

PORTABLE PLANERS

**\$259 Buys a
Great Tool!**

AMERICAN WOODWORKER[®]

April 2000 #79

www.americanwoodworker.com

Brad Nailers

**The New Generation is
Better and Cheaper!**

**A piece of America's Past:
Molly Brown's Parlor Table**

**A Slick Jig for Hanging
Cabinet Doors - Flush
Straight and Even**

**Easy Lock-Miter Joints
on the Router Table**

PLUS

**Tame a Noisy
Shop Vacuum**

**Classic Pie Safe
made easy with
biscuit joinery**

**Choose the
best size
Belt Sander**

\$4.93 U.S. / \$5.95 CAN



A READERS' DIGEST PUBLICATION

Brad Nailers 43

Molly Brown's Table 50

Recreate the Unsinkable's collapsible parlor table.

Lock Miters 57

A simple, unique technique for making these strong, attractive joints.

Outdoor Rietveld Chair 60

Build this icon of modern furniture design.



page 60



page 70



page 43

Cover photo by Mike Habermann

Shop Test: Belt Sanders 66

We help you choose the size and style that'll work best in your shop.

Cherry Pie Safe 70

The biscuits that hold this cupboard together are easy as pie.

Flush-Fit Doors 78

A simple jig for a perfect fit every time.

Shop Test: Portable Planers 82

Our favorite models, plus how to steer clear of snipe.



page 82

Contents

DEPARTMENTS

8 Question & Answer

16 Workshop Tips

24 Woodturning Rolling Pin

NEW 38 One-Day Project Photo Album

88 Product Reviews

NEW 100 Small Shop Tips

116 Shop Solutions Shop Vacuum Muffler Box



page 100



page 8



page 24

Subscription inquiries

American Woodworker, Subscriber Service Dept., P.O. Box 2134, Harlan, IA 51593-0323; (800) 666-3111; e-mail: AWW-custserv@cds.fulfillment.com

Back issues

Back issues (if available) are \$5 each. Copies of past articles: photocopies are available for \$3 each. For either, write or call: American Woodworker Reprint Center, Box 83695, Stillwater, MN 55083-0695; (715) 247-5060, 8 AM to 5 PM CST, Mon. through Fri.

How to reach us

We welcome your comments, suggestions, or complaints. Write to us at: **American Woodworker**, 2915 Commers Dr., Suite 700, Eagan, MN 55121 Phone: (651) 454-9200 Fax: (651) 994-2250 E-mail: amwood@concentric.net

AMERICAN WOODWORKER

EDITOR Ken Collier

ASSOCIATE EDITORS Tom Caspar, Tim Johnson, Dave Munkittrick

CONTRIBUTING EDITOR George Vondriska

ART DIRECTORS David Farr, Melanie Haubrich, Patrick Helf, Barbara Pederson, Joel Spies

COPY EDITOR Mary Flanagan

PRODUCTION TEAM Deborah Palmen, Judy Rodriguez, Bill Sympon

SHOP ASSISTANTS Jeff Larson, Al McGregor

READER SERVICE SPECIALIST Roxie Filipkowski

ADMINISTRATIVE ASSISTANTS Lori Callister, Shelly Jacobsen

PUBLISHER Michael P. Reilly

NATIONAL SALES MANAGER Brenden Delaney

MARKETING DIRECTOR Robert Calandruccio

SHOW MANAGER Jonathan Frank (215-862-9081)

AMERICAN WOODWORKER SHOW BOOTH SALES Bob Ryan (215) 321-9662 ext. 42

BUSINESS MANAGER Aseem Chhabra

ASSOCIATE PROMOTION DIRECTOR Rose-Anne Tifre

PROMOTION COORDINATOR Andrea Vecchio

ADVERTISING COORDINATOR Cindy Giurici

SALES ASSISTANT Joanne Noé

ADVERTISING SALES

260 Madison Ave., New York, NY 10016; 212-850-7109

NEW YORK Brenden Delaney (212) 850-7124

CHICAGO Dennis Wiesnoski (312) 540-4803

LOS ANGELES Carl Mischka (949) 759-3450

SAN FRANCISCO Ron Evans (949) 759-3450

CLASSIFIED ADVERTISING The McNeill Group, Inc. (215) 321-9662

PUBLISHED BY HOME SERVICE PUBLICATIONS, INC., a subsidiary of the Reader's Digest Association, Inc.

EDITOR-IN-CHIEF Gary Havens

OFFICE ADMINISTRATIVE MANAGER Alice Wagner

VICE PRESIDENT, GROUP PUBLISHER

Bernadette Harrison Haley

VICE PRESIDENT, U.S. MAGAZINE FINANCE

Joseph Williams

VICE PRESIDENT, CIRCULATION, US MAGAZINE

PUBLISHING Craig Reynolds

DIRECTOR OF OPERATIONS Thomas Tzoucalis

ADVERTISING RESEARCH DIRECTOR Wayne Eadie

QUALITY CONTROL MANAGER Ernie Salto

PRESIDENT, US MAGAZINE PUBLISHING

Gregory G. Coleman

CHAIRMAN, CHIEF EXECUTIVE OFFICER

Thomas O. Ryder

Published by Home Service Publications, Inc., an affiliate of the Reader's Digest Association, Inc.

American Woodworker® (ISSN 1074-9152) is published seven times a year in February, April, June, August, October, November, and December by RD Publications, Inc., 260 Madison Ave. New York, NY 10016. Periodicals postage paid at New York, NY and additional mailing offices. Postmaster: Send change of address notice to American Woodworker®, P.O. Box 2134, Harlan, IA 51593-0323. Subscription rates: U.S. one-year, \$23.88; two-year, \$43. Single-copy, \$4.95. Canada one-year, \$31.88; two-year, \$58 (Canadian funds). GST #R122988611. Foreign surface one-year, \$35; two-year, \$65 (U.S. funds). Foreign air one-year, \$42; two-year, \$80 (U.S. funds). U.S. newsstand distribution by Hearst Distribution Group, New York, NY 10019. In Canada: Postage paid at Gateway, Mississauga, Ontario; CPM# 1447866. Send returns and address changes to American Woodworker®, P.O. Box 2134, Harlan, IA, USA 51593-0323. Printed in USA. ©2000 Home Service Publications, Inc. All rights reserved.

We make our mailing lists available to divisions of Reader's Digest and other carefully selected companies whose products and services may be of interest to our customers. If you would like your name excluded from these mailings, simply send your request to: Reader's Digest Mailing List, Attn: Circ. Dept., Reader's Digest Road, Pleasantville, NY 10570. Please include a copy of your address label.

Question & Answer

Recreating the Details

Q. I picked up a charming but slightly damaged table at a yard sale. I know how to refinish the piece but part of the carved detailing is missing on one of the legs. How can I replicate this unusual piece of wood? I've never done any carving and I don't have the tools for it.

Howard Langthorp
Peoria, IL

THE COMPLETED REPAIR



1 **SMOOTH AND FILL** the area around the missing part.

A. Carved details are prone to breakage, as any furniture restorer knows. Carving the replacement out of wood is the best approach, but don't let a lack of carving skills stop you from tackling this repair. Because carved details are often repetitive, a duplicate of the missing piece can be used to form a mold. From the mold you can make a casting of the missing detail.

We used salvaged door casing with some fantastic carvings to demonstrate the process, but it will work just as well on your table leg.

Here's what to do:

1. Create a clean, flat area where the piece is broken or missing. Use wood filler to even out any holes or gouges (Photo 1).

2. Find a matching piece of the detailing on which to form the mold. Then spray the surface with PPS-Porous Pattern Sealer to prevent the mold from sticking (see Sources, p. 10).

3. Thoroughly mix equal amounts of the two-part RTV silicone putty (see Sources, p. 10). The putty is safe for skin contact, so go ahead and use your fingers!

4. Press the putty firmly around the matching piece to form the mold (Photo 2). Let it set for 40 to 55 minutes, then press your fingernail into the edge of the mold. If you see a mark, let the mold set longer; if there's no mark, carefully peel the mold off the form.

5. Use Minwax's catalyzed wood filler or Bondo auto-body filler and slightly overfill the mold (Photo 3). Use a small stick to work the filler into the details.

6. After 15 minutes remove the casting



2 **MAKE A MOLD** with silicone putty using an undamaged part for the shape.



3 **FILL THE MOLD** completely with catalyzed wood filler.

Question & Answer

from the mold and carve away the excess material (Photo 4).

7. Refer to the spot where the casting will be attached to create the mating shape. Clean the edges and cut to fit with a knife or a chisel. Then sand with 150-grit sandpaper to eliminate any rough or high spots in the casting. Take your time or you could sand off the fine details. Continue with 180- and 220-grit sandpaper.

8. Glue the replacement in place with ordinary wood glue (Photo 5). Take a little bit of wood filler and smooth it into any gaps until the new piece fits seamlessly. Use some extra-fine sandpaper where necessary.

9. The last step is to blend in the repair by staining and, if necessary, painting in grain lines. If you want more on this step, see AW #73, p. 100.

Our door casing looks as good as new—your table will too!



4 CLEAN UP THE CASTING and cut to fit with an X-Acto knife or chisel.



5 GLUE ON the replacement piece. Then stain and glaze to match.

Sources

Available from Micro-Mark, (800) 225-1066:
Silicon putty, #81853, \$27.50
Porous Pattern Sealer, #82101, \$5.95

Minwax High-Performance Wood Filler is available at most home centers.

Ask Us

If you have a question you'd like answered, send it to us at:
Question & Answer,
American Woodworker,
2915 Commers Drive, Suite
700, Eagan, MN 55121.
Sorry, but the volume of mail prevents us from answering each question individually.

Does size matter?

You bet it does! You see, the bigger a company gets, the harder it is to keep the needs of the "little people" in mind. We have never lost sight of the fact that small cabinet shops are what got us started over 21 years ago. We've sold a lot of machinery over the years, but we have always stayed true to our original mission: to provide the highest quality, most innovative machinery at affordable prices.

No matter how much we grow, we treat every customer with the respect they deserve. Give us a call and see for yourself just how good a small company can be.



15" Production Wide Belt Sander

- Open-end design combined with 16" x 48" belt enables sanding of up to 30" with no seams
- Pneumatic tracking belt oscillation control
- 1,500 units in operation

SDM-15

Available in Single or 3 phase

25" Production Wide Belt Sander

- 25" x 48" Sanding belt
- Photoelectric tracking belt oscillation control
- Pneumatic belt tension for quick & easy belt changing
- Emergency disk brake
- Variable feed: 13-52 FPM
- 10HP single phase or 15HP 3 phase motor
- Solid construction: 1,500 lbs.

SDS-25



1-800-929-4321

Call now for more information

Visit us at: www.sunhillnic.com

SUNHILL
MACHINERY

The Best Machinery Values in America.™

SUNHILL MACHINERY

500 Andover Park East
Seattle, WA 98188
Toll-free: 1-800-929-4321
Fax: 206-575-3617
email: sunhill@sunhillnic.com

JUST LIKE A SECOND PAIR OF HANDS

Now your table saw will support up to 48" of cut material.

Lifts quickly into position and folds out-of-the way in one simple easy step with no tools... supports 200 lbs.



FREE Color Catalog
Call: 1-800-624-2027
HTC PRODUCTS, INC.,
ROYAL OAK, MI 48068-0839



Question & Answer

Paint-Filled Pores

Q. After stripping about 10 layers of paint off an old oak washstand I was left with paint-filled pores. Should I sand down the top until the paint disappears?

John Riach
Greensboro, NC

A. Put your sander away, there's an easier way!

Use a methylene chloride-based stripper (available at most home centers)—pick the one with the highest concentration of methylene chloride. These strippers work from the bottom up and can loosen the paint in the pores. To free up the trapped paint, use a brass wire brush and scrub the surface *with the grain*.

The small diameter brass wires pop the loosened paint out of the pores without harming the wood.

CAUTION!

Be sure to use these strippers with good ventilation and wear gloves and eye protection (see AW #77, p. 12). Work outdoors or use a fan to take the fumes outside. Remember that methylene chloride fumes are heavier than air and will accumulate near the floor.

Sources

Brass brushes: Constantine's,
(800)223-8087; 6 in., #BRS36 \$2.60;
12-7/8 in., #29BRS \$7.95.



METHYLENE
CHLORIDE-
BASED
STRIPPER

BRASS WIRE
BRUSH

- WORKSHOPS
 - GARAGES
 - STORAGE
- Buy Factory-Direct
—SAVE—
THOUSANDS!



**Unique build-it-yourself design
saves you even more money!**

- No heavy equipment needed to assemble
- Specially designed for strength and durability; can withstand severe weather conditions.
- Assorted styles, sizes and colors available to choose from.
- Take delivery now—or defer it up to 12 months with our FREE Storage Program.

LIMITED OFFER

Building Packages include
steel frames, endwalls, galv.
sheeting, hardware, trim &
assembly plans.

34' x 48'
a \$14,642 value

**NOW ONLY
\$7,668**

(Other building sizes available at great prices too.)



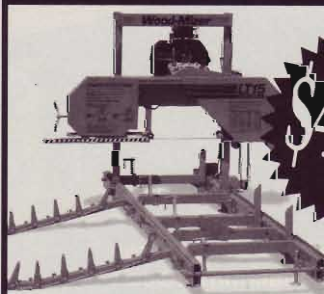
MIRACLETRUSS®

1-800-663-0553

www.miracletruss.com

AMWD

Save Money – saw your own lumber



(Shown with optional loading ramps.)

\$4945

With a Wood-Mizer!

- Cut logs up to 28" D. x 11' L.
- Extra bed sections permit longer lengths.
- Easily transportable.

► **Free \$2
Catalog***

Wood-Mizer®

8180 W. 10th Street Dept. AW53
Indianapolis, IN 46214
www.woodmizer.com

* With purchase of
All Products Video @ \$10.

LT15 Personal Sawmill

1-800-553-0219



The **NEW**
REPLACEABLE and **REVERSIBLE**
Microplane® Rasp.

"Microplanes® shave the wood
instead of tearing and gouging."

- Scott Phillips

For more info call: **1-800-555-2767**

Microplane
A Product of Grace Manufacturing®

www.microplane.com
info@microplane.com

Moisture Meters

Q. I've been looking at moisture meters and wondering why I should buy a pin type if a pinless can do the job without poking holes in the wood?

Donald Kutz,
Ames, IA



A. If you buy your wood already surfaced, then a pinless meter will work fine. If you buy your wood rough or if you dry your own wood, a pin-type meter is the way to go.

A pinless meter's greatest asset is its ability to scan over an entire board or even a finished piece of furniture, without leaving a mark. Pinless meters are also unaffected by temperature, which eliminates the conversion charts needed with pin-type meters.

The biggest drawback to pinless meters is the flat, smooth surface required for the sensing pad. This means they can't be used effectively on rough-sawn lumber without first planing a flat area.

Pin-type meters work equally well on rough or sur-

facied wood. These meters can also be adapted to take accurate readings at depths beyond their normal range. Simply drive uncoated nails to the depth you wish to measure and use alligator clips to connect the pins on the meter to the nail heads (see photo). If you dry your own lumber, these nails can be left in place allowing you to monitor your wood as it dries.

Still can't make up your mind? Electrophysics (800-244-9908) offers a dual mode pin-type and pinless meter for \$330. Good quality moisture meters are also available from Highland Hardware (800-241-6748), Woodcraft Supply (800-225-1153) and Woodworkers' Supply of New Mexico (800-645-9292); prices range from \$50 to \$250. For further reading on moisture meters call Forest Products Laboratories (608-231-9200) and ask for the report, "Electric Moisture Meters for Wood," by William James.

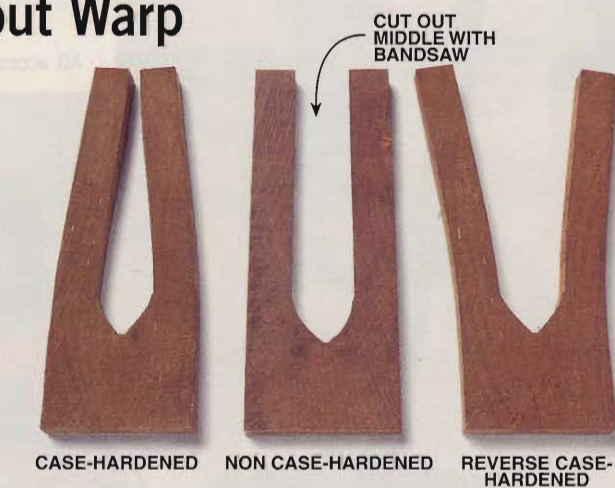
Resaw Without Warp

Q. I've had a few bad experiences with wood warping after I resaw. Is there any way to tell whether a board is a good candidate for resawing?

Tom Martin
Casper, WY

A. The warp you refer to is case-hardening. A case-hardened board looks like any other board but has internal stresses caused by improper drying techniques. These stresses lay hidden until resawing releases them causing the board to warp.

Unfortunately, there's no way to visually tell if a board is case-hardened or



not, but there is a simple test. Go in about 6-in. from the end of the board and cut a 3/4-in.-thick section. Go to the bandsaw and cut out about one half of the width from the middle. If case-hardening is not present, the fork will remain stable. If there are internal stresses pre-

sent, they will manifest themselves in forks that either pinch together (case-hardened) or bow outward (reverse case-hardened).

Harlan Peterson, University of Minnesota Department of Forestry, helped us with this answer. **AW**

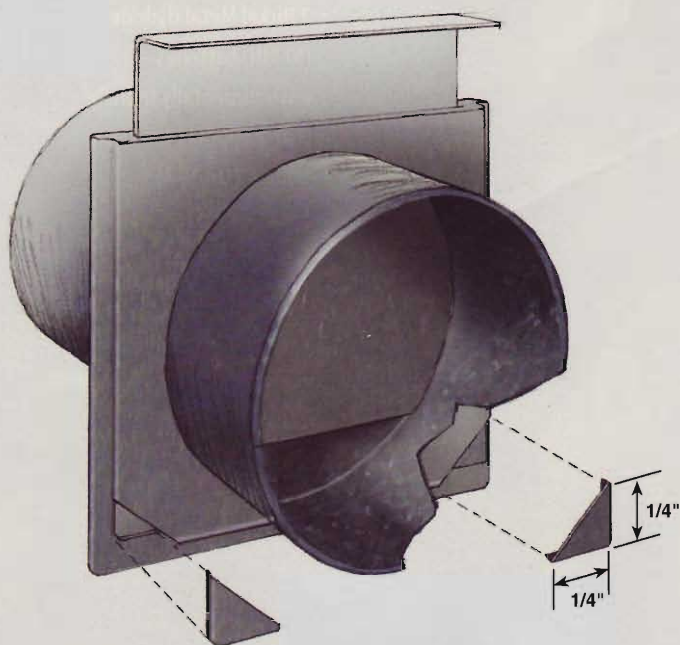
Department of Corrections

The cutting list in the Hoosier Cabinet story (AW #77, p.63) contains double listings. Pieces R-1 through Z-5 are listed twice. The second (bottom) listing of these parts is the correct one to use.

The birdhouse Christmas tree ornament on page 71 of AW #78 was turned by John Magnussen of Buffalo, Minn. The birdhouse design has traveled far and wide in recent years, much inspired by the full-size versions by Andy Barnum of Carmel, NY. (see cover of AW #13).

From Our Readers

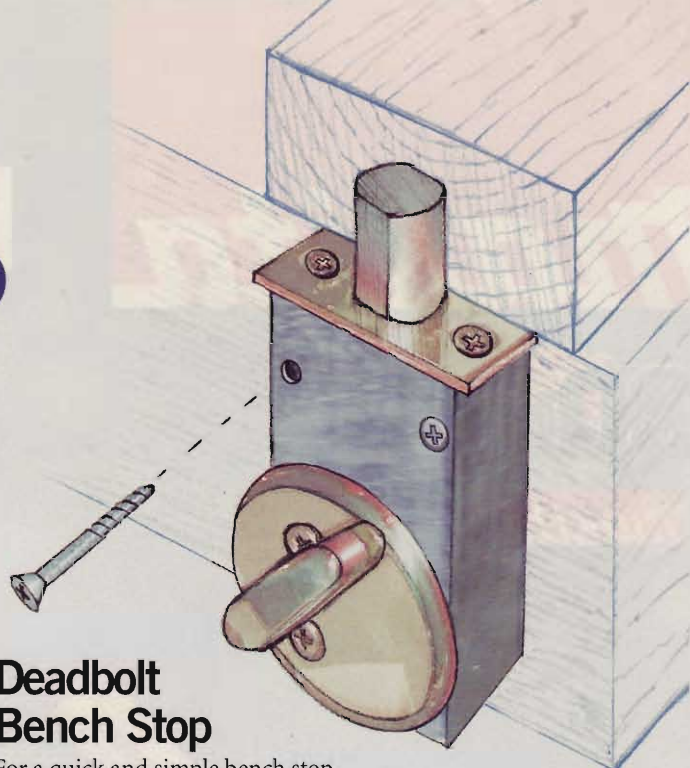
WorkShop Tips



Those Blasted Gates

Periodically, fine dust and sawdust accumulates in my plastic dust collector blast gates, preventing the gates from fully closing. Because the gates are permanently molded into the housing, I can't take them apart to clean them. Removing a small triangle at each of the bottom corners of the housing allows the vacuum in the dust collector hose to flush out this debris. Even though there are now "holes" in the blast gates, I haven't noticed any appreciable loss in performance, though you could cover the openings with duct tape and periodically remove the tape to clear the sawdust.

CARL FREELAND
DODGEVILLE, WI



Deadbolt Bench Stop

For a quick and simple bench stop, I mounted an old deadbolt taken from a door to the end of my workbench. In the "locked" position, the bolt stays put, and in the "unlocked" position it can be pushed down so you can use the unobstructed top.

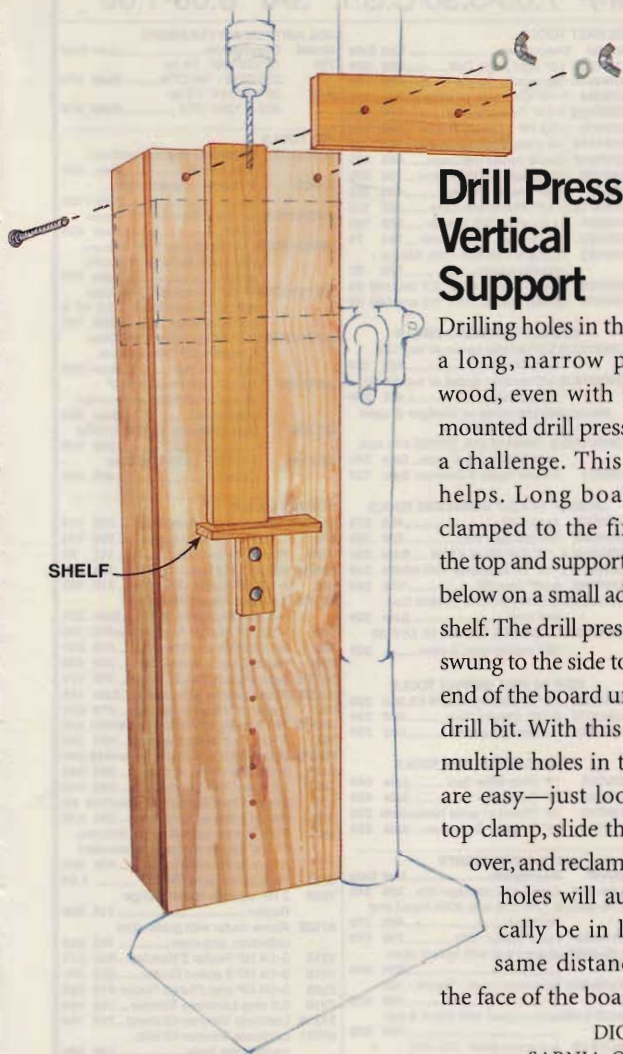
DARRYL THOMAS
THORNHILL, TN



More Blade for Your Money

I use my scrollsaw blade almost exclusively for cutting stock of 1/2-in. thick or less. Consequently, I only use about one-sixth of the total cutting length of the blade. To maximize the life of the blade, I've built a raised platform that fits snugly on top of the scrollsaw table. When the blade gets dull, I install the platform and now I'm using sharp teeth. Finish the platform with varnish for a smooth sliding surface.

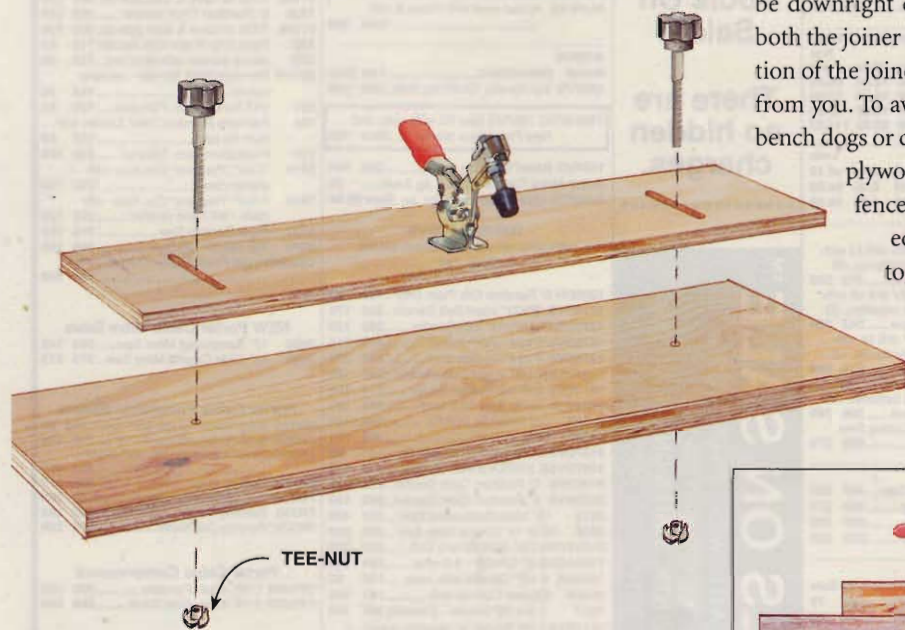
BETZALEL KIRSHNER
AZOR, ISRAEL



Drill Press Vertical Support

Drilling holes in the end of a long, narrow piece of wood, even with a floor-mounted drill press, can be a challenge. This fixture helps. Long boards are clamped to the fixture at the top and supported from below on a small adjustable shelf. The drill press table is swung to the side to put the end of the board under the drill bit. With this system, multiple holes in the ends are easy—just loosen the top clamp, slide the board over, and reclamp. These holes will automatically be in line, the same distance from the face of the board.

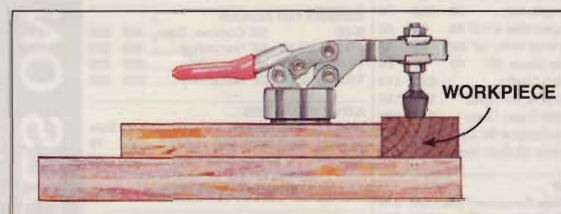
DICK FORD
SARNIA, ONTARIO



Biscuit Joiner Jig

Cutting slots for biscuits in small or narrow stock, such as when slotting solid-wood edge banding for shelves or cabinets, can be downright dangerous. There's no effective way to hold both the joiner and the stock with your hands. Also, the rotation of the joiner blade can fling a small piece of wood away from you. To avoid this, I devised this jig. Clamp it between bench dogs or clamp it to the benchtop with C-clamps so the plywood base just overhangs the bench. Adjust the fence so the stock you are cutting is flush with the edge of the jig. Clamp the stock down with the toggle clamp and you're ready to cut.

ANDY RAE
LENHARTSVILLE, PA



Stowing Table

Now and then I need extra bench space for assembly or finishing. My garage shop is cramped so I made this easy-to-stow bench add-on. The tabletop is built of 1/2-in. plywood and 1x4 aprons. The legs are hinged and connected to the tabletop with a collapsing brace to prevent the legs from being accidentally kicked in. The add-on table connects to my workbench with a beveled cleat—a 2x4 cut at 45 degrees. Storage is a snap—it slides against the wall behind my bench.

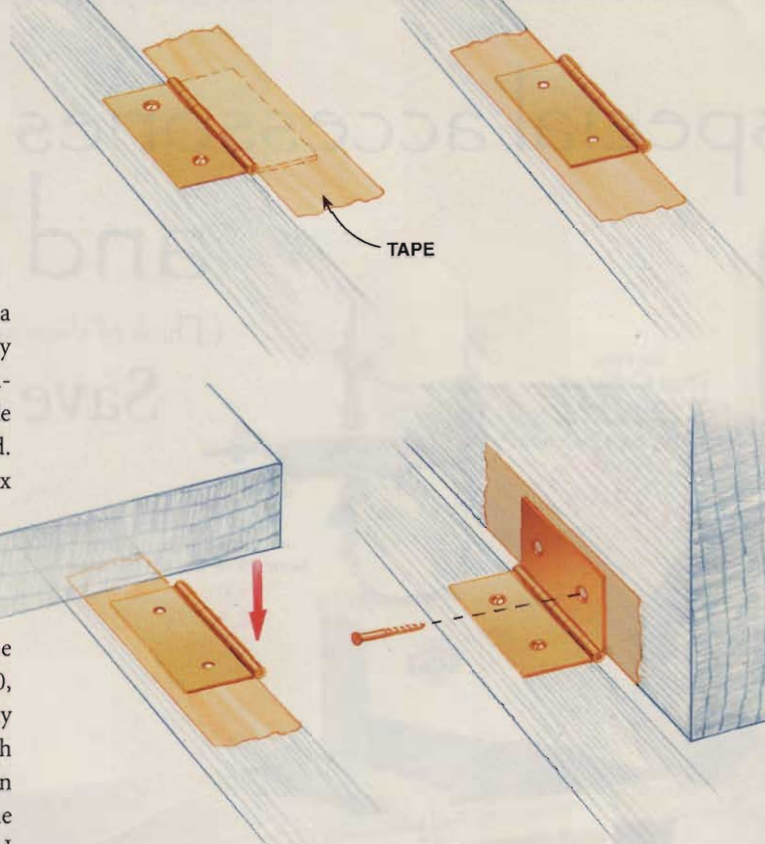
PHIL PRATT
MARCO ISLAND, FL

(continued on page 20)

Workshop Tips

Accurate Location of Small Hinges

On the jewelry boxes I make, I have a tough time getting small hinges properly aligned. I've come up with a way to temporarily attach the lid to the hinges while the screw holes are drilled or marked. The hinges are first attached to the box with screws. The hinges are opened, and on each of the open leaves, a large piece of clear shipping tape (3M, Scotch Premium Heavy-Duty Packaging Tape #3750, \$4.69; Office Max, 800-788-8080, item #0700-3725) is fixed with the sticky side down. The hinges are closed, which places the sticky side of the tape up. When the lid is carefully placed in position, the tape should grab it. When it doesn't, I use a thin strip of wood to push the tape onto the lid. Gingerly open the lid on the hinges and press on the tape. The holes to



the lid-side hinge leaves can now be drilled or marked. The shipping tape doesn't leave any residue and can be

reused in case you are not satisfied with the first placement of the lid.

HERBERT AKERS
ROCKVILLE, MD

Introducing!

A new laminate bit is in town and it's name is "DynaBit"™

Our new DynaBit™ delivers speed, long life and an EXTRA CLEAN EDGE.

Our unique 6° downshear and special abrasion resistant carbide won't "lift" laminate from substrate.



**Introductory
Price ONLY
\$ 15.35/EA.**
for 1/4" shank

PRODUCT SPECIFICATION:

- 1" length of carbide, 1/2" diameter

Tool No. 47105 - 1/4" shank ...\$15.35
Tool No. 47109 - 1/2" shank ...\$15.95

**Available nationally at better Cabinet
supply houses, saw shops, woodworking
suppliers and tool stores.**

Call 1-800-445-0077 for our latest catalog and for the dealer nearest you, or visit our web site at <http://www.amanatool.com> (mention our DynaBit™ upon calling)

Amana Tool®

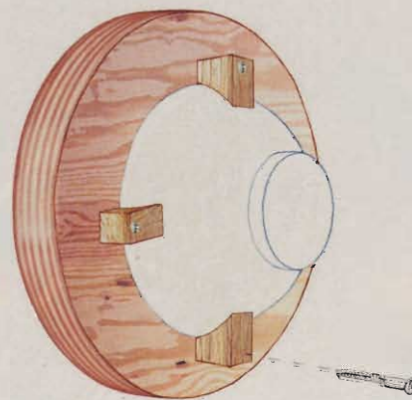


Workshop Tips

Turning Bowl Bottoms

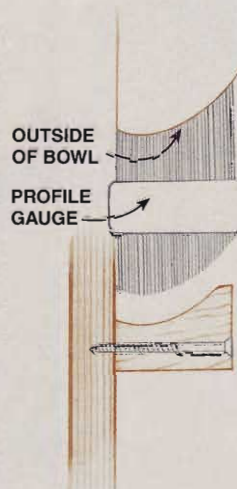
I make a lot of turned "kitchenware" such as bowls and platters. I've perfected most of my techniques, but I struggle with turning a smooth foot. I've tried many off-the-shelf jigs, like chucks with

adjustable jaws, but haven't been satisfied. The method I've come up with allows me to grab any bowl with a top larger than its foot (convex shape) so that the bottom can be easily turned and



finished. I start by gluing my bowl blank on a sacrificial plywood disc which in turn is mounted to my lathe's faceplate. I turn the inside of the bowl and as much of the outside as possible. The bowl is carefully sawn off the plywood. I then mount a new 3/4-in. plywood disc on the faceplate and scribe onto it a circle the size of the bowl's top.

Now, here's the trick: using a profile gauge (a device made of many small, steel pins sandwiched between two plates; the ends of the pins are pressed against an object to copy its profile), I make four blocks with the



same shape as the outside of the bowl. The bowl, centered on the circle, is clamped top side down on the plywood plate using the blocks, equally spaced around the bowl. I spin the bowl by hand to check for concentricity and then turn the bottom of the bowl at 500 rpm or less. **AW**

WILLIAM TARLETON
LAFAYETTE, CA

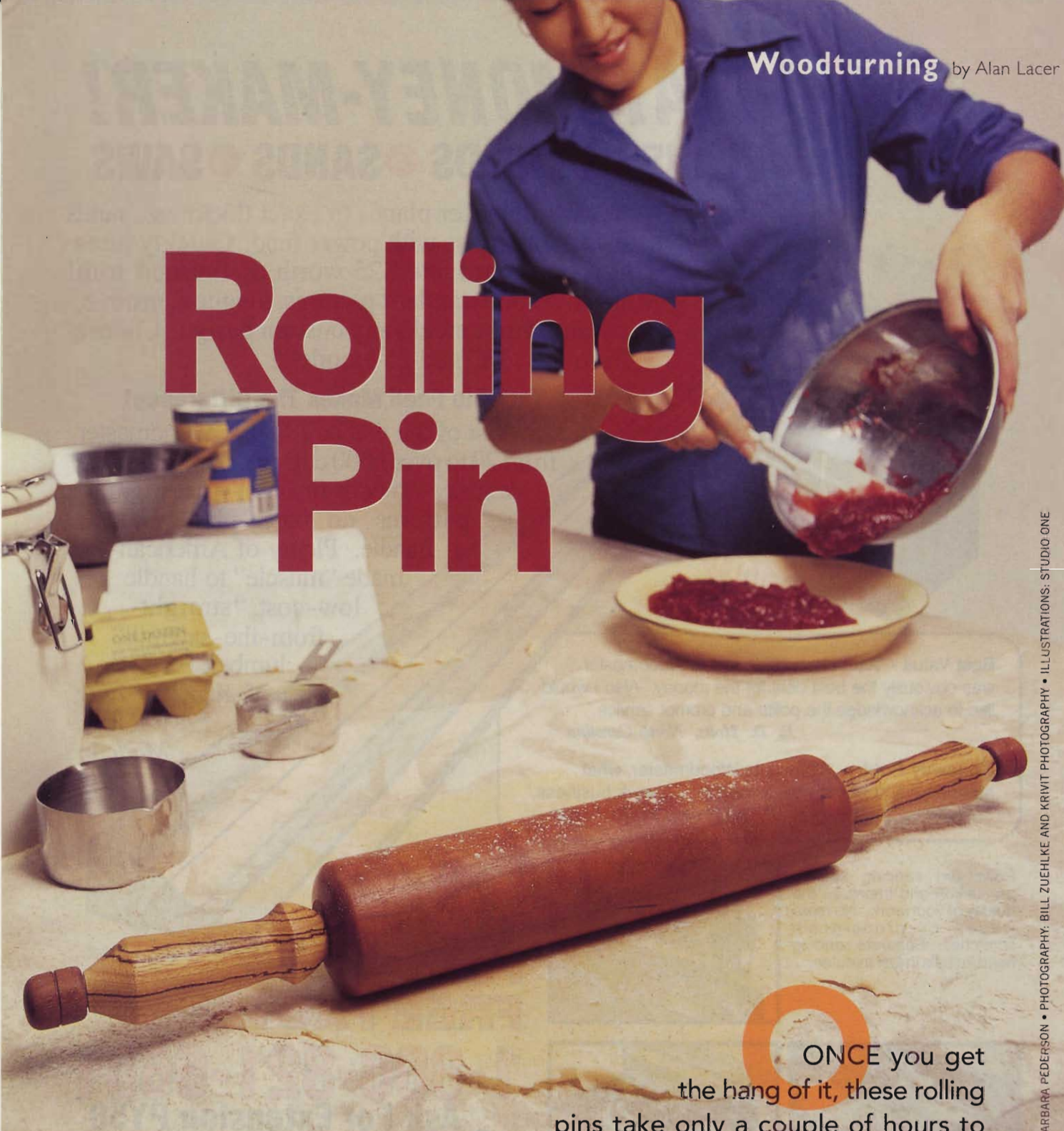
If you have an original Workshop Tip, send it to us with a sketch or photo. We pay \$200 for each one we print. Send to: Workshop Tips, American Woodworker, 2915 Commers Drive, Suite 700, Eagar, MN 55121. Submissions can't be returned and become our property upon acceptance and payment.

The most useful tool since the OPPOSABLE thumb.

Gorilla Glue® is the handiest thing on a job site since the pickup truck. It works on wood, stone, metal, plastics and more. It can be stained or painted, and it goes farther than yellow glue. Plus, Gorilla Glue is 100% waterproof so it's perfect outdoors. Reducing call-backs is in your grasp. Call 800-966-3458 for a dealer, or find out more at www.gorillaglu.com.

THE TOUGHEST GLUE ON PLANET EARTH™

Rolling Pin



ONCE you get the hang of it, these rolling pins take only a couple of hours to make. The beauty of this project is that only a few tools are required and it offers several challenges, especially turning a true cylinder and drilling and aligning all the parts on the same axis. Follow our photo sequence and make a bunch of these rolling pins—they're great gifts.

ART DIRECTION: PATRICK HELF AND BARBARA PEDERSON • PHOTOGRAPHY: BILL ZUEHLKE AND KRIVIT PHOTOGRAPHY • ILLUSTRATIONS: STUDIO ONE

Woodturning

Wood to Turn

Use "closed-grain" wood—cherry, maple, birch or beech—for the roller so food particles aren't pushed into the wood pores. Don't use exotic hardwoods—zebra wood, cocobolo, and others—for the roller because they can be toxic.

For other turned parts, use whatever scrap hardwoods you have around the shop.



1

DRILL AXLE HOLES

Drill the blanks for handles, caps and one end of the barrel using a shop-made corner block. Drilling the holes before turning ensures that the holes will be centered.

Clamp the pieces firmly in the corner block to ensure the holes are vertical. Drill holes for the axle clamps and one end of the barrel with a 1/2-in. brad-point bit. **It's crucial that the hole in the large roller is centered and vertical.** Use a 14mm brad-point bit or a 9/16-in. spade bit to drill the 4-in.-long axle hole in the handles.

Tools and Supplies

Here's what you'll need:

- A 1/2-in. spindle gouge, a larger gouge for roughing out the main cylinder and a 1/4-in. parting tool.
- An outside calipers with at least a 3-in. capacity and well-rounded ends with absolutely no sharp edges.
- A 3-1/2-in. dia. disc of pine or poplar, 2- to 3-in. thick for the shop-made cone center.
- A 3-in. faceplate to mount and turn the cone center.
- A ball-bearing live center to hold blanks while turning. It should have a conical tip (see Sources, p. 34).
- A drill press for drilling holes in the blanks, plus a 1/2-in. brad-point bit and either a 14mm brad-point bit or a 9/16-in. spade bit.
- A 1-in. square piece of leather or thick fabric to protect the axle cap from the live center when turning.
- Mineral oil for the finish.

continued on page 28

ZAR® Wood Stain is made using only the finest ingredients. ZAR's unique formula puts extra pigment into a rich base so ZAR wipes on easily and covers evenly. And with ZAR's controlled



penetration you can work at your own pace without fear of those disappointing streaks or lap marks. ZAR. The best thing that ever happened to wood.

If you want the richest finish, start with the best ingredients.

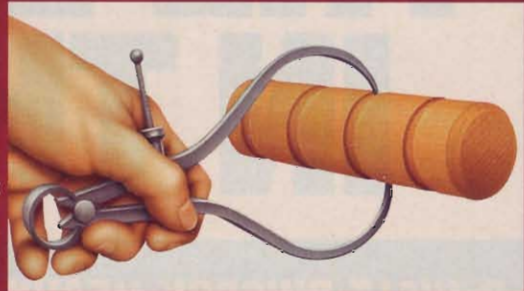
For a free brochure and the name of your nearest dealer, call 1-800-272-3235, or visit us at www.ugl.com

UGL

Woodturning

True Cylinders—with some help

With practice you can turn pretty true cylinders by eye and feel but until then, use calipers to help. Set your outside calipers to within 1/16 in. of the



intended diameter of the cylinder. Using the calipers and a parting tool, turn down to the desired diameter at 4 or 5 points along the blank. Next, simply connect these with your roughing gouge to make a cylinder. To turn it by eye, sight along the top horizon—rather than watching the tool. Check your progress with a straightedge and calipers. Soften the corners of the roller using a small gouge. Remove the tool rest and proceed with sanding.

If you still need a little help in leveling the cylinder, try sanding with 80-grit paper over a back-up block at least 4-in. in length. After sanding with the lathe in motion, it often helps to remove "ringing" by sanding with the lathe off, but with the grain. This is especially helpful for the final sanding with 150-grit paper.

2

MAKE THE ROLLER

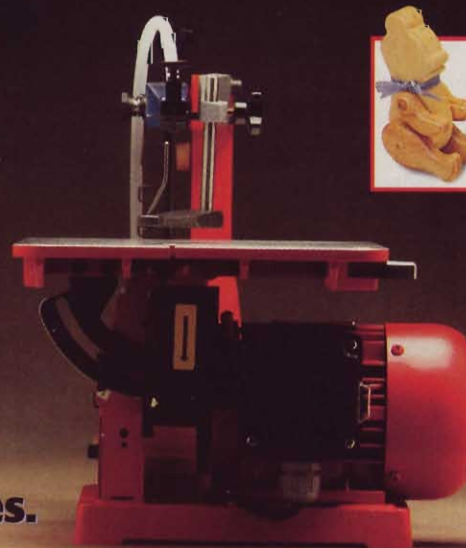
Mount an 11-in.-long blank between centers on the lathe. Place the end you previously drilled on to the live center of the tailstock. Your driving center should be located on the opposite end of the blank's center.

Turn the blank into a cylinder using a gouge.

continued on page 30

HEGNER the Better Scroll Saw

Mention this ad and **SAVE**
as much as **\$187** on one of
our Scroll Saw value packages.



Clean, accurate cuts
with no sanding

Easy Blade
Change

Smooth Quiet
Operation

Long Blade
Life

Safety Stop
Upper Arm

6 YEAR
Warranty

To receive your **FREE** information on HEGNER Scroll Saws, please call or fill
out the coupon and mail to Advanced Machinery.

P.O. Box 312, Dept. 6026 New Castle, DE 19720 www.advmachinery.com

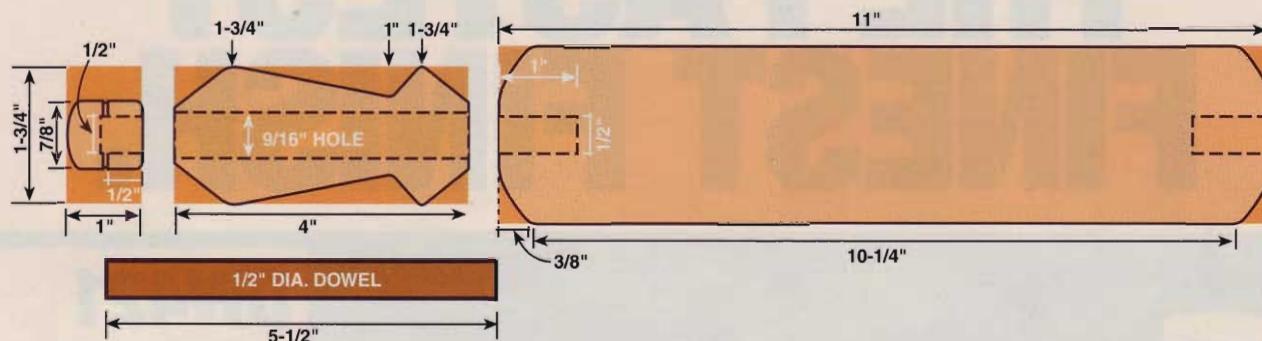
1.800.322.2226

Please mention
ad 6026

Name _____
Address _____
City, State, Zip _____
Phone (____) _____ (6026)

HEGNER makes it **better!**

Woodturning



SHOPPING LIST

ITEM	QUANTITY
2-1/2" x 2-1/2" x 12" hardwood (maple, cherry, birch or beech)	1
1-1/2" x 1-1/2" x 10" hardwood	1
1-1/2" x 1-1/2" x 4" hardwood	1
1/2" x 36" hardwood dowel	1
3-1/2" dia. disc, 2" to 3" thick	1
3/4" standard wood screws	4
14mm brad-point bit or 9/16" spade bit	1
1/2" brad-point bit	1
sandpaper (80-, 100-, 120-, 150-grit)	3 sheets
mineral oil	6 oz.

CUTTING LIST

PART	PCS.	SIZE & DESCRIPTION
A	1	2-1/2" x 2-1/2" x 11" hardwood
B	2	1-3/4" x 1-3/4" x 4" hardwood
C	2	1-3/4" x 1-3/4" x 1" hardwood
D	2	1/2" dia. x 5-1/2" birch dowel



continued on page 32

Great Clamps – Low Prices

Clamps From Garrett Wade

These are German made with the expected high quality design and workmanship – and at less than \$4.50 each, they are a phenomenal value.

Light, strong and easy to use (throat depth 2 1/2") with vinyl capped swivel ends and wooden handles. It's terrific to have a bunch around the shop. The Clamp size (listed below) is the maximum opening.

We cannot recommend these enough. Ten of each saves you considerably. Real value doesn't come any better than this.

Regular Sale

37F02.10	4" Cab. Clamp(10)	\$62.95	\$44.95
37F02.20	8" Cab. Clamp(10)	\$68.95	\$48.95
37F02.30	12" Cab. Clamp(10)	\$73.95	\$52.95

Combo. Set consists of 10 of each of the 3 sizes of clamps. 30 Clamps total- only \$4.65 each.

37F20.10	Combo. Set	\$205.85	\$139.50
----------	------------	----------	---------------------

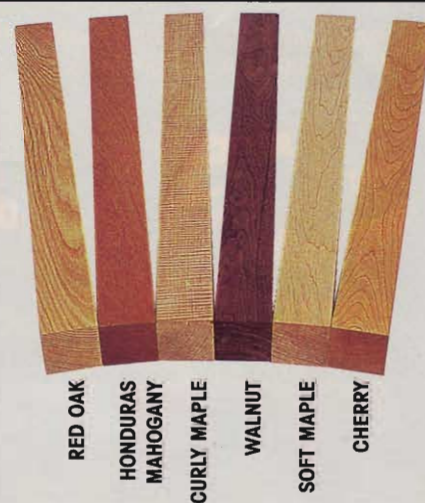
Garrett Wade. Shipping Charges
161 6th Avenue \$6.95 to \$9.95
New York, NY 10013 depending on value.



FREE GARRETT WADE CATALOG

Our high quality Woodworking Catalog has thousands of tools to choose from. Visit our web site at www.garrettwade.com or call us at the numbers below.

CALL TOLL-FREE 800-221-2942 or fax 800-566-9525



SOLID 3" x 3" SQUARES

Available in (3) Lengths
17" • 22" • 30"

Surfaced Hit or Miss
to 2 15/16" Square

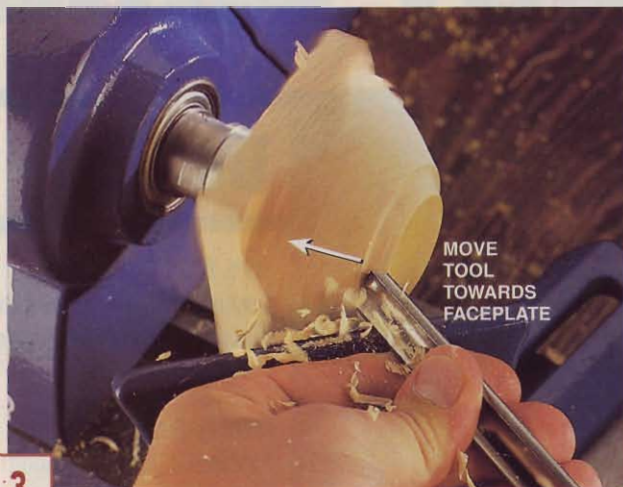
Kiln Dried to 6-8%

FREE CATALOGUE



Adams Wood Products™ L.T.D., L.P.
974 Forest Drive, Dept #AW26
Morristown, TN 37814
Factory/Office 5436 Jeffrey Lane
Phone 423-587-2942 • Fax 423-586-2133

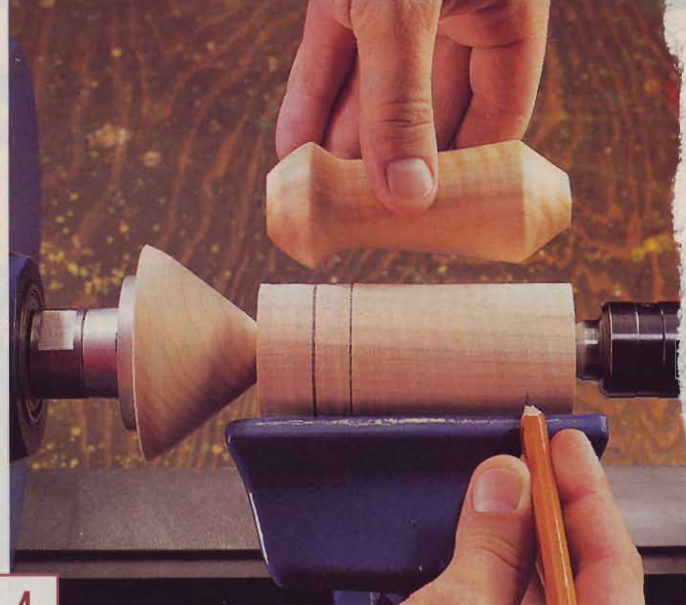
Woodturning



3

MAKE A CONE CENTER

Turn a 2- to 3-in. thick, 3-1/2-in.-dia. disc of pine, poplar or other soft material into a cone to help hold the drilled handle parts. The exact angle of the cone isn't critical—between 60 and 80 degrees will work fine. To make the cone center, screw the disc onto a 3-in. faceplate using screws that penetrate the wood between 1/2 to 3/4 in.—try standard wood screws or better yet, #10 or #12 sheet metal screws. Turn the disc to a triangular point. Turn it like a bowl, moving the tool from the point of the cone towards the faceplate.



4

MAKE THE HANDLES

Turn one handle holding it between your cone center and a conical live center. If the handle stops spinning while you're turning, crank the live center into the wood and take lighter passes with the gouge.

Use the handle you just turned as a pattern and turn a duplicate. Hold a pencil on the tool rest, as shown, to transfer high and low spots of the shape to the spinning wood. You may want to use your outside calipers to do a more exact sizing of the second handle to the first. Carefully sand both handles.

continued on page 34

The Woodworker's Edge... **BRIDGEWOOD®** Quality... More Affordable Than You Think!

TSC-10C Table Saw...

with features such as a large working surface, powerful American made motor and sturdy construction you'll see we didn't spare quality to make an economical table saw

- Miter gauge with T-slot groove
- Cast iron extension wings
- Magnetic switch
- Quick release plug connection on motor
- 4" dust collection hook up
- Large 27" x 40" table
- Beveled front table edge for smooth miter gauge operation
- 1 1/2 HP American made motor
- Comes with VEGA® U-26 fence (shown)

BW-6R Jointer

Acclaimed a "best buy" among 6" Jointers by a professional woodworking publication

- 3-knife cutterhead
- Jackscrew knife adjustment
- New fence tilts both ways, quick and easy adjustment. 3 positive stops
- Enclosed stand
- 1 HP motor
- Rabbling table and ledge
- Surface ground tables
- Pushbutton switch
- Cast iron wheels

Ask about easy Bridgewoodworker LEASE PLANS



BW-15BS Bandsaw...

don't let its low price fool you, this amazing bandsaw is designed and built to provide trouble free operation cut after cut.

- Heavily ribbed, cast iron c-frame
- Cast aluminum wheels with rubber tires
- Non-rocking steel floor stand
- Miter gauge
- Motor mounted directly to cast iron frame for smooth operation
- 3/4 HP motor
- Two blade speeds: 2000 or 2600 SFM



BW-15P Planer...

economically priced yet built like big professional planers, it offers absolutely vibration free finishes

- 3 HP motor
- 3 v-belt drive from motor to cutterhead
- Table moves up and down - cutterhead stationary for smoother cuts
- Sturdy 4 leg non-rocking stand
- Extended stock support rollers
- Anti-kickback fingers across entire width
- 3 spring chip breaker
- Heavy cast iron construction
- Magnetic switch
- Jackscrew knife adjustment



BW-002A Dust Collector...

portable, compact unit can solve your dust collection problems at a very low cost

- 1 Micron, 15.2 sq. ft. filter bag
- Two 4" dia. hose inlets
- 1059 CFM
- 43.5 gal. see-through collection bag attached with quick release metal straps
- 2 HP single-phase motor
- Metal impeller (not plastic)

See when it's full!

WILKE
MACHINERY COMPANY
MACHINERY POWER TOOLS

For information and a FREE Catalog contact us by toll free phone...

1-800-235-2100

visit our web page...

www.wilkemach.com

or write:
3230 Susquehanna Trail, York, PA 17402

Woodturning

SOURCES

CRAFT SUPPLIES
1287 E. 1120th St., Provo, UT
84601; (800) 551-8876.
Metal cone-tipped live center.

WOODCRAFT SUPPLY
210 Wood County Industrial Park,
P.O. Box 1686,
Parkersburg, WV 26102-1686;
(800) 535-4482.
1/4 mm brad-point bit, 11Y91, \$6
1/2" brad-point bit, 12B18, \$6



5

MAKE THE AXLE CAP

Mount the cap blank in the lathe between the wood cone and the live center. A piece of leather or thick fabric will keep the metal center from scarring the end of the cap. Turn the cap with rounded ends and a shallow, decorative groove made by rolling the gouge's cutting edge to make a slicing, semi-vertical cut.

6

FINAL ASSEMBLY

When you're finished turning and sanding, return the roller to the corner block jig on the drill press and drill the 1/2-in. hole on the other end. Use the hole from your drive center to pilot the point of the brad-point bit. Glue the dowels into the roller, slide the handles over the dowels and glue the axle caps on the ends. Finish the whole thing with mineral oil and wax. *AW*

Rely on Yellow to make the cut.



Hole Saws

50 standard sizes and a dozen kits to saw through virtually any material. Plus, our pre-assembled **Quick-Shot®** arbor and saw system for convenience and design, it's the best there is.

Hacksaw and Blades

Our new, faster cutting **Bearcat™** BGT bi-metal blades with ground teeth combine with our **High-Tension Hacksaw** frame which provides a 28,000 PSI setting for optimal performance. Twisting and binding are eliminated.

Jigs & Recip Blades

Industrial quality blades feature heavy-duty, bi-metal construction, special heat-treated teeth, aggressive tooth designs and an exhaustive selection of pitches, shapes and styles.



NEW

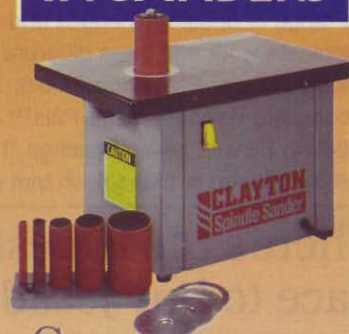
Blade cuts
30% faster

Starrett®

The L. S. Starrett Company
121 Crescent Street, Athol, MA 01331
Tel: (978) 249-5330 • Fax: (978) 249-8495

Visit us on the web at www.starrett.com

THE STANDARD IN SANDERS



Clayton Spindle Sanders are built in the USA with precision balanced spindles, oversized bearings, and a premium Baldor Induction Motor.

- Benchtop and full-sized, professional models
- Large table surface
- Built-in dust port
- Quick-change drums

Clayton tackles the toughest sanding jobs...smoothly.

FREE COLOR CATALOG,
call: 1-800-971-5050

CLAYTON
Spindle Sanders

ROYAL OAK, MI 48068-0520



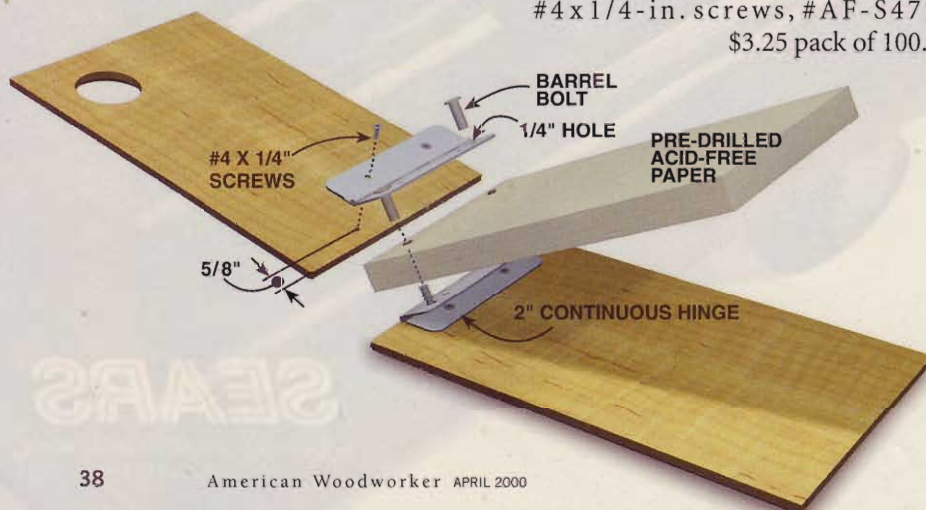
Photo Album

Do you have a pile of photos waiting to be put in an album? We all do. That's why you can't go wrong making these distinctive photo albums for yourself or as gifts.

Figured wood makes an attractive cover. The first album in the photo was made from a 3 in. x 20 in. piece of tiger maple and the second from a single 6 in. x 10 in. piece of walnut. You can make larger covers (12-1/2 in. x 12-1/2 in.), but they are more likely to warp. The

walnut was resawn to make front and back covers. The maple was resawn and glued up to create book-matched covers.

The 9-1/4 in. x 5 in. acid-free paper pages come pre-drilled and are available from Anchor Paper, (800) 659-2127, #ZR301-213, \$6.50 plus s&h for 25 pages. The 2 in. x 24 in. continuous hinge and the brass barrel bolt connectors and screws are available from Van Dyke's Restorers, (800) 558-1234; barrel bolts, #AF-S1572, \$13.95; hinges, #AF-S6167, \$.75 ea.; #4 x 1/4-in. screws, #AF-S4739F, \$3.25 pack of 100. **AW**



How To Make It

1. Surface the covers to about 1/4 in. and chamfer the outside edges. (Optional: Use a 1-1/2-in. hole saw to cut a circular frame in the cover.)

2. Sand and finish. We used a sealer coat of Super Blonde Shellac followed by two coats of water-borne polyurethane.

3. Cut two 4-in. lengths of hinge (two 11-in. lengths for 12-1/2 in. x 12-1/2 in. covers) for each album and file a radius on the corners.

4. Use the pre-drilled paper as a template to drill two 1/4-in. holes in one leaf of each hinge. File any rough edges smooth.

5. Drill two 5/64-in. pilot holes 5/8-in. in from the back edge of each cover. Mount the hinges to the cover with #4 screws. (Nip off the ends of the screws if your covers are 1/4-in. thick or less.)

6. Bolt the loose leaves of the hinges through the paper with the barrel bolts; add photos and enjoy.

ART DIRECTION: JOEL SPIES • PHOTOGRAPHY: MIKE HABERMANN • ILLUSTRATION: DAN WESTERBERG

Brad Nailers

By Tim Johnson

What was the first tool you ever bought? I'll bet it was a hammer. After all, hammering is something we begin to master as infants. No other tool feels as natural to hold or conveys its purpose quite like a hammer does. But guess what? As a tool for driving nails to fasten things, there's something better.

These tools are so versatile, affordable and easy to use that once you pick one up, you won't want to put it down.

BRAD NAILERS

Whenever you pull the trigger on a brad nailer you save time. It drives and countersinks brads instantly, without pre-drilling.

Air-powered nailers have been fixtures on job sites and in professional shops for years and there's an air-powered nailer for practically every nailing situation. But they're still uncommon in home woodworking shops. Yes, they do require a compressor and consequently seem expensive—especially compared to the cost of a hammer. But there are compelling reasons for a woodworker to own one: They're useful tools, much faster than hammering, more convenient to use and they give a cleaner result. Wouldn't you be willing to pay for all that?

Breakthrough Brad Nailers

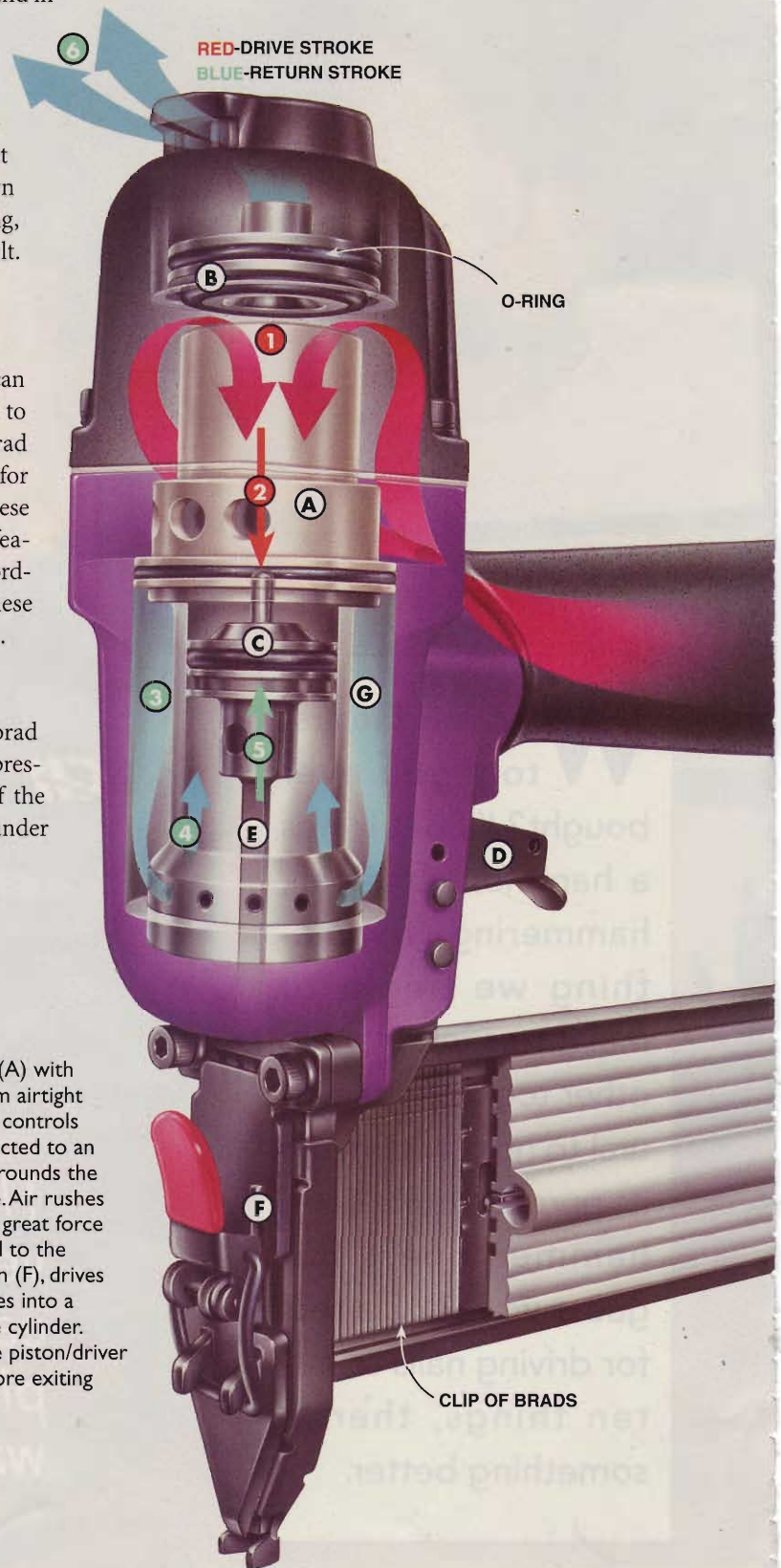
The big news is that the latest generation of brad nailers can sink brads from 5/8-in. to 2-in. long, a range that used to require two separate nailers. That means the same brad nailer can be used for woodworking projects and also for light carpentry work around the house. What's more, these lightweight, compact-sized nailers are loaded with features for safety and convenience. To top it off, they're affordable; ranging from \$90 to \$145. You can buy one of these nailers *and* a compressor to power it for less than \$300.

How a Nailer Works

A piston, housed in a cylinder inside the body of the brad nailer, is driven through its drive and return cycles by pressurized air (Fig. A). A rod attached to the bottom of the piston drives the brad. The brads are held in position under the drive rod by a spring-loaded magazine.

FIG. A AN AIR-POWERED HAMMER

A BRAD NAILER is a simple tool, containing a cylinder (A) with a head valve (B) and piston (C), and rubber O-rings to form airtight seals between the parts. A second valve at the trigger (D) controls the supply of air and operates the head valve. When connected to an air source, pressurized air fills the body of the gun and surrounds the top of the cylinder. Pulling the trigger opens the head valve. Air rushes into the cylinder (1) and drives the piston downward with great force (2). This is the drive stroke. A metal drive rod (E), attached to the bottom of the piston and housed in a guide shaft of its own (F), drives the brad. After driving the piston, the air immediately cycles into a return chamber (3, G) that surrounds the lower half of the cylinder. From there the air rushes back into the cylinder under the piston/driver assembly (4), and drives the piston back to the top (5) before exiting through the exhaust port (6). This is the return stroke.



Specially Designed Brads

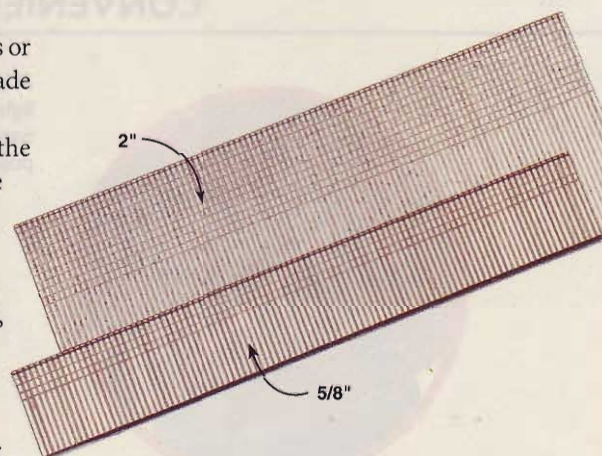
A brad nailer drives brads (Fig. B) that are a hybrid of staples and traditional finish nails. They're rectangular, with tee-shaped heads and slightly blunted vee-shaped tips, and coated with glue to increase their grip strength. They're also conveniently packaged. Load a clip into the magazine and you're ready to drive 100 brads.

A Small Compressor

Brad nailers don't have big appetites for air. A 1-hp compressor with a small (minimum 2-1/2 gallon) reserve tank, capable of supplying about 2.0 cubic feet of air per minute (cfm) and maintaining up to 120 pounds per square inch (psi) of air pressure provides plenty of punch. Pressure adjustments,

depending on the length of the brads or the hardness of the material, are made at the regulator on the compressor.

You'll need a hose to connect the nailer and compressor. A good one will remain flexible under pressure. They're usually made with three layers, an outer protective cover surrounding a wrap of braided, high tensile material that's bonded to an inner core of natural rubber or PVC tube. Use 3/8-in. inside diameter (i.d.) hose for runs longer than 50 feet, otherwise 1/4-in. i.d. works fine. Expect to pay \$15 to \$20 for a 25-ft. length. Quick-connect fittings on both ends of the hose (another \$10) are convenient. Most nailers come with one fitting.



A WIDE RANGE of brads can now be driven by the same nailer. New models can handle brads from 5/8 in. to 2-in. long. Driving long brads requires more air pressure than short ones. To accommodate the varying demands, the nailers are designed to operate between 70 and 120 psi.

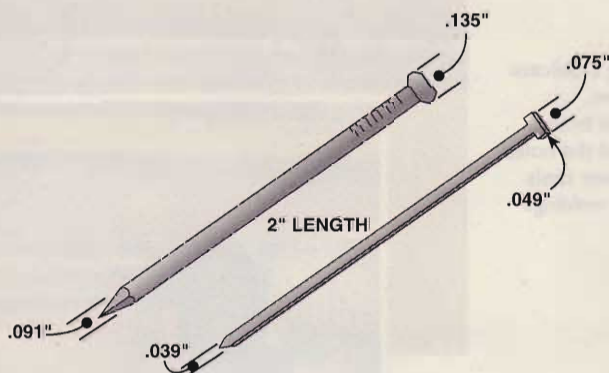


FIG. B A BETTER BRAD

AN 18-GAUGE BRAD for a nailer (above right) looks different than a traditional finish nail (above left) and its design has several advantages. It's smaller than its traditional counterpart, so it leaves a smaller, less noticeable hole. Its tip isn't sharply pointed. Instead, it's slightly blunted, which makes it less likely to split the wood, and it's wedged-shaped, so it can be smoothly driven and set by a single blow from the nailer. A finish nail has to withstand numerous hammer blows, so it must be made of harder steel, is noticeably larger in diameter and has a bigger head.

TIP

How to Avoid Impact Marks

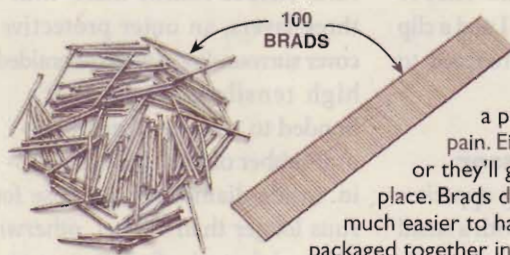
Brad nailers sometimes leave dents on the surface. These dents aren't made on the drive stroke. They're caused by the gun's recoil on the return stroke. The manufacturers' simple solution is to supply a plastic tip that fits over the drive point and protects the wood surface. It works, but obscures the drive point from view. A sure-fire way to avoid dents is to buy a nailer that has a trigger-controlled return. This mechanism, designed for safety, allows you to control the return stroke—it won't occur until you release the trigger. To avoid marring the wood, simply remove the nailer from the surface before you release the trigger.

Good Reasons to Own a Brad Nailer

CONVENIENCE



A brad nailer combines three tools, a hammer, drill and countersink, in a lightweight package that you can hold in one hand. And you can forget fumbling for brads or mashing your thumb—the nailer holds them in position for you.



OUCH! Dealing with a pile of 100 brads is a pain. Either you'll get poked, or they'll get dropped all over the place. Brads designed for a nailer are much easier to handle because they're packaged together in clips.

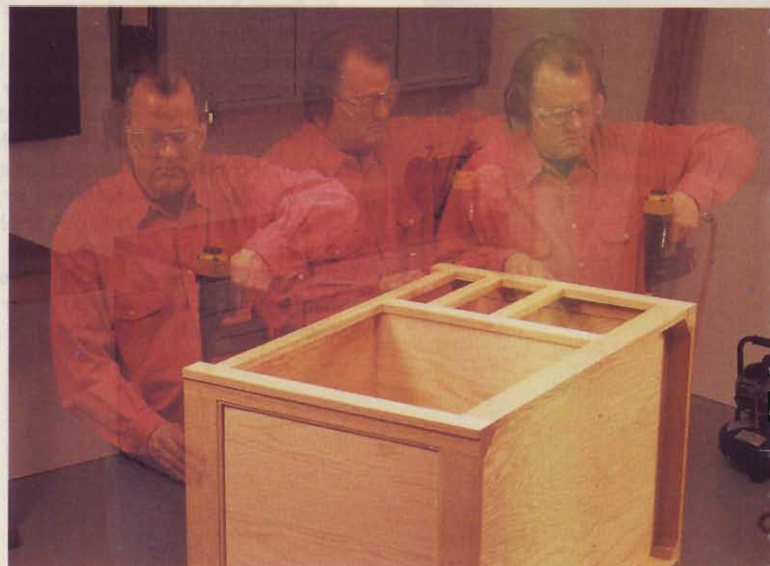
BETTER RESULTS

A BRAD NAILER EXCELS at jobs requiring a delicate touch. Instead of numerous jarring hammer blows, each brad is driven in one shot. A nailer can sink brads close to the edge of a piece without splitting and the holes left by the brads are tiny. Brad nailers are excellent tools for attaching trim moldings to cabinets or edge moldings to shelves.



SPEED

STREAMLINE BUILDING PROCESSES, like gluing a face frame onto a cabinet, by using a nailer as a third hand. Taking a few seconds to shoot a couple of brads keeps the face frame from slipping out of place while you're putting on the clamps. Brad nailers are great for making jigs or fastening improvised clamps or stop blocks.





AROUND THE HOUSE, 2-in. brads are long enough for light carpentry jobs, like fastening thin trim moldings to studs through 1/2-in. drywall. However, you may need to rent or buy a bigger nailer for some trim jobs. Nailers are much less tiring than hand hammering in overhead work; installing a beaded ceiling, for example.

VERSATILITY



IN THE WORKSHOP, 5/8-in. to 1-1/2-in. brads are perfect for numerous applications, from assembling built-up moldings to making prototypes. Simple drawer joints, glued and reinforced with brads are amazingly strong.



BLOW-OUT

The Bane of Brad Nailing

BLOWOUT is unpredictable, instantaneous and dangerous. Keep your free hand away from the path of the brad.

Because they're made from soft steel, brads have a tendency to deflect when they encounter something hard. A hidden knot, a bit of metal or even the cellular structure of a hard wood can cause the brad to come shooting out the side of your work. The result can be catastrophic (photo, middle left).

You can minimize the chances of blowout by the way you orient the brad (photo, at right). The brad is guided by its vee-shaped tip, so any deflection almost always follows it. Orienting the brad so this tip is perpendicular to the outer edge of the workpiece will keep any deflection parallel to the edge and unlikely to blow through.

Even though you do everything right, blow-out can still occur—it's that unpredictable. Repair the damage by clipping the brad (photo, bottom left). Don't try to pull it through or back it out—you'll make things worse because the brad will bend and break.



CLIP OFF A PROTRUDING BRAD as close to the surface as possible. (Got your safety glasses on? Good.) Countersink the remaining metal and carefully glue the damaged splinters back in place over it, using a block of wood (with waxed paper between it and the damaged surface) to press everything flat; then clamp.



AVOID BLOWOUT by holding the nailer perpendicular to the outer edge of the workpiece. This orients the vee-shaped tip of the brad so any side-to-side deflection is contained within the wood. Hold the nailer level with the surface, so you shoot straight. **Always wear protection for your eyes and ears.**

Desirable Features

The latest generation of brad nailers is loaded with features. Some are innovative, all are beneficial.

A DRIVE-DEPTH CONTROL allows you to adjust how far the nail is driven below the surface. The easiest ones to operate have a threaded adjustment wheel.

A WINDOW in the magazine lets you see when it's time to reload.

A NOSE PAD protects the workpiece from impact bruises.



A NOSE-MOUNTED SAFETY is the best trigger lock mechanism. The trigger remains locked until you depress the spring-loaded safety onto the workpiece. Only then can you drive a brad. A safety that's mounted behind the driver shaft, like this one, is better for bench work because it doesn't obscure your view of the drive point.

A "RESTRICTIVE-FIRE" TRIGGER is safest because it allows you to shoot only one brad at a time. You can't shoot again until you release the trigger and reset the safety, which requires lifting the nailer off the wood. This eliminates the risk of a dangerous "double fire."



HINGED, QUICK-RELEASE LATCHES provide the fastest access for clearing jams from the guide shaft. On some tools the quick release isn't hinged and some tools require using an Allen wrench for access.

A REAR-DIRECTED EXHAUST PORT is an innovative design that means you'll never get a blast of air in the face. There's even a sponge muffler inside the vent to reduce the noise and the force of the exhaust. Other nailers have an adjustable port mounted on top of the cylinder.



A PACKAGE DEAL, including nailer and compressor can be a good buy if you don't already own a compressor. On sale, this combo was only \$300.

RULES FOR SAFE OPERATION

Driving a brad with pressurized air requires a lot of force. It's noisy—each shot can exceed 90 db—and misfires are possible. A brad can deflect out the side of the workpiece or come flying back at you at terrific speed. **ALWAYS WEAR PROTECTION FOR YOUR EYES AND EARS** and **KEEP YOUR FREE HAND AWAY FROM THE PATH OF THE BRAD.**



MAKE REPAIRS YOURSELF. There's not much that can go wrong inside a brad nailer because there are few moving parts. And when something does happen, the owner's manuals have comprehensive troubleshooting/repair sections. If the driver breaks, it's easily replaced, as are worn out O-rings, which cause the nailer to lose its effectiveness. You can order replacement parts from the manufacturers, individually or bundled in overhaul kits.

THE WHOLE PACKAGE

A compressor provides pressurized air for the nailer through a supply hose equipped with quick-connect fittings. Contractors often use "pancake-style" models ("A Packaged Deal," bottom left) because of their compact size and portability, but shop around—a bigger unit, with more power and a larger reserve tank (at right) may cost less.



RECOMMENDATIONS

Each nailer is a unique package. They vary in size and weight, and in the design and number of features included as well.

Look for a brad nailer that's comfortable to hold, especially when it's attached to an air hose. A restrictive-fire trigger coupled with a nose-mounted trigger lock is the safest combination. Quick-release jamb clearance mechanisms make sense, even if jams are infrequent. The easiest ones to use are hinged. A threaded drive-depth control is convenient for making small adjustments, but you'll still need to regulate the pressure at the compressor when you change from one brad size to another.

To produce an affordable, good quality brad nailer, most manufacturers have stayed with tried and true designs, refining the components to enhance performance. Porter-Cable has made the most of this approach. The result is a nailer that combines light weight with an abundance of well-designed

features and excellent performance. Other manufacturers have concentrated on price. Grizzly, Hitachi and Airy nailers can be found for under \$100. The design of the Accuset nailer is new and innovative, inside and out. It has the only rear-directed exhaust port, and couples a restrictive-fire trigger with a low-impact, trigger-controlled return stroke. These are three excellent features.

A brad nailer isn't the first tool to buy for your workshop. But after you've acquired a core of woodworking machines, adding air power is worth thinking about. There's a whole world of air-powered tools for woodworking, from spray guns for finishing to vacuum bags for veneering; from sanders to routers (these last two require at least a 5-hp compressor). Once you've got a compressor and hose, the door is open to renting or buying other members of the nailer family (trim, framing, or roofing nailers) for serious remodeling and home improvement projects. **AW**

SOURCES & STREET PRICES

Accuset
(888) 222-8144
www.accuset.com
Model A200BN, \$125
5/8-in. to 2-in. brads
70-120 psi, 3.41 lbs.

Airy
(562) 926-6192
Model ATT-0249SRK, \$98
3/8-in. to 2-in. brads
55 to 95 psi, 3.1 lbs.

Campbell Hausfeld
(800) 543-6400
www.campbellhausfeld.com

Model NB004000, \$129
5/8-in. to 2-in. brads
70 to 110 psi, 2.8 lbs.

Grizzly
(800) 523-4777
www.grizzlyindustrial.com
Model G6047, \$90
62 to 115 psi, 2.97 lbs.

Hitachi
(800) 706-7337
Model NT50AE, \$95
5/8-in. to 2-in. brads
70 to 120 psi, 3.2 lbs.

Makita
(800) 4-MAKITA
Model AF503, \$129
5/8 in. to 2 in. brads
60 to 115 psi, 3.1 lbs.

Porter Cable
(800) 487-8665
www.portercable.com
Model BN200A, \$130
3/4 in. to 2 in. brads
70 to 120 psi, 2.75 lbs.

Sears Craftsman
(800) 377-7414
Model 351.184240, \$149
5/8 in. to 2 in. brads
60 to 100 psi, 2.6 lbs.

Stanley Bostitch
(800) 556-6696
Model SB-1850BN, \$125
5/8-in. to 2-in. brads
70-100 psi, 2.69 lbs.

the Unsinkable
Molly Brown's
PARLOR
TABLE

by **Tim Johnson**

This table is an accurate reproduction of one purchased by Molly Brown and her husband in the late 1880s, when they were starting their family in the rough mining town of Leadville, Colorado. It easily disassembles for transport so it could lend instant civility to a new home in unfamiliar surroundings. Simply but ingeniously built, it bears all the hope and exuberance of a young America during its age of westward expansion.



The Denver Public Library,
Western History Collection

Apparently the Browns liked this table. They kept it with them even after they struck it rich, and moved from Leadville to a large house in Denver's most prestigious neighborhood. It still resides there, in what is now the Molly Brown House Museum.

Rigid and durable, this table is built with the simplest joinery. You'll only need about 15 board feet of 3/4-in.-thick walnut, and you can build it in a weekend using your tablesaw, bandsaw, router and drill.

**This little charmer
folds flat, then sets
up in seconds.**

1. | Unfold the legs





2. Install the notched shelf



3. Put the top in place



4. Lock the legs and top together

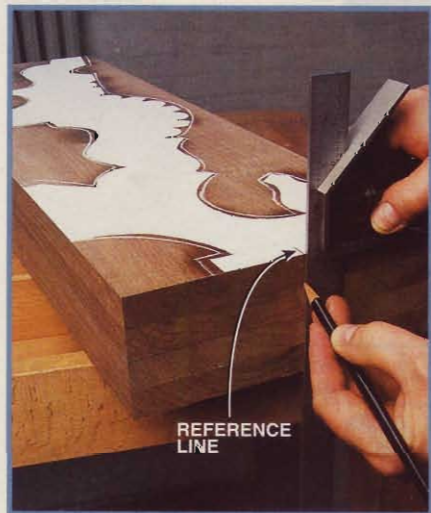


Fig. A | Parlor Table Exploded View

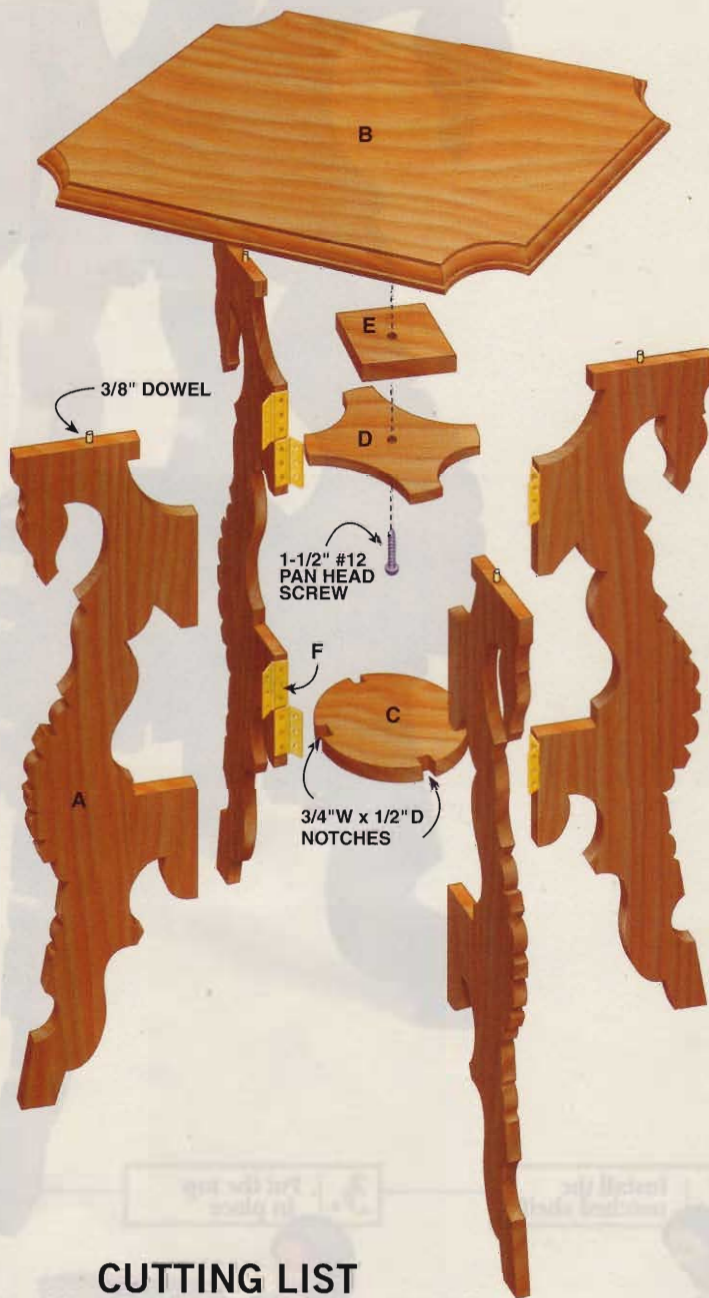
Hinges, dowels and friction hold this table together. There are only eight parts and you can make four of them at once. With simple changes, this table could be square, round or half round.



1. HOLD THE LEG BLANKS TOGETHER with double-stick tape (see Sources, p. 56). Using the paper pattern at right, outline the leg on each blank. This keeps the blanks properly oriented and shows you where to put the tape. Press the blanks together, one pair at a time. Keep the back edges of the blanks aligned by standing them on a flat surface. Align the end-grain edges with your fingers and then press the blanks together. Glue the paper pattern on the completed stack, aligning it with the edges (Photo 2).



2. TRANSFER THE LINE for the dowels onto all four blanks at once, using the reference line on the paper pattern. Before making these marks, true up the ends of the stack on the tablesaw, using the miter gauge, if necessary.



CUTTING LIST

Overall Dimensions: 28-1/4" H x 22" W x 16-1/2" D

Part	Name	Qty.	Dimensions
A	Legs	4	3/4" x 8" x 27-1/2"
B	Top	1	3/4" x 16-1/2" x 22"
C	Shelf	1	3/4" x 7-1/2" dia. round
D	Lock	1	3/8" x 6-5/8" dia. round
E	Block	1	3/4" x 5" x 5"
F	Hinges	6	2" L x 1-1/2" W dull brass

Making the Legs

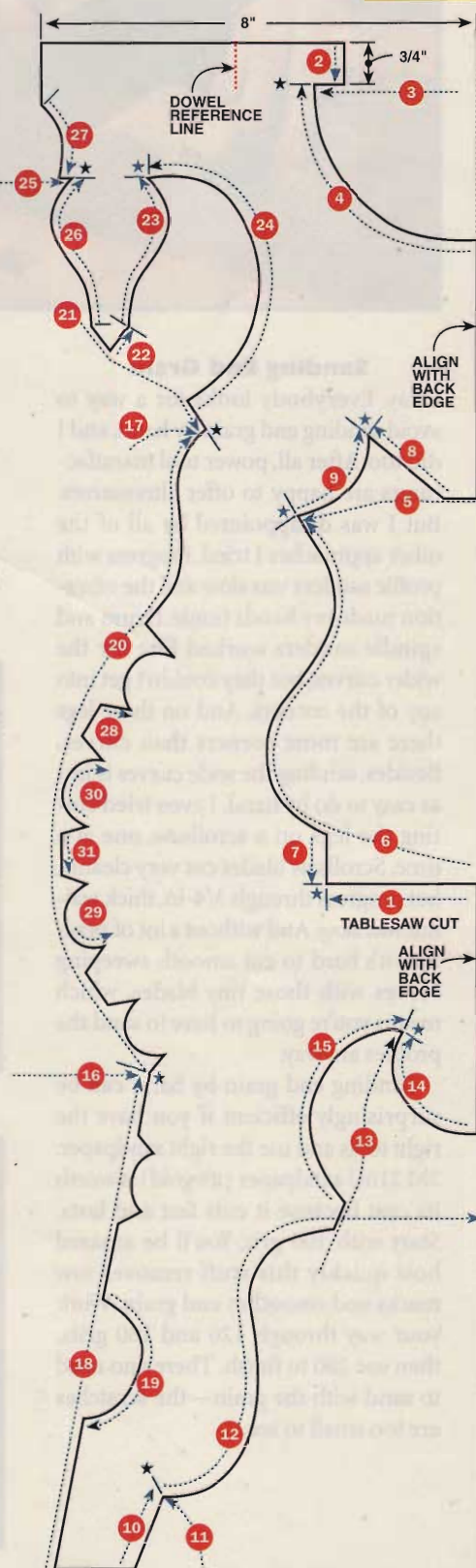
Look for boards without sapwood that are 8-1/2-in. wide, otherwise you'll have to glue pieces together. You can saw the legs individually, but it's better to saw all of them at once. Stack the four leg blanks together, using pieces of double-stick tape (Photo 1). Keep the edges aligned. Then affix a full-size paper pattern on one side (Photo 2) and saw out the legs (Fig. B and Photo 3).

Sawing the ganged-together leg blank on the bandsaw is a simple combination of curved cuts, access cuts and relief cuts. To be successful, it's important that your saw is in tune (see AW #25, p. 18 for how-to) and the blade is sharp. A 3/16-in. 4-tpi skip-tooth blade (see Sources, p. 56) will do a good job. To make accurate cuts with smooth curves, it's also important for you to be in tune with the saw. Use a light touch so you can find the blade's optimal feed rate and see how it tracks. Then advance the workpiece steadily—don't try to cut too fast—and let the saw do the work. Make access cuts first. They allow the blade to escape from dead-end curved cuts easily.

After sawing, clamp the legs in a vise and sand the edges (Photo 4). Attach the hinges (Photo 5), then pry the legs apart. Use a putty knife with blunted edges and smooth faces—any burrs on the knife will scratch the wood. After the legs are loose, remove the paper pattern and any double-stick tape that remains. Then sand the faces.

Fig. B | A Pattern and Plan for Cutting the Leg

Enlarge this pattern to 200 percent. Take the enlarged copy and enlarge again at 170 percent. Cut out and glue the pattern to the leg blanks. The sequence of all the cuts you'll need to make is shown right on the pattern. Stars mark points where you need to make access cuts. Just follow the numbers to cut out the leg. Cut #1 is best done on the tablesaw. Do the rest of the cutting on the bandsaw. If you have a 14-in. saw, you can cut out the entire leg without flipping it over. There is only one critical dimension. The tongues at the top of the legs (cut #2) must be 3/4-in. wide for the lock block (Fig. C) to work properly (Photo 10).



3. SAW THE SMALL DETAIL SHAPES at the front of the legs in three steps. **FIRST**, saw the edges of the flat-topped details (Fig. B, 28). **SECOND**, make a relief cut, sawing into one corner of each half-round detail, creating a notch for the saw blade (Fig. B, 29). **THIRD**, saw the half-round profile, starting at the newly created notch and working in the opposite direction (Fig. B, 30).



4. YOU'LL BE AMAZED how quickly and accurately you can smooth and level all four legs at once, using rubber sanding pads and 3M 216U Production RN Fre-Cut sandpaper (see Sources, p. 56). This teardrop sander is perfect for the job because it acts like a flexible sanding block, conforming to all sorts of contours.

Flexible Rubber Sanding

Pads (see Sources, p. 56) come in a variety of shapes and contours, don't cost much and make the job of hand sanding much easier.



Sanding End Grain

Okay. Everybody looks for a way to avoid sanding end grain by hand, and I did too. After all, power tool manufacturers are happy to offer alternatives. But I was disappointed by all of the other approaches I tried. Progress with profile sanders was slow and the vibration made my hands tingle. Drum and spindle sanders worked fine for the wider curves, but they couldn't get into any of the corners. And on these legs there are more corners than curves. Besides, sanding the wide curves is just as easy to do by hand. I even tried cutting the legs on a scrollsaw, one at a time. Scrollsaw blades cut very cleanly, but progress through 3/4-in. thick walnut was slow. And without a lot of practice, it's hard to cut smooth sweeping curves with those tiny blades, which means you're going to have to sand the profiles anyway.

Sanding end grain by hand can be surprisingly efficient if you have the right tools and use the right sandpaper. 3M 216U sandpaper (it's gold) is worth its cost because it cuts fast and lasts. Start with 100 grit. You'll be amazed how quickly this stuff removes saw marks and smoothes end grain. Work your way through 120 and 180 grits, then use 280 to finish. There's no need to sand with the grain—the scratches are too small to see.



5. MOUNT THE HINGES

while the legs are still fastened together. Center the barrel of each hinge over its joint. Pre-drill holes for screws with a #5 self-centering hinge bit. Use the same mounting pattern on both parts of the legs.



6. SAW AWAY the

corners of the top. Be sure to draw diagonal reference lines for locating the base before you cut the corners off. Lines drawn with colored chalk pencils (see Sources, p. 56) show up great on dark woods like walnut.

Attach the Legs to the Top

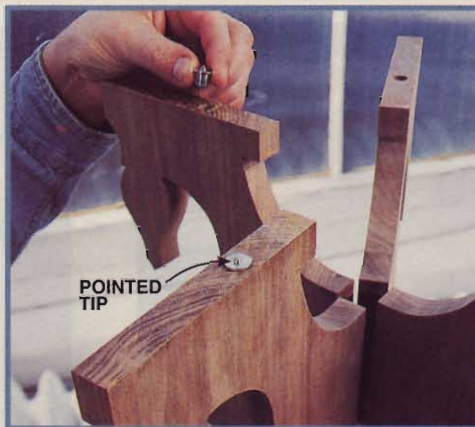
First, make the top, a rectangle with radiused corners (Photo 6). Rout the top edge with a 3/8-in. beading bit. Using a doweling jig, drill dowel holes in the legs, transfer their location to the top (Photos 7 and 8), and drill these holes. Then glue dowels into the legs. Make the lock block (Fig. C and Photo 9) and install it. Then fit the legs to the top, and test the locking operation.

A Notched Shelf Stiffens the Legs

Use the top as a template to make the notched shelf (Photo 10). For the notches to slip around the legs without being too loose, saw on the insides of the lines you've drawn on the shelf. Test the fit on the assembled table. If the fit is too tight, widen the notches slightly with sandpaper or a file. If it's too loose, just make another shelf. (That's what I had to do!)

A Canned Finish

This project begs for a spray finish. Brushing the legs would be a drippy nightmare and oil would make the end grain too dark. I used shellac, sprayed from an aerosol can as a seal coat. First I folded the legs together and sprayed all the end grain edges at once. Then I opened them up and sprayed the faces. It took only 10 minutes. The next day, after a light sanding, I sprayed on a topcoat of aerosol polyurethane.



7. INSERT DOWEL CENTERS (see Sources, p. 56) in the holes drilled in the tops of the legs. Dowel centers are designed to transfer the location of dowel holes from one piece to another.



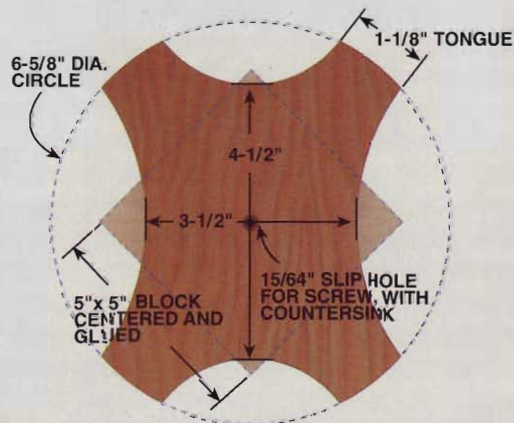
8. POSITION THE BASE on the top by centering it on a 5-3/4-in.-dia. circle. Then center each leg on its diagonal. Press or tap the base onto the top to set the points of the dowel centers. Mark both the top and one leg for reference. Remove the base and drill holes in the top for the dowels.

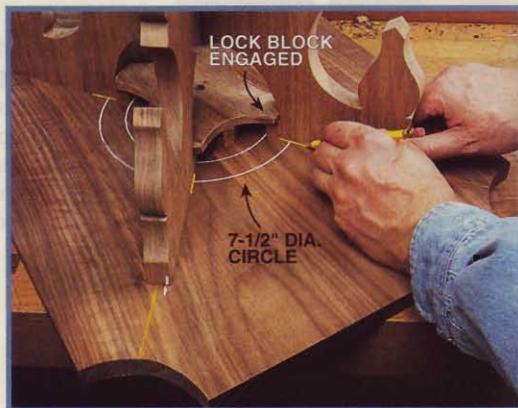


9. EASE THE EDGES of the lock block tongues so they'll engage the legs smoothly.

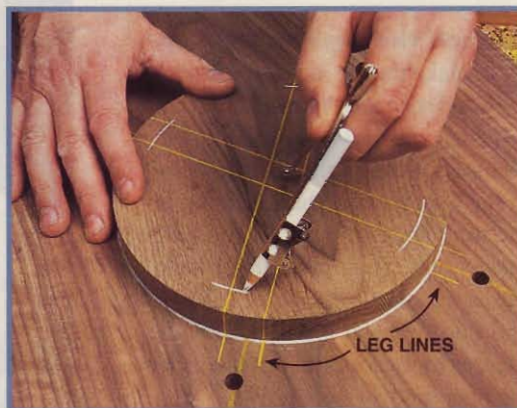
Fig. C | The Lock Block

The locking block swivels to lock the legs to the top. Center the block on the round lock blank and glue them together. Then drill the slip hole and cut the curved profiles.





10. USE THE TOP AS A TEMPLATE for the notched shelf that stiffens the legs. First, draw a second circle on the top that's the same diameter as the shelf. Then, with the table assembled, mark where the legs intersect this circle.



11. LOCATE THE NOTCHES in the shelf by centering the shelf in the circle drawn on the top and transferring the leg lines. Then draw another 6-1/2-in.-dia. circle to mark the bottom of each notch.

Sources

3M Scotch 666 double-stick (coated) tape, 3/4 in.
#910455, \$8.54
Office Depot
(888) 463-3768
www.officedepot.com

3/16", 4 tpi bandsaw blade
#126171 (for 14" bandsaw), \$11
Woodcraft Supply
(800) 225-1153
www.woodcraft.com

Brass butt hinges, satin finish, 1-1/2" x 2"
about \$4 per pair, three pairs needed
Dowel centers, about \$4 per set, two sets
needed. Get these at your local hardware
store or home center

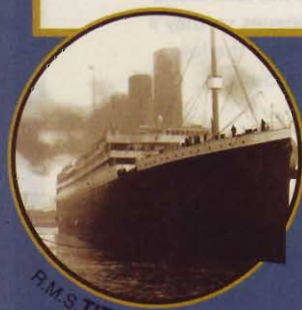
Flexible Sanding Pads
Tadpole contour sanders (complete set of 18
profiles), #KL50000, \$18
Teardrop hand sander, #KL05245, \$6
Flat rubber sanding block, #KL05215, \$8
Klinspor's Sanding Catalog
(800) 228-0000
www.woodworkingshop.com

3M 216U Production RN Fre-Cut sandpaper,
\$.50 per sheet
Tools on Sale, (800) 328-0457; www.7corner-shdwe.com; also available from auto body
supply stores

Chalk Marking Pencils
Available at art supply stores

Learn More About Molly Brown

Molly Brown House Museum
1340 Pennsylvania St.
Denver, CO 80203
(303) 832-4092
www.mollybrown.org



R.M.S. TITANIC

the Unsinkable Molly Brown



Young Margaret Tobin traveled west to Leadville, Colorado in 1886 to seek her fortune. Within a year she met and married J.J. Brown (13 years her senior), an engineer for the Ibex Mining Company. In 1893, thanks to a process J.J. devised, a played-out silver mine, called the Little Johnny, was found to have one of the largest veins of gold and copper ore in the country. The Browns became millionaires overnight.

In 1894 they moved to Denver,

where Molly immersed herself in Denver society.

In 1912, she gained national recognition for her heroism the night of the Titanic disaster. Mrs. Brown found herself, with other horrified survivors, adrift on a lifeboat. Taking command from the panicked sailor in charge, she began rowing and instructed others to do the same, safely piloting the boat through the icy darkness. Later she raised \$10,000 for families of victims.

She was an excellent fund-raiser

for charitable causes in Denver, where she was a champion for miners and orphans. Fiercely independent and outspoken, she ran for the Senate before women had the right to vote. She was named to the French Legion of Honor for her work entertaining soldiers in WW I.

Not even the largest ocean liner disaster the world had ever known could stop the Unsinkable Molly Brown! **MW**

Titanic photo courtesy of National Museums & Galleries of Northern Ireland, Ulster Folk and Transport Museum. Molly Brown photo courtesy of Denver Public Library, Western History Collection.

Lock Mitters



A lock miter router bit.

By George Vondriska

This simple set-up process guarantees *perfect joints!*

Lock miters are strong, attractive joints that make assembly easy. So why the heck don't we use lock miters more? I think it's because they can be a pain to set up. Well, no more excuses. Here's a clever technique, sent to us by Jim Rodgers of Martinez, California. Give it a try and you may become a lock miter enthusiast.

What's a Lock Miter?

A lock miter router bit cuts a 45-degree miter with a tongue and groove. When correctly cut, the parts go together at a perfect 90-degree angle and the interlocking tongues and grooves make for lots of mechanical strength and glue surface area. Lock miters are also great at keeping parts aligned during assembly. Use this joint on drawers, boxes or even hollow columns like newel posts. You can cut a lock miter on end grain, as shown in our photos, or on the long grain. Almost anyplace you'd use a miter, you can successfully use a lock miter.

Tooling Up

Lock miter bits come in a range of sizes. The size you use

depends on the thicknesses of your wood. Even the smallest lock miter bit makes a substantial cut, so I prefer bits with a 1/2-in. shank. They're more stable and result in smoother cuts. Expect to pay \$50 to \$100 for a bit, depending on the size.

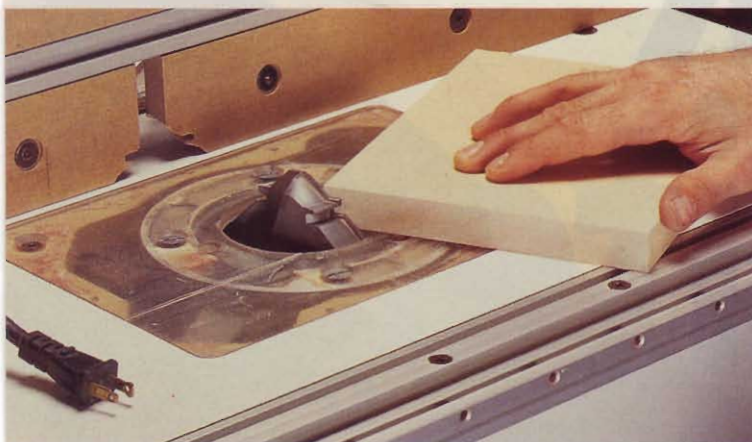
Note: The maximum size lock miter bit you can run in a 1-1/2-hp router is the 2-in. diameter. Larger bits must be run in a 2-hp or higher machine.

It is essential that you run these massive cutters at the right speed—about 10,000 rpm. Your router must have variable speeds so you can slow down for these big cutters.

The Perfect Set-Up

Follow the sequence shown in Photos 1 through 7 to produce perfect lock miters on your router table. Remember to have on hand the material required for your project plus six test pieces. It's critical that the test pieces be the same thickness as the project pieces because the bit set up is specific to the thickness of your material. As you get more familiar with the set up procedure you'll need fewer test pieces.

First, center the bit on the material.



1 CENTER THE BIT on your workpiece by eye. Be sure your router is unplugged.

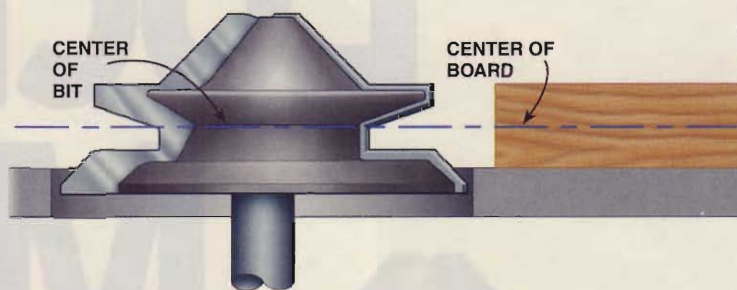


FIG. A Centering the Bit
The router bit is properly set when the center of the bit profile lines up with the center of your material.



2 ADJUST THE ROUTER TABLE FENCE by eye to its approximate position. Three points must be aligned. The top of the workpiece, the face of the fence and the 45-degree angle of the cutter (Fig. B). This is just a preliminary set up. You'll perfect the fence position later.

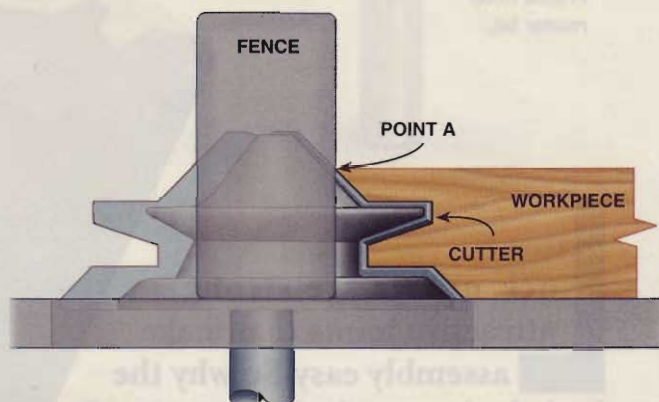
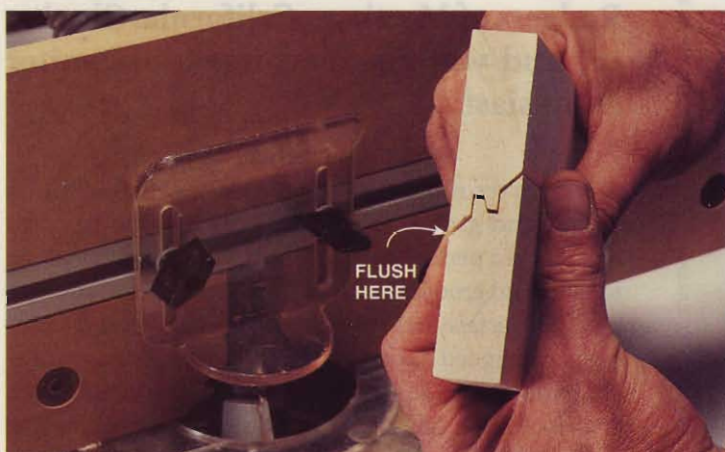


FