

**CUSTOM
HANDSCREW
CLAMPS**
See page 74

Homestead and Gardens®

WOOD

THE #1 MAGAZINE FOR HOME WOODWORKERS

JUNE 1990 • ISSUE NO. 35

Display until June 19

4 FUN-TO-MAKE TOY WHEELS

See page 40

SHOPSMITH vs. TOTAL SHOP

Feature-by-feature
comparison of
these look-alike
machines

5 EASY STEPS TO A GLASS-SMOOTH TABLETOP FINISH

WINNERS ALL!

Victorian settee
Spoon/thimble wall
cabinet
Monster truck



INSIDE MICKEY'S WORKSHOP AT DISNEY WORLD

Page 56



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#491		1 1/2" Classical		1 1/2"	3/4"	1/4"	\$25.00
#792		1 1/2" Classical		1 1/2"	7/8"	1/2"	\$25.00
#231		5/32" Roman Ogee	5/32" R	1/4"	1 5/32"	1/4"	\$17.00
#232		1/4" Roman Ogee	1/4" R	1 1/2"	3/4"	1/4"	\$18.00
#661		1/4" Roman Ogee	1/4" R	1 1/2"	3/4"	1/2"	\$21.00
#340		1/8" Cove	1/8" R	5/8"	1/2"	1/4"	\$12.00
#341		1/4" Cove	1/4" R	1"	1/2"	1/4"	\$13.00
#342		3/8" Cove	3/8" R	1 1/4"	9/16"	1/4"	\$14.00
#343		1/2" Cove	1/2" R	1 1/2"	5/8"	1/4"	\$15.00
#644		3/4" Cove	3/4" R	1 7/8"	3/4"	1/2"	\$28.00
#350		1/8" Round Over	1/8" R	3/4"	1/2"	1/4"	\$11.00
#351		3/16" Round Over	3/16" R	7/8"	1/2"	1/4"	\$11.00
#230		1/4" Round Over	1/4" R	1"	1/2"	1/4"	\$12.00
#354		3/8" Round Over	3/8" R	1 1/4"	5/8"	1/4"	\$15.50
#355		1/2" Round Over	1/2" R	1 1/2"	3/4"	1/4"	\$17.00
#656		3/4" Round Over	3/4" R	2"	7/8"	1/2"	\$21.00
#657		1" Round Over	1" R	2 1/2"	1"	1/2"	\$33.00
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#368		1/4" Slot Cutter	3/8" Deep	1 1/4"	1/4"	1/4"	\$14.00
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#405		1/2" Dovetail	14 degree	1/2"	1/2"	1/4"	\$ 8.50
#409		3/4" Dovetail	14 degree	3/4"	7/8"	1/4"	\$10.50
#709		3/4" Dovetail	14 degree	3/4"	7/8"	1/2"	\$10.50
#402		3/8" Dovetail	8 degree For	3/8"	1/2"	1/4"	\$12.00
#404		1/2" Dovetail	8 degree Leigh	1/2"	1 3/16"	1/4"	\$12.00
#708		1 1/16" Dovetail	8 degree Jigs	1 1/16"	1"	1/2"	\$14.00

ITEM NO.	BEST CUT BEST PRICE	DESCRIPTION	ANGLE/DEPTH/RADIUS CIRCLE DIAMETER	LARGE DIA.	CUTTING LENGTH	SHANK SIZE	PRICE
#415		1/4" Core Box	round nose	1/4"	1/2"	1/4"	\$10.00
#416		3/8" Core Box	round nose	3/8"	3/8"	1/4"	\$11.00
#417		1/2" Core Box	round nose	1/2"	1 1/2"	1/4"	\$14.00
#418		3/4" Core Box	round nose	3/4"	5/8"	1/4"	\$15.00
#719		1" Core Box	round nose	1"	3/4"	1/2"	\$18.00
#470		1/4" Straight	plunge cutting	1/4"	3/4"	1/4"	\$ 7.00
#471		3/16" Straight	plunge cutting	3/16"	1"	1/4"	\$ 7.00
#472		3/8" Straight	plunge cutting	3/8"	1"	1/4"	\$ 7.00
#474		1/2" Straight	plunge cutting	1/2"	1"	1/4"	\$ 7.00
#775		1/2" Straight	plunge cutting	1/2"	2"	1/2"	\$14.00
#476		3/16" Straight	plunge cutting	3/16"	1"	1/4"	\$ 7.00
#478		5/8" Straight	plunge cutting	5/8"	1"	1/4"	\$ 8.00
#479		3/4" Straight	plunge cutting	3/4"	1"	1/4"	\$10.00
#781		1" Straight	plunge cutting	1"	1 1/2"	1/2"	\$12.00
#500		3/8" Flush	Trimming	3/8"	1/2"	1/4"	\$ 7.00
#502		1/2" Flush	Trimming	1/2"	1/2"	1/4"	\$ 7.50
#503		1/2" Flush	Trimming	1/2"	1"	1/4"	\$ 8.50
#804		1/2" Flush	Trimming	1/2"	1 3/16"	1/2"	\$ 9.00
#545		Tongue & Groove	Straight	1 5/8"	1"	1/4"	\$29.00
#845		Tongue & Groove	Straight	1 5/8"	1"	1/2"	\$29.00
#546		Tongue & Groove	Wedge	1 3/16"	1"	1/4"	\$29.00
#846		Tongue & Groove	Wedge	1 5/8"	1"	1/2"	\$29.00
#450		1/8" Beading	1/8" R	3/4"	1/2"	1/4"	\$11.00
#451		3/16" Beading	3/16" R	7/8"	1/2"	1/4"	\$11.00
#233		1/4" Beading	1/4" R	1"	1/2"	1/4"	\$13.00
#453		3/16" Beading	3/16" R	1 1/8"	1/2"	1/4"	\$14.00
#454		3/8" Beading	3/8" R	1 1/4"	5/8"	1/4"	\$15.50
#455		1/2" Beading	1/2" R	1 1/2"	3/4"	1/4"	\$17.00
#375		45 degree Chamfer	45 degree	1 1/2"	5/8"	1/4"	\$15.00
#676		45 degree Chamfer	45 degree	1 7/8"	7/8"	1/2"	\$23.00

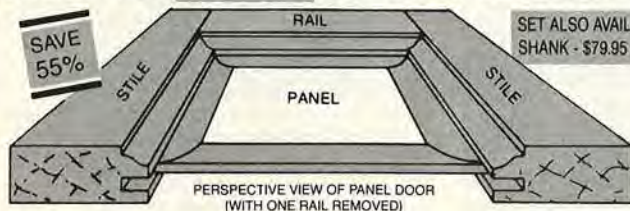
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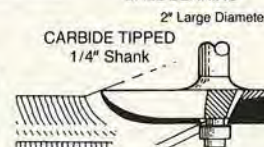
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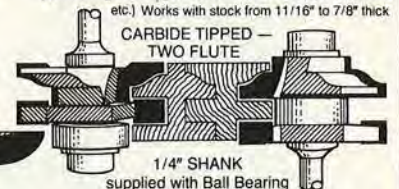
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THE #1 MAGAZINE FOR HOME WOODWORKERS

June 1990 • Vol. 7, No. 3 • Issue No. 35

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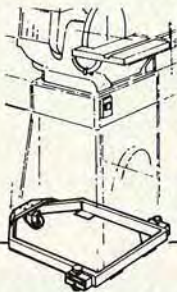
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Better Homes and Gardens.

WOOD®

THE #1 MAGAZINE FOR HOME WOODWORKERS

This issue's cover wood grain: cottonwood

JUNE 1990

ISSUE NO. 35

WOOD PROFILE

Black walnut—the native aristocrat

33

Long ago, Europeans crowned oak as their favorite hardwood. But in North America, walnut continues to hold royal status.

TOOL BUYMANSHIP

Shopsmith vs. Total Shop

35

Lathe-based multipurpose tools make a lot of sense for some woodworkers—and especially those working in cramped quarters. In this issue, our testing team examines the differences between two look-alike models.

SHOP-TESTED TECHNIQUES

4 Fun-to-make wheels

40

Everyone knows you can really dress up a full-sized car with a sharp wheel and rim. Now, put the same principles to work with your next toy project.



NOW YOU CAN BUILD IT

Fun-charged monster truck

46

Here's another great toy design from the 1989 Build-A-Toy™ competition—this pickup with huge wheels comes from a retired Oldsmobile engineer.

5 Easy steps to a finish that's glass-smooth

50

We found a couple of nifty 3M automotive products that easily adapt to woodworking. Best of all, the depth of the shine will amaze you.

CRAFTSMAN CLOSE-UP

Toys for the big boys

52

Meet Karol Fedoryshyn, a talented Manitoba woodworker who crafts realism into the 1/12-scale models he builds for Canadian truck drivers.



The wonderful wood-working world of Disney 56

Fifty or so woodworkers in Orlando, Florida, have jobs most of us dream about: They work for the world's most famous mouse.



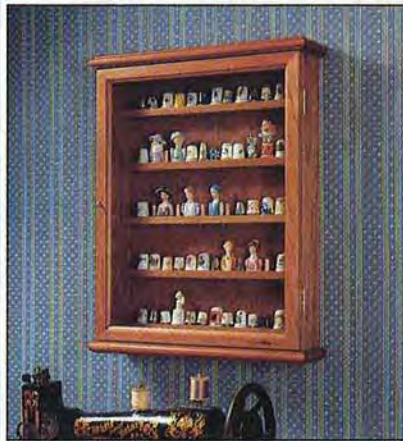
Solid-oak settee 60

Toss away the plastic lawn furniture—this outdoor project is comfortable enough for a whole day of reading and relaxing. Even better, the settee should last a lifetime, too.



Collector's showcase 68

You'll be pleased how smartly teaspoons, thimbles, and a long list of other small collectibles show off in this cherry wall-hung case.



WOODWORKER'S SURVIVAL GUIDE TO BUYING... 72

Mail-order products

Because so many readers buy wood, tools and supplies through catalog firms, it makes sense to review buying practices that avoid disaster.

COLLECTOR'S EDITION Handscrew clamps 74

No, this isn't another one of those complicated handscrew projects that require incredibly involved drilling setups. We're confident you'll quickly master this laminated design.



SHORT-SUBJECT FEATURES

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Products That Perform	13	Finishing Touches	96
Tips from Your Shop (And Ours)	16		

	QTY.	TOTAL
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THE EDITOR'S ANGLE

Photograph: Mercer Harris Photography

'LOOK WHAT SAILBOAT PAPA MADE FOR ERIN AND ME'



Best friends Elisa Riley, left, and Erin Martin show off their strollers made by "Sailboat Papa."

All of us here at **WOOD**® magazine love hearing from readers because your letters tell us a couple of important things. First, they let us know you appreciate all the hard work that goes into each and every issue of the magazine. And second, they allow us to hear about and sometimes even see what you have been up to.

That's why we were so happy when Georgia Cowan, from Naples, Florida, dropped us a line not long ago and shared with us a couple of photos showing some of her husband Ian's handiwork. Ian, who has been woodworking most of his life, has built everything from his own house to a 30-foot sailboat—complete with kitchen, a master bedroom, and a small bathroom. But I'm willing to bet that the strollers he built for

his granddaughter, Elisa Riley, and one of Elisa's best friends, Erin Martin, won him more brownie points than any other project he's ever undertaken.

I talked to Elisa the other evening, and it's apparent to me that this 5-year-old is pretty darn impressed with "Sailboat Papa"—her name for Ian. And, with her stroller, a project that appeared in our December 1987 issue. She reports that she and Erin are having lots of fun "carting their dolls around the neighborhood."



Roscoe the Raccoon rough-out a rip-roaring success

A big "thank-you" to all of the carvers who ordered rough-outs of the Desiree Hajny raccoon carving that appeared in the June 1989 issue. And thanks to Ron Conn, the Branson, Missouri, carver who manufactured and sent out the rough-outs. As promised, we have sent more than \$1,400 to the National Wildlife Federation's Backyard Wildlife Habitat Program to educate the public in how to attract birds and other wildlife to urban areas.

 Print this article

Larry Clayton

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#8633 Plastic Jar 8" \$3.79/EA	Birch Spindles
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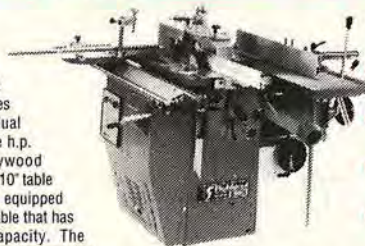
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TALKING BACK

We welcome comments, criticisms, suggestions, and even an occasional compliment. Send your correspondence to: Letters Editor, Better Homes and Gardens® WOOD® Magazine, P.O. Box 11454, Des Moines, IA 50336-1454.

In the states, we're catching on

I was somewhat amused with your article in the June 1989 issue concerning square-drive screws. My father introduced me to square-drive screws and drivers



in the early 1960s when I was a young boy working on my own projects. And ever since, "Robertson," as we call them, has been the screw to use for me and my dad. I can assure your readers that once they try square-drive, they'll be hooked.

—Carl Ambridge, Hamilton, Ontario

Children inherit 'disease' from woodworker's spouse

Just received the last edition of WOOD magazine, which included my shop tip about making duplicate marks with BBs. Sure made my day! Thanks!

There is a problem in my workshop. Since you are partially the cause of it, I hope you will help a fellow woodworker get out of his dilemma. Each time your magazine arrives at our house, my wife comes down with a strange disease. I call it "I want this and thisitis" disease. I usually can cure her by making the projects she wants. The big problem is with our five children. They have inherited the same disease from their mother. What this means is that I do not have time to design myself.

—Bernard Paumier, Baltimore, Ohio

Bernard, our research indicates this affliction can spread to grandchildren, too. We suggest you take immediate measures to rope another family member into the workshop. Then, someone else can help you "doctor" the family.

A remedy for irritating bandsaw welds

In the December 1989 issue, I found the article on bandsaw blades to be informative. I would like to comment about inspecting the welds of new blades. I have encountered a slight half-moon depression in the back edge of the blade in line with the weld. The result: a thump when the depression goes over the back-blade guides. This irritation makes for rougher cuts and shortened blade life. I try not to buy defective blades. However, when I do, I file the back of the blade to make the entry and exit of the depression less severe.

—John Walter, Columbus, Indiana

Continued on page 9

TALKING BACK

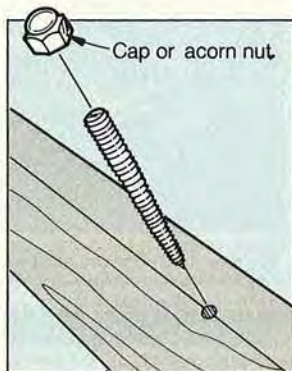
Continued from page 8

That would be a cap or acorn nut

As a hobbyist and do-it-yourselfer in the home and craft area most of my life, I've become an avid reader of *WOOD* magazine. The detail and accuracy of your articles are excellent, but even the best, on occasion, have a slip.

Such is the case in your February 1989 issue in the shop tip "easy way to install hanger bolts." What you call a cap screw is quite obviously a cap nut or sometimes called an acorn nut.

One small caution: Cap nuts usually are found in brass. As such, if the pilot hole is not properly drilled for the hanger bolt, you can force the hanger bolt out through the crown of the cap nut. Here's another solution: Jam two conventional hex nuts against each other, and then tighten with a wrench.



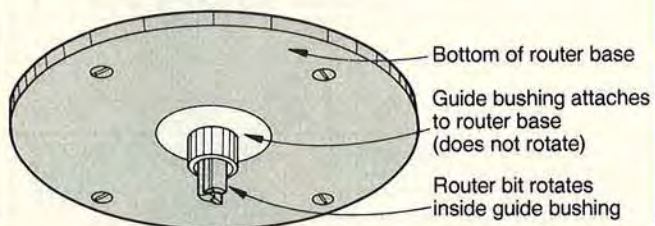
—Larry A. Stanley, president,
Empire Bolt and Screw, Inc., Spokane, Wash.

Tell me more about guide bushings

I found the article about router tricks in the February 1990 issue most interesting. Everything seems reasonably clear, except it would seem that the guide bushing for the router bit would have to be on the top of the cutter, and I can't seem to locate one. If I am missing something, I would appreciate an explanation of how to cut the circle after the template has been made.

—Don Dragon, Easton, Maryland

Don, some woodworkers confuse a router guide bushing, which attaches to the router base, with a pilot bearing, which is part of a router bit. Guide bushings cost about \$7 apiece and mount to the router as shown below. 🐉



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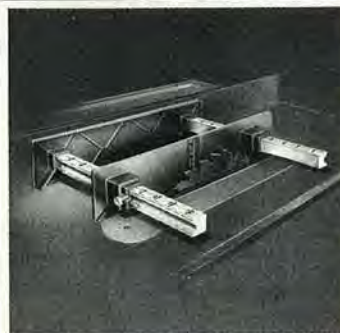
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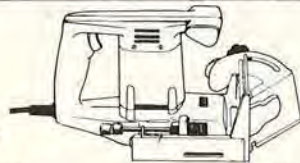
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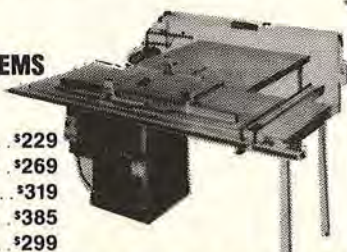
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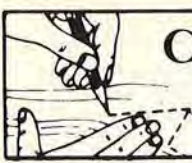
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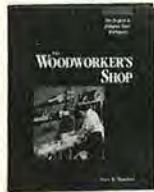
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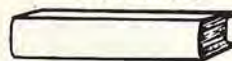
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PRODUCTS THAT PERFORM

Jig makes bandsawed dovetail joints a snap

Few things give a look of fine craftsmanship to a project the way that precision-cut through dovetails do. In the past, I've used backsaws to handcut such dovetails, but after testing the Jiggit bandsaw dovetail jig, I doubt that I'll ever go back to that method. The Jiggit helped me cut tight-fitting dovetails with a minimum of fuss or guesswork.

To use the jig, I placed the dovetail pin stock on one side of the roof-shaped jig, made a series of cuts for one side of the pins, then made a similar series of cuts on the other side of the jig's "roof." Doing it this way, you can cut the pins in an infinite number of sizes and spacings. After cutting the pins, you just clean them up with a chisel, trace them onto the mating piece of stock, and cut the necessary sockets with your bandsaw.



I did, however, find that I had to clamp a piece of hardboard to the "roof" to extend its support area when I made the final cuts. Because the plastic jig curves near its peak, I couldn't hold the pieces steady without the hardboard extension. So I'd like to see the jig's brief instructions include a mention of how to use such an exten-

sion, and illustrations of dovetail construction for the benefit of novice dovetailers. Gaylord Livingston of Jiggit told me he plans to expand the instructions. ♣

—Tested by C. L. Gatzke

Jiggit bandsaw dovetail jig, \$53.95 ppd. from Jiggit, Rd. 1, Box 35, Chazy, NY 12921.

Continued on page 14

PRODUCTS THAT PERFORM

Continued from page 13

Power steel wooling

This product falls under the category of those that make me wonder, "Why hasn't someone thought of this before?" Rakso's steel wool sheets attach to your 1/4- or 1/2-sheet sander, enabling you to steel-wool surfaces just as you would power-sand them.

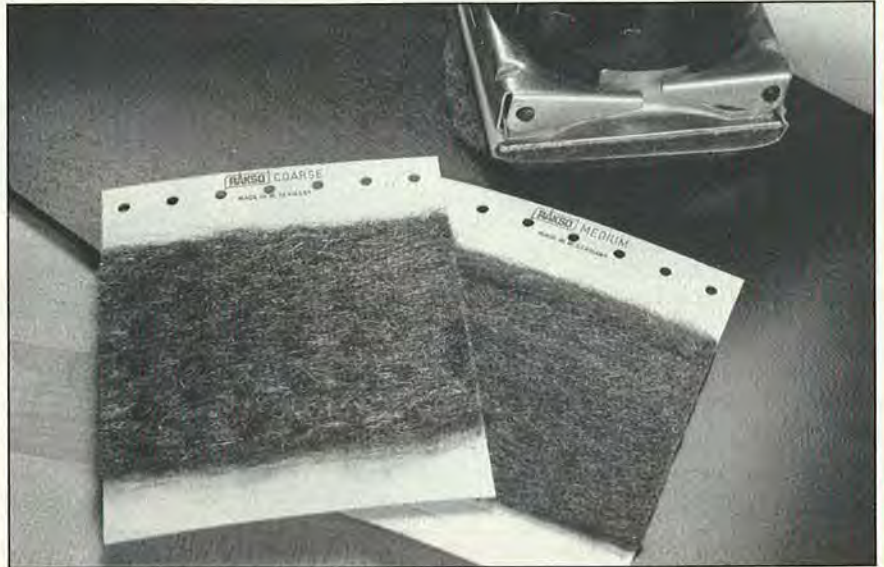
The Rakso sheets helped me quickly smooth out coats of lacquer and enamel paint on large, flat surfaces. Since the product doesn't wear unevenly like steel wool pads, one sheet lasted a surprisingly long time. An added benefit: the sheets uniformly removed the finishes, leaving no swirl marks to telegraph through to the next coat.

I also had excellent results when power-scrubbing rust off stationary machine tables. It helped to apply a solvent/lubricant such as WD-40 to the table prior to scrubbing.

—Tested by Jim Boelling

Rakso steel wool sheets, \$12.95 for six 1/4 sheets (2 of each grade), \$14.95 for six 1/2 sheets, from Woodworker's Supply of New Mexico, 5604 Alameda Place, NE, Albu-

querque, NM 87113. Include \$4.50 postage for orders under \$15 or \$5.50 for orders \$15-\$29.99, \$6.75 for orders \$30-\$49.99 and \$7.50 for orders \$50-\$300. ♣



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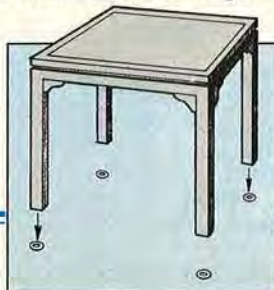
Top Shop Tip
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Eliminate "sticky feet" when finishing

When varnishing, applying lacquer, or painting furniture, the wet finish often runs down the legs and makes them stick to the floor or workbench. Pulling them loose can damage your project.

TIP: Eliminate this nuisance by placing flat metal washers under the ends of the legs. If any excess finish accumulates, it's at the end of the leg where it can be sanded away without harming the leg.

—From the WOOD magazine shop

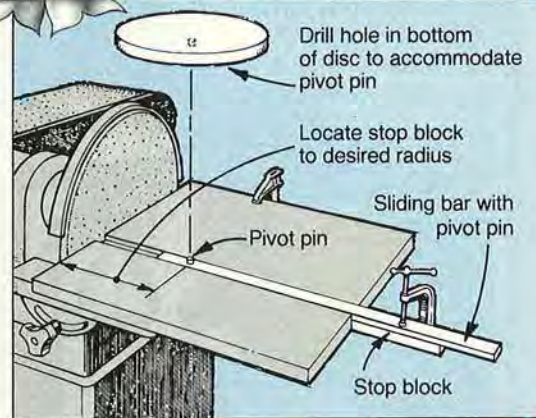


Sand perfect circles

It's practically impossible to cut perfect circles for such projects as wheels or small round tables using a bandsaw or scrollsaw.

TIP: Try a disc sander to achieve true roundness. First, from 3/4" plywood, build an auxiliary table (about twice the size of the table on your disc sander) with a 3/8"-deep slot 3/4" wide. Now, fit a hardwood bar a few inches longer than the auxiliary table so it slides freely in the slot. About 1" from one end of the slide, fit a 3/32" pin that protrudes 1/4" (see drawing). Bore a 3/32" hole at the center of the circular workpiece, place it over the pin on the slide, and slowly advance it into the sanding disc. When you reach the scribed circumference, clamp the slide to the auxiliary table and spin the workpiece for a perfect circle.

—Edward Hanselman, Hoosick Falls, N.Y.



For his tip, Edward receives the AEG model STPE 500 electronic jigsaw shown above.

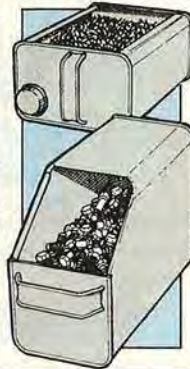
A new wrinkle on making storage bins

Most every woodworker accumulates an assortment of fasteners and small parts that requires systematic storage. Otherwise, clutter and chaos soon take over.

TIP: You can easily make storage bins of one-gallon cans used for packaging liquids such as paint thinner. Dave Wilson of Aberdeen, Wash., sent one style (shown at right, top) and

it appeared in the June 1988 issue. Cutting away the corner diagonally as shown below left renders a container of a different breed. Use tin snips to do the shearing and turn over the sharp edges with a pair of pliers and a hammer. The second style creates a container you can pick up by the handle and carry without spillage.

—Clarence R. Evans, Cape May Court House, N.J.

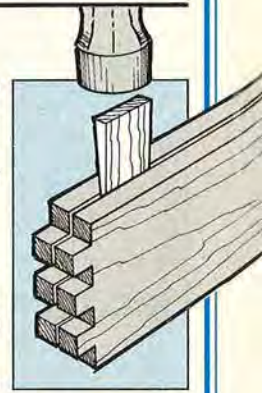


Equal—but not separated

Double-faced (carpet) tape works great for temporarily fastening pieces of stock together when making identical cuts such as finger joints. But, sometimes the adhesive works too well, making it difficult to pull apart the pieces.

TIP: Carefully drive a narrow wedge of softwood between the two pieces. This will force them apart without marring the workpieces. If the pieces still resist separation, splash lacquer thinner on the joint.

—From the WOOD magazine shop



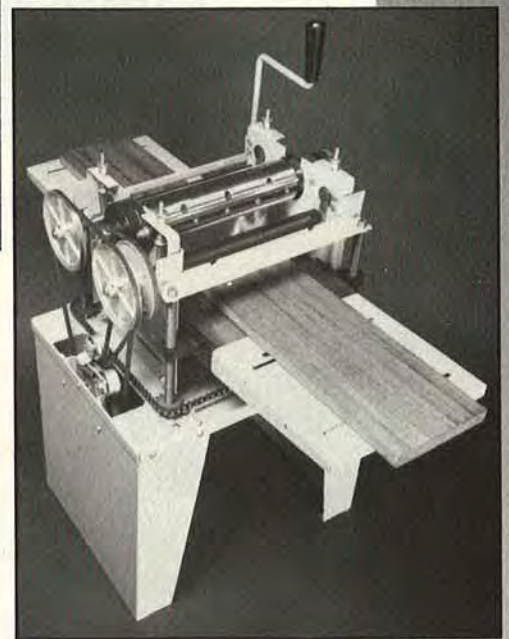
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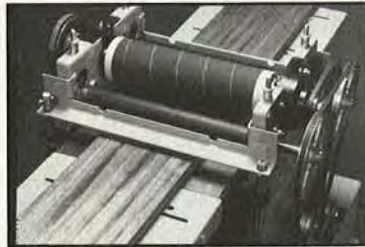
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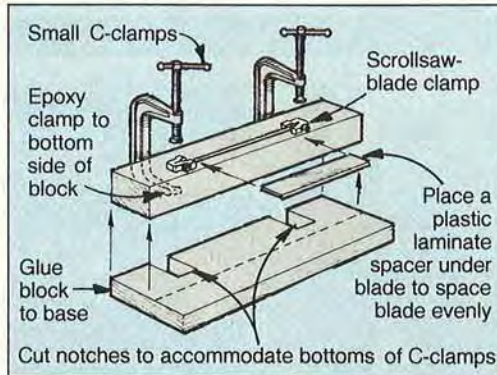
9005

TIPS FROM YOUR SHOP (AND OURS)

Continued from page 16

This jig makes for easy scrollsaw blade changes

Because of the small pieces involved, putting a new scrollsaw blade into its mounting clamps can be a hair-raising experience—unless you just happen to have three or four hands. With only two hands, by the time you get everything together, the alignment may be off and the set screws not tight enough to secure the blade in place.

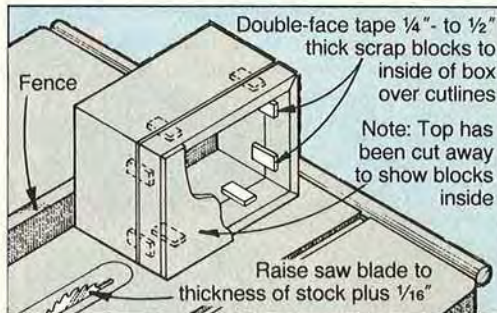


TIP: Simplify this irksome job by building a jig that holds everything in place while you tighten the set screws. All you need is a pair of small C-clamps, two pieces of scrap wood about 8" long, and a strip of plastic laminate or thin stock to serve as a spacer. You don't necessarily have to epoxy the C-clamps to the block, but doing so will make for quicker changes.

—John A. Henson, Lakeland, Fla.

Taped gussets simplify cutting loose box lids

Saw blades tend to bind when cutting off lids on wooden boxes, particularly when parting the final side. Consequently, kickback or sloppy cuts may result. Inserting wedges in the saw kerf helps some, but doesn't prevent all binding.



TIP: While assembling the box, tape or hot-melt glue temporary gussets of scrap wood 1/4" to 1/2" thick along the intended saw kerf as shown at left. Set your saw blade about 1/16" deeper than the thickness of the walls of the box. After sawing, tap loose the scrap pieces.

—Gerald Hunt, Swartz Creek, Mich.



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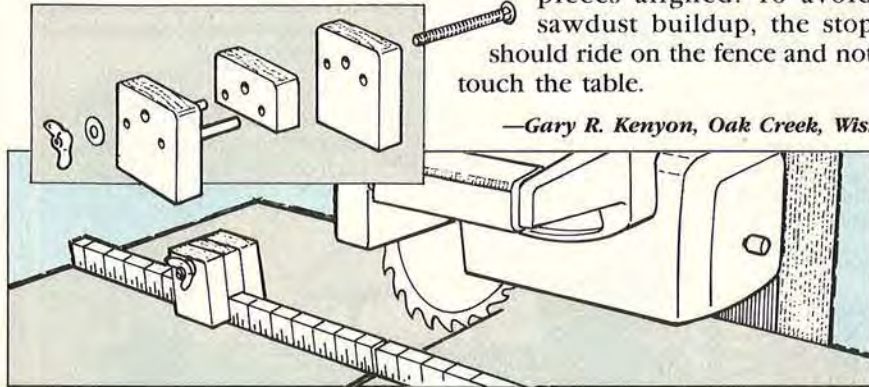
*TEFLON® Resin is DuPont's registered trademark © 1990, Rust-Oleum Corporation, U.S.A.



Quick help for accurate cuts

Measuring and marking get real old when cutting parts for a project that requires several duplicate pieces. And, it's nearly impossible to cut pieces of exactly identical lengths using a tape measure.

TIP: When you install a new fence on your radial-arm saw, draw marks at 1/4" intervals on both sides



of the blade. Or, buy an adhesive-backed ruler. Then, you'll always have a ruler to help you instantly measure stock on the table.

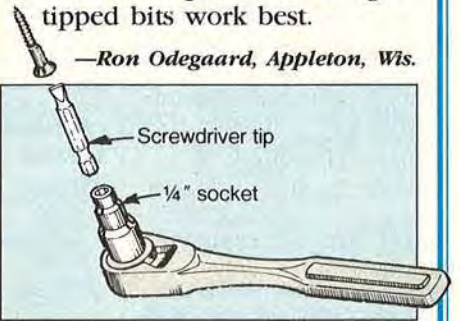
To get those exact repetitive cuts, build a clamplike adjustable stop by cutting pieces of scrap as shown in the inset drawing. The middle piece should be slightly thinner than the thickness of the fence. Quarter-inch dowels keep the pieces aligned. To avoid sawdust buildup, the stop should ride on the fence and not touch the table.

—Gary R. Kenyon, Oak Creek, Wis.

Offset screwdriver reaches tight spots

Sometimes you have to drive a screw in an area where there simply isn't enough room to use a conventional screwdriver.

TIP: You can buy a bounty of screwdriver tips these days, including slotted, Phillips, square, Torx and other bits. For an offset screwdriver, insert the appropriate bit in a 1/4" socket or ratchet wrench and proceed. Single-tipped bits work best.



—Ron Odegaard, Appleton, Wis.

Continued on page 21



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Installs between lower arm and base - keeps your pattern line visible at all times. Installation instructions included.

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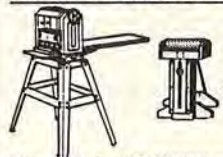
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- 3 Speeds: 660, 1500, 2850 RPM
- Headstock thread - 3/4" x 10 tpi
- Overall length: 60" - Weight : 100lbs

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Heavy duty. Wt. 25Lbs
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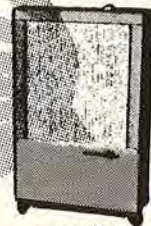
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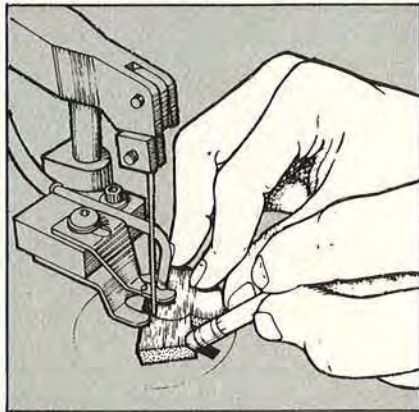
Continued from page 19

Control small pieces with a pencil

Scrollsawing parts from small pieces of stock can be tricky because the blade action tends to lift the wood off the cutting table.

TIP: Press the workpiece against the saw's table with the eraser end of a pencil as shown below to guide the workpiece. The rubber tip helps you control the part and follow the cutting line.

—Louis Mouis, Aurora, Ill.



Vinegar takes sticky epoxy off your fingers

Even the most persnickety of workers rarely avoid an oops with freshly mixed epoxy glue. Accidental drips and smears quickly show up on the materials being glued and on the worker's hands. Trying to wipe up these little messes before the epoxy sets up often falls short of the success you'd like.

TIP: Dampen a clean cloth with white vinegar (available in grocery stores) that contains 5 percent acetic acid. Then, wipe up the epoxy before it hardens.

—Walt Easley, Gladbrook, Iowa



Continued on page 22

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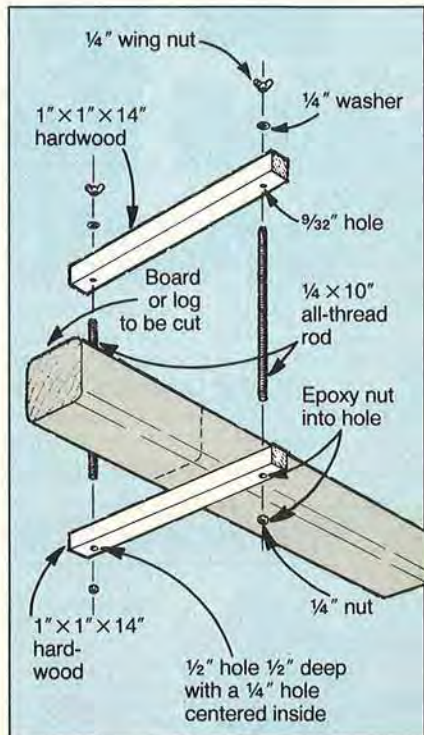
Continued from page 21

Handy guide for cutting thick, irregular stock

Making accurate perpendicular or angular cuts in thick timbers or odd-shaped posts can be troublesome, particularly when you can't make a complete cut from one side. Often the second cut from the back side doesn't match the first cut, leaving an unsightly mismatch.

TIP: Make a great cutting guide from two pieces of 1×1×14" hardwood and two 10" lengths of 1/4" threaded rod fitted with nuts and washers as shown at right. After measuring the distance between your circular-saw blade and the edge of its base plate, clamp the guide in place. Then, cut one side of the stock to a depth just more than half the stock's thickness, flip it over and cut the opposite side. You can also angle the guide.

—Tom Xedos, Moreno Valley, Calif.



MORE TIPS FROM OUR WOODWORKING PROS

You'll find more useful shop tips scattered throughout this issue of *WOOD* magazine:

- Clamping tiny parts? You can secure them with nails and a substrate covered with waxed paper as shown on page 49.
- On page 55, our featured craftsman substitutes readily available golf tees and wooden drapery rings for toy parts.
- For advice on choosing wood and fasteners for outdoor projects, see the boxed information on page 61.
- Need a jig for reinforcing miter joints? Turn to page 70.
- To avoid slippage and uneven pressure when clamping several pieces together at once, see page 75 for assistance. ♣

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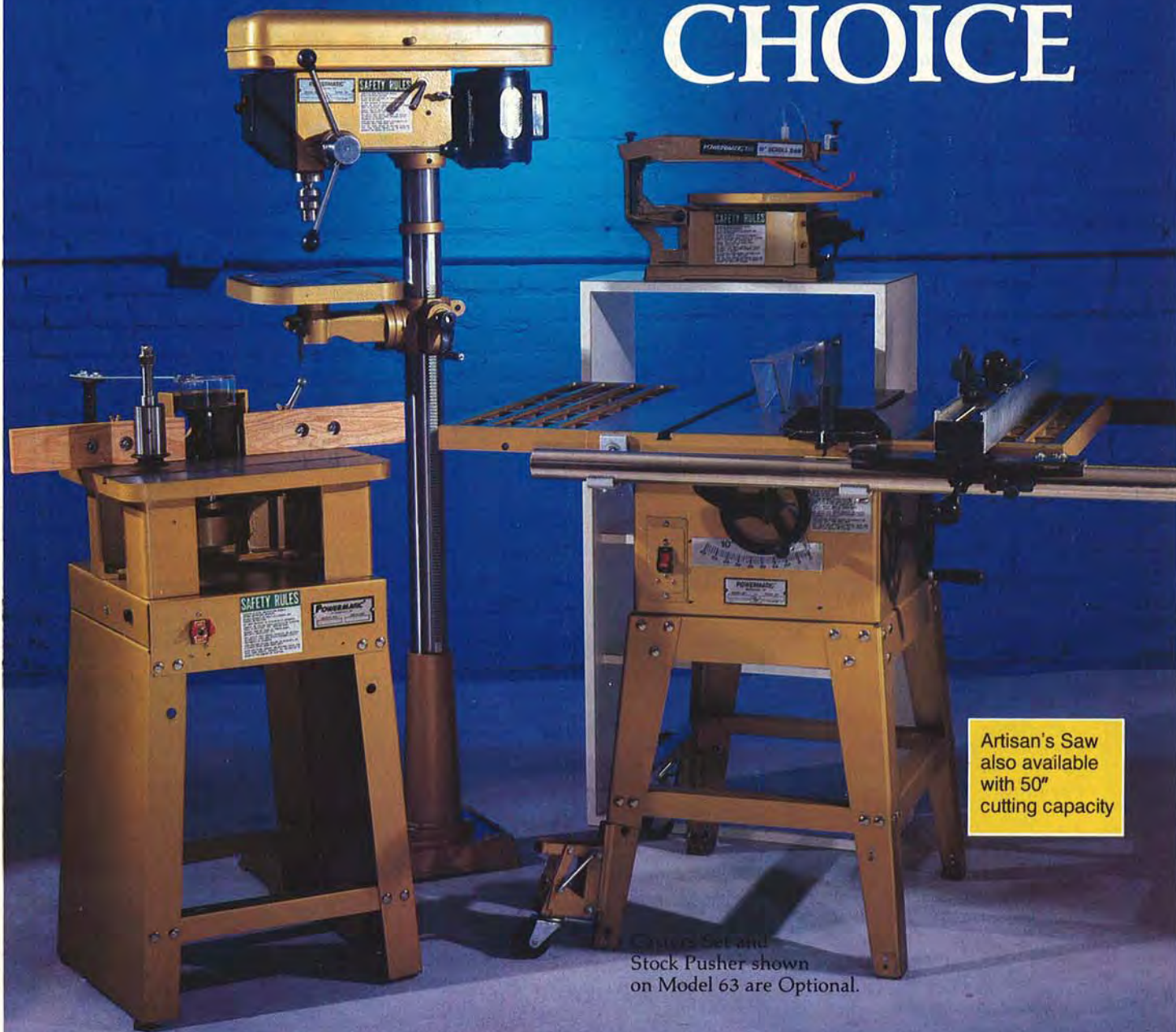
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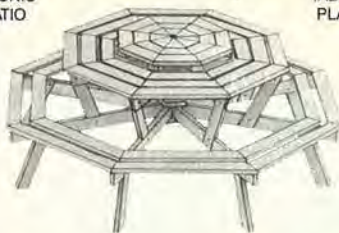
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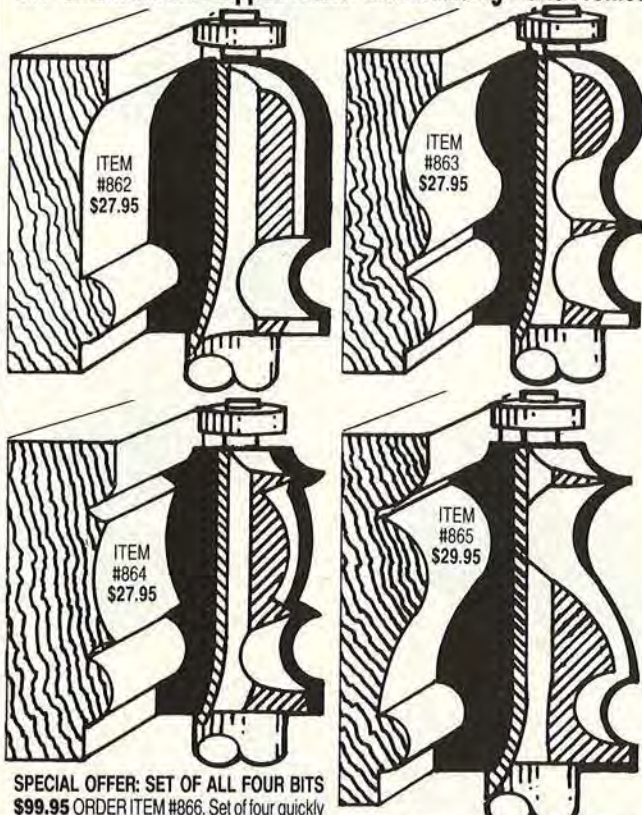
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ASK WOOD

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We'll answer all questions, but due to the volume of mail, we can't publish every letter. We may edit letters selected for publication.

Post-hole blues

I have a lovely 8'-long turned wooden post that I would like to use as a yard light. How can I drill a center hole down the length of the post for the electrical wire?

—Robert Ward, Norfolk Va.

You're probably not going to like our answer, Bob, but here it goes anyway. You'll have to rip that post into two cross sections, rout a channel down both sides, slip an electrical wire down the middle, and then glue together the halves.

Keeping out the rain

Is there a way to seal the edges of outdoor plywood to keep seeping water from separating the plies?

—William Boskey, Beecher, Ill.



Jim Downing, our design editor, has done plenty of work with plywood on the 30' sailboat he's building. From his experience, he'd recommend sealing the plywood edges with regular-set epoxy and then sanding the edges smooth.

Grinding question: How slow?

I recently built my own grinder with a 1,725 rpm 1/2-hp motor and a 6" white wheel (soft for polishing). With belts and pulleys, I slowed the wheel to 431 rpm. Is this correct, or should the wheel run faster?

—Gerry Goertzen, Steinbach, Manitoba

Our project builder, Jim Boelling, says you can reduce the speed on your grinder to as low as 250 rpm. "You should sharpen fine steel, such as carving tools and bench chisels, at a slow speed," Jim says. "Use higher speeds for general-purpose grinding when you want to remove large amounts of steel."

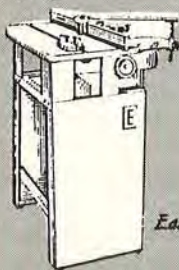


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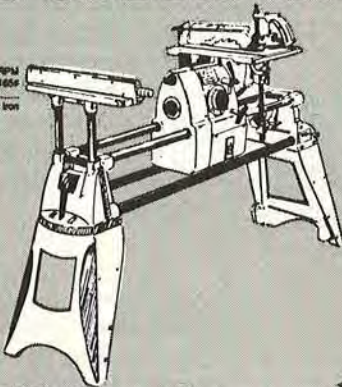
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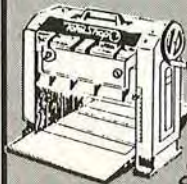
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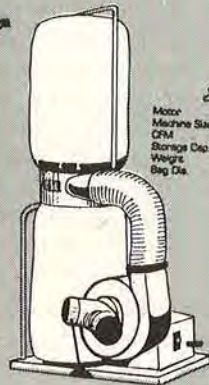


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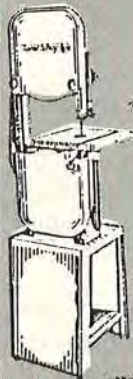
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~~1/2 HP~~ Sander



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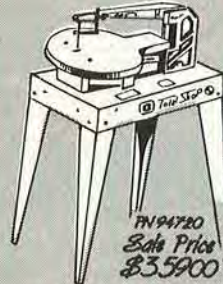


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~~1/8 HP~~ Scroll Saw

Specs

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Weights 68 pounds

~~1/2 HP~~ Dust System

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ASK WOOD

Continued from page 26

Sound advice about door harps

I recently started building wooden toys and wooden projects to supplement my Social Security income. I'm interested in making some door harps, but the plans and instructions I have don't specify the kind of wood to use for the front and back sounding boards. One of the *WOOD* magazine advertizers supplies "resonant" plywood. Can you tell me more about this?

—Gerald Grim, Mt. Airy, Md.

Our sources say resonant plywood is a misnomer, but some plywood has better resonance than others. Jerry Brown at St. Croix Kits (423 S. Main St., Stillwater, MN 55082) says that because of superior tonal quality, craftsmen use spruce-veneer sound boards when they assemble fine instruments such as psalteries, guitars, and dulcimers. Three layers of solid sitka spruce veneer are laminated together for a piece of plywood measuring a little over 1/8" thick. St. Croix sells the plywood for about \$7.50 a square foot. For door harps, Jerry recommends 1/8" to 1/4" baltic birch plywood, which sells for \$1.25 for a piece 10x12". For serious instruments, the straight grain of sitka spruce sustains better vibrations than baltic birch.

Something doesn't smell good

I have built kitchen canisters from 1/2" oak plywood, and finished them on both sides. I applied Behlen's Salad Bowl Finish to the inside of the canisters, but the smell that lingers after four weeks is overwhelming! What do you suggest I use to finish the inside?

Frank Rennie, Newbury Park, Ca.

Jonathan Kemp, Behlen's national sales manager, recommends that you apply Salad Bowl Finish in light coats, in low humidity, and with good air circulation. Under normal drying conditions, their finish should dry thoroughly after three to four days. He doesn't recommend putting food in the containers until the odor disappears. If you still experience a slight odor, try lightly sanding the final coat and putting a fan near the canisters to speed the drying. "Using oxidized Salad Bowl Finish from a previously opened can contributes to the odor—an unopened can has a one-year shelf life," Jonathan said.



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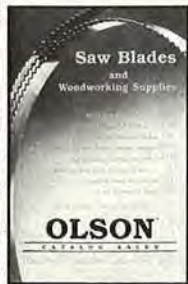
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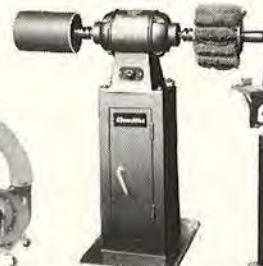
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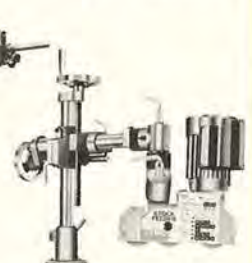
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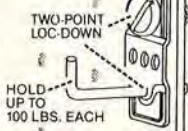
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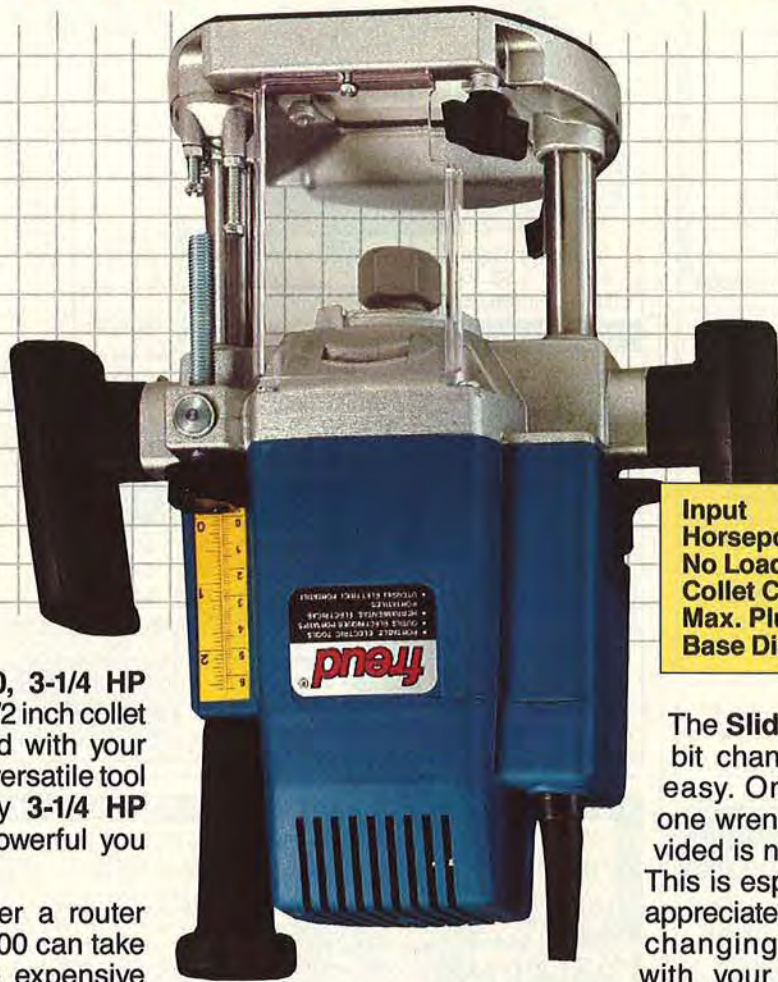


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Black WALNUT

The native aristocrat

Ancient Romans loved walnuts, and thought so highly of the meaty fruit that they planted the tree throughout south central Europe and England. Attention always focused on walnut for its nut crop, while oak prevailed as the choice for furniture.

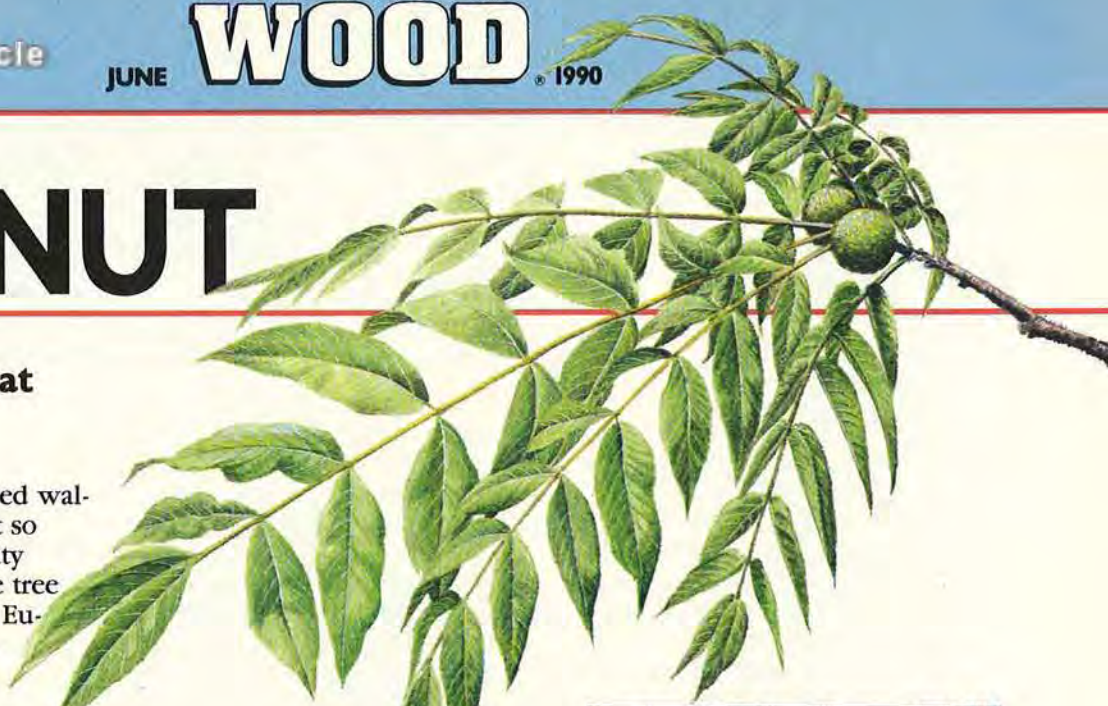
In America, though, native black walnut has always been prime stock. While frontier families gathered walnuts to eat, city craftsmen worked the dark wood into classic pieces. Today, black walnut continues as the aristocrat of native hardwoods and the hallmark of tradition.

Wood identification

European walnut (*Juglans regia*) carries the names of countries and regions, such as English walnut, French walnut, and Circassian walnut from the Caucasus Mountains along the Black Sea. A walnut (*Juglans neotropica*) also grows in South America.



Illustrations: Steve Schindler, Mike Henry



North America claims two walnuts: white walnut or butternut (*Juglans cinerea*), favored by carvers, and black walnut (*Juglans nigra*). It's black walnut, though, that woodworkers covet.

Black walnut's range covers most of the eastern half of the U.S. and southern Ontario. However, prime walnut requires moist, deep, rich, well-drained soil, such as found in the upper Mississippi River valley.

In idyllic conditions, walnut reaches a height of 150' and a 6' diameter. More commonly, however, it matures at about 100' with a 3' diameter. The tree's thick, dark brown to brownish-gray bark has marked ridges.

Walnut's distinctive leaves measure 1-2' in length and carry a dozen or more leaflets. In spring, flowing catkins emerge on branch twigs. In mid-summer, nuts appear.

Walnut's heartwood varies from a purplish-brown with thin, dark veins to gray-brown and even orange-brown. The narrow sapwood tends to be white.

Unfigured walnut has straight, somewhat open grain. Figured walnut—fiddleback, burl, stump, and crotch—feels coarse-textured. A cubic foot of dry walnut



Natural range

weighs about 39 pounds, making it just a little heavier than cherry.

Uses in woodworking

Walnut remains a favorite for furniture, paneling, musical instruments, turned bowls, relief carvings, and sculpture. Veneer proves popular in marquetry and as furniture accents. Walnut's shock-resistance, strength, and stability, also make it perfect for shotgun and rifle stocks.

Availability

Selling from coast to coast, walnut ranks as our most expensive native hardwood at a cost of about \$4 per board foot. It's also offered as plywood, furniture squares, buttons, plugs, turning blocks, and dowels. Plain veneer costs about fifty cents per square foot, but up to \$3 for highly figured grades.

Continued

black walnut

(*Juglans nigra*)



Straight-grained black walnut



Crotch-figured black walnut

Machining methods

Black walnut rates as classic cabinet stock not only because of its eye-appeal, but because you get good results with either hand or power tools. It does, however, sometimes require special treatment. *Our suggestions:*

- Black walnut dust can irritate the eyes, so wear protective goggles, a dust mask, and have adequate ventilation or dust removal.
- Avoid any tearout by taking shallow cuts when jointing. And, try this on the planer: Run two short pieces of stock the same thickness as the walnut board through the planer at the same time—one ahead and one behind. This levels the infeed and outfeed rollers for a chip-free cut.
- In crosscutting, attach a backing board to the miter fence to act as a chip breaker.
- Walnut doesn't burn easily in routing, but shallow passes eliminate tearout.
- Any adhesive performs well with walnut, but in joining with white or yellow glues, keep glue

squeeze-out to a minimum and skim off skinned-over glue. Dry glue discolors the dark wood and shows up in the finish. (Elmer's new dark glue minimizes this.)

- Straight-grained walnut generally doesn't require filling. Figured walnut—especially burls and crotch wood—has irregular, more open grain that you should fill.
- Staining walnut isn't necessary, unless color is uneven. Then, aniline dyes won't cloud the grain.
- The best finish for walnut is a clear one. Several coats of Danish oil provide clarity. For protection, add a compatible clear topcoat.

Carving comments

Walnut works best for sculptures and large figures with simple lines, or signs and relief carvings. If you do select walnut for a carving project, remember these tips:

- Deep cuts along the grain may cause the wood to pop out.
- Walnut's grain varies from very open to almost closed, depending on where it grew. Each performs differently. Open-grain walnut

carves easier. Closed-grain walnut may be more difficult to carve, but it takes a finer finish.

Turning tricks

Walnut turns best at a lathe speed of 800–1,000 rpm, and requires sharp tools. Bowl turners know that walnut's pronounced end grain in the bottom of a bowl tears easily and produces a rough surface that's difficult to smooth. Here's what Arizona turner John Lea does to counter that:

- Leave a little extra thickness—about 1/8" or less—in the end grain at the bowl's bottom. Then, stop the lathe and with a power disc or flap sander, sand the grain down to a slightly lower level than the surrounding wood. Turn on the lathe and sand the remaining wood around the bottom. This method gives you a round bottom instead of the oval shape you get with the uneven sanding done with the lathe on. ♣

SHOP-TESTED TECHNIQUES THAT ALWAYS WORK

Any exceptions, and special tips pertaining to this issue's featured wood species, appear under 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 wood with figured or twisted grain at a slight angle (about 15°), and take shallow cuts of about 1/32".
- For clean cuts, rip with a rip-

profile blade with 24–32 teeth. Smooth cross-cutting requires about a 40-tooth blade.

- Avoid drilling with twist drills. They tend to wander and cause breakout. Use a backing board under the workpiece.
- Drill pilot holes for screws.
- Rout with sharp, preferably carbide-tipped, bits and take shallow passes to avoid burning.
- Carving hardwoods generally means shallow gouge bevels—15° to 20°—and shallow cuts.

BLACK WALNUT AT A GLANCE

Cost	\$\$\$\$\$
Weight	AAAA
Hardness	TTTTT
Stability	▲▲▲▲▲
Durability	⌚⌚⌚⌚⌚
Strength	EEEEE
Workability	🔪🔪🔪🔪🔪
Toxicity	☠☠☠☠☠
Look-alike	Sweet gum

Compiled with woodworkers Jim Boelling, Don Wiperman, Roy Kratz, carver Fern Weber, and turner John Lea

THE CASE OF THE LOOK-ALIKE MULTIPURPOSE MACHINES



Chances are at one time or another, you've seen a Shopsmith Mark V demonstration at a woodworker's show, state fair, or shopping mall. Pretty impressive, wasn't it? These slick demonstrations have convinced more than 500,000 woodworkers to buy a Mark V (or a predecessor model) since 1947. And, up until 11 years ago, Shopsmith was the only player in this market niche. Then, Total Shop began importing a similar machine from Taiwan, and has sold between 25,000 and 35,000 units to date.

Nowadays, we hear from plenty of readers who want to know whether they should buy a Shopsmith, or save \$150-\$300 by opting for a Total Shop. So, we brought both machines into the *WOOD*® magazine shop and put them through their paces. Although the machines look identical, we spotted significant differences under our magnifying glass.

SHOPSMITH VS. TOTAL SHOP

Times were lean in 1937 when Dr. Hans Goldschmidt packed his engineering degree and fled Nazi Germany. He eventually landed a job as a foreman in a California woodworking shop, and it was here that he started dreaming about a multipurpose woodworking machine.

A few prototypes later, he and a handful of partners formed Magna Engineering Company and began producing Shopsmiths at a Berkeley lumberyard. By 1950, Magna was a nationwide success and in 1958 merged with Yuba Consolidated Industries. The parent company, however, ran into financial difficulties and stopped making Shopsmiths in the 1960s.

In 1971, John Folkerth, then a stockbroker, breathed new life into the Shopsmith line when he visited the closed factory in search of parts for his Shopsmith radial-arm saw. He not only found the parts, but all the molds, dies, and jigs necessary to build multipurpose machines. Within two years, the Shopsmith Mark V was back in production in Dayton, Ohio, and Folkerth was in charge of the new firm.



Dr. Goldschmidt with an early prototype.

Continued

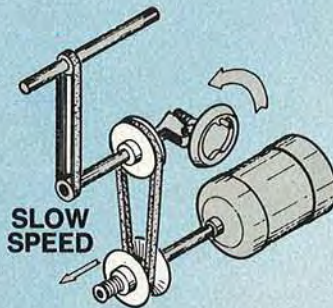
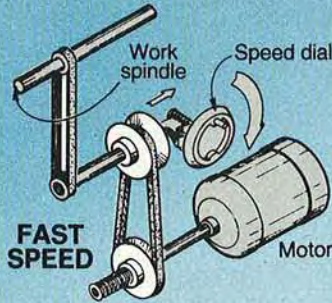
SHOPSMITH vs. TOTAL SHOP

How these machines work

As you can see by the photos, *below*, the Shopsmith Mark V and Total Shop multipurpose machines appear nearly identical until you add a few options.

At the heart of these versatile performers sits a headstock that slides along two tubular ways. The headstock's motor drives an adjustable-pulley system that allows you to dial up variable speeds from 700 to 5200 rpm on the Shopsmith and 850 to 5200 on the Total Shop. As shown in the drawing at *right*, a spring-activated lower pulley changes size as you adjust the size of the upper pulley by turning the speed dial. Both machines have two fixed-work spindles on the left end of their headstocks and a movable quill assembly on the right ends of the headstocks.

Jim Berkeley of Shopsmith's engineering department pointed out to us that a major selling point of his

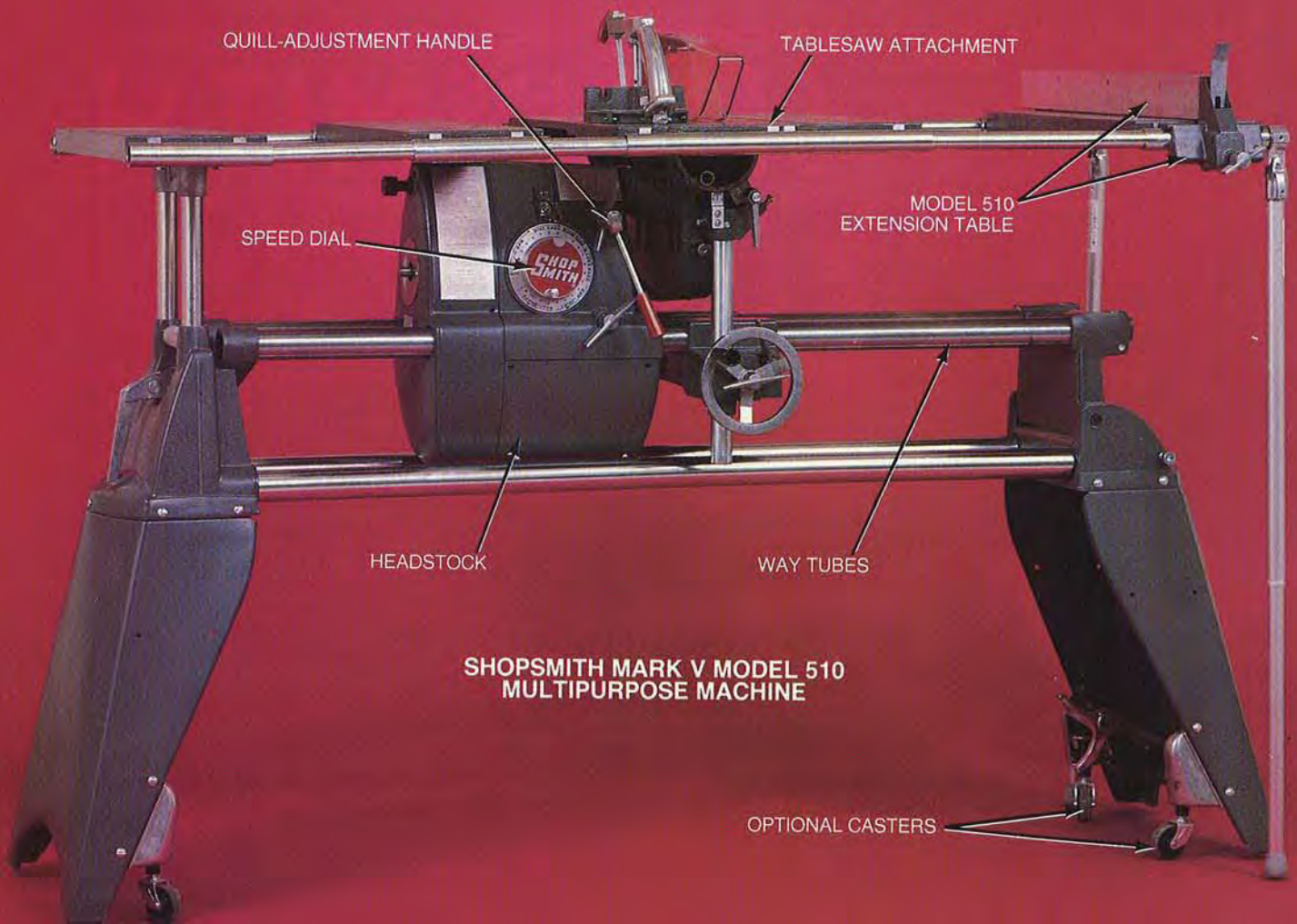


company's machine is its stainless-steel motor shaft. "Stainless steel will not rust, so the motor shaft will not freeze up if the machine is stored in a damp area for a long time." Total Shop's motor shaft is made of steel—not a problem so long as you keep it lubricated.

Both machines convert into a 10" tablesaw, 12" disc sander, lathe, drill press, or horizontal borer. From either company, you can purchase an optional 11" bandsaw, 4" jointer, 6" belt sander, scrollsaw, or plate joiner. Shopsmith also offers a 1" strip sander, 12" thickness planer, and lathe duplicator.

The multipurpose-tool advantage

Few woodworking machines pack as much versatility into a 2'x6' floor space as these tools do. And, that can be a mighty important consideration if you're restricted to a small work area.



SHOPSMITH MARK V MODEL 510
MULTIPURPOSE MACHINE

Although these machines will save you some space, they won't necessarily save you a lot of money. For example, you could buy a stand-alone table saw, lathe, and drill press of moderate quality for slightly more than the cost of one multipurpose machine. And, the bandsaw, jointer, scrollsaw, and belt sander attachments from either company cost no less than some stand-alone, Taiwanese-made units.

However, both of these multipurpose machines perform some feats that no stand-alone tool can. For example, the variable-speed dial makes speed changes a snap compared to the manual pulley changes required by most lathes and drill presses. When it comes to the disc sander, we don't know of any machine, at any price, that rivals this component. As shown at *right*, the disc attaches to the drill-press quill, which increases your control when you feed the spinning disc into a

clamped workpiece. And, because the disc-sander table also serves as the table saw top, you can precisely sand compound angles.

Initially, we thought that changing the machines from one function to another would be a big hassle. But, after making all the initial installation adjustments on each tool, most of the changeovers took no more than two minutes.

Quality considerations

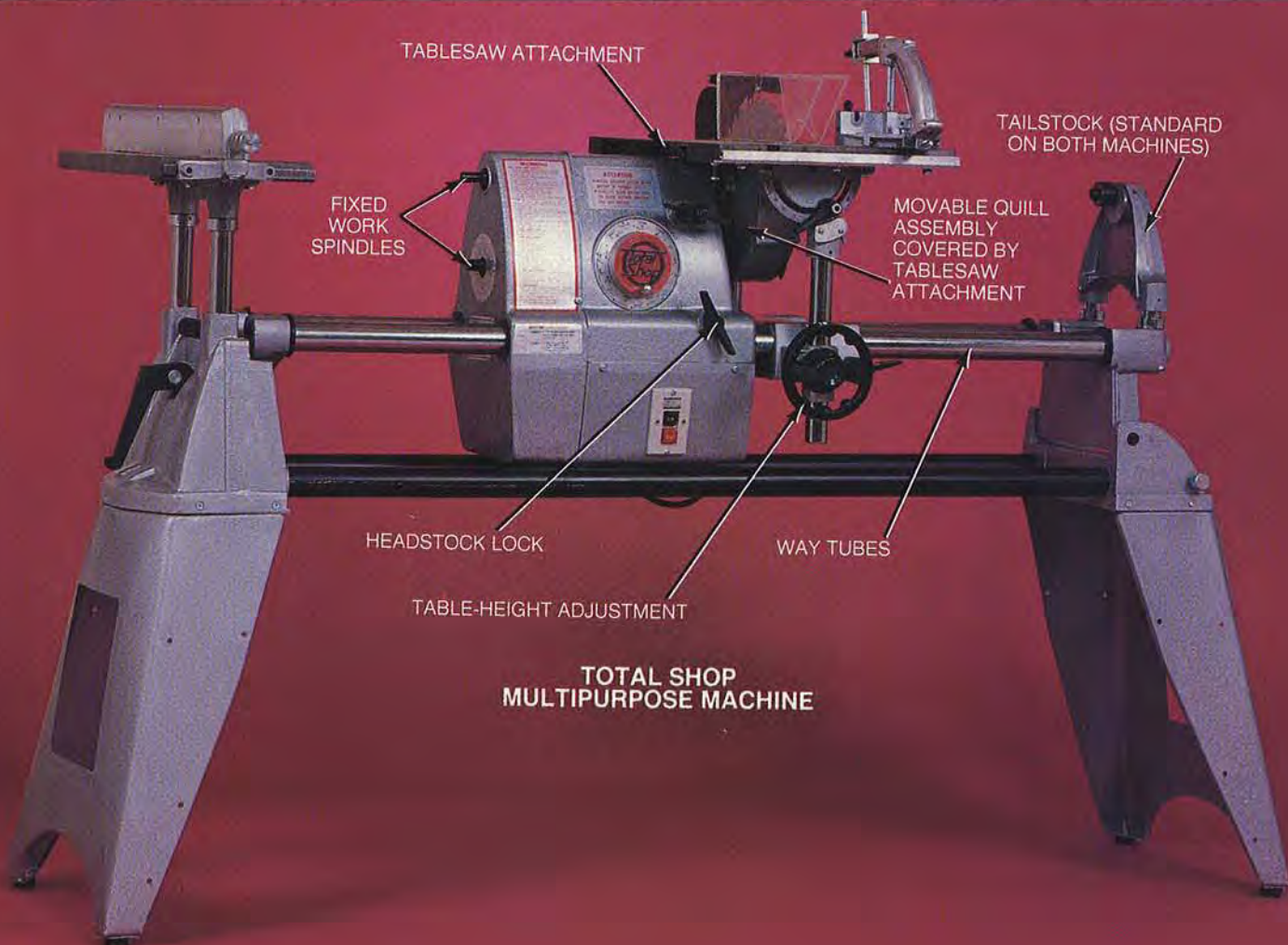
As with most Taiwanese-made machines, you'll save dollars by buying the Total Shop, but you'll find a slightly rougher fit and finish on most parts. For example, we found that the cranks and handles fit better on the Shopsmith than on the Total Shop. These differences will not prevent you from doing quality work on the Total Shop, but if you want a product with smooth-fitting parts right out of the box, then go for the Shopsmith.



The quill-mounted disc sander moves to the workpiece, giving you greater control over certain sanding operations.

With the units switched ON, the Shopsmith speed-control dial turned easily with one finger curled around its peg, but we had to firmly grasp the Total Shop control with a full hand and put more effort into turning it. As we went through the different speeds, we noticed that the Shopsmith produced slightly less vibration and belt and motor noise.

