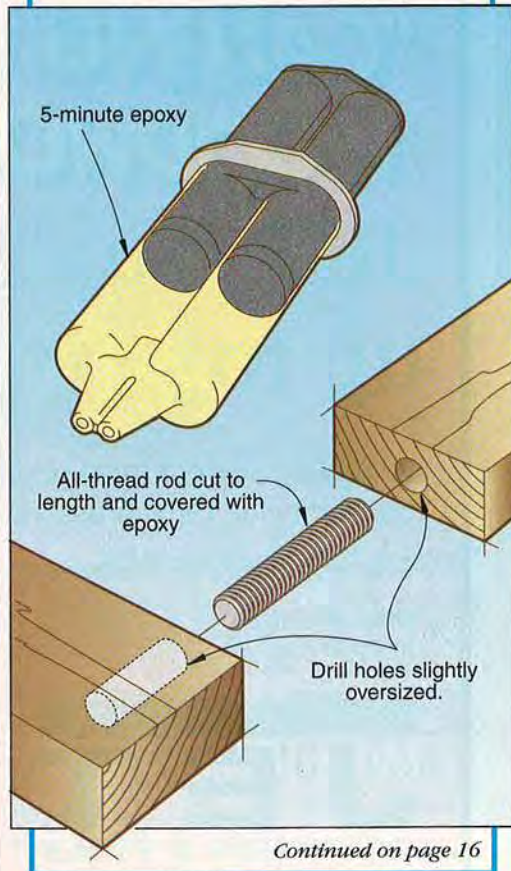


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Continued on page 16



The cutting tool source!

Carbide Tipped Blades

Item	Primary Function	No. of Teeth	List	Sale
10" diameter, 5/8" arbor:				
110-240	Ultra-smooth Ripping	24	\$60.00	\$51.00
210-240	Thin-kerf Ripping	24	\$69.00	\$58.65
110-500	Maxi-Combo™	50	\$78.40	\$66.60
110-600	General Purpose	60	\$84.40	\$71.70
210-500	Maxi-Combo Lite™	50	\$79.00	\$64.90
210-800	Thin-kerf Fine	60	\$84.40	\$71.70
110-800	Ultra-Cut™	80	\$100.90	\$85.80

Miter Blades with -5° hook!

Item	Blade Diam.	No. of Teeth	Arbor Size	List	Sale
185-048	8-1/2"	48	5/8"	\$59.40	\$50.50
185-600	8-1/2"	60	5/8"	\$74.40	\$63.20
110-801	10"	80	5/8"	\$100.90	\$85.80
112-901	12"	90	1"	\$135.00	\$114.75
114-100	14"	100	1"	\$144.00	\$122.40
115-100	15"	100	1"	\$149.00	\$126.65

Two-blade Packages. SALE!

110-221	List: \$134.00	110-240 Rip & 110-500 Maxi-Combo	\$100.50
110-223	List: \$201.90		
110-800	Ultra-Cut & 110-801 Miter	210-240 Thin Kerf 24T Rip & 210-600 Thin Kerf 60T Fine	\$115.40
110-224	List: \$153.40		
110-225	List: \$185.40	110-600 60T General Purpose & 110-800 80T Ultra-Cut	\$138.90
110-228	List: \$178.00		
110-800	80T Ultra-Cut & 210-500 50T Maxi-Combo Lite	110-800 80T Ultra-Cut	\$128.50
110-233	List: \$179.30		
110-500	50T Maxi-Combo & 110-800 80T Ultra-Cut		\$119.00

CMT's Award-Winning Joint-Master 8" Dado



Includes CMT's 3/32" Ply-Groove Chipper plus four 1/8" chippers & one 1/16" chipper. The Joint-Master's 24 teeth and 4-wing chippers deliver incredibly smooth cuts, even in veneer plywood!

108-2405 Dado Set with free Dado Shim Set

List: \$268.40 **Sale: \$179.00**

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One Rabbiting bit makes you the master of seven different cuts at one low price!

800-639	1/4" Shank	\$38.90
Rabbit-Master Plus		
800-640	1/2" Shank	\$39.90
Rabbit-Master Plus		



This kit flush trims plus it cuts 6 common rabbets!

1/2" 7/16" 5/16" 1/4" 1/8" 3/8"

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3DC-999 3D Carver Video

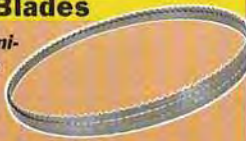
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CMT carries premium quality blades for most popular band saws. For a complete selection call for our free catalog



93-1/2" Blades fit Delta's 14" saws plus 14" saws by, Enlon, Elephant, Reliant, Grizzly & more!

Item	Width	Pitch	Style	Sale
BSB-931	1/8"	14 TPI	Std.	\$16.10
BSB-932	3/16"	4 TPI	Skip	\$13.00
BSB-933	3/16"	10 TPI	Std.	\$13.00
BSB-934	1/4"	6 TPI	Skip	\$12.50
BSB-935	3/8"	4 TPI	Skip	\$12.50
Heavy-duty resaw blades:				
BSB-936	3/4"	3 TPI	Hook	\$15.70
BSB-937	3/4"	3 TPI	Skip	\$15.70
BSB-938	3/4"	6 TPI	Std.	\$15.70
BSB-939	3/4"	10 TPI	Std.	\$15.70
BSB-930	1"	3 TPI	Hook	\$17.50
BSB-193	1"	8 TPI	Std.	\$17.50
BSB-293	1"	14 TPI	Std.	\$17.50

Save on our package of five 93-1/2" blades

Includes one each: 1/8"x14TPI, 3/16"x10TPI Std., 1/4"x6TPI Skip, 3/8"x4TPI Skip, 3/4"x3TPI Hook.

BSS-951 Save over 10%! SALE \$62.00

105" Blades

Fits Inca 710, Delta, Jet & other 14" extended

Item	Width	Pitch	Style	Sale
BSB-101	1/8"	14 TPI	Std.	\$17.30
BSB-102	3/16"	4 TPI	Skip	\$13.90
BSB-103	3/16"	10 TPI	Std.	\$13.90
BSB-104	1/4"	6 TPI	Skip	\$13.00
BSB-105	3/8"	4 TPI	Skip	\$13.00
Heavy-Duty resaw blades:				
BSB-106	3/4"	3 TPI	Hook	\$17.00
BSB-107	3/4"	3 TPI	Skip	\$17.00
BSB-108	3/4"	6 TPI	Std.	\$17.00
BSB-110	1"	3 TPI	Hook	\$18.80
BSB-111	1"	8 TPI	Std.	\$18.80
BSB-112	1"	14 TPI	Std.	\$18.80

Save on our package of five 105" blades

Includes one each: 1/8"x14TPI, 3/16"x10TPI Std., 1/4"x6TPI Skip, 3/8"x4TPI Skip, 3/4"x3TPI Hook.

BSS-151 Save over 10%! SALE \$66.20

Planer & Jointer Knives

High Speed Steel Specialty Knives Perfectly match your planer or jointer!

Item	Knives	Fits	Sale (set)
SPK-005	2	Ryobi JP155	\$48.50
SPK-025	2	Ryobi AP10	\$49.40
SPK-030*	2	Makita 2012 planer	\$38.50
SPK-035	2	Ryobi AP12 planer	\$45.80
SPK-040	2	Ryobi AH-115 & AH-125	\$91.30
SPK-045	2	Makita 2030N planer	\$63.40
SPK-055*	2	Delta 22-540	\$45.40
SPK-060	2	Makita 2040	\$77.80

*Double Edged Knife

HSS Knives

A keen edge that's ideal for hard or soft wood (Number of knives in parenthesis)

Item #	Description	Sale
SJK-005	4" Knives for Delta, Craftsman, other (3)	\$16.30
SJK-010	6" Knives for old Delta, Craftsman (3)	\$24.00
SJK-012	6" Knives for Grizzly (3)	\$24.00
SJK-015	6-1/16" Knives for Delta DJ-15 (3)	\$25.10
SJK-020	8" Knives for old Delta & Rockwell (3)	\$31.80
SJK-025	8-1/16" Knives for Delta DJ-20 (3)	\$32.60
SJK-030	12" Knives for Powermatic (3)	\$46.10
SJK-035	12-1/2" Knives for RBI 612 & 812 (2)	\$44.90
SJK-040	12-1/2" Knives for Grizzly & other (2)	\$45.90
SJK-045	13-1/8" Knives for Delta RC-33 (3)	\$52.10
SJK-055	15" Knives for Grizzly, other imports (3)	\$58.20
SJK-057	16" Knives for SCM Jointer (4)	\$82.60
SJK-065	20" Knives for Parks 20" planer (4)	\$101.60
SJK-070	20" Knives for Delta 20" & others (4)	\$103.30
SJK-075	20-1/2" Knives for RBI 820 (3)	\$78.70

Carbide Tipped Knives

Ideal for abrasive materials like plywood & particleboard. (Number of knives in parenthesis)

Item #	Description	Sale
SCK-005	4" Knives for Delta, Craftsman, other (3)	\$58.90
SCK-010	6" Knives for old Delta, Craftsman (3)	\$80.10
SCK-012	6" Knives for Grizzly (3)	\$80.10
SCK-015	6-1/16" Knives for Delta DJ-15 (3)	\$89.10
SCK-020	8" Knives for old Delta & Rockwell (3)	\$117.00
SCK-025	8-1/16" Knives for Delta DJ-20 (3)	\$118.30
SCK-030	12" Knives for Powermatic (3)	\$193.60
SCK-035	12-1/2" Knives for RBI 612 & 812 (2)	\$122.10
SCK-040	12-1/2" Knives for Grizzly & other (2)	\$122.10
SCK-042	12-1/2" Knives for Delta 22-540 (2)	\$193.50
SCK-045	13-1/8" Knives for Delta RC-33 (3)	\$193.10
SCK-055	15" Knives for Grizzly, other imports (3)	\$196.90
SCK-057	16" Knives for SCM Jointer (4)	\$279.90
SCK-065	20" Knives for Parks 20" planer (4)	\$392.70
SCK-070	20" Knives for Delta 20" & others (4)	\$416.90
SCK-075	20-1/2" Knives for RBI 820 (3)	\$274.70

* Solid Carbide double-edged knives

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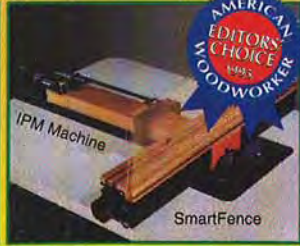
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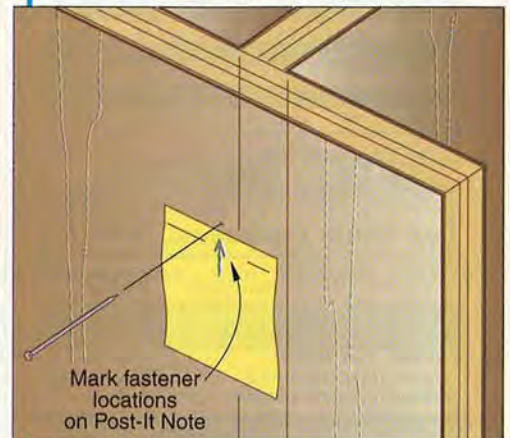
TIPS FROM YOUR SHOP (AND OURS)

Continued from page 14

Post-It Notes mark the location of hidden nailers

To mark the location of a stud or a hidden nailer, use a 3M Post-It Note or a similar adhesive-backed paper tab. These squares of paper can be left in place for days, they won't leave a pencil mark on your wall or project, and they won't peel up paint or finishes as masking tape might. What's more, you can draw level lines across the squares of paper to aid in the installation of shelves.

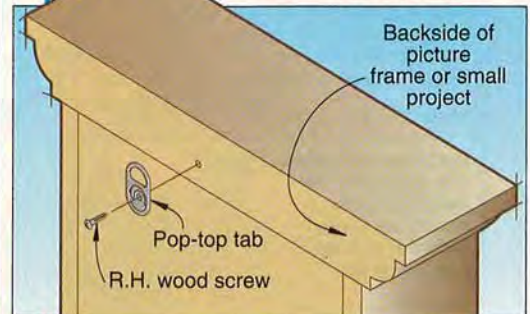
—Randy Lee, Fairfield, Ohio



Pop-top tab proves perfect for hanging small projects

You want to hang a small frame on your wall, but using two eye screws and a wire won't work. Chill out and grab a can of soda pop. When you're done with the drink, pull the pop-top tab off the can with a pair of pliers. Drive a small screw through the rivet hole in the tab to fasten it to the back of your project. Hook the larger hole on the tab over a nail in the wall and you're done.

—Jack Howard, Joliet, Ill.



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Circle No. 615

Hand-rubbed finishing technique is in the bag

You could spend a lot of money on oil and pumice to get a hand-rubbed look on a varnish finish. But a brown paper bag will do a nice job as well.

Cut out a section of a bag, and wad it up a few times to soften the surface. Then, fold it into a flat pad that fits your hand comfortably, and use it to rub your finish. The paper will knock down any small dust nibs and give you an even, matte finish.

—Alan Bakke, Forrest Lake, Minn.



A FEW MORE TIPS FROM OUR WOODWORKING PROS

- Catching a tool can mar your turning, sometimes ruining it. In spindle turning, a simple substitution for your spur center can prevent this trouble. Find out how on page 66.
- Clamping odd-shaped pieces often proves tricky. Check out page 53 to see how we held the parts of a fretwork whatnot together while the glue dried.
- If you don't have a bench hook, you don't know what you're missing! On page 73, we show you how to build one. 🐿️

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Circle No. 15

PAPER BIRCH The tree that gave and gave

In the days when voyageurs paddled the lakes of the United States and Canada, there were seemingly unlimited beaver, mink, and muskrat. The waters swarmed with fish. Deer, moose, and elk browsed in abundance and roamed through great stands of bone-white birch trees (*Betula papyrifera*). Like the fish and game, the trees provided the native people with essentials.

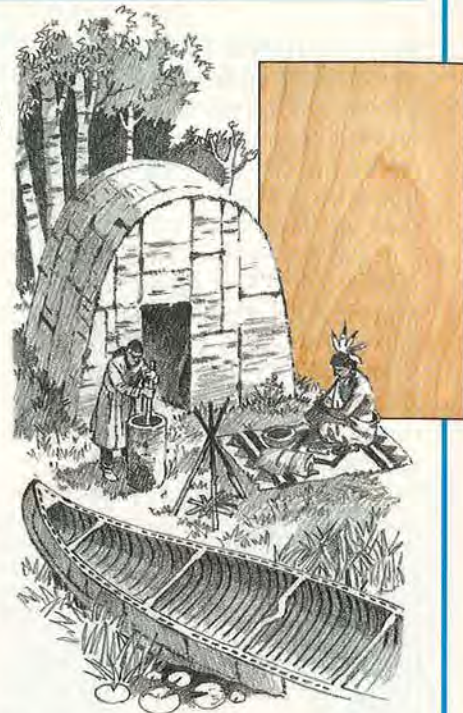
Paper birch, as it came to be called because of its paperlike curls of outer bark, yielded a complete bark layer thick enough to skin canoes. But the easily peeled, tough material also became sheathing for lodges. Campfires began with fast-burning kindling made from bark shavings. Tightly

tied into a taper, the leather-like bark slowly smouldered to ward off swarming mosquitoes.

The paper birch also was tapped for sweet sap every spring. When chewed, its small twigs were aspirin-like in relief. Even the branches were bent and formed into snowshoe frames.

To the lumbermen of later years, however, the paper birch's wood was of little use. Yet, in imitation of the first inhabitants, they made the bark into waterproof roof liners. In their leisure, it became postcards to send home, baskets, and tiny canoes.

Today you'll find paper birch's workable wood as dowels, toothpicks, and clothespins. Its bark has no common present use. ♣



To the Native Americans, birch bark was for home and travel.

Illustration: Jim Stevenson

"All my tools should be this good!"

The **Accu-Miter**® is a professional miter gauge that makes perfect angles easily. Shot-pin action assures dead-on accuracy for common angles — plus a precise protractor scale for everything in between!



We do not recommend operating without the saw blade guard, as is shown here. US Patent #5,038,486

Optional accessories: manual clamp—pneumatic clamp—3/8" x 3/4" miter bar—

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100 thru 150C	14.50	25.60C

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*C = 100 SHEETS

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5"	80	.46
5"	100 thru 320	.45

* Available in 5 hole pattern *

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3X18	.86 ea	4X36	1.35 ea
3X21	.90 ea	6X48	3.50 ea
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TALKING BACK

How to calculate the side length of a polygon

The side length of the hexagon that was shown in the "How wide is that side?" reader letter in the August 1995 issue equals the radius of the circle that encloses the hexagon. However, finding the

Number of sides	Miter Angle	Multiplier
4	45°	1.414
5	36°	1.1755
6	30°	1.000
7	25.71°	.8677
8	22.5°	.7854
9	20°	.684
10	18°	.618
11	16.36°	.5633
12	15°	.5176

To find the side length, multiply the radius x the multiplier. ($L=R \times M$)
 To find the radius, divide the side length by the multiplier. ($R=L \div M$)

length of sides on regular polygons with other than six sides usually requires the use of trigonometry. I have calculated the following table to make it easier for your readers to determine the side length. Just take the listed multipliers times the radius of the enclosing circle to find the side length of any regular polygon!

—Gordon Du Floth,
Grass Valley, Calif.

Thanks to Gordon and the many other readers who sent letters contain-

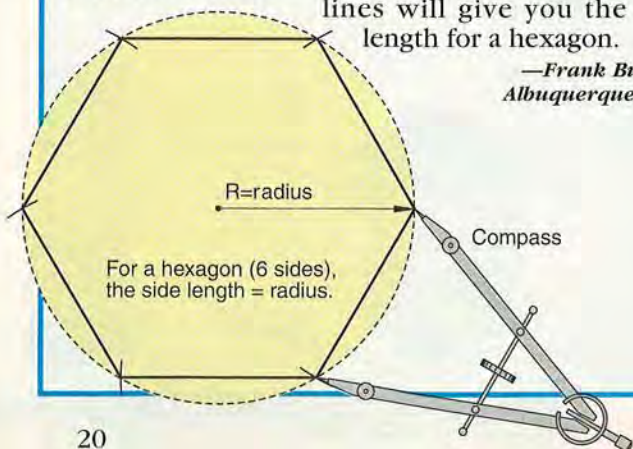
ing similar tables and techniques for finding the side length of a regular polygon. Here's a compilation of the tables sent in by all you good folks. Just plug the figures into the appropriate formula shown at the bottom of the chart.

A simpler way to find the side length of a hexagon

I read with interest the answer to "How wide is that side?" in the August 1995 Talking Back, and I have a useful method for laying out a six-sided project. Here's how it works:

- 1 Draw a circle with your compass set to $\frac{1}{2}$ of the project width.
- 2 Place the pointed end of the compass on the circle, and strike an arc that intersects the circle. Move the compass point to the pencil mark, and draw another arc. Continue this around the circle.
- 3 Draw lines from arc to arc on the circle. These lines will give you the side length for a hexagon.

—Frank Burton,
Albuquerque N.M.



We welcome comments, criticisms, suggestions, and even compliments. Send your correspondence to: Talking Back, *Better Homes and Gardens*® WOOD® Magazine, 1912 Grand Ave., Des Moines, IA 50309-3379. To contact us via computer, use these on-line addresses: CompuServe: 74404,3516 Internet: 74404.3516@compuserve.com

Computers and woodworking: where to find the miter calculator

In our November 1995 article "Home Computers, 7 Ways They Can Help Your Woodworking," we mentioned a miter-calculator program which some readers are having difficulty locating. You can find the program in the America Online (AOL) software library.

To get into the software library, open up the menu listings under "GO TO," scroll down to the "SEARCH SOFTWARE LIBRARIES" line, open that window, and type "MITER" in the keyword section. The program is listed in the "ENGINEERING & SCIENCE" category under the subject "MITER: V1.3A ANGLE CALCULATOR with a file name of "MITER.ZIP." (The "ZIP" suffix means that you'll also have to download the "ZIP" software from America Online in order to use this and other "zipped" programs from AOL.) If you don't have the AOL service, you can order the program on a floppy disk directly from the author by sending a check for \$25 to: Carl Shafer, 2717 Turtle Creek Dr., Hazel Crest, IL 60429.

And speaking of computers, thanks to all those readers who corrected our inflated definition of a "byte." For the record, a "byte" is a single unit of information such as a number, letter, space, or punctuation mark.

—Tom Jackson, General-Interest Editor

Patented dado shim set available directly from Veritas

In our article "Shims: the secret to making dados fit" in the October 1995 issue of WOOD® magazine, we showed a dado shim set made by Veritas. However, we neglected to advise readers that this product is protected by patent number 5,316,061, and that the set is sold by Veritas Tools for \$6.95. To order, call 800/667-2986.



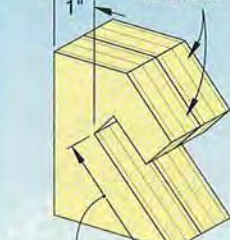
Simplified angle gluing

I loved the article "Corner Classic" in the November 1994 issue. However, I have been building wall-mounted corner cabinets for a number of years, and have developed a process that makes the clamping and gluing of the 22½° beveled stiles to the beveled sides much easier.

First, to eliminate slippage problems while clamping this joint, I cut biscuit slots into the beveled edge of the sides and stiles. To do this, I use the 22½° jig shown right and a slot-cutter bit mounted in my router table. You can also substitute a spline for the biscuits to reinforce this joint.

CLAMP CRUTCH

2 pieces of ¾" plywood laminated

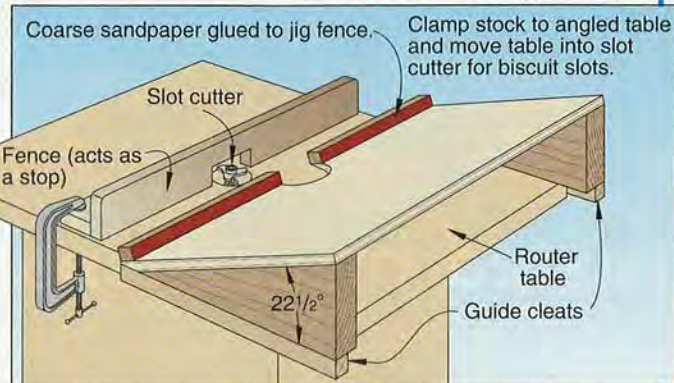


Equal to width of angled stile



Second, I use several shop-built 22½° clamp crutches (as shown in the drawing left) to draw the miter joint together and to apply even pressure along the joint line. These crutches help maintain the stiles at the proper angle to the sides while the glue dries.

—Frank Harland, Citrus Heights, Calif.



Continued on page 22

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TALKING BACK

Continued from page 21

Dreaming of (and building) her own shop

I enjoy *WOOD* magazine, and woodworking has provided me with years of enjoyment. Several of the Idea Shop projects were used while I was creating my own workshop.

I am a Sister of Saint Joseph from Rochester, and an occupational therapist by profession. I was able to spend an entire summer working on an accessible housing project for our local chapter of Habitat for Humanity. The experience convinced me to look for a way of using more of my untapped woodworking talents. As a result, I now spend one day a week working with a local renovation contractor to improve my skills. And my confidence has increased enough to where I can tackle most of the *WOOD* magazine projects with good results.

My own woodworking shop started out in a small attic room with a jigsaw and a 1/4" electric drill. This was followed by moving the shop to a more traditional basement location. However, as I acquired more tools and wood, the projects grew bigger, and the sawdust and noise began to interfere with the general living space.

During the summer of 1994, I was fortunate enough to acquire space for my wood shop in a



17x27' garage bay on our motherhouse property. I planned, framed, insulated, drywalled, and painted the space. Since September 1994, it has been an operating shop, although the work areas are still being rearranged for greater efficiency and storage. And in this new and wonderful space, I build Adirondack chairs, deck furniture, folding beach chairs, custom-sized bookcases, and cabinets. And the scrap wood becomes small craft items like clocks, candleholders, and boxes. ♣

—Eileen Curtis, SSJ, Rochester, N.Y.

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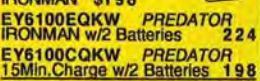
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- 35-617 10"x50T Carbide Blade 34
- 35-677 14"x108T Carbide Blade 75

SANDPAPER

- STIK-ON DISCS**
- | Grit | 4 1/2" roll | pieces | 6" round | 5" round |
|------|-------------|--------|----------|----------|
| 60 | N/A | 100 pc | 12.95 | 11.95 |
| 80 | 9.95 | 100 pc | 11.95 | 10.95 |
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| 220 | 8.85 | 100 pc | 10.95 | 9.95 |

- hook & loop**
- any grit 10 pcs \$3.95
- triangle sanders**
- Ryobi 30 pc assorted \$4.25
 - Fein 30 pc assorted 6.95
 - Bosch 50 pc assorted 10.50

FEIN Detail Sander

- Kit w/case & paper \$188
- Scraper Blade attachment 15.95
- 30 pc assorted PSA paper 6.95

STABILA

- LEVELS - Hand holes. Two vertical vials. Two milled faces. Yellow coat.**
- 2464 24" w/ hand hole 44
 - 2469 36" w/ hand hole 46
 - 2467 48" w/ hand hole 49
 - 2468 72" w/ hand hole 104

- 2859 NEW Laser Level 325
- 2699 6 ft -3vial 99
- 2700 6 ft 6" -3vial 115
- 2701 8 ft -3vial 125

RYOBI

- OSS450 Spindle Sander \$159**
- AP10 Replacement Blades 24.95
 - BS900 NEW! 9" Band Saw 165
 - DP80 8" Drill Press 99
 - DS1000 Detail Sander 39
 - DC500 Detail Carver 62
 - J60VK JigSaw Kit 85
 - TRM2C Trimmer w/2 bases 99
 - RJ100VK Reciprosaw 99
 - RS115K RO Sander Kit 69
 - SC162 Scroll Saw 119
 - SC162VS VS Scroll Saw 165
 - TS254 10" Miter Saw 197

AIRY

- NAIL GUNS**
- 241SK 18 G 3/8-1-1/2" Kit \$98**
- EZ1 shoots pins & staples 98
 - 250SK 18 G 3/4-2" Kit 164
 - 350K 16G 3/4-2" Kit 194
 - 565T 1-2-1/2" Finish Gun 204
 - 626SK 1/4" Crown 1" Spaker Kit 104
 - 6290 6d-16d Framing Nailer 314

Emqlo

- AIR COMPRESSORS**
- AM39HC4V 3/4 HP-2 tank \$ 293
 - AM78HC4V 1 1/2 HP-2 tank 307
 - AM8BDOLHC4V New! Oilless 307

SENCO

- SFN2B Finish Nail Gun 1 1/2" to 2 1/2" \$359**

- Roll-Air COMPRESSORS**
- D1500HP5 1.5 hp 4.5 gal tank \$307

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New Technology Improves Sleep Quality

Chances are, you need better sleep. Thanks to advances in sleep surface technology, now you can get it!

America has become a nation of the chronically sleep-deprived. The Better Sleep Council reports that over the past 20 years, we Americans have added around 158 hours, or nearly an entire month each year, to our job schedules. That's not to mention the time we spend working hard to care for our families and homes. Sleep deprivation is caused by both lack of time spent sleeping and poor quality sleep. Sound familiar? Then you owe it to yourself to read on!

SLEEP DEPRIVATION CAN BE DANGEROUS

According to the AAA Foundation for Traffic Safety, sleep-deprived drivers are vulnerable to "micro-naps" lasting four or five seconds—plenty of time at highway speeds for a fatal crash to occur. Disrupted sleep and sleep disorders cost American businesses billions of dollars annually in lost productivity, industrial accidents and higher medical bills. Lack of sleep also was implicated in the Exxon Valdez oil spill, the space shuttle Challenger disaster and the nuclear accident at Three Mile Island.

Loss of sleep during the night is responsible for increased vulnerability to illness, a tendency to nod off at work the next day, and even loss of creativity and clarity of thinking, say British researchers. Power tools can become dangerous weapons in the hands of someone who is not well rested. And almost everyone is familiar with the physical aches and pains that occur because of poor quality sleep.

DO YOU NEED MORE SLEEP, OR JUST BETTER SLEEP?

On the average, most adults require seven and a half to eight hours of sleep per night, and a full cycle including deep sleep is required for us to feel adequately rested in the morning. Any number of factors can interfere with

deep, nourishing sleep—including cigarette smoking, worry, a noisy environment and physical discomfort.

Air-cushioned support has been proven to positively affect all three factors that determine the quality of sleep: spinal alignment, pressure points and physiology.

We try remedies from pain medication and sleeping pills, to chiropractic care and self-relaxation techniques in order to get better sleep and rid ourselves of morning aches and pains. But new sleep surface technology offers a simpler solution for many people who toss and turn.

THE FIRST REAL BREAKTHROUGH IN SLEEP SURFACE TECHNOLOGY IN OVER 100 YEARS

Even if you just bought a new bed, you may be sleeping on an antiquated surface! Developed a century ago, innerspring mattresses can create pressure points that interfere with total relaxation. Waterbeds made a big splash in the '60s, but even those labeled "firm" can produce a hammock effect, which can cause the spine to curve unnaturally. Fortunately, a new technology has come through test after test with flying colors: Select Comfort Air Sleep Systems™.

The Select Comfort adjustable firmness mattress uses air which distributes body weight more evenly and provides better support.

While it looks like a traditional mattress on the outside and even fits standard sheet sizes, the Select Comfort mattress is completely unique on the inside. Air is captured inside innovative "I-beam" chambers that contour to the body, provide proper spinal support, reduce pressure points and evenly distribute weight for better sleep.

What's more, each side of the Select Comfort adjustable firmness mattress is independently adjustable—with a remote hand control that digitally tells you the

firmness level that's perfect for you. And, you can let air in or out to change the mattress firmness, depending upon how your body feels each night. This is essential for couples, because two people of different shapes and sizes cannot sleep on the same surface and both be as comfortable as they should be to achieve the best possible sleep.

MADE-IN-MINNESOTA QUALITY

Select Comfort adjustable firmness mattresses are manufactured in Minneapolis, Minnesota, and tested for comfort and durability by independent laboratories. Well on its way to becoming a worldwide leader in state-of-the-art sleep systems, Select Comfort currently is the fastest growing company in America's bedding industry, and has earned 22 U.S. patents.

LIGHTWEIGHT AND EASY TO SET UP YOURSELF

The Select Comfort adjustable firmness mattress is so lightweight, it can be delivered via UPS in one carton. Following the simple instructions, one person can set up the system at home, usually in 30 minutes or less. An attached electronic air pump fills the mattress with the right amount of air, and then hides out of sight under the bed. Dual controls allow each sleeping partner to adjust the sleep surface to their desired firmness.

TRY SELECT COMFORT AT NO RISK FOR 90 NIGHTS

Thousands of people from coast to coast already own a Select Comfort adjustable firmness mattress. You can try one, too, protected by a "No-Risk 90 Night" guarantee and up to a 20-year limited product warranty. Call our sleep consultants and ask them about your particular sleep needs. They can answer all your questions and help you better understand how you can benefit from a Select Comfort adjustable firmness mattress.

For a free brochure and introductory video, call 1-800-831-1211, Ext. 4841.

Get The Best Night's Sleep Ever!

Frustrated With The Quality Of Your Sleep?

Do you toss and turn at night? Can't seem to find a comfortable position? Does your back ache when you awake? These are signs that your metal coil mattress or waterbed isn't supporting you properly and isn't right for your body. Select Comfort can help you sleep better with a revolutionary mattress that's so comfortable and supportive, it's recommended by the many doctors who use our product.

Sleep Better On Air

A Select Comfort adjustable firmness mattress doesn't rely on springs or water. Instead, it supports your body on a cushion of air. Air is better because it gently contours to your body's shape and keeps your spine in its natural alignment. And that lowers the tension in the surrounding muscles. So you can sleep comfortably in any position and wake feeling great!



Select Comfort contours to your body.



Firmer

Softer

With Select Comfort, you each get exactly the firmness you need.



Select Comfort provides proper back support and contours to your body. Weight is more evenly distributed and pressure points are reduced.



Metal coil mattresses can create pressure points and provide uneven support.

You Control The Firmness

With Select Comfort, you can change the firmness depending on how your body feels each night. Go from extra-firm to extra-soft, simply at the touch of a button. In



Customize the firmness of each side of the mattress.

fact, the firmness adjusts independently on each side of the bed so you and your partner can get custom support without compromising comfort or quality of sleep.

Call For More Information

You owe it to yourself to learn more about this revolutionary way to a better night's sleep.

For a **FREE** Video and Brochure, Call
1-800-831-1211
Ext. 4841



As Heard on Paul Harvey News & Commentary

The Only Mattress with Push Button Firmness Control.

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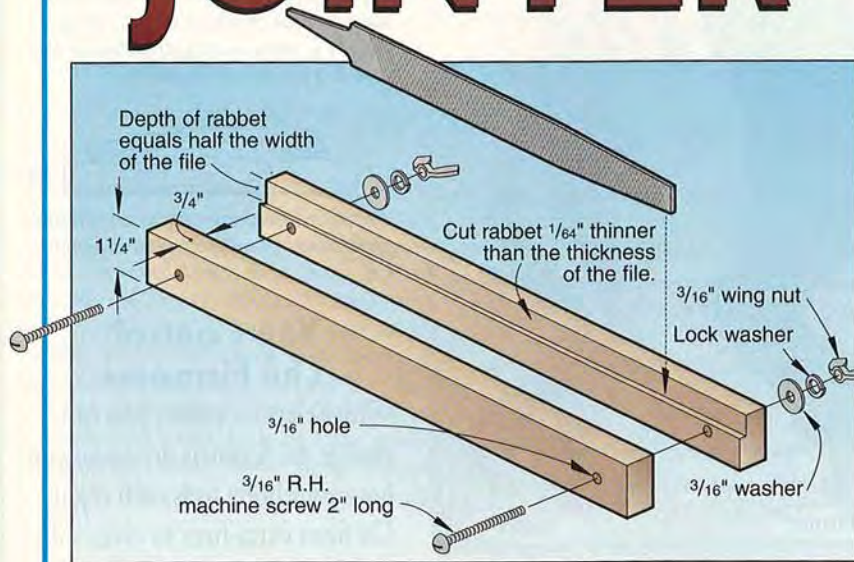


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Clamp a double-cut flat file into our handy laminate jointer, and you can clean and straighten rough laminate edges so they will meet neatly at a seam. You also can smooth and straighten the cut edges of sheet metal with this easy-to-make device.

To start, size the length of the laminate jointer a couple inches longer than your file. Then, cut the rabbet (but in only one side of the holder). To ensure a tight fit, cut the rabbet about $\frac{1}{64}$ " thinner than the thickness of the file. Drill the holes, assemble with the hardware shown, and put your jointer to work. 🌲

Project Design: Chuck Hedlund
 Photograph: King Au
 Illustration: Roxanne LeMoine

Convert Your Workshop Into A Money Making Machine!

Have you ever dreamed of converting your workshop into a money making machine? With RBI tools, your dream can become reality! Using your RBI Hawk Ultra Precision Scroll Saw, you can turn scrap pieces of wood into profitable craft items. Another possibility is to use your new Universal Woodplaner to take sawmill cut lumber and turn it into valuable finished stock or expensive hardwood moldings.



Scroll Saws

Wood Bundles



Universal Planers

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Our RBI 812 Planer was rated ★★★★★ for overall performance! **WOOD® Magazine Sept, 1995**

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There's no better time, no easier way, to start your own money-making full or part-time business. And there's no obligation or cost involved in learning the easy steps you can take to make your new career a reality!

1 Locksmithing. As millions of Americans demand greater protection, this becomes a high demand field. We provide the training to make you a professional locksmith who commands \$25 per hour.

2 Small Engine Service & Repair. There are more than 65 million small engines in use today (a number growing at a rate of 1,000,000 each month). You can make \$45 in just 1/2 hour for a simple tune-up, and even more for many of the simple repairs you'll learn on everything from snow blowers to bass boats.

3 Professional Saw & Tool Sharpening. Imagine a business where 90 cents out of every dollar you take in is cash profit! You'll earn \$18 to \$25 per hour running machines that do the work for you.

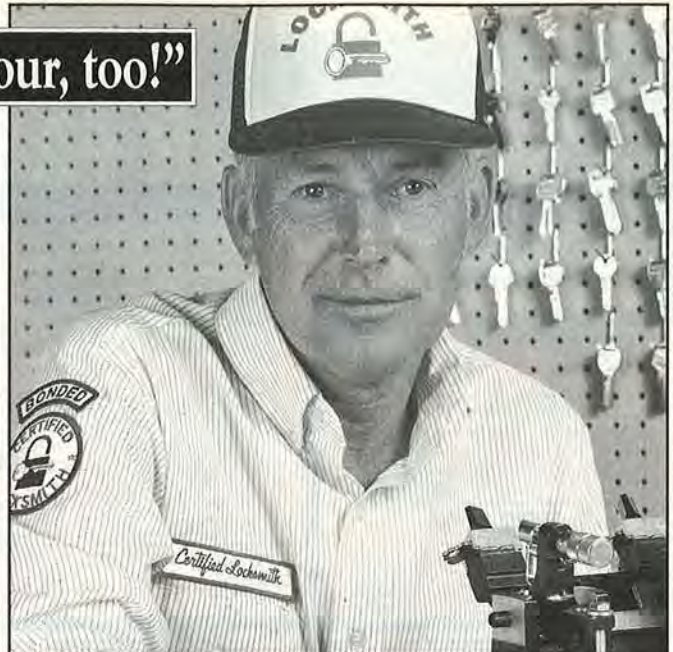
4 VCR Cleaning, Maintenance & Repair. The VCR has become a basic part of nearly every American household. You can make up to \$50 per hour in this fast growing field.

5 Computer Repair, Maintenance & Upgrade. There's no doubt about it, the computerization of America is taking place! Get a jump on a high paying occupation or business of your own in a field with an unlimited future.

6 TV & Satellite Dish Repair. You see them popping up in yards all over town. The demand is growing for the variety in entertainment only a satellite dish can provide. Get the skills you'll need to profit in this growing field.

7 Professional Gunsmithing. Skilled gunsmiths — when you can find one — charge up to \$50 per hour for simple repairs. That's money you can put in your pocket with the training you'll get from Foley-Belsaw.

8 Professional Woodworking. Build over \$3,000 worth of valuable furniture while you learn! You'll start the Foley-Belsaw course with the simplest of projects then move on to creating heirloom-quality furniture! You'll save thousands on your own home repairs alone.



"I chose Locksmithing, but that's just one of many fast-growing fields in need of skilled professionals. And with Foley-Belsaw, you train at home in your spare time while earning money from the start."

Bill Smith

9 Upholstery. As furniture prices rise and quality noticeably decreases, it makes good sense to pursue a career in upholstery. You'll learn to make big profits in both commercial and consumer markets.

10 Computer Programming. It's a fact: Computers are more widespread than ever before. And programmers with the right skills command top dollar for their work. Learn the languages most in demand — Q Basic, C, C+ and C++ — and watch your income soar.

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- Saw & Tool Sharpening, Dept. 21573
- VCR Repair, Dept. 62433
- Computer Repair, Dept. 64330
- TV/Satellite Dish Repair, Dept. 31206
- Gunsmithing, Dept. 92236
- Woodworking, Dept. 43508
- Upholstery, Dept. 81177
- Computer Programming, Dept. 35154
- Vinyl Repair, Dept. 71111



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HARBOR FREIGHT TOOLS



CENTRAL MACHINERY

5 SPEED BENCH DRILL PRESS

1/3 HP MOTOR

- 2" stroke, 8-1/4" swing
- 1/2" chuck

ITEM 05901-7VNA

\$499⁹⁵

FREE SHIPPING

25 PC. BRAD POINT WOOD BIT SET

- Sizes: 1/8" through 1/2" by 64ths

ITEM

03376-6VNA

\$8⁹⁵

FREE SHIPPING



CHICAGO

Electric Power Tools

3-1/4" PLANER

- Front base has a V-groove to help guide in chamfering
- 2 blade cutter
- Includes rabbeting guide plate/fence, sharpening holder, blade setting jig, spare brushes, and replacement belt
- D-handle with lock-on button
- 1/10" maximum depth of cut
- 110V, 5 amps, 17,000 RPM
- 34,000 cuts per minute
- 6-1/4 lbs. tool weight

ITEM 32222-3VNA

\$39⁹⁹

FREE SHIPPING

2 PC. REPLACEMENT BLADES

ITEM 33262-2VNA

\$7⁹⁵

FREE SHIPPING



CONTROLLED PRESSURE NON-MARRING HARDWOOD CLAMPS

JAW OPEN-JAW LENGTH CAP. ITEM PRICE

6"	3"	06986-4VNA	\$2⁹⁵
7"	4-1/2"	06987-7VNA	\$3⁴⁹
8"	4-3/4"	04852-6VNA	\$4⁹⁵
10"	6"	04853-6VNA	\$5⁹⁵
12"	8-1/2"	04854-8VNA	\$6⁹⁵

FREE SHIPPING



DRILL MASTER



TIN COATED FORSTNER BIT SETS

Includes 3/8" cut down shanks and individually organized wooden case. Rockwell hardness range from 55-65HRC. 20

16 PC. SET

- 16 sizes 1/4" to 2-1/8" by eighths

ITEM 32404-8VNA

\$29⁹⁹

FREE SHIPPING

20 PC. SET

- 20 Sizes from 1/4" to 3/4" by 16ths, 7/8", 15/16", 1" to 2" by eighths

ITEM 31130-7VNA

\$34⁹⁹

FREE SHIPPING

CENTRAL MACHINERY

10" PLANER

- 2 HP, 110V, 1 phase, 11 amp, 8000 RPM
- 19" x 16-5/8" x 16" overall dimensions
- 5-1/8" working distance
- 10-1/8" x 9-1/8" feed table
- 2-blade cutter head
- 10-1/8" blade size
- Stand sold separately

LIMIT 1

BLOW OUT PRICE!

ITEM 32377-3VNA

\$199⁹⁹

FREE SHIPPING



BUY NOW & SAVE!

12-1/2" ROLLER AND BRACKET SET

Double your table saw capacity! Make your own roller table.

ITEM

30026-8VNA

\$4⁹⁵

FREE SHIPPING



Pittsburgh

LIFETIME WARRANTY

LIMIT 2

2 PC. 3/4" HEAVY DUTY PIPE CLAMP SET

- Pipe not included.
- Handle screw operating range: 2-1/8" • Weight: 2-7/16 lbs.
- 1-1/2" throat depth

ITEM 31255-4VNA

\$2⁹⁹

FREE SHIPPING



SKIL HD TOP GUN II

Skil HD2736-02X INCLUDES FREE 13 PC. DRILL BIT SET 12V, 3/8" DRIVER/DRILL WITH KEYLESS CHUCK

- Includes TWO batteries
- Two speed ranges: 0-500 and 0-1650 RPM
- 5 torque settings • 4 lbs. tool weight
- 1 hour recharging time

ITEM 32559-1VNA

\$129⁹⁵

FREE SHIPPING

LIMITED QUANTITIES



CENTRAL MACHINERY

MORTISING MACHINE

Make a square hole in the fraction of the time it takes by hand!

- Includes 1/4", 3/8", and 1/2" chisels
- 5" maximum work piece height
- 3-1/2" swing
- 1/2 HP, 110V, 2.3 amps

ITEM 30036-4VNA

\$209⁹⁹

FREE SHIPPING



Pittsburgh

LIFETIME WARRANTY

10 PC. SPRING CLAMP SET

- Made of nickel-plated, heavy gauge steel, with heavy duty tempered springs and comfortable vinyl coated handles.
- Contains four 1" capacity clamps, four 2" capacity clamps, & two 3" capacity clamps

ITEM 05968-2VNA

\$7⁹⁹

FREE SHIPPING



CENTRAL MACHINERY

LIMIT 1

1" x 30" BELT SANDER

Remove the belt back plate and sand all types of curves and odd shapes.

- Motor: 1/4 HP, 2 amp, 60 Hz, 120V, 3450 RPM • Table: 5" x 5"
- Shipping weight: 19 lbs.

ITEM 07830-5VNA

\$39⁹⁹

FREE SHIPPING



CENTRAL MACHINERY

LIMIT 1

FREE ACCESSORIES: Stand, 6" belt, 9" disc, open-end wrench, hex key wrench

COMBINATION 6" BELT & 9" DISC SANDER

- 1 HP, 110V, 8 amps, 3450 RPM, all ball bearing motor; overall height: 40"; table tilt 0° to 50°; table surface: 6-1/2" x 12-3/4"; two position work table for disc or belt use; disc speed: 1720 RPM; belt: 6" W x 48" L; belt speed: 1280 FPM; wt: 121 lbs.

ITEM 06852-5VNA

\$149⁹⁹

FREE SHIPPING



LIMITED QUANTITIES STANLEY

STANLEY INTERLOCK KNIFE

This knife is designed with a contoured sure grip handle to prevent injuries. Blade extends from fully covered to stops at one quarter, half and fully extended. Spare blades are stored in the handle.

ITEM 04783-4VNA

\$1⁹⁹

FREE SHIPPING



CENTRAL MACHINERY

10", 2HP BENCH TABLE SAW

- Max. depth of cut @ 90°: 3"; @ 45°: 2-1/2"
- Motor: 2 HP, 115V, 60 Hz, 13 amp, 4500 RPM
- Blade sold separately
- Shipping weight: 40 lbs.

ITEM 32648-3VNA

\$179⁹⁹

FREE SHIPPING



10" SAW BLADE

- 40 tooth carbide tips
- 5/8" arbor

ITEM 00529-6VNA

\$9⁹⁵

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6 PC. HEAVY DUTY PLIER SET

Drop forged from rugged alloy steel, precision machined, heat-treated, & highly polished for long life. Includes 6" all-purpose diagonal cutters, 7" heavy duty diagonal cutters include tapered jaws, 8" needle nose pliers features extra strong grip, 8" lineman's pliers has hardened cutting edges and jaw separation, 10" slip joint pliers includes a shear wire cutter, and 10" groove joint pliers.

ITEM 00532-6VNA ~~\$199~~ **\$99.50** FREE SHIPPING



12" PLANER

Put a professional finish to low cost raw lumber quickly. Powerful smooth drive system gives cool, even planing and constant blade speed.

- Motor: 2 HP, 115V, 60 Hz
- Single wheel depth adjust: 0" to 6"
- Maximum planing capacity: 3/32" FREE SHIPPING
- Maximum width: 12"

ITEM 06469-7VNA **\$299.99**



13 GALLON INDUSTRIAL PORTABLE DUST COLLECTOR

Develops over ten times the suction of most shop vacuums. 4" hose is sized to pick up large chips from jointers, saws, shapers and planers. Unit has heavy duty ball bearing casters. Hose is sold separately.

Bag capacity: 13 gallon; Motor: 110V, 7 amp, 1 HP; Hose inlet: 1; CFM: 660; Shipping weight: 56 lbs. FREE SHIPPING

ITEM 31810-4VNA **\$119.95**



12" X 37" WOOD TURNING LATHE

Index pin contains 36 - 10° spacings for accurate fluting and marking on workpieces. Accessories include: left and right turning face plates and 6" and 12" tool rests. (Base sold separately)

Distance between centers: 37"; Swing over bed: 12"; Spindle speeds: 575, 980, 1560, 2520 and 3580 RPM; Motor: 1/2 HP, 1725 RPM, 115V, 60 Hz AC, swing mounted to headstock; Drive spindle: No. 1 Morse taper plus 3/4-16 threaded; Tailstock: No. 1 Morse taper 2-3/8" ram travel; Ship. wt.: 80 lbs.

ITEM 06841-0VNA **\$139.99** FREE SHIPPING

WOOD LATHE STAND

(Wood table top not included.)

ITEM 06842-1VNA **\$59.99** FREE SHIPPING

2 HP, 1050 PSI, 1.75 GPM, ELECTRIC PRESSURE WASHER

PACIFIC HYDROSTAR

This washer delivers 1050 PSI, but its turbo rotary nozzle boosts your cleaning power up to 1400 PSI! Excellent for standard and heavy duty cleaning jobs, degreasing, sandblasting, and paint removing. Includes lance, turbo lance, foaming lance, 12 oz. detergent nozzle, gun with safety trigger, 39 ft. cord with ground fault current interrupt, and 19-3/4 ft. hose.

- 115V, 15 amps
- 31-1/2 lbs. ship. wt.



ITEM 33594-4VNA **\$159.50** FREE SHIPPING



CANVAS TOOL BAG

Handy 15" size. Made with heavy duty canvas and hard bottom. Features heavy duty zippered top with two internal pockets and one external pocket with a snap down flap.

• 15" x 6" x 8-1/2" FREE SHIPPING

ITEM 32282-1VNA **\$5.99**



BOSCH
Bosch 1587VS

VARIABLE SPEED TOP-HANDLE JIGSAW

- Foot plate tilts to 45°
- 5 amp, 120V motor
- 1" stroke length
- 5-1/2 lbs. net weight

ITEM 31591-8VNA **\$142.95** FREE SHIPPING



STANLEY

Stanley 33-430

POWERLOCK TAPE MEASURES

- 25 ft., 1" blade remains rigid for 7 ft.
- Chrome-plated case with belt hook
- Yellow Mylar® coated steel blade with Tru-zero hook

ITEM 00906-4VNA **\$9.95** FREE SHIPPING



CENTRAL PNEUMATIC CONTRACTOR SERIES

LIMIT 1

18 AND 19 GAUGE AIR FINISH NAILER

Easy to use in tight spots. With a loading capacity of 105-18 gauge brads.

- Air consumption: 3.5 CFM at 75 PSI
- Uses 18 and 19 gauge brads
- Similar to Senco LS4
- 1/4" NPT inlet

ITEM 32870-2VNA **\$42.93** FREE SHIPPING



CENTRAL MACHINERY

LIMITED SUPPLIES!

PROFESSIONAL 4" BELT/6" DISC SANDER

Die cast aluminum table for disc or belt sander bevels to 45°. Versatile sander handles wood, plastic, aluminum, and steel.

- 1/3 HP, 120V • Belt: 4" x 36"; disc: 6"
- Speeds: belt 1952 ft./min.; disc 3450 RPM • Ship. wt.: 47 lbs.
- Belt table fills 0° to 90°
- Work table: 5" x 7-1/2"

ITEM 05908-8VNA **\$79.99** FREE SHIPPING



CHICAGO Electric Power Tools

HEAVY DUTY 4-1/2" DISC GRINDER

- High power to weight ratio
- 5/8"-11 spindle with 7/8" arbor adapter
- High powered 10,000 RPM
- Motor: 3/4 HP, 110V, 5.18 amps
- 11-7/8" long

ITEM 31135-1VNA **\$27.95** FREE SHIPPING



STANLEY BOSTITCH

LIMITED QUANTITIES

19 GAUGE PNEUMATIC BRAD NAILER

- 19 gauge • 1/4" NPT air inlet
- 60 to 100 PSI range

ITEM 50082-9VNA **\$99.99** FREE SHIPPING

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Compact size and one hand operation make this clamp unbeatable in cramped areas. The harder you squeeze, the tighter the grip, with up to 150 lbs. of pressure. Soft pliable pads protect fine finishes. Convenient trigger releases clamp at the touch of a finger.

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BEVEL BASICS AND BEYOND

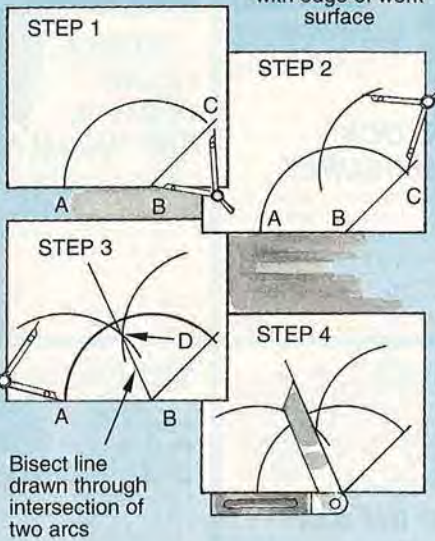
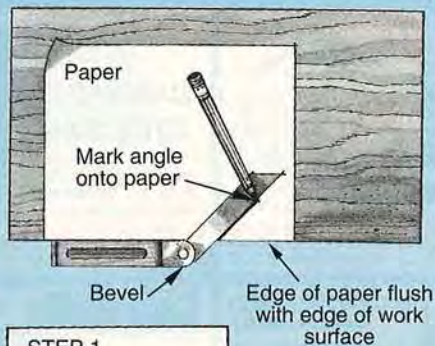
Woodworkers have used bevels for centuries, and with good reason. This simple hand tool transfers and duplicates angles with dead-on precision. In this article, we'll show you how to set the bevel for angles taken off workpieces, full-sized plans, and written instructions.

How a bevel helps you install trim

If all wall, tabletop, and cabinet corners measured exactly 90°, installing trim moldings would be a snap. You would simply set your saw for a 45° angle and start cutting. Of course, few corners meet this description. Fortunately, with a bevel you can duplicate any angle and transfer it to a sheet of paper. Then, with a few simple procedures you can cut matching mitered trim pieces. Here's how.

First, you need to "bisect" the angle, meaning that you divide the angle into two equal angles. To do this, loosen the bevel's wing nut, lay the body along one edge of the corner, and position the blade along the other edge of the corner as shown *below*. When the bevel hugs the edges, tighten the wing nut. (You can do the same on inside corners, too.)

Now, align the edge of a sheet of paper with the straightedge of a work surface, and transfer the bevel's angle to the paper as shown *above*. (You can mark the line using either side of the



bevel's blade.) Then, bisect this angle with a compass as in the 4-step drawing *left*. Here's an explanation of each step:

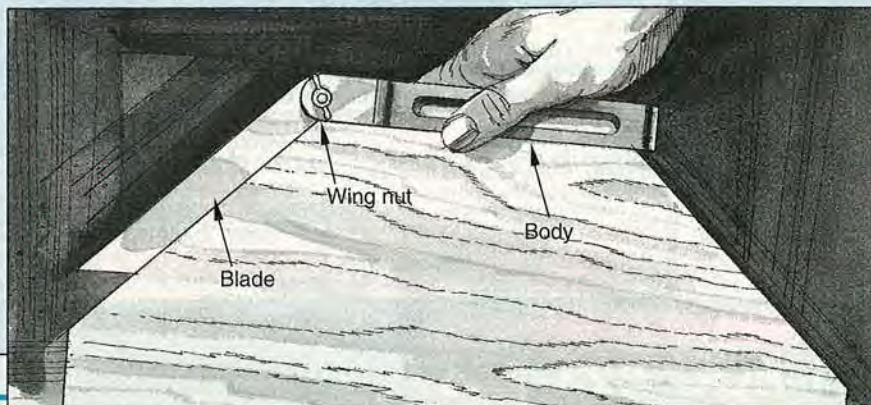
1 Place the point of a compass at the bottom of the marked line (point B), and create points A and C by swinging an arc of any radius between 3" and 5". Use a sharp lead for the best accuracy.

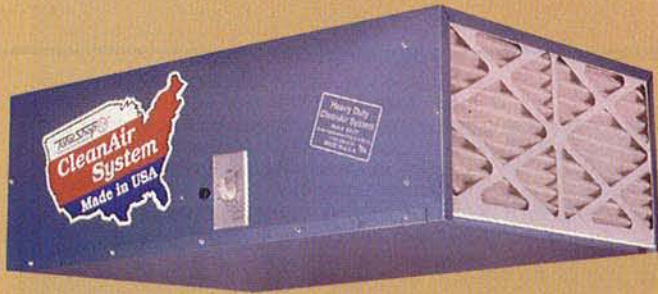
2 With the radius of the compass unchanged, place the point at C and swing another arc.

3 Move the point of the compass to point A and swing an arc just as you did in Step 2. The intersection of these two arcs creates point D. With a straightedge, draw a line from point B through point D to create the bisect line.

4 Adjust your bevel according to the angle between the work-surface edge and the bisect line. To cut a tight-fitting miter, adjust your saw according to the bevel's angle as shown *above*.

Continued on page 32





Got a dust problem? Take a look at the **FACTS** about air filtration systems.



Fact #1 Total Shop's CleanAir System is the only air filtration system with an air tight fan box. We caulk our filters in place for a totally air tight seal. No dust can slip by the filters creating a fire hazard in the motor. On other units, a potential fire hazard does exist.

Fact #2 With the Total Shop CleanAir System you will spend less time changing filters. Our 15" thick filter has been proven to last in hobby shops for an average of 12 - 14 months. Considering filter size, the JDS Air Tech 2000 unit would last only 6 - 7 months with their 8" filter and the Hartville Tool unit would last only 3 months between filter changes with their 4" filter.

Fact #3 The Total Shop CleanAir System is the only filter unit in this price range that has been UL Tested and Approved. Our main filter is the only filter approved and labeled by ASHRAE as 95% effective on wood dust. A recent magazine article featured the JDS unit and revealed the Air Tech 2000 has only 65% efficient filters.

Fact #4 Total Shop's CleanAir Systems have been made in Greenville, SC for almost 9 years. No competitor has been advertised for more than 2 1/2 years.

Fact #5 The Total Shop CleanAir System is the only filtration unit that includes a lifetime warranty. Any defect in workmanship will be repaired FREE for as long as you own the unit. No competitor currently offers this!

Fact #6 Experience and customer satisfaction are #1 at Total Shop. All competitors combined have less units in use than Total Shop. We are so sure of our CleanAir System that we give you a 30 day trial period. If you aren't satisfied just send it back for a refund.

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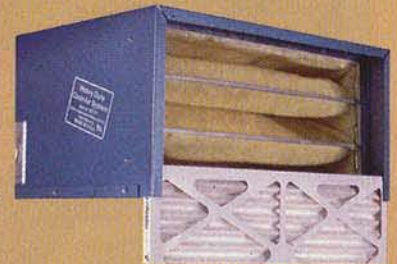
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- Available for any size shop
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How to duplicate cutting angles specified in written instructions

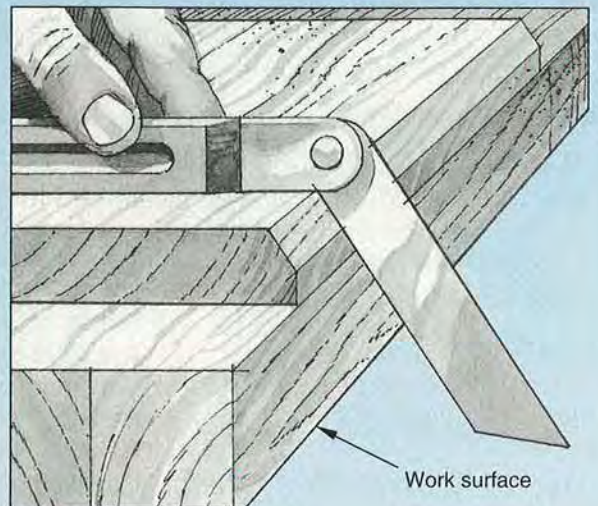
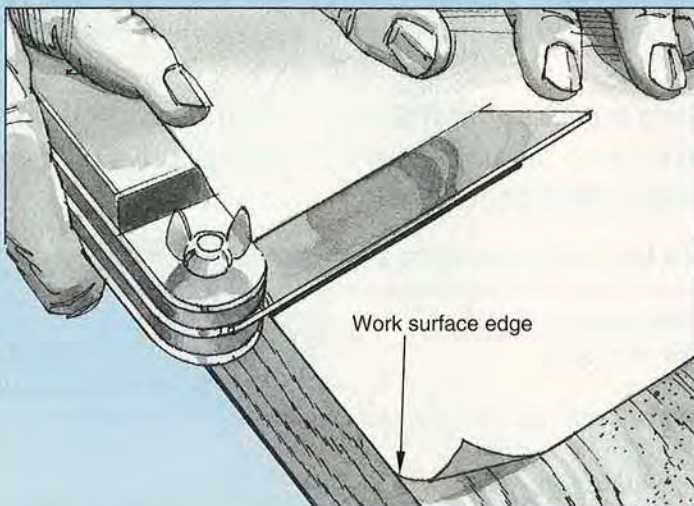
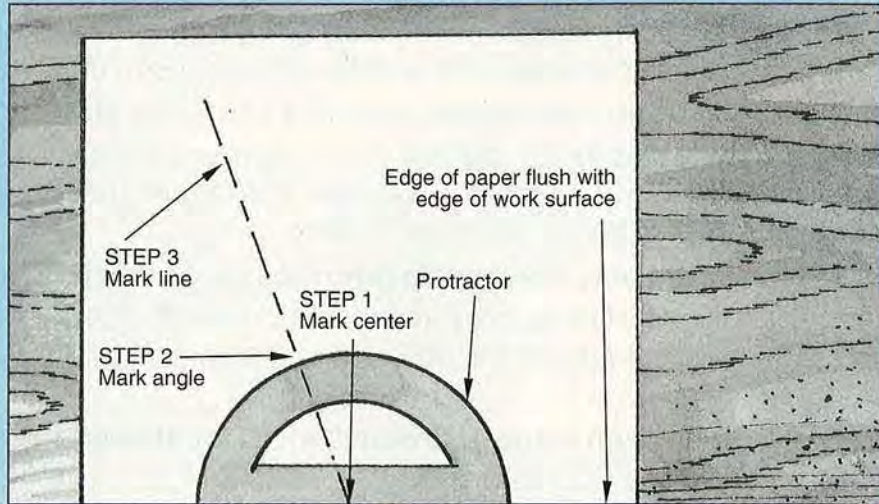
When a plan asks for a beveled or angled cut, or angled hole, you can use an inexpensive protractor and bevel for precise results. First, using a protractor, lay out the

angle along the edge of a work-sheet as shown *below*. Then, position the body of the bevel along the edge of the work surface, and set its angle according to the lay-

out line you just drew as shown *middle left*.

The first few times you try this, it makes sense to double-check the accuracy of your setting by repeating the procedure. This shouldn't take more than a few seconds. Now, use the bevel to set the miter gauge, fence, or table of your tablesaw, radial-arm saw, jointer, drill press, bandsaw disc sander, or other shop tool.

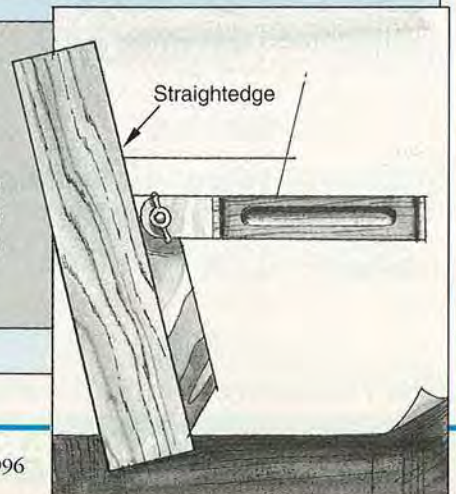
If a plan calls for a chamfered edge, and you prefer to do the job with a bench plane, then a bevel can help you in this instance, too. After adjusting your bevel for the necessary angle as described in the *previous* paragraph, use the bevel to periodically check your work as shown *below*.



Duplicating angles from full-size drawings

To accomplish this task, lay a straightedge, such as a jointed board, along one side of the angle. Then, place the blade of the bevel against the straightedge, and align the body with the other side of

the angle as shown *right*. This method works more accurately than positioning the bevel above the pattern and eyeballing its alignment without the aid of a straightedge. ♣



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DeWalt 8-1/2" & Ryobi 8-1/2"x60Tx5/8"	\$179	\$109
Delta 9"x80Tx5/8"	\$204	\$119
Ryobi-Makita & all 10"x80Tx5/8"	\$207	\$129
DeWalt, Makita, B&D, Hitachi 12"x80Tx1"	\$229	\$139
Ryobi-Makita 14"x100Tx1"	\$266	\$179
Hitachi 15"x100Tx1"	\$277	\$189

For good general purpose cuts use Woodworker II 30T & 40T or Woodworker I. Use small stiffener where possible.

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With this one ALL PURPOSE blade you can RIP & CROSSCUT 1"-2" ROCKHARDS and SOFTWOODS resulting in a SMOOTH AS SANDED surface. PLY-VENEERS of OAK and BIRCH will crosscut with NO BOTTOM SPLINTER on alternate feed rates.

- DOUBLE HARD and 40% STRONGER C-4 CARBIDE
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5/8" holes, boring thru 1-1/4" add \$7.50. Larger at Time Basis—Shipping \$4.50

WOODWORKER II	LIST	SALE	10%	20%
14"x40Tx1"	\$215	\$149	\$134	\$119
14"x30Tx1"	\$195	\$139	\$125	\$111
12"x40Tx1"	\$183	\$129	\$116	\$103
12"x30Tx1"	\$162	\$119	\$107	\$95
10"x40Tx1/8" or 3/32"	\$156	\$119	\$107	\$95
30T 1/8" or 3/32"	\$135	\$ 99	\$ 89	\$ 79
9"x40T	\$146	\$109	\$ 98	\$ 87
30T	\$125	\$ 99	\$ 89	\$ 79
*8-1/4"x40TX 3/32"	\$136	\$ 99	\$ 89	\$ 79
8"x40T 3/32"	\$136	\$ 99	\$ 89	\$ 79
30T	\$115	\$ 89	\$ 80	\$ 71
7-1/4"x30T 3/32"	\$112	\$ 69	\$ 62	\$ 55
**6"x40T 3/32"	\$136	\$ 89	\$ 80	\$ 71

*NEW for Sears & Makita Table Saws **New For Saw Boss

The Proof Is In The Cutting

Both Woodworker II blades performed very well, whether cutting through butter-soft 3/4"-thick pine or iron-hard 1 3/4"-thick ash. The 20° positive hook angle and 15° alternate top bevels give the blades an aggressive attack; we maintained a brisk, uniform feed rate while ripping a variety of woods on the powerful Unisaw and experienced no discernible resistance or slowing. On the smaller saws, switching to the thin-kerf blade allowed very similar feed rates, again with barely noticeable resistance.

Although we've used blades that cut faster, their cut quality couldn't touch what we got with the Forrest blades. On solid stock, ripped edges came off our saws jointer-finished, smooth and slick with no visible teeth marks—good enough to edge-glue without additional machining. Crosscuts came out crisp and clean with no fuzzing or tiny splintering. The Bottom Line

Performance of the Woodworker II is impressive enough that you could bolt this versatile, general-purpose blade on your saw and use it for virtually all of your cutting operations.

SHOP TEST, Woodworker's Journal Nov./Dec. '95 pg.78

WOODWORKER I — For TABLE and RADIAL SAW

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- ALL 60T AND 3/32" THIN KERF 30° ATB and 5° face hook on 10" diameter and under. 12" and 14" are 20° ATB 1/8"K.
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- Our STIFFENER STRONGLY RECOMMENDED AGAINST outside blade for best cuts. Made and serviced in U.S.A. for your benefit.

	LIST	SALE
14"x60Tx1" 1/8"K	\$224	\$159
12"x60Tx1" or 5/8" 1/8"K	\$198	\$139
10"x60Tx5/8" 3/32"K	\$162	\$129
9"x60Tx5/8" 3/32"K	\$156	\$119
8"x60Tx5/8" 3/32"K	\$150	\$109

NEW!

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WOODs Magazine test, Sept. '93, pg. 45

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(Bore up to 1-1/4" Add \$25 — Plus \$5.50 S&H)

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9"x80Tx1/8" & 3/32" K	\$207	\$179	14"x100Tx1"	\$266	\$226
10"x80Tx1/8" & 3/32" K	\$207	\$159	16"x80Tx1"	\$262	\$223
12"x80Tx1-1/8"K	\$212	\$181	16"x100Tx1"	\$294	\$243

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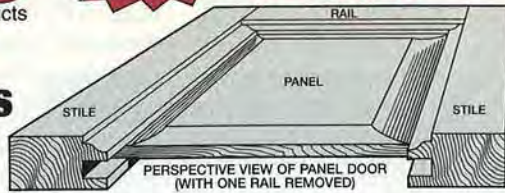
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LONGLEAF PINE

The South's hardest-working softwood

You probably know longleaf pine best as treated boards and posts for decks and fences, or as dimension lumber for building construction. Yet in the past, longleaf pine played other serious roles, too.

Along with its cousin pitch pine, longleaf pine was an important contributor to the United States' naval stores' industry. The trees' pitch or gum was collected, then distilled into turpentine and resin, which was used in the manufacture of paint, varnish, shoe polish, printing ink, and other products.

Longleaf pine also admirably served as flooring, interior trim, and millwork such as doors and windows in grand homes throughout the Southeast and Deep South. The hard, heavy wood stood up well to abuse and looked great at the same time. Too, because longleaf pine has superior strength for a softwood, it was sawn into large beams and girders for use in bridges, trestles, and other heavy construction.

Today, this once-prominent species of the original southern pine forest has made a comeback. Not only is it a mainstay for the treated-wood and construction industry, but it's finding its way into cabinetry, doors, windows, and other architectural elements.

Wood identification

A part of the southern pine family that includes loblolly, slash, and shortleaf pine, longleaf pine (*Pinus palustris*) grows best in the coastal plain from southern Virginia through the Carolinas into Georgia, Florida, Alabama,



Mississippi, Louisiana, and eastern Texas. The species thrives in moist, but well-drained, deep, sandy soil where it reaches 100' heights and diameters of 3'.

The trunks of mature trees have orange-brown bark broken into papery scales. In keeping with its name, longleaf pine features slender, flexible needles up to 18" long carried on the branches in groups of three. Cones up to 10" long develop in the second season following its blooms.

Longleaf pine has a very thin band of nearly white sapwood surrounding its resinous orange-yellow heartwood. The wood rates as straight-grained, extremely hard, strong, durable, and, at about 42 pounds per cubic foot



Natural range

air-dry, nearly as heavy as sugar maple. Rapidly grown plantation trees produce wood with a somewhat coarse texture, resulting from the difference in density between light earlywood and heavier latewood.

Uses in woodworking

Mills across the South process the newly appreciated longleaf pine into cabinet-class lumber as well as an extensive list of construction and architectural grades. That means you can craft it into just about anything. Don't plan on using it for naturally finished projects outdoors, though, unless you buy the treated variety or coat it with primer and paint.

Availability

Home centers and lumberyards carry longleaf pine boards (called Southern pine) in common grades (Nos. 1, 2, etc.), but not always the clearer finish grades (C, C&Btr.). These may have to be special-ordered. Better grades run about \$1 per board foot.

PERFORMANCE PROFILE

longleaf pine (*Pinus palustris*)



Longleaf pine

Longleaf pines are large trees, which means that you can buy thick, wide boards and timbers greater than 5×5". Finish-grade boards, generally clear except for a few tight knots, are your best bet for natural-finish projects. Otherwise, No. 1 Common and Better will yield about 66⅔ percent clear cuttings.

Because longleaf pine has primarily been delivered to the construction industry, even kiln-dried wood can have a moisture content of from 15-19 percent. The drier boards carry a stamp that reads either "KD15" or "MC15"—averaging about 12 percent. Even this wood you'll want to store for a few weeks in your shop and let it acclimate to the relative humidity. When you're ready to work it, heed the following guidelines.

Machining methods

- Although botanically classified as a softwood, you'll find longleaf

pine to be quite a hard wood. So use power, not hand tools.

- Because this species of pine is a resinous one, the pitch or gum tends to collect on saw blades and other cutting edges. To avoid the burning and blade wander that comes from gum buildup during ripping, stop occasionally to wipe the saw teeth with acetone or oven cleaner. Or, switch to a Teflon-coated blade. Remember the pitch when routing, too.

- Much like Douglas fir, longleaf pine has a tendency to chip and splinter on cuts across the grain. Use a backing board.

- Drill this wood at faster drill press speeds than hardwood, but make it a practice to back the bit out of deep holes to remove cuttings that might burn.

- Although resin can cause problems in sawing and cutting, it doesn't hinder adhesives, unless there's an obvious sap pocket in the joint.

- Before painting, seal any knots or pockets in the wood with shellac to prevent bleed-through.

- Longleaf pine accepts stains nicely if you first prepare the wood with a thinned washcoat of shellac or wood conditioner to get even stain penetration.

- All pines, but especially longleaf, tend to darken with age, so select your stain color or clear finish with that in mind.

Carving comments

- The difference in hardness between the latewood and earlywood makes the wood very difficult for detail work.

- Because of splintering, limit long cuts with the grain.

- Clean gum buildup from power-carving cutters.

Turning tips

- Let any resin droplets on turned wood dry. Then scrape them off before finishing. ♣

SHOP-TESTED TECHNIQUES THAT ALWAYS WORK

Any exceptions—and special tips pertaining to this issue's featured wood species—appear under other headings elsewhere on this page.

- For stability in use, always work wood with a maximum moisture content of 8 percent.

- Feed straight-grained wood into planer knives at a 90° angle. To avoid tearing, feed figured or twisted grain at a slight angle (about 15°), and take shallow cuts of about ⅛".

- For clean cuts, rip with a rip-profile blade having 24-32 teeth.

Smooth cross-cutting requires at least a 40-tooth blade.

- Avoid using twist drills. They tend to wander in the wood and cause breakout in the hole. Use brad-point bits and a backing board under the workpiece to reduce tearout.

- Drill pilot holes for screws.

- Rout with sharp, preferably carbide-tipped, bits and take shallow passes to avoid burning.

- Carving softwoods generally means fairly steep gouge bevels—20° or more—and deeper cuts.

LONGLEAF PINE AT A GLANCE

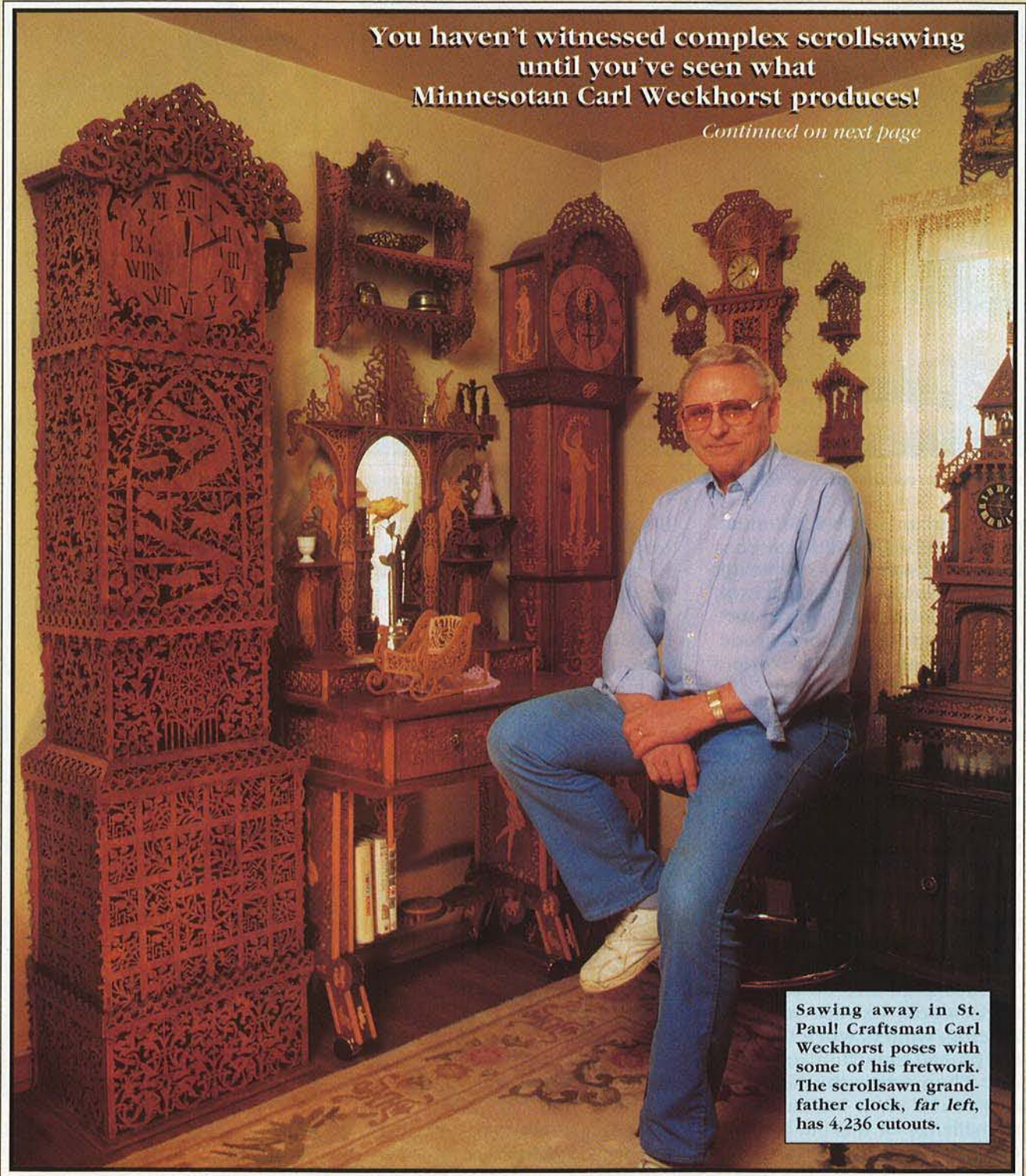
Cost	\$ \$ \$ \$ \$
Weight	⚖ ⚖ ⚖ ⚖ ⚖
Hardness	T T T T T
Stability	▲ ▲ ▲ ▲ ▲
Durability	🕒 🕒 🕒 🕒 🕒
Strength	💪 💪 💪 💪 💪
Toxicity	☠ ☠ ☠ ☠ ☠
Workability	🔪 🪚

Look-alike: Douglas fir

FRETWORK MASTERPIECES

You haven't witnessed complex scrollsawing
until you've seen what
Minnesotan Carl Weckhorst produces!

Continued on next page



Sawing away in St. Paul! Craftsman Carl Weckhorst poses with some of his fretwork. The scrollsawn grandfather clock, far left, has 4,236 cutouts.

FRETWORK MASTERPIECES



The large patterns that Carl prefers to cut out require a scrollsaw with a 30" throat.

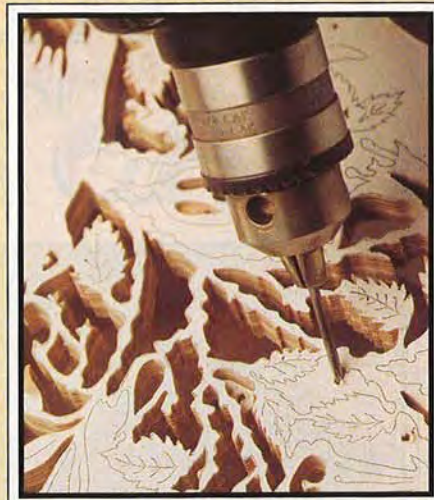
In suburban St. Paul, Minnesota, there's a veritable mecca for scrollsawers. It's not built of granite or marble, though. And there isn't a billboard or marquee to announce the exhibits inside. The only sign happens to be a folksy cutout attached to the garage door. It reads: "Retired and enjoying it." But for Carl Weckhorst, the owner of the building and the neatly trimmed home next to it, that phrase really says it all.

At 71 years young, Carl has been scrollsawing for more than 30 years. For the past nine (since his retirement), he's been able to practice his craft whenever and for however long he wants to. That means all afternoon, seven days a week, except in those Minnesota winters when temperatures plunge into the deep-freeze zone. Then, even the heater in Carl's 14x18' shop building—and the challenge of making just one more intricate cut—won't keep

him warm. However, the down time isn't wasted. He uses it to pour through catalogs of patterns, planning the thrill of future cuts.

Three decades of classic cutouts

By his own breakdown, Carl has made 253 scrollsawn projects (at this writing) since he began in earnest during the early sixties. To professional scrollsawers adept at turning out items for the craft-show market, that's not much production. But consider this *partial* list: three grandfather clocks (one has 4,236 cutouts), 18 wall clocks, 23 mantel and table clocks (some resembling 36"-tall gothic cathedrals), two parlor cabinets (each over 6' tall), 38 picture frames, 66 wall shelves and hanging cabinets, four bird cages, a writing desk, and even a model Eiffel Tower that stands 36" high! And Carl still has most of them, proudly on display for he and his wife, Phyllis, to admire.



To drill clean blade start holes in his fretwork patterns, Carl chucks a 19-gauge brad into his drill.



The more difficult the cuts in a pattern, the more Carl likes it. Here, the lacy cutouts on either side of the leaf present a real challenge.

Sell them? Hardly. Carl gave up his other former pastimes of fishing, hunting, and golf to spend more time at scrollsawing. You see, it's the doing that he enjoys.

"I like the patterns with the most intricate cutouts," Carl admits, the inflection solidly verifying his Norwegian ancestry. "And there's lots and lots of them I want to make yet."



Standing a little over 72" high, the fretwork parlor cabinet commands attention. Built in sections, it took Carl two years of part-time sawing to complete.

Reviving fretwork's Golden Age

From the early 1800s until about the 1920s, fretwork was big in the United States and England. The art of cutting open, ornamental designs in wood with a framed, thin-bladed handsaw (a coping, or fretsaw) was a popular, safe, and inexpensive parlor hobby for the whole family. Even when the foot-powered scrollsaw came along in 1865, the machine was painted and decorated with pin stripes so that it would look well in the living rooms of the era.

The patterns for that golden age of scrollsawing evolved from the delicate latticework found on Chinese Chippendale furniture and reflected the "gingerbread" of Victorian architecture. Pattern suppliers were numerous. But perhaps the largest in the U.S. was H. L. Wild of New York, New York, (1876-1939) whose catalog covered everything from parlor cabinets to mirrors and bird cages. It was copies of those Wild patterns that kindled Carl's craving for fretwork.

"When I was a boy on our farm in western Minnesota, I cut out toys from apple crates with a coping saw," recalls Carl. "I used to trace patterns from pictures in catalogs and magazines—cowboys, Indians, horses, all that."

In 1958 Carl purchased a BWI benchtop scrollsaw and once again started sawing as a hobby. "I was farming at the time and didn't have much leisure. Then, I started working for the state highway department, and had more spare time," he says. "But because there weren't any fretwork patterns around that I could find, I just cut out simple shapes for painted lawn ornaments and signs, and did some woodcarving."

Desperate for scrollsaw patterns, Carl ran a classified advertisement calling for them in a national woodcarving newsletter. The results were more than he had hoped for. "A fella in Ohio wrote to tell me that he had a bunch of

Continued

FRETWORK MASTERPIECES

original H.L. Wild patterns," Carl remembers. "I paid him \$60 for them all."

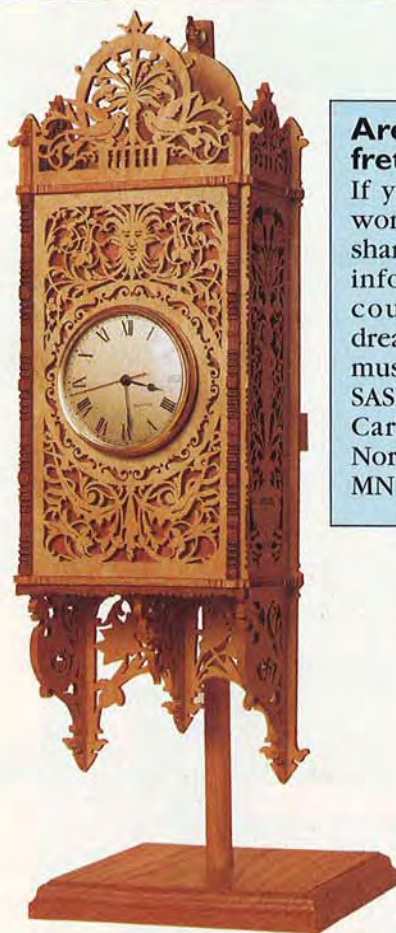
From then on, Carl was continuously turning up more classic patterns. At a local mall craft show, he met a shop teacher whose father had a collection of fretwork designs. Carl traded for them. Next, he heard about a farmer near New Prague, Minnesota, who had more H. L. Wild patterns, especially of furniture items (he turned out to have the entire catalog). Carl paid to copy them.

Today, Carl will still track down an occasional pattern, or swap patterns with another scrollsawer, but he mostly relies on a Wisconsin supplier. "Jim Reidle [Wildwood Designs, Inc., P.O. Box 661, Richland Center, WI 53581] has more than I can ever cut," admits Carl. "It seems that fretwork is undergoing a real revival among scrollsawers. There's more patterns now than ever before."

What it takes to saw for detail

Fretsawing usually implies cutting out a pattern from material $\frac{1}{4}$ " or less in thickness (occasional projects may require stock up to $\frac{3}{4}$ " thick). In the old days, fretsawers relied on stock that was hand-planed to thickness. Nowadays, practitioners like Carl purchase Baltic-birch plywood or solid-core hardwood plywood for their projects. "But you must make sure that all the plywood you use is either solid-core or of many plies, such as Baltic birch," Carl advises. "Otherwise, edges of the cuts will chip out."

Modern fretsawers also have moved up to motorized scrollsaws. Carl, for instance, takes pride in his Excalibur heavy-duty model with its 30" throat (he can cut to the center of a 5' panel). "You watch while I show you no vibration," he says as he places a nickel on edge on the saw's table, then turns it on. "See, that's



Above: Carl traded for the pattern for this Italian-design clock made of Baltic-birch, $\frac{1}{8}$ " plywood stained a walnut tone.

Above right: Turn-of-the-century fretwork pattern books featured elegant bird cages like this one of Carl's. It's 20" tall and stained walnut.

Right: One of Carl's 44 fretwork clocks, called the Chimes of Normandy, stands 40" tall.

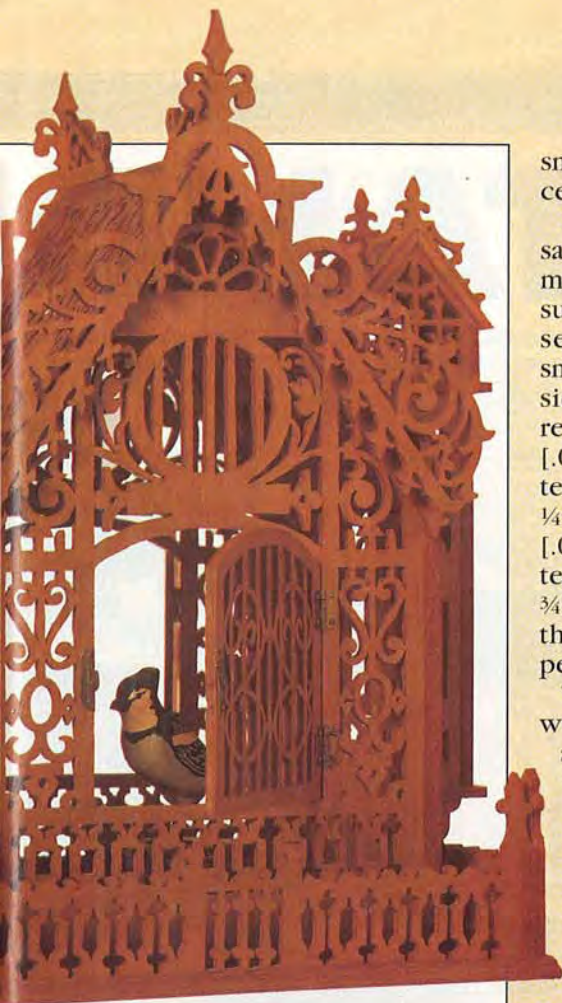
Far right: A table lamp such as this, sawn from $\frac{1}{4}$ " cherry plywood, might have graced a Victorian-era parlor.

Are you a scrollsaw fretwork fancier?

If you have classical fretwork patterns you'd like to share, or would like more information on how you could help realize the dream of a major fretwork museum, write (enclose a SASE, please):

Carl E. Weckhorst, 2449 North Dale Street, St. Paul, MN 55113.





smooth," he comments as the five-cent piece remains motionless.

In fretsawing, as with all scroll-sawing, the right choice of blades makes the difference between success and failure. And Carl has selected his favorites. "To get smooth, splinter-free cuts on both sides of the piece, I like Olson reverse-tooth blades. I use a size 2 [.014 thick \times .032" wide with 20 teeth per inch] for $\frac{1}{8}$ " stock. For $\frac{1}{4}$ - $\frac{1}{2}$ " stock, I go to the size 5 [.016 thick \times .038" wide with 12.5 teeth per inch]. Then, for heavy $\frac{3}{4}$ " stuff, I put in a size 20 [.022 thick \times .100" wide with 9 teeth per inch]."

To adhere the patterns to the workpiece, Carl relies on spray adhesive. "On a real large pattern, rubber cement gets real dry and lifts up before I'm finished cutting," notes the scroll-sawer. "Spray adhesive won't do that, and the pattern comes off real easy with lacquer thinner or lighter fluid."

For drilling the blade start holes for each of his inside cuts, Carl has found that a 19-gauge brad (and other appropriate sizes) fitted in his drill works perfectly. "A regular drill bit breaks out the wood on the backside. Brads don't, especially in real tiny spaces," he advises. Before he starts sawing, Carl first drills all the blade start holes in a pattern.

Due to the smooth-cutting blades, this scrollsawer's pieces require only a wipe or two with coarse No. 2 steel wool to clean up the back side. He never sands. And two coats of spray Deft complete his finishing.

The huge scrollsaw might be the center of attention in Carl's shop, but other tools see plenty of duty, too. "I use my oscillating spindle sander for lots of edgework," he says. "Then, I've got an old 10" tablesaw, a bandsaw with a resaw blade, a 12" planer, and that ancient 1" belt sander there. Why, I had that back on the farm even, but it sure comes in handy when I

have to just take a hair off a piece to get a good fit."

The museum of yesteryear

To the visitor, Carl and Phyllis' home is not unlike a museum of classical fretwork. Carl's scrollsaw work adorns every wall in the kitchen, living room, two bedrooms, and the basement den. And Carl remembers something about each piece he has created.

"This clock here, I got the pattern for it from a photograph in a magazine. I used the squares' method to enlarge the pattern, because there weren't a lot of copy machines around back then," he says proudly.

Walking from room to room, Carl points out the blue-ribbon winners from the Minnesota State Fair's scrollsaw competition. "I took first place in the event for 24 out of 25 years, you know," he comments. "But the competition seems to keep getting tougher all the time."

An observer of Carl's fretwork craftsmanship can't help but ponder the thought that his intricately sawn pieces should reside somewhere for the public to enjoy. That thought has crossed Carl's mind, too. "Jim Reidle, over in Wisconsin, has plans to build a fretwork museum there. And I'd probably display my projects in it, and that's only a few years off, according to him. It will be wonderful—the only fretwork display of its kind, and it could be a real tourist attraction.

"I got to do something," Carl adds. "We're running out of room, and there's more I want to make." Phyllis may have the final say regarding more fretwork projects, though. "He has so many [projects] now that are all cut out and stored in boxes. If he doesn't start assembling them soon, I'm going to go through all those cardboard boxes and start mixing up the pieces for him!"

Written by Peter J. Stephano
Photographs: Layne Kennedy

LATHE STAND

On many stand-mounted lathes, there's an empty space beneath the lathe bed that does little besides collect dust. But with this clever add-on, you can create valuable and convenient tool storage in a hurry. Our hinged-door project features holders for chisels, gouges, wrenches, faceplates, and other lathe accessories.

Note: Our drawings and measurements are for a door panel and frame fitted for Jet's JW1-1236. The size of the pieces needed for other stands will vary. Please measure your lathe stand and tools, and adjust accordingly.

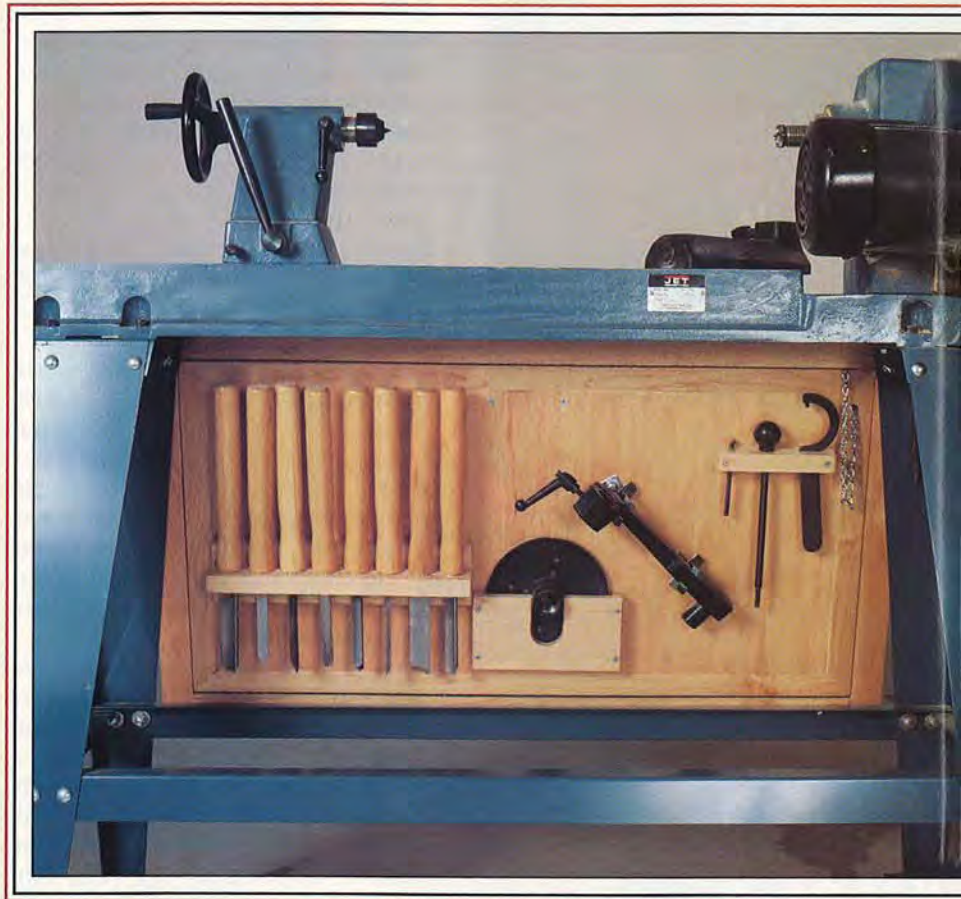
1 Start by cutting the hardwood frame members (A, B) to size. Although the opening on our lathe stand was trapezoidal, we made our frame rectangular for ease in construction.

2 Layout and drill the mating holes. Then, glue, dowel, and clamp the corner joints, checking for square. Later, drill $\frac{1}{4}$ " holes through the wooden frame and metal stand for bolting the frame to the lathe stand later.

3 Cut the door panel (C) to size from $\frac{3}{4}$ " birch plywood.

4 Miter-cut the banding strips (D, E) to size from $\frac{3}{4}$ " stock. Rout $\frac{1}{16}$ " chamfers along the mating edges of C, D, and E where shown on the Front View drawing.

5 Cut or rout $\frac{1}{8}$ " grooves $\frac{1}{4}$ " deep along the mating edges of the banding strips (D, E) and plywood door panel (C). Cut splines to the



Hinged door viewed from back of lathe.

sizes listed on the Exploded View drawing. Next, glue, spline, and clamp the chamfered banding strips to the plywood panel.

6 On the inside face of the door panel, add a solid-wood tool holder (F) to fit your turning tools. The holes in the holder should be about $\frac{1}{16}$ " larger than the diameter of the metal ferrule on your turning-tool handles. Add other holders as needed.

7 Finish-sand the pieces. Mask the plywood door panel. Now, finish the solid-wood banding (D, E) and

frame (A, B) with a clear finish. Later, mask the sealed wood, and paint the plywood door panel.

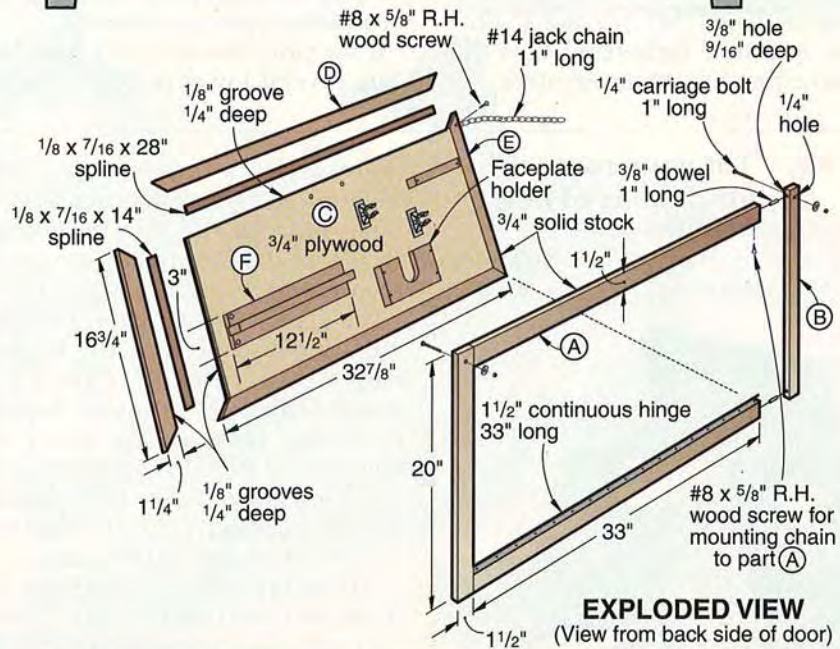
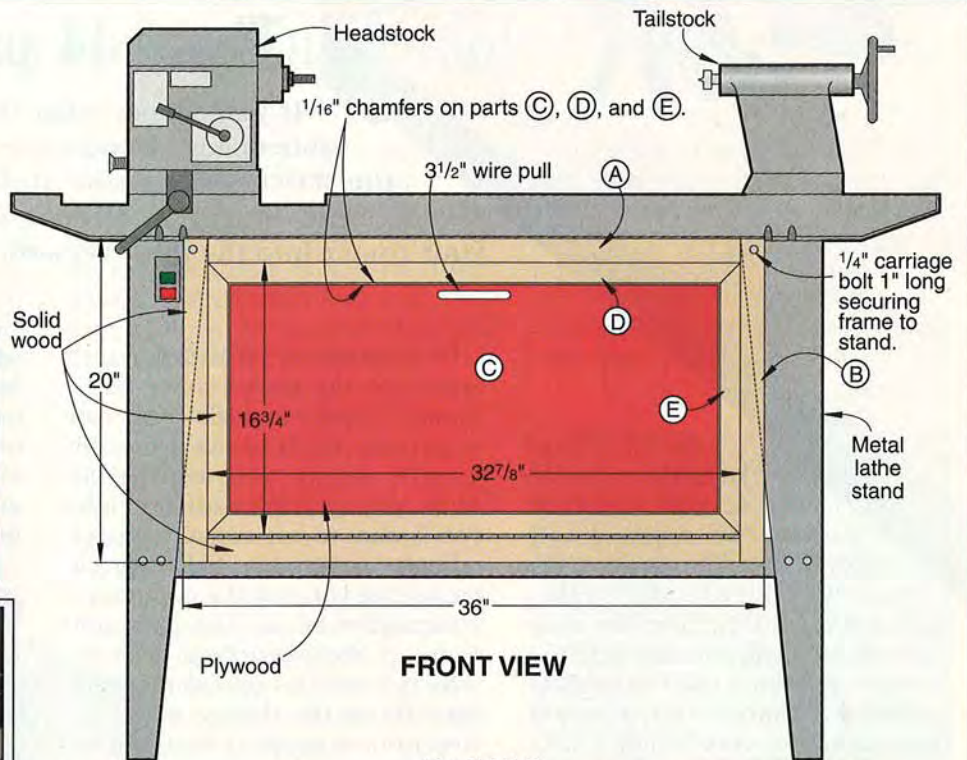
8 Use a piece of $1\frac{1}{2}$ " continuous hinge to secure the bottom of the door panel to the top edge of the bottom frame member (A). Bolt the frame to the stand. Finally, to keep the door from opening too far, use an 11" length of chain to connect the door to the frame. ♣

Written by Marlen Kemmet
Project Design: Jim Boelling
Illustrations: Roxanne LeMoine
Photographs: Hopkins Associate

Retrofit



Hinged door (open), viewed from top of lathe.



HIGH-PERFORMANCE ROUTER

These 14 products will make

If you suspect that there's more to routing than rabbets and round-overs, you're right! We surveyed the *WOOD*® magazine staff and contributing editors and came up with a selection of accessories that will turn your router into the most versatile tool in your shop.



Beall Wood Threader cranks out screws and nuts

Compared with hand-turned wood threaders, the Beall Wood Threader makes quick work of cutting the male threads by using a router held in a fixture. The kit I tried from Beall includes a V-groove bit, a mounting bracket for your router, plastic inserts for 1/2", 5/8", 3/4", and 1" dowels, and four right-hand taps that correspond to the insert sizes.

In making the wooden handscrews in the photo above left, I found it takes some trial and error to get the depth of the router bit exactly where you want it. So once you get the setting right you'll want to cut as many threaded parts as you can. I also recommend that you buy the company's companion book, *The Nuts and Bolts of Woodworking*, \$18.95, which contains useful information about the design and construction of projects that feature wooden screws and threads.

If the price seems steep, you can buy several lower-priced versions

of this kit. The bracket with a 1/2" tap and insert sells for \$69. You can get a bracket and one of any other size tap and insert for \$75. Or you can buy a kit with bracket, 1/2", 3/4", and 1" taps, and matching inserts for \$144.

—Tested by Tom Jackson

PRODUCT SCORECARD

Beall Wood Threader

Performance ★ ★ ★ ★ ☆

Price \$179

Value ★ ★ ★ ☆ ☆

Beall Tool Company, 541 Swan Rd. NE, Newark, OH 43055. Call 800/331-4718.

2 Tilt your router for dozens of new profiles

If you've ever wished you could tilt a router bit, you'll want to



know about a device called the Angle Ease. It consists of a wooden router clamp, two brackets that hold the clamp, and a router-table insert.

The clamp tilts 45° from vertical in one direction and 10° in the other direction. It requires a router with a 3 1/2"-diameter motor housing, such as the Black & Decker 3329, Elu 2721, Bosch 1604, or Porter-Cable 690. And a newer version accepts Porter-Cable's 7518 and 7519 routers.

Although the Angle Ease is designed for router tables, you can use the unit for freehand routing too. Just turn the Angle Ease right-side up and push the edge of the insert along a fence.

I found the Angle Ease well built and easy to use. With it I can cut angled slots and grooves, create new cutting profiles with my old bits, and rout chamfers at odd angles like 22.5°. I recommend it as a way to increase the usefulness of your router bits and the scope of your projects.

—Tested by Jim Downing

PRODUCT SCORECARD

Angle Ease

Performance ★ ★ ★ ★ ★

Price \$102.99 (7 3/4" X 10 1/4" insert)
\$107.99 (9 1/4" X 11 3/4" insert)

Value ★ ★ ★ ★ ★

Woodhaven, 5323 W. Kimberly Rd., Davenport, IA 52806. Call 800/344-6657.

ACCESSORIES

your router a woodworking super tool

3 Leigh Dovetail Jig offers mortising attachment

Leigh Industries recently added this Mortise-and-Tenon Attachment as an accessory to their Dovetail Jig. As with the dovetail operation, the Mortise-and-Tenon Attachment allows you to vary the width, depth, height, and spacing of the parts of the joint.

In comparing my old Leigh Jig to the new model that came in for this test, I noticed that the new model comes with quick-change cam clamps to secure your workpieces. Owners of the older models can buy a set of four of these cam clamps and the hardware for about \$35 to retrofit their jigs. The convenience is well worth the

price. I also like Leigh's new and improved instruction manual.

The Mortise-and-Tenon Attachment sets up for a full range of joints including raised or flush tenons, through or blind mortises, finger joints, and half-blind finger joints. The jig normally cuts tenons with round shoulders, but you can adjust it to cut square tenons and then just chisel the mortise corners square. The jig and attachment will handle stock up to 24" wide.

It takes a couple of evenings to assemble the jigs and learn how to use them. After that, I've found

I need only about 15 minutes (and a piece of scrapwood) to make the test cuts required to perfect a new joint profile.

In terms of materials and construction, everything fits well and locks positively for repeatable accuracy. The jig is expensive, but I think it's worth it. Once you get familiar with the jig, you can rout joints in minutes that would otherwise take hours by hand.

—Tested by Bob Settick

PRODUCT SCORECARD

Leigh model D3 Dovetail Jig and Mortise-and-Tenon Attachment

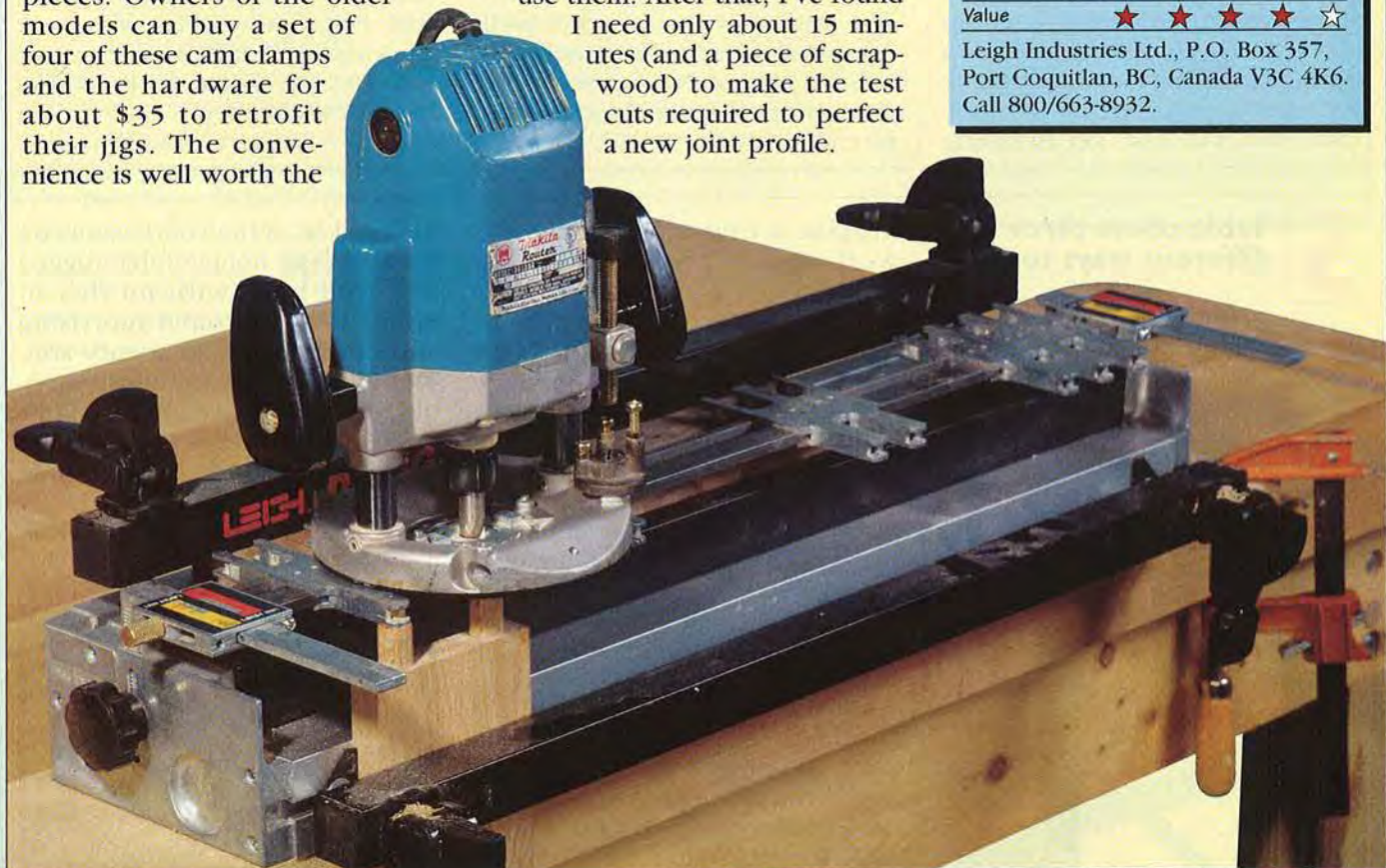
Performance ★★★★★

Price 24" Dovetail jig: \$379.

Mortise-and-tenon-attachment: \$199.

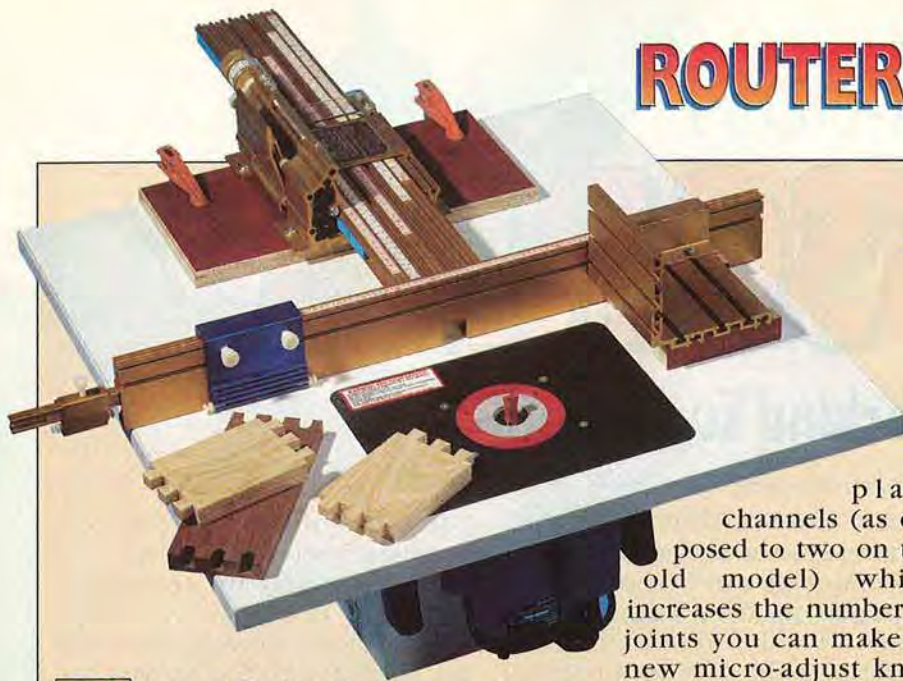
Value ★★★★★☆

Leigh Industries Ltd., P.O. Box 357,
Port Coquitlan, BC, Canada V3C 4K6.
Call 800/663-8932.



Continued

ROUTER ACCESSORIES



4 Incra Jig beefs up components, adds micro adjustment

Over the past decade, the Incra Jig has evolved from a simple fence-positioning device into an elaborate joinery system. I recently had a chance to try the latest version, the Incra Jig Ultra 16".

At the heart of the system is a sawtooth rack in the carriage that allows you to move the fence up to 17½". The Incra Ultra offers a beefier anodized-aluminum fence and carriage that helps to eliminate flex. You also get five tem-

plate channels (as opposed to two on the old model) which increases the number of joints you can make. A new micro-adjust knob enables you to move this fence in increments as small as .001". A fence stop and right-angle fixture complete the system.

I worked with the jig for most of a day before I could create tight-fitting box and dovetail joints. To advance to the elaborate joints shown in the company's promotional literature requires even more study and trial-and-error. The instruction booklet was well organized, clearly illustrated, and helpful, but you have to study the instructions thoroughly to use the jig effectively.

PRODUCT SCORECARD

Incra Jig Ultra 16"

Performance ★ ★ ★ ★ ☆

Price \$245

Value ★ ★ ★ ★ ☆

Taylor Design Group, Inc., P.O. Box 810262, Dallas, TX 75381. Call 214/484-5570.

In using the jig, however, I found the Incra Ultra well made and thoughtfully designed for quick, repetitive operations. I recommend that you use a router table that measures at least 24×32" with the router plate insert mounted near the edge of the table rather than the middle.

I also found that the 3"-high fence and 6×6" right-angle fixture limit the size of workpiece you can use. I had no problem with box and drawer sides, but any workpiece longer or wider than about 16" starts to feel unwieldy. These minor limitations aside, I had a lot of fun working with this tool. For woodworkers who want to create spectacular decorative joinery, the Incra Ultra works hard for the money.

—Tested by Dave Henderson

5 Table offers three different ways to rout



Imagine a router table that also works as a horizontal mortising machine and a pin router. That's the package you get with the Porta-Nails Universal Router Table and accessory arm.

The 16×20" cast-aluminum table features a built-in miter-gauge slot, two holes for starter pins, and a circular polycarbonate plate insert. A second vertical mounting plate allows you to attach another router and use it as a horizontal mortising tool. By turning a hand crank you can raise or lower this plate up to 7".

The optional cast-aluminum arm attaches to the top of this vertical plate. At one end you can fasten a polycarbonate safety shield or a steel pin supplied with the arm to use it as a pin router.

I found all of the components on the Universal Router Table rugged and well built with no flex in either the horizontal mortising attachment or the accessory arm. The Porta-Nails is the most versatile router table I've found, and its ability to do the work of three machines makes it a great value for the small shop.

—Tested by Dave Henderson

PRODUCT SCORECARD

Universal Router Table

Performance ★ ★ ★ ★ ☆

Price Table with horizontal routing attachment: \$359.
Pin routing attachment: \$49.95

Value ★ ★ ★ ★ ☆

Porta-Nails, Inc., P.O. Box 1257, Wilmington, NC 28402. Call 800/634-9281.

6 Big, sturdy fence works with even the tallest bits

CMT designed this cast-aluminum router fence to handle any size router bit from 3" panel-raising bits down to 1/8" straight bits. The two replaceable plywood faces on this fence can be loosened and moved in or out to closely conform to the bit's diameter. And the 4" height of the fences ensure that you can rout workpieces with the tallest vertical-molding or panel-raising bit.

A ground cast-aluminum flange holds the fence 90° to the table. This flange attaches to the table with two carriage bolts which come up through slots in the horizontal leg of the flange. The slots give you a range of about 3" to move the fence toward or away

from the bit. This system requires that you drill two slots in the surface of your router table, but it holds the fence solidly. A dust-collection hood with a 2½" hose connection is cast into the flange and picks up about 75 percent of the dust generated.

If I were to change anything about the fence, I would make the plastic guard a bit sturdier. Otherwise, if you plan to use a lot of different-size bits, including

the tall ones, this fence will give you the height and flexibility you need at a good price.

—Tested by Lee Gatzke

PRODUCT SCORECARD

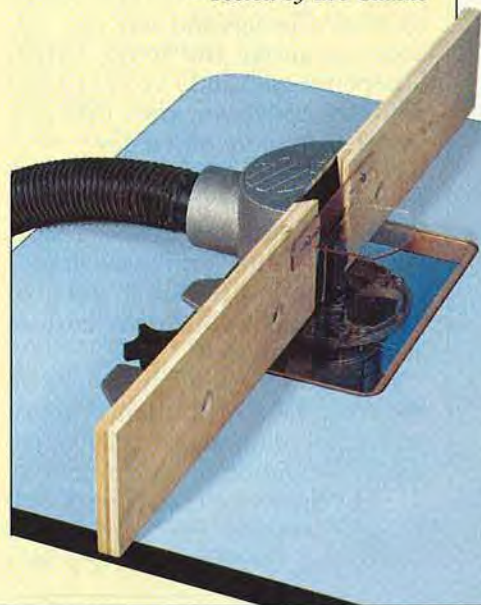
Router Table Fence, RTF-001

Performance ★ ★ ★ ★ ☆

Price \$64

Value ★ ★ ★ ★ ★

CMT Tools, 310 Mears Blvd., Oldsmar, FL 34677. Call 800/531-5559.



7 Table-and-fence package gets you up to speed fast

There are two ways to get started in table routing operations. You can build your own components and buy accessories piecemeal. Or, purchase one of these packages from Eagle America. Except for the router, the Router Table and Fence Package from Eagle America gives you all the components you need. The package includes a 24×32" table, polycarbonate insert, and a fence with a bit guard, featherboard, and stop.

The 1½"-thick MDF table is covered with plastic laminate on both sides and includes a miter-gauge slot. The fence's ¾" maple face is held in place by a piece of aluminum angle. All the accessories fit into a T-slot that runs the length of the fence. To collect sawdust, you can hook up a standard 2½"-diameter shop vacuum hose to an adapter on the back of the fence.

I think the Router Table and Fence Package is a good way to plunge into table routing. The components are made well, and you have everything you need with a single purchase.

—Tested by Dave Henderson

PRODUCT SCORECARD

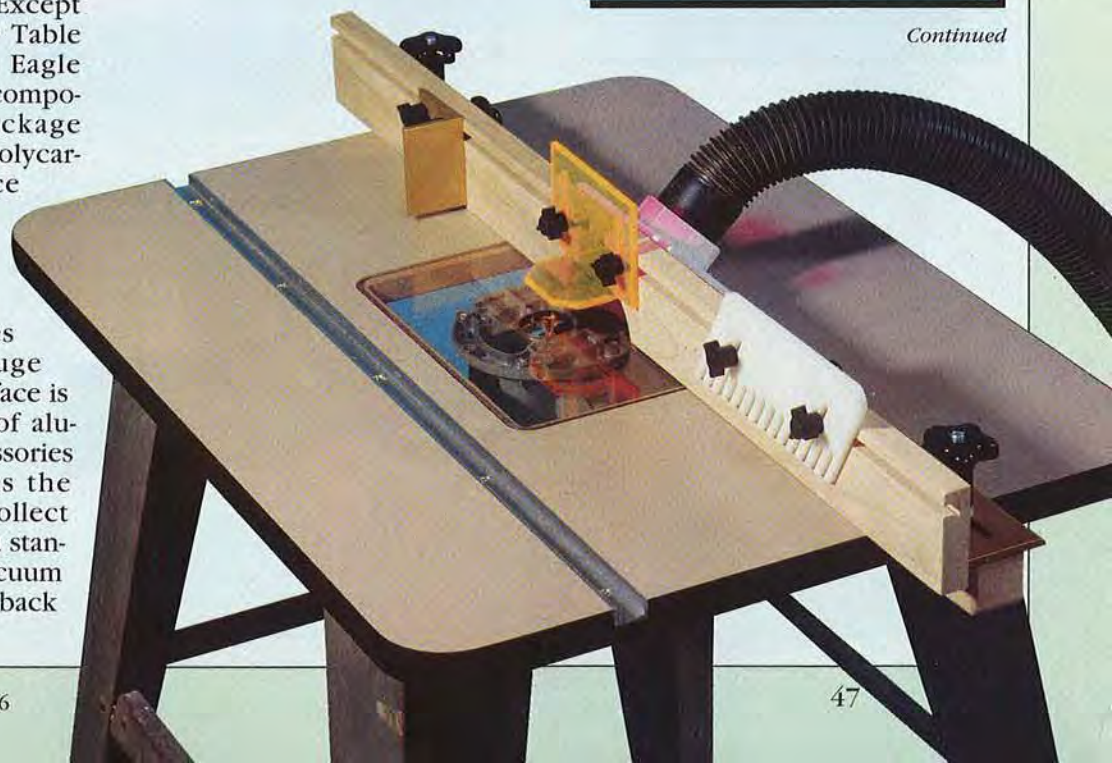
Router Table and Fence Package

Performance ★ ★ ★ ★ ★

Price \$199.99

Value ★ ★ ★ ★ ☆

Eagle America, P.O. Box 1099, Chardon, OH 44024. Call 800/872-2511.



Continued

ROUTER ACCESSORIES

8 Jointech offers a feature-laden fence for router tables

If it's versatility you're looking for, the Jointech Smart Fence adapts to numerous jigs and add-ons. You also can move the fence halves independently, and I've yet to find any dust-collection port that performs with more efficiency.

On the top and sides of the fence you can install stops, featherboards, and jigs in the T-slots provided. The company makes accessories to fit the T-slots, or you can make your own custom accessories as well.

The two independent halves on the front face of the fence adjust in $\frac{1}{64}$ " increments. The bit opening in the fence measures $2 \times 4\frac{1}{2}$ ", but the fence comes with two plastic zero-clearance inserts. Routing a bit's

profile in these inserts proved tricky, but I found the inserts useful when working with small pieces that might hang up in a larger opening. If you want more profiles, you can buy a boxed set of six inserts for \$25.

For tall workpieces, the Fence Raiser accessory (about \$40) boosts the fence height to 9". This includes the medium-density fiberboard piece that clips into the T-slot on the fence and the featherboard assembly shown right.

I tested the 32" Smart Fence and Fence Raiser, but the company also sells 24" versions for about \$130 and \$35 respectively. The only limitation I found is that you can't use bits taller than 2". Otherwise, the Smart Fence gets my vote as the most innovative router product I've seen this year.

—Tested by Dave Henderson

PRODUCT SCORECARD

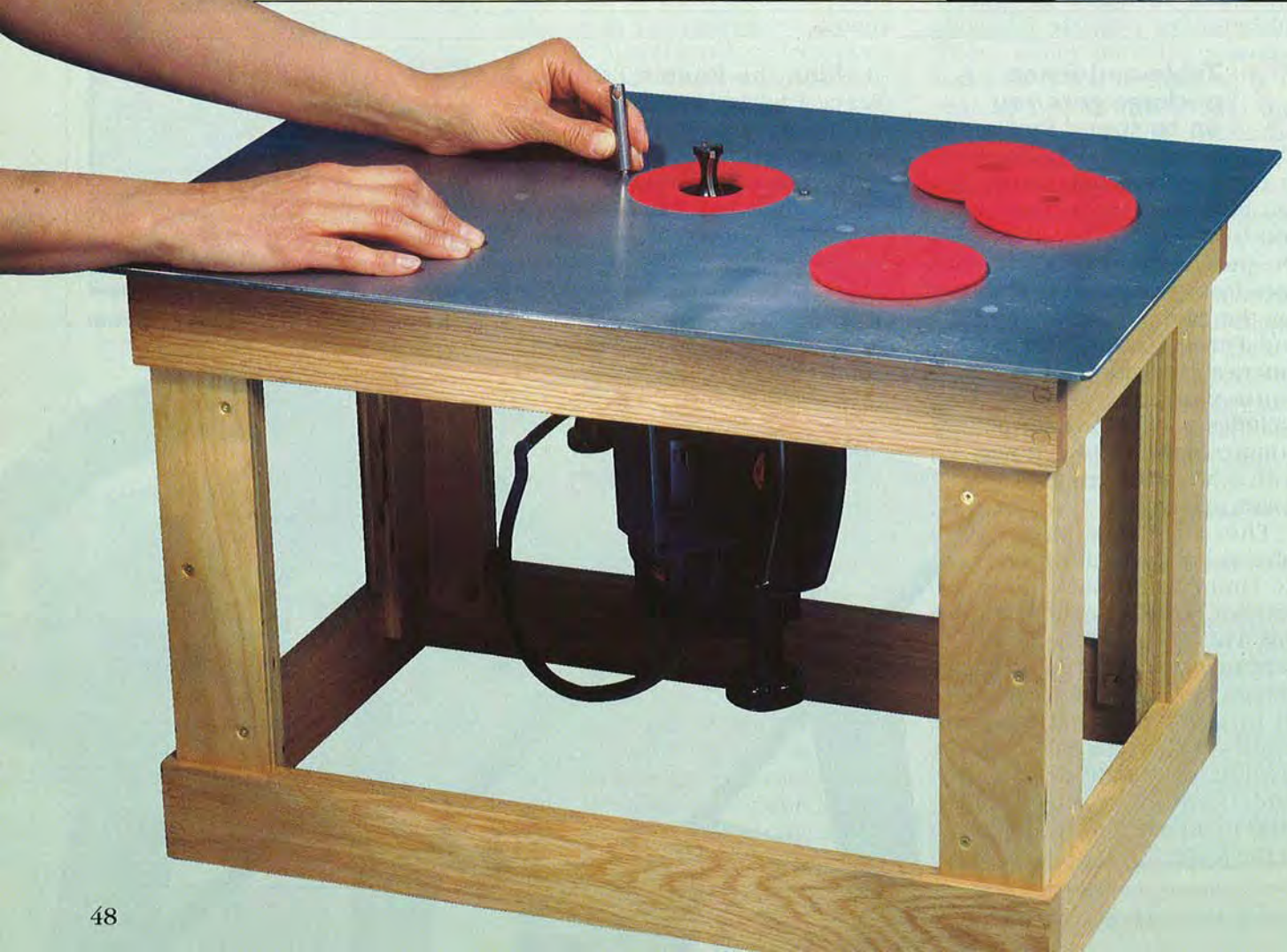
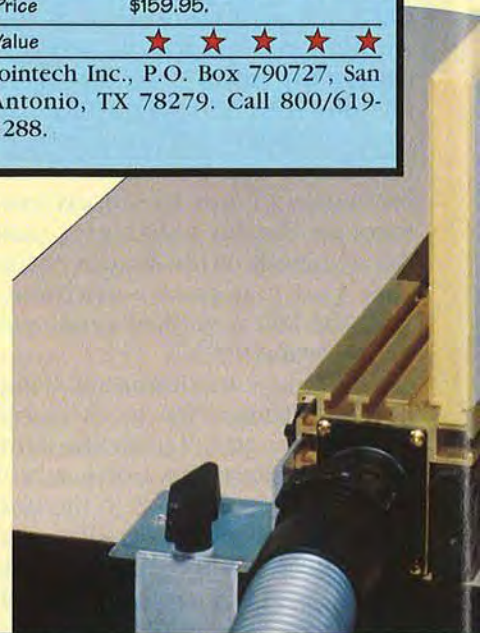
Smart Fence

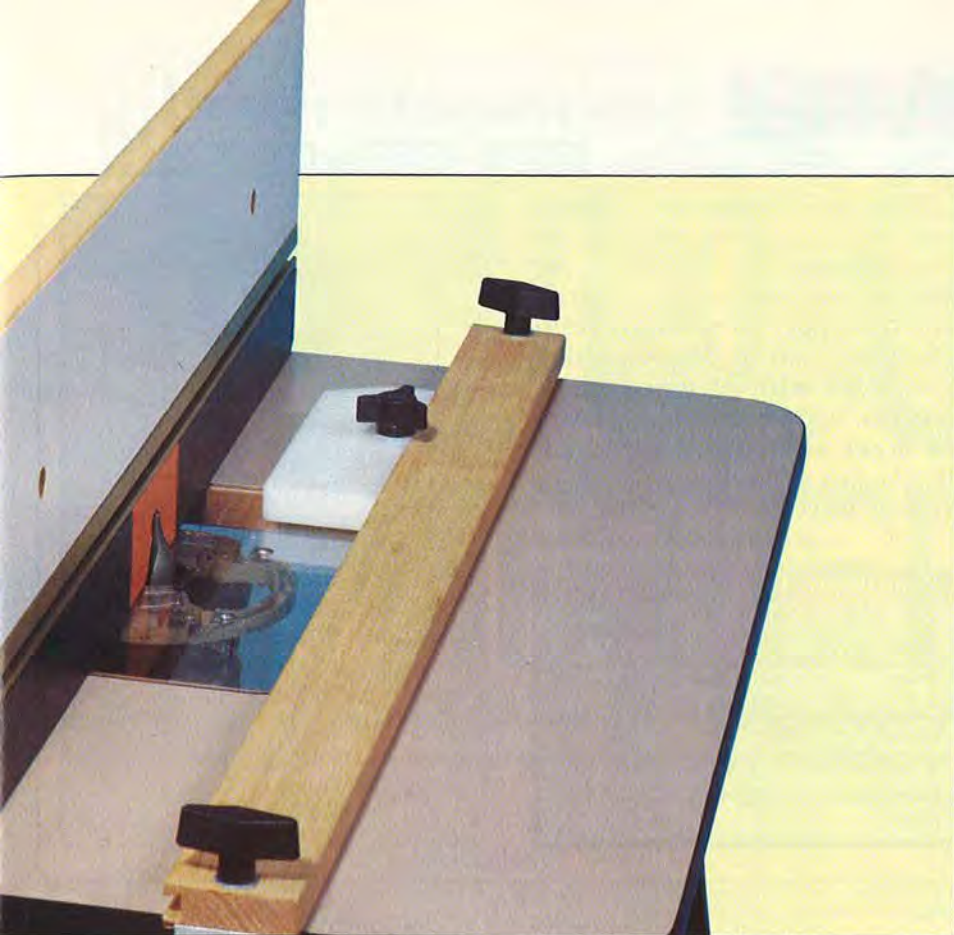
Performance ★ ★ ★ ★ ☆

Price \$159.95.

Value ★ ★ ★ ★ ★

Jointech Inc., P.O. Box 790727, San Antonio, TX 78279. Call 800/619-1288.





9 Solid-steel table holds router with clamp system

Laminate router tables with acrylic or polycarbonate inserts offer woodworkers many advantages. But the inserts and tables will sag a bit over time. This solid-steel Router Table Top from Veritas offers a super-flat table surface and a quick-change router-clamping system. The $\frac{3}{16}$ "-thick steel plate does not sag even with the heaviest routers. And the 16x24" top is milled flat to within plus or minus .004".

What I especially like about this table is that you don't have to remove the baseplate from your router. You simply turn the table top over, place your router between the two clamping brackets, snug the brackets up to the baseplate, and tighten the nuts on the clamp bars. The process takes less than a minute.

The $\frac{3}{8}$ " bit opening in the table top accepts large panel-raising bits, and the table comes with

two plastic inserts that give you openings of $\frac{1}{2}$ " and 1 $\frac{1}{2}$ ". And you can buy additional inserts for about \$4.50 each. The table includes two starter pins and threaded holes in the top for the pins to screw into. On the bottom of the table, four machine-screw studs enable you to bolt the top to a stand of your own construction.

The only reservation I have about this design is that a heavy, 2 $\frac{1}{2}$ -3hp router that lacks a soft-start feature will, when it starts, jerk hard enough to budge the router. If you want to install one of these big routers, I recommend you use a soft-start model.

—Tested by Dave Henderson

PRODUCT SCORECARD

Router Table Top

Performance	★ ★ ★ ★ ☆
Price	\$149
Value	★ ★ ★ ★ ☆

Veritas Tools Inc., P.O. Box 1720, Ogdensburg, NY 13669-1720. Call 800/667-2986.

10 Finger-joint router bit saves wood and money

My stack of offcuts grows bigger every year, and until I got this bit, most of my scraps were destined for the woodstove.

With this Freud Finger-Joint Bit you can join two pieces of wood with a glue joint that is stronger than the wood itself. If you match the color and grain of pieces, the joint line is barely noticeable. On painted projects, the joint line disappears completely.

The bit I tested came razor-sharp and easily cut the joint in a single pass. The height of the cutter enables you to join stock up to 1 $\frac{1}{2}$ " thick.

Given the cost, this bit may not represent a great value for everyone. But if you spend more than a few hundred dollars a year on wood, I think you'll find that this bit can pay for itself within a year or two by salvaging the bulk of the scrapwood in your shop.

—Tested by Dave Henderson

PRODUCT SCORECARD

Finger-Joint Bit

Performance	★ ★ ★ ★ ★
Price	About \$80
Value	★ ★ ★ ★ ★

Freud Inc., P.O. Box 7187, High Point, NC 27264. Call 800/472-7307.



Continued

ROUTER ACCESSORIES



Plywood bit comes with up- and down-shear cutters

If you use an upshear router bit to trim plywood, you get tear-out on the top face of the sheet. A down-shear bit tears out on the bottom. What to do?

This Up- & Down-Shear Router Bit gives you the best of both cutting angles by splitting the flutes. The carbide on the top edge cuts down and the carbide on the bottom cuts up. I tried this bit on both oak and Baltic-birch plywood and got crisp, clean edges on both faces of the plywood. Routing across the grain of the face veneer produces a nearly invisible line of fuzz on Baltic-birch plywood, but I still consider that acceptable.

These bits come with 1/2" shanks and in two cutting lengths 1 1/8" (#21228) and 1 5/8" (#21288). The shorter bit handles 3/4" material, and the longer bit will trim a double lamination of 3/4" plywood. If you work with plywood, these bits can end the hassle of having to make scoring cuts and the headaches of finding tear-out on an expensive piece of plywood.

—Tested by Dave Henderson

PRODUCT SCORECARD

Up- & Down-Shear Bits

Performance	★ ★ ★ ★ ★
Price	#21228: \$40.99 #21288: \$51.99
Value	★ ★ ★ ★ ★
Woodhaven, 5323 W. Kimberly Rd., Davenport, IA 52806. Call 800/344-6657.	



Fight figured woods no more with this spiral bit

When it comes to highly figured woods, you often risk tear-out

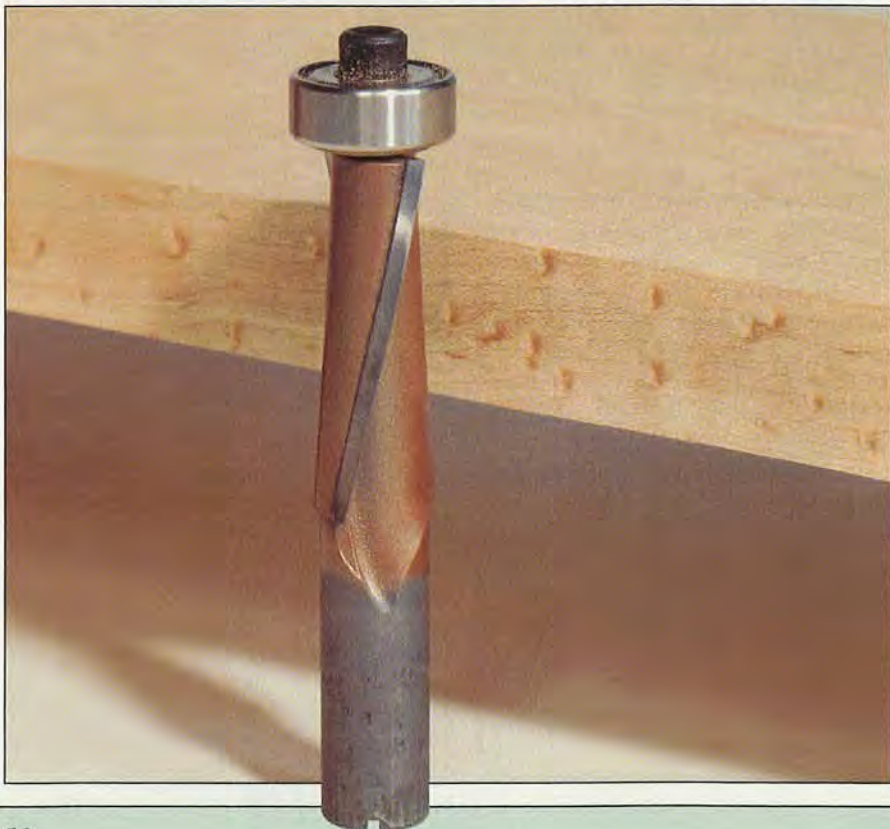
with a traditional straight bit. Woodhaven came up with a solution by mounting a pilot bearing on a spiral bit. The spiral angle of the carbide helps to slice the

wood, rather than chop it like a vertical cutter.

With this 1/2"-shank bit in a hand-held router, I made several dozen passes on a wildly figured piece of maple. I got glass-smooth edges with and across the grain. On the top edges of the pieces in cross-grain routing, I noticed a small amount of fuzzing. But that's normal for an upshear flute design and easily remedied with a few light strokes of sandpaper.

The bit I tested had a 1 1/2" cutting length, but you can get the same bit with a 1" length in a 1/4" or 1/2" shank for \$13 less. If you do a lot of work with highly figured woods, I recommend that you get one of these bits and put an end to your tear-out problems.

—Tested by Dave Henderson



PRODUCT SCORECARD

Spiral Flush-Trim Bit, #20088

Performance	★ ★ ★ ★ ★
Price	\$54.99
Value	★ ★ ★ ★ ★
Woodhaven, 5323 W. Kimberly Rd., Davenport, IA 52806. Call 800/344-6657.	

13 Inlay kit produces perfect-fitting pieces

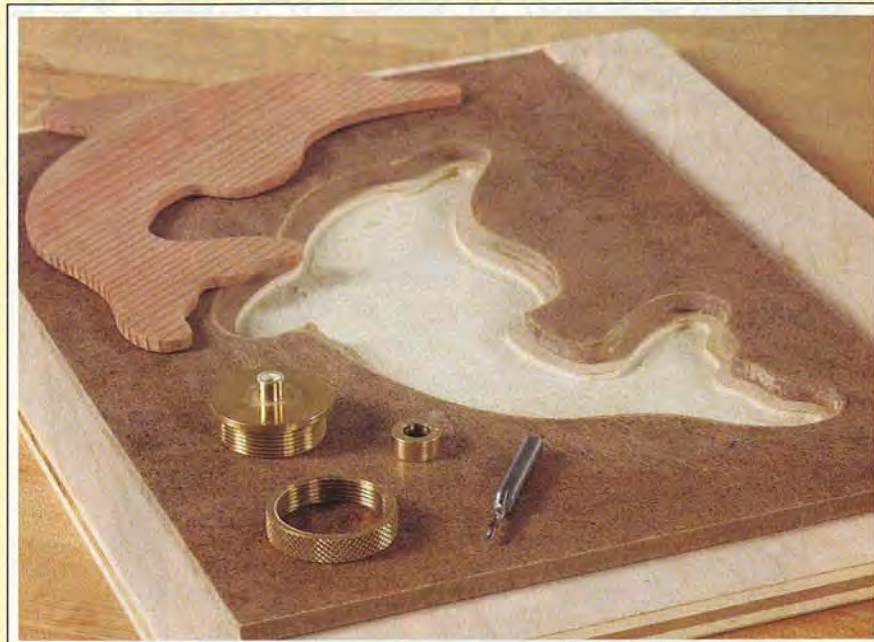
Hand-cut inlays require painstaking patience. You can achieve nearly the same results with the CMT Router Inlay Kit and a few hours of practice. The kit consists of a brass template guide with a locking ring, a snap-on bushing, and a 1/8" solid-carbide spiral bit.

To use the kit, simply cut a female template from hardboard or other 1/4" material. Rout your recess by following the inside of the template with the brass template guide. Then place your template over the inlay wood, add the

brass bushing, and rout the matching piece. The difference in diameter between the guide and the bushing compensates for the cutting diameter of the bit.

Using a plunge router, I found this system foolproof. The only limitation is that, due to the 1/8" diameter of the bit, you can't cut inlays with square corners.

—Tested by Tom Jackson



PRODUCT SCORECARD

Solid Brass Inlay Kit

Performance ★ ★ ★ ★ ★

Price \$29.90

Value ★ ★ ★ ★ ☆

CMT Tools, 310 Mears Blvd.,
Oldsmar, FL 34677. Call 800/531-
5559.

14 Foot switch gives you no-hands control of router

Reaching under a table to turn off a router is like walking behind a mean horse. Both are accidents waiting to happen.

The Billy Pedal Foot Switch allows you to turn your router on and off by just stepping on the pedal—no bending over and no blind groping. You simply plug your router into the two-way prong at the end of the 8' extension cord, and then plug the cord into your power source. The Billy Pedal is rated for 15 amps and can also be used for your tablesaw, bandsaw or most other power tools in your shop.

If you are setting up a router table, I recommend this device. Not only is it good for routinely turning your router (or any other stationary power tool) on and off, but it's a good shut-off switch in case of an emergency too. 🚫

—Tested by Tom Jackson

PRODUCT SCORECARD

Billy Pedal Foot Switch

Performance ★ ★ ★ ★ ★

Price \$29.95 ppd.

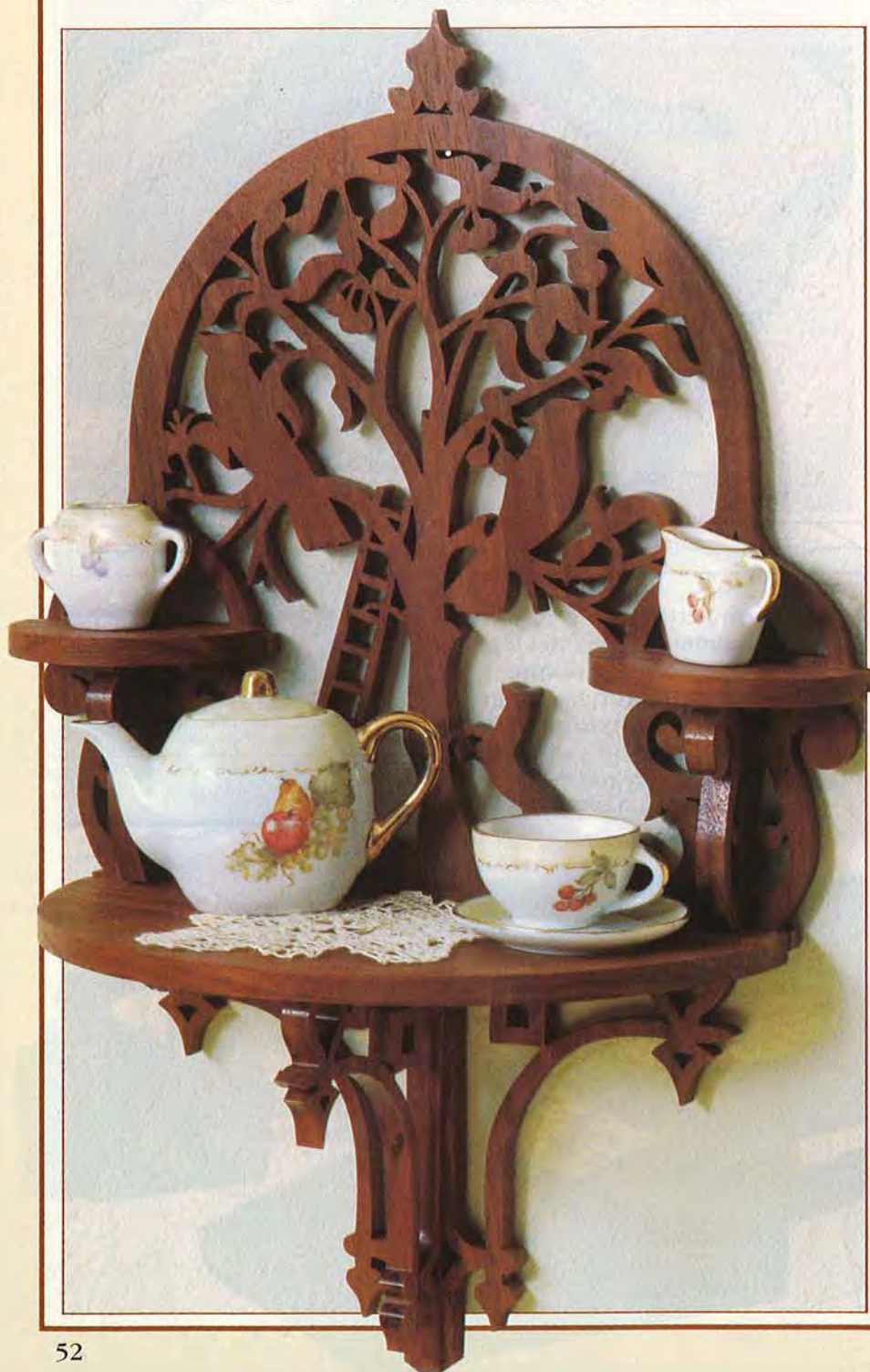
Value ★ ★ ★ ★ ★

MLCS, P.O. Box 4053, Rydal, PA
19046. Call 800/533-9298.



WONDERFUL WHATNOT

A SCROLLSAW CHALLENGE FROM YESTERYEAR



John Nelson combs New England antique shops for old-time fretwork treasures, then takes patterns from them. Here's one of his recent finds, a triple-shelf whatnot with an elaborate silhouetted scene.

Note: You'll need $\frac{3}{8}$ " \times 11" \times 17" stock for the shelf back and brackets and a piece $\frac{3}{8}$ " \times 5" \times 11" for the three shelves. You can edge-glue narrower stock for the wide piece. We used walnut.

First, put on the patterns

1 Photocopy the patterns for the back and brackets from the *WOOD PATTERNS™* insert in the middle of the magazine. Make two copies of the side bracket pattern. The back pattern requires an 11" \times 17" sheet.

2 Adhere the back pattern to your stock with rubber cement or spray adhesive. Fit the three bracket patterns into the waste areas around it. Align the arrows on the brackets with the grain. (We placed the side brackets flanking the top of the back pattern and inverted the center bracket to fit at the bottom.)

3 Lay out the three semicircular shelves on the other piece of stock. You'll need one shelf 9" diameter ($4\frac{1}{2}$ " radius) and two $3\frac{1}{4}$ " diameter ($1\frac{5}{8}$ " radius). Draw the large shelf first, placing the center at the midpoint of one edge of the stock. Then, draw the two smaller shelves along the opposite edge.

4 Cut out the shelves, and set them aside for later. Then, cut the patterned stock apart to separate the patterns for easier sawing. Don't cut along the outlines of the back and brackets yet, however.

Next, cut out the parts

1 Drill $\frac{1}{16}$ " blade start holes for the inside cuts in the back and brackets. Drill each hole slightly inside the cutting line—not on it—in each shaded area. Drill near a corner or point when possible; it's

difficult to neatly enter a cut in the middle of a straight or slightly curved section.

2 Begin cutting the side brackets. Thread the scrollsaw blade (a #4 blade, .033×.014" with 15 teeth per inch, will do the trick) through a start hole. Make the inside cut, then thread the blade through the next hole.

3 After completing the inside cuts, saw around the outside pattern line. Endeavor to cut the top and back edges, which will be glue joints, straight and true.

4 After cutting out the side brackets, move on to the center bracket, then the back.

5 When sawing the back, start with the smallest inside areas and finish with the largest ones. Then, saw around the pattern outline to complete the piece.

Then, assemble the shelf

1 Ensure that the back and top edges of each bracket are 90° to each other. Sand as necessary to square them up and true the gluing surfaces, taking care to keep the two side brackets the same height.

2 Carefully finish-sand the front and back of each part. To avoid breaking off delicate pieces, lay each part flat on the workbench and hand-sand with a block. Sand with 150- and 220-grit sandpaper.

3 Lay the back facing up on your bench. Then, dry-assemble the shelf, following the Exploded View drawing.

4 Glue the large shelf and center bracket into place, using woodworker's glue or epoxy. Clamp with rubber bands, as shown in the photo *above right*.

5 Next, glue the two side brackets and shelves into place. Clamp them with C-clamps or bar clamps

as shown in the photo. Clean off the glue squeeze-out.

6 After the glue dries, apply a clear finish. Let dry, then attach a hanger at the top on the back. ♣

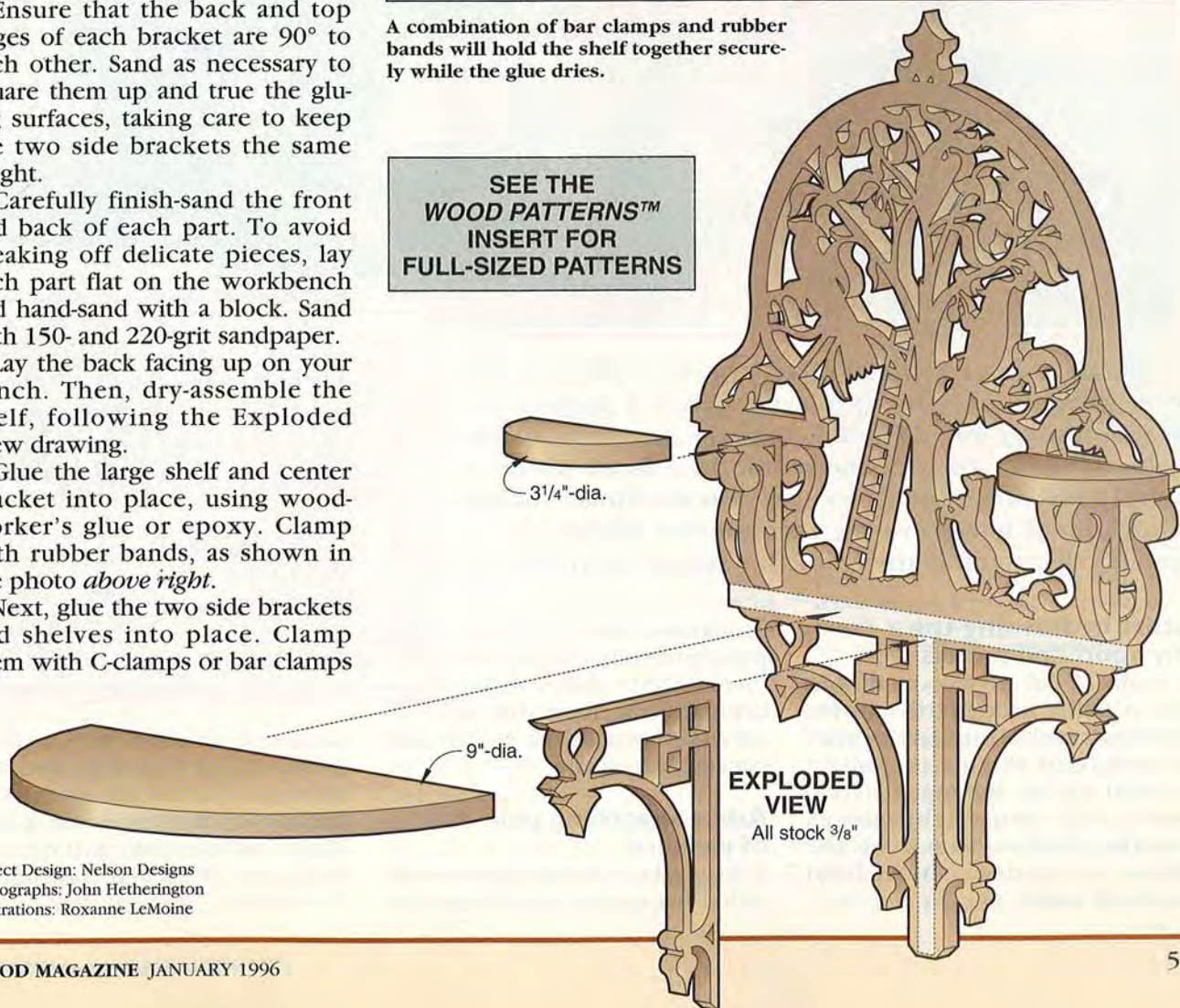
Buying Guide

Catalog. For a catalog of modern and antique scrollsaw patterns, write to Nelson Designs, P.O. Box 422, Dublin, NH 03444-0422.



A combination of bar clamps and rubber bands will hold the shelf together securely while the glue dries.

SEE THE
WOOD PATTERNS™
INSERT FOR
FULL-SIZED PATTERNS



Project Design: Nelson Designs
Photographs: John Hetherington
Illustrations: Roxanne LeMoine

*Sweet
Dreams*

CRADLE

A first bed for baby that's stylish, sturdy, and easy to store and transport



If there's an expectant mother at your house (or your son's or your daughter's place), here's a project that you definitely should build. It rocks gently to soothe baby to sleep. To lock the cradle in a fixed position, simply flip down the brass stops on the ends. And the knockdown hardware we recommend allows you to quickly disassemble the cradle for storage or transport.

Start by forming the plywood end panels

1 From $\frac{1}{4}$ " oak plywood, cut four pieces to 22" wide by 15" long for the end-panel blanks (A). Spread an even coat of glue or contact cement on the mating surfaces, and clamp two of the pieces together *back-to-back*, with the edges and ends flush, to form each end panel.

2 Transfer the End-Panel pattern from the *WOOD PATTERNS™* insert in the center of the magazine to the oak plywood. Cut the two end panels (A) to shape.

Add a matching pair of rockers

1 From $1\frac{1}{16}$ " stock (commonly called five-quarter stock), cut the



rocker blanks (B) to the size listed in the Bill of Materials. Use your own stock, or see our source for a hardwood kit listed in the Buying Guide accompanying the Bill of Materials. We used red oak for this project.

Bill of Materials

Part	Finished Size			Mater.	Qty.	
	T	W	L			
END FRAMES						
A	end-panel blanks	*1/2"	22"	15"	LOP	2
B	rocker blanks	1 1/16"	4 1/2"	29"	O	2
C	top-rail blanks	1 1/16"	5"	28"	O	2
D	uprights	1 1/16"	1 1/2"	29 1/4"	O	4
E	center-rail blank	1 1/16"	3 3/4"	20"	O	2
F	cleats	3/4"	3/4"	16 1/2"	O	2
SIDE PANELS						
G	lower side rails	3/4"	3 1/4"	36 1/2"	O	2
H	top side rails	3/4"	2"	36 1/2"	O	2
I	slats	1/4"	1"	7 1/4"	O	32
J	spacers	1/4"	5/16"	1 1/4"	O	68
K	cleats	3/4"	3/4"	36 1/2"	O	2
L	bottom	1/4"	18 1/4"	36 7/16"	OP	1

*Measure the thickness of two pieces of oak plywood glued back-to-back for actual thickness.

Materials Key: LOP-laminated oak plywood, O-oak, OP-oak plywood.

Supplies: 4" deck screws, #8x1 1/4" flathead wood screws, two 12"-long brass float rods, two 1/4" brass acorn nuts, #10x1 1/4" roundhead wood screws, #6x1/2" flathead wood screws, finish.

Buying Guide

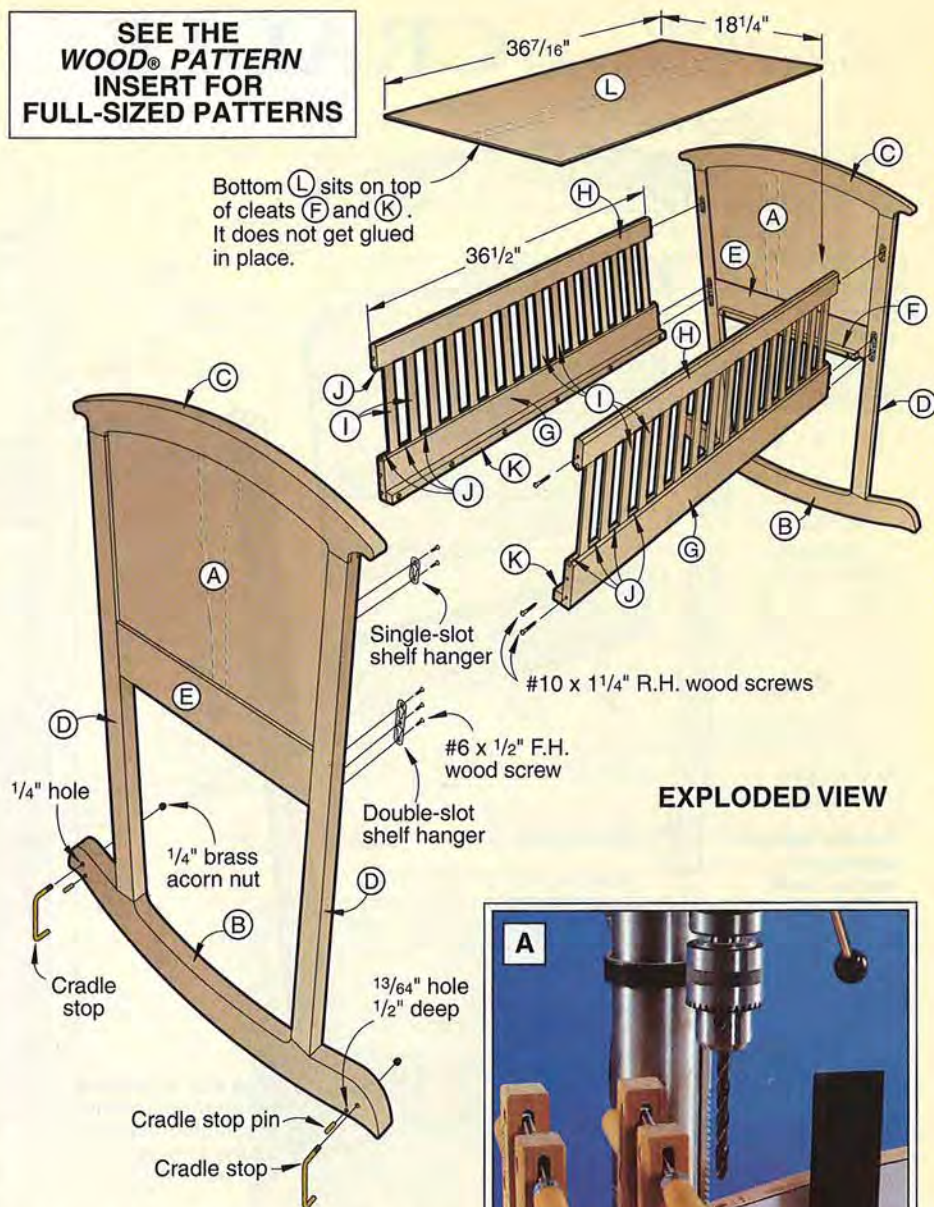
Hardwood kit. All the individual pieces shown on the Cutting Diagram cut slightly oversized in length and width from the thicknesses listed in the Bill of Materials. Available in red oak (\$124.95 ppd.) and cherry (149.95 ppd.). Heritage Building Specialties, 205 North Cascade, Fergus Falls, MN 56537. Or call 800/524-4184 to order.

Keyhole shelf hangers. Two pair of single-slot shelf hangers, part no. 38-891; and two pair of double-slot shelf hangers, part no. 38-895. Call for prices. Constantine, 2050 Eastchester Road, Bronx, NY 10461, or call 800/223-8087.

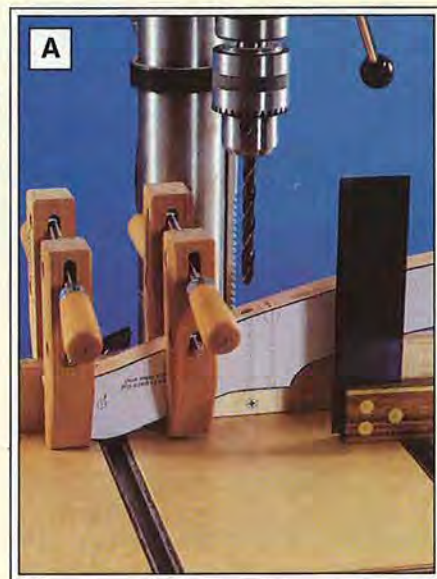
2 Transfer the full-sized rocker pattern (B) from the *WOOD PATTERNS™* insert to one of the rocker blanks. (We cut the paper pattern to shape and used spray adhesive to adhere it.) Bandsaw and sand the rocker to shape.

3 Use the cut-out rocker as a template to mark its shape onto the remaining rocker blank, and bandsaw it to shape. Tape the rockers together face-to-face, and sand the edges flush. Pry the pieces apart, and remove the tape.

SEE THE **WOOD® PATTERN INSERT FOR FULL-SIZED PATTERNS**



EXPLODED VIEW



Clamp the rocker to your drill-press fence so the screw-hole centerline is square to the table and aligned with the bit. Then, drill the counterbores.

4 Chuck a 3/8" brad-point bit into your drill press. As shown in Photo A, clamp one of the rocker blanks to your drill-press fence, with the drill bit aligned with the marked screw-hole alignment centerline on the paper pattern. Using a square, check that the alignment centerline is square to the drill-press table as shown in the photo. Drill four counterbores centered in the *bottom* edge of each rocker.

5 Switch bits, and drill a 5/32" shank hole centered inside each 3/8" counterbore. Repeat for the second rocker.

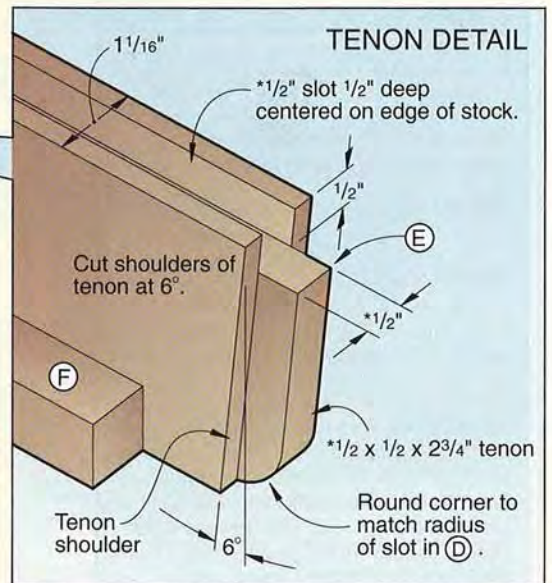
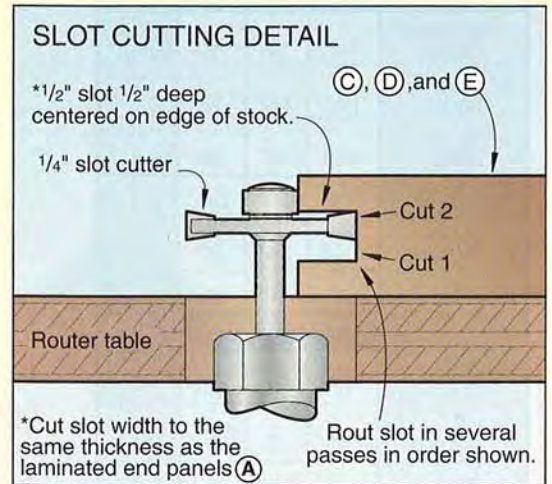
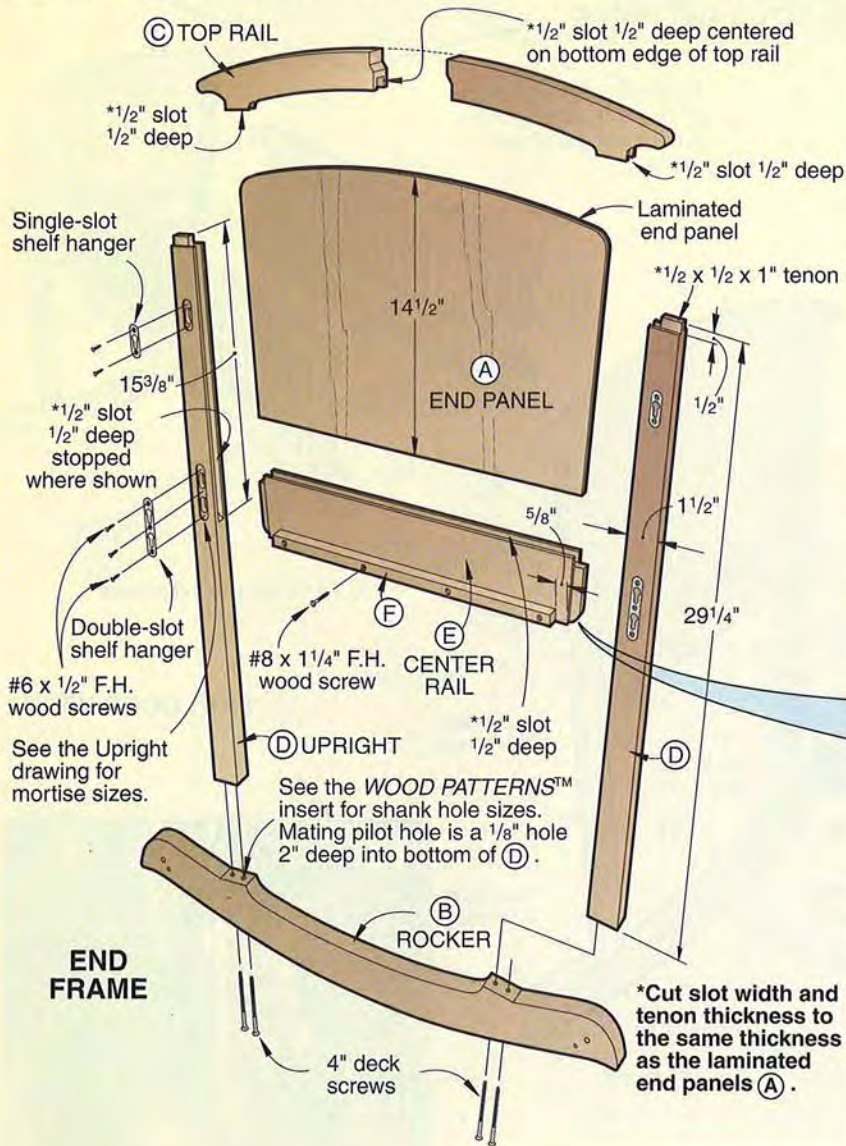
6 With the pattern still attached, drill four holes in the one rocker for the brass stops and stop pins that will be added later.

Now for the top rails, uprights, and center rails

1 Cut the top-rail blanks (C) to the size listed in the Bill of Materials. Using the same procedure used to form the rockers (B), transfer the patterns, and cut and sand the top rails to shape. As

Continued

Sweet Dreams CRADLE



shown on the pattern insert, don't cut the bottom corners to shape until after the slot is routed.

2 Carefully measure the thickness of the end panels (A). Measure precisely—the width of the slots and thickness of the tenons in the end-frame assemblies must be the same as the end-panel thickness.

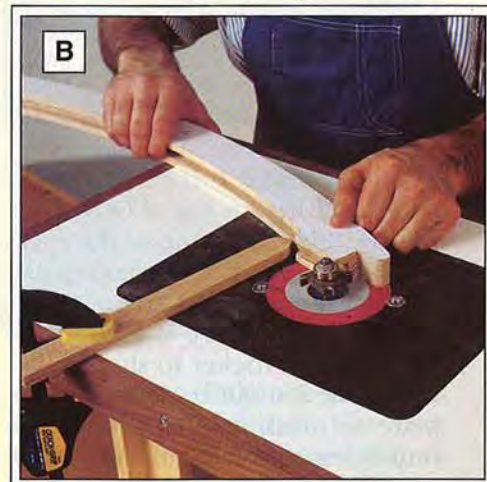
3 Secure a slot-cutting bit into your table-mounted router. Rout a 1/2"-deep slot centered along the bottom edge of each top rail as shown in Photo B. As shown on the Slot Cutting detail above right, make several passes to form a slot centered in the rail and equal in width to the thickness of the laminated plywood panel (A). Leave the router and bit setup; you'll

use it again later. Now, finish bandsawing the bottom corners of the top rails to shape.

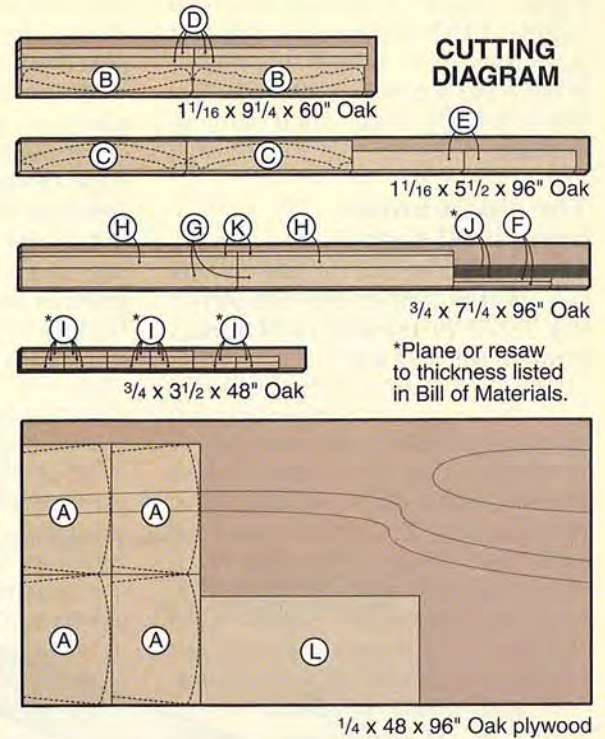
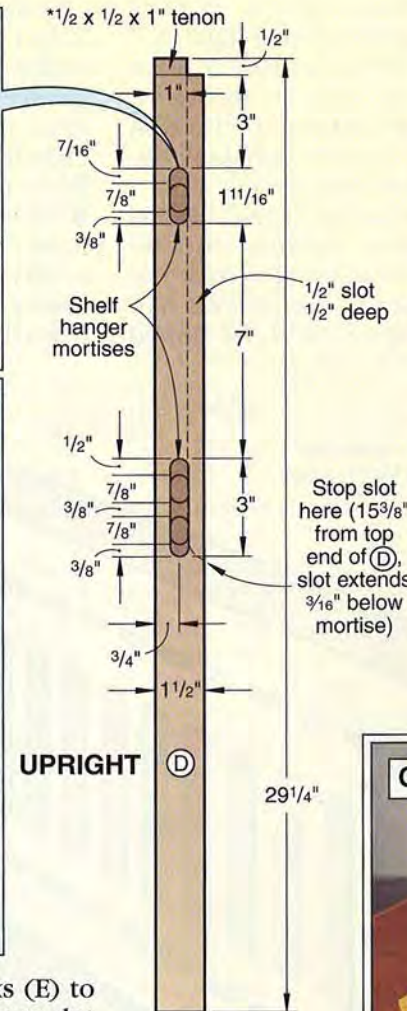
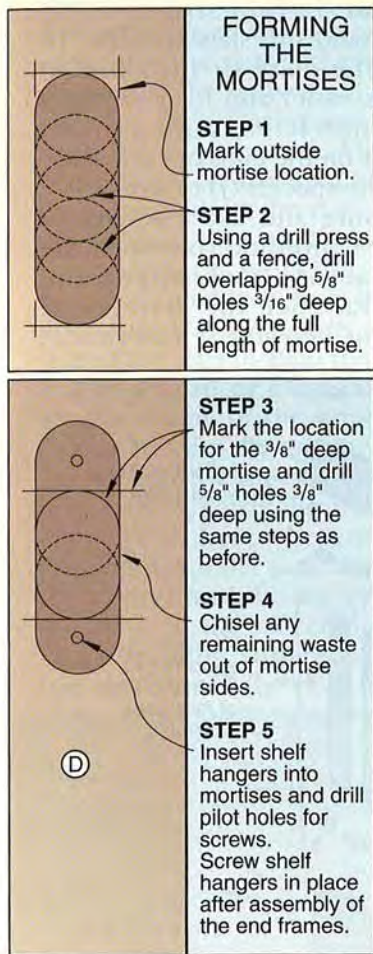
4 Cut the uprights (D) to size. Rout a 1/2"-deep slot 15 3/8" long along the inside edge of each upright where shown on the End Frame and Upright drawings.

5 Using your tablesaw fitted with a dado blade and miter gauge, cut rabbets to form tenons on the top end of each upright.

6 Using the dimensions on the Upright drawing on the opposite page, mark the mortise locations on the inside face of each upright. Now, following the procedure listed on Forming the Mortises drawing, machine the mortises to house the shelf hangers.



Rout a slot along the bottom edge of the top rail to fit the plywood panel. The guide stick clamped to the router table helps support the top rail.



7 Cut the center-rail blanks (E) to size ($3\frac{1}{4} \times 20$ "). Rout a $\frac{1}{2}$ "-deep slot along the *top edge* of each blank.

8 Transfer the center-rail pattern from the *WOOD PATTERNS™* insert to one of the center-rail blanks. Miter-cut both ends of each center rail at 6° .

9 Using your tablesaw fitted with a dado blade and a miter gauge angled to 6° , cut rabbets to form tenons on each end of each center rail. See the Tenon detail accompanying the End Frame drawing for reference. You want a snug fit of the center-rail tenons into the slots in the uprights. Round the bottom corners of each tenon to match the radius of the slot in the uprights.

10 Cut the cleats (F) to size. Drill four countersunk mounting holes in each for attaching to the center rails (E) later.

Dry-clamp each end frame to check for tight joints and proper fit before applying the glue.



It's time to assemble the end frames

1 As shown in Photo C, dry-clamp (no glue) each end frame (except for the rockers and cleats) to check the fit. Adjust if necessary, and then glue and clamp each end frame together.

2 After the glue has dried, remove the clamps, and clamp a rocker (B) to the bottom of each end frame. Check that the joints between parts B and D are tight,

trim if necessary. Using the previously drilled holes in the rockers as guides, drill $\frac{1}{8}$ " pilot holes into the bottom ends of the uprights. Remove the clamps and rockers from the bottoms of the uprights. Now, deepen the pilot holes in the bottoms of the uprights.

3 Glue and screw the rockers to the bottom of the uprights, using $\frac{1}{4}$ " deck screws.

4 Glue and screw the cleats (F) to the inside face of each rocker end

Continued

Sweet Dreams CRADLE

frame, flush with the bottom edges of the center rails (E) and centered side-to-side.

5 Drill the screw-mounting holes, and screw the metal shelf hangers in place.

The side frames bring it all together

1 Rip and crosscut the lower rails (G) and the upper rails (H) to the size listed in the Bill of Materials from $\frac{3}{4}$ "-thick stock.

2 Rout $\frac{1}{8}$ " and $\frac{1}{4}$ " round-overs along the edges of the rails as noted on the Side Frame drawing.

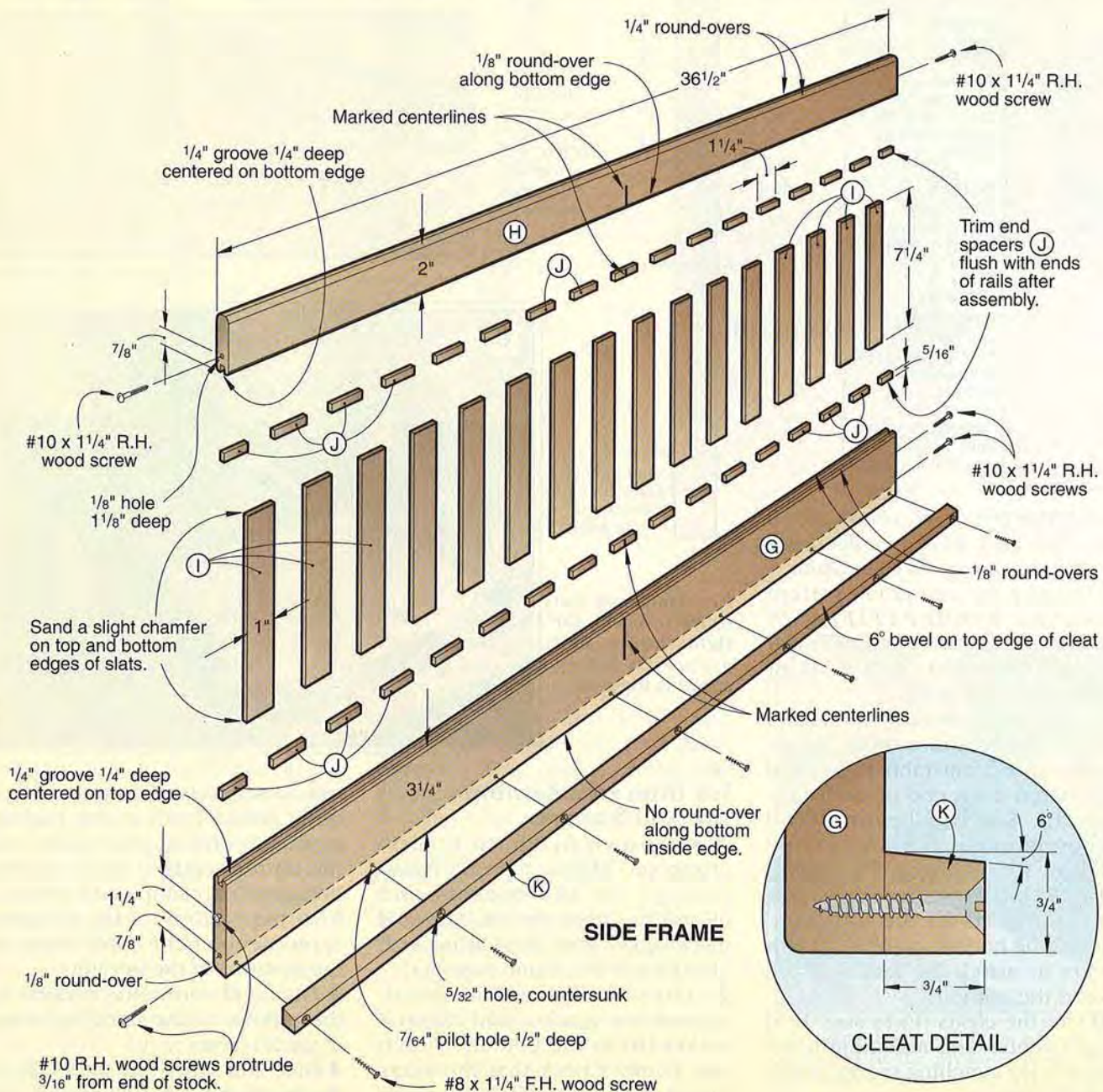
3 Mount a $\frac{1}{4}$ " dado blade to your tablesaw, and cut a $\frac{1}{4}$ " groove $\frac{1}{4}$ " deep centered along the bottom edge of the top rail and along the top edge of the bottom rail.

4 Cut the slats (I) to size, checking that they fit into the $\frac{1}{4}$ " grooves in the rails. (To make the $\frac{1}{4}$ "x 1 "x $7\frac{1}{4}$ " slats, we planed oak stock to $\frac{1}{4}$ " thick. Next, we ripped

1"-wide strips from the stock, and crosscut 32 thin strips to $7\frac{1}{4}$ " long.) Sand the slats smooth. To make the slats fit into the $\frac{1}{4}$ " grooves easier and for a stronger glue joint later, sand a slight chamfer on the ends of each slat.

5 Cut the spacers (J) to size.

6 Measure and use a square to mark a centerline (between the ends) across each upper and lower rail. See the Side Frame drawing below for reference.



Then, mark a centerline down one face of four of the spacers.

7 Working from the center to the ends, glue the slats and spacers in position in the bottom rail, checking that each slat aligns square with the bottom rail. Align the centerlines on the spacers with those marked on the rails to start the process. (We used white glue for a longer working time.) Working quickly before the glue dries, clamp a scrap strip on each side of the slats to align them.

8 Run a bead of glue along the groove in one of the upper rails. Center the top rail on the center spacer, and fit the slats into the upper rail. Quickly flip the assembly over to keep the glue from running down the slats. Starting at the center and working toward the ends, fit the spacers in place. Use a framing square to check that the ends of the rails are flush

with each other. Repeat this process with the second bottom rail. If your spacers fit a bit loose, use masking tape to hold them in place until the glue dries.

9 Cut the cleats (K) to size, bevel-ripping the *top* edge of each at 6° where shown on the Cleat detail accompanying the Side Frame drawing. Drill countersunk mounting holes, and glue and screw them flush with the bottom inside edge of each side frame.

10 Carefully mark the hole centerpoints on the ends of the rails (G, H) where dimensioned on the Side Frame drawing. Then, position the ends of the side frames next to their mating location on the uprights (D), and verify that the marked centerpoints are centered against the openings in the metal shelf hangers. Having verified the centerpoints, use an awl to make an indentation at each

point. Drill 1/8" holes 1 1/8" deep where indented. Drive a #10x1 1/4" roundhead wood screw into each hole, leaving the head to protrude 3/16" to fit into the slotted shelf hangers in the uprights. Check the fit of the side frames to the uprights, and adjust if necessary.

Add the bottom, the cradle stop, and then the finish

1 Connect the side frames to the cradle end frames. Measure the opening, and cut the bottom panel (L) to size.

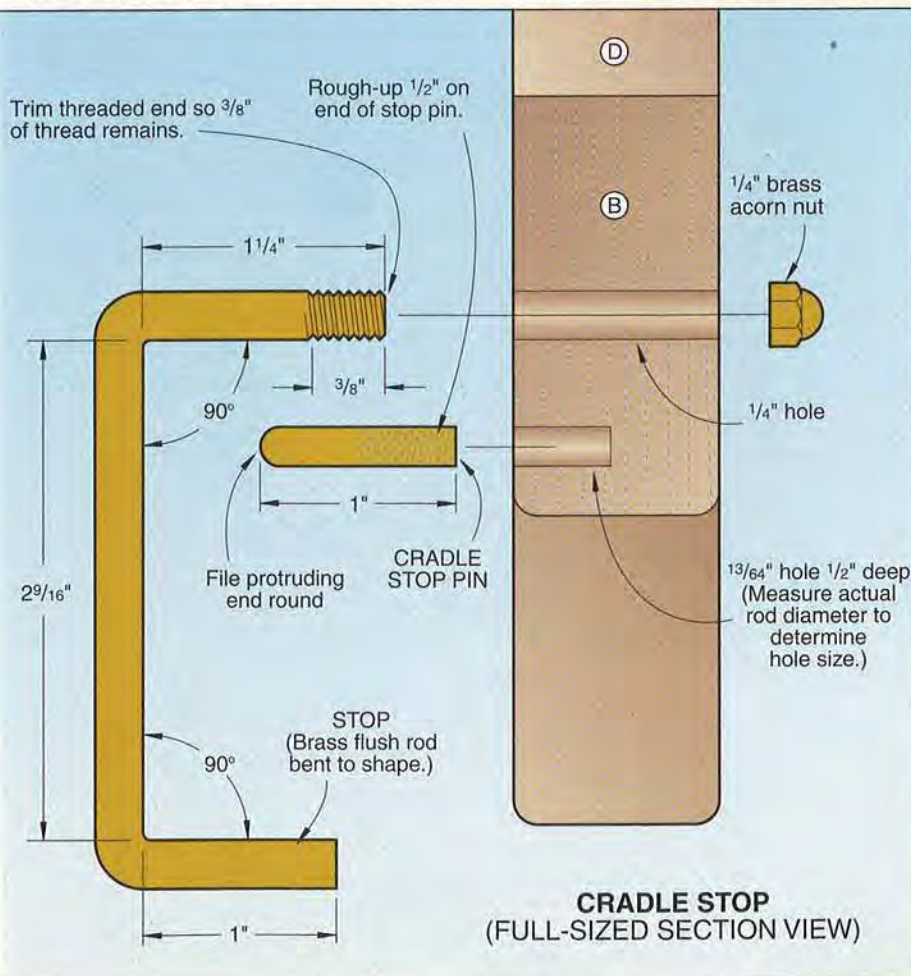
2 To make the cradle stops, purchase two 12"-long brass float rods (used in a toilet tank). Use a hacksaw to cut a 5"-long section from the end of each rod. This will give you two 5"-long pieces each with a threaded end. Trim the threaded end of each rod section so that 3/8" of thread remains where shown on the Cradle Stop drawing below left.

3 Using your vise and a mallet, bend the stops (float rods) to the shape shown on the full-sized drawing. Trim the end opposite the threaded end to length on both stops.

4 From the remaining rod, cut two pieces to 1" long. You'll use these for the stop pins. File a round-over on one end of each and rough up 1/2" on the opposite end. Epoxy the stop pins in place in the 1 3/64" holes. Roughed-up, the end of the stop pin adheres better to the epoxy.

5 Slip the threaded end of the stops through the 1/4" hole in each rocker. Add the acorn nuts to secure the stop to the rocker. Test the fit of the stops in the holes in the rockers. The stops should swing freely. Remove the stops.

6 Finish-sand the end frames, side frames, and bottom panel. Stain if desired (we left ours natural), and apply the finish (we used satin polyurethane). Attach the cradle stops with 1/4" acorn nuts. 🛠️



Written by Marlen Kemmet
Project Design: James R. Downing
Illustrations: Kim Downing; Lorna Johnson
Photographs: King Au; John Hetherington

HOW TO WORK WITH PLASTICS

YOU ALREADY HAVE THE TOOLS; NOW HERE'S THE KNOW-HOW

Why should woodworkers be interested in plastics? Several reasons actually.

Once you learn some of the simple techniques presented here for working with plastics, you can make all sorts of objects that complement your woodworking. For inside the shop, build dust-collection hoods, miter-gauge slides,

router-table inserts, and saw guards. For outside the shop, make trophy and display cases, clear shelving, plaques, and decorative cutouts like the acrylic reindeer in the photo *below*.

To get you started, we'll introduce you to the four different plastics every woodworker should know. Next, we'll show you how

to cut, drill, join, and finish plastics with the skill of a professional. In most cases, the woodworking tools you already own will work well. And don't worry if you've never seen these plastics in your local lumber or hardware stores. On *page 65* we give you sources for everything you need. Now, let's get started.

A FEW THINGS YOU CAN MAKE WITH PLASTICS



WHAT'S WHAT IN PLASTICS

Acrylics

They're crystal-clear and rigid

Imagine what you could do with glass if it were practically unbreakable, easy to join, and safe to machine. In a nutshell, that describes acrylics.

Acrylic sheets come in thicknesses from 1/8" to 1". Some woodworking catalogs sell acrylic in 9x12" or 12x12" sizes for router-table inserts. You also can buy acrylic sheets up to 4x8' from plastic-supply outlets.

For router-table inserts, we recommend pieces that are 3/8-1/2" thick to resist sagging. And 1/4"-thick acrylic works fine for most jigs and fixtures like dust hoods and machine guards. Acrylic also can serve you well as a router template material because its hard edges won't dent or groove under pressure from a pilot bearing.

In addition to clear, acrylic comes in a variety of translucent colors, and bronze and smoked tints. Expect to pay about \$5.50 per square foot for 1/4" material.

Polycarbonate

Tough and resilient, too

Polycarbonate looks just like acrylic. It comes in the same sizes and thicknesses, and you can fabricate the two with the same basic techniques. But polycarbonate rates as 300 times more impact-resistant than glass and 30 times more impact-resistant than acrylic.

You can use 1/4"-thick polycarbon-



On the bottom of a tablesaw cutoff jig, UHMW polyethylene slides like silk in the miter-gauge slot.

ate anywhere you need a machine guard, especially as a shield over table-mounted router bits and tablesaw blades. And like acrylic, polycarbonate makes an excellent template material.

Polycarbonate's toughness comes at the expense of rigidity. Over time, polycarbonate will sag when carrying a load, making it unsuitable for router-table inserts or long spans. Prices for 1/4" polycarbonate run about \$7 per square foot.

Phenolic laminate

Strong and abrasion-resistant

These opaque sheets come in four grades, but they are all made the same way—by applying heat and pressure to layers of paper or fabric that have been impregnated with a synthetic resin. Phenolic laminate offers more strength under load and abrasion resistance than acrylic or polycarbonate. This makes it ideal for router-table inserts that have to hold a heavy router, or in those situations where you work with rough stock that might scratch the surface of an acrylic sheet.

We tried the canvas-grade phenolic laminate, as shown in the photo *below*. It machines easier than acrylic or polycarbonate, and over time it won't show scratches as the clear plastics will. This high performance comes at a higher price. A square foot of this material, 1/4"-thick, costs about \$8.

UHMW polyethylene

Slippery stuff for sliding jigs

UHMW (ultra-high molecular weight) polyethylene, shown in the photo *above*, offers two properties rarely found in one material. It is both abrasion-resistant, and slippery to the touch. These characteristics make it ideal for guide strips that ride in the miter slots in tablesaws and other machine tops. This white, lightweight plastic won't expand and bind in a slot like wood, and it will last for decades, even under constant use.

You won't get any structural or load-bearing strength from UHMW polyethylene, but it holds screws well, so you can fasten it securely to other materials. This low-friction plastic comes in sheets of various thicknesses as well as rolls of adhesive-backed tapes. The tape makes a good lining for jigs or tablesaw and router-table fences where metal-to-metal or wood-to-metal friction can hinder the movement of a workpiece.

The cost for adhesive-backed UHMW polyethylene tape runs about \$1 a yard in 1" widths. Sheets in 1/4" thickness cost about \$5.60 per square foot.

Continued

Rigid, scratch-resistant phenolic laminates make great router-table inserts.



PLASTICS

HOW TO MACHINE PLASTICS Guidelines for foolproof results

With Tablesaws

More teeth are better

You can cut any of the above-mentioned plastics with any saw that cuts wood, but for the best results use a tablesaw or radial-arm saw with a 10" carbide-tipped blade having 50-60 teeth, a triple-chip tooth design, and a positive rake angle of 5-10°.

Avoid ripping blades, combination blades, and blades with aggressive hook angles. These will cause chipping and may grab the plastic sheet, resulting in kickback. When tablesawing plastics, watch your feed rate carefully. If you go too fast, you'll experience some chipping. If you go too slow, the plastic may melt and

cause kickback. Leave the adhesive-backed paper wrapper on your plastic sheets during sawing or any machining operation. This protects the plastic from scratches and gives you a surface on which to draw lines.

With Bandsaws and Scrollsaws

Good for roughing out shapes

Bandsaws work well when you cut curves or rough-out a shape. Run the saw at 2,500-7,500 feet per minute. The thicker your material, the higher speed you should run. Use blades with 10-14 teeth per inch (tpi).

Scrollsaws do a fair job of cutting plastics, although the short cut-

ting stroke allows plastic grit to build up and bind in the kerf. Sheets thicker than ¼" tend to overheat scrollsaw blades, melt the plastic, and bind the blades. With scrollsaws, use a coarse cut blade with 10-14 tpi.

With Jigsaws

Keep your piece clamped tight

If you don't have any other means of cutting plastic, a jigsaw can be used, although it is the least desirable method. Use a metal-cutting blade with about 10 tpi, avoid the saw's orbital settings, and make sure the jigsaw is going full speed before entering the sheet.

The rough motion of a reciprocating blade can vibrate the entire workpiece and cause chipping on the cut line and cracks or crazing elsewhere in the sheet. To prevent this, clamp the workpiece firmly to your bench. Use a wide board (1×6" or so) as a hold-down and as a straightedge to guide the baseplate of the saw. The cut line should extend no more than 1" beyond the support underneath it.

A router with a piloted straight bit cuts a clean edge around a template.



Routing Strategies

Straight bits leave clean edges

Of all the machining operations, routing provides the best quality finished edge on plastics. You'll get the smoothest results by rough-cutting the sheet ⅛" larger than the finished size and then routing the edges to the finished size with a spiral bit or two-flute straight bit. Use a straightedge or template, and a piloted bit, as shown in the photo *left* to guide the router. If you have a variable-speed router, use the highest speed, typically 20,000 rpm.

Drilling Tips

Modified bits prevent mishaps

Twist-type drill bits work best on plastic, but they tend to grab the material, especially near the exit point. To avoid this, file a small



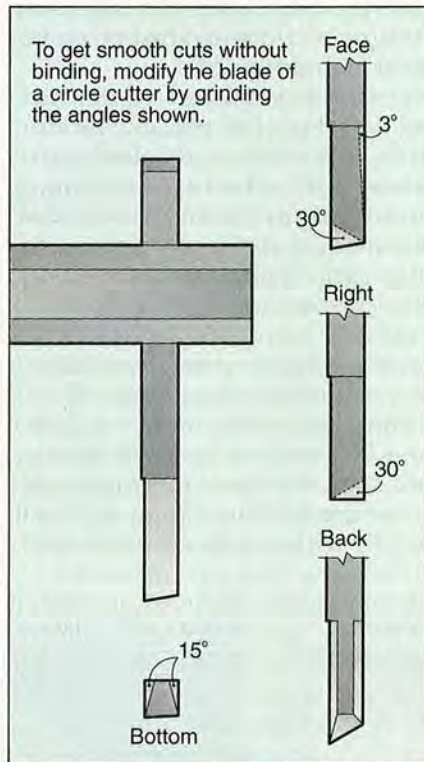
Filing a small flat on the cutting edge prevents drill bits from grabbing at the plastic.



With the shaft in the hole, the cutter can scribe a smooth circle.

flat, about $\frac{1}{32}$ "-wide on the cutting edges, as shown in the photo *top*. If you don't want to modify your bits, you can buy special drill bits for plastic where most plastic sheets are sold.

When you drill a hole three times deeper than the diameter of the bit, use a drill press to steady the bit, and lubricate the bit with paraffin to remove chips and improve the finish. For cutting larger holes in plastic, use a circle cutter mounted in a drill press,



and modify the tip of the cutter by grinding the cutting angles as shown in the illustration *above*. If your circle cutter comes with a shaft rather than a drill bit in the center, drill a guide hole for the shaft of the circle cutter in the center of the workpiece. Insert the shaft in this hole before starting your cut. As shown in the photo *above left*, the guide hole acts as a bearing for the shaft and reduces the amount of wobble in the cutter.

Continued

HOW TO KEEP DUST AND GRIT AT BAY

On acrylics and polycarbonates, static electricity attracts dust and grit that may scratch the surface of the sheet. Manufacturers make a variety of antistatic treatments, but you can defeat this problem yourself by wiping the sheet with a damp cloth and patting it dry. The best way to clean plastic is to wash it gently with a mild solution of dishwashing detergent and a soft cloth, sponge, or chamois.

GUARD AGAINST SHRINKING AND SWELLING

Even though they seem stable, acrylic and polycarbonate expand and contract up to $\frac{1}{16}$ " per foot over a 50-degree change in temperature. On close-fitting components like router-table inserts, be careful not to size your plastic part so tightly that it can't be removed later. The expansion rates of UHMW polyethylene and phenolics are not large enough to affect most shop or woodworking applications.

FUMES AND GRIT

Protect yourself and your tools

Machining any of these plastics will release some fumes into the air, including a methyl methacrylate monomer. These fumes may cause eye or respiratory irritation, nausea, or headaches. To prevent these problems, work in a well-ventilated area. If you intend to do a lot of machining at one time, wear a respirator with an organic vapor cartridge.

Airborne dust isn't a problem with these plastics since the machined particles are large and heavy. You should, however, take care to prevent the buildup of plastic grit and debris inside your machinery, by thoroughly blowing out plastic particles. This debris can shorten the life of your bearings and clog or interfere with moving parts.

PLASTICS

THREE WAYS TO FINISH PLASTIC EDGES

The machined edges of acrylic, polycarbonate, and phenolics usually need smoothing after they've been cut. There are three ways to accomplish this: scraping, buffing, and flame polishing. The last two edge treatments are usually reserved for projects such as trophy cases, jewelry boxes, and other showpieces that look better with a clear, polished edge.

Scraping

For a fast, matte edge

The easiest way to remove saw marks is to scrape the edges with a straight, blunt steel edge such as the unsharpened end of a cabinet scraper. This produces a clean, frosted finish.

Prior to scraping, secure the workpiece in a vise padded with a soft cloth. Hold the scraper about 20° from vertical, as shown in the photo *below left*, and bear down with hard, fast strokes. When you're done scraping, you'll have sharp corners on the edges that you can knock off by scraping a small bevel, as shown in the photo *below right*.

If you are preparing the workpiece for a decorative item, you

may want to peel off only that portion of the paper where you need to work. Since a small scratch won't affect the performance of a shop fixture, we found it easier just to peel off the entire wrapping during the beveling stage, as shown in the photo *below right*.

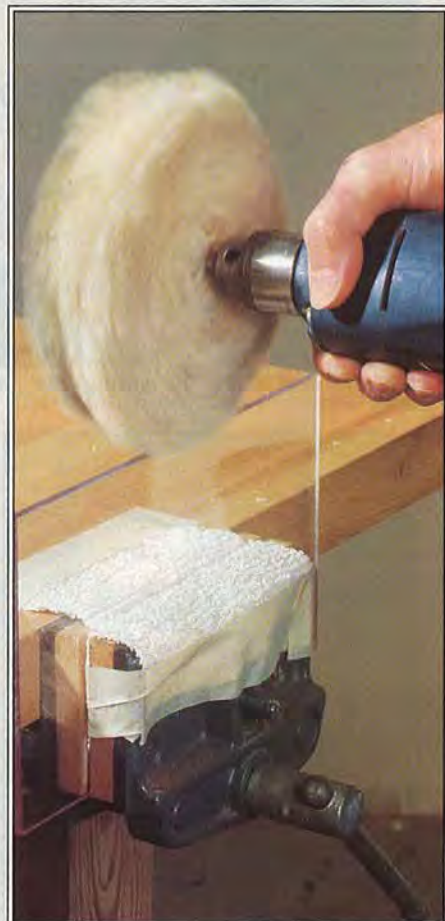
Buffing

Slow but controllable

The first stage in buffing is to scrape the edge of the plastic to remove saw or tool marks. Then, sand the edge with 320- and then 400-grit wet/dry sandpaper moistened with water.

Next, chuck a felt or muslin buffing wheel in your portable electric drill, as shown *right*. Dress the wheel with a buffing compound such as those made for silver or brass, or car polishing compounds. (But avoid compounds that contain silicone or cleaning agents.) You also can use wood polishes such as tripoli, or buy specialized plastic buffing compounds.

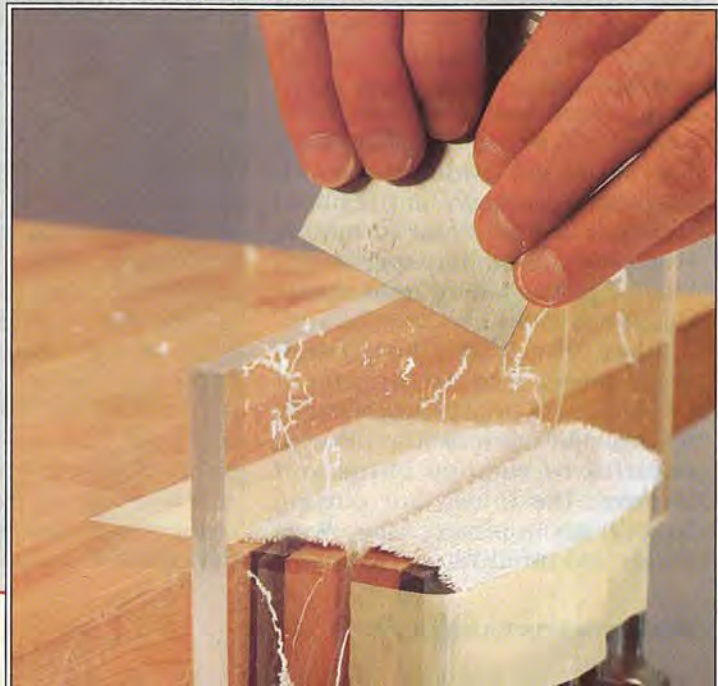
Run your buffing wheel at 3,000 to 4,500 surface feet per minute, and keep the wheel moving to prevent heat build-up. Apply the final polish with a soft cotton wheel.



Buffing a scraped edge produces a smooth, clear finish.

The blunt end of a cabinet scraper puts a smooth finish on the rough edges of acrylics and polycarbonates.

To finish cleaning up an edge, remove any small burrs on the corners with a light scraping.



Flame polishing

Tricky but quick

Manufacturers do not recommend this technique, but many fabricators flame polish plastic edges because the procedure is simple and fast. The problem with flame polishing is that it can cause crazing on the surface of the sheet, and this may not show up until weeks after the piece has been polished. If you are careful not to overheat the plastic, flame polishing produces a crystal-clear edge faster than any other method.

Light a propane torch and position the tip so that the blue inner cone of flame just touches the edge of the plastic as shown *below*. Move the flame back and forth across a small area several times, watching carefully for signs of distortion or burning. The object is to apply only enough heat to melt the rough edges and form a clear, smooth finish. Use only on acrylic and polycarbonate plastics.

Flame polishing requires careful control to avoid damaging the plastic.



A FEW TIPS ON JOINING AND FASTENING PLASTICS

When you join two pieces of acrylic or polycarbonate with the proper solvent-based cements, you create a joint that is stronger than the material itself. The methylene-chloride-based solvents used to join acrylic and polycarbonate dissolve the material on the edges and recombine them into a single, welded, waterproof piece. UHMW polyethylene and phenolics, however, cannot be cemented together and must be mechanically fastened with screws.

To start the solvent-joining process, scrape the saw marks off the edge to be joined and butt the pieces together. Keep the joint line horizontal to prevent the solvent from dripping out of the joint. Use a glue syringe to inject the solvent into the joint, as shown *right*, but don't force solvent into the joint. Capillary action will draw the solvent out of the syringe and into the gap, and the bond will set up within about 20 minutes. If you squeeze too much solvent out of the syringe, it will puddle and smear the surrounding surfaces.

To secure the two workpieces during this operation, build a right-angle clamping jig out of particleboard sized to fit the dimensions of your project. A bright work light placed near the joint helps you see the solvent being drawn into the joint and

prevents you from overfilling or starving the joint.

All of these plastics can be tapped to hold screws, but on acrylic, lubricate the tap with paraffin to prevent chipping the edges of the threads. For machine screws that will be frequently removed, consider using a threaded insert. Whenever you tighten a round-head screw into a piece of plastic, use a rubber or nylon washer under the screw head, and apply gentle pressure so you don't crack the plastic.



Capillary action draws the glue out of the syringe and into the joint.

WHERE TO BUY PLASTICS AND SUPPLIES

Many home centers and hardware stores carry sheets of acrylic and a limited selection of solvents and drill bits. You'll find a better selection of materials and tools, though, if you check in the local Yellow Pages under "plastics."

If your Yellow-Pages search doesn't turn up any prospects, contact United States Plastic Corp., 1390 Neubrecht Rd., Lima, OH 45801. Call: 800/537-9724. This mail-order firm carries everything mentioned in this article and will process any order over \$5.♣

Written by Tom Jackson
Photographs: King Au

Technical consultant: Dave Wiles, Van Horn Plastics
Illustration: Roxanne LeMoine

Turn them
two at a time

HANDY, DANDY



Tired of propping doors open with bricks or books? If so, just turn a few of these mansion-quality doorstops—we'll show you how to make two at a time. Then, you can stand doors open stylishly.

Project prep

Stock: 1½×1½×9¼" Hardwood. Each piece this size yields two doorstops.

Lathe equipment: Cup-type dead center, live tail center.

Turning tools: ½" and 1" skew, ¼" and ¾" bowl or spindle gouge, parting tool.

Lathe speeds: Roughing and sanding, 1000–1200 rpm; finish turning, 1200–1500 rpm.

Start with a piece of stock 1½×1½×9¼" (oak shown). Plane or sand the faces flat, smooth, and square to each other. Ordinarily, you don't need to be concerned about the faces on a turning blank, but most of this one won't be turned—it will remain square.

Locate and mark the center on each end of the blank. To find the center accurately, draw diagonal lines on each end—they cross at the center. Using a try square and a pencil with soft lead, draw dark lines across one face of the blank, 1⅞" from each end. Draw another line ½" inside each of those.

Mount the blank between centers on your lathe. At the drive

(headstock) end, install a cup-style dead center, the type often furnished with a lathe as the tail center shown in *Photo 1 below*. Use a rotating (live) tail center.

Round the ends to start

Using a ¾" spindle or bowl gouge, turn the 1⅞"-long section at each end of the blank to 1⅝" diameter, leaving the 5½"-long midsection of the blank square. Begin the transition from square to round at the line nearest each end, as shown in *Photo 2*. Then round the blank from the line out to the end.

Next, square each shoulder (where the round end meets the midsection) to the line. The 1" skew easily handles this chore. Lots of turners are leary of the skew, but the dead-center drive employed here makes it less likely that you'll do any serious damage by misusing a tool. If you snag the tool, the turning simply stops going around.

To skew-cut the shoulders, stand the tool on edge on the tool rest, long point down. Angle the skew to place the bevel that faces into the blank perpendicular to the side of the blank, as shown in *Photo 3*. Taking light cuts, square the shoulder to the first line at each end.

Taper the round sections to 1⅜" diameter at the shoulder. With the skew, undercut the base of each



1 Install a dead (nonrotating) cup center in the headstock. This way, tool catches are less likely to damage the turning.



2 Turn the ends round from the outer line outward. If the turning stops too easily, increase the tailstock pressure.



3 Square the shoulder with a skew before rough-turning the handles. Cut to the outermost line.

DOORSTOPS

round end. (The ends should now look like the rough-turned handle on the Full-Sized Template).

Shape the handles

Next, round over the shoulders. Starting from the line $\frac{1}{2}$ " inside the shoulder, make a rolling cut down to the face of the shoulder. You can do this with either a skew or a gouge. Cutting from the line down to the face helps prevent splintering at the corners.

To make the cut, start with the tool in position for a normal round-surface cut at the line. Near the line, you'll be cutting away corners in an interrupted cut. Then, move the tool toward the end of the blank, rolling it at the same time, as if cutting a bead, as shown in *Photo 4*. The tool should describe an arc rather than a straight line.

After forming the shoulders, turn the knobs. Lay out guidelines on each rough-turned handle, then shape the knob with a small gouge and skew, as shown in *Photo 5*. At the end of the handle ($\frac{1}{4}$ " from the end of the blank), cut in with the parting tool to about $\frac{3}{4}$ " diameter. Shape the end of the knob as far as you can without parting off the supporting tenons. Sand the handles with 150- and 220-grit sandpaper.

Make the two decorative grooves where shown. A parting

tool laid on its side or the tip of your skew will make a suitable V-shaped cut. To make the grooves show up better, burn them in. Here's how:

Cut a 12"-length of 18-gauge steel or copper wire (or any other size that fits into the grooves you've cut). Secure each end to a dowel or stick suitable for a grip, leaving 5" or 6" of wire between the handles. With the lathe running, stretch the wire, and press it into each groove, holding it until friction burns the wood.

Now, complete the knobs. Shape the ends, working on them alternately until you have just two small cones supporting the turning. Remove the turning from the lathe, and trim the waste ends off.

Cut the turning in two

Draw a diagonal line across one face of the square section, as shown on the Full-Sized Template. Bandsaw the turning in half along the line. Sand the wedge, removing the saw marks and rounding the corners slightly. Sand the handle ends.

Stain or apply a clear finish, as you prefer. The doorstop will be subject to a lot of scuffing, so put on a final coat of semi-gloss polyurethane for protection. ♣

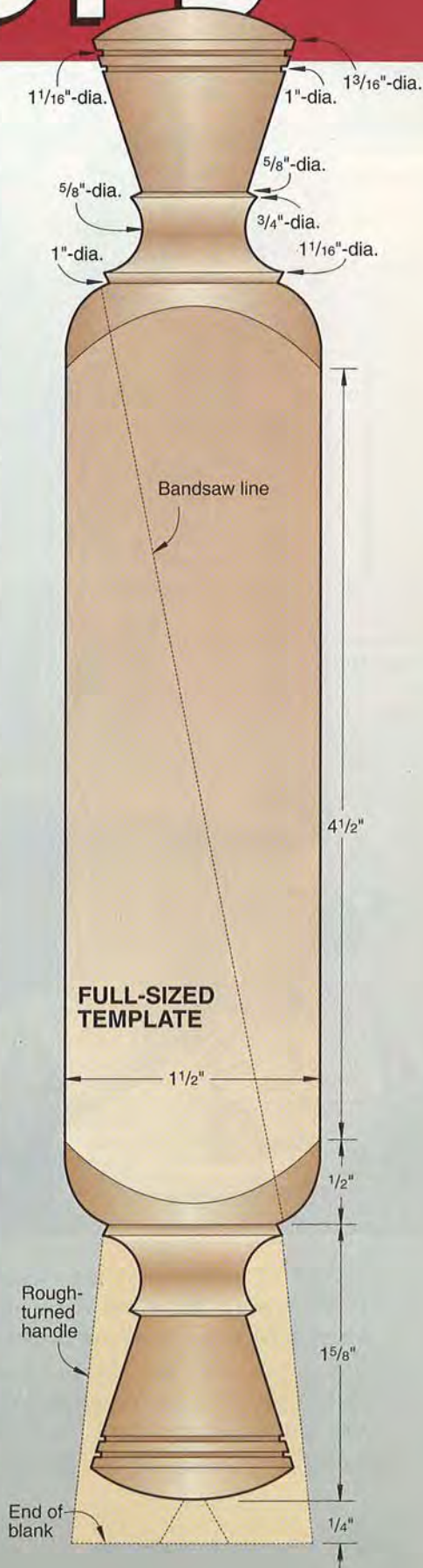
Project Design: Dick Sing
Photographs: John Hetherington
Illustration: Roxanne LeMoine



When rounding the shoulders, cut away from the line to prevent splintered corners.



Guidelines drawn on the turning will help you position the knob features. Check the template as you work.



COLLECTOR'S-SPECIAL



Note: The machining and construction of the tabletop and wall-hung display cases are nearly identical, other than the overall size of the projects. Use the directions here to build either project. Or, lay out your collection on a flat surface, and build a case to fit the size you need.

Start with the frame molding and glass stops

1 From $\frac{1}{2}$ " stock (we used walnut), rip enough lineal strips to $2\frac{1}{8}$ " wide for the frame ends (A) and sides (B). (We cut our pieces extra long to allow for waste on each end when machining in the following steps. We also cut an extra strip about 10" long for use as a test piece when adjusting the dado blades and router bit in the three-step Machining the Frame Molding drawing.)

2 Using Step 1 on the three-step drawing for reference, fit your tablesaw with a dado set and auxiliary fence. Then, cut a $\frac{3}{8}$ " rabbet $\frac{1}{2}$ " deep along the bottom inside edge of each piece of frame stock.

3 Using Step 2 of the drawing for reference, switch dado blades,



Attention collectors! We dedicate this project to all of you who have trouble finding a display case worthy of your favorite collectibles. We think you'll agree that ours get the job done in a way that guarantees top billing for your prized collection. And do you know something else? The cases couldn't be easier to build.

DISPLAY CASES

and cut a $\frac{1}{4}$ " dado for the glass stops where dimensioned.

4 As shown in Step 3 of the drawing, use your router fitted with a $\frac{3}{8}$ " round-over bit to rout partial round-overs along the top edge of each frame member (A, B).

5 Cut the glass stops C and D to $\frac{1}{4} \times \frac{3}{8}$ " and to the same lengths as the frame members.

6 Glue the stops into the frame members A and B, using the glue sparingly to avoid excess squeeze-out. Use a damp cloth to wipe off the excess glue. See the Frame Assembly drawing for reference. (We used spring clamps to hold the glass stops in place. These clamps are easy to remove when wiping off the excess glue.)

Miter-cut and assemble the frame

1 Miter-cut two pieces of scrap, hold them together, and check with a square to verify accurate 45° angles. Adjust the miter setting if necessary. Now, miter-cut the frame members A/C and B/D to the lengths listed in the Bill of Materials. (To minimize splintering the glass stops when mitering,

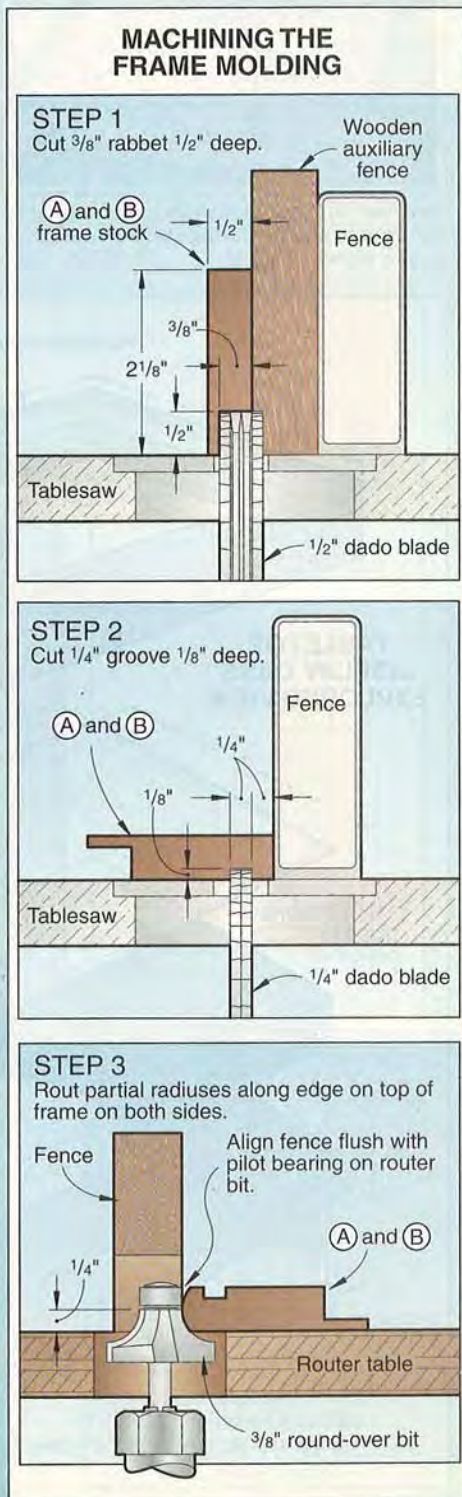
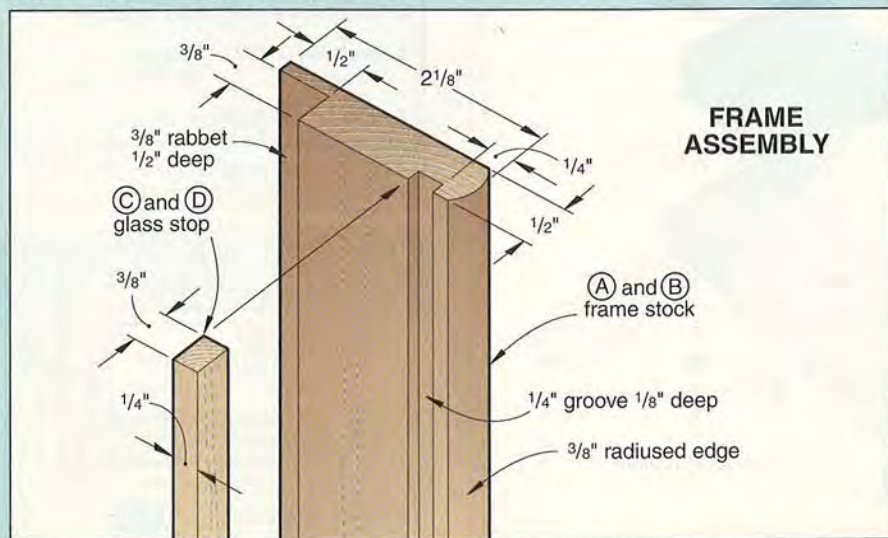
we wrapped masking tape around them to support the fibers when making the cut.)

2 Position the four frame pieces inside facedown on a flat surface, with the mitered ends butted together. Keeping the top and bottom edges aligned, use masking tape to tape the pieces together end-to-end. Cover the entire joint with the tape. The tape will prevent squeeze-out on the outside surface of each joint. Unfold the frame and apply glue to the miters. Refold the pieces and tape the mating corners. Check for square. Wipe off the excess glue with a damp cloth.

3 Measure the rabbeted opening, and cut the $\frac{1}{2}$ "-thick plywood back (E) to size. Drill countersunk mounting holes, and secure the back to the frame with $\#6 \times 1$ " flat-head wood screws.

4 For the tabletop display case shown on the inset photo on the *opposite page*, add four rubber feet to the bottom of the case. For the wall-hung case, remove the plywood back and rout keyhole slots in the back. Use a plunge

Continued



DISPLAY CASES



Use end and top guides to guide and stop the router when routing the keyhole slots in the plywood back.

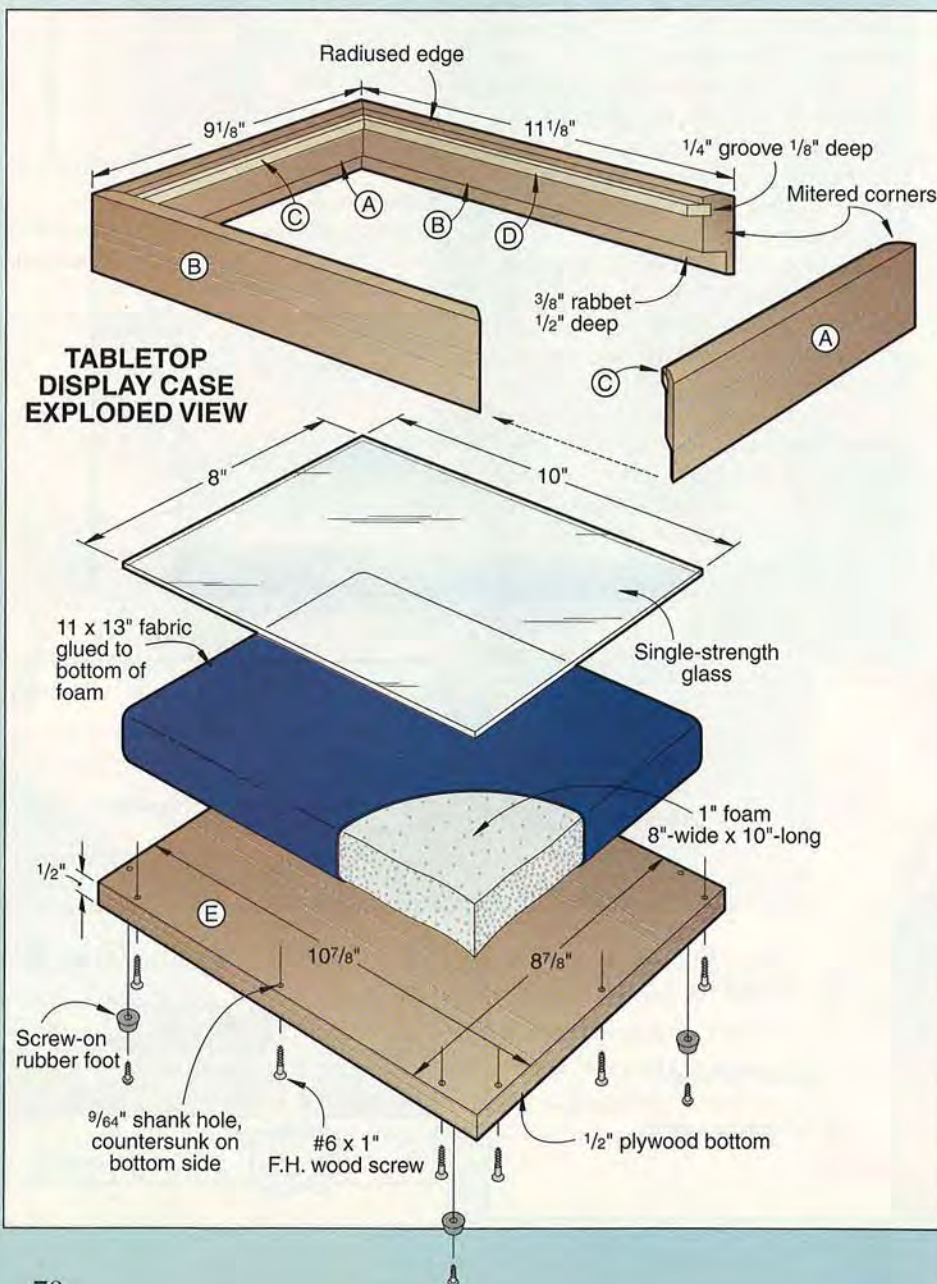
router fitted with a keyhole bit. See the photo *at left* for our setup to do this. (As shown in the photo, we constructed guides to guide the router for straight cuts.)

Sand, apply the finish, and add the collectibles

1 Finish-sand the frame. Apply a clear finish (we used Minwax Antique Oil Finish, following the directions on the can and rubbing lightly between coats with 0000 steel wool).

2 Have a piece of single-strength glass cut to fit the opening. Secure it in place with a couple drops of clear silicone sealant.

3 To display objects against the glass, cut a piece of 1"-thick poly foam to fit inside the frame. (We cut the foam piece for our tabletop case on the bandsaw using the fence for a guide. For the wall-hung case where the foam can be too large to cut on the bandsaw, we used a metal straight-edge and utility knife. To do this, we

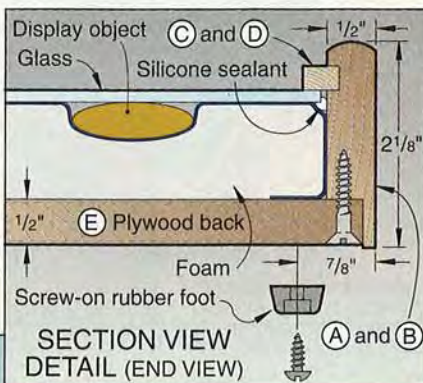


Bill of Materials					
Part	Finished Size			Mtl.	Qty.
	T	W	L		
TABLETOP DISPLAY CASE					
A* ends	1/2"	2 1/8"	9 1/8"	W	2
B* sides	1/2"	2 1/8"	11 1/8"	W	2
C* end stops	1/4"	3/8"	8 3/8"	M	2
D* side stops	1/4"	3/8"	10 3/8"	M	2
E back	1/2"	8 7/8"	10 7/8"	BP	1
WALL-HUNG DISPLAY CASE					
A* ends	1/2"	2 1/8"	15 1/8"	W	2
B* sides	1/2"	2 1/8"	21 1/8"	W	2
C* end stops	1/4"	3/8"	14 3/8"	M	2
D* side stops	1/4"	3/8"	20 3/8"	M	2
E back	1/2"	14 7/8"	20 7/8"	BP	1

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

Materials Key: W-walnut, M-maple, BP-birch plywood

Supplies: 1/8" single-strength glass, clear silicone sealant, 1"-thick poly foam, #6x1" flathead wood screws, screw-on or self-adhesive rubber feet for tabletop version, fabric, clear finish.



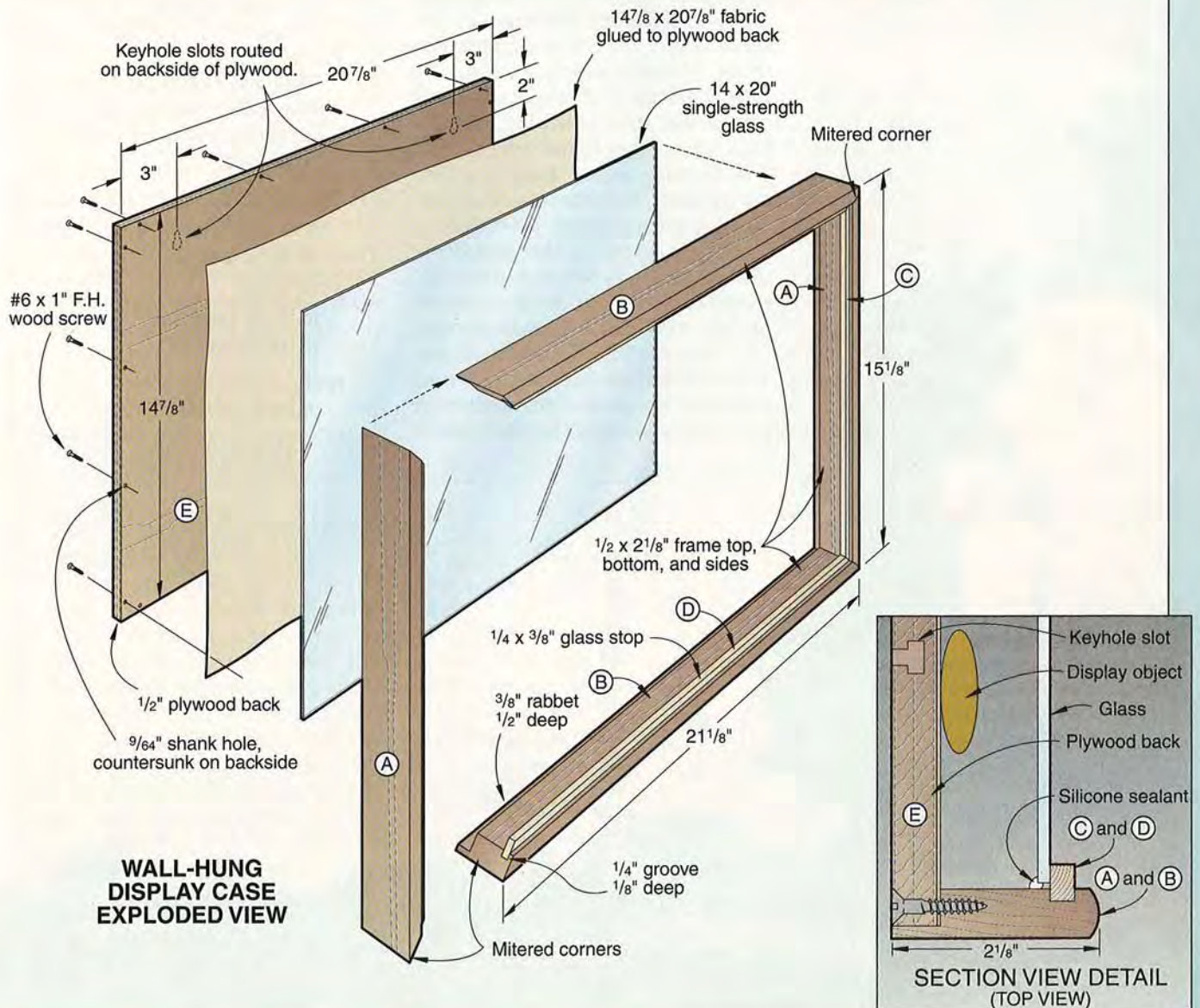
pushed the straightedge against the foam to compress it, and then used the knife to trim the foam, running the blade against the metal straightedge.)

4 Cover the foam with a fabric of your choice, and secure the back of the fabric to the foam with spray adhesive. Place the frame with glass installed facedown on a flat surface, and arrange the objects to be displayed facedown on the glass. Carefully insert the fabric-covered foam, and then fas-

ten the plywood back with #6 screws. Turn the case over.

5 To display objects mounted to the back of the case, cover the plywood back with fabric, fastening the fabric to the front surface and edges with spray adhesive. Mount the objects to the fabric. The method of mounting will depend on the objects being displayed. *Note that the plywood back (E) does have a top and bottom edge, depending on where you routed your keyhole slots.* By

mistake, we mounted our display pieces to the backboard, only to turn it over and realize that the keyhole slots were at the bottom rather than top edge of the back. Place the frame with glass installed facedown on a flat surface. Insert the plywood back, with objects attached, into the rabbeted opening in the frame, and secure with the #6 screws. Turn the frame over and hang it in a prominent place for all to see and enjoy. 🍄



CARVE SOME COMIC RELIEF

CARTOON

Relief carving meets cartooning in this terrific caricature. Even if you're a newcomer to carving, you'll find this one as much fun to carve as it is to look at.

SEE THE
WOOD PATTERNS™
INSERT FOR
FULL-SIZED PATTERNS

I had the worst time carving figures; I couldn't get the eyes on straight," Larry Green jokes as he recounts his early attempts at carving caricatures. Whether or not fear of uneven eyes really turned him to side views, the Knoxville, Tennessee, carver has taken to them in a big way.

In collaboration with artist and cartoonist Mike Altman ("I can't draw, and Mike isn't a very good woodcarver!"), he's created hundreds of different side-view caricatures. Larry carves his characters from 3/4"-thick stock, employing relief-carving techniques to trick observers into thinking they're looking at a 3-D figure.

To begin carving Larry's proud carpenter, photocopy the full-sized pattern in the *WOOD PATTERNS™* insert in the middle of the magazine. With a piece of transfer paper or carbon paper facedown beneath it, tape the pattern to a 3/4x5 1/2x9" piece of basswood, and trace it onto the wood. A French curve and a straightedge will help you keep the lines sharp.

(You can enlarge or reduce the pattern if you wish, and carve it on thicker or thinner stock, as appropriate. Larry carved the 14"-tall one shown *below left* from 1 3/4"-thick stock. The how-to photos show a pattern-sized carving.) Bandsaw or scrollsaw around the outer pattern line.

Project prep

Stock:

Basswood or other carving wood, 3/4x5 1/2x9".

Tools:

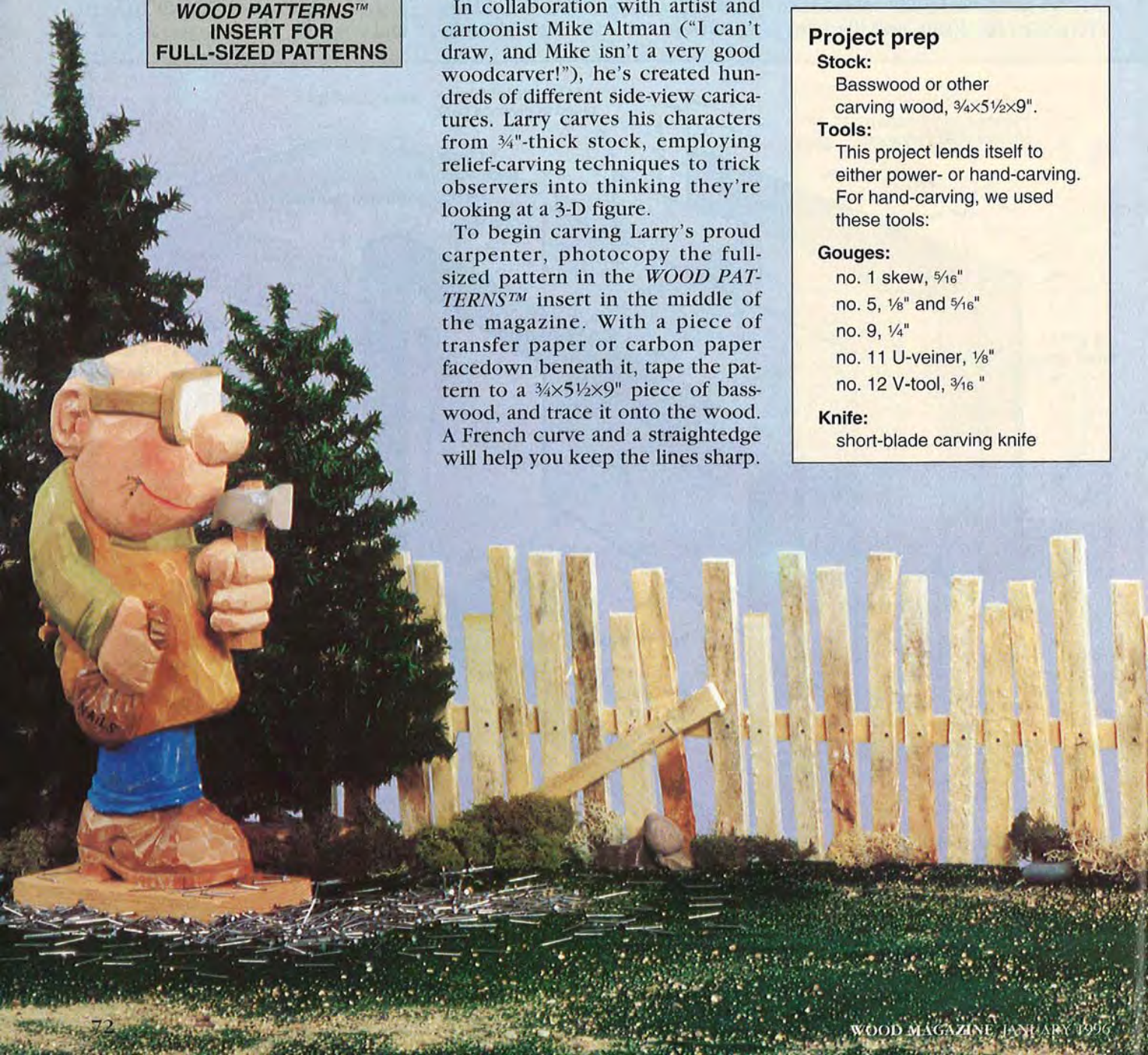
This project lends itself to either power- or hand-carving. For hand-carving, we used these tools:

Gouges:

- no. 1 skew, 5/16"
- no. 5, 1/8" and 5/16"
- no. 9, 1/4"
- no. 11 U-veiner, 1/8"
- no. 12 V-tool, 3/16"

Knife:

short-blade carving knife



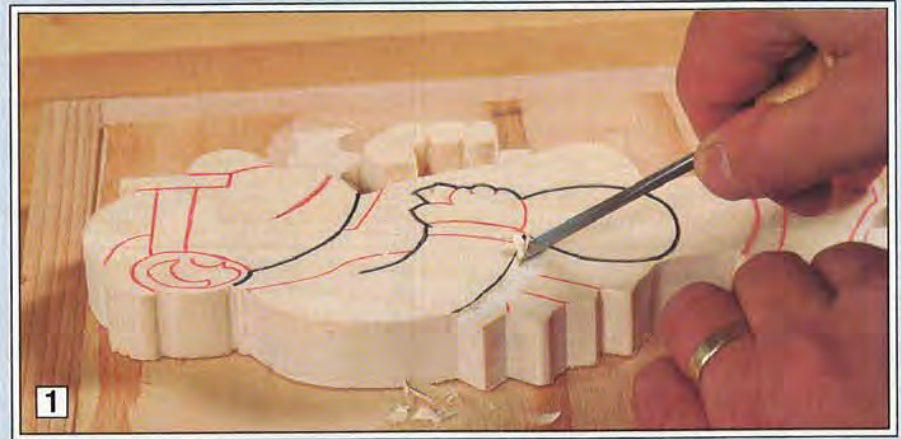
CARPENTER

Start at the lowest level

Begin carving at the deepest relief level. For our carpenter, that would be the palm of the left hand, the one holding the hammer. The left sleeve is just about as deep, so carve it at the same time. Stop-cut the line down the front of the body and the one that takes in the back of the thumb and the fingers.

You can make the stop cuts, which enable you to cut up to a line without tearing out the wood beyond it, with either a V-tool or a knife. To stop-cut with the V-tool, cut along the waste side of the line, holding the wing of the tool nearest the line perpendicular to the surface. If you're using a knife, just slice straight into the wood along the line.

Using your gouges, carve away, or waste, the area until the palm is about half the thickness of the blank. (You'll have to do this in stages; stop-cut, waste to the depth of the stop cut, stop-cut again, waste again, and so on.) Start with the no. 9 gouge to



remove wood quickly, then change to a no. 5 gouge to remove the deep grooves.

When you reach a depth of about $\frac{1}{4}$ ", draw in and stop-cut the cuff line for the left sleeve (Line A on the pattern). Leave the cuff—the area between the line and the front of the body—a little higher than the palm. While you're working in the vicinity, pare the hammer head and handle down about $\frac{1}{4}$ ", leaving them a little more than half the blank thickness.

An arm and a leg

Next, stop-cut the upper arm line (Line B). Continue stop-cutting around the hand and nail bag, back to the elbow. With a shallow gouge, cut toward the line as shown *above* to set out the arm, hand, and bag. Cut about $\frac{1}{8}$ " deep at the line. Reduce the depth near the shoulder at the top of Line B. The shoulder and upper arm remain at surface height. Stop-cut the jawline and the bottom of the ear, and carve to that line.

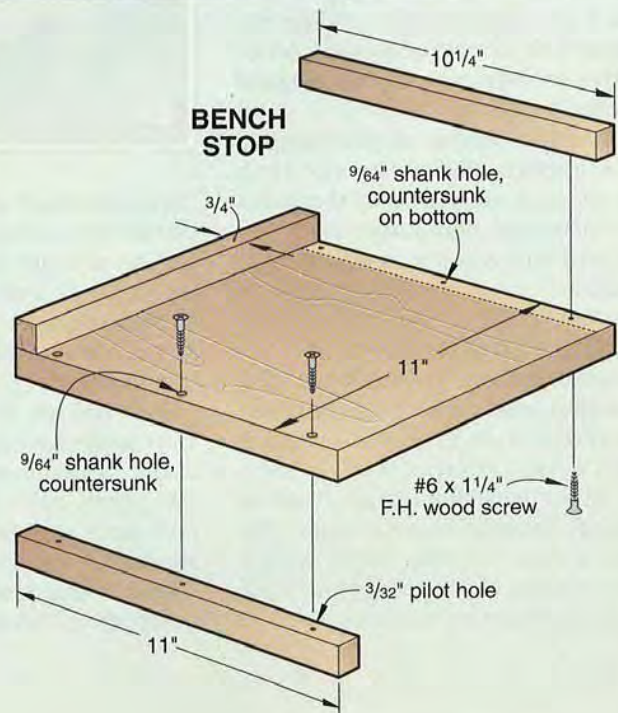
Continued

Get a hold on your work

Before you start carving, you need to come up with a way to hang on to the blank while you work. Here's a simple and effective way:

Cut a piece of scrapwood $\frac{3}{4} \times 9 \times 9$ " (plywood or particleboard would work). Draw a centerline on the back of the piece (draw it across the grain on solid stock). On the centerline 2" from each edge, drill and countersink a $\frac{5}{32}$ " hole. Now, center the carving blank on the front of the board, and fasten it from the back with two #8 $\times 1\frac{1}{4}$ " flathead wood screws through the holes.

With the blank mounted on this square, you can now hold it securely for carving using a simple bench stop. This setup allows you to turn the carving to different positions for easier working, too. To make a bench stop, refer to the drawing *right*. Assemble the parts with glue and screws.



CARTOON CARPENTER

Continue stop-cutting and wasting, taking the body surface down about $\frac{3}{16}$ ". Carve slightly deeper right along the line you're cutting to; this creates a clear separation between levels that enhances the relief effect.

Shave the fingers of the left hand to the thickness of the body. As you carve, you don't need to develop perfectly flat planes. In fact, you want to maintain some curvature so the carving will appear round instead of flat.

Working from the top of the pants cuff (Line C) upward, taper the leg to meet the body. Then, stop-cut Line C, and carve the leg down about $\frac{1}{16}$ " at the cuff. Stop-cut the lower cuff line (Line D). From about the middle of the shoe, carve to the line, going about $\frac{1}{16}$ " deep. With a V-tool, carve the shoe sole and heel lines (Lines E and F) about $\frac{1}{16}$ " deep. Your carving should now look approximately like the one in *Photo 2*.

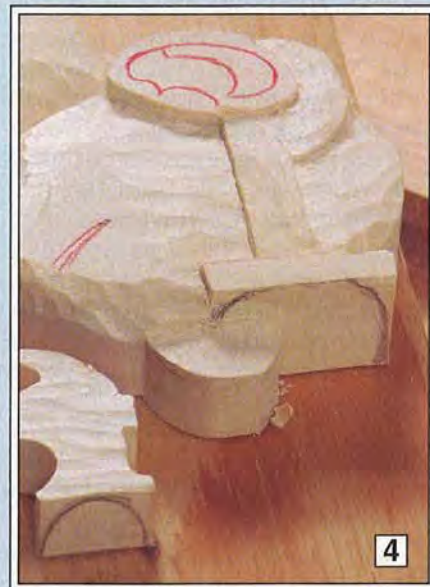
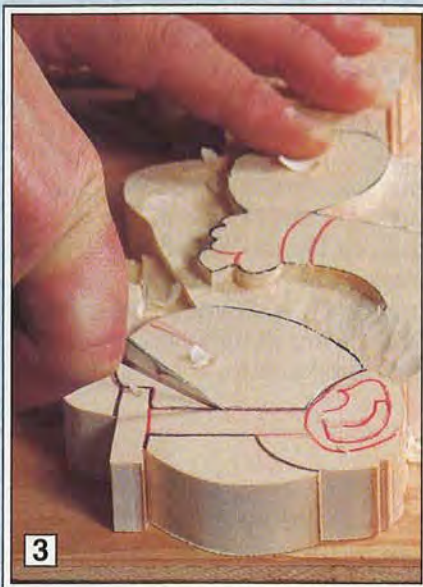
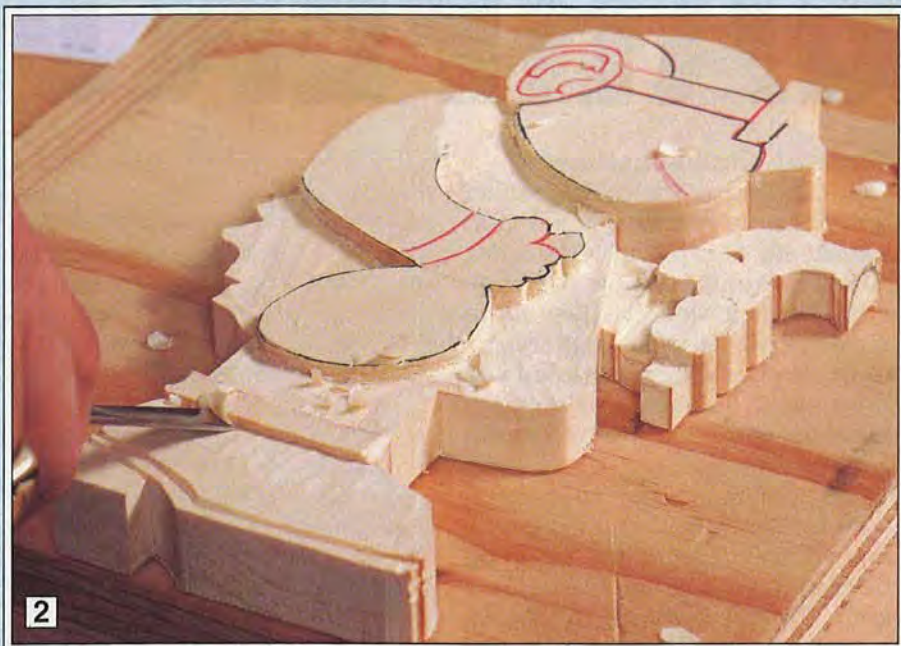
Take it from the top

With the body roughed out, shape the carpenter's head. Stop-cut the nose, glasses, lower-ear outline, and hairline, as shown in *Photo 3*. Carve the nose to about $\frac{1}{16}$ " thick. Set out the glasses, ear, and hair, carving to about $\frac{1}{8}$ " deep at the line. Carve the head, rounding the edges. The cheek near the corner of the mouth can stay at original surface height.

Carve the temple of the carpenter's glasses slightly lower than the ear and the frame of the glasses. Carve the hair lower than the ear and the temple, as shown in *Photo 4*.

It's time to shape up

Round the front of the body, the shoulder and right arm, and the leg and foot to give the roughed-out carving shape. Strive for a smooth curvature rather than an abrupt, rounded-over corner. We used a detail-carving knife with a short blade in conjunction with the gouges at this stage.



A quick way to start rounding a corner is to shave it away with the inside of a no. 5 gouge, as shown in *Photo 5*, *opposite page*. Watch the changing grain direction—in some places, you won't be able to use this trick.

With the no. 9 gouge or a no. 11 U-veiner, gouge out a channel about $\frac{1}{4}$ " wide along the middle of the pants cuff. Set out the sleeve cuff on the right arm, and carve a similar groove on it.

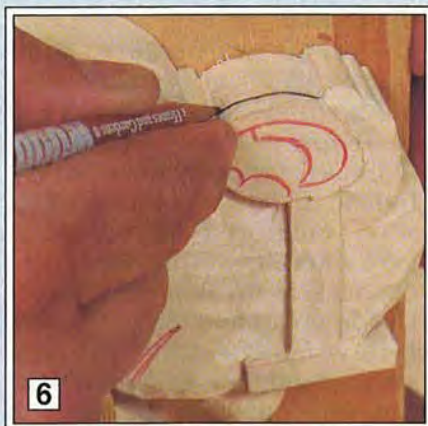
Round the jawline down to the body, then round the top of the

head—including the hair—and the nose. Round the top and bottom corners of the glasses. On the back of the head, draw a line parallel to the surface of the ear and about $\frac{1}{4}$ " from it, shown in *Photo 6*. Stop-cut that line, the collar line across the back, and the hair line, creating a U-shaped section behind the ear.

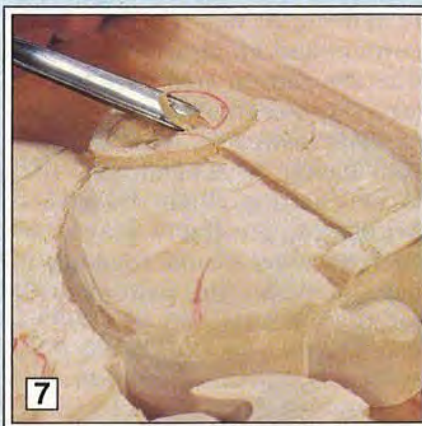
Working toward the mounting board, cut away the area to form the back of the head. You can rough in the back of the head now, then complete it after you



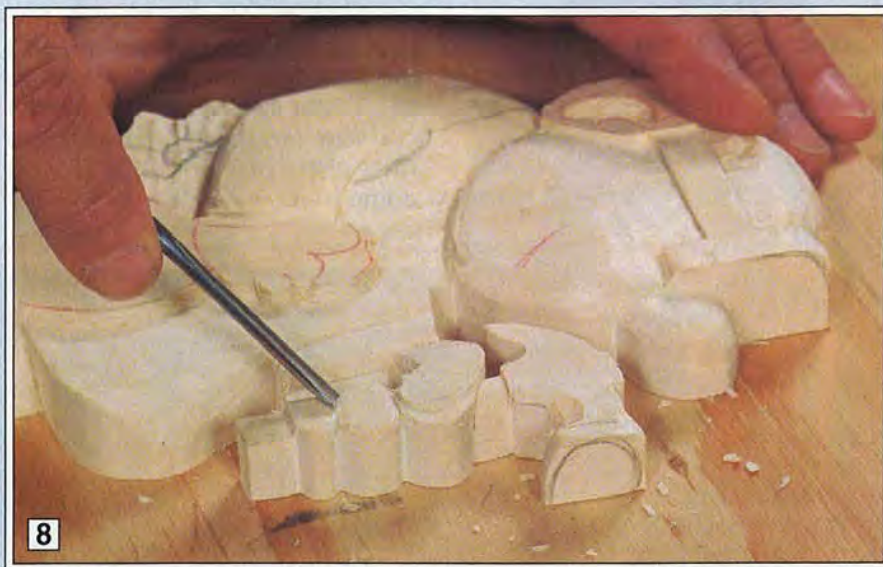
5



6



7



8

remove the carving from the mounting board later. Cut deep enough near the collar that the back of the head visually meets up with the jawline. Taper the back of the ear into the head.

On the face of the ear, stop-cut the outer line (Line G). Then, starting from the space between the lines at the front of the ear, cut along the curve of the inner line with a deep gouge (we used a 1/4" no. 9 gouge), as shown in *Photo 7*. Hollow out the lower area, keeping a deep channel

along your original gouge cut. Make a shallower hollow in the upper area in the ear. Carve the mouth with a V-tool or knife.

Details make the man

Carve the left hand and the hammer. Draw in the line for the thumb, then set the thumb out from the underlying finger. Taper the thumb back to the cuff, carving it a bit lower than the cuff where they meet, as shown in *Photo 8*. Shape the fingers, hand, and sleeve. Round the top and

bottom corners of the hammer face, shape the hammer head, and carve the handle.

Next, model the right hand and the nail bag. Set the hand out slightly from the bag. Form the gathers and wrinkles in the paper bag with V-tool cuts.

Draw in the apron neckline, and carve it. Similarly, carve the corner of the shirt at the lower back corner of the apron. Then, draw in the lines for the apron bow, and carve the knot. A dome with two wings coming from it makes a great bow knot.

Touch up any missing details, or add extra details that will give your carpenter individuality. Finish the surface to your preference. The carpenter looks great as a slightly rough-hewn folk-style carving. Or if you like, you could sand the tool marks away.

Remove the carving from the mounting board. Carve the edges as necessary to remove saw marks, and complete the back of the head. Remove any fuzz or splinters along the back edge.

Dress him up in colors

Paint the completed carving with acrylic paints. Thin the paints to a milky consistency with water, and apply several coats to build the color. Oh, yes. For those nails in his mouth, use 3/4" x #19 wire nails.

The flat-backed relief caricature can be hung on a wall, mounted on a plaque, or incorporated into a sign to go on or over your shop door. Or, you could mount it on a base as a stand-up character.

For a stand-up base, cut a 3/4 x 3 x 7" piece of stock. (We used walnut, and routed a 1/2" chamfer around the top.) Drill a centered 7/64" hole 2 1/4" from each end. Countersink the holes on the bottom. Stand the carving on top, and fasten it in place with two #6 x 1 1/4" flathead wood screws from the bottom. 🛠️

Project Design: Larry Green
Photographs: John Hetherington
Illustration: Roxanne LeMoine
Written by Larry Johnston

A VERY CURIOUS DESK

Do you waste time searching for something to write with? Put Sherlock Holmes on the case! Anything stored in this caddy falls under the Great Detective's constant surveillance. Who would pilfer a pencil then? Few projects so fun to build deliver such peace of mind.

There seem to be some patterns to all this

1 Photocopy the full-sized patterns from the *WOOD PATTERNS™* insert in the middle of the magazine. Using rubber cement or spray adhesive, adhere the patterns for the arch sides (A, B) to two $1\frac{1}{4}\times 2\frac{1}{2}\times 8\frac{1}{4}$ " pieces of mahogany. (You also could laminate stock for the arch sides.)

2 Adhere the patterns for parts C and D to a piece of $\frac{1}{4}$ "-thick walnut. To make the four parts E,

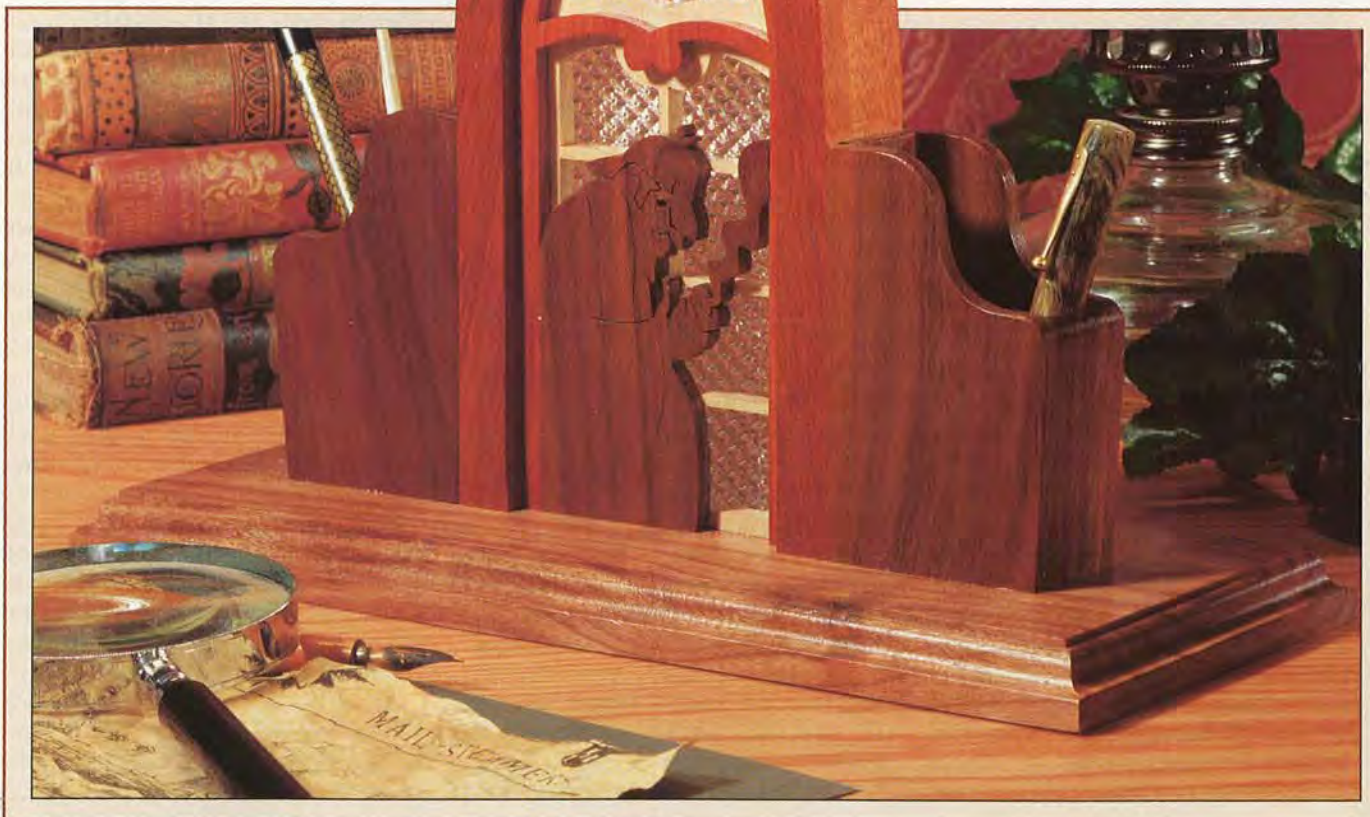
stack four $\frac{1}{4}\times 2\frac{3}{4}\times 4\frac{1}{2}$ " walnut blanks together with double-faced tape between them. Apply the pattern to the top of the stack.

3 Stack two $\frac{1}{4}\times 4\times 8$ " maple blanks together for the two parts F. Fasten the blanks together at the corners and along the edges outside the pattern area with double-faced tape or small spots of cyanoacrylate adhesive. This will prevent having to separate the parts after cutting, with the risk of breakage. Similarly stack two $\frac{1}{4}\times 4\times 8$ " cedar blanks together for parts G. Apply the pattern to the top of each stack.

What you saw will be most important later on

1 Cut out the arch sides (A, B) first. Install a #11 scrollsaw blade (.063 \times .019" with 9 $\frac{1}{2}$ -12 $\frac{1}{2}$ teeth per inch) to saw the $\frac{1}{4}$ "-thick stock.

2 Change the blade to a #2 (.028 \times .012" with 20-23 teeth per inch) to cut out parts C and D. When you cut out Holmes (C), start at the pipe bowl where indicated on the pattern. This way, you'll make the most delicate cuts last, minimizing the chances of breaking the piece. Cut down around the pipe bowl, following the line into the stopped cut that marks the bowl rim. Back out along the line, and make the stopped cut that delineates the bowl side. Back out of that line, then saw on around the bottom of the pattern and up the Great Detective's back. As you saw around the pattern, cut into each interior line as you come to it.



CADDY INDEED

3 Before cutting out part D, drill the hole where shown for the bird's eye. Cut the bottom straight across now; later, you'll mark and cut the notch.

4 Change the blade to a #7 (.045x.018" with 14 teeth per inch). Saw the four-piece stack of parts E, then separate the pieces.

5 Drill 1/8" blade start holes for parts F and G where shown. On each part, complete the inside cuts, then saw around the outside.

Now, we're getting to the bottom of this thing

1 Cut a piece of walnut 3/4x5x12" for the base (H). Rout a 5/32" roman ogee along the top edge.

2 Cut two pieces of walnut 1/4x7/8x2 3/8" for the box fronts (I) and two pieces 1/4x7/8x4 1/8" for the box backs (J).

3 Attach the pattern for part K to a piece of translucent plastic, and cut it out. (We used pebbled styrene about 3/32" thick made for a ceiling lighting fixture.)

4 Remove the patterns from all parts. Sand the parts as necessary. Ensure that mating edges (see the Exploded View drawing) are square and straight.

Aha! The pieces are all coming together now

1 Assemble the pencil boxes. Glue a front (I) and a back (J) between two sides (E), as shown in the Exploded View drawing. Let the front and back extend slightly beyond the sides at the top and bottom edges, then clamp. Sand the top and bottom flush.

2 Glue one part G to the front of each part F to make the window trim assemblies. Align the edges flush. Glue the Holmes cutout to part G on the assembly that will face the front, as shown.

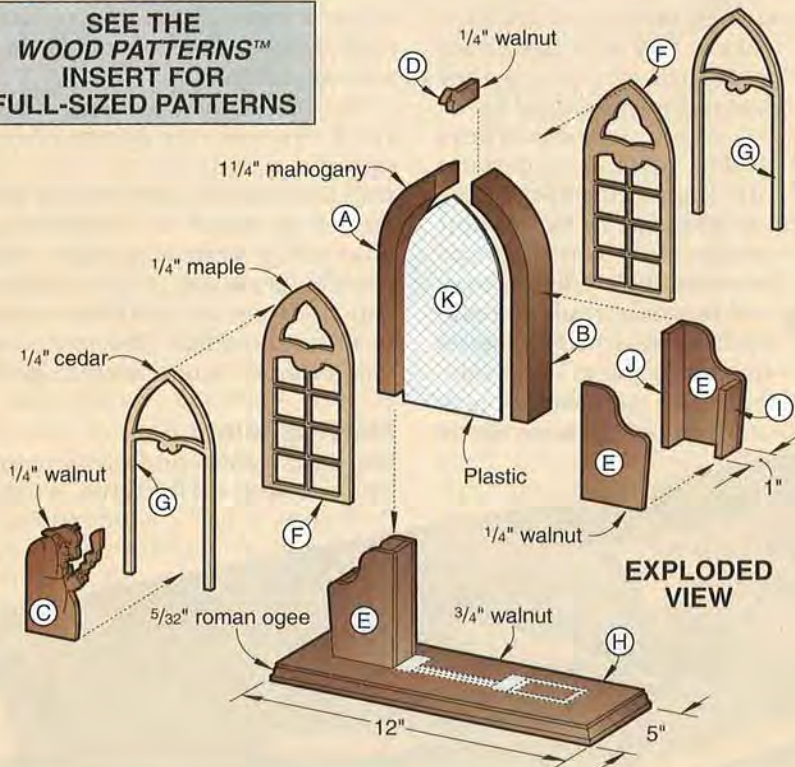
3 Glue a window trim assembly to each side of the plastic glazing (K). Attach the assembly with Holmes in it to the front of the plastic. Cyanoacrylate adhesive (instant glue) will do the trick.

4 Fit the window between the arch sides (A, B). There should be a 1/4" gap for the bird between the arch sides at the top, and the bottom must be flush. Adjust as necessary, then glue the arch sides to the window, making the back flush. (Lay the assembly on waxed paper for easier working.) Place the bird in the gap at the top, but don't glue it yet. Clamp the sides.

5 Center the assembled arch and the two pencil boxes on the base, then glue them in place. After the glue dries, slip the bird into the slot between the arch tops. Position its back flush with the back of the arch, then mark the location for the notch in the bottom of the bird to clear the window point. Cut the notch.

6 Using a small carving gouge, a knife, or by sanding, taper the bird's bill to about 1/16" at the tip and round over the corners of the breast and head. Then, glue the crow (or is it a raven?) into place. Apply a clear finish. 🦉

SEE THE
WOOD PATTERNS™
INSERT FOR
FULL-SIZED PATTERNS



Bill of Materials

Part	Finished Size			Mati.	Qty.
	T	W	L		
A, B* arch sides	1 1/4"	2 1/2"	8 1/4"	Mg	2
C* silhouette	1/4"	3"	4 1/8"	W	1
D* bird	1/4"	1 1/8"	2 3/8"	W	1
E* box sides	1/4"	2 3/4"	4 1/2"	W	4
F* muntins	1/4"	4"	8"	Mp	2
G* trim	1/4"	4"	8"	C	2
H base	3/4"	5"	12"	W	1
I** box front	1/4"	7/8"	2 5/8"	W	2
J** box back	1/4"	7/8"	4 1/8"	W	2
K* window	***	4"	8"	P	1

*Blank size; see pattern for finished dimensions.

**Cut long initially, then trim to finished length in accordance with the instructions.

***Translucent material of any thickness up to about 1/8" will work.

Materials Key: C—cedar, Mg—mahogany, Mp—maple, P—translucent plastic, W—walnut

Project Design: Bill Zaun
Photograph: John Hetherington
Illustrations: Roxanne LeMoine, Lorna Johnson

Tried-and-true Joinery of

Centuries ago, skilled woodworkers were called joiners, and no wonder. They crafted an amazing array of tight-fitting, specialized joints for everything from doors to church pews. If you enjoy a challenge, give one or more of these a try.

English historian and writer Joseph Moxon described joinery in a 1645 essay as, "...an art manual whereby several pieces of wood are so fitted and joined together by straight lines, squares, miters, or any bevel, that they shall seem one entire piece." Moxon's words became a definition that distinguished the joiner (and the cabinetmaker) from the carpenter. And such distinction lingered in England and throughout Europe for centuries.

In Colonial America, however, less distinction was made between a carpenter and a joiner. According to tool historians Paul B. Keabian and Dudley Witney (*American Woodworking Tools*, New York Graphic Society, New York, 1978), tool inventories from early America furnish about the only evidence of the differences between skills—joiners and cabinetmakers not only had more tools than carpenters, they had more specialized tools.

Most woodworkers today, of course, depend on high-tech tools and techniques to craft their projects. The router and its seemingly endless array of bits has replaced the many molding planes owned by joiners and cabinetmakers. Screws, biscuits, and adhesives make

unnecessary the variety of joints early woodworkers had to learn, then rely on. Still, old joinery inspires a certain nostalgia, and a respect and admiration for the problem-solving minds and skilled hands that preceded us.

Mortise-and-tenoned joints

Perhaps used more in the past than any other woodworking joint, the mortise-and-tenon has today been mostly replaced by dowel joints and simple screw joints. Yet even today's woodworker will take the time to shape mortise-and-tenons for a project of heirloom quality.

Mortise-and-tenoned joints appeared in every facet of woodworking at one time or another. That's why the varieties run into the hundreds. Among them, the *fox wedge* (shown *opposite, top left*) supplies great strength when a through-tenon wouldn't look right, such as on a chair leg-and-rail assembly.

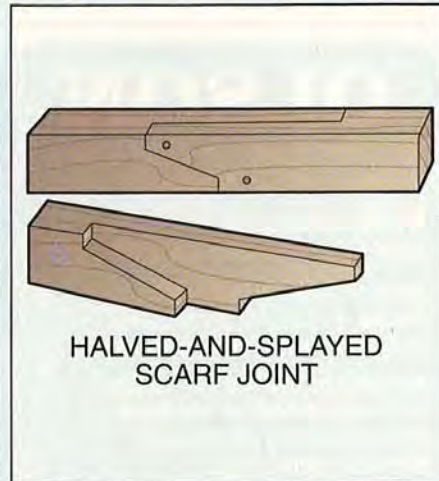
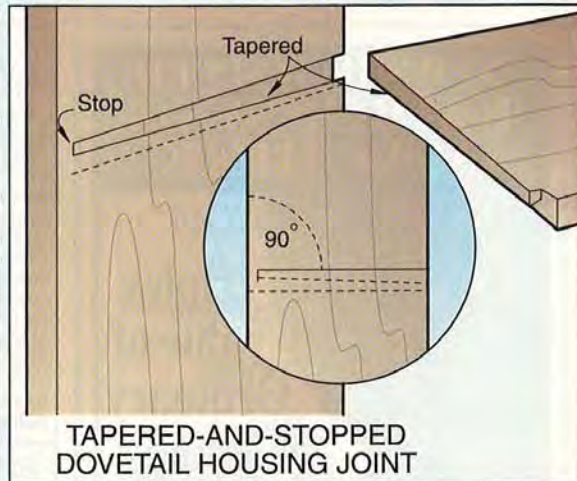
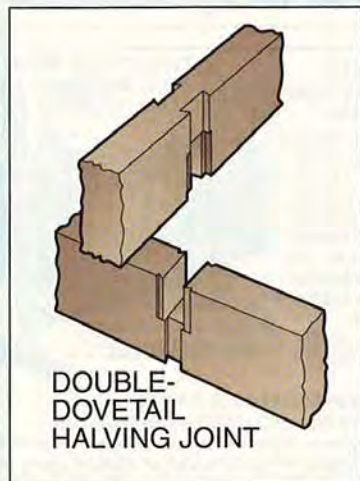
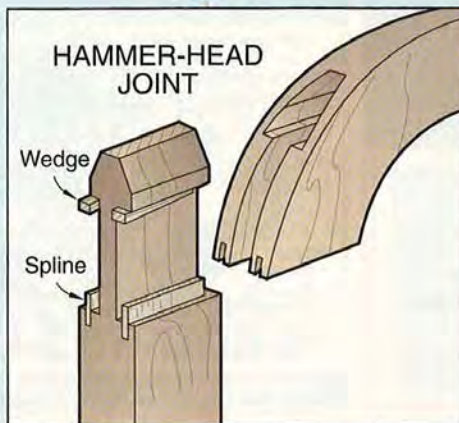
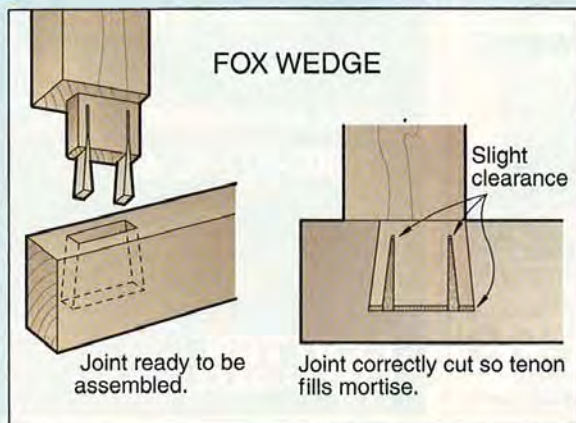
One of the most unusual joints you'll ever see, the *hammer-head* (shown *opposite, top center*) was used in the past to join the arched members of a round-top door to the straight uprights. The wedges draw the joint together, and the tongues hold the wood in at the shoulders. This joint was cut before the curve was shaped.

Halving joints

For light frames and cross members, L-shaped halving joints



yesteryear



prove simple to make. Just remove half the wood from each piece—the front face of one, the rear face of the other—and fasten them together.

To strongly join two pieces of wood together at an angle, say in a latticework or railing, joiners applied the *strong-oblique halving joint* (shown above, top right). For more strength and attractiveness, joiners looked to the *double-dovetail halving joint* (shown above left). There's no doubt that it's a lot of work, but with two dovetails cut in each piece, this strong joint resists stress in two directions. Patternmakers found it useful in designs subject to heavy strains.

Housed joints

Principally used in the construction of stationary cabinet and book shelves, the housed joint was made as either a simple cross-grain dado into which the shelf fitted, or as a dovetail. A dovetail version made for a tighter fit, but at the same time sliding in the shelf proved difficult. The deeper the shelf, the more difficult was the chore.

One rather simple solution to the problem was the *tapered-and-stopped dovetail housing*. Shown above, it was perfect for tall bookcase units in which the sides were inclined to bow outward. The dovetail "locks" the shelf in and prevents this. And because the

taper is cut on the bottom of the shelf, the assembly is always bound to be square.

Scarfed joints

Joining two short boards or timbers to get a longer one usually required a scarfed joint. This was true whether the project was a boat or a barn.

A simple scarf joint required long flat tapers on each end of each piece of wood to be joined. The rule was 6" of taper for every 1" of thickness. The strength was in the gluing surface. The *halved-and-splayed scarf*, above, was an improved version that withstood sideways stress. In timbers, it was pinned; in small projects, glued. ♣

Photograph: John Hetherington

Illustrations: Lorna Johnson

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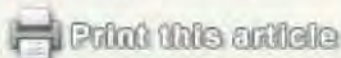
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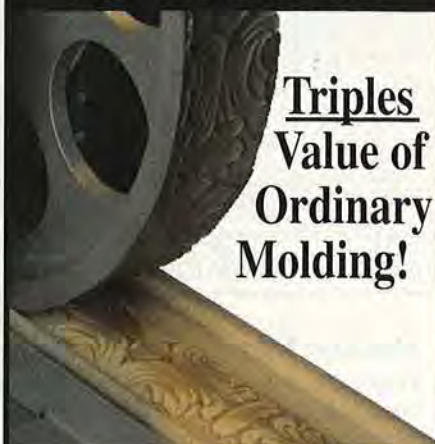
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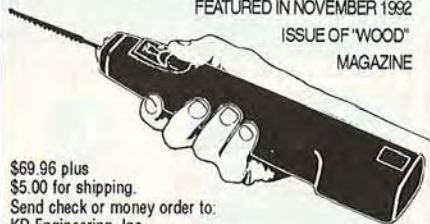
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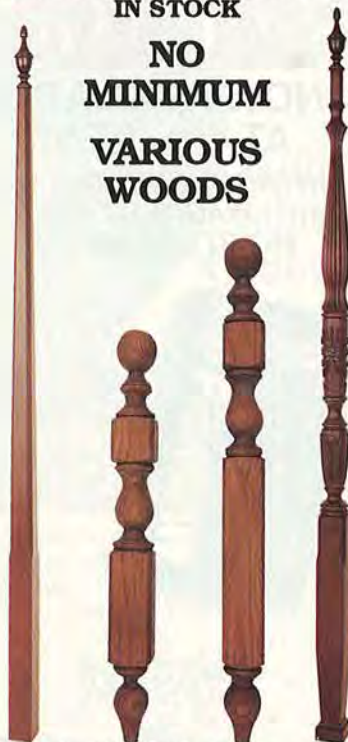
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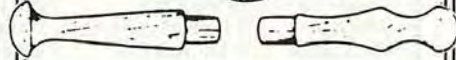
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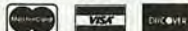
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SOME SURPRISING SAWDUST SOLUTIONS

Swamped by sawdust?
Surrounded by shavings?

Try these practical ways to rid your shop of waste, without adding to your local landfill.

Wax some sawdust for starters

With Christmas right around the corner, now's the time to sack up some sawdust to give away. You'll have to gift-wrap it first, though. As holiday fire starters, your unwanted sawdust will burn as brightly as a long-lasting friendship. Like kindling, these colorful little bits of magic get a fireplace (or campfire) going quickly.

Here's the material you'll need for three or four dozen:

- red, white, and green tissue paper wrap
- a pound of paraffin
- gift ribbon
- a grocery sack full of sawdust

Slowly heat and melt the paraffin in the top part of a double-boiler on the stove. Turn the heat down just enough to keep the paraffin liquid, and place a cookie sheet nearby. Then, cut the tissue paper into 10" squares.

For each fire starter, ladle about one-half cup of sawdust into the center of a tissue square. Wrap the tissue tightly around the sawdust and twist the loose ends together. Tie a piece of gift ribbon around the twist.

Dip each wrapped sawdust ball into the paraffin until saturated (about half a minute). Then, set it on the cookie sheet to harden. A dozen of these in mixed colors makes a welcome gift.

Send it away to a manger

Livestock owners welcome wood shavings and sawdust as bedding

material for their animals. And it doesn't make any difference whether your wood waste is softwood or hardwood. Both work the same. Don't, though, pass along any walnut, especially to horse lovers.

"Walnut sawdust, chips, or shavings will kill horses," says Brian Andrew, owner of Andrew's Pallet and Wood Fiber Co. in Des Moines, Iowa. At Andrew's, walnut is always excluded from bedding that they sell in quantity to farmers and others who raise livestock. "There's a chemical in walnut that's released when horses urinate on it. Then, it's absorbed through their hooves and into their system." Brian adds that he hasn't heard of walnut having the same effect upon other animals. But, it's much better to be safe than sorry.

Help your garden grow

If you or your friends maintain a garden, you have a nearby depository for your wood waste. But you shouldn't use sawdust or wood shavings indiscriminately.

Andy Baker, a wood-waste researcher at the USDA Forest Service's Forest Products Laboratory in Madison, Wisconsin, explains some cautions. "Bacteria requires nitrogen to break wood down. And in the garden, the only place it can get it is from the soil. So, you'll have to add a nitrogen-rich fertilizer to replace the loss," he notes. "For already acid soils, adding wood may be too much."

And, there's a difference between shavings and sawdust, adds Andy. "In my garden, I till sawdust in to make a finer loam. It breaks down quicker, too. Shavings, on the other hand, can take more than a year to deteriorate. They're best used for mulch." He also notes that wood waste need not be aged. You can use it fresh from the shop, although Andy does apply his sawdust in the late fall, then digs it in deep with a tiller come spring planting time.

Support local arts and crafts

Some of the most beautiful colors that potters can achieve on glazed clay result from sawdust. That's right, sawdust.

Potters who produce pit-fired vessels or those who use an ancient Japanese smoke-coloring technique called *raku* rely heavily on sawdust and/or wood shavings as combustion material. So, if there are any potters in your area, they're likely to haul away all the fine waste that you can produce.

Save some for the shop

Some savvy woodworkers, especially woodturners, maintain a collection of sawdust from different species stored in jars. This multi-hued sawdust inventory comes in handy as filler to hide holes, cracks, imperfections, and mistakes. Just mix the sawdust with epoxy for a perfect color match to the wood. ♣

Photograph: King Au



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NN830	3 HP Dust Collector	449
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Which is the best direction to move the router when cutting?

I have seen conflicting information about the direction to move my router while using it. The router's manual says to move the tool clockwise around the wood, or with the rotation of the cutter.

Two router books I have advise me to move the tool in the opposite direction, or into the rotation of the router bit. The authors say this gives better control of the router.

However, when I tried this second method, the router raised a long splinter on the edge of the tabletop I was shaping. Who's right?

—Joseph M. Just, M.D., Ely, Minn.

We prefer to move the router counter-clockwise around a board. This way, we're feeding the wood into the rotation of the router bit, and have more control of the tool. This is of particular importance when you are moving the router along a straight-edge or a template. A router moved clockwise or with the bit rotation may jump away from the guide when the bit strikes a knot or other dense area of wood.

Here are some ways to reduce the chances of chipping or raising splinters while cutting against the router-bit rotation:

1 Make multiple shallow cuts with the router rather than trying to do the job in one pass. Finish the routing with a light clean-up cut.

2 Use sharp, carbide-tipped router bits. A dull bit will have a much greater tendency to grab and tear out splinters from the edge you are routing.

3 Plan the assembly of a panel or frame to minimize the amount of against-the-grain cutting. By routing with the grain, any splinters will cleanly separate from the workpiece without extending into the wood as shown *right*.

4 Move the router more slowly when cutting against or across the grain. This allows each pass of the router-bit cutting edge to remove less wood, resulting in a cleaner cut with a lower chance of tearing out splinters from the edge.

But I wanted a square frame!

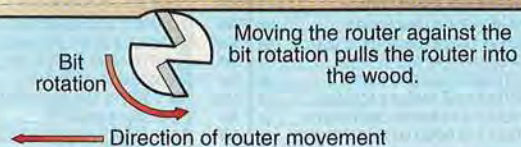
I was trying to make a picture frame from zebra-wood, but every piece I tried to rip turned into a burned, bent and twisted board. The kerf kept closing as soon as it passed the blade, and the strip of wood developed a curve as it came off the saw. I am using a new blade, and the fence is parallel to the blade. Help!

—Ron Spoto, LaVerne, Calif.

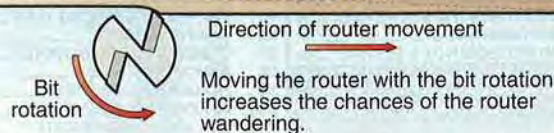
We suspect that you got some zebra-wood with grown-in or dried-in stresses. As soon as you

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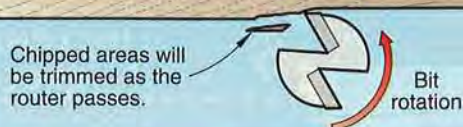
CORRECT ROUTER MOVEMENT



INCORRECT ROUTER MOVEMENT



CORRECT GRAIN ORIENTATION



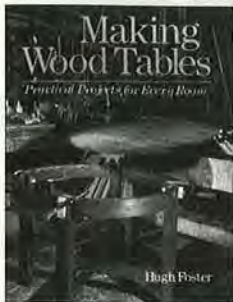
INCORRECT GRAIN ORIENTATION



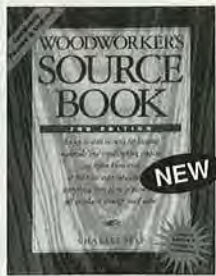
changed the balance of these stresses by cutting the board, the pieces began to curve. Although this can happen in almost any wood, it's more likely to occur in the harder and denser species such as zebra-wood.

To solve this problem, first rip the board into pieces wider than needed. If practical, cut the pieces to within 1" of finished length, and about 1/4"-1/2" wider than the final width. Stack and sticker these pieces for a few days to allow them to adjust to the stress changes. Then, cut them to final size.

Continued on page 98



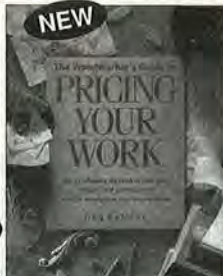
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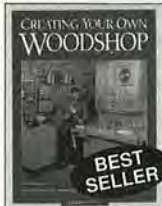
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The Dust Eliminator Workbench pictured with optional manometer gauge.

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Circle No. 1295

ASK WOOD

Continued from page 94

How do I choose a tablesaw?



I want to become more involved in woodworking, but I question spending hundreds of dollars on a table-saw. What "rule of thumb" or criteria should I use in making a decision on which saw to buy?

— Doug Forsberg, Gagetown, Mich.

For most of us, cost often becomes an important consideration when buying a tool. However, experience has shown the staff at WOOD® magazine that we usually get what we pay for when we purchase tools. The more-expensive heavy-duty machines generally are more accurate and will last longer than the lighter-duty saws. With that short sermon out of the way, here are some other factors to consider when purchasing a tablesaw:

1. The amount of space you have for the tablesaw. Woodworkers with smaller shops and limited space may find themselves happier with a benchtop tablesaw. You will sacrifice some accuracy with this type of saw, and cutting sheet goods and long boards will be more difficult than with a larger saw. However, these saws take up less space, can be moved from place to place with more ease, and generally cost less than floor-model tablesaws.

2. Match your saw to your work needs. If you build just a few projects a year, primarily out of 3/4" or thinner wood, a light- (benchtop) or medium-duty (1 1/2 hp) saw will suffice. If you do daily work with hard and thick woods, we recommend that you purchase a heavy-duty (3 hp) tablesaw.

3. Materials used to make the saw affect the cost. We prefer cast iron for the tabletop and the blade-carriage assemblies. We choose anodized cast aluminum as second for saw tabletops, and cast aluminum second for blade carriages, followed by stamped steel. But well-made cast-iron parts cost more than cast-aluminum parts, which, in turn, cost more than stamped-steel pieces.

4. Rip fences and guides indicate tablesaw quality. The better tablesaws have the rip fence mounted on a tubular steel guide. Here are some other fence guide choices, in order of decreasing cost (and accuracy): angle-iron; flatiron; and guides cast or formed into the tabletop.

5. Tablesaw price reflects the type of motor. Costlier tablesaws generally use an induction-type motor that's designed to operate for long periods of time under a heavy load. Most benchtop tablesaws have a lighter-duty, universal motor, like those found in portable power tools. For more information, look at the article "\$300 to \$700 Tablesaws" in our February 1994 issue. ♣

Model	Description	List	Sale
23-700	Wet/Dry Grinder.....	234	155
23-710	New Sharpening Center.....	210	165
23-680	6" Bench Grinder 1/4 HP.....	86	69
11-950	8" Drill Press.....	129	89
31-050	1" Bell Sander 2.0 amp.....	104	75
31-460	4" Bell/Disc Sander.....	198	129
40-550	16" 2 speed Scroll Saw.....	266	169
40-560	NEW 16" Scroll Saw.....	153	115
11-990	12" Bench Drill Press.....	276	184
11-990	32" Radial Bench Drill Press.....	399	305
43-505	1/2" Bench Router/Shaper.....	399	295
22-540	1/2" Bench Top Planer.....	399	295

FREE SET of extra knives included!

36-220	10" Compound Mitre Saw.....	350	215
28-180	Bench Band Saw.....	432	258
29-190	NEW 12" Band Saw.....	365	235
40-640	20" Bench Scroll Saw.....	466	295
37-070	NEW 6" Visc Bench Joiner.....	337	258
14-650	Hollow Chisel Mortiser.....	468	285
46-700	12" Wood Lathe.....	648	449
33-990	10" Radial Arm Saw.....	818	495
37-280	6" Motorized Jointer.....	488	329
33-055	8-1/4" Sawbuck comp w/lgs.....	865	689
36-400	8-1/4" Compound Mitre Saw.....	224	149
36-905	30" Unifence.....	385	249
36-960	50" Delta Unifence.....	525	305
36-755	10" Tilling Arbor Saw.....	1264	1039
17-900	16-1/2" Floor Drill Press.....	462	314
33-060	"Sidelock" Miter Saw.....	510	389
37-190	6" Deluxe Jointer.....	554	479
36-275	8-1/4" Builders Saw.....	444	265
36-210	10" Compound Mitre Saw.....	438	255
36-070	10" Mitre Saw.....	284	165
34-555	Sliding Table.....	459	289
22-661	6" Jointer w/mobile base.....	1513	1239
22-675	NEW DC380 15" Planer.....	1439	1275
37-154	6" Jointer w/mobile base.....	1451	1239
34-444	Contractors Table Saw.....	812	659
34-444	34-444 Saw w/30" Unifence.....	1200	829

above saw comes w/mobile base

28-283	14" Band Saw w/stand.....	910	779
36-250	NEW 10" Slide Compound Saw.....	825	489
36-230	NEW 12" Compound Mitre Saw.....	480	359

above saw comes w/mobile base & fence

36-250	NEW 10" Slide Compound Saw.....	825	489
36-230	NEW 12" Compound Mitre Saw.....	480	359

MILWAUKEE TOOLS

5527	NEW Sawzall with case.....	320	178
6528	above Sawzall w/wired cord.....	314	178
0408-6	12V Drill w/keys chuck & 2 batt.....	172	128
0406-1	9.6V Drill Kit w/ 2 batteries.....	332	195
0224-1	3/8" Drill 4.5 amp magnum.....	227	138
0234-1	1/2" Drill 4.5A mag 0-850 rpm.....	237	139
0235-1	1/2" Drill w/keyless chuck.....	237	139
0244-1	1/2" Drill 4.5A mag 0-600 rpm.....	237	139
0228-1	3/8" Drill 3.5 amp 0-1000 rpm.....	198	115
0222-1	3/8" Drill 3.5 amp 0-1000 rpm.....	198	115
0375-1	3/8" close quarter Drill.....	237	139
0379-1	1/2" close quarter Drill.....	268	159
6546-1	cds Screwdr 200 & 400 rpm.....	141	84
6547-1	6546-1 w/bits, 1/4" chuck, & case.....	117	65
5399	1/2" D-handle Hammer Drill Kit.....	332	194
5097	Original Sawzall with case.....	264	152
5397-1	3.6" var. spd Hammer Drill Kit.....	255	144
5371-1	1/2" var. spd Hammer Drill Kit.....	340	188
3107-1	1/2" v/spd right angle Drill Kit.....	399	228
6754-1	Drywall Gun 0-4000 5.4 amp.....	196	114
3300-1	1/2" var. spd right angle Drill.....	356	214
5680	Router 2 HP w/ 1/4" & 1/2" collets.....	362/165	215
6142	4-1/2" Grinder w/case & access.....	208	125
6749-1	Drywall Gun 0-2500 5.4 amp.....	218	132
6385	7-1/4" Circular Saw 13 amp.....	218	125
6386	6385 w/fence & carbide blade.....	228	129
6387	6385 w/fence, carb. blade, & case.....	249	142
6377	7-1/4" Worm Drive Saw.....	339	195
6256	Top Handle Jig Saw.....	264	158
6480	10" Mitre Saw.....	444	295
6491	8490 w/ carbide blade & bag.....	532	325
6494	10" Compound Mitre Saw.....	444	295
0422-1	NEW 12V Hammer Drill w/2 batt.....	340	219
0431-1	NEW 12V Drill w/ 2 batteries.....	385	229

FREUD CARBIDE TIPPED SAW BLADES

Item	Description	Teeth	List	Sale
LU72M010	Gen Pur. A.T.B.10" 40	69	42	42
LU82M010	Cut-off 10"	60	93	45
LU84M011	Comb 10"	50	78	42
LU85M010	Super Cut-off 10"	80	115	59
LM72M010	Ripping 10"	24	69	38
LU73M010	Cut off 10"	60	84	42
LU87M010	Thin Kerf 10"	24	72	42
LU88M010	Thin Kerf 10"	60	88	45
LU98M010	Ultimate 10"	80	128	68
LU91M010	Compnd Mitre 10"	60	88	54
F410	NEW Quiet Blade 10"	40	95	49
F810	NEW Quiet Blade 10"	60	135	74
TK303	7-1/4" Finishing	40	38	25
TK906	10" Combo	50	52	32
SD508	8" Dado - Carbide	20	119	62
SD508	6" carbide w/case & shims	280	185	105
SD508	6" carbide w/case & shims	344	168	105
F10	2-1/8" x 3/4" Biscuit 1000 Qty	43	29	23
F20	2-3/4" x 1" Biscuit 1000 Qty	45	29	23
FA	Assorted Biscuits 1000 Qty	45	29	23
FB100	16 piece Forsner Bit Set	338	189	105
94-100	5 pc. Router Bit Door System	320	159	85
TR215	10" Slide Cmpd Mitre Saw	688	369	215

The following tool has a \$20.00 rebate thru 3/31/96

The following tools have a \$30.00 rebate thru 3/31/96

JS100	Biscuit Joiner w/ case	334	168
JS102	Biscuit Joiner w/fence & case	355	179

Model	Description	List	Sale
6172DWE	3/8" v/spd Drill Kit w/ 2 batt.....	220	109
6095DWE	3/8" v/spd Saw Kit 9.6 volt.....	270	148
ML900	Incandescent Flashlight 9.6V.....	36	27
DA391DW	3/8" angle Drill Kit 9.6 volt.....	312	179
6012HDWE	2 speed Drill Kit w/2 batt.....	243	135
6095DWE	6095DW Drill Kit w/2 batteries.....	270	139
63005D	6095DW Drill only & case.....	79	30
632002-4	9.6 volt Battery.....	47	30
632002-4	7.2 volt Battery.....	39	28

NEW CORDLESS BATTERIES

Model	Description	List	Sale
6202DWDG	9.6V 3/8" Drill Kit w/ LED batt.....	390	219
6212DWDG	12V 3/8" Drill Kit w/ LED batt.....	412	228
6312DWDG	12V 1/2" Drill Kit w/ LED batt.....	432	239
6201DWH	9.6V 3/8" Drill Kit w/ 2 batt.....	351	175
6211DWH	12V 3/8" Drill Kit w/ 2 batt.....	368	185
6311DWH	12V 1/2" Drill Kit w/ 2 batt.....	399	205

5007NBA	7-1/4" Saw w/electric brake.....	263	138
9900B	3" x 21" Belt Sander w/bag.....	344	179
9924DB	3" x 24" Belt Sander w/bag.....	329	189
4031BV	Orb. var. spd Jig Saw 3.5A.....	292	155
JR3000V	var. speed Recip Saw w/case.....	252	139
9820-2	Blade Sharpener.....	394	215
N1900B	3-1/4" Planer with case.....	244	134
N9514B	4" Disc Grinder 4.6 amp.....	111	65
DA04552	1/4 sheet Pad Sander w/bag.....	98	55
DA3000R	3/8" Angle Drill.....	314	185
270W8	8-1/4" Table Saw.....	585	309
2711	10" Table Saw with brake.....	1067	599
6405	3/8" Drill Rev. 0-2100 rpm.....	112	68
6150LVR	3/8" Drill Rev. 0-1050 rpm.....	168	98
6103BR	1/2" Drill Rev. 6 amp.....	280	149
9401	4" x 24" Belt Sander w/bag.....	378	239
4303C	var. speed Orbital Jig Saw.....	351	205
5077B	7-1/4" Hypoid Saw.....	281	155
5007NB	7-1/4" Circular Saw 13 amp.....	232	124
5007NBK	5007NB Saw w/ plastic case.....	129	65
LS1011	10" Slide Compound Saw.....	946	525
LS1211	NEW 12" Slide Cmpd Saw.....	1550	795
3901	NEW Plate Joiner Kit.....	372	209

Model	Description	List	Sale
SNF1+	Finishing Nailer 1" - 2" w/ case.....	448	335
SN325	Nailer 1-7/8" - 3-1/4".....	665	419
SLP20	New Finer w/case 5/8" - 1-5/8".....	399	278
SKS	Stapler 5/8" - 1-1/2".....	390	275
SN70	Fram. Nailer Clip Hd 2" - 3-1/2".....	690	479
SN60	Fram. Nailer-Full Hd 2" - 3-1/2".....	638	449
SN65	15% more power than SN60.....	709	479
SN40	NEW Finish Nailer 1-1/4" - 2-1/2".....	319	189

Model	Description	List	Sale
SN60S-1	Slick Nailer.....	Super Sale	355
RN45	Cool Roof Nailer 3/4" - 3-1/4".....	845	395
NOF92N	Finishing Nailer.....	600	335
BT35-2	Brad Tacker 5/8" - 1-3/8".....	275	159
BT35-2K	BT35-2 w/ case, oil, & brads.....	299	169
CWC100	1 HP Pancake Compressor.....	463	289
MHIFS	Flowing Stapler 15 gauge.....	831	529
S325X-1	Finish Stapler - 1/2" - 1-3/8".....	275	159
S325X-1K	S325X-2 w/ case & oil.....	269	169

Model	Description	List	Sale
2735-04	12 volt cordless Drill Kit.....	249	144
2736-04	2735-04 w/ keyless chuck.....	269	148
1605-02	Biscuit Joiner w/case.....	221	135
3400	10" Table Saw - Bench Top.....	270	189
77	Famous 7-1/4" Worm Drive Saw.....	144	74
77M	NEW 77 Mag Worm Saw - 2 lbs lighter than Model 77.....	159	95

PANASONIC CORDLESS

EY6205EQK	Same as EY6205BC but comes with ironman battery.....	368	195
EY6207BC	NEW 12 volt 1/2" Drill w/keyless chuck var. speed w/ 15 min. charger & case.....	420	222
EY6282EQK	Var. spd 9.6 volt Drill with 15 min. charger, case & NEW Ironman battery.....	315	169
EY62821DKW	9.6 volt Drill Kit w/2 batt.....	395	165

NEW PREDATOR DRILLS

EY6181CRKW	NEW 9.6V Compact Drill Kit w/2 batt - 10% more pow than EY62821DKW.....	305	165
EY6150CRKW	NEW 12 volt Drill Kit with 2 batteries, 1 hour charger, & case.....	359	188
EY6100CQKW	Same as EY6100CRKW but has 15 minute charger.....	420	189
EY6100EQK	NEW 12 volt Drill Kit with NEW Ironman battery, 15 min. charger, & case.....	375	195
EY6100EQKW	Same as EY6100EQK but w/2 Ironman batteries.....	473	198

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IM325	Impulse Framing Nailer Kit.....	849	548

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List 194 Sale 104
0635SK
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Model	Description	List	Sale
DW364	7-1/4" Circ Saw w/broke.....	285	158
DW945K-2	12V Cds Drill Kit w/2 batt.....	309	185
DW610	1-1/2 HP 2 handle Router.....	274	149
DW411	1/4 sheet Palm Sander.....	97	58

FINISHING TOUCHES

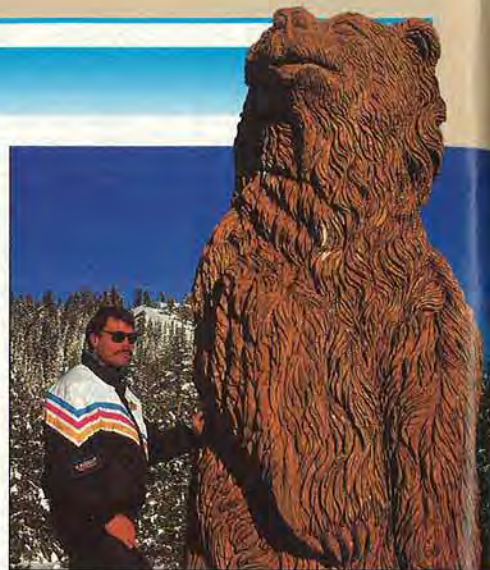
CARVER'S WAIT FOR PET PROJECT ENDS

Most woodworkers have a stockpile of wood awaiting just the right use. None can compare, though, to what California chain-saw carver Myles Tucker kept squirreled away for 10 years.

In 1984 Myles discovered a huge sugar-pine log at the bottom of a ravine in the Sierra Nevada Mountains near his home. It seems that the loggers who cut the 32'-long, 5'-diameter log from the mountainside some 25 years before couldn't figure out how to get it out. But Myles and a logger friend with winches and steel towers for running cable did.

Myles, 55, whose work has been recognized by the Smithsonian Institution, stored the log at his home until 1994. That's when Bear Valley, an all-season family resort situated between Lake Tahoe and Yosemite National Park, commissioned him to carve a pair of giant bruins to flank the main entrance.

From the salvaged log, Myles created two brown bears, each 16' tall and weighing about 13,000 pounds. Known for his attention to detail, Myles chain-sawed and chiseled plenty of realism into them, as shown *right*.



"While a bear has hair all over its body, it comes in different lengths and coarseness," says Myles Tucker, standing by one of the bears he crafted with chainsaws and chisels.

How fast trees grow in the South

The Southern Pine Council and the U. S. Forest Service calculate that southern forests grow enough every 24 hours to produce the equivalent in softwood lumber for 6,000 new homes. They base their figures on the assumption that an average home of 2,000 square feet requires 14,000 board feet.

More than 24 billion trees grow on 80 million acres of timberland in the 12 southern states, reports the council. Most of these trees mature in 35 years or less, and provide material for both lumber and paper.

ONCE-WET WOOD WORKS WELL

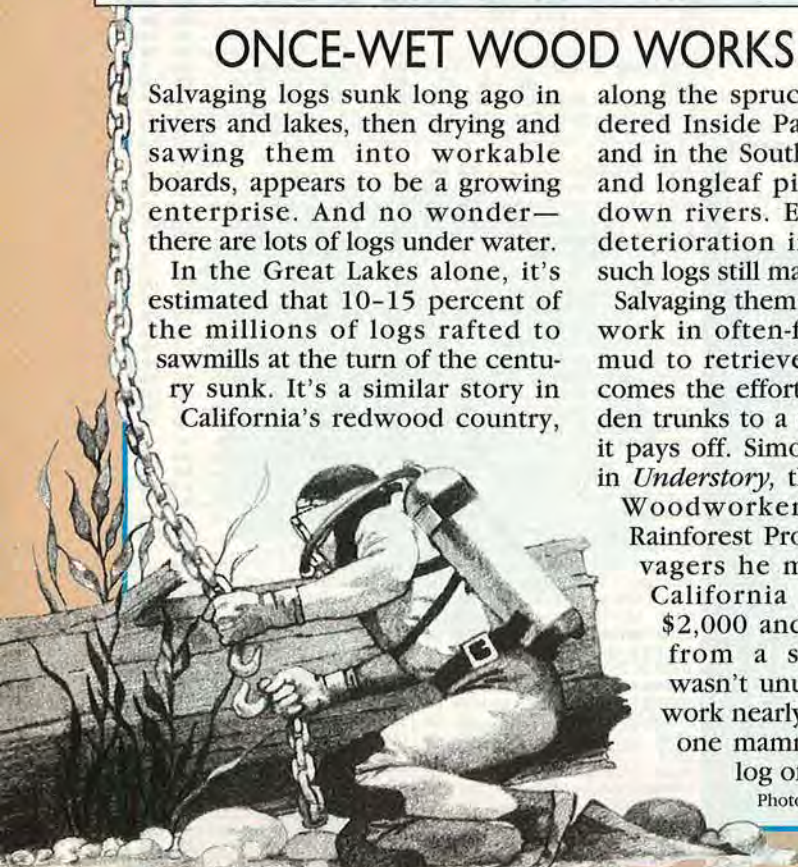
Salvaging logs sunk long ago in rivers and lakes, then drying and sawing them into workable boards, appears to be a growing enterprise. And no wonder—there are lots of logs under water.

In the Great Lakes alone, it's estimated that 10-15 percent of the millions of logs rafted to sawmills at the turn of the century sunk. It's a similar story in California's redwood country,

along the spruce and cedar-bordered Inside Passage to Alaska, and in the South, where cypress and longleaf pine were floated down rivers. Except for some deterioration in the sapwood, such logs still make good lumber.

Salvaging them isn't easy. Divers work in often-frigid water and mud to retrieve the logs. Then comes the effort to haul the sodden trunks to a drying place. Yet it pays off. Simon Watts, writing in *Understory*, the journal of the Woodworkers Alliance for Rainforest Protection, says salvagers he met in Northern California got between \$2,000 and \$6,000 per log from a sawmill. But it wasn't unusual for them to work nearly a month to raise one mammoth, old-growth log of redwood.

Photograph: Courtesy Carter/Waxman Illustrations: Jim Stevenson



Create a clock, and win a trip to Germany!

Klockit, a Wisconsin-based supplier of clock movements, parts, and kits, celebrates its 25th anniversary by offering a trip for two to Germany as grand prize in its Create-A-Clock contest. First-through third-place winners in each of six categories win \$50 to \$100 gift certificates.

According to a spokesperson for Klockit, entries will be judged in the following clock categories: wall, mantel, floor, original, craft, and humorous. Only category winners will be eligible for the grand-prize trip.

To participate, send a color photograph of your entry by March 15, 1996 to Klockit, P.O. Box 636, Lake Geneva, WI 53147. Include your name, address, telephone number, and the category you are entering on the back of the photo. For more contest information, call 800/556-2548.

An original, corner-hugging clock by Dallas' Frank Eastman was a category winner in Klockit's 1995 contest.



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FREE Buy the Contractor Saw with a 30" Unifence and we'll put it on wheels for free. With a free mobile base for both the saw and the Unifence extension, you'll be rolling first class.

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FREE 14" Band Saw with enclosed stand comes with a free mobile base, plus a free 18" fence. The ultimate deal on wheels.

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DEALS ON WHEELS
LIMITED TIME

We all love those Delta machines. But sooner or later, something's got to give. There's only so much shop space before we hit our limit.

Now here's an idea that just might move you. For a short time only, we're making it easier than ever to roll one of these beauties into your shop and park it anywhere you want.

Just buy any one of the five machines pictured here, and we'll let you slip a hefty mobile base underneath it for free. A genuine Delta Accessory that makes these valuable machines even better. So you'll be able to rearrange your space on a daily basis, if you want. Or move one machine to work in closer proximity to a companion piece. Effortlessly. (Who knows, you might even have room for *two* new machines.)

We're rolling out our *Deals On Wheels* promotion for a limited time only. And *only* at participating Delta dealers. And if you look closer you'll notice that several of these tools even have an extra goody to make an already great value even greater.

If you're ready to roll Delta Quality into your shop, call for the name of your nearest participating dealer. Delta International Machinery Corp., 800-438-2486. In Canada, 519-836-2840.

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Ram Sport is one emotionally expressive ride. But its practical benefits come through loud and clear as well.

First and foremost, Ram Sport is a Dodge Ram. The truck that changed the rules.



So of course, along with those neat looks, cool fog lights and beefy tires, it has a standard driver airbag and a roomiest-in-class interior. There's also a 40/20/40 bench seat with fold-down

center console. And because it's a Dodge, Ram Sport draws from our Magnum[®] engine lineup—overall the most powerful line of truck engines on the planet.

Here's another reason you'll be glad Ram Sport is a Dodge: Ram has better resale value than Ford, Chevy or GMC full-size pickups.*

Ram Sport is available in regular and Club Cab models. For still more information, give us a shout at 1-800-4-A-DODGE.



America's Truck Stop



The New Dodge
A DIVISION OF THE CHRYSLER CORPORATION

Always wear your seat belt for a fully effective airbag. *We calculated resale using avg. trade-in values for '94 full-size models vs. MSRP's; published in Jan.-July '93 N.A.D.A., Official Used Car Guide® monthly editions. Use of these values does not constitute NADA's endorsement.

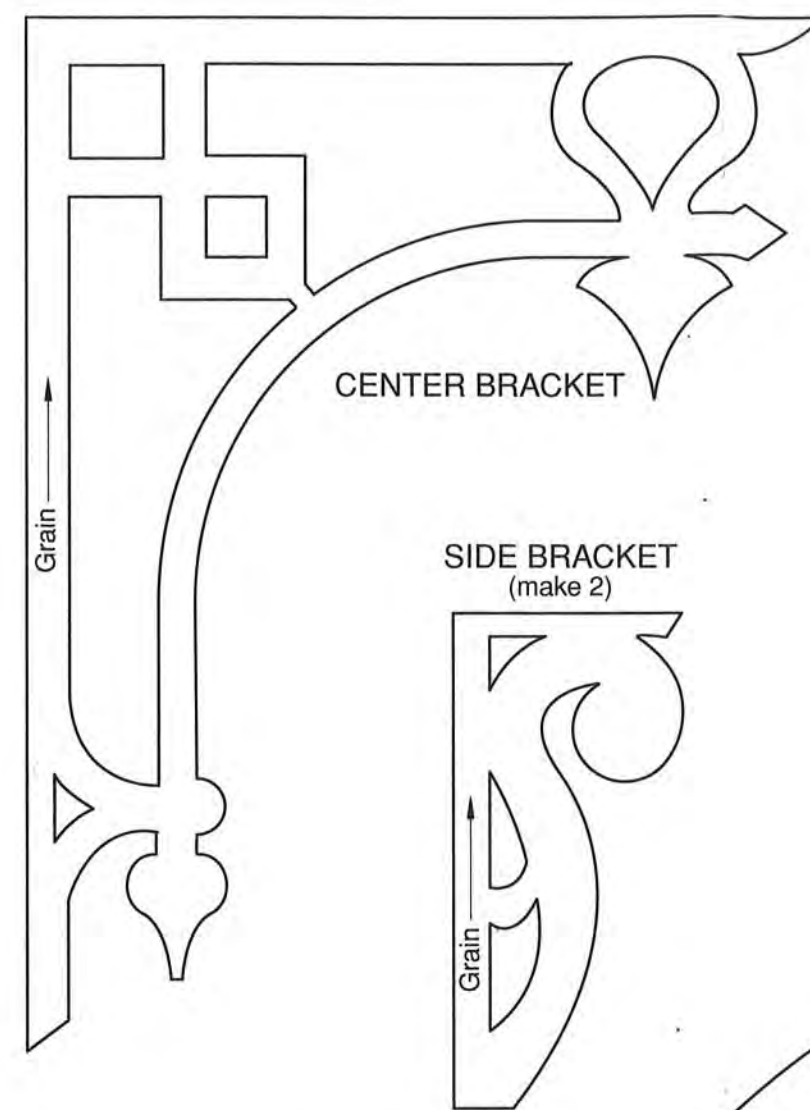
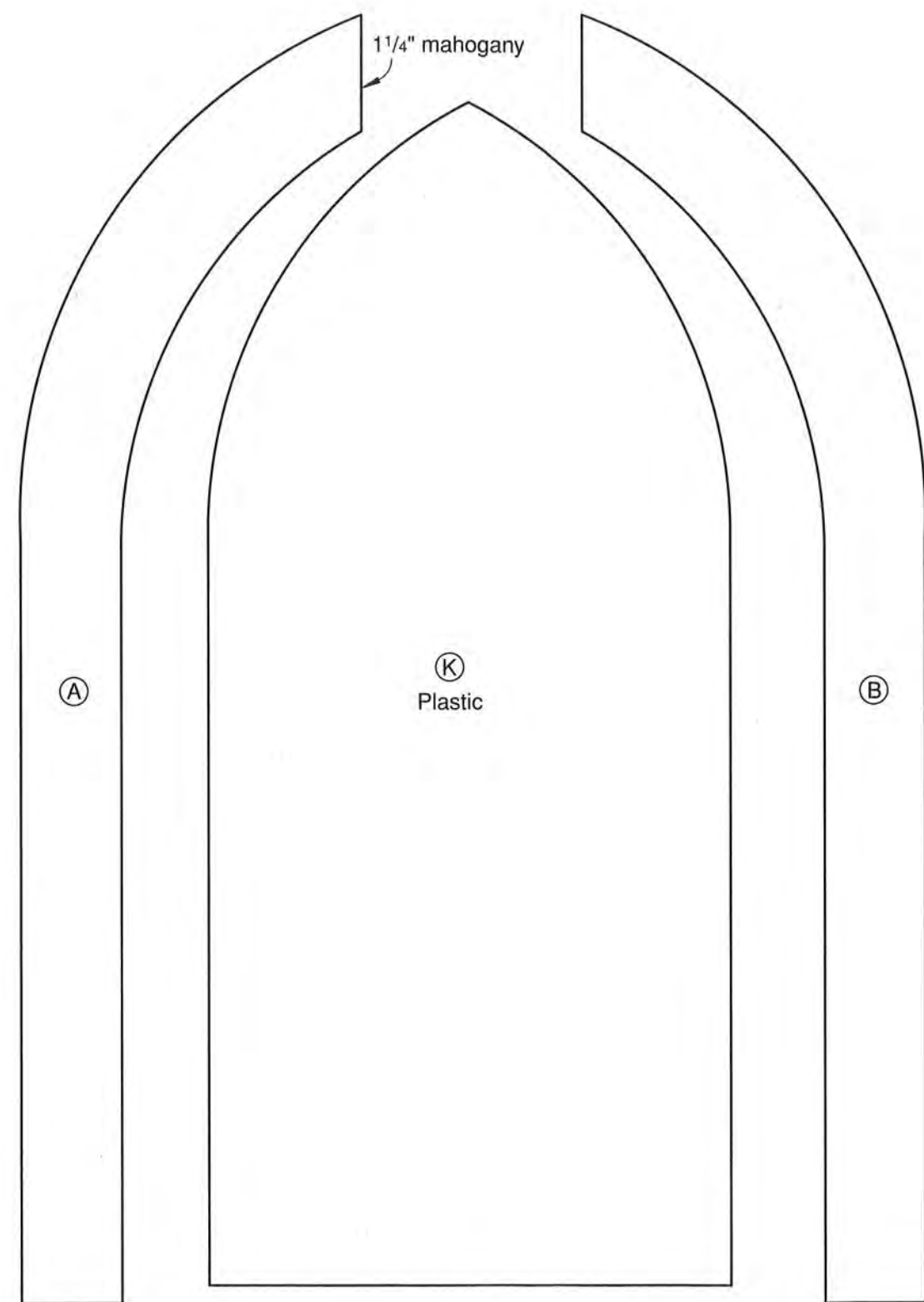
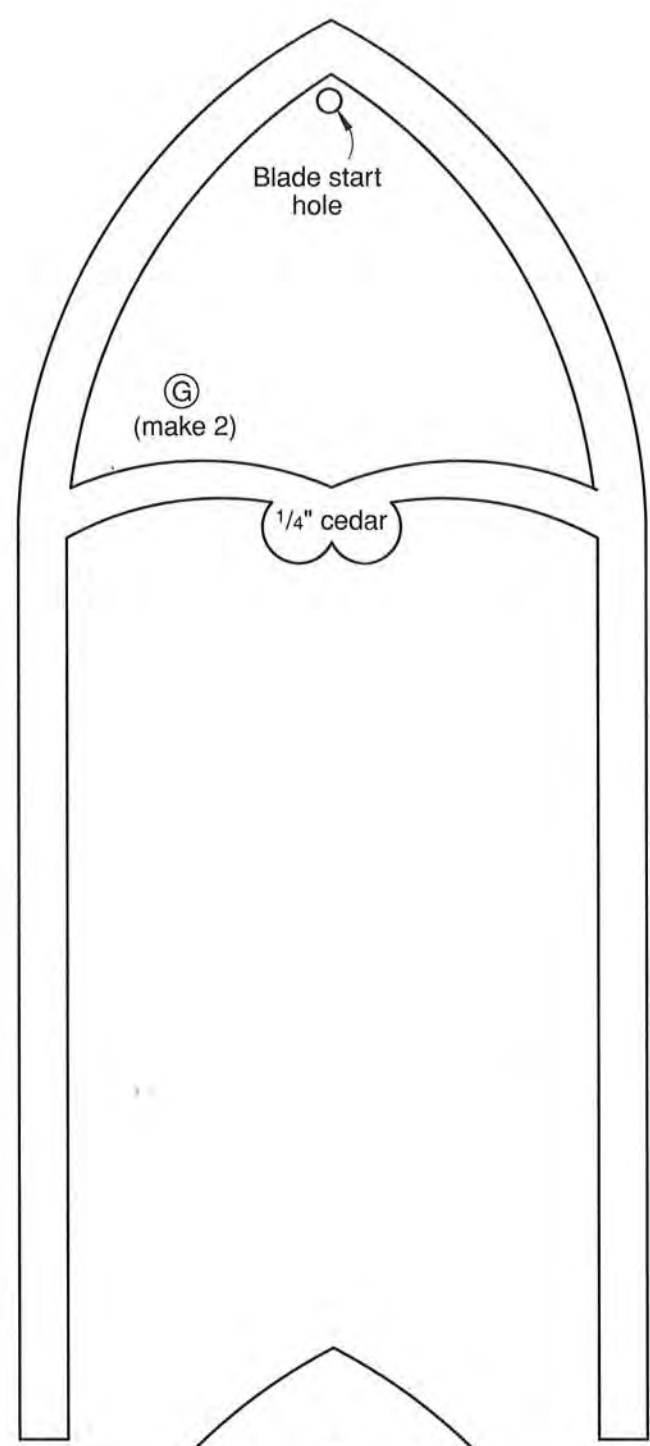
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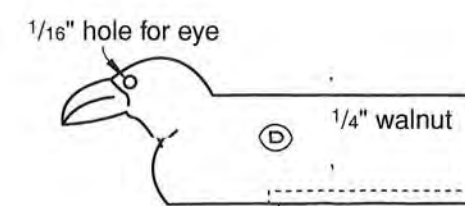
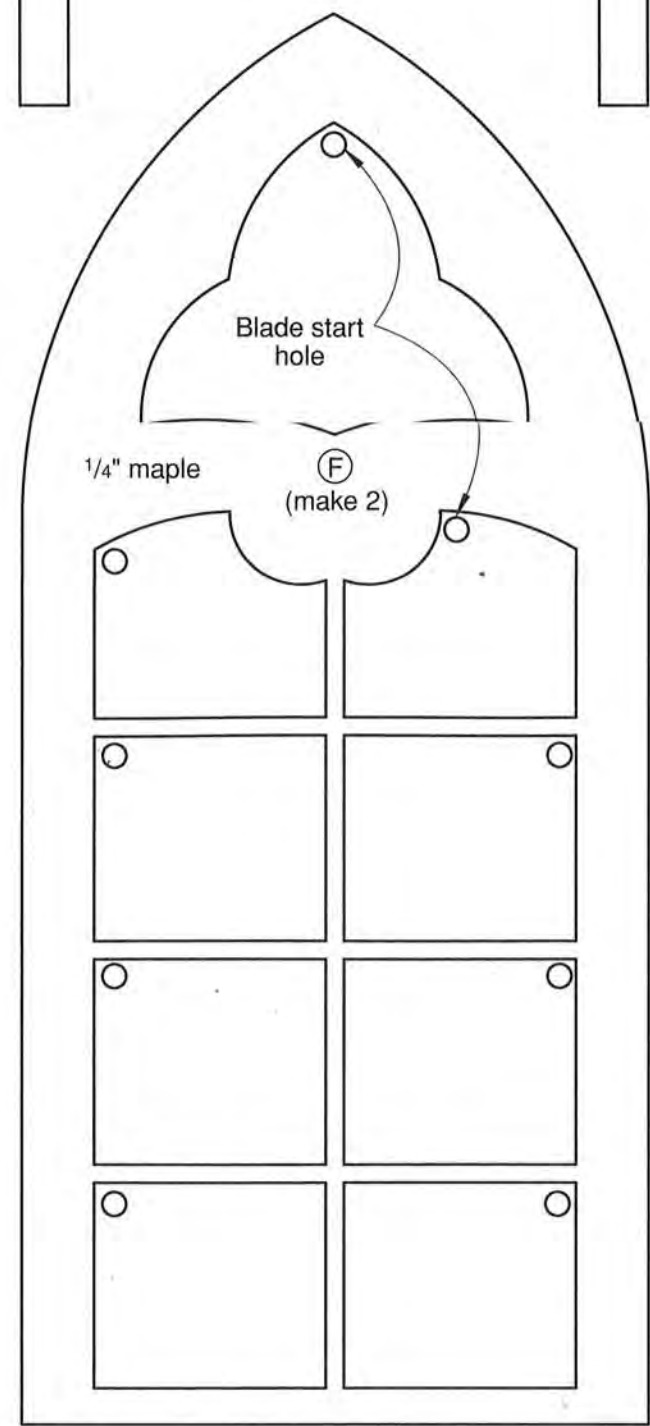
JANUARY 1996

ISSUE 85

Dear Reader: As a service to you, we've included full-sized 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.

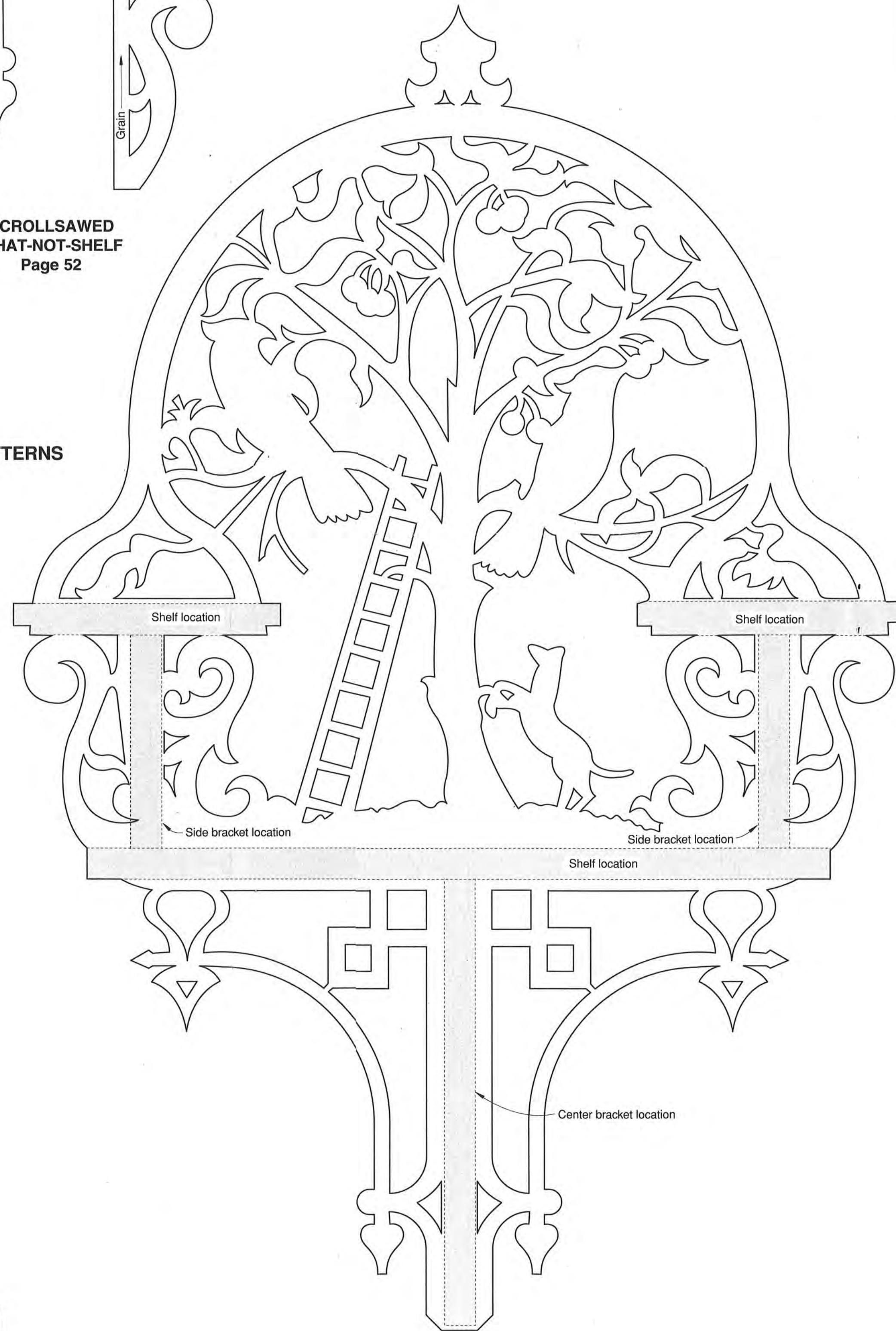
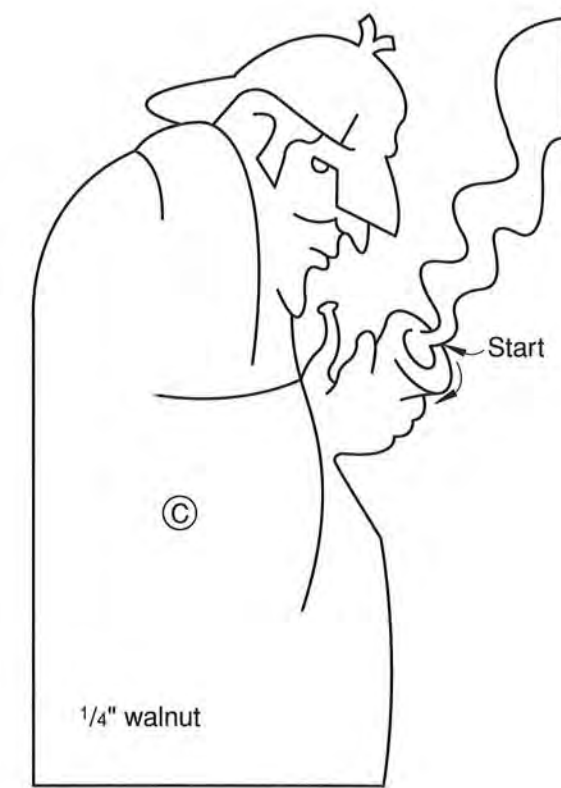


SCROLLSAWED WHAT-NOT-SHELF Page 52

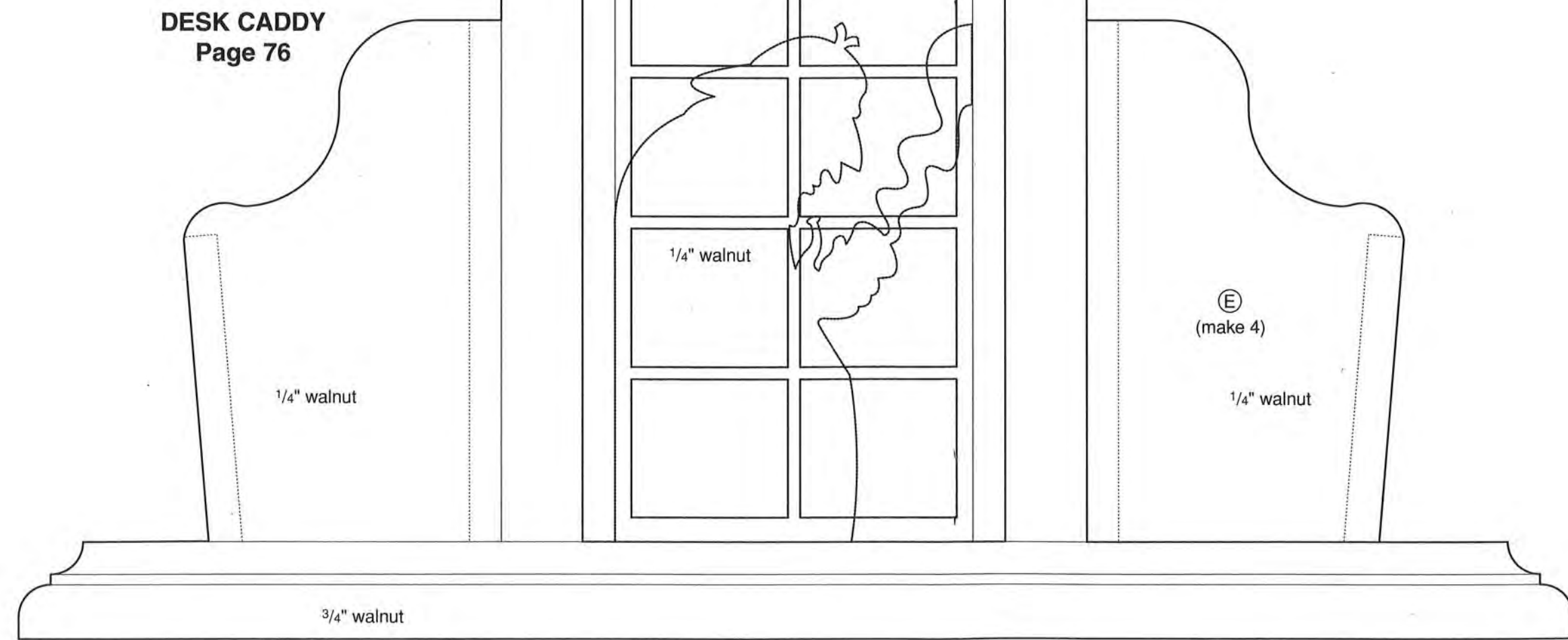


Cut out bird first, cut this notch later in accordance with how-to instructions.

FULL-SIZED PATTERNS



DESK CADDY Page 76



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- Corner shelf
- Knock-down cradle
- Woodworker carving
- Sherlock desk set



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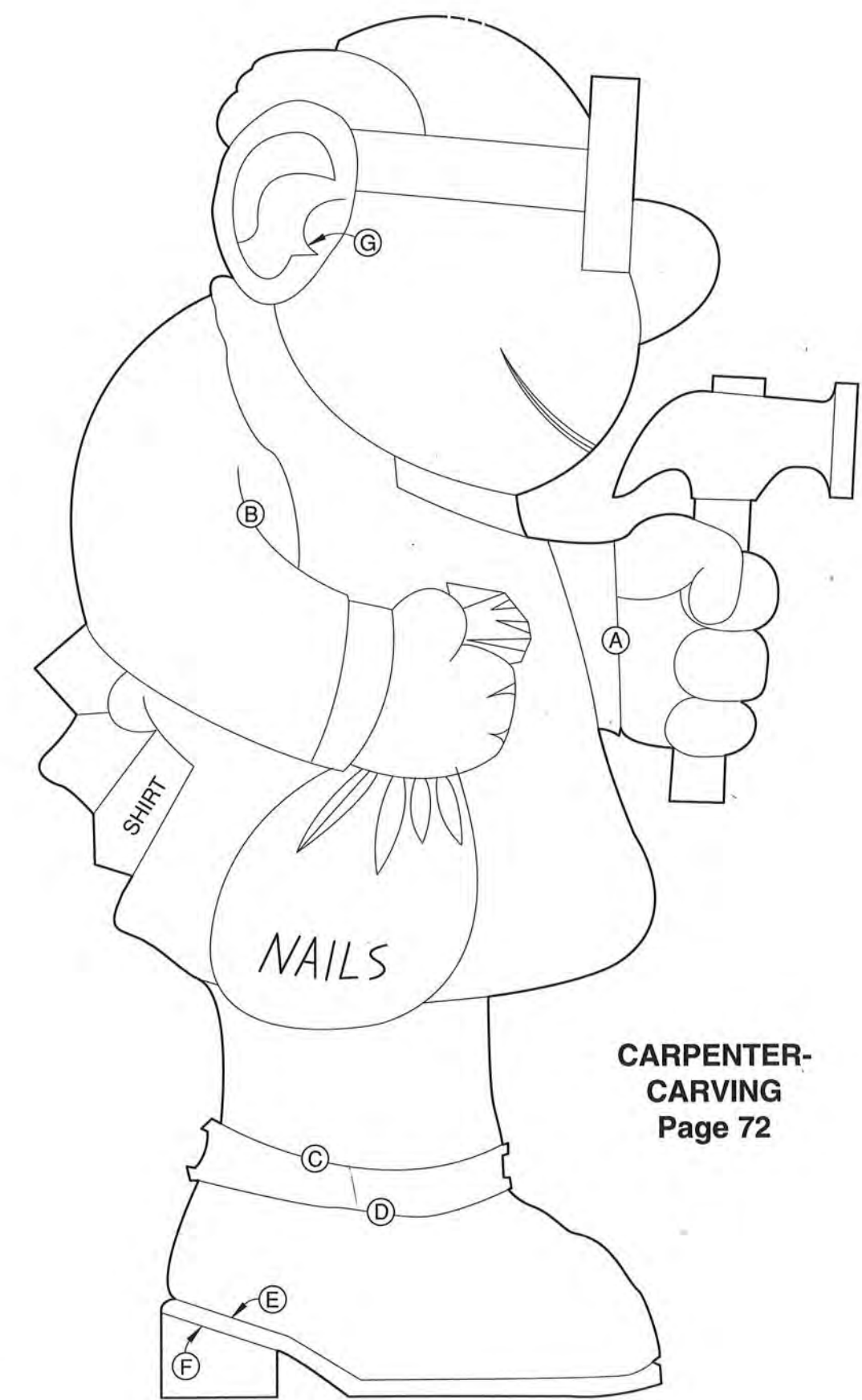


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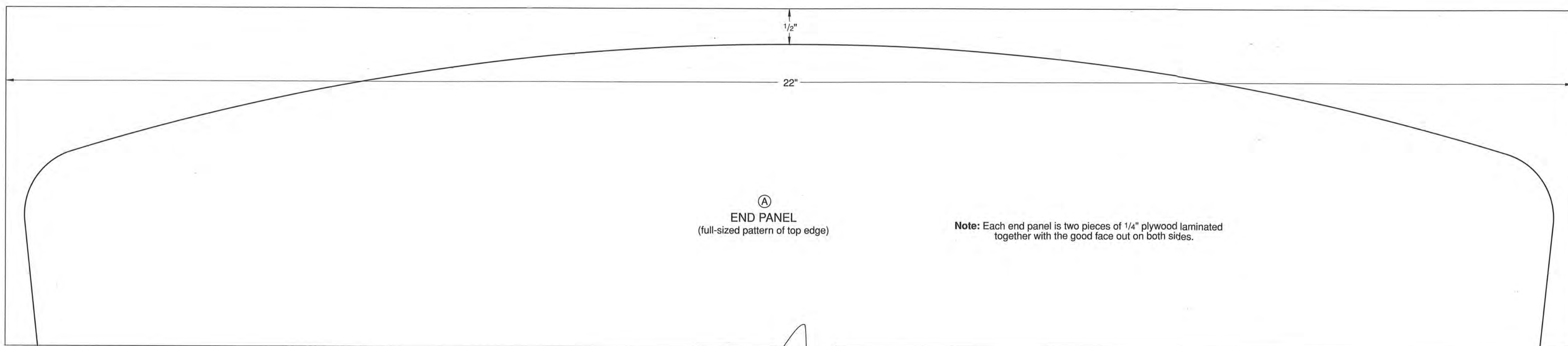
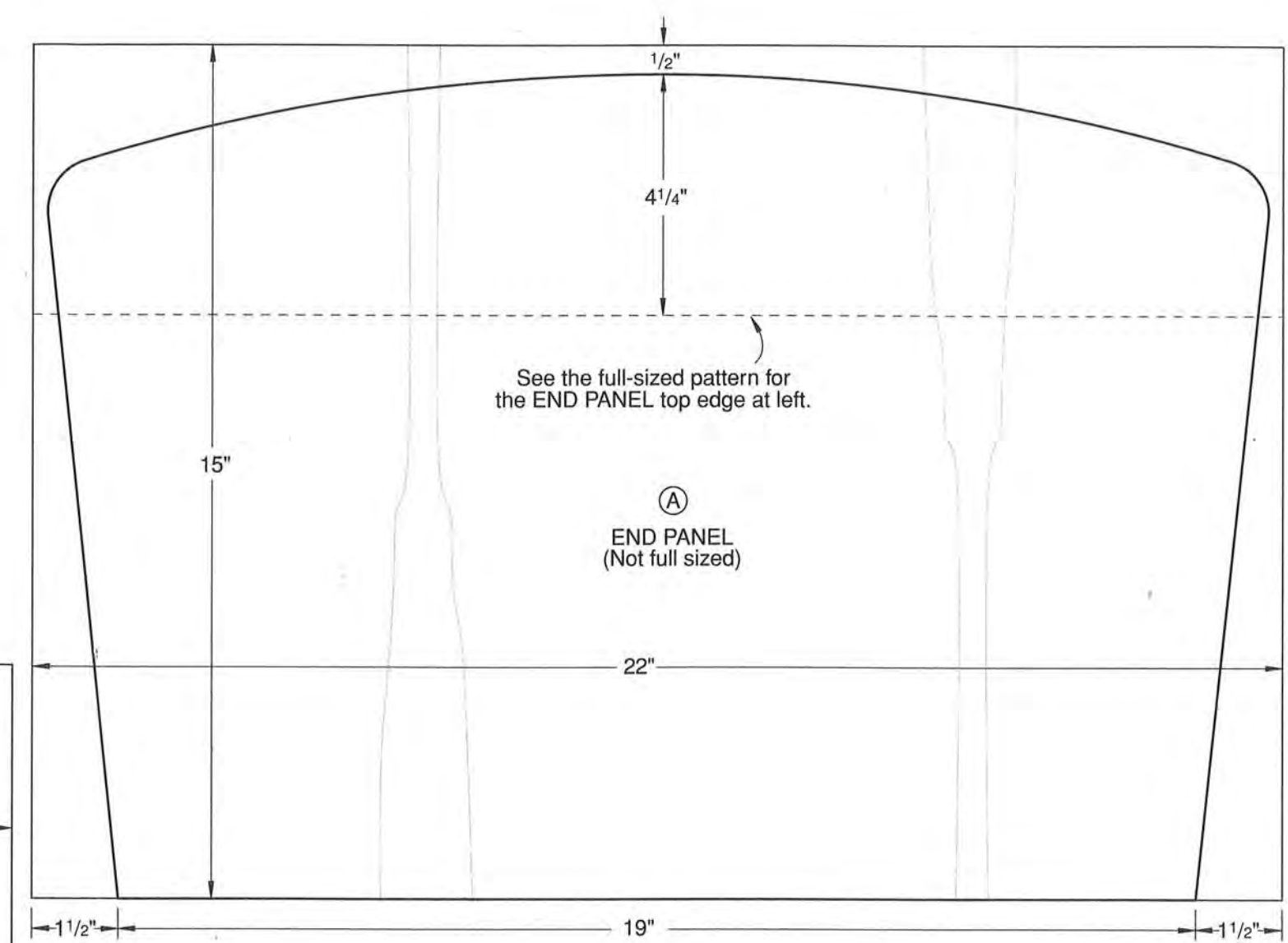
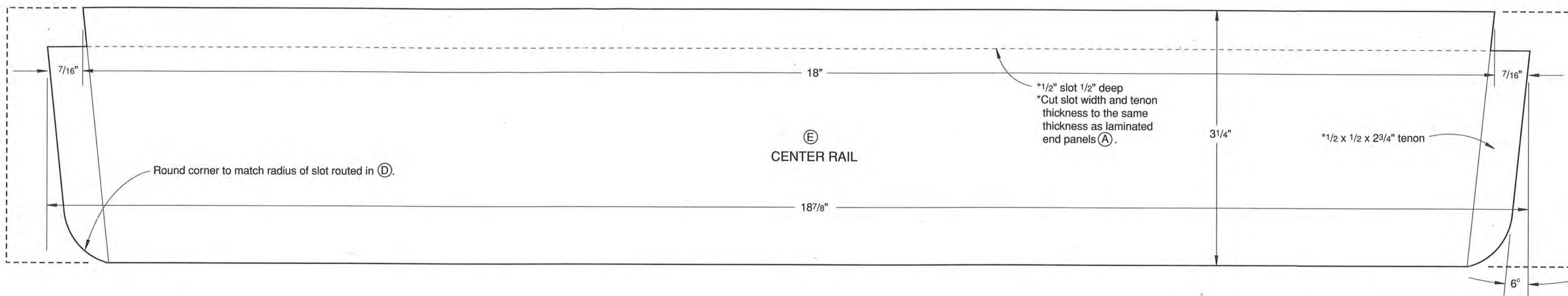
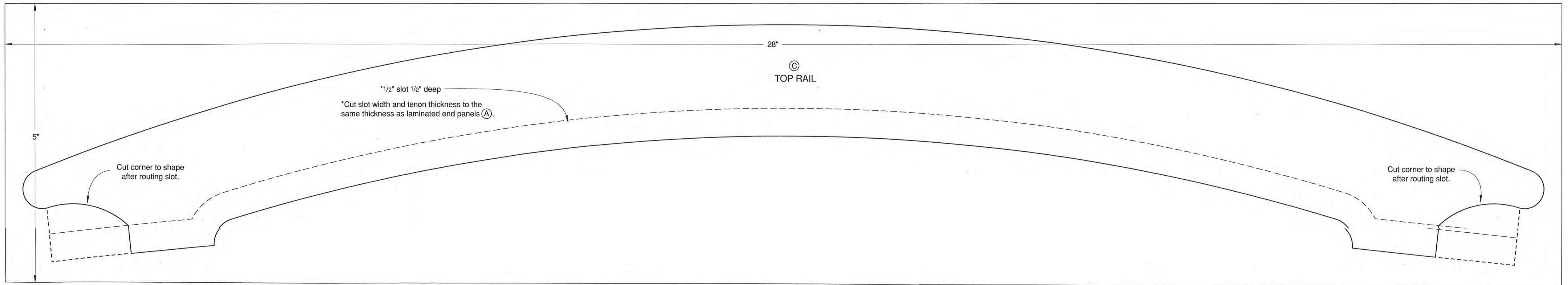
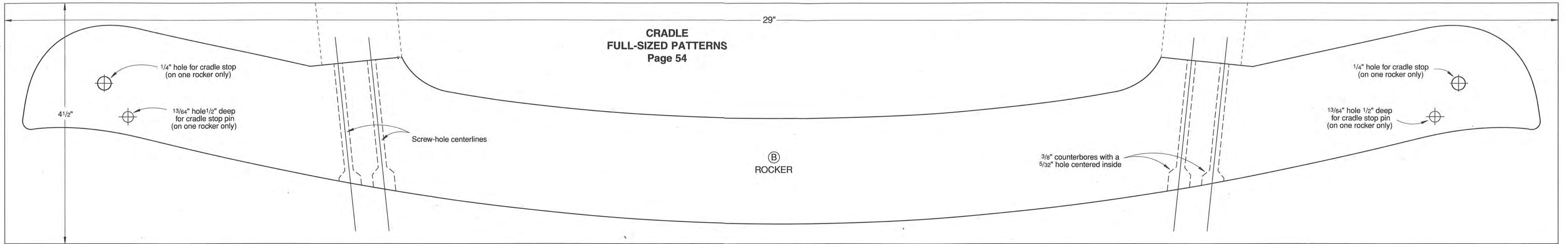
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CARPENTER-CARVING Page 72

CRADLE
FULL-SIZED PATTERNS
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Note: Each end panel is two pieces of 1/4" plywood laminated together with the good face out on both sides.