Continued



TABLESAW ATTACHMENT

FIXED WORK SPINDLES

TAILSTOCK (STANDARD ON BOTH MACHINES)

MOVABLE QUILL ASSEMBLY COVERED BY TABLESAW ATTACHMENT

HEADSTOCK LOCK

WAY TUBES

TABLE-HEIGHT ADJUSTMENT

TOTAL SHOP MULTIPURPOSE MACHINE

SHOPSMITH vs. TOTAL SHOP

A MATCHUP OF MULTIPURPOSE MACHINES

		SHOPSMITH MARK V MODEL 500	TOTAL SHOP
HEADSTOCK	Voltage	Either 110 or 220	Dual 110 and 220
	Horsepower	1½	1½
	Speed range	700-5,200	850-5,200
WAYS	Material ¹	C	C, B
	Diameter (Inches)	1.75	1.68
TABLESAW	Material ²	CA	CI
	Size (Inches)	14x18"	14x18½"
	Table tilt	45°R	45°R
	Cutting capacity at 90°	3¼"	3¼"
LATHE	Distance between centers (Inches)	34	34
	Swing (Inches)	16	16
DRILL PRESS	Quill travel (Inches)	4½	4½
	Chuck capacity (Inches)	½	½
	Table tilt	90°R	90°R
DISC SANDER	Material ³	S	A
	Diameter (Inches)	12	11¾
Weight (Pounds)		198	248
List price		\$1,599	\$1,495
Demonstration price		**	\$1,059
Country of origin ⁴		US	T

*Mark V also available as model 510 with 17½x22" table.
 **Shopsmith offers \$250-\$400 in merchandise and cash discounts with demonstration purchases.

- (C) Chromed steel
(B) Black-anodized steel
- (CA) Cast aluminum
(CI) Cast iron
- (S) Steel
(A) Aluminum
- (US) United States
(T) Taiwan

Manufacturers listing:

Shopsmith
 3931 Image Drive
 Dayton, OH 45414-2591
 800-543-7586

Total Shop
 P.O. Box 16297
 Greenville, SC 29606
 Outside S.C.: 800-845-9356
 S.C. residents: 803/228-4174

COMPARISON OF 3 MAJOR TOOLS

• Drill press

With the headstock and upper tubes in their normal, horizontal position, these machines make precise horizontal borers. You'll especially appreciate this capability for drilling dowel holes. To convert the machines to a drill press, you simply rotate the headstock 90° by pivoting the upper tubes from a horizontal to vertical position. Both machines work well in this respect, but neither turn slow enough for many drilling operations. Since the Shopsmith has a low speed of 700 rpm, and the Total Shop turns no slower than 850 rpm, both machines can damage larger drill bits, especially in hardwoods. In response to this problem, Shopsmith manufactures a speed reducer that slows the spindle speed to 100 rpm. Price: \$199. Shopsmith tells us this speed reducer will fit Total Shop machines as well.

• Lathe

We've heard people refer to these machines as being "lathe based," and it's easy to see why. They *look* more like a lathe than any other stationary machine. Both machines work well as a lathe, but because of their ⅝" spindles (small by lathe standards) you'll experience vibration with larger turnings such as bowl blanks more than 8" in diameter and 4" in thickness.

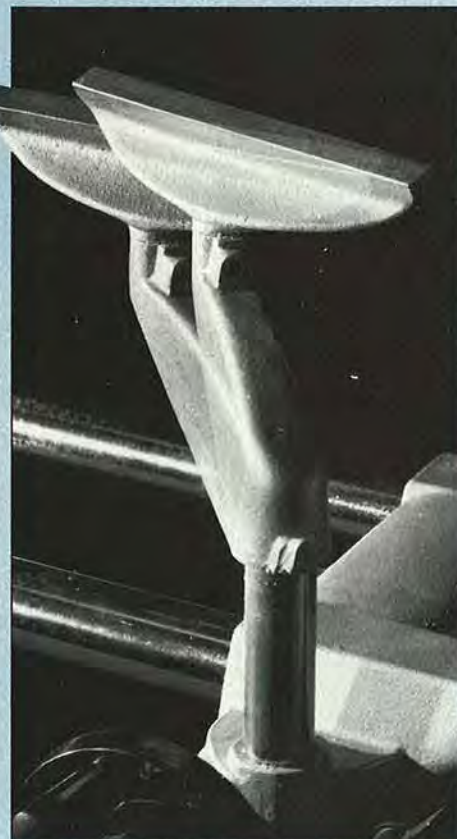
As we did some test turnings, it didn't take long to discover a problem with the Total Shop tool rest. Even when locked into position, the tool rest pivoted more than 1" as shown in the double-exposure photo at *right*. This shortcoming could prove dangerous to you and your project.

• Tablesaw

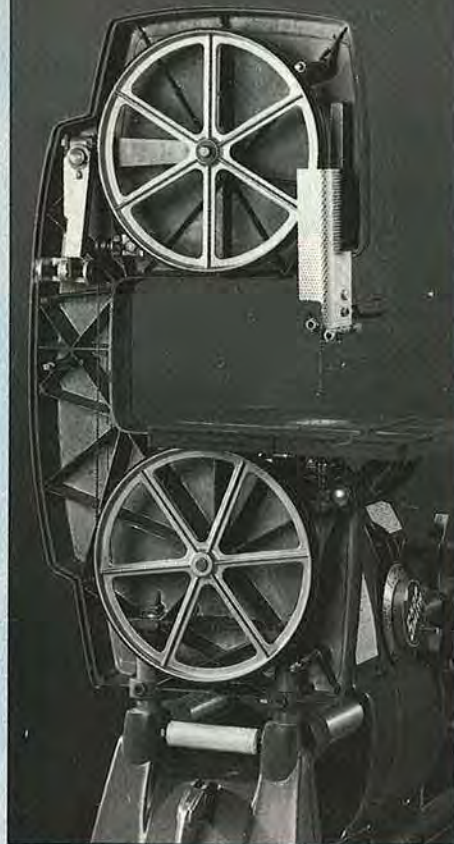
Although these machines excel at certain operations, their tablesaws disappointed us. The reason: Both tabletops seem undersized in our opinion. The tops measure about 14" wide by 18" deep, with only 6" of surface in front of the blade. We

spoke with several Shopsmith owners, and they agreed that crosscutting wider pieces challenged them. And, since the blade doesn't tilt, sheet goods can be nearly impossible to handle on the tilted tabletop. Because of these limitations, it didn't surprise us when several of the Shopsmith owners told us they owned stand-alone tablesaws, but really enjoy using the other functions. Shopsmith addressed these shortcomings with the larger (17½x22") table and extensions of the model 510, which has about 8" of tabletop in front of the blade.

We found the lighter cast-aluminum top on the Shopsmith considerably easier to lift into position than the cast-iron Total Shop table. But once in place, we preferred the cast-iron surface because it proved smoother and more durable than the Shopsmith table.



Even when locked in place, Total Shop's tool rest pivots more than 1"—something to consider if you're a turner.



A look inside the Shopsmith bandsaw reveals its inner workings, including automatic blade-tracking control.



Although nearly identical to the Total Shop belt sander, the Shopsmith unit has a swiveling 2½" dust port.

MORE BUYING POINTS TO THINK ABOUT

• Major accessories

We found the jointer and belt sander accessories similar in most respects, but the companies have taken different routes in manufacturing their bandsaws. The biggest difference: Shopsmith builds an auto-tracking mechanism into this accessory, whereas the Total Shop has the standard adjustments for blade tracking. We found the auto-tracking control hard to adjust for different blade types and sizes.

The bandsaws also proved to be the bulkiest and most difficult accessories to lift into place, so Shopsmith's use of plastic for the housing cover makes good sense. Both machines have cast-aluminum housings, but Total Shop also has a cast-aluminum cover that helps add 11 pounds to the accessory.

Shopsmith manufactures a wider line of additional accessories, large and small. Although the patent on the Mark V has long since expired, company representatives say they hope to obtain patents on new accessories such as the plate joiner and speed reducer.

• Customer service

To their credit, both companies offer a 1-year warranty, a 30-day full-refund period, and a toll-free customer service number. However, the headstock-repair programs have some significant differences.

Shopsmith has 45 stores in the U.S., and three in Canada, that you can take your machine to for service. Shopsmith will loan you a headstock during the repair period, and will pay freight to and from the factory for both your headstock and the loaner if you're not near a Shopsmith store.

Total Shop doesn't have a repair network, but Wayne Preston of Total Shop told us that doesn't pose a problem because "Ninety-nine percent of the time, an owner can make a repair after we supply him with the parts. We also repair headstocks here, and provide loaners, but we haven't had to send out a

loaner in three years." If you can't make a headstock repair, Total Shop most often will arrange to have a local motor shop make the repair. On any repair shipment you make to Total Shop, you pay for the freight to them, and they pay the return freight.

• Owner's manual and other little extras

Both machines have the kind of extensive owner's manuals (about 100 pages each) that we would like to see included with all woodworking machines.

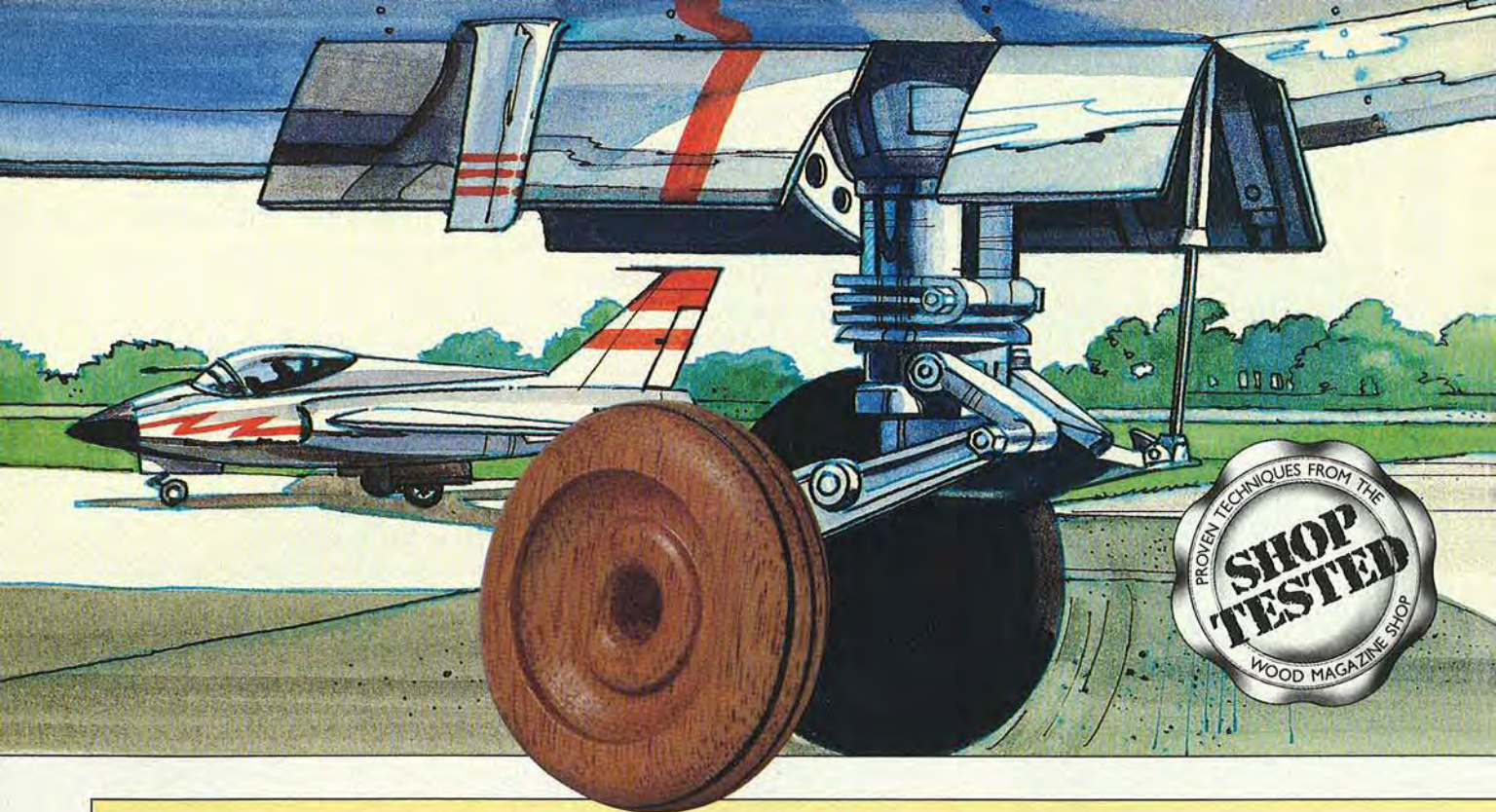
Shopsmith also includes the 360-page book *Power Tool Woodworking for Everyone*, a self-study guide, and a video tape on setting up and adjusting the Mark V. You'll also receive three "Heirloom Projects" packages. One package covers woodworking fundamentals. The other two contain plans, instructions, and a video covering any one of 12 different projects of your choice. If you can get to a Shopsmith store, the company offers a free one-day seminar on operating their machine.

• The bottom line: price

It's not surprising that most of these machines sell at demonstrations—you really need to see them in operation to appreciate their many talents. To learn the site of the next demonstration in your area, call each company at the toll-free numbers listed on page 38. You'll not only save money on either machine by buying it at a show, but you'll also save freight charges.

The Total Shop machine lists for \$1,495, and sells for \$1,059 with additional discounts or free merchandise at shows. Shopsmith lists its machine at \$1,599, but gives you between \$250 and \$400 off that price in merchandise or cash discounts at demonstrations. ♣

Written by Bill Krier
 Technical consultant: George Granseth
 Photographs: John Hetherington
 Illustrations: Kim Downing; Bill Zaun



A SIMPLE WHEEL WITH AERODYNAMIC STYLING

To get things rolling, we'll walk you through the procedure for the easy-to-make wheel shown *above*. You can fashion this little gem in a matter of minutes, then mount it on anything from simple pull toys to airplanes.

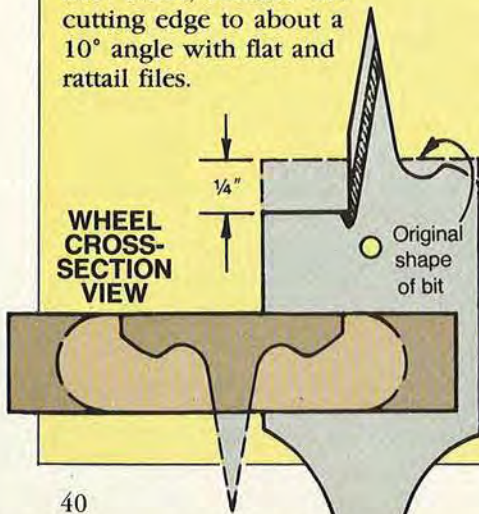
Give the wheel character with a modified spade bit

You can add a fancy touch to most any wheel by modifying an old spade bit. To shape a $1\frac{1}{8}$ " spade bit to the profile shown *below*, first lower one side of the bit about $\frac{1}{4}$ " on a grinder. Then, tightly clamp the bit in a machinist's vise and create the curved side with a rattail file. Next, restore the cutting edge to about a 10° angle with flat and rattail files.

These modified spade bits tend to tear the grain of some softwoods, but we had good results in $\frac{1}{2}$ "-thick hardwoods such as red oak, walnut, maple and Honduras mahogany. To keep this grain tearing to a minimum, ease the bit slowly into the wood as you approach the final depth.

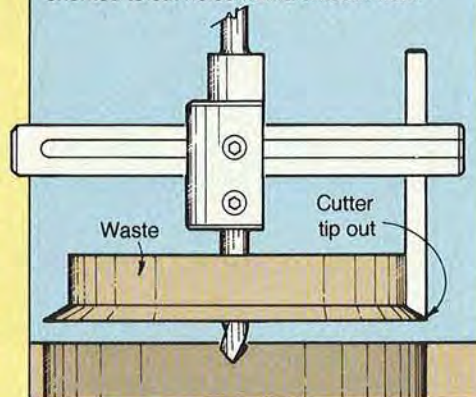
To make the best use of your time, mark all the wheel centers, then perform the following operations on all of the wheels before moving onto the next step. For these $1\frac{3}{4}$ "-diameter wheels, we suggest you space the centers $2\frac{1}{4}$ " apart. With your drill press set to 1,500 rpm, slowly lower the spade bit into scrap wood to a depth that leaves a full bead (about $\frac{1}{4}$ ") according to the wheel cross-section view at *left*. Once you're satisfied with the depth of the cut, set the depth gauge on your drill press.

Using the illustration at *right* as a guide, set your circle cutter for a $\frac{7}{8}$ " radius, reduce the drill-press speed to 500 rpm or less, and cut the outside perimeter of the wheels as shown on the opposite page. When using a circle cutter, remember to clamp the workpiece to the drill-press table.

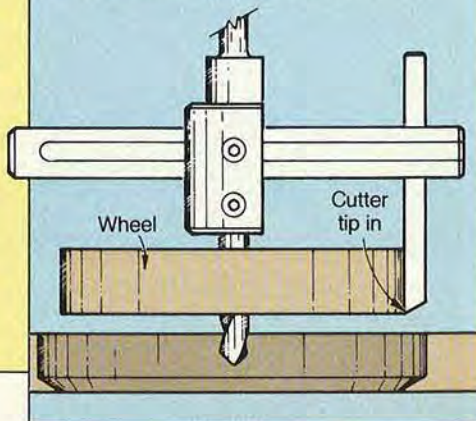


HOW TO GET THE MOST FROM YOUR CIRCLE CUTTER

Cutting holes: When purchased, the cutter is oriented to cut holes with a smooth wall.



Cutting wheels: Rotate the cutter 90° to produce a wheel with smooth sides.



YOUR PROJECTS
WILL TRAVEL IN
STYLE ON THESE

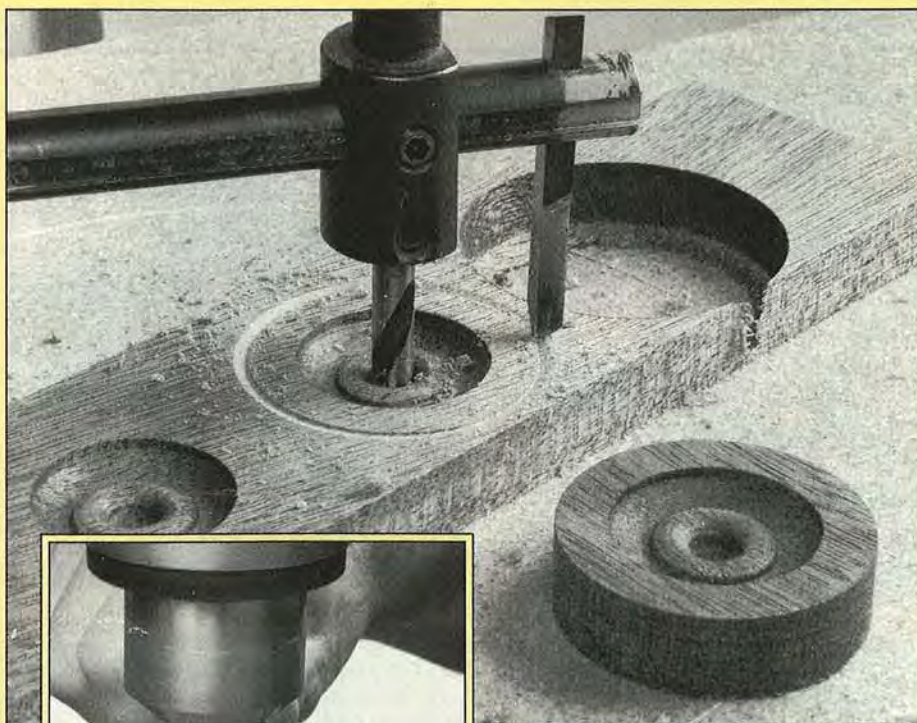
4 FUN-TO-MAKE WHEELS

Car manufacturers have known for years that a great-looking set of tires and rims can transform a ho-hum auto into a real standout. Now, you can perform the same magic on your next project.

 Print this article

We always knew that *WOOD*® magazine's design editor, Jim Downing, is a big wheel in the woodworking shop. So, it didn't surprise us when he responded to our request for a few great wheel ideas. We also tapped the expertise of loyal reader Ed Dohm of White Cloud, Michigan. Ed was

one of more than 400 readers who sent a toy into our first-ever Design-A-Toy™ competition in 1989. His monster truck didn't win a prize, but we were so impressed with his heavy-duty tires that we just had to find a way to share them with you. In case you're interested in building Ed's truck, you'll find the complete plans on page 46.



Keep your hands at a safe distance when using a circle cutter.

Use the back edge of an old hacksaw blade to burn in the tread lines.

Here's how to true and shape the wheel

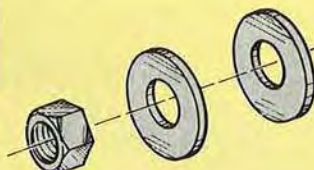
To get started, make a work arbor similar to the one shown *below* from a $\frac{1}{4} \times 3''-4''$ bolt. Place the wheel between the two washers, tighten the nuts, and chuck the nonthreaded end of the arbor into your drill press. Now, set your press for 750 rpm, and shape the outside of the wheel with a rasp. Remember to move the rasp continuously for a smooth, rounded wheel.

After sanding the tire smooth, burn in the three tread lines with a hacksaw blade as shown at *left*. To do this, grip the ends of a full blade and hold the *non-toothed, back* edge of the blade against the tire as

EASY-TO-MAKE WORK ARBOR

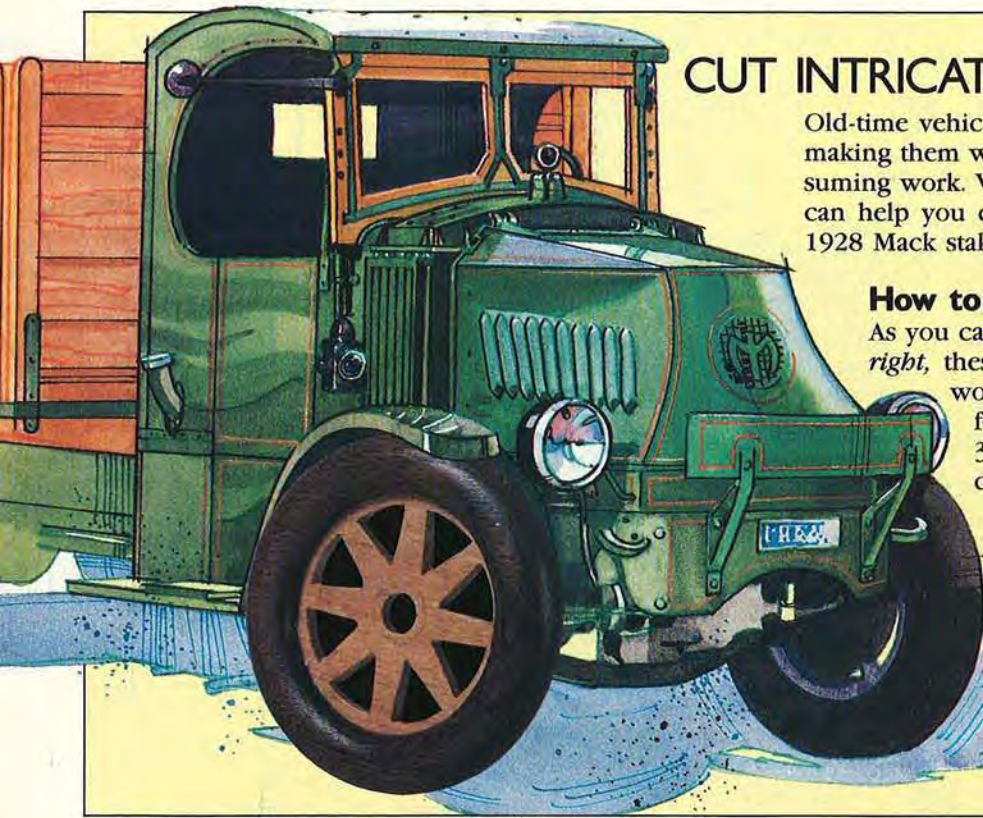
Chuck this end into your drill press

Cut off bolt head



it turns as fast as your drill press allows. (We set our drill press at 4,700 rpm.) Consider each tread line done when you see a small puff of smoke.

Continued



CUT INTRICATE WHEELS WITH YOUR

Old-time vehicles just cry out for spoked wheels, but making them with dowels can be tricky and time-consuming work. With a minimum of fuss, your scrollsaw can help you cut wheels like the one shown on the 1928 Mack stake-bed truck at *left*.

How to cut four rims at once

As you can see by the exploded-view drawing at *right*, these wheels consist of a scrollsawed plywood rim inside a solid-wood tire. To cut four rims at once, stack together four 3×3" layers of 1/8" birch plywood. Place double-faced tape between each layer to hold the stack together. Then, transfer one of the full-sized rim patterns shown *above right* to the top of the stack. Drill the 1/4" axle hole. Now, carefully cut on the pattern lines, going along the outside diameter last, with your scrollsaw. If the stack resists being pried apart, soak it in lacquer thinner and try again.

RETURN TO THE '50s WITH THESE WHITEWALLS

Jim Downing must have been day-dreaming about his first car—a '57 Chevy—when he came up with this wheel. Jim made the tire shown on the opposite page out of 3/4" and 3/8" walnut and 3/8" maple.

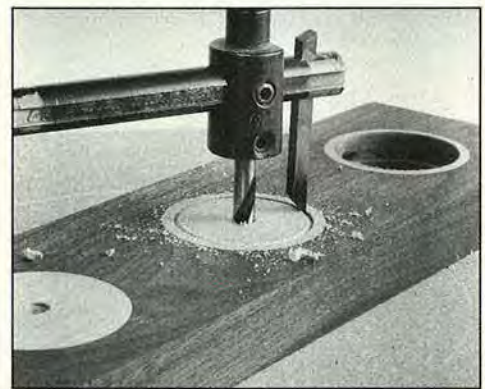
Seven simple steps and you're done

With a little bit of patience and the step-by-step instructions shown *below*, you can turn out a set of these wheels in about the time it takes to watch one rerun of "Happy Days." As you go through the steps, keep these tips in mind:

- To cut plugs that fit perfectly every time, make test plugs from scrap stock. If you don't have access to 3/8" stock, insert 3/4"-thick plugs and saw them off to within 1/16" of the stock surface.

- When gluing the plugs in place, apply adhesive to only the walls of the plugs. This allows you to cut away and remove the centers later, as we're doing at *right*.

- After step 7, mount the wheel on a work arbor, and shape it according to the Section View shown at *right*. Then, drill a 1/2" hole, 3/16"-deep, in the center of the wheel to



Glue only the walls of the plugs so you can cut and remove their centers with a circle cutter.

HOW TO MANUFACTURE YOUR OWN WHITEWALL TIRES

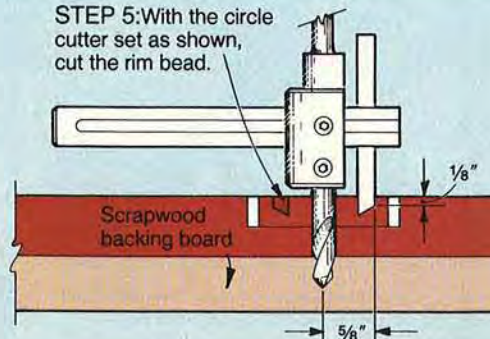
STEP 1: Using a Forstner bit, bore a 1 7/8" hole, 3/8" deep, into the 3/4" walnut stock.

STEP 2: Cut a plug from 3/8" maple stock to fit the 1 7/8" hole. We used a circle cutter.

STEP 3: With a circle cutter, bore a 1 5/8" hole, 3/8" deep, in the center of the glued-in-place maple plug.

STEP 4: Cut a 3/8"-thick walnut plug to fit the 1 5/8" hole.

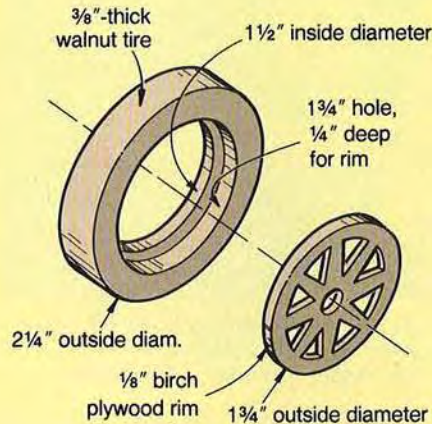
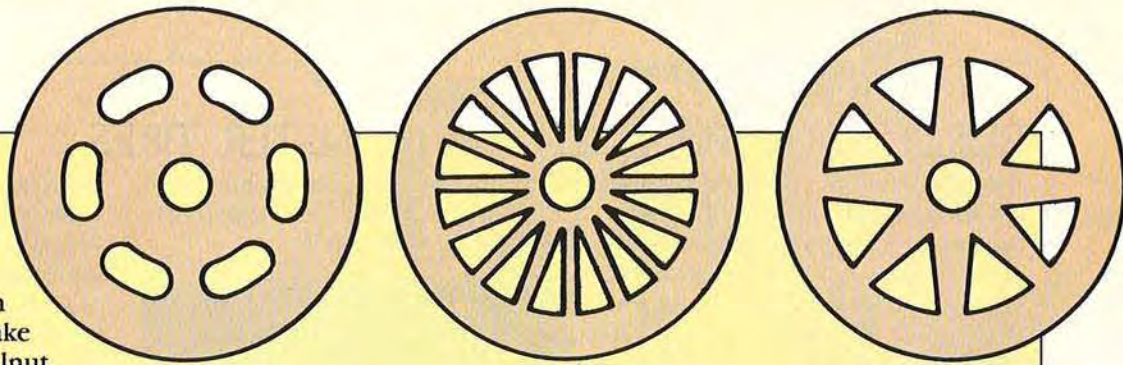
STEP 5: With the circle cutter set as shown, cut the rim bead.



SCROLLSAW

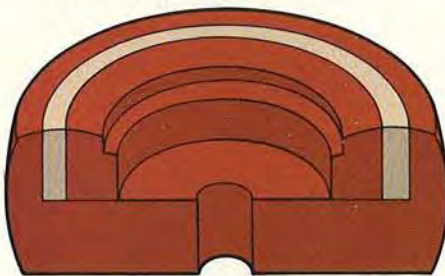
Make a balloon tire for old time's sake

A spoked rim deserves an appropriate tire, so let's make a balloon tire from $\frac{3}{8}$ " walnut. First, mark a series of centerpoints, spaced at least $2\frac{1}{2}$ " apart, on the backside of the walnut. With a compass, draw a $2\frac{1}{4}$ "-diameter circle at each mark. Then, at each centerpoint, cut $\frac{1}{4}$ "-deep holes with a $1\frac{3}{4}$ " Forstner bit. Center a $1\frac{1}{2}$ " Forstner bit in the holes you just made and bore clear through the wood. Moving over to your scroll-saw, cut along the outside of the tires, being careful not to creep inside the line. Now, glue the rims into the tires. After the glue sets, mount the tire on a $\frac{1}{4}$ " work arbor and round over the edges. Finally, clean up any scrollsaw boo-boos on the rim as shown at *right*.

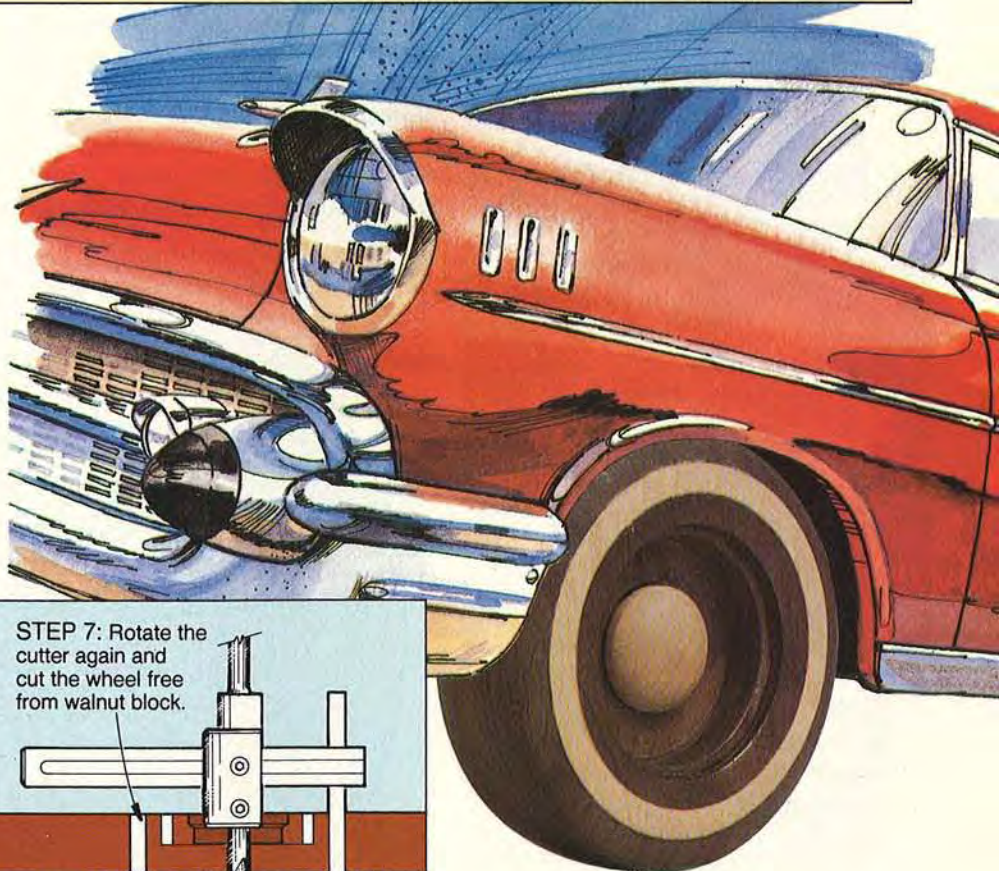


Small riffler files help you clean up scrollsaw cuts, even in the tightest spots between the wheel spokes.

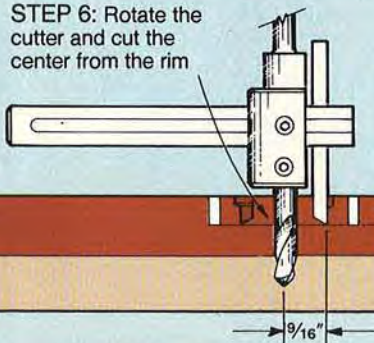
accommodate a baby-moon hubcap. You can either shape your own hubcaps from dowel stock, or buy $\frac{1}{2}$ " birch mushroom-head screw-hole plugs.



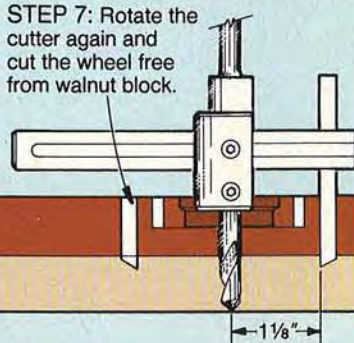
SECTION VIEW



STEP 6: Rotate the cutter and cut the center from the rim



STEP 7: Rotate the cutter again and cut the wheel free from walnut block.



Continued

BUILD YOURSELF A SET OF MONSTER TIRES

For heavy-haulin' vehicles such as the dump truck shown opposite, or the monster pickup truck on page 46, you just can't top these big wheels. And, after you build the two simple jigs required, you can turn out these wheels lickety-split.

Get the wheel into the round

As you can see by the illustration *below*, this wheel consists of two halves, each cut from 1 1/4" stock. For each wheel, draw two 3 1/2"-diameter circles on the stock. Within one of those circles, use the same centerpoint to draw a 1 3/8" circle. (This will be the outside half of the wheel.) Now, cut out the two wheel halves on your bandsaw, staying just outside the 3 1/2" circles. Then, build the simple sanding jig shown on page 16. Drill a 3/8" hole in the center of both halves and sand the wheels round as shown at *right*. Next, rout a 1/4" round-over

around the outside diameter of each wheel on the sides previously marked with a pencil.



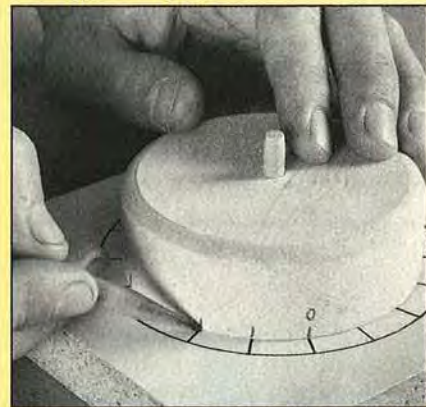
Set the sanding jig's stop for the correct wheel diameter, then turn the wheel into roundness with a disc sander.

Let's add those earth-hugging treads

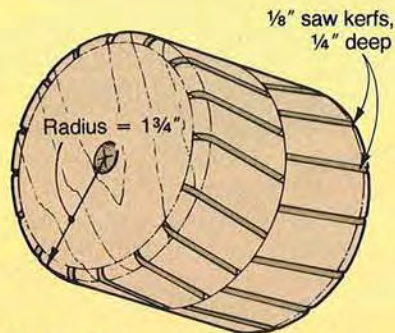
Before you cut the kerfed treads, you need to make a kerf-marking platform by inserting a 2"-long, 3/8" dowel into the center of a 5" x 5" piece of stock. Center the full-sized kerf pattern shown *below* on the platform, and mark the kerf posi-

tions on the unrounded edges of each wheel half as shown in the photo *below*. Write "0" above one kerf mark on each wheel half.

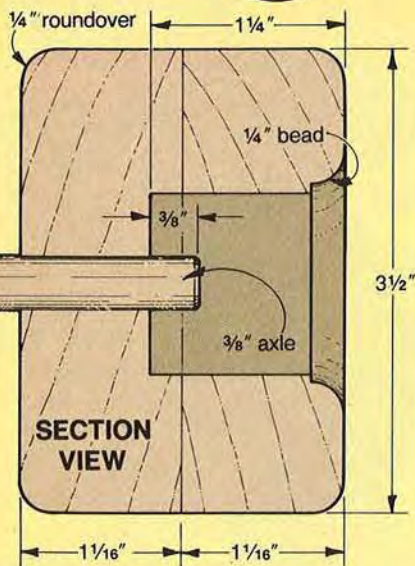
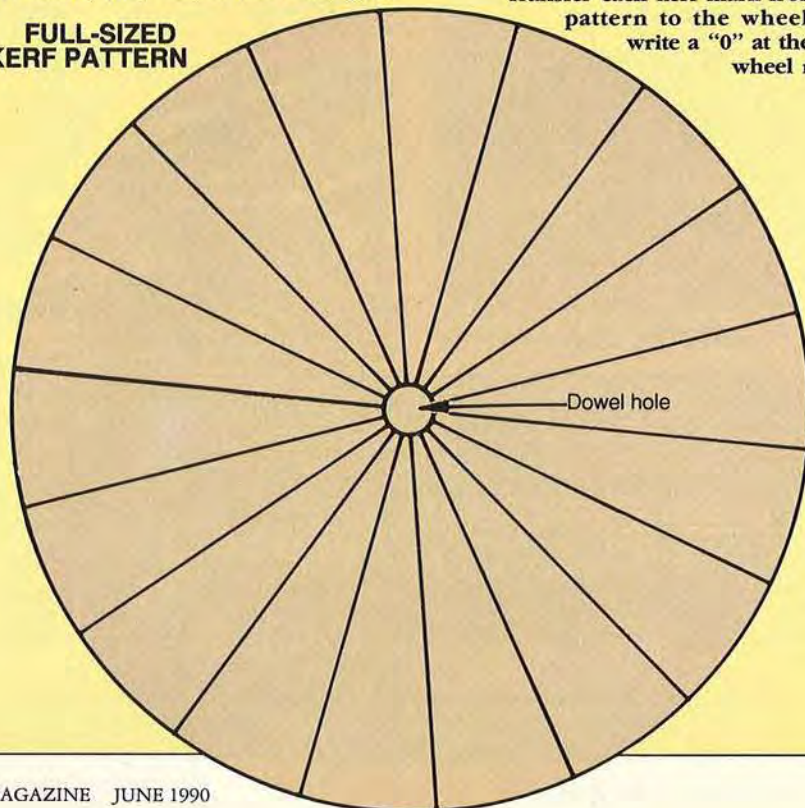
To make the angled kerf-cutting jig shown *opposite*, cut a piece of 3/4" plywood to 3 1/2 x 16". Then, center this piece on your miter gauge and attach it with screws. With you miter gauge set at 15° according to the kerf-cutting drawings on the opposite page, cut two saw kerfs through the jig with your miter gauge set to the left and then to the right of the blade. Add 3/8" dowels and reference marks to the jig as indicated in the drawing on the opposite page.



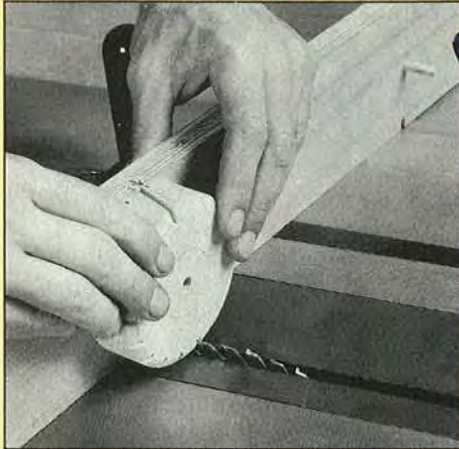
Transfer each kerf mark from the pattern to the wheel and write a "0" at the first wheel mark.



FULL-SIZED KERF PATTERN



Now, slip each of the wheel halves (unrounded side first) over one of the jig's dowels according to the instructions given on the illustration at *bottom*. Starting with the "0" mark aligned with the jig's reference mark, cut one 1/4"-deep kerf after another as shown *below*. Stop making cuts when the "0" goes all the way around the wheel and again reaches the reference mark.

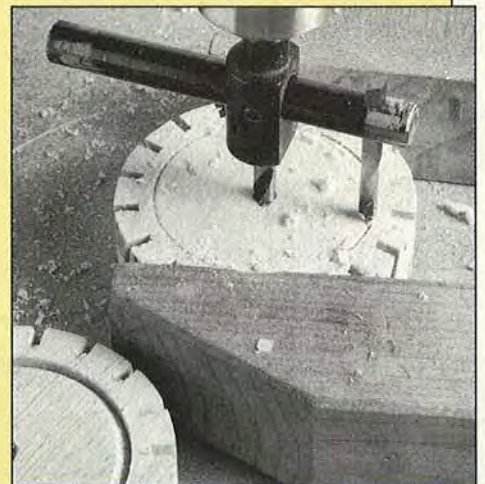
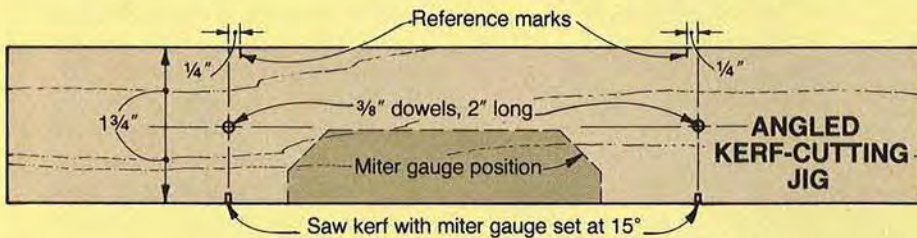


Line up each mark on the wheel with the reference mark on the jig before cutting each kerf.

Now, assemble your wheels

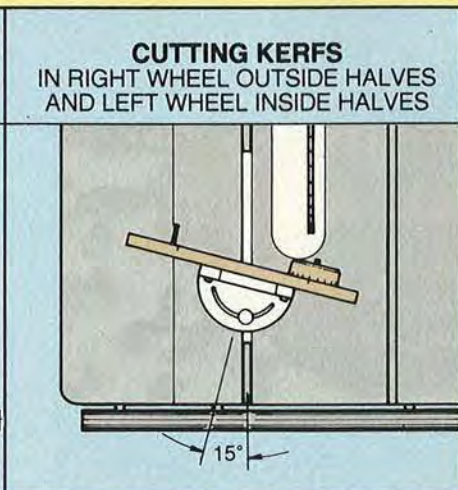
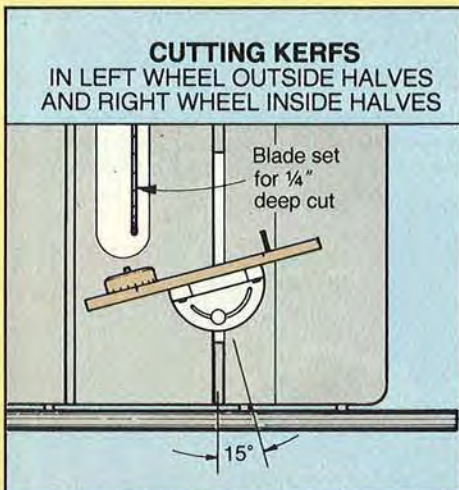
Here's a trick for avoiding glue squeezeout that you can use on other similar projects. Before gluing together the wheels, cut a 1/8"-deep trough just inside the treads on the

facing edges of the wheel halves as shown *below*. After applying the glue, place a 3/8" dowel through the two wheel halves for alignment, clamp the halves together, then



Use your circle cutter to make a handy trough for catching glue.

withdraw the dowel so it doesn't become glued in place. Bore a 1 3/8" hole, 1/4" deep into the outside of the wheels where marked previously. Then, add a 1/4" bead as shown on the opposite page. That's it—you've created a monster! 🐉



Written by Bill Krier with Jim Downing.

Illustrations: Bill Zaun; Mike Harrington; Jim Stevenson.

Photographs: Hopkins Assoc.

FUN-CHARGED

MONSTER

Making vehicles and jigs is nothing new to Edward Dohm of White Cloud, Michigan. A retired Oldsmobile production engineer, he spent less than an hour concocting the jig to kerf the hefty wheels on his monster truck. With a quality project like this, it's easy to see why this retiree enjoys spending more than 30 hours a week in his woodshop. In fact, Ed and his wife, Janice, market their wood projects at more than 10 craft shows a year in western and southern Michigan.

Note: To form the large wheels, refer to our wheel-making techniques article starting on page 44. You'll also need some thin pine for this project. You can either resaw or plane thicker stock to size.

Cut and join the cab and body parts

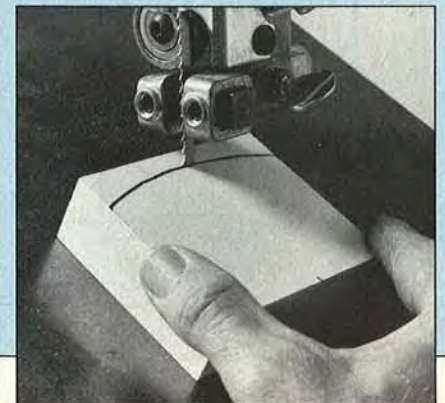
1 Cut the pickup bed (A) to the size listed in the Bill of Materials on page 49. (We planed a piece of $\frac{3}{4}$ "-thick stock to $\frac{3}{8}$ " thick.)

2 Cut the hood (B) to size. With the front ends and edges flush, glue and clamp the hood to the bed. (When clamping together the pine pieces to make this project, we used clamp blocks to prevent the jaws from denting the soft pine.)

3 Cut a piece of $1\frac{1}{16}$ "-thick pine to $2\frac{1}{2}$ " wide by $3\frac{3}{8}$ " long for the cab blank (C). Transfer the full-sized cab bottom-view pattern to the bottom surface of the cab blank. Tilt your bandsaw table 30° from horizontal. With the bottom surface of the cab blank facing up, follow the marked line to cut the cab front (windshield) to shape, as photographed below.

4 From $\frac{3}{8}$ " pine stock, cut two pieces $1\frac{3}{8}$ " wide

Transfer the pattern to the bottom of the cab blank, angle the bandsaw table, and cut the cab front to shape.



TRUCK AN OFF-THE-ROAD TRAILBLAZER

by $7\frac{3}{4}$ " long for the fenders (D). Using double-faced tape, stick together the two pieces, with the edges and ends flush. Now, transfer the full-sized fender pattern to one of the pieces. Cut the wheel openings to shape. Splash a bit of lacquer thinner on the taped joint, and pry apart the pieces (we used a wooden wedge, because a screwdriver tends to dent the pine).

5 Glue and clamp the fenders (D) to the bed-hood assembly (A, B), with the top edges and ends flush. See the Body Assembly Drawing for reference. With the back edge of the cab (C) flush with the back edge of the hood (B), glue and clamp the cab to the hood.

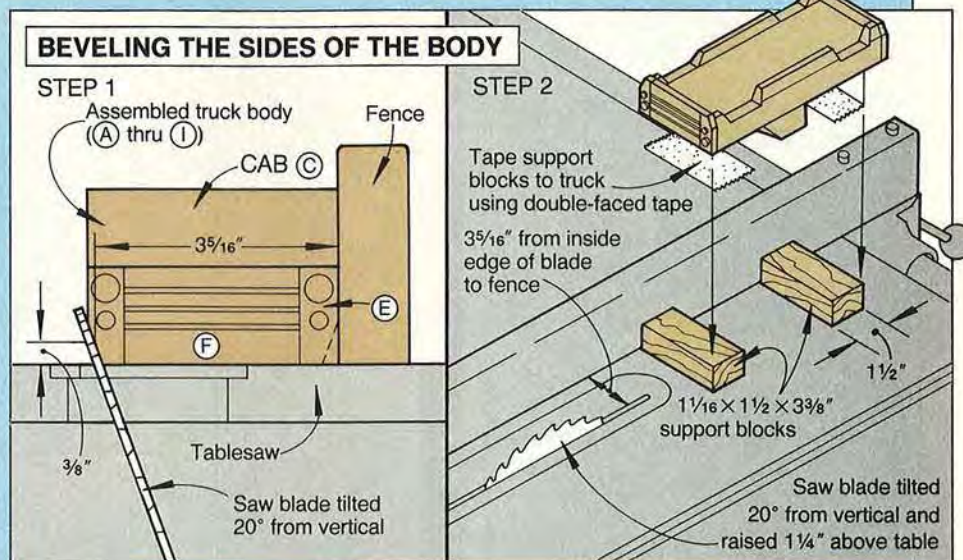
Here's an easy way to assemble the grille

1 Cut the grille parts (E, F, G, H) to the sizes listed in the Bill of Materials from $\frac{1}{4}$ " pine stock.

2 Tape a piece of waxed paper onto a piece of flat stock. (The waxed paper keeps the grille parts from sticking to the substrate.) Spread glue on the mating surfaces and hold the parts together with nails, spacing the parts with dimes as shown in the photo below.

3 After the glue dries, pull the nails and remove the grille from the sub-

strate. **Hold the grille pieces together with nails. Space the glued pieces apart with dimes until the glue dries.**



strate. Referring to the Parts View Drawing for locations, drill the headlight and parking light holes. Sand both surfaces of the grille. With the top of the grille flush with the top of the hood, glue the grille to the front of the cab assembly.

Tailgate, bumpers, and lights add a flashy look

1 Cut the tailgate (I) and bumpers (J) to size.

2 Cut a $\frac{1}{32}$ " saw kerf $\frac{1}{32}$ " deep in the tailgate where shown on the Parts View Drawing. (We used a dovetail saw to cut the kerfs.)

3 With a brad-point bit, drill the holes in the tailgate where shown

on the Parts View Drawing. Sand the tailgate smooth.

4 From $\frac{1}{4}$ " and $\frac{3}{8}$ " dowel stock, cut the headlights, taillights, brake lights, and parking lights for the grille and tailgate to length. Glue the dowels in place.

5 With the top of the tailgate flush with the top of the fenders, glue the tailgate to the truck body.

6 Using the two-step drawing above for reference, bevel-rip both sides of the pickup body.

7 Glue and clamp the bumpers to the front and back of the truck.

The wheels and drive-train assembly come next

Note: For details on how to make the oversized wheels (M), see the instructions on page 44.

1 Laminate three pieces of $\frac{3}{4} \times 2\frac{3}{8} \times 6\frac{1}{2}$ " pine face to face, and cut the axle blocks (K) to shape from the lamination (see the Parts View for the full-sized pattern).

2 Drill a $\frac{7}{16}$ " hole through each axle block where marked. Cut the axles to $5\frac{1}{4}$ " long from $\frac{3}{8}$ " dowel.

Continued

MONSTER TRUCK

3 Using the full-sized pattern at right as a guide, cut the transfer case (L) to shape and sand smooth. Glue and clamp the transfer case and axle blocks to the bottom of the bed, centered from side to side where shown on the Section View Drawing on the opposite page.

Now, form the spacers and mount the tires

1 Cut a piece of $\frac{1}{8}$ " pine stock to 2×12 " (we resawed thicker stock to $\frac{1}{8}$ " thick). Using a circle cutter, set to cut a 1" outside diameter, cut the four spacers (N). You could also cut the round spacers on the bandsaw. With a $\frac{7}{16}$ " bit, enlarge the pilot hole in the center of each spacer. See the spacer on the Parts View Drawing at right for reference. (To complement the pine truck, we preferred making our own spacers instead of using $\frac{3}{8}$ " metal washers.)

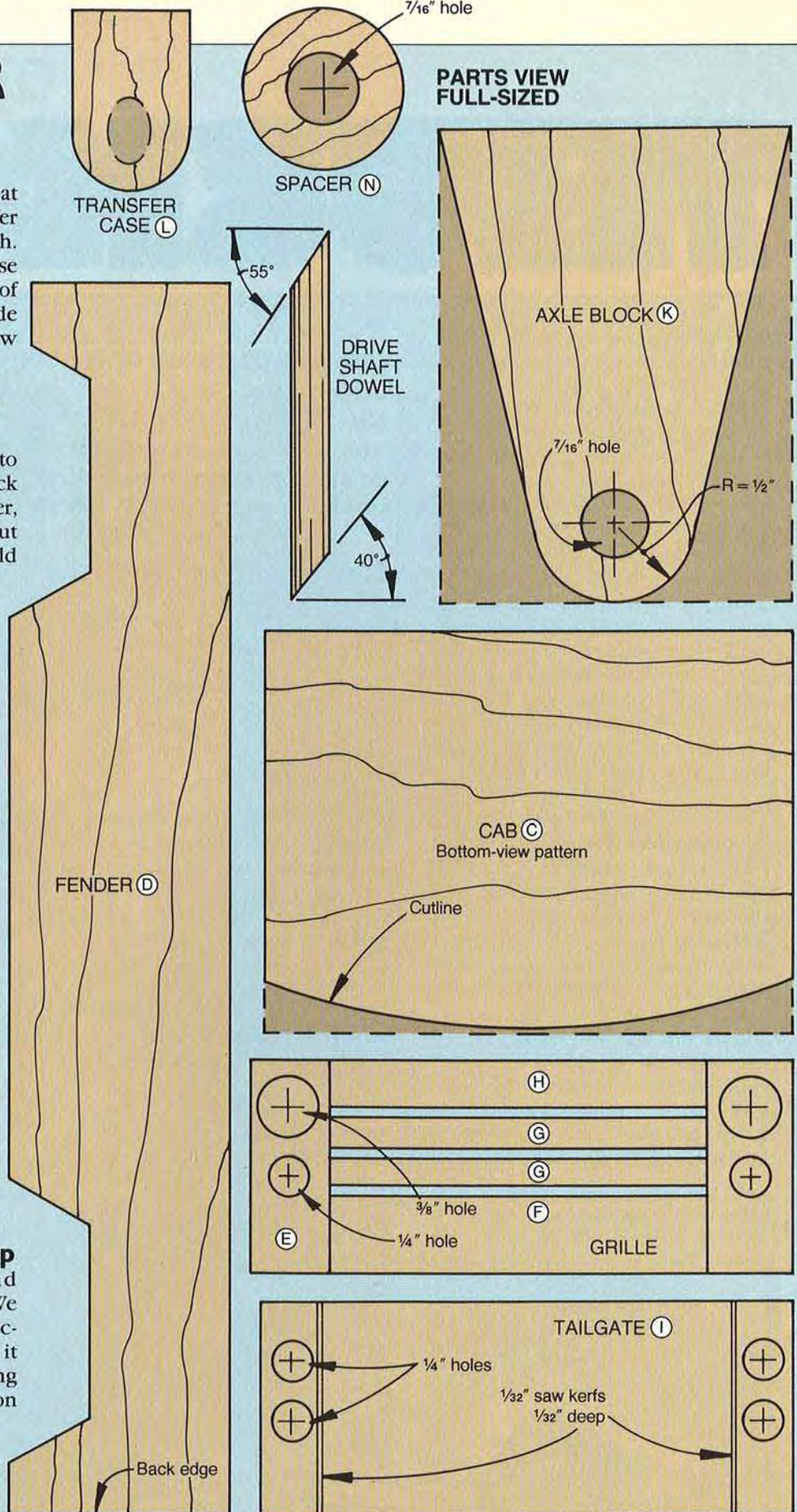
2 Glue an axle to one wheel so $\frac{3}{8}$ " of the axle protrudes in the counterbore of the wheel. Add a wood spacer onto the axle dowel on the inside face of the wheel. Slide the axle through the axle block, add another spacer, and glue the axle to another wheel. Repeat for the other axle assembly.

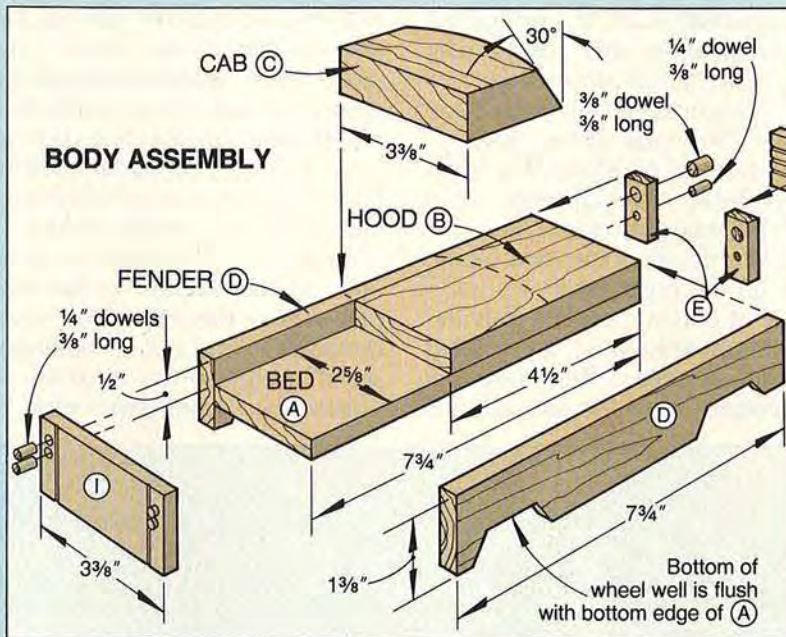
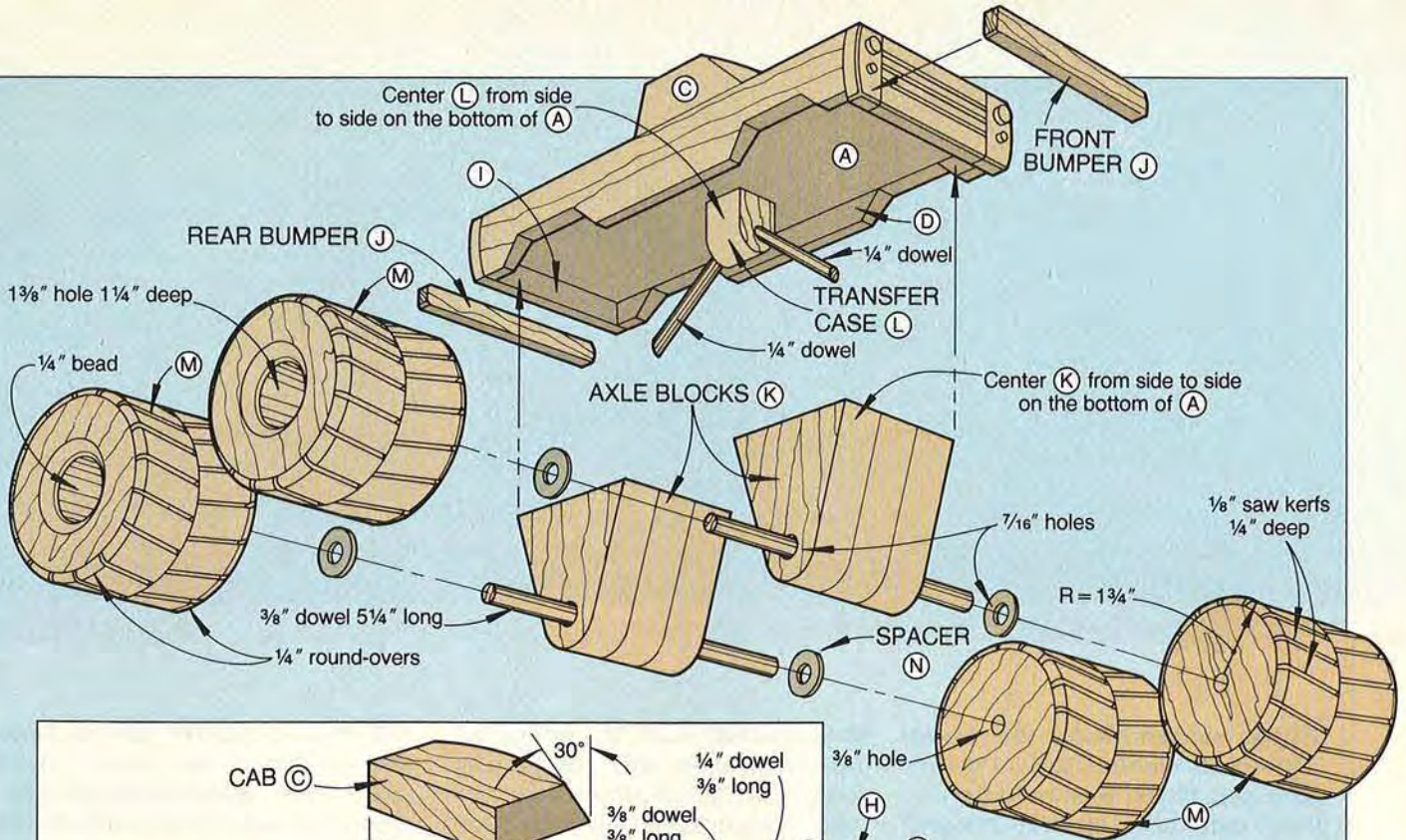
3 From $\frac{1}{4}$ " dowel stock, miter-cut the drive-shaft dowels to the length shown on the Parts View Drawing. Glue pieces in place (we used instant glue). You may need to sand the beveled ends for a gap-free fit between the transfer case and axle blocks.

Add the finish and fuel it up

1 Finish-sand the pickup and wheels. Add a clear finish. (We used polyurethane. We do not recommend an oil finish on toys; it tends to "attract" dirt from young hands and the finished project soon looks dirty.)

Produced by Marlen Kemmet
Project Design: J. Edward Dohm
Photographs: Hopkins Associates
Illustrations: Kim Downing; Mike Henry





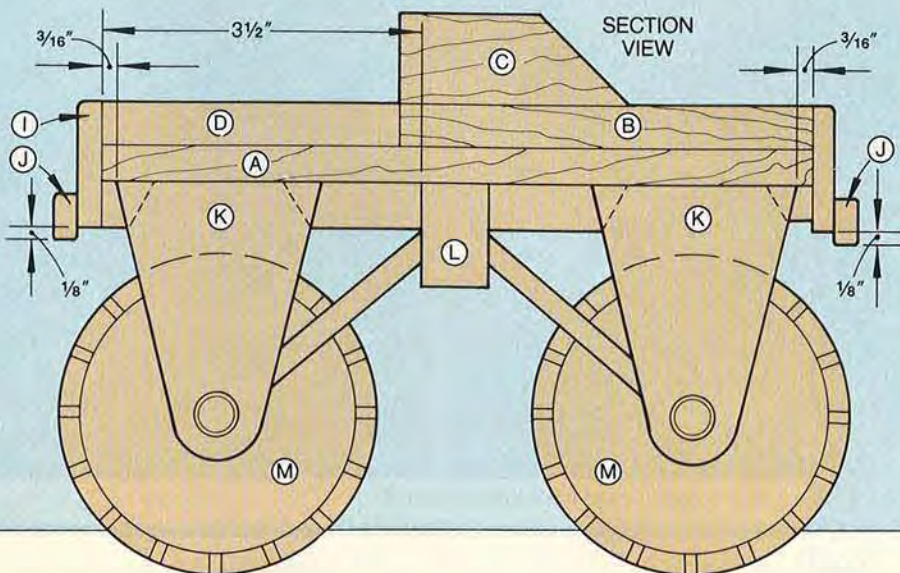
Bill of Materials

Part	Finished Size*			Mater.	Qty.
	T	W	L		
A bed	3/8"	2 5/8"	7 3/4"	P	1
B hood	1/2"	2 5/8"	4 1/2"	P	1
C* cab	1 1/16"	2 1/2"	3 3/8"	P	1
D fenders	3/8"	1 3/8"	7 3/4"	P	2
E grille sides	1/4"	1/2"	1 3/8"	P	2
F grille bottom	1/4"	1/2"	2 3/8"	P	1
G grille centers	1/4"	3/16"	2 3/8"	P	2
H grille top	1/4"	5/16"	2 3/8"	P	1
I tailgate	1/4"	1 3/8"	3 3/8"	P	1
J bumpers	1/4"	1/2"	3 3/8"	P	2
K* axle blocks	2 1/4"	2 1/4"	3"	LP	2
L transfer case	3/4"	3/4"	1 1/8"	P	1
M* wheels	2 1/2"	3 1/2" dia.		LP	4
N* spacers	1/8"	1" dia.		P	4

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

Material Key: P-pine, LP-laminated pine

Supplies: double-faced tape, 1/4" and 3/8" dowel stock, clear finish.



5



Print this article

EASY STEPS TO A FINISH THAT'S

GLASS-SMOOTH

1 For starters, sand the wood surface smooth with 150-grit paper. If you plan to stain the piece, sand it again with 220-grit paper. If you used an orbital sander, be sure to closely inspect the surface under sidelighting and sand away any swirly marks.

Now, carefully remove the sawdust from the surface with compressed air. Otherwise, vacuum the surface and clean it with a tack rag. If you prefer a stained surface, apply an oil-based stain and allow it to dry for 24 hours.

2 Coat the end grain of the surface with polyurethane, and allow it to saturate the pores fully before applying any finish to the tabletop. After a couple of minutes, and 2-4 applications, the end grain will stop absorbing polyurethane. Now, coat the top by brushing the polyurethane across the grain as shown below, then brush with the grain to completely

fill the wood pores. If you stained the piece, allow this coat to dry completely before proceeding.

For unstained wood, immediately wipe away the excess polyurethane with a 6-8" squeegee as shown below. The squeegee helps drive the material down into the wood pores, and leaves almost no finish on the high grain.

After the first coat of polyurethane dries (on either the stained or unstained piece), lightly smooth the surface with 150-grit sandpa-

per, being careful not to sand through the finish of the stained piece. With a fast-drying polyurethane (we used Varathane's Professional Clear Finish), you can apply your second coat after 12 hours. For slower-drying polyurethanes, wait 24 hours between coats.

Apply and squeegee a second coat to the stained or unstained piece. After this coat dries, inspect the surface in a strong sidelight to see if the grain has filled to your satisfaction. If not, sand with 150-



One morning not long ago, Design Editor Jim Downing marched into the *WOOD*® magazine shop carrying a smooth-as-glass tabletop that he had made for the galley of his 30' sailboat. Not surprisingly, it brought on a chorus of "oohs" and "aahs" as staffers rushed to run their fingers across it. Right away we knew that Jim's polyurethane-finish technique was too good to

keep a secret from our faithful readers.

The key supplies for Jim's glass-smooth finish include 1,500-grit sandpaper and two finishing compounds formulated for auto finishes. In case you can't find a local auto-supply dealer that carries these products, we've arranged for a mail-order source. And, you won't need any special tools—just some patience and a little elbow grease.

grit paper and repeat the process. Sand the final coat with 150- and 220-grit papers. For the porous red oak end table in this story, we applied and squeegeed four coats to completely fill the grain.

3 Next, spray a heavy, flowing coat of polyurethane onto the surface. Apply three more coats, and sand between them with 220-grit paper. (Aerosol cans work fine if you don't own a spray gun.)

After the final coat dries, apply a few ounces of water and wet-sand the surface with a 3M No. 20 wet or dry sponge pad and 1,500-grit paper as shown *below left*. Check for glossy spots and resand any missed areas. You can purchase the pad, 1,500-grit paper, and finishing compounds through the Buying Guide *below right*.

4 Build that glowing finish with 3M's Finesse-it II Finishing Material. Squirt an

ounce or two of the liquid onto the surface and rub it in with a clean, soft rag as shown *below left*. Bear down hard as you rub the entire surface. Then, wipe the surface clean, and if you see any dull areas that you missed, redo them.

5 For the final luster, repeat Step 4 with 3M's Imperial Hand Glaze. Be careful to use separate, clean rags for steps 4 and 5.

From beginning to end, we spent five days finishing the end table's oak surface. Less-porous woods, such as cherry, maple, or walnut, require about half that much time.


Buying Guide

• **Glass-smooth finishing kit.** Quart-size bottles of 3M Finesse-it II Finishing Material and Imperial Hand Glaze, 50 sheets of 1,500-grit sandpaper, and No. 20 wet or dry sponge pad, \$44.62 (U.S.) ppd. Hawkeye Auto Supply, 417 12th St., Des Moines, IA 50309. 🌿



Written by Bill Krier with James R. Downing Photographs: John Hetherington; Hopkins Associates



 Print this article

TOYS FOR

Canadian woodworker Karol Fedoryshyn crafts truckers across



Karol Fedoryshyn

When Phil Vander Ploeg, president of Toys and Joys in Lynden, Washington, mentioned that he knew a man in Manitoba who

made lots of neat trucks, we checked out his tip. Sure enough, Phil, one of our 1989 Design-A-Toy judges, recognizes a craftsman when he sees one.

At East Braintree, in eastern Manitoba, we found Karol (say Carl) Fedoryshyn at work on his model trucks. He and his wife, Mabel, made us feel at home.

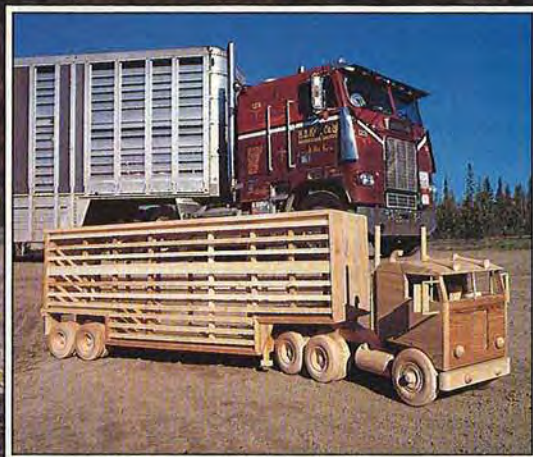
Karol also took us to the weigh station where he's employed so we could see firsthand how he does his research. There, we met several swell Canadians who make their living on the open road. And, after watching us photograph some of Karol's trucks, the drivers even placed orders for their own models.

Trans-Canada Highway 1 spans 2,500 kilometers from its oceanside beginning at Vancouver, British Columbia, to its dilution into several routes near lake-dotted Kenora, Ontario. To truckers, names like Kamloops, Medicine Hat, Moose Jaw, and Portage-la-Prairie become landmarks on a cross-country road that slices through soaring mountains, flat grain fields, and dense timberland.

Long-haul drivers know every inch of Trans-Canada 1—particularly the weigh stations at provincial borders. To weight or safety violators, these mandatory stops can represent delays, fines, hassles. Most truckers, though, look on them as oases on the long, paved ribbon.

BIG BOYS

custom cedar semis for
the provinces.



Manitoba's West

Hawk scales, at the Ontario border, has an added attraction. To hundreds of Canadian truckers, it's where "the model guy works."

Fords, Freightliners, Macks, Petes, Whites, and wolves

Karol Fedoryshyn has worked at the West Hawk scales long enough to have seniority, and learn a lot about semis. He studies them for his job, and for the models he knows he'll eventually build. Since he began building them five years ago, Karol has made at least 400 truckers happy with 1/12-scale copies of their rigs. His models sell for about \$200 (Canadian) and have found their way to England, New Zealand, Ireland, East Germany, as well as

the States.

Karol has made small and big trucks—one rig had 52 wheels and stretched 5'7". No matter the size, though, count on realism.

"That's a Ford L9000," Karol says after glancing at a truck just coming onto the off ramp. "Fords, Freightliners, Macks, Peterbuilts—the radiator gives them away," he notes from his desk.

With a twinkle in his eye to rival St. Nick's, Karol mentions the basic truck body styles of cabover and sleeper, then spells out how each manufacturer adds distinctive features. With knowledge that goes below the surface, he doesn't hesitate to explain tridem axles and engines to boot.

Karol notes the nuances from truck to truck because he has to.

▲ Near the West Hawk scales, a cab-over Freightliner hauling livestock parks behind Karol's 1/12-scale version.

"My models must be accurate," he explains. "Two truckers may each own the same tractor, but they'll never be exactly alike. They customize them, eh.

"So, when someone wants me to make a model of his tractor, he'll point out what he's added," Karol continues. "Then, I take a photograph that shows all the details, and build from that."

Studying trucks has become as second nature to this craftsman as watching for wildlife has to long-haul drivers on Canadian highways. During his shifts at the scales, Karol scans each semi as it's weighed and thinks about

Continued



TOYS FOR BIG BOYS

how he can copy some aspect of it in wood. "Sometimes, I get an idea for a new way to make a part," he notes. "Like where the exhaust stacks curve to go beneath the cab body. I used to make them from dowels that I bent with a series of cuts, then glued. But they never looked quite right. Then, I thought of wooden drapery rings. A cut-off section of the radius worked perfectly. That's what I went to."

Closely observing trucks at the scales has brought some surprises, too. Such as the time Karol spotted the wolf.

"We're so far out in the bush," he says in setting the scene, "it's not unusual to see a bear or a moose amble down the highway. But, one winter night, I was watching a driver walk around his truck to thunk tires—and there was a timber wolf following him! Just interested, you know, in what the man was doing. The trucker, he didn't see him, eh. Just kept walking. He wouldn't believe it happened."

Eighteen wheelers at 40 degrees below

Around sparsely settled Falcon Lake, box numbers replace house numbers. And, after years spent in bustling Winnipeg, Karol likes the solitude of his 20-acre parcel adjoining the Boggy River. Even the double-garage-turned-shop touches the woods.

"Here's where I block my wood to size," Karol explains as he opens the overhead door. In the walkways between the racks and stacks of stored wood stand some dusty stationary machines. "I started 10 years ago with a used jointer and a 10" tablesaw. But, the planer I got has turned out to be a godsend. Before, I had to do a lot of sanding to get the wood to the proper thickness after resawing. Now, I send it through the planer and it comes out exactly 1/4" or whatever I want."

Karol pauses, surveys his machines, then reflects, "My Dad bought me my first saw when I was six. He was a butcher by trade, but he learned woodworking in the Old Country—Czechoslovakia—where they built a workbench or other projects without any fasteners. He'd use pegs and slotted joints. No power tools. I learned a lot from him."

Karol continues the train of thought. "In high school, my wood shop teacher, Mr. Burnside, made us do everything with hand tools the first year. We called him 'Face-Side and Face-Edge Burnside' because he'd give us a rough piece of lumber and we'd have to plane the face side of it flat. Then, he'd check it with a square, and the face edge had to be exactly 90°. If it wasn't right, you had to scrap it and start over again. A lot of kids now," he says, tugging at an ear, "they're lost without an electric power tool and an extension cord."

Karol walks over to a door in



the dividing wall and opens it to reveal a second shop. "This room is where I do all the parts-sawing, sanding, and assembly. It's insulated to 40° below," he says proudly. The assembly shop isn't filled with bank after bank of stationary power tools, only the necessities.

Karol, for the most part, makes do with what he has. "That tablesaw is 30 years old. I bought it at Sears," he explains. "It's a 'National' and it has a 4" jointer. With the stand, motor and everything, it cost \$125. I remodeled the fence, though, and rebuilt the arbor."

Left top: Karol makes cars for gift shops, although he sells the trucks, such as the sleeper he's inspecting, by special order.

Right top: Karol trims up cab detail. Note the materials: the golf-tee air horns and drapery-ring sections for exhaust pipe.

Right bottom: From maple, Karol turns inner wheels for his semis ten at a time. He buys outer wheels by mail order.

Left bottom: " 'Bout time I got it, eh?" says jovial trucker Gerald Michaud of St. Pierre, Manitoba, as he takes delivery of his model Ford LT9000. Karol personalizes his models by photographing each rig, then adding details from the photo.



Karol does all his resawing on the little bench-type saw. He makes crosscuts on the radial-arm saw—when its table isn't littered with sketches and plans. "That's where I do all my drawings," he says, clearing away the jumble of rolled and folded papers.

Production for the parts bins

Karol hasn't yet made all the rigs he sees go through the scales. But he's made enough to know that there's lots of identical parts on the road. That means inventory.

"Cutting the parts and assembling the trucks take about equal time," Karol notes. "I'd say I average about 10 hours per truck. And that's because I try to save time where I can."

For instance, Karol buys ready-made hardwood wheels by mail order. The inside wheels that don't show, he turns in his shop from maple. "I just chuck a long square on the lathe, turn it round, define each wheel, and cut them apart," he says. (See photo, left.)

"I use the router for the radiators," Karol adds. "When I turn out the radiators [grills], I do them 50 at a time, with templates. I cut the rough block out twice as thick as the radiator will be and press it into the template that acts as a router guide. After I rout out the grill area on one side, I turn the block around and do the other. Then I cut it into two radiators, leave them rough, and stack them in my parts bin. When I make a vehicle, I sand them."

An inspection of Karol's parts department reveals carefully separated containers full of unfinished golf tees for air horns, hardwood plugs and buttons for head- and taillights, dowels and wooden drapery rings for exhaust pipes, turned barrels for tanks, and stack after stack of thin-sawed material for mudflaps, mirrors, and trailer sides. The crowded bins with their labels identifying model designations present a factorylike appearance to one wall of the shop. Everywhere else, there's wood.

Apparently, the near-wilderness setting develops resourcefulness because Karol admits he not only doesn't throw away much wood, he acquires it as inexpensively as possible. "I only use white cedar

for my models," Karol says, "and it's expensive. The last time I bought some, in Kenora, it was \$1,300 a thousand [board feet]. Some people around here seem to waste a lot of wood, maybe because it's so plentiful."

Trips to the landfill, for instance, prove profitable for Karol. "The contractors who build lake cottages, if they make a mistake, they tear the new stuff out and go to the dump with it," he says.

Trucks for display, not play

Trucks represent the bulk of Karol's production, but he also makes old-fashioned, stake-side pickup trucks, sedans, and other vehicles. A few years ago, he even made a replica of Winnipeg's *Paddle Wheel Queen*, a boat that took 1,000 pieces of cedar to complete.

For the occasional model he builds of hardwood, Karol assembles with yellow glue. The white cedar pieces for most of his vehicles, though, go together with a hot-glue gun. "It's fast, not messy, and it holds up," Karol says. "I've only had to repair one. The man said it fell off the mantle, but I suspect it had a rough go."

Karol's also a bit unconventional about finishing. He refuses to.

"We seem to be at a time now when people prefer natural wood," Karol says. "I had a guy who showed me pictures of plastic model trucks his son made. He said, 'I want you to make me one out of wood. They're totally different.' The wood seems to bring something out in the truck. If I even put a clear finish on it, I lose all that. Besides, they may be big boys' toys, but they end up on display." 🌲

To contact Karol, write:

Karol Fedoryshyn, Falcon Lake Post Office, Falcon Lake, Manitoba ROE ONO Canada

Written by Peter J. Stephano
Photographs: Brian Gould/Image 2

THE WONDERFUL WOOD

At Florida's Walt Disney World, the show must go on, and to a select group of craftsmen, that means living a fantasy.

 [Print this article](#)

The Magic Kingdom. Epcot Center. Disney-MGM Studios. It's all Walt Disney World. And, without a doubt, it's really a world apart.

Sprawling across 27,000 acres—that's 43 square miles—Walt Disney World covers a land mass about twice as big as New York's Manhattan Island. For population, would you believe 31,000 employees, a number surpassing many Chicago-area suburbs? And, guess what? Just as in any place with that many people, there are a goodly number of woodworkers, too.

Hi ho, hi ho, it's off to work we go

Behind the characters, castles, exhibits, glitter, parades, restaurants, rides, and thrills that the Disney corporation created in central Florida's piney woods, we found some hardworking craftsmen. Even a hot summer sun, humidity, or a blustery day can't dim the enthusiasm of the 40-man crew that makes up Walt Disney World's mill shop.

Above the din of saws and shapers, there's occasional laughter. And why not? The Disney brand of woodworking happens to be fun.

Where else but at Disney World could a woodworker—in a week—carve a car from Styrofoam, mend Cinderella's carriage and castle, cut out 300 plywood palm leaves, repair a century-old carousel horse, and craft cabinetry for a foreign exhibition? At Disney World, these tasks are a matter of course.

"We're not really a production shop, we're a specialty shop," explains Cephas Goodman, 56, mill shop superintendent and a Disney employee for two decades. "One day, a worker could be making a real fancy cabinet, the next he could be making a crate."

In the Wonderful World of Disney, who can tell when the boss might drop in to lend a hand? Mickey shows Carlos Boero how to fasten a spindle.

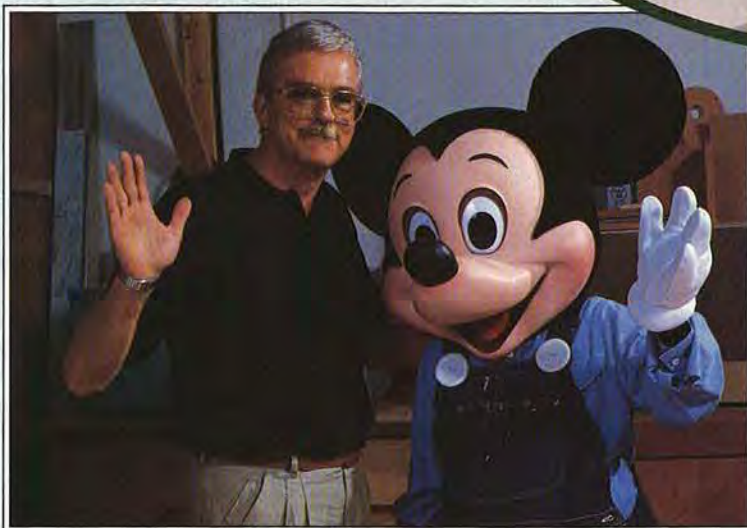


WOOD® ON THE ROAD

Did you know that Mickey Mouse likes woodworking, too? And, boy, does he ever have a great shop with lots of tools!

Last August I got to see first-hand what it's like to be a behind-the-scenes woodworker at Walt Disney World. For the better part of two days, I met and talked with the craftsmen you'll meet in this article and their fellow workers. I saw their work, too, and from cabinetry to stage sets, it's all first class. And you know what? I can't recall a happier bunch. Maybe it's because they know their work makes others happy. Thanks for the experience, Mickey and friends.

—Peter J. Stephano, Features editor



WORKING WORLD OF ...

DISNEY



Whatever happens to be on the daily agenda, however, it won't be made or repaired in a slipshod manner. The sign on the side of the massive Central Shops building that encompasses the mill shop says it all: *CENTRAL SHOPS, Dedicated to Excellence.*

"Big manufacturing companies and even cabinet shops can't afford to take the time to do things like Disney does," says Cephias. "Like building Mickey Mouse's car for Mickey's Birthday Land. Carl Reynolds (see photo *below*) probably spent four weeks on it, besides his other work. He carved it out of foam from nothing but a rough-drawn sketch."

Then again, Cephias often sees to it that some things get done quickly. For unlike *Mary Poppins*, Cephias' crew can't get the work done magically. "Sometimes, we have to turn jobs around pretty fast, and a lot of work becomes overtime because Disney always wants the show to go on."

▼ Carver Carl Reynolds, a former Detroit auto-industry model maker, fashioned Mickey's car from Styrofoam with a chainsaw and a bread knife.



A workshop fantasia

Walt Disney World's Central Shops covers 180,000 square feet—that's about four football fields—and serves the entire Disney empire. From within its walls emerge everything from paddlewheelers to mechanical animals, destined not only for the Florida kingdom, but California's Disneyland, the theme park outside Tokyo, the facility under construction near Paris, and even non-Disney enterprises. "For example, we built a dozen small ride boats for a Hyatt hotel in Hawaii," Cephias points out.

As part of Central Shops, Cephias Goodman's mill shop claims a floor area equal to 48 double-car garages (23,000 square feet). And, that gigantic shop houses a host of equipment: seven jointers, nine radial-arm saws, nine 10" tablesaws, seven bandsaws, a huge resawing bandsaw, a straight-line rip saw, three planers, a profile sander, an overhead router, an inverted router with vacuum template, five shapers, a pair of doweling machines, four chop saws, eight disc sanders, five spindle sanders, a 6'-bed lathe, and a huge lathe with a 27' bed. And probably 101 hammers.

The mill shop even has an in-house millwright, Bobby Fultz. What does a millwright do? Sharpen blades, weld bandsaw blades from roll stock, and create special blades—such as the .700 shaper knives with profiles unique to Disney World—on a \$20,000 profile knife grinder.

With all those woodworkers working and tools machining, Cephias' crew naturally goes through a lot of wood, even in a week. That's why the lumberyard across the way carries enough stock to service a small city.

Wood by the train-car load

Tiki Parks, the mill shop's planned-work specialist, tracks the running inventory of wood in the lumberyard. Her daily tallying indicates

Continued

that more than several train-car loads pass through the shop each year. "The lumber warehouse, in an average year, issues 39,000 board feet of South American mahogany, 12,000 board feet of hard maple, about 49,000 board feet of select, structural, vertical-grain Douglas fir, 261,000 board feet of construction-grade spruce, 125,000 board feet of pressure-treated pine, 11,000 board feet of oak, and a mixture of others—cherry, poplar, cedar," she says after a quick glance at her computer. "Then, there's the plywood. Fir plywood alone runs over 16,000 sheets. And, we special-order other woods as needed."

To most *WOOD* magazine readers, that's more than a cat's nine live's worth of stock. Where does it all go? "Mahogany and vertical-grain Douglas fir hold up the best for outdoor moldings, doors, trim, and the like," says Cephas. "In California, redwood held up beautifully when they built Disneyland, and we used a lot of it here when we originally built the park. But, in this damp climate it didn't last, so we don't use any redwood at all now. And, mahogany here costs about the same as vertical-grain fir, and," he adds, "they're both cheaper than pine. We use maple inside for turnings for stair rails and balusters, and it's good to paint. Mahogany also goes into cabinets."

Pressure-treated southern pine ends up as Disney World fences and decking. "For decking," Cephas notes, "we use only 2-by or 3-by stock, dovetail it every inch, then put a Carborundum material in the grooves to hold up to traffic. Otherwise, the planks would wear out too soon and we'd have safety problems."

Plywood sheets become the material for stage floors, backdrops, and props, such as the palm trees that will eventually decorate the



Top: Woodworkers build a plywood-and-steel frame for a 54×46' shell that will adorn the Dolphin and Swan Hotel.

Bottom left: Harold Headlee turns everything from stair balusters to 27' pillars. Note his handy tool rack on the lathe.

Center top: Roberto Marrero cuts out plywood signs in the shape of mouse ears with an inverted router.



entrance hall of Disney World's brand-spanking-new Dolphin and Swan Resort Hotel. In other construction at that facility, mill-shop employees constructed a 54×46' scallop shell with ribbing made from 400 sheets of 3/4" plywood, steel framing, and a fiberglass covering (see photo, left). Complete, it weighs 75,000 pounds. Held in place at the hotel entrance by a trio of fiberglass dolphins, it will serve as the basin for a massive cascading fountain that visitors drive their cars beneath.

Only experienced woodworkers need apply

Cephas attempts to hire only people who have worked in cabinet or millwork shops, or have extensive home-building experience. "A lot of people have worked in different shops, but we find that no one has ever worked in a shop like Disney's," he notes. "We do things here that you just don't do in other places."

The superintendent spent nearly 20 years as a cabinet-maker in northern Florida before migrating to Orlando and the magic of Disney World. And his employees can cite similar backgrounds. Carlos Boreo, 40, one of Cephas' foremen, grew up in Argentina where he began his woodworking as a young teen with a Cinderella job sweeping out a cabinet shop. Carl Reynolds, the in-house carver, claims 30 years of his 50 in woodworking, including a fun stint making model cars in Detroit. There's also a craftsman who once focused his skills on piano-making; a young man who previously customized private airplane cabins with cabinetry; and a former U.S. Navy submariner who picked up skills in his spare time at base woodshops. Throughout the mill shop runs the common thread of woodworking experience, and for Cephas and Disney World, it pays off in big dividends.

Job tickets from scratch

"We do a little bit of everything," explains Cephas. "I don't really keep track of the categories, but a lot is maintenance—maybe 60 percent—such as repairing doors or cabinets, or even carousel horses. New work might be 40 percent. It's really hard to break down, it varies so much." Vary it does, and that's why Carl, the carver, loves it.

One goofy week, he carved Mickey's car from Styrofoam—complete with dashboard, steering wheel, and seat. The next week he blocked out intricate signs in oak with palm gouges. "There's no pressure, and there's always plenty of time allowed to do the job from start to completion," says Carl.

And, when a project starts from scratch, the woodworker making it follows it through. "When I carve a sign in relief," Carl notes, "I select the wood, cut it, and surface it, too. The only thing we don't do is finishing. For that, it goes down the line to the paint department."

Turner Harold Headlee, 56, has worn the Magic Kingdom patch on his snow-white shirt for nearly 10 years. At his lathe, he shapes the spindles for railings, ship's wheels, and chairs. On the 27'-bed lathe—yes, longer than most garages—he's turned masts for sailing ships and pillars for plantations. "The most fun I've had, though, was turning the balusters for the front porch on Mickey's house. They were made of Styrofoam, like his car!"

Carousel horses, carriages, cabinets, doors, displays, parade floats, paddlewheelers, signs, spindles, ship's wheels, and trams to move people, they're all on the job tickets at Walt Disney World, a woodworker's fantasyland. In fact, Cephas and his craftsmen will attempt practically anything. "Except," says the head man with a sigh, "wagon wheels. We found out it's cheaper to buy them."

Note: Back-lot tours of Walt Disney World are not available to the general public. ♣

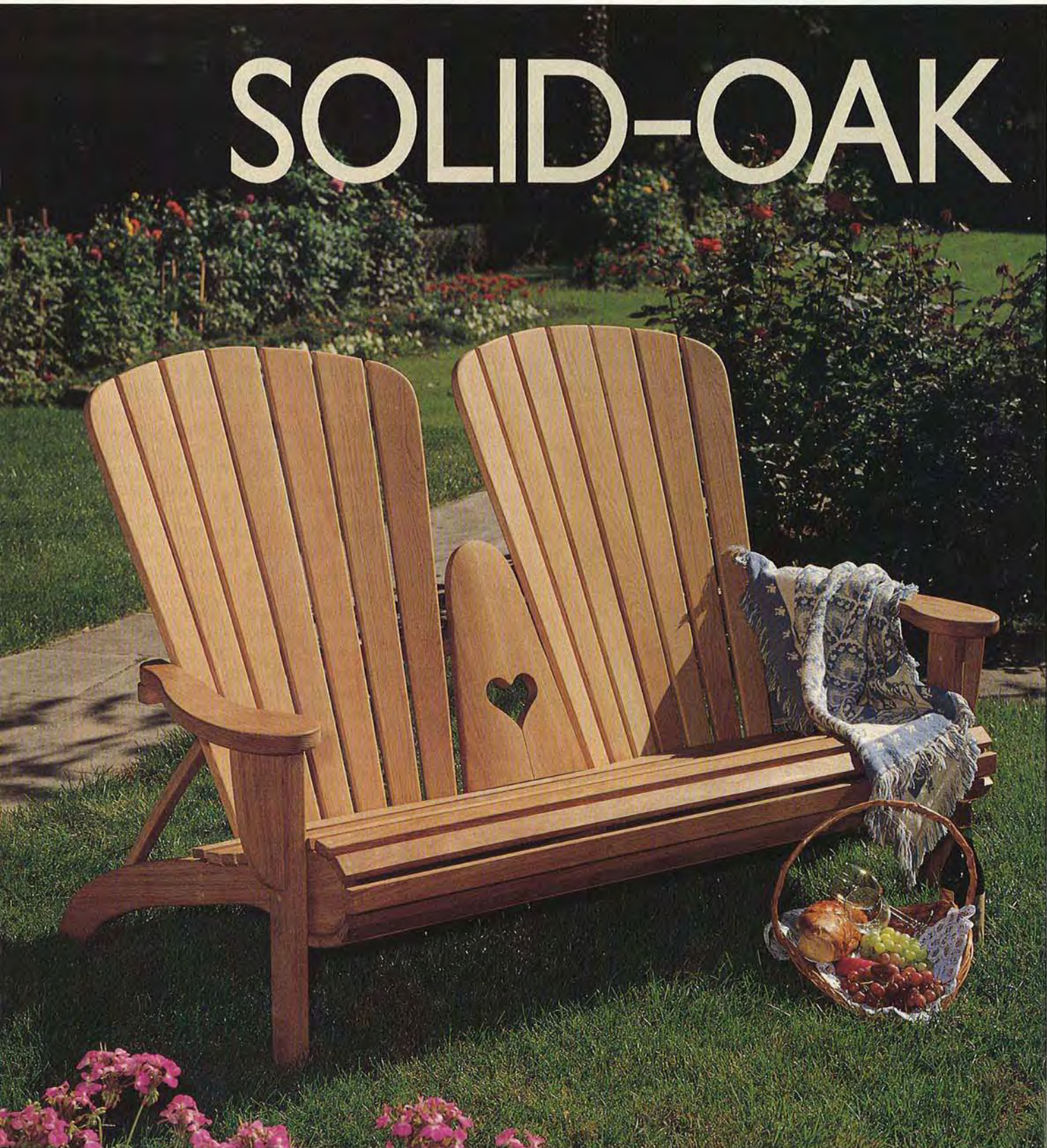


Center bottom: Cephas Goodman, on step, and assistant Mark Hilton inspect Cinderella's carriage for damage.

Bottom right: A Disney woodworker, Rafael Mejias, repairs a joint on a carousel horse with a mortise and tenon.

Written by Peter J. Stephano Photographs: Bob Hawks Design by C.L. Gatzke

SOLID-OAK



SETTEE



Last summer when I was doing some rough drawings for an outdoor settee, I opened an envelope sent in by Luis Elizondo, a reader from Houston, Texas. I was so impressed with Luis's settee design, I suggested we present his project. And am I ever pleased with the results. Since then, we've built two settees to verify the full-sized patterns, dimensions, and joinery, and they've both turned out beautifully. Come on, dive into this project—you'll be glad you did.

A. R. Downing Design Editor

Note: For your convenience, we've listed a source in the Buying Guide for full-sized patterns for the settee. Or, if you just can't wait to get started, enlarge the gridded patterns shown on pages 64 and 65. Our cost for this project, including the white oak, stainless-steel screws, and finish, totaled less than \$175.

Enlarge the patterns and make the templates

1 To enlarge the gridded patterns, draw 1" grids on large pieces of paper to match the 13 patterns on pages 64 and 65. Using the gridded patterns as guides, lay out the shape of parts on the gridded paper. To do this, mark the points where the pattern outline crosses each grid line. Draw lines to connect the points. Now, mark the screw-hole centerpoints and reference lines on each pattern.

2 Coat the back face of each pattern with spray-on adhesive. With a helper, start at one end and work to the other, laying the patterns flat onto $\frac{1}{8}$ " or $\frac{1}{4}$ " hardboard. Keep the patterns as flat as possible and be sure to flatten any air bubbles.

3 Bandsaw each template to shape, cutting just *outside* the marked line. Then, sand to the line for the finished shape. Don't forget to bandsaw the notches in the center-support templates (E).

4 Drill $\frac{1}{8}$ " holes through the templates at each marked centerpoint.

5 Position the templates (except for part P) and trace their outlines and hole centerpoints onto the stock. See the Cutting Diagram for reference and layout.

Machine the parts and construct the seat frame

1 Cut the seat rails (A, B) and legs (C) to the sizes listed in the Bill of Materials on page 63.

2 Bandsaw the end supports (D), center supports (E), and armrest supports (F) to the shape traced from the templates.

3 Cut the notches in the front rail (B) where shown on the Seat Frame Drawing. (We cut ours on the radial-arm saw.)

4 Rout a $\frac{1}{4}$ " round-over along the edges of the pieces where shown on the Seat Frame Drawing on the next page. Do not round over the seat rails (A, B), center supports (E), or the top ends of the leg parts (C, F). Sand the seat-frame members (A through F) smooth.

5 Clamp together the seat members (A, B, E), checking for square. Drill and counterbore the mounting holes, and fasten the parts together with stainless-steel or galvanized deck screws.

6 Using bar clamps, clamp the end supports (D) to the seat assembly (A, B, E). Drill the counterbores (holes for the plugs) in the end supports where marked. Then, drill a $\frac{1}{8}$ " pilot hole through the middle of the counterbore and $1\frac{3}{4}$ " into the ends of the seat rails (A, B). Now, enlarge the pilot holes in the end supports to $\frac{3}{16}$ " to form shank holes for the screws. See the Screw Hole Detail accompanying the Seat Frame Drawing for reference. Fasten the end supports to the rails.

How we chose the wood and fasteners for our settee

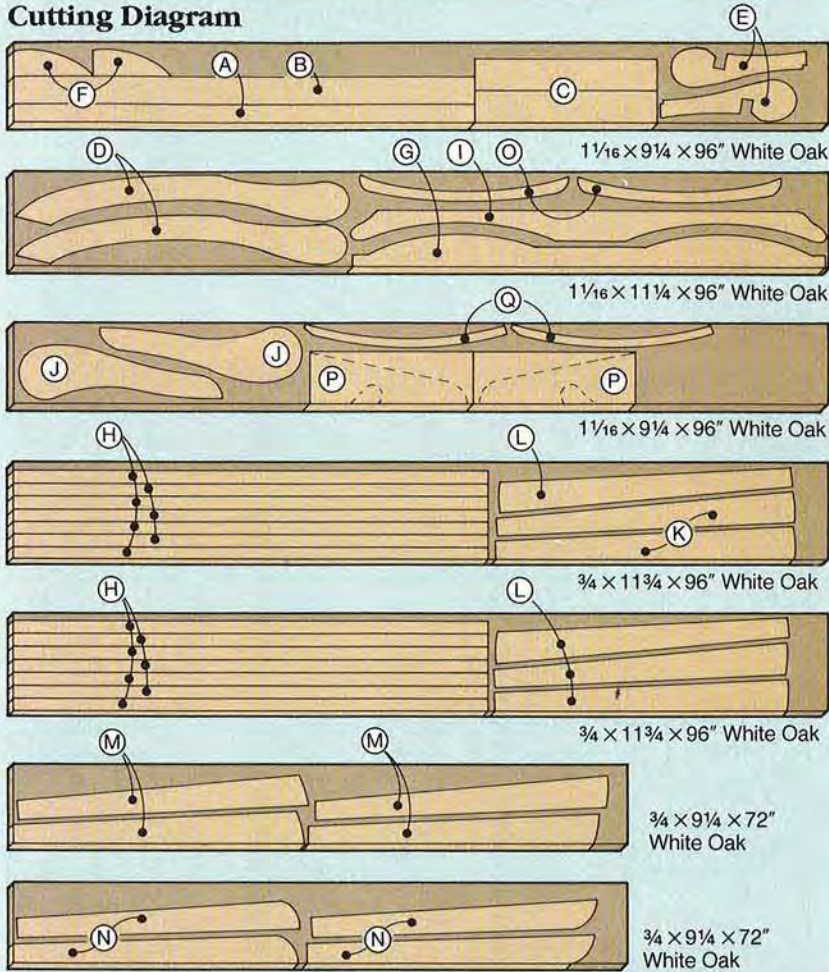
After weighing the merits of several types of lumber for this project, we selected white oak. Native to the eastern United States and Canada, white oak rates as one of the heaviest, strongest, and hardest of all the oaks. The pores of this species contain tyloses—bubblelike structures that form in the vessels of certain hardwoods and resist liquids from penetrating. This attribute makes white oak a perfect material for liquid containers and barrels, and an excellent candidate for our settee.

If you have trouble locating white oak or you wish to cut costs, you could substitute fir or pine pressure-treated deck material. You'll need to plane the pressure-treated stock to the thickness listed in the Bill of Materials.

What's the best fastener to use in this case? We recommend either stainless-steel or galvanized deck and machine screws. The tannic acid in white oak along with Mother Nature causes ordinary screws to rust and discolor the wood.

Continued

Cutting Diagram



Bill of Materials

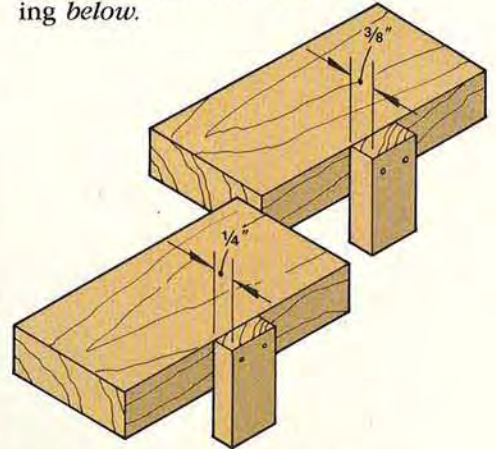
Part	Grid Size*			Mtrl.	Qty.	Part	Grid Size*			Mtrl.	Qty.
	T	W	L				T	W	L		
SEAT FRAME						SEAT BACK ASSEMBLY					
A rear rail	1 1/16"	2 1/8"	53 7/8"	WO	1	I* rear-slat support	1 1/16"	4"	56"	WO	1
B front rail	1 1/16"	3 1/4"	53 7/8"	WO	1	J* armrests	1 1/16"	7"	25"	WO	2
C legs	1 1/16"	3 3/4"	21 1/4"	WO	2	K* slats	3/4"	4"	36"	WO	2
D* end supports	1 1/16"	6"	40"	WO	2	L* slats	3/4"	4"	36"	WO	4
E* center supports	1 1/16"	6"	17"	WO	2	M* slats	3/4"	4"	35"	WO	4
F* armrest supports	1 1/16"	3"	10"	WO	2	N* slats	3/4"	4"	34"	WO	4
SLAT SUPPORTS AND SLATS						O* top slat supports	1 1/16"	3"	26"	WO	2
G* rear support	1 1/16"	4"	56"	WO	1	P* center piece	1 1/16"	12"	20"	EW	1
H seat slats	3/4"	1 1/2"	56"	WO	14	Q* braces	1 1/16"	3"	25"	WO	2

Parts A, B, C, and H are cut to the sizes listed above. The dimensions of the remaining parts (marked with an *) are the sizes of the 1" grid pattern for each.

Material Key: WO—white oak, EW—edge-jointed white oak

Supplies: spray adhesive, 1/8" or 1/4" hardboard, flathead wood screws (stainless-steel or galvanized deck screws) in the following sizes: #10 x 1", #10 x 1 1/2", #10 x 2", #10 x 2 1/2", 1/4 x 2 1/2" machine screw with flat washer and nut (stainless steel or brass), 1/4 x 1 1/2" machine screw and nut, clear finish.

5 Cut the pieces and build four 1/4" spacers and four 3/8" spacers like those shown in the drawing below.



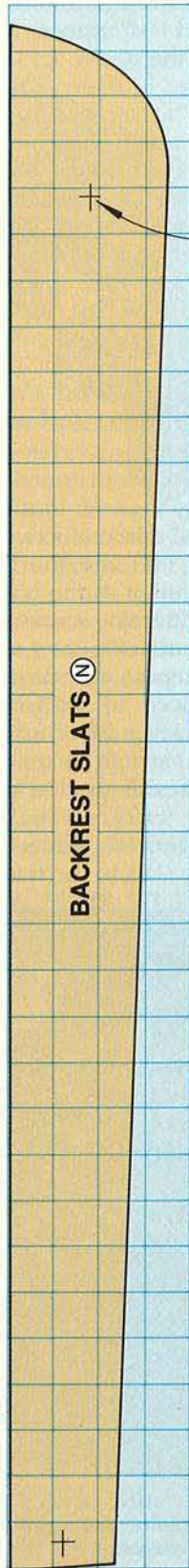
6 Position the 3/8" spacers between the rear support (G) and the first seat slat where shown in the photo below. Now, as shown, screw the seat slat to the end and center supports (D, E). Repeat the process with the 3/8" spacers to space and fasten the next seven slats to the seat frame. Then, switch to the 1/4" spacers for the next four slats that go around the curve. Finally, switch back to the 3/8" spacers to add the final two slats to the frame.



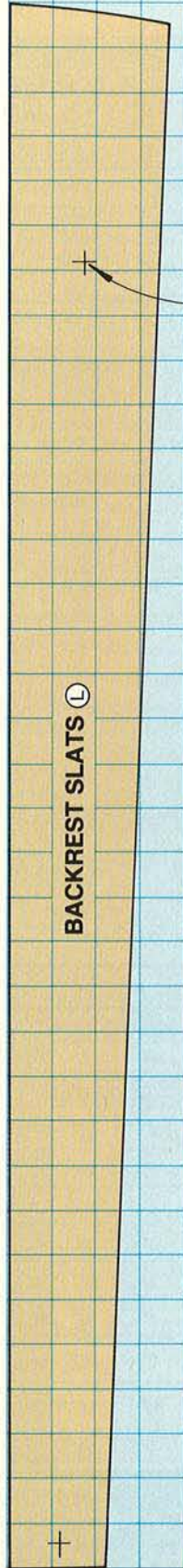
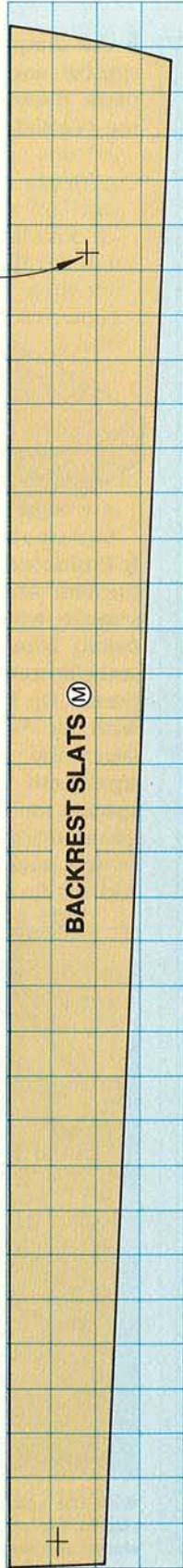
With the spacers in place, clamp a seat slat to the rear support, and screw the slat to the support pieces.

Continued

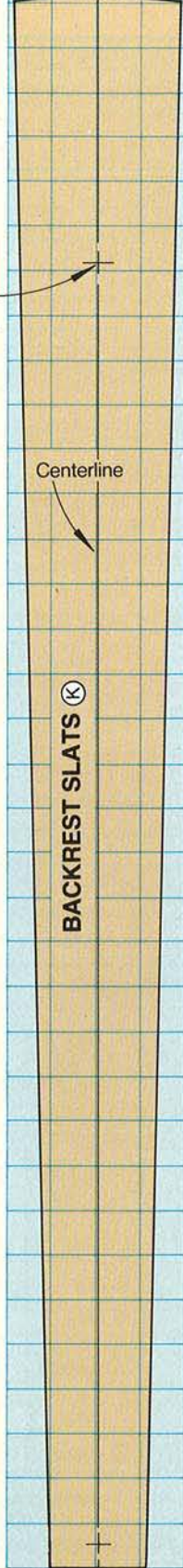
Each square = 1"



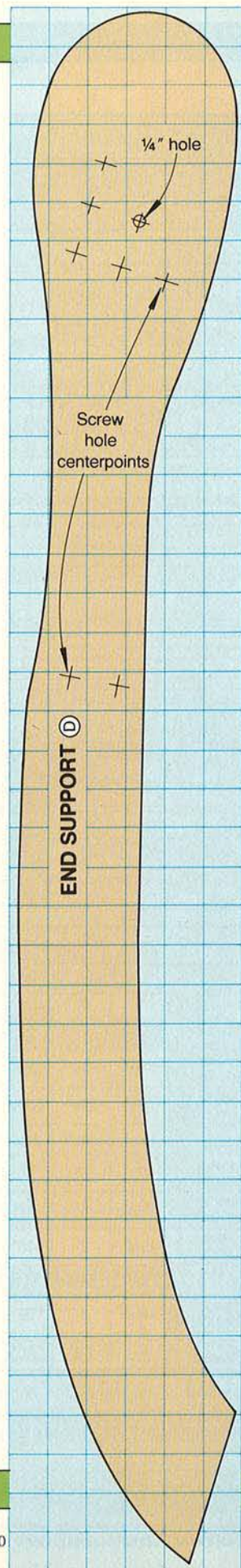
Screw hole centerpoints



Screw hole centerpoints



Centerline



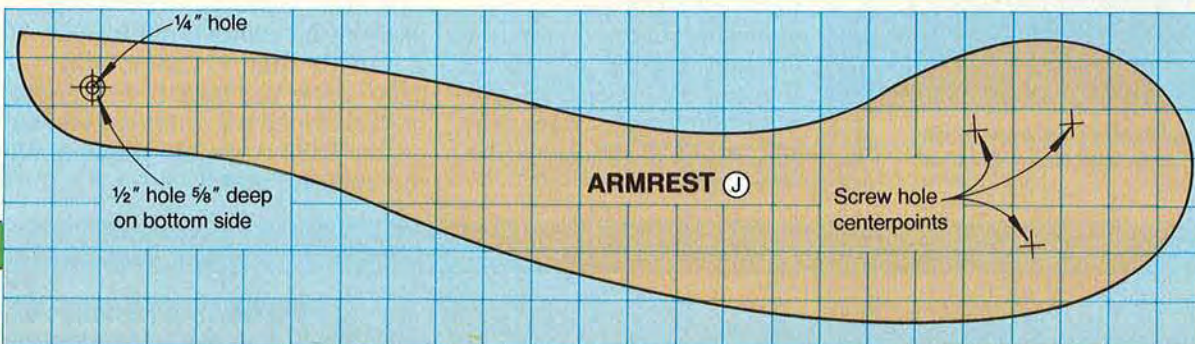
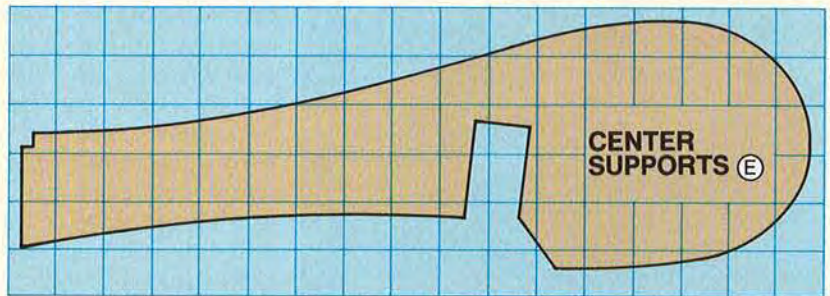
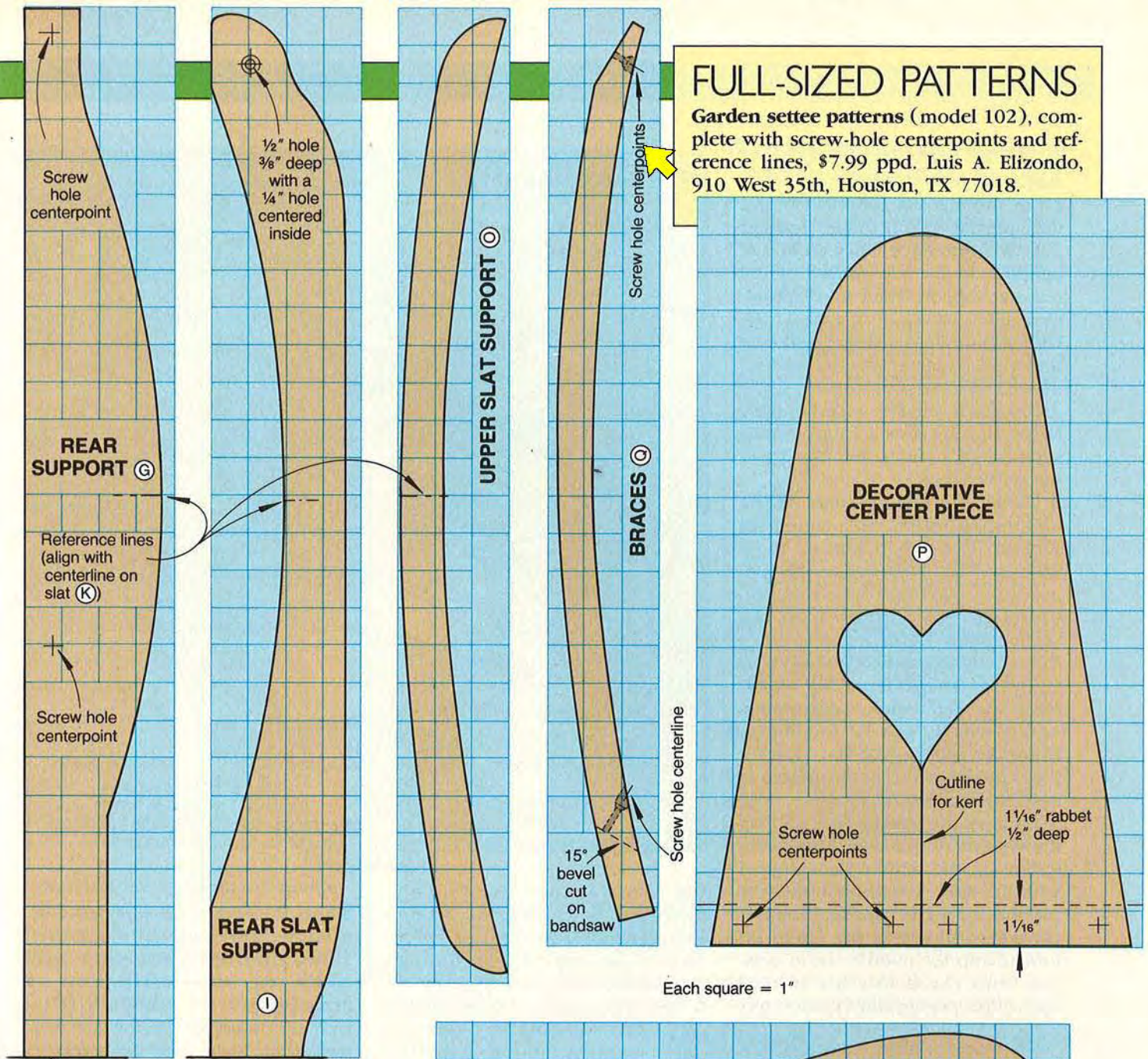
1/4" hole

Screw hole centerpoints

END SUPPORT (D)

FULL-SIZED PATTERNS

Garden settee patterns (model 102), complete with screw-hole centerpoints and reference lines, \$7.99 ppd. Luis A. Elizondo, 910 West 35th, Houston, TX 77018.



Continued

Add the contoured seat back assembly next

1 Cut the rear-slat support (I) and the armrests (J) to shape. Transfer the two reference lines from the template to the top surface of the rear-slat support. Rout a $\frac{1}{4}$ " round-over along all edges of each (I, J). Drill the mounting holes, and bolt the pieces together with $\frac{1}{4} \times 1\frac{1}{2}$ " machine screws and nuts.

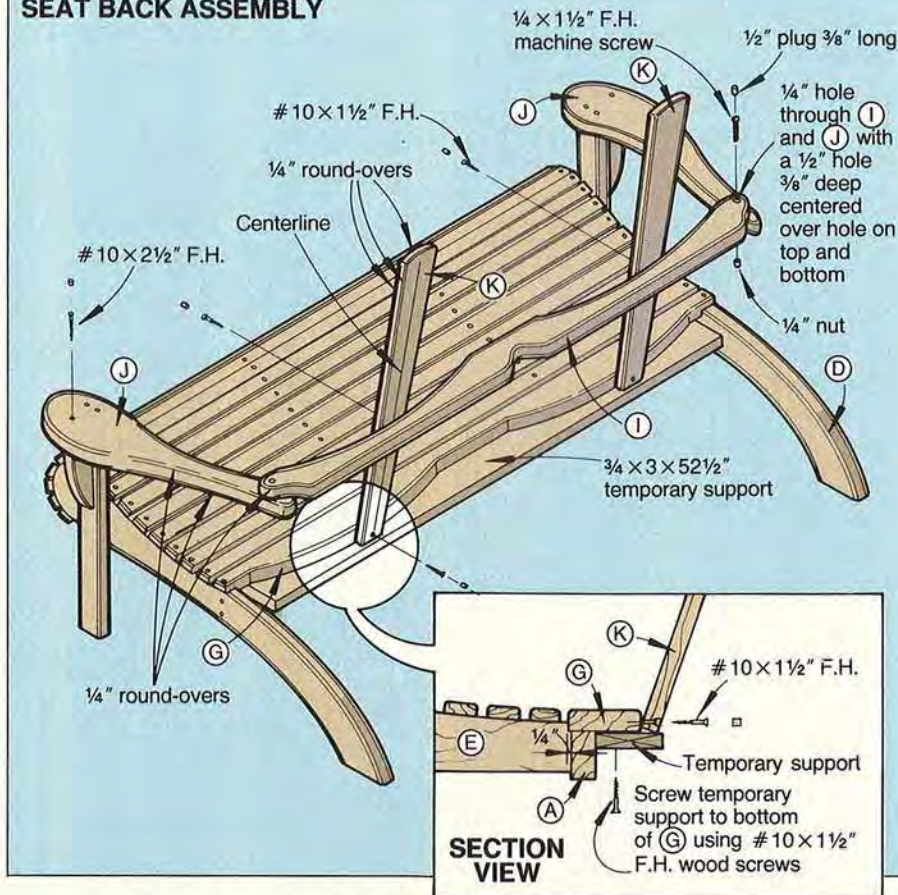
2 Using just one screw per armrest, fasten the armrests to the armrest supports (F). (Later, you'll add two screws per arm.)

3 To get the bottom edges of the backrest slats flush, cut a temporary support from $\frac{3}{4}$ "-thick stock to 3" wide by $52\frac{1}{2}$ " long. Fasten the support to the bottom of the rear support (G) where shown on the Section View Detail at *right*.

4 Bandsaw the seat back slats (K, L, M, N) to shape from $\frac{3}{4}$ " stock. Mark the screw-hole centerpoints on the slats. Rout a $\frac{1}{4}$ " round-over along all edges of each slat. Transfer the centerline onto both surfaces of both middle slats (K).

5 Position the middle slats (K) on the temporary spacer with the centerline on the middle slats aligned with the reference lines on the rear support (G) and rear-slat support (I) where shown in the photo *below*. Clamp the middle slat in position, and check that the marked screw-hole centerpoints center over

SEAT BACK ASSEMBLY



the rear-slat support. Drill the mounting holes. See the Section View Detail for reference before drilling the angled hole through the slat and into the rear support.

6 Fasten the center slats (K) to the rear support and rear-slat support. When fastening each backrest slat, drive the bottom screw partway and then drive the top screw partway, continue until each screw is snug. For ease in attaching the slats, do not insert one screw all the way before inserting the other.

7 With the assembly square, drive the remaining two screws through each armrest (J), and into the leg tops.

8 Using the $\frac{3}{8}$ " spacers, position the backrest slats, drill the mounting holes, and fasten the slats to the settee frame.

9 Cut the upper-slat supports (O) to shape, and rout a $\frac{1}{4}$ " round-over along their edges. Center and clamp one upper-slat support in place against the seat-back slats. Drill the holes and screw the support to the slats. Plug the holes.

Now, fashion and install the decorative center piece

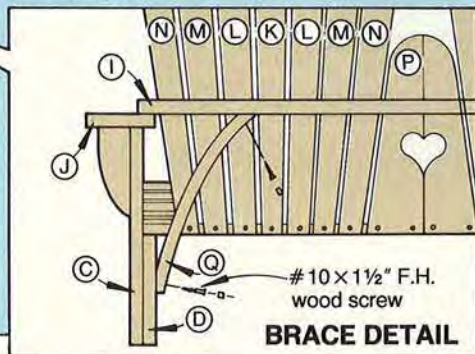
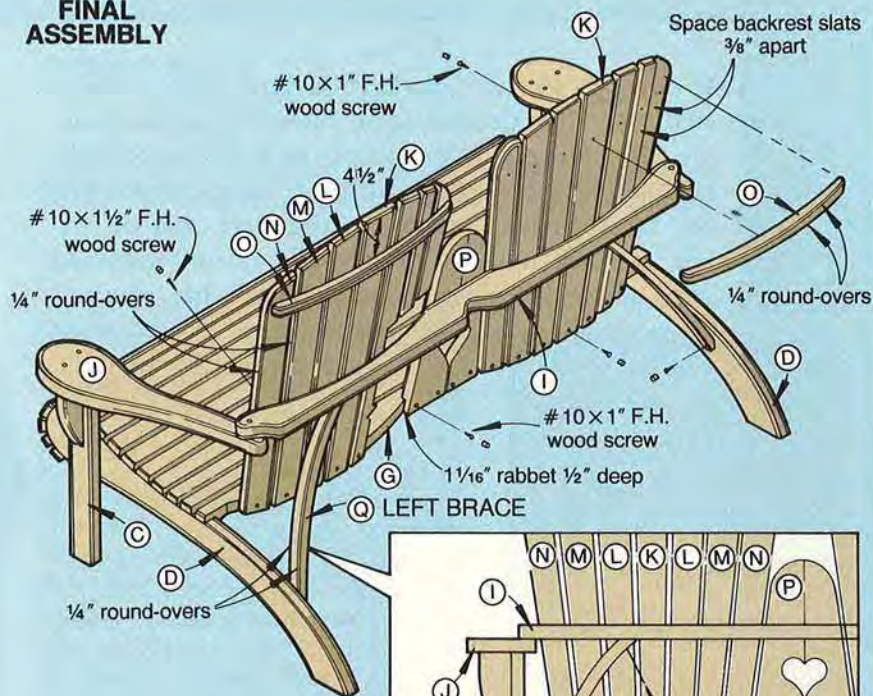
1 From $1\frac{1}{16}$ " oak stock, cut two pieces 6" wide by 22" long. Joint or plane one edge of each piece and then edge-joint the pieces together to form the center piece (P). Transfer the full-sized pattern outline and heart opening from the template to the center-piece blank.

2 Cut or rout a $1\frac{1}{16}$ " rabbet $\frac{1}{2}$ " deep along the bottom front edge of the center piece where shown on the Final Assembly Drawing on the opposite page.



Align the top and bottom supports, position the center slats, and fasten them to the supports.

FINAL ASSEMBLY



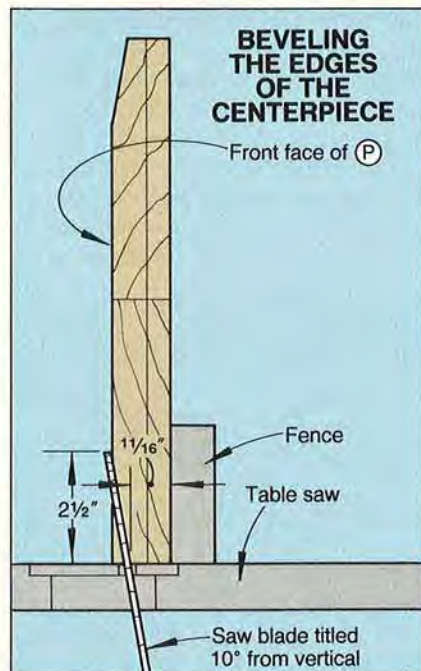
3 Bandsaw the center-piece outline to shape. Using a $\frac{1}{4}$ \"/>

4 Raise your tablesaw blade $2\frac{1}{2}$ \"/>

5 Sand a $\frac{1}{4}$ \"/>

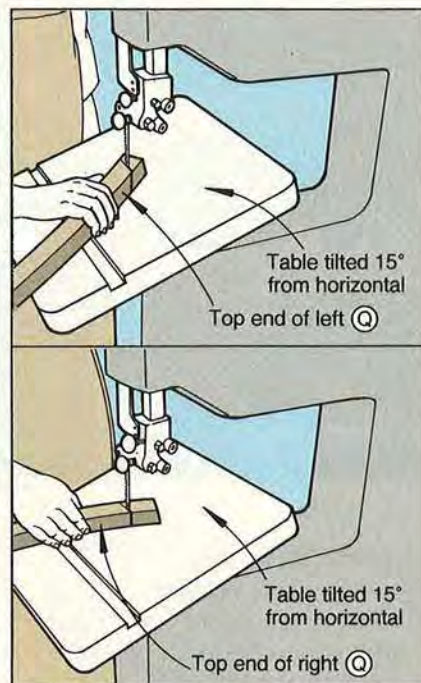
6 With a belt sander and then a palm sander, form a smooth curve on the front of the center piece.

7 Clamp the center piece between the slats. Drill four holes through the center piece and into part G. Mark the hole locations and drill two holes through the center piece and into the rear-slat support (I). Screw the center piece in place.



Time to add the braces and then apply the finish

1 Cut the braces (Q) to shape. Following the two-step drawing below, bandsaw the bevels on the top end of the braces. Rout a $\frac{1}{4}$ \"/>



2 Position the top end of one brace against the rear-slat support (I), and center the lower end on the supports (D) where shown on the Brace Detail above left. You'll need to move the brace around until no gap exists between the ends of the brace and the mating surfaces (D, I). Once positioned, tape the brace in place, drill the mounting holes, and fasten it to parts D and I. Repeat the procedure to position and secure the remaining brace.

3 Plug the remaining counterbores. Sand the settee smooth. Finish the settee as desired. (We brushed on several coats of clear Olympic Wood Preservative.) 🌲

Produced by Marlen Kemmet
 Project Design: Luis A. Elizondo
 Photographs: Hopkins Associates;
 Jim Kascoutas
 Illustrations: Kim Downing;
 Mike Henry

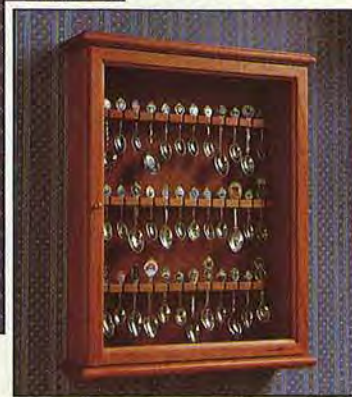
A WALL-HUNG HOME FOR COLLECTOR'S



It doesn't take a Philadelphia lawyer to make a case for this project. For opening arguments, we offer simple dowel joints to form the sturdy case as well as spline-mitered doors. Here are the facts: From first cut to the first coat of finish, it took us less than eight hours to build with about \$25 in materials. What's the verdict?

The jury declares this another prize-winning project.

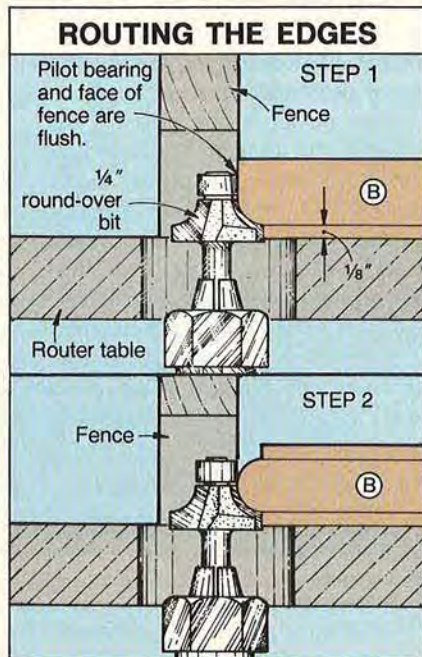
 Print this article



Cabinet as display for spoons

Construct the case to get the ball rolling

- 1 Rip and crosscut the case sides (A) and top and bottom (B) to the sizes listed in the Bill of Materials.
- 2 Follow the two-step drawing below to rout the front edge and ends of the top and bottom pieces (B).



- 3 Mark the dowel-hole center-points on the ends of each case side where shown on the Hole Detail at right. Using a doweling jig, drill $\frac{3}{8}$ " holes $\frac{9}{16}$ " deep.
- 4 Place dowel centers in the holes just drilled. Center the sides (A) between the top and bottom (B) where shown on the Exploded-View Drawing. Clamp together the pieces to transfer the hole locations to the top and bottom pieces. (Depending on how many dowel centers you have, you might have to

do one joint at a time.) Transfer the $\frac{3}{8}$ " bit to your drill press, and drill $\frac{3}{8}$ " holes $\frac{9}{16}$ " deep where marked.

5 Sand the four pieces. Using $\frac{3}{8}$ " dowel pins 1" long, glue, dowel, and clamp the sides between the top and bottom pieces, checking for square. Immediately remove excess glue with a damp cloth.

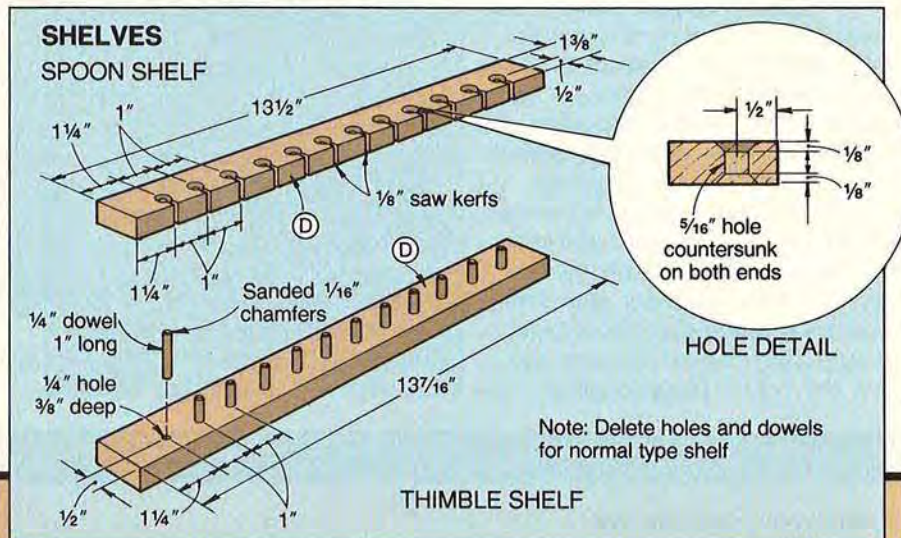
6 To house the back (C), rout a $\frac{3}{8}$ " rabbet $\frac{1}{4}$ " deep along the back inside edge of the case frame (A, B). Square the corners with a chisel.

7 Cut the back (C) to size. Drill the mounting holes in the back and case, and screw the back in place.

It's your choice: Spoon or thimble shelves

- 1 Cut the shelves (D) to size from $\frac{1}{2}$ " stock (we resawed $\frac{3}{4}$ " stock to size). You'll need three shelves for spoons or five for thimbles.

Continued



2 For the spoon shelves, mark the hole centerpoints where dimensioned on the Shelves Drawing. Drill and countersink a $\frac{5}{16}$ " hole at each centerpoint (see the Hole Detail on the drawing for reference). Flip over the piece and countersink the holes on the opposite surface.

3 With a combination square, mark the kerf locations centered on the holes just drilled. Attach an auxiliary fence to your miter gauge. Raise your blade $\frac{1}{2}$ " above the saw table, and cut the kerfs where marked as shown in the photo at *right*.

4 To build the thimble shelves, mark the dowel-hole centerpoints on five shelves where shown on the Shelves Drawing. Using a brad-point or Forstner bit, drill twelve $\frac{1}{4}$ " holes $\frac{3}{8}$ " deep where marked in each shelf. (To ensure consistent hole depths, we set the depth stop on our drill press. And, to keep the holes in a straight line, we clamped a fence to our drill-press table.)

5 Cut sixty $\frac{1}{4}$ " dowels 1" long for the thimble posts. Finish-sand each shelf smooth, and then sand a slight chamfer on both ends of each dowel. Place a drop of glue in each hole, and tap the dowels into place. Immediately wipe off excess glue with a damp cloth.

6 Using double-faced tape, adhere the shelves in position in the case. Drill the $\frac{7}{64}$ " shank holes through the back (C) and $\frac{5}{64}$ " pilot hole $\frac{1}{2}$ " deep into the shelves where shown on the Exploded-View Drawing. Remove the shelves and double-faced tape. (We attached the shelves to the back after staining.) Now, drill a pair of $\frac{1}{4}$ " holes through the case back where shown on the Exploded-View Drawing for mounting the completed case to a wall later.

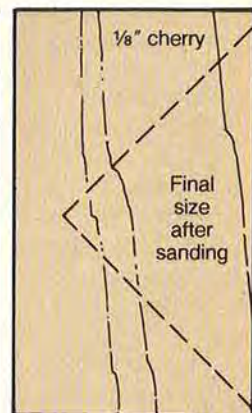
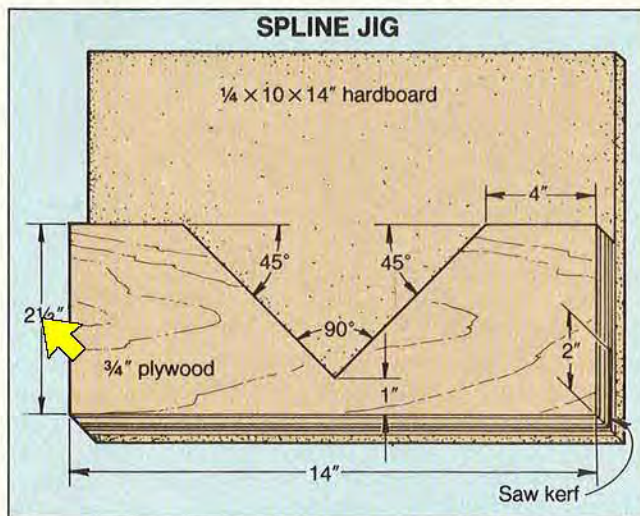
Now, build the door

1 Cut two pieces of $\frac{3}{4}$ "-thick cherry to 1" wide by 20" long for the door stiles (E) and two pieces 1" wide by 16" long for the rails (F).

2 Using the Door Frame Detail accompanying the Exploded-View



Mount an auxiliary fence to your miter gauge, and cut the kerfs.



FULL-SIZED SPLINE

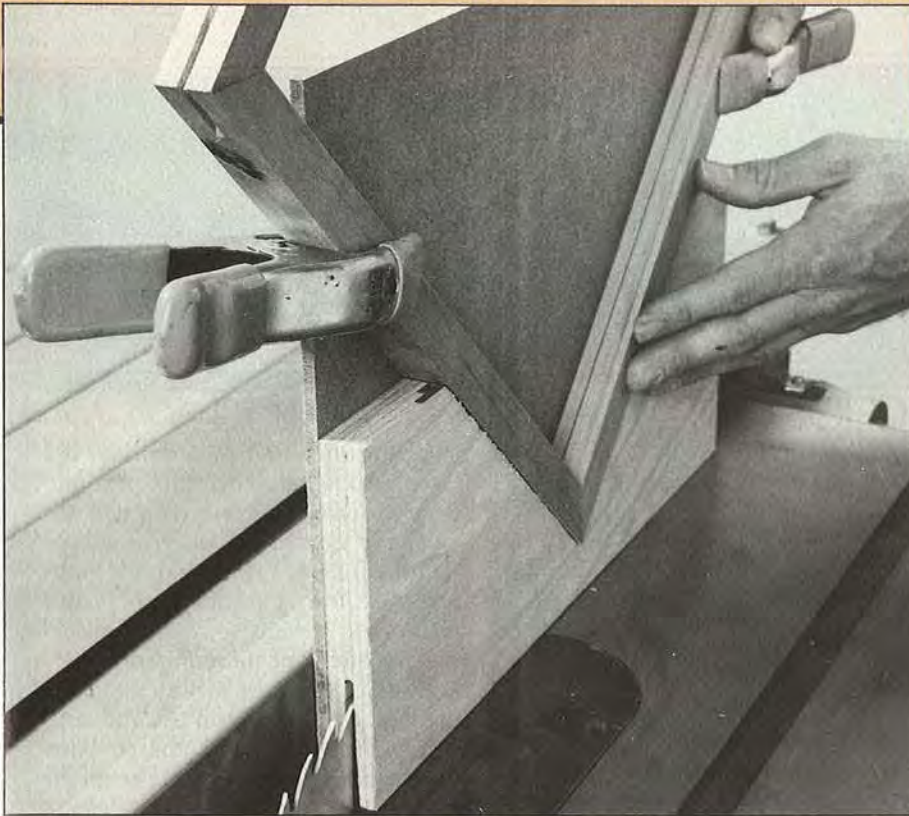
Drawing for reference, rout a $\frac{1}{4}$ " round-over along the front inside edge of each door piece. Cut or rout a $\frac{1}{4}$ " rabbet $\frac{3}{8}$ " deep along the back inside edge to house the glass.

3 Miter-cut the stiles (E) and rails (F) to the lengths listed in the Bill of Materials. (For extra support, we attached an auxiliary fence to our miter gauge and mitered the pieces to length on the tablesaw.)

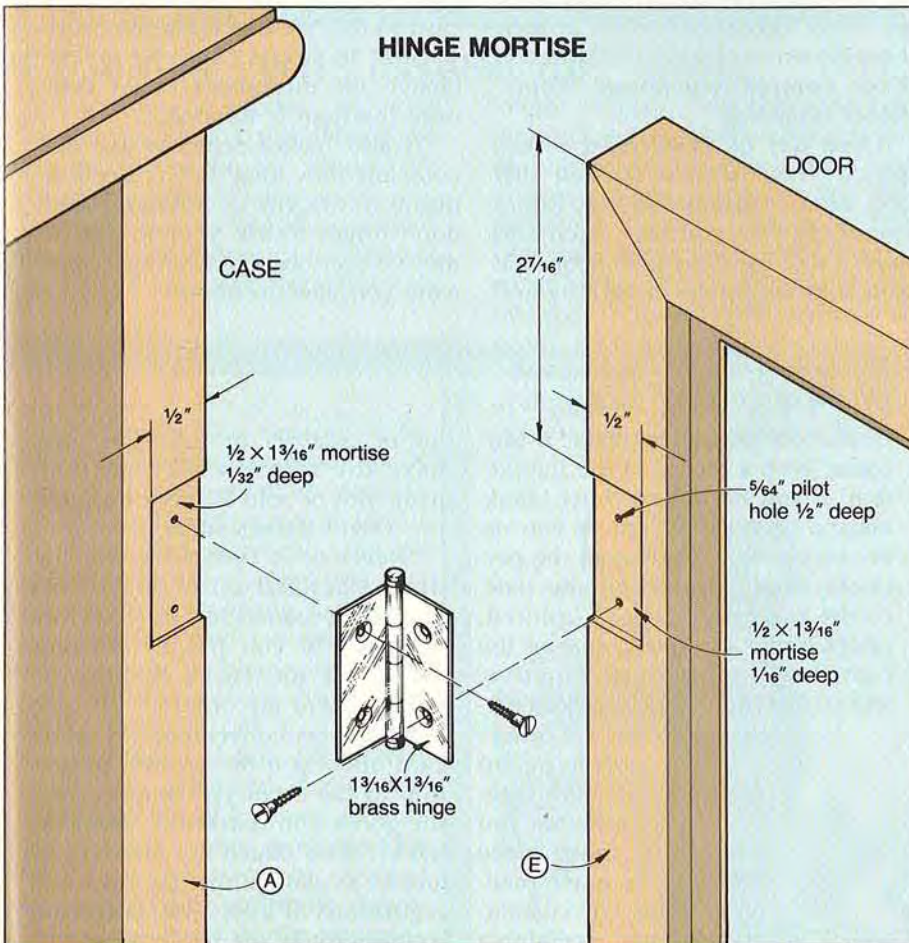
4 With the surfaces flush, glue and clamp together the door frame, checking for square.

5 Build a spline jig to the dimensions shown on the drawing *above*. Raise the blade 2" above the table-saw surface. Now, as pictured *above right*, cut a $\frac{1}{8}$ " kerf 1" deep in each corner of the door frame.

6 Cut a piece of $\frac{1}{8}$ " cherry (we resawed a thicker piece) to $1\frac{1}{4}$ " wide by 12" long. Next, cut four slip-leaf splines to $2\frac{1}{8}$ " long. Glue a spline in each kerfed corner of the frame. When dry, trim or sand off the protruding spline, being careful not to cut or sand the door frame.



Cut a kerf through each mitered corner of the door frame.



Produced by Marlen Kemmet.

Project Design: James R. Downing.

Photographs: Hopkins Associates; Jim Kascoutas.

Attach the hardware

1 Mark the hinge locations on the right side piece (A) where shown on the Exploded-View Drawing. Using double-faced tape, adhere the hinges to the side piece. With an awl, poke through the tape and screw holes in the hinge and into the side piece. Next, drill the hinge mounting holes.

2 With a hobby knife, score the outline of the hinges. Remove the hinges and tape. Using a sharp chisel, form a pair of $\frac{1}{32}$ "-deep mortises in the side piece (A), cutting to the scored outlines. Screw the hinges to the side piece.

3 Repeat the process in steps 1 and 2 above to form a pair of $\frac{1}{16}$ "-deep mortises in the door.

4 Drill the mounting hole for the magnetic catch where shown on the Exploded-View Drawing. To fasten the strike plate to the mating location on the back side of the door, drill a $\frac{1}{2}$ " hole $\frac{1}{16}$ " deep with a $\frac{5}{64}$ " pilot hole centered inside.

5 Drill the $\frac{1}{8}$ " mounting hole, and attach the knob where shown on the Exploded-View Drawing.

Remove the hardware and apply the finish

1 Remove the hinges, magnetic catch and strike plate, and knob. Finish-sand all the parts.

2 Wipe on the stain. Using $\frac{3}{4}$ " wood screws, fasten the shelves to the plywood back. Apply the finish.

3 Have a piece of $\frac{1}{8}$ " glass cut to fit the door. (We secured the glass in the door frame with a fine bead of clear silicone sealant.)

4 Attach the hardware and door. Place the case back into the rabbeted opening, drill the holes, and then screw the back in place. Level and fasten the case to the wall.

Buying Guide

• **Hardware kit.** $1\frac{3}{16} \times 1\frac{3}{16}$ " solid-brass butt hinges; $\frac{3}{8}$ "-diameter polished knob, magnetic catch. Kit no. 71042, \$5 ppd. Klockit, P.O. Box 636, Lake Geneva, WI 53147. Or, call 800-556-2548 to order. 🌿



A few Saturdays ago, I drove around town to shop for a self-centering doweling jig, but came home empty-handed and grumbling. "I'll just order it out of a catalog," I said to myself. So I thumbed through a stack of catalogs until I found the jig I wanted.

"Whoa, I don't know anything about these guys," I realized. "How do I know they won't rip me off?" In spite of those misgivings, I really wanted that jig. It was time for a little investigating.

Bill Kier
Product/Techniques Editor

The woodworker's survival MAIL-ORDER

CHOOSING THE RIGHT CATALOG

Before I buy anything, I like to know something about the people I'm dealing with. So, I called several mail-order firms. Eagerly, the people at the other end ticked off the advantages of mail order. A few; large selection (even hard-to-find tools), at-home convenience, and it's easy to compare prices.

Still, I was uneasy. So, I talked to Roger F. Campbell of the Council of Better Business Bureaus in Arlington, Virginia. "One way to check out a mail-order business is to call the Chamber of Commerce or Better Business Bureau in their hometown and ask if customers have complained about them," Roger suggested.

Chett Ray of Woodworkers Supply of New Mexico advised that you ask the catalog company lots of questions: "Do you have such and such a tool in stock? How soon will you ship my order? Is packing and

shipping included in the price? If I have problems with the product, do you have someone who can answer my questions? Do you accept credit cards? If I don't like the merchandise, can I return it for a full refund? If I want to, can I talk to the president of the company?"

David Draves of Woodcraft Supply suggested that you ask the supplier when they will charge your credit-card account. "Like most mail-order firms, we process a check as soon as we receive it. We have to treat checks as if they're cash so that we can fulfill the order within 48 hours. But, we never charge the customer's credit card until the item is shipped.

"It also makes sense to ask the company how long they've been in business," David continued. "And don't forget to ask your friends if they've ever ordered from the company you have in mind."

PAYING THE BILL

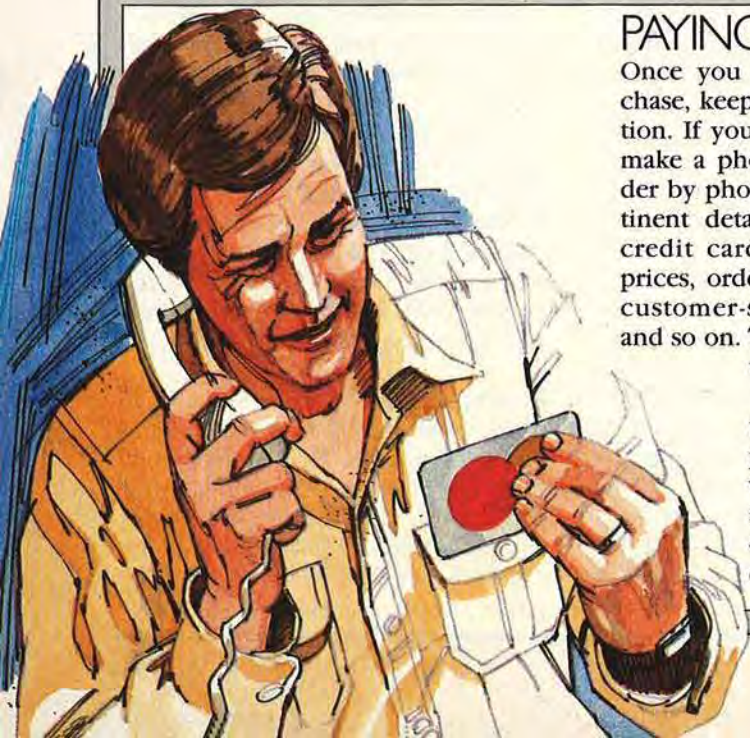
Once you decide to make a purchase, keep a record of the transaction. If you fill out an order blank, make a photocopy of it. If you order by phone, jot down all the pertinent details, including the date, credit card used, items ordered, prices, order number, name of the customer-service representative, and so on. Then, ask the representative to repeat the order.

Before you hang up the phone, let the company know whether you want your name made available to other mail-order firms. "If customers don't like receiving a

lot of catalogs in the mail, they have the right to ask that their name not be sold to other businesses," David Draves advised.

"Never send cash with your order," Chet Dalzell of the Direct Marketing Association in New York told me. "If you pay by personal check, jot the check number on your copy of the order."

Besides its convenience, a credit card offers you the greatest protection in the event you don't receive the goods you ordered. I called the banker who issued my MasterCard, and he explained that the rules and regulations of VISA and MasterCard solidly protect the cardholder.



guide to buying... PRODUCTS



Lou Howard

tools from the West German company at manufacturer's cost. (See page 14 of the February 1990 issue of *WOOD* magazine for more details.)

"Two things I would say about this," Lou remarked. "What were Ben Franklin's words? 'Experience teaches a dear school, but the fool will learn in none other.' Also, I'll never send off for anything again unless I charge it to a credit card or insist on C.O.D."

OCCASIONALLY, A BAD APPLE

Although the vast majority of mail-order houses deal reputedly, every now and then a consumer gets burned by a less-than-honorable firm. Lou Howard of Amityville, New York, knows the meaning of these words all too well.

Lou sent off a bank draft for \$3,410 to Tools-To-Go, a Miami-based mail-order firm. He ordered a Scheppach woodturning lathe, a copying attachment, and a planer. When the equipment failed to arrive, Lou tried to call Tools-To-Go,

and learned that its phone had been disconnected.

So, imagine Lou's surprise when he found representatives of the firm exhibiting at a weekend wood-working show near his hometown. Seizing the opportunity, he bored in with questions, and they had pat answers every time.

As it turned out, that was the last time he had contact with anyone from that operation. Tools-To-Go vanished. To make a long story short, Lou eventually received his

DEALING WITH DISAPPOINTMENT

At one time or another, we've all bought something that left us unhappy. Or maybe the product arrived damaged. What's next?

If the product arrives in a damaged container, you can refuse the shipment and save yourself some

freight charges. Even if you accept the package, note the damage on the shipping list before signing.

Most dealers accept returns, but they may assess a restocking fee (normally about 10 percent) to recover some of the shipping costs incurred when filling the order and taking it back.

When you talk to a mail-order dealer about returning goods, try not to unload your anger. "If you

act reasonable, the dealer may waive the restocking charge as a goodwill gesture," Shiraz Balolia of Grizzly Imports told me.

"Also, if the tool needs minor repairs that you can make and the dealer has the parts, negotiate a compromise rather than insisting on a new one. You'll both come out better," Balolia added.

Finally, if you can't settle a mail-order dispute, write to the Direct Marketing Association's Mail Order Action Line at: 11 West 42nd St., P.O. Box 3861, New York, NY 10163. Remember to include documentation of the transaction and a description of your problem. The organization will contact the mail-order firm and attempt to resolve the problem. You can also file a report with the local Better Business Bureau, the U.S. Postal Service, and the state attorney general's office.

Editor's Note: By the way, I finally ordered that doweling jig and a nice set of drill bits to go with it. My package arrived in five days. ♣

For example, you have up to 60 days after the issuance of a VISA or MasterCard statement to dispute the charge. This charge will appear on subsequent statements, but no interest will be charged for that amount. After receiving the necessary sales slips and a written statement of your problem, the issuing bank will research the dispute and charge the fee back to the merchant, if your claims prove true. You're also protected if the merchant goes out of business. Just remember not to wait more than 60 days after the issuance of your statement to file the dispute. American Express has a similar policy.




Photograph: Hopkins Associates Illustrations: Jim Stevenson

**Collector's Edition*

HANDSCREW CLAMPS

BUILD YOUR
OWN AND SAVE



 [Print this article](#)

If you're like most woodworkers we know, you could stand having a few more hand-screw clamps around your shop. Now you can—quickly and inexpensively. Our instructions tell how to build 8" hand-screw clamps. Be sure to see the Buying Guide for our source of the hardware for this and the other sizes of clamps available. And, don't forget to order the brass "Collector's-Edition" emblem we've had computer-engraved for this project. It really sets these clamps apart from the rest.

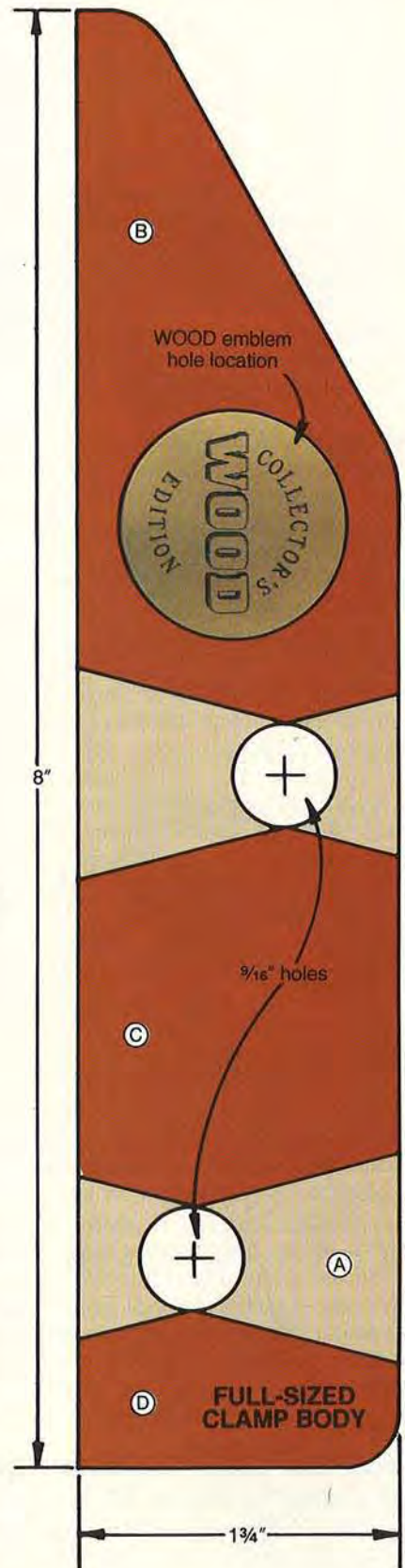
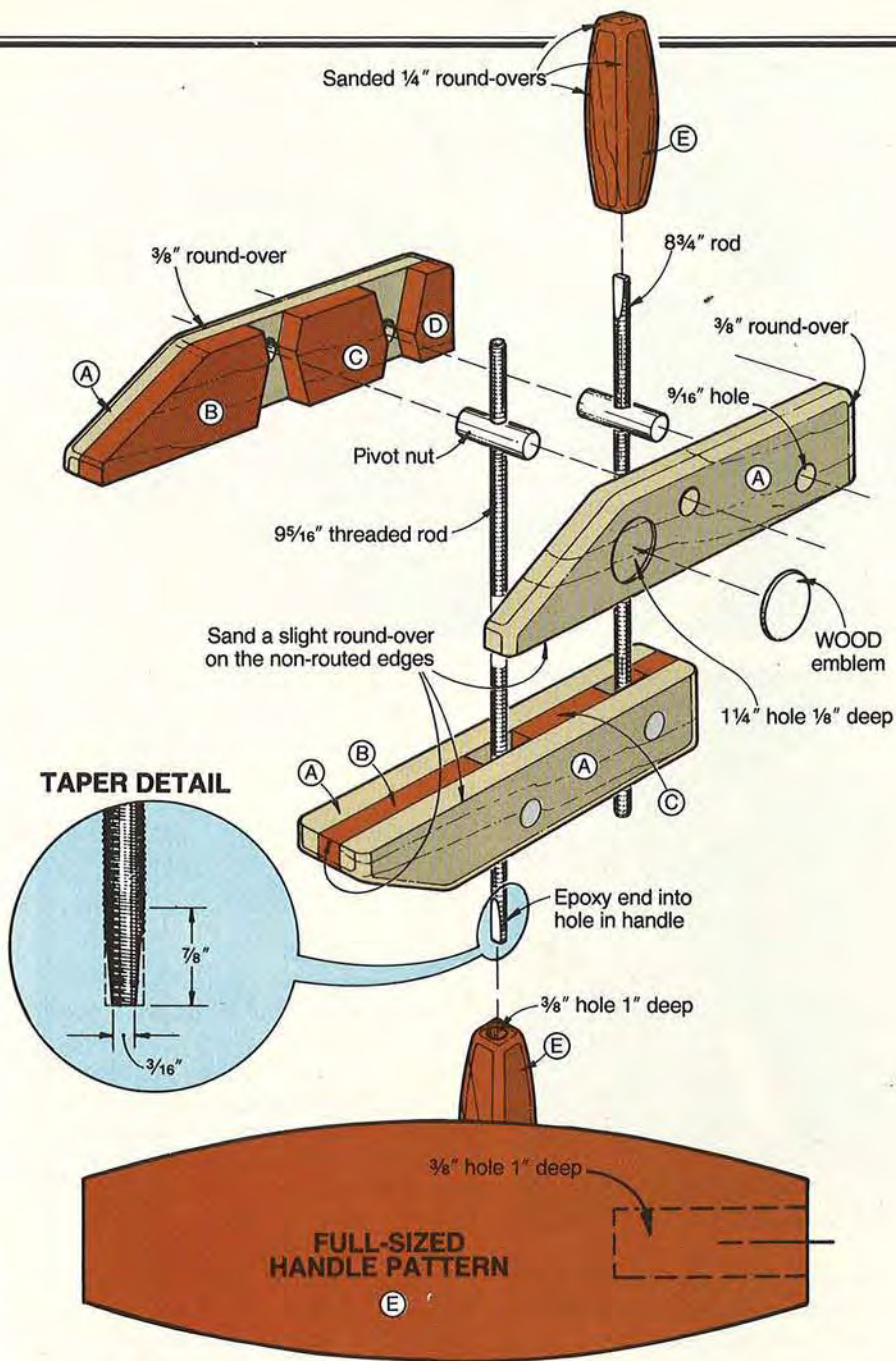
Note: You'll need 1/2"-thick walnut and maple for the clamp jaws. Either resaw or plane thicker stock to size. (We positioned the tablesaw fence 1/2" from the blade and resawed 3/4"-thick stock to 1/2" thick.)

First, machine the jaw parts

1 Cut four pieces of 1/2"-thick maple and two pieces of 1/2"-thick walnut to 1 3/4" wide by 8" long.

2 Using double-faced tape, stick together two pieces of maple face to face, with the edges and ends flush. Repeat with the two remaining maple pieces and then with the two walnut pieces.

3 Using carbon paper or photocopies and spray adhesive, transfer the full-sized patterns (A, B, C, D) at right to each lamination. Cut the walnut pieces (B, C, D) to shape.



Next, laminate the jaws

1 With a $\frac{1}{16}$ " bit chucked in a drill press, bore two holes through each pair of maple pieces where located on the patterns. (For smooth operation of the pivot nuts in the holes, we recommend a brad-point bit.)

2 Taper the fronts of each maple lamination on a bandsaw. Pry apart all the taped-together pieces, remove the tape, and clean off the sticky residue with lacquer thinner.

3 Using the pivot nuts for alignment and the walnut pieces spaced apart where shown on the full-

sized pattern, glue and clamp together each clamp jaw as shown in the photo on the following page. (For even clamping pressure, and to prevent denting the maple, we used plywood scraps as clamp blocks. We adhered the plywood to the maple pieces with double-faced tape.) Also, to keep the walnut pieces from sliding around, let the glue get a bit tacky before clamping. Check for slippage after clamping. Remove any excess glue from the openings with a chisel.

Continued

CLAMPS

4 Later, remove the pivot nuts and scrape off the excess glue. Rout $\frac{3}{8}$ " round-overs along the edges of each jaw where shown on the Exploded-View Drawing. Sand smooth.

5 Drill a $1\frac{1}{4}$ " hole $\frac{1}{8}$ " deep where shown on the full-sized pattern for the engraved WOOD "Collector's-Edition" emblem. (We used a Forstner bit, but a spade bit would also work.) For better adhesion, sand the back of the emblem, and epoxy it into the hole.

Add our customized handles, if desired

Note: The kit comes with turned handles. Our handles, though, give you a firmer grip and look better than the turned ones.

1 Start with a piece of walnut $1\frac{1}{4}$ " square by 12" long. (We laminated $\frac{3}{4}$ " stock, and then jointed both faces to keep the joint line centered.) Crosscut two pieces $3\frac{3}{4}$ " long from the 12" length.

2 Mark diagonals on one end of each $3\frac{3}{4}$ "-long handle blank (E) to find center. Drill a $\frac{3}{8}$ " hole 1" deep centered in the end of each.

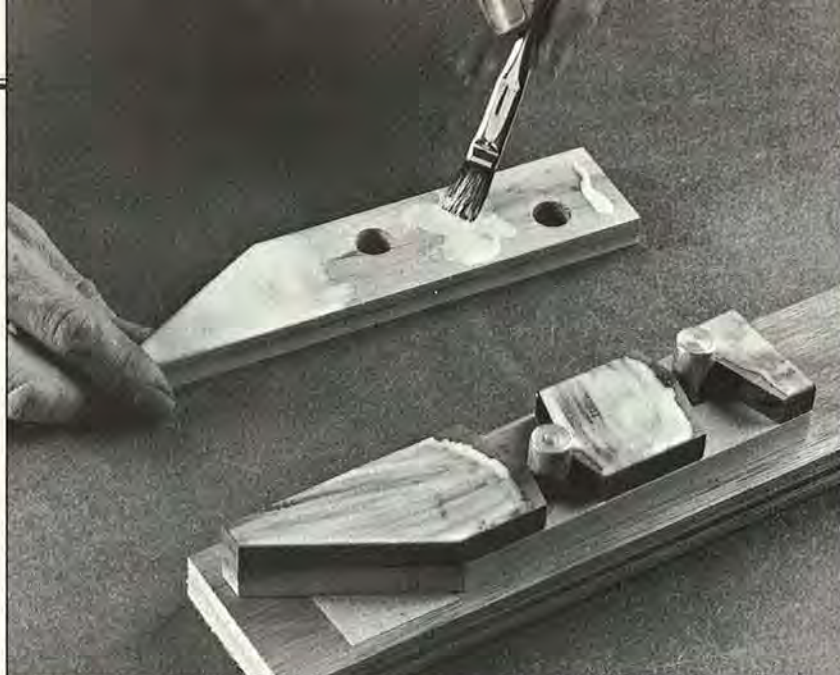
3 Now, stick a 12" length of $\frac{3}{8}$ " dowel into each of the walnut handles to act as a temporary grip.

4 Transfer the full-sized handle pattern to one face of each handle blank and bandsaw along the marked handle lines. Using double-faced tape, stick the waste pieces back to the edges from which they were cut. Now, transfer the handle outline to an adjacent surface and cut it shape as shown in the photo *above right*.

5 Still using the dowel handles as grips, use a stationary belt sander to remove the saw marks from the handles. With a palm sander, sand $\frac{1}{4}$ " round-overs along the edges and sand the handles smooth.

Apply the finish, and install the clamp hardware kit

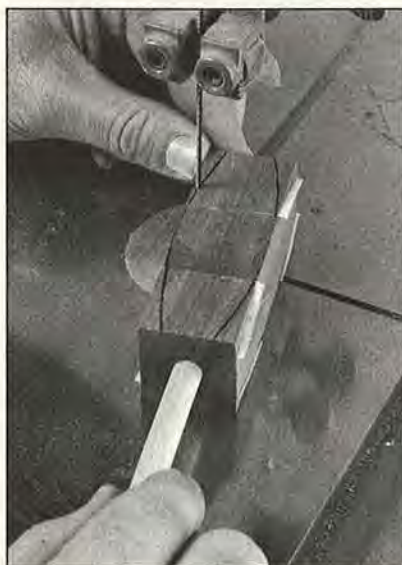
1 Remove the dowel handles. Apply an oil finish to each part (we used Watco Natural Oil).



▲ Brush glue onto the mating surfaces and clamp the jaw parts together with the edges and ends flush.

◀ Use a temporary dowel handle for stability when bandsawing the walnut handle to shape.

Supplies: double-faced tape, epoxy, spray adhesive or carbon paper, finish.



Buying Guide

● **8" handscrew clamp kit.** Two threaded rods, four pivot nuts, two turned handles. Catalog no. WMS71597, \$3.99 (U.S.) per clamp kit, add \$2.95 postage and handling per order (not per kit). Leichtung Workshops, 4944 Commerce Parkway, Cleveland, OH 44128. Or, call 800-321-6840 to order.

We've provided Leichtung with full-sized patterns for building 6", 10", 12", and 14" handscrew clamps. All sizes of patterns will be included with each clamp hardware kit. Call Leichtung for prices of the additional clamp sizes.

● **Computer-engraved brass emblem.** To order, send \$1 (U.S.) per emblem along with a self-addressed stamped envelope to Custom Awards, 1427 NW 81st St., Des Moines, IA 50311. Foreign readers: Please include an international reply coupon. ♣

Produced by Marlen Kemmet
Photographs: Hopkins Associates;
Bob Calmer
Illustrations: Kim Downing; Bill Zaun;
Mike Henry

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	ST413E	1/2	2	1/2	14.00		CR210	3/8	5/8	1/4	14.00
	ST216	5/8	1	1/4	5.90		CR213	1/2	3/4	1/4	16.00
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	DV213	1/2	1/2	1/4	4.60	CV206	1/4	1/2	1/4	11.00	
	DV413	1/2	1/2	1/2	4.60	CV210	3/8	9/16	1/4	12.00	
	DV419	3/4	7/8	1/2	6.50	CV213	1/2	5/8	1/4	13.00	
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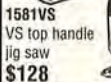
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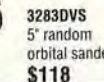


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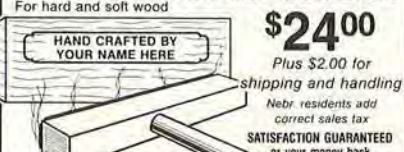
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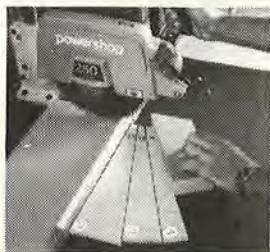
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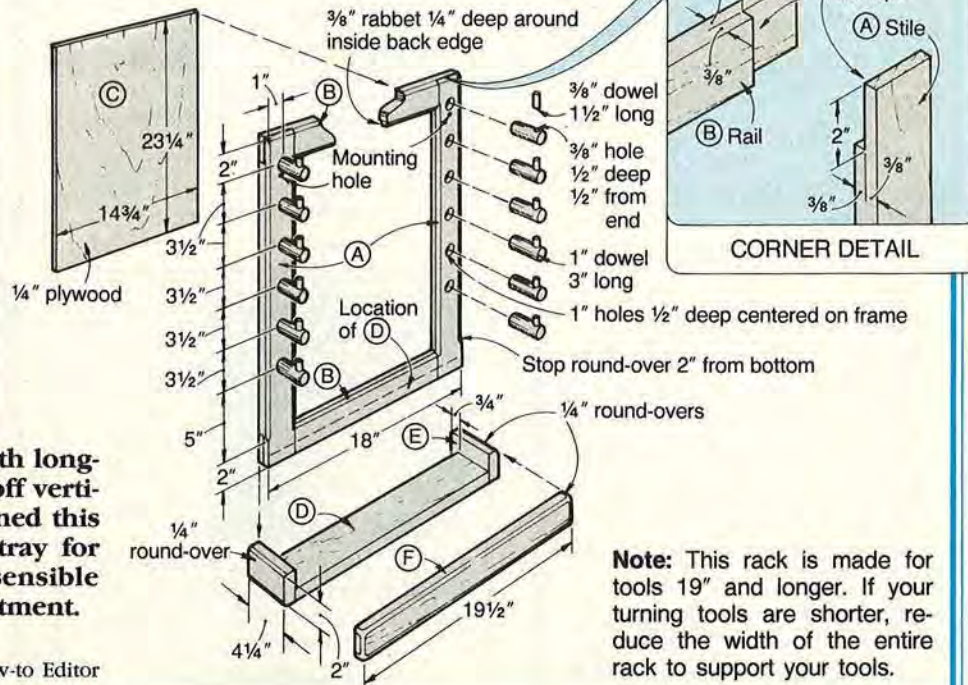
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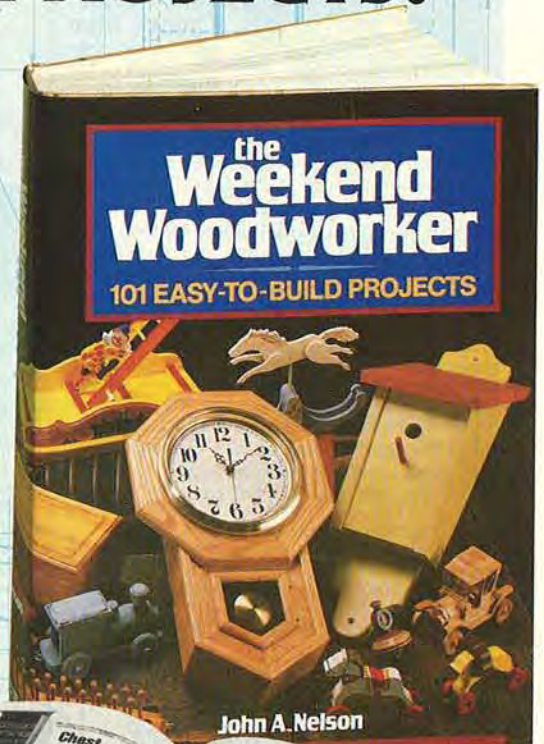
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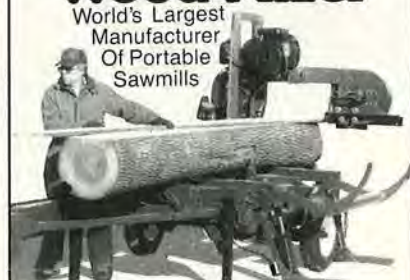
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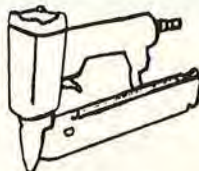
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A terrific selection of turned wood parts. All American made. Shaker pegs, candle cups, wheels, balls, dowels, screwhole buttons, and much more. Free shipping on orders over \$25. Bulk prices available. High quality - reasonable prices - fast service. 24-page catalog, 75c. AMERICAN WOODCRAFTERS SUPPLY, R.R. 2, BOX 147, RICEVILLE, IA 50466. (515) 985-4032.



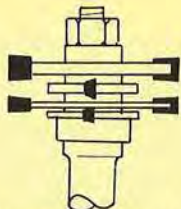
Piranha circular saw blades by Black & Decker. Their exclusive curved carbide teeth, fish hook gullet design and extremely sharp cutting edge make cutting faster and easier than with other carbide blades. Pressure-treated lumber blades also available. See your nearest home center, building supply or hardware store.



The new RBI 720 Woodplaner-Molder-Sander, power fed gang rip saw is built to handle any of these basic woodworking functions with speed, and precision. Set up is easy with RBI's patented quick change cutterhead system. Available in 8", 12" and 20" models. Proudly made in America. RBI, 1801 Vine St., Harrisonville, MO 64701. 1-800-535-8665.



Powermatic introduces the new Model 63 Artisan's 10" Tilt Arbor Saw. 1 1/2 HP rear induction motor with modular wiring, T-slot miter gauge, cast iron top with open grade extensions, and dust collector. Includes exclusive Vega saw fence with thumbwheel micro adjust. Optional retractable caster set & stock pusher. POWERMATIC, Div. of Stanwich Industries, Inc., Morrison Rd., McMinnville, TN 37110. 615-473-5551.



Versatile 1/2" shank bit has many uses - slot cutting, rabbeting, grooving, dadoes, etc. Four, 2 flute carbide tipped slot cutters, used singly or in combination, produce many different groove widths. Set includes, 1/8", 5/32", 3/16" & 1/4" slot cutters & shim spacers - range of grooves is variable from 1/8" to 23/32" in one pass. On sale now \$45.00. order item #867. MLCS Ltd, P.O. Box 4053D, Rydal, PA 19046 1-800-533-9298.



Build this classic New England Rocker today, create a family heirloom for generations to come. Design features laminated head with a fancy wood mane. Full-sized plans show how to build this American classic. Size is 26" x 44". Materials list & complete instructions are included. Order plan #338. Price: \$12.50 ppd. ARMOR PRODUCTS, Box 445, East Northport, NY 11731.



Jet woodworking video. Jet helps you learn. "See" how to set up and operate JET's woodworking machinery. VHS video tapes features a tablesaw, bandsaw, jointer, shaper, planer or drill press and is available from JET distributors. See the special offer in the ad in this issue. JET EQUIPMENT & TOOLS, INC., P.O. Box 1477, 1901 Jefferson Avenue, Tacoma, Washington 98401-1477. (206) 572-5000, Fax 1-206-383-8705.



Make your scroll saw twice as versatile! Easily saw larger pieces and unusual bevels. Premium quality German blades, 5" long, flat ends to fit most scroll saws. Variety pak makes perfect gift. Sizes #3, #4, #5 and #6 (1 doz. ea.). \$32 value for \$16 + \$3.95 s&h. Order today! ADVANCED MACHINERY IMPORTS, LTD., P.O. Box 312, Dept. 407 New Castle, DE 19720. 1-800-648-4264.



Econ-Abrasives is proud to introduce our new line of Bosch carbide tipped router bits. As with our famous sandpapers, our router bits will cut through the competition and impress you both in quality and price. Every bit worth asking for! Free information. ECON-ABRASIVES, P.O. Box B865021, Plano, Tx 75086 or call 1-800-367-4101, in TX 214-377-9858.



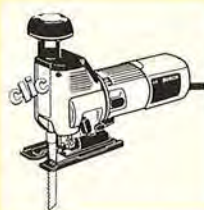
Tool bag. This heavy duty canvas bag protects your tools better, organizes your tools better, and is easier to carry than any conventional toolbox-at a fraction of the price! 9 1/2" high, 18" long, 6" wide, with 24 separate pockets. No. WT0T90, \$31.50 ppd. ALBERT CONSTANTINE & SON, 2050 East Chester Rd., Bronx, NY 10461.



Pocket Hole Drilling Guide System allows user to drill pocket holes with portable drill. Join side by side for multiple hole drilling. Complete with 3/8" carbide tipped counterbore, spur, driver bit and screws. Toggle clamp with E-Z adjustable shoe optional. Drill Press model available. Send .25c for Brochure or call today KENCRAFT COMPANY, 821 N. Westwood Ave., Dept. WO, Toledo, OH 43607, (419) 536-0333.



Do-it-yourself school clock. Solid oak just like the originals. Complete kit is under \$50 and includes ready to finish case, quartz pendulum movement, dial, glass and hardware. Send \$1.00 for catalog featuring over 60 high-quality traditional clock kits. AMERICAN CLOCKMAKER, P.O. Box 326, Clintonville, WI 54929.



New Bosch innovation for 1990: 1582VS "CLIC"™ quick-change system for blades; eliminates screw-driver when changing blades. Blades change in an instant with a turn of a top handle. The "CLIC"™ can be yours for \$133.00 from TOOL CRIB, P.O. Box 1716, Grand Forks, N.D. 58206 1-800-358-3096.



Spend Father's Day making something for the kids! Our popular B-winged Desk is a proven hit with the young aviators. Plywood construction - full size plans - 4' wingspan, 4' long. Parts Kit includes necessary hardware, dowels, etc. - no lumber. #04083Z Plans and Parts Kit \$12.95. #27083 Laminated Wheels \$5.90/2. Plus \$4 processing charge. 48-page Catalog \$2 (refundable). CRAFTER'S MART, P.O. Box 2342WF, Greeley, CO 80632.



High quality rocking horse kit, assembled and carved from solid hardwood - ready to sand and paint. Ash rockers, precut leather for saddle, etc., brass hardware. Horse hair provided for mane and tail. For more information send \$1.00 and SASE (business) To: SPECIALTY WOOD-CARVING Ltd., P.O. Box 736, Sunbury, PA 17801.



Executive wood toys! Now you can create this 1929 Ford showpiece and many others like it from our detailed and easy-to-read patterns, parts and wheels. Make this day a time to remember with one of our executive wood toys! Send \$1.00 for catalog to: TOYS AND JOYS, Box 628 HGL, Lynden, WA 98264.



Drill Press and Radial Arm Saw Rotary Planers! Won't grab or kick back! Planes, tenons, rabbets, molding, raised panels, and decorative cuts; all with a Safe-T-Planner. Safety designed diecast unit with detailed instructions and sharpening tools for easy maintenance. Guaranteed! Moderately priced through suppliers & catalogs or contact G.&W. TOOL, INC., P.O. Box 691464, Tulsa, OK. 77169.



One man saw mill, weighing only 45 lbs, Ripsaw cuts 20" diameter logs any length into dimensional lumber. The narrow kerf band saw blade cuts quickly & accurately with minimum waste. Maximum cutting width of 14" with a thickness adjustment from 1/8" to 9". High performance model for only \$1599. Less expensive models available. BETTER BUILT CORPORATION, 845 Woburn St., Wilmington, MA 01887, or call (508) 657-5636.



Finally, a solution for accurately setting your table & radial arm saw, Para Gauge provides a parallel measurement up to 10" for setting rip fences & up to 2.5" in blade depth. Para Gauge can also be used to set band saws, drill presses & router tables. A perfect gift idea for only \$29.95, plus \$3.50 shipping & handling. To order call 1-800-343-6129, MC/Visa. ACCUSET TOOL CO., P.O. Box 1088, Troy, MI 48099.



Fathers Day Special! Because Dad deserves the best, order Warren Tool Woodcarving Kit (shown) plus "Basic Woodcarving" book (not shown), #KBL3. Special only \$23.95 ppd. (foreign orders add \$3). Offer expires 8-1-90. Send check or money order to: WARREN TOOL CO., INC., Rt. 1, Box 14-A, Dept. PDW, Rhinebeck, N.Y 12572, UPS-COD, Extra charge. 1-914-876-7817.



Band Saw Blades. Tried the best? Suffolk Machinery offers Swedish Silicon steel band saw blades by Hakansson. Known for milled sharp teeth, electro heat induction hardened European patented 1946. We have any size & length in stock. Flex & hard back Band Saw Mill blades, Bi-Metal - M-2/M-42. Guaranteed. We offer 24 hour service! Dealers welcomed. Send for free catalog. SUFFOLK MACHINERY CORP., 12 Waverly Ave., Patchogue, NY 11771.



These top quality thickness sanders are available 12" to 26" capacity. They will sand material smooth and flat in seconds. These American made sanders are the finest in the world and are reasonably priced. ROSS INDUSTRIES, INC., Box 637, Pineville, MO 64856.



The new Delta 16" 2-Speed Scroll Saw, Model 40-560, performs intricate inside curve cutting. Speeds of 850 and 1790 CS/M cut woods, metals, plastics, and compositions. Capacities: 16" arm to blade and 2" depth of cut. The 11-3/4" diameter table tilts 45° for bevel cutting, features instant-acting blade tension release lever, easy blade changing and/or internal cut threading and tensioning. DELTA INTERNATIONAL MACHINERY CORP., 246 Alpha Dr. Pittsburgh, PA 15238.



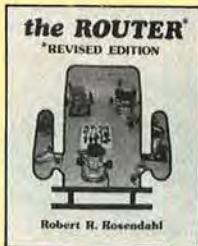
This highly versatile carbide bit set allows you to make raised panel cabinet doors plus over 39 different molding profiles. The bits have 1/2" shanks & come in a sturdy wooden storage case. For use with a table mounted router, it is an ideal gift for the fine woodworker. FREUD, P.O. Box 7187, 218 Feld Ave., High Point, NC 27264.



Hexagonal Picnic Table – plans, \$16.95. This 3 legged table automatically levels itself. Walk through seating for 6 people. Designed to accept an umbrella. SPECIALTY FURNITURE, 797 West Remus, Mt. Pleasant, MI 48858. Visa/MC accepted. MI residents add 4%.



Make the Father's Day gift that lasts forever. Build the Continental Kit pool table and save hundreds of dollars while creating an heirloom. We sell complete kits, individual components and accessories. Factory direct. Send \$1.00 for complete information. CONTINENTAL BILLIARDS, 2905-B Peachtree Industrial Blvd., Buford, GA 30518. 404-271-1824.



Book, *The Router*, revised by Robert Rosendahl – Step-by-step instruction book with original drawings & photos to make router set-ups, safety precautions, & tips easily accessible to carpenters, hobbyists & craftspeople. Covers tablemounting, portable uses, detailed moldings, reverse inlays, panel doors, miter work, pattern work, circle work, box joints, dovetails & more. Father's Day Special, \$11.95 ppd. Call 1-800-665-0252. Visa/MC. OAK PARK ENTERPRISES.



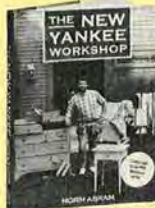
Now available direct from Foley-Belsaw is a new Portable Planer that also makes molding. A unique open side design allows this 6" planer to plane boards 12" wide in two passes. Priced at under \$400 you'll save big by ordering direct from the manufacturer. For more information contact FOLEY-BELSAW COMPANY, 6301 Equitable Rd. Dept. 91548, Kansas City, MO 64120. WOOD MAGAZINE JUNE 1990



Now you can cut precision angles without changing your radial arm or table-saw setting from 90°. The Eze-Angleguide makes 160 different angles with eight precisely-cut templates. Sticky-back sandpaper prevents movement. Free directions to make octagon and table/slide. Kit contains complete instructions & angle-chart. \$24.95 + \$2.40 handling. STEUSSY CREATIONS, 334 Atherton Ave., Novato, CA. 94945.



We feature the finest northern kiln dried hardwoods. Our large inventory has been carefully selected to ensure quick service. Ed Seeley and Tim Johnston's experience and personal assistance can quickly help you satisfy your hardwood needs. We carry all sizes of domestic hardwood needs with no minimum or maximum order required. Send \$1 for catalog. NATIVE AMERICAN HARDWOODS, LTD., 6570 Gowanda State Rd. Hamburg, NY 14075. 1-800-688-7551.



Build along with Norm Abram! Build American country furniture step-by-step with Master woodworker Norm Abram in his new book *The New Yankee Workshop*. Learn Norm's shop secrets while creating authentic reproductions of Yankee craftsmanship. To order your copy and save \$5 off the retail price send \$24.95 to RODALE BOOKS, P.O. Box 02469, Emmaus, PA 18098.



Solid cherry commode table \$169. Ready to assemble, 20" x 27" x 22" high. Also available in walnut, oak and mahogany with matching coffee table. Shipped from stock. Free brochure. ADAMS WOOD PRODUCTS, INC., 974 Forest Dr., Morristown, TN 37814. Or call 615-587-2942.



Bravo Designs offers new plans for a unique folding wooden patio chair. The Cradle Chair®, based on an ancient Mayan design, conforms comfortably to natural body lines. This great one day project for intermediate craftsmen requires only basic hand tools. Packet contains plans, materials list, exploded views, assembly techniques. Send \$12.50 + \$2.50 p+h for Plan #190. BRAVO DESIGNS, P.O. Box 451-F, Brick, NJ 08723.



Portable Drafting Kit with graduated protractor, straight edge and side scales. Professional quality W. German product with durable white plastic surface takes 11x17 paper. Ideal for on-the-spot sketches and drawings. Carrying case included. \$82.70 ppd. GARRETT WADE, 161 6th Ave., New York, NY 10013 or 1-800-221-2942.



The New Super Max combines the proven features of the Performax S/T Sander and the infinitely variable 0-20"/minute Power Feed with a 5HP motor and heavy duty stand for even greater power, precision, and speed. New brochure includes new accessories for the Performax Component Sander. For free catalog send to: PERFORMAX PRODUCTS INC., 1221 Woodlake Dr., Burnsville, MN 55332. 1-800-334-4910.



Mooserack – full size pattern with step-by-step suggestions. A unique design for a one of a kind coat rack. Makes a great gift for children or adults. A fun, easy project. \$6.95. JOBUCK™, Plan #13, 17813 Brooks Blvd, Bothell, WA 98012.



Holiday Candle Holder. Made from a wheel, spindle, candle cup and insert. Wood parts and dowels from MIDWEST DOWEL WORKS, INC., 4631 Hutchinson Rd., Cincinnati, OH 45248.



Lumber drying – Nyle Corp., the largest manufacturer in the United States of dehumidification Dry Kiln Systems offers *Introduction to Dehumidification Lumber Drying*. Send for free catalog. NYLE CORP, P.O. Box 1107, Bangor, ME 04401-1107 or call 1-800-777-6953 (USA/Canada).



Eagle America offers over 10 different router bit sets, including many specialty sets in attractive wooden cases for moldings, table tops, picture frames, hand rails and door construction. All specially priced for Father's Day. Call 1-800-872-2511 for details. EAGLE AMERICA.



Keep your shop clean and safe from sawdust with this large capacity, commercial style system. The DC-1 Dust Collector features 1 HP motor, 610 cfm air flow and 20 gallon bags. Price is \$189.95 + \$20 UPS shipping. Includes \$15 free accessories. Order from PENN STATE INDUSTRIES, 2850 Comly Rd. Philadelphia, PA 19154, or call 1-800-288-7297.



The Dupli-Carver is a wood duplicating machine that can reproduce three-dimensional carving in wood. The machine uses a stylus (tracer) to follow the contours of a statue or plaque. Two models starting at \$359. WOOD-MIZER®, 8180 W 10th St., Dept. QQ29, Indianapolis, IN 46214. 1-800-553-0219, IN 317-271-1542.



You'll forget where you put your miter gauge after using the Dubby on your table saw. It's guaranteed for accuracy and, with the optional 97 minute video, even novice woodworkers can complete complex projects quickly, easily and accurately. For information send \$1 to: IN-LINE INDUSTRIES, 661 S. Main St., Webster, MA 01570. Orders only, 1-800-533-6709.



Personalize your wood items quickly and easily with this brass branding iron. First line: HAND CRAFTED BY; second line: your choice of up to 20 characters including spaces. Compact size. \$26 ppd. Guaranteed. Order toll-free 1-800-826-7606 or by mail from: NOVA TOOL CO., P.O. Box 29341, Dept. BGL, Lincoln, NE 68529. Shipped within 1 week.



Best value gift. This 3HP shaper comes with 1" & 3/4" spindle, spring hold down; 28" x 30" cast iron table, magnetic switch, forward/reverse control, 8000/10,000 RPM, 110/220V, 1 PH, table insert, miter gauge. Sale price only \$799. Free catalog. LOBO POWER TOOLS, 9034 Bermudez St., Pico Rivera, CA 90660. 213-949-3747.



Curved molding, raised panels, dowels, crowns, and many others. Quick changeover. Five-year warranty, and free thirty day trial. Whether you're a do-it-yourselfer or a professional you can rely on the W&H Molder/Planer to perform a range of woodworking jobs quickly, smoothly and with warranted dependability. WILLIAMS & HUSSEY MACHINE CO., INC., Riverview Mill, P.O. Box 1149, Witon, NH 03086.



30 lbs. of assorted hardwoods. Excellent for small crafts and toys. Random species and thicknesses. All surfaced 2 sides. 1/2" - 2" thick, 3" - 10" wide and 6" - 24" long. Shipped UPS prepaid, \$29.95. STEVE H. WALL LUMBER CO., Rt. 1, Box 287, Mayodan, NC 27027. 1-800-633-4062 or 919-427-0637.



Now you can lay out precise letters and numbers for your wood craft projects. Scroll sawers and sign carvers use these specially designed lettering layout guide sets. Quick and easy to use - simply trace around the letters - guides are very durable. Several styles and different sizes are available. Brochure \$1.00. SEYCO SALES, 1414 Cranford Drive, P.O. Box 472749, Garland, TX 75047.



Stop pegboard hook fall-out forever. M-CLIPS are the guaranteed perfect solution to the annoying problems of pegboard hooks that come loose when a tool is removed. Fits both 1/4" and 1/8" perfbboard. Locks into adjacent holes and holds hooks tightly in place. Send self-addressed stamped envelope for free sample or \$5.99 plus \$1 p&h for package of 50 to: AETECH CORP., Dept. W. Box 6298, Lawrenceville, NJ 08648.



Sanding abrasive cleaner works like giant eraser to remove wood, plastic and metal from sanding belts, sheets, disks, and drums. Long lasting abrasive cleaners are clean, safe, and non-toxic. For use with all kinds of abrasives on any power tool. Will not harm the grit or the power tool in any way. #LMAC-2212, 2" x 2" x 12" at \$11.95 each. THE OLSON SAW CO., Rt. 6, Bethel, CT 06801. Phone 203-792-8672.



Elegantly designed, Emperor's new solid cherry Chippendale Writing Desk will flatter home or office decor. Our do-it-yourself kit features beautiful fretwork and brass hardware, demonstrating quality to last a lifetime. Send \$1.00 for color catalog to EMPEROR CLOCK COMPANY, Dept. 3597, Emperor Industrial Park, Fairhope, AL 36532.

CARBIDE TIPPED 1/4" SHANK ROUTER BIT SETS



"Must have" Carbide Tipped Router Bits Set includes most desired bits used by all woodworkers. Set makes a special gift. 8-piece set includes: 3/8" round over bit, 1/4" straight bit, 1/2" flush bit, 3/8" rabbeting bit, 45° chamfer bit, 3/8" key hole bit, and 1/2"-40° dovetail bit. Exceptional quality and value. \$69.95 for set. MLCS LTD, P.O. Box 4053, Rydal, PA 19046. Call toll-free 1-800-533-9298.



Lawn swing on wheels. Plans and patterns - \$7.95. Suspension kit - \$54.95. Kit includes 4 wheels - 6" diameter, 2 axles - 3/4" diameter, 4 nylon bearings, 8 aluminum rockers and 8 fixtures for benches. VIEL TOOLS, P.O. Box 250, Isle-Vert, Quebec, Canada 60L 1K0.



Like a third hand. Provides that extra support so often needed. Its rugged, heavy-duty, all-steel construction makes it a tool you'll depend on for years. Roller is 13" long, galvanized and ball bearing. Adjusts in height from 25 3/4" to 45". When you're done it folds flat. #HPR-13, \$39.95 + UPS. HTC PRODUCTS, INC. Toll free 1-800-624-2027. In MI, 313-399-6185.



Gramma & Gramps yard sign welcomes friends, displays wood shop name or street address. This 44" tall plywood cutout is sure to get lots of smiles! Full size pattern, painting instructions plus catalog of over 850 fun woodcraft projects only \$7.00. THE WINFIELD COLLECTION, Dept. FD2, 12044 Parkin Lane, Fenton, MI 48430.

Makita
POWER TOOLS

Call 1-800-2-MAKITA for the largest selection of Makita at the right price. That's 1-800-262-5482. Same day shipping, free freight. Visa, MasterCard, Discover, COD. HOMELUMBER, 449 Whitewater St. Whitewater, WI 53190. Please call for pricing on Amana Carbides, Bostich Air Nailers & David White Instruments.



The Makita 6093 DW drill comes complete with a one hour fast charger, 9.6 volt battery, steel carrying case, and double-ended phillips bit. The 6093 DW drill kit is variable speed (0-400 and 0-1100 RPM) with six position clutch for a variety of fastening applications. List price \$261, yours for \$127. TOOLS ON SALE, 216 W. 7th St., St. Paul, MN 55102. Call 1-800-328-0457. In MN, 612-224-4859.



New Woodcarvers Kit from Foredom, flexible shaft machine includes powerful 1/8 HP motor, flex shaft, electronic foot control, collets, #44B handpiece and woodcarvers accessory kit. Model 2294, \$239.00. Free delivery! R.A. Ness & Co. THE WOODWORKERS EMPORIUM, 8888 N. Milwaukee Ave., Niles, IL 60648. Phone: 708-824-0565.



Edlco is offering a bundle of lumber. 10 board feet of 3/8" shorts, 3" and wider, 18" - 36" long in cherry, oak or walnut. Includes a "How To" project book and top-grade lumber catalog! Only \$42.95 delivered. Specify species and send check or money order to: EDUCATIONAL LUMBER COMPANY, Box 5373 W, Asheville, NC 28813.



If you enjoy woodworking, a versatile Marlin Woodcarving Machine may be just what you need. Three-dimensional carving of sculptures, plaques, panels and mouldings is easy. Wood sign carving is simple. Available in three sizes. MARLIN INDUSTRIES, INC., Route 70, Box 191, Cashiers, NC 28717. 704-743-5551.



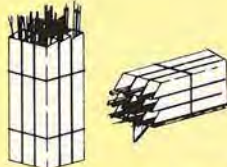
1", 3/4", & 1/2" spindle, 3 HP reversible speed, 9000/12,000 RPM. Router bit chuck. Side and top hold-down. Steel fence and dovetailed miter gauge. Dead collar for irregular surfaces. 25" x 22" milled table. 2 1/2 spindle travel. Weight 395 lbs. TCM INDUSTRIES, INC., 322 Paseo Sonrisa, Walnut, CA 91789. Call toll free 1-800-654-7702. (CA 714-594-0780).



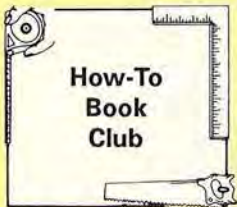
Amazing Square Drive Screw virtually eliminates driver bit "cam-out". Assortment special includes 100 flat head steel screws in each of 6 sizes (600 total) from #8 x 3/4" to #8 x 2 1/2" a hex shank power driver, 7 1/2" hand driver, and a set of 6 storage bins. New "Combo Square/Phillips" recess uses either driver type and is included along with square recess type. Just \$24 plus \$3.50 s&h (AK & HI, s&h is \$8). MCFEELY HARDWOODS, 712 12th St., Lynchburg, VA 24505. 1-800-443-7937.



This machine cuts intricate wood patterns easily. The unique stroke mechanism (patent No. 10485) makes blades cut efficiently and smoothly. UL listed (No. 37J2), CSA listed (No. AR59053). Our best durable quality guaranty. Order before May 31, 1990, get a free router RPM controller plus nylon caliper. Call 1-800-78AMMAX.



You get 33 birch dowels together with 9 individual organizer bins. Stand them upright or lay them flat on a shelf. Assortment includes 5 each of our 1/8", 3/16", 1/4", 3/8", and 1/2" dowels plus 2 each of our 5/16", 7/16", 5/8", and 3/4" birch dowels. All dowels are 36" long. Order #8401 dowel assortment w/bins for \$24.94. (postage paid). MEISEL HARDWARE SPECIALTIES, P.O. Box 70-WFD, Mound, MN 55364.



How-To Book Club is offering you (or your Father) the opportunity to receive 5 books, of your choice, plus a free gift for only \$4.95! Values to \$113.75! For details, write or phone: HOW-TO-BOOK CLUB, Customer Service Dept., Blue Ridge Summit, PA 17294-0800. 1-800-233-1128.



Ideal for home workshops, the new Delta 10" Motorized Bench Saw offers a large capacity at an economical price. It cuts stock 3" thick, 2 1/2" at 45 degrees, and rips 9 1/2" to right of blade. Saw highlights include: 16"x26" die cast aluminum table; standard equipment mitre gauge; front and rear locking rip fence; see-thru blade guard with splitter and anti-kickback fingers; 13 Amp, 115V, 60 Hz motor, and Delta two-year limited warranty.



Buy this superb wooden block plane for about the same price that you pay for a high quality steel plane. Lightweight hornbeam body and super-tough lignum vitae soleplate. Was \$40; Holiday Special \$35 ppd. Catalog \$1.00 (refunded with first order). HAMMER-MARK ASSOCIATES, BOX 201-ABW12, FLORAL PARK, NY 11002.



Create a beautiful life size male woodduck decoy in a few hours! Finely sanded basswood decoy with true to life accuracy. Included in complete kit: quality glass eyes, painting instructions & pattern, acrylic tube colors and brushes. Anyone can produce this heirloom quality art piece with a minimum of money, effort and time! \$49.95 ppd. Order #8900. 1-800-843-3320. VAN DYKES, Dept. 55, Woonsocket, SD 57385.



Everything you need to repair cracks, loose joints and fill splits. Superior bonding material will not crack, tear loose or break out. Fix your own projects or make money repairing furniture as a hobby/business. Complete instruction manual shows how to handle big structural repairs as well as quick-fix problems, \$249.95. Complete furniture restoration catalog \$2. Free professional workshops offered. MINUTEMAN, INC., Dept. 17C, 115 N. Monroe, Waterloo, WI 53594.



The perfect gift for the VIP woodworker in your life! These superb Rosewood writing instruments are hand assembled to insure a premium quality pen. The "Executive" ball point and matching pencil set (04T14), the "President" fountain pen (04T17) \$29.95 ppd. Unequaled in style and appeal. Uses standard ink or lead refills. Attractive gift box. WOODCRAFT SUPPLY CORP., 210 Wood County Ind. Park, P.O. Box 1686, Dept. WBH50F, Parkersburg, WV 26102. Credit cards 1-800-225-1153.



Moisture related problems such as shrinking, warping and cracking can ruin the most beautiful wooden pieces built. Avoid moisture problems by checking the wood with a moisture meter! The pocket-size Mini Ligno moisture meter is for the serious hobbyist and professional woodworker. LIGNOMAT, P.O. Box 30125, Portland, OR 97230. Call 503-257-8957 or 800-227-2105.



Eagle America offers over 10 different router bit sets, including many specialty sets in attractive wooden cases for moldings, table tops, picture frames, hand rails and door construction. All specially priced for Father's Day. Call 1-800-872-2511 for details. EAGLE AMERICA.



Sands on a cushion of air! We supply 5 free "flexible" sanding sleeves to go along with 1 1/2" diameter x 4" long heavy-duty sander. Chuck into your drill press or drill, (3/8 shaft incl. in drum) & quickly polish out scratches, burns and cutting marks. \$29.95 + \$2.50 s&h. Cat. #01605. INDUSTRIAL ABRASIVES CO., 642 N. 8th St. Reading, PA 19603 1-800-428-2222. (PA 1-800-222-2292).

FOREVER PEG HOOKS

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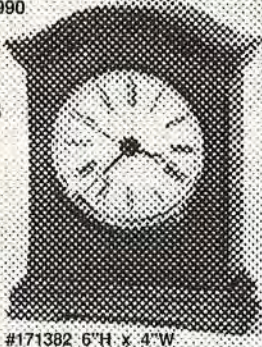
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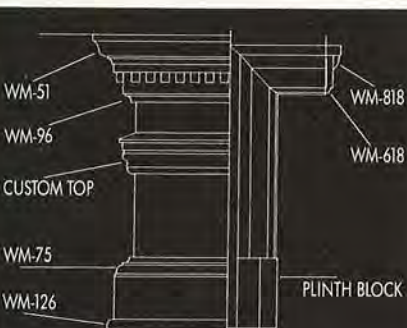
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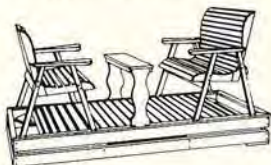
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87....\$1.00	339....\$1.00	480....\$1.00	855....\$4.00	1244....\$1.00	1430....\$3.00	2185....\$1.00
89....\$1.00	345....\$3.00	510....\$1.00	900....\$4.00	1248....\$1.00	1450....\$1.00	2320....25¢
93....\$1.00	355....\$8.00	520....\$1.00	920....\$1.00	1307....\$1.00	1480....\$1.00	
94....\$1.00	370....\$1.00	530....\$2.00	1016....\$1.00	1320....\$3.00	1490....\$1.00	

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DELTA BENCH TOP TOOLS

Model	List	Sale
23-700	Welding grinder	201 155
23-680	6" bench grinder 1/2 H.P.	81 75
23-880	8" bench grinder 1/2 H.P.	136 109
23-960	10" bench grinder 1 H.P.	246 203
11-950	8" drill press	164 135
14-640	14" drill press	313 309
40-150	1 1/2" hobby scroll saw	178 139
29-160	1 1/2" hobby band saw	189 144
31-050	2" belt sander 2.0 amp	93 78
31-450	4" belt sander 5.2 amp	178 159
31-340	"NEW" 1" belt sander	226 175

DELTA STATIONARY

Model	List	Sale
34-740	Super 10" motorized table saw	690 429
34-429	10" lifting arbor bench saw	

Model	List	Sale
33-990	10" radial arm saw	727 609
37-280	6" motorized jointer	440 339
50-170	1/2 H.P. dust collector	535 439
50-180	2 H.P. dust collector	760 599
37-154	Deluxe D-145 5/8" jointer	

Model	List	Sale
22-661	13" planer w/2 H.P. motor	1288 1029
33-050	"NEW" 8 1/2" Sabwbuck	742 545
34-330	"NEW" 8 1/2" Table Saw 13A	321 209
34-670	10" motorized table saw	437 379
34-985	1/4 H.P. stock feeder	698 599
32-100	"NEW" stationary plate joiner	645 459
36-400	"NEW" 8 1/2" compound miter saw	216 155

MILWAUKEE TOOLS

Model	List	Sale
0399-1	"NEW" 12V cordless drill	
0399-1	w/blade, charger & case	280 155
0395-1	9.6V cordless drill w/blade	254 148
0395-1	9.6V cordless drill w/blade	277 165
0395-1	7.2V cordless drill w/blade	174 105
0224-1	3/4" drill 4.5A magnum	189 114
0244-1	1/2" drill 4.5A mag 0-850 rpm	199 107
0244-1	1/2" drill 4.5A mag 0-600 rpm	199 107
0228-1	3/4" drill 3.5A 0-1000 rpm	174 99
0228-1	3/4" drill 3.5A 0-1000 rpm	164 95
0375-1	1/2" close quarter drill	208 119
0379-1	1/2" close quarter drill	243 149
6539-1	Cordless screwdriver 190	113 69
6540-1	Cdless screwdriver w/blade & case	154 95
6546-1	Cdless screwdriver 200 & 400 rpm	120 75
3102-1	Plimbers rt angle drill kit	330 189
3002-1	Electricians rt angle drill	320 199
5399	1/2" D-hole hand drill kit	304 175
1676-1	H.D. Hole Hawg w/blade	415 224
6511	2 sp SawZall w/blade	214 125
6405	8 1/4" circle saw	219 125
6510-1	Drywall gun 0-4000 4.5A	154 95
6507	TSC SawZall w/blade	239 129
6510	14" chop saw	430 275
6012	Orbital sander 3 1/2" x 7 1/2"	189 115
6014	Orbital sander 4 1/2" x 9 1/2"	199 118
6305	6 1/4" cordless circle saw	299 175
8977	Var temp heat gun	114 75
5397-1	3/4" v. spd. hammer drill kit	232 139
5371-1	1/2" v. spd. hammer drill kit	310 185
3107-1	1/2" v. spd. rt angle drill kit	340 195
6754-1	Drywall gun 0-4000 4.5A	179 119
6741-1	Drywall driver-D-2500	154 99
0230-1	3/4" drill 0-1700 rpm	179 105
3300-1	1/2" v. spd. magnum rt angle kit	299 179
5660	Router 1 1/2 H.P.-10 amp	299 189
5660	Router 2 H.P.-12 amp	350 225
5455	1/2" polisher 1750 rpm	229 129
6215	16" chain saw	280 169
8975	Heat gun	89 59
6355	7 1/4" circular saw	195 114
6356	7 1/4" circ saw w/blade & bld	204 119
6358	7 1/4" circ saw w/blade, bld & case	233 129
0215-1	2 spd cordless drill Hi-torque	222 129
0215-1	1/2" drill keyless chuck mag	209 119
6256-1	1/2" sheet pad sander	79 45
6145	4 1/2" grinder 10000 rpm	154 95
6142	6145 w/blade & access	192 115
6140-1	Drywall gun 0-2500 4.5A	169 125
6377	7 1/4" worm drive saw	295 174

FREUD SAW BLADES

Item No.	Description	Diam.	Teeth	List	Sale
L072M010	Gen. Purp. A.T.B.	10"	40	58	39
L081M010	Gen. Purp. Tr.Ch.	10"	40	85	42
L082M010	Cut-off	10"	60	77	45
L083M010	Super Cut-off	10"	60	86	55
L084M010	Ripper	10"	24	57	36
L085M010	Cut off	10"	60	70	44
L086M010	Thin kerf	10"	24	60	39
L087M010	Thin kerf	10"	60	74	44
L088M010	Ultimate	10"	60	107	69
L089M010	Non-ferrous metal	10"	72	87	55
P5023	Gen. Purp.	7 1/4"	24	25	19
P5023	Plywood	7 1/4"	40	36	25
S2036	8" Dado - Carbide			104	105
S2036	8" Dado - Carbide			106	109
S2036	1 1/4" x 1/4" Biscuits 1000-01y			32	27
F10	2 1/4" x 1/4" Biscuits 1000-01y			32	27
F20	2 1/4" x 1/4" Biscuits 1000-01y			34	29
F40	Assorted Biscuits 1000-01y			34	29
WC105	6 pce. chisel set w/blade 1 1/2"			70	52
WC105	10 pce. chisel set w/blade 1 1/2"			119	78
FR100	16 pce. forstner bit set 1/2" x 1/2"			82	49
FR107	7 pce. forstner bit set 1/2" x 1/2"			82	49
FR100	5 pce. router bit set 1/2" x 1/2"			280	159
J5100	Biscuit Joiner w/blade			300	159
CE120	Planer w/blade carb bld & guide			218	129
FR2000	3 1/4" H.P. plunge router			299	189

MAKITA CORDLESS

Model	List	Sale
6070DW	3/4" var spd. rev. drill, 7.2v	130 78
6071DW	3/4" var spd. rev. drill w/interchangeable batt, 7.2v	199 115
6090DW	3/4" saw kit, 9.6v	256 139
60100DW	3/4" cordless drill kit, 7.2v	164 95
60105DW	3/4" cordless drill, 7.2v	99 65
DA3000DW	3/4" angle drill, 7.2v	251 139
8400DW	Hammer drill kit, 9.6v	272 149
4390DW	9.6 volt cdfs. recip saw kit	230 128
4300DW	Jig saw kit comp. 9.6v	232 129
60120DW	2 spd. driver drill w/blade & case, 9.6v	236 117
6082DW	Vsppd. drill, kit complete	250 123
6083DW	Vsppd. drill w/blade - complete	261 127
6081DW	Drywall gun 0-1400, 9.6v	237 135
632007-4	9.6 volt battery	48 30
632002-4	7.2 volt battery	40 28
5007NBA	7 1/4" saw w/elec. brake	233 128
5008NBA	8 1/4" saw w/elec. brake	284 158
804510	1/4 sheet pad sander	85 54
9900B	3"x21" belt sander w/bag	268 148
99240B	3"x24" belt sander w/bag	282 149
9945N	1/2 shd fin. sand. w/bag	231 134
4290N	4 1/2" circ. saw 7.5 amp	225 127
4301NB	Orb. vsp. jig saw w/blade	289 155
JR3000V	1/2" recip saw w/blade	227 129
LS1020	New 10" miter saw	463 245
9820-2	Blade sharpener	373 209
1900WB	3 1/4" planer w/blade	209 115
1911B	4 1/4" planer 7.5 amp	240 138
1100	3 1/4" planer w/blade	401 219
9205PFC	7" sander-polisher	276 155
3601B	1 1/2" H.P. router	255 139
3700B	1 1/2" H.P. router	290 165
8501BZ	4" grinder, 3.5 amp	126 75
804530	6" round sander	101 59
804550	1/4 sheet pad sander w/bag	86 55
DA3000R	3/4" angle drill	270 148
6302	3/4" vsp. 5.2 amp drill	209 125
HP210N	3/4" vsp. hammer drill w/blade	309 165
2708V	8 1/4" table saw	504 259
2711	10" table saw w/brake	641 489
2620N	12" planer/jointer	310 189
2640	15 1/2" planer	2595 1489
18058	6 1/2" planer kit w/blade	679 359
5005BA	5 1/2" circular saw	223 135
6404	3/4" drill 0-2100 rpm, 2 amp	104 65
6510LR	3/4" drill rev. 0-1050 rpm	145 79
6013BR	1/2" drill rev. 6 amp	241 139
5402A	16" circular saw - 12 amp	636 349
3612BR	3 H.P. plunge router	377 195
3401	1 1/2" x 2 1/2" belt sander w/bag	318 169
3620	1 1/2" H.P. plunge router w/blade	192 109
4302C	Vsppd. orb. jig saw	302 159
5077B	7 1/4" Hypoid saw	252 138
LS1440	14" Miter saw	721 435
2414	14" cut-off saw AC/DC	351 205
5007NB	7 1/4" circ. saw 13 amp	209 114
3612B	3 HP plunge router sq/base	377 195

DELTA TOOLS

Model	List	Sale
34-444	Table Saw Complete w/1 1/2 H.P. motor & stand	619.00
34-445	Table Saw complete w/300" Unifence	799.00
33-150	8 1/4" Saw Buck	485.00
28-283	14" Band Saw w/enclosed stand & 1 1/2 H.P. motor	699.00
70-200	NEW 20" Drill Press	709.00
17-900	16 1/2" Floor Drill Press	385.00
40-601	18" Scroll Saw w/stand and blades	699.00

DELTA #34-080 10" MITER BOX

XTRA SPECIAL 199.00 List 269.00

DELTA XTRA SPECIAL 199.00 List 269.00

Model	List	Sale
6850-02	"NEW" 1 1/2" EMH hammer drill w/blade 4 amp	255 129
5510	(55) 5 1/2" circ. saw	112 105
5625	(52) 6 1/2" circ. saw	175 129
5656	(53) 7 1/4" circ. saw	132 125
5750	(807) 7 1/4" circ. drop foot	198 145
5790	(810) 10 1/4" circ. drop foot	420 275
5825	(367) 6 1/2" worm saw	229 155
5865	(625) 8 1/4" worm saw	250 164
4580	Var. orbit jig saw w/blade	144 105
3810	10" Miter saw	293 225
3810S	3810 w/60 tooth carb. bld	293 239
7575	1 1/2" palm sander	52 48
77	7 1/4" worm drive saw	230 145
5350	2 1/2 HP circ. saw	80.99 77
5290	2 1/2 HP circ. saw	68.99 66
2735-04	12v vsppd. cordless drill complete w/blade & 2 batt. 114	244

LEIGH DOVETAIL JIGS

Model	List	Sale
D1258-12	List 314.00 - Sale 269.00	
D1258-24	List 375.00 - Sale 305.00	

LEIGH INSTRUCTIONAL VIDEO - SALE 29.00!!

Model	List	Sale
MMT 500	NEW 24" multiple mortise & tenon jig	509 399
MMT	12" multiple mort. & tenon attachment for D1258-12	259 219
MMT	24" multiple mort. & tenon attachment for D1258-24	299 239

HITACHI TOOLS

Model	List	Sale
TR8	Plunge router, 1 1/2 H.P.	219 119
M12V	NEW 3 H.P. var/spd. router	437 249
TR12	Plunge router, 3 H.P.	354 175
CI19A	10" div. miter saw	585 469
CI2FA	"NEW" 12" miter saw	490 275
C8FB	8 1/4" slide compound saw	859 469
FREUD L091M008	8 1/4" cbld 48 tooth 58	49
CI16A	1 1/2" miter saw	745 409
FREUD L085M015	15" cbld 108 tooth 181	115

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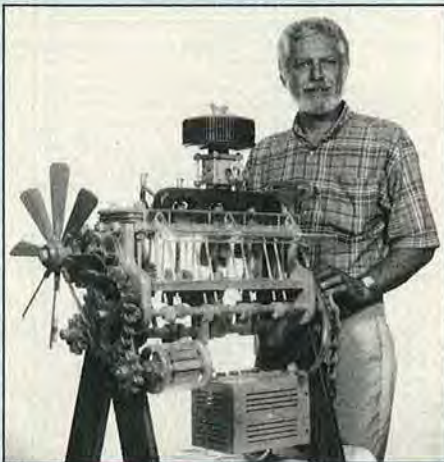
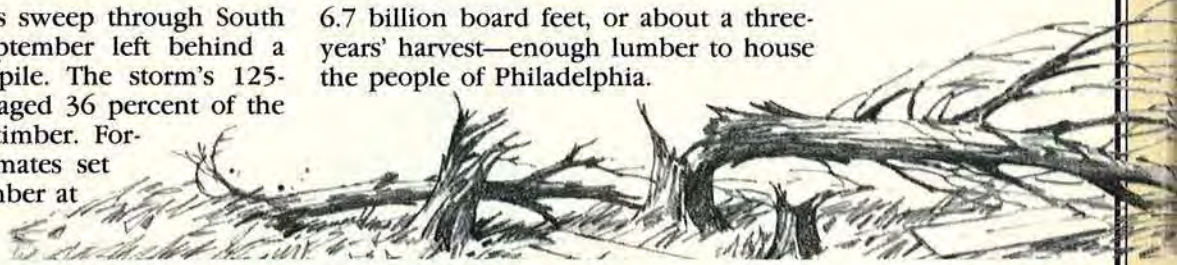
PIRANHA By Black & Decker

Model	Diameter	#Teeth	List	Sale
73-716	6-1/2	18	13.70	7.35
73-756	6-1/2	36	30.45	16.85
73-717	7-1/4	18	13.90	7.99
73-737	7-1/4	24	17.20	9.29
73-757	7-1/4	40	31.30	16.79
73-758	7-1/4	40	43.80	24.85
73-759	8-1/4	40	44.85	24.99
73-719	8-1/4	22	19.65	10.95
73-739	9	30	32.35	16.79
73-769	9	60	68.35	35.99
73-715	9-1/2	16	13.70	7.49
73-704	7-1/4	18	20.20	12

Hugo's harvest

Hurricane Hugo's sweep through South Carolina last September left behind a staggering woodpile. The storm's 125-mph winds damaged 36 percent of the state's standing timber. Forest industry estimates set the destroyed timber at

6.7 billion board feet, or about a three-years' harvest—enough lumber to house the people of Philadelphia.



Paul Wilson and his handmade, hardwood, four-cylinder engine.

Detroit oak

It all started with some clear plastic tubing that reminded Paul Wilson of engine cylinders. By the time he was done, the 54-year-old high school shop teacher from Beaver Falls, Pennsylvania, had built an automobile engine out of wood.

Powered by a battery and an electric motor, the parts of Paul's creation move just like a real four-cylinder engine. The fan spins, the crankshaft rotates, and the four pistons slide up and down in plastic tubes. He relied on red oak for most of the engine, and some hard maple. In all, the wooden power plant boasts several hundred parts.

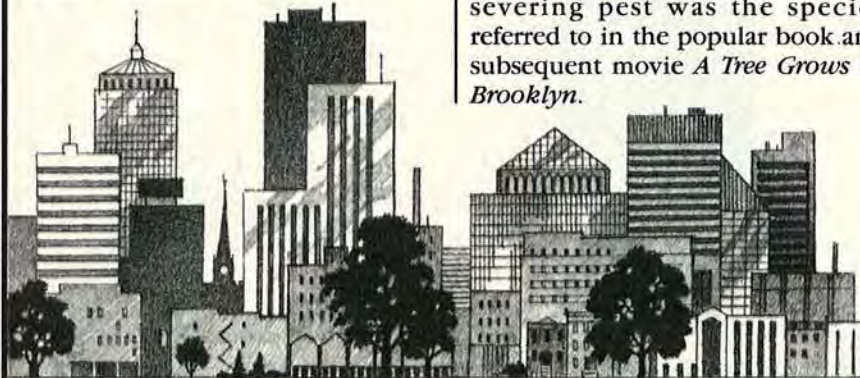
"They're fun to make, and to watch in operation," Paul says of the all-wood engine. "I'm sure I'll be building more of them sometime in the future."

In fact, for woodworkers with loads of patience and the same mechanical bent, he has put together a set of drawings, extensive instructions, and how-to tips covering all one needs to know to build a four-cylinder engine like his. For more information about his building plans, contact Paul at *Wilson Creations, 121 Pinebrook Drive, Beaver Falls, PA 15010. Telephone 412/843-3178.*

City chainsaw murders

The editors of *American Forests* magazine surveyed 20 cities from Boston to San Diego to find out what shape our urban forests are in. They found bad news.

On the average, four trees die or are removed for each new tree planted. In some, it's as high as 10 to one. Around Atlanta, for instance, about 50 acres of trees are converted to urban use *each day*. Chicago had the best ratio of healthy trees to tree spaces.



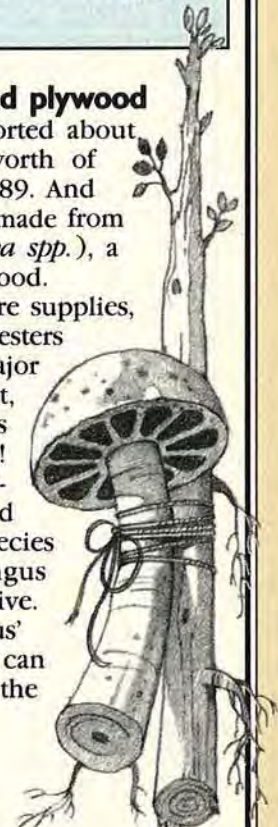
It grows in Brooklyn

The Tree of Heaven (*Ailanthus altissima*), a native of China, grows rapidly in poorer-than-average conditions. Brought here in the 1920s and 1930s to provide quick shade, the tree now proliferates east of the Rocky Mountains. In fact, it has become a weed tree, competing with more desirable native species. The wood looks somewhat like ash, yet because it doesn't compare in size, strength, or hardness, it goes unworked. Strangely enough, the persevering pest was the species referred to in the popular book and subsequent movie *A Tree Grows in Brooklyn*.

Of fungus and plywood

Indonesia exported about \$2.5 billion worth of plywood in 1989. And most of it was made from meranti (*Shorea spp.*), a tropical hardwood.

To ensure future supplies, Indonesian foresters set out on a major replanting. But, the seedlings wouldn't grow! Now, researchers have found out that the species requires a fungus on its roots to live. With the fungus' help, the land can again produce the tree. 🌱



Illustrations:
Jim Stevenson



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and stains than brush-on polyurethanes.

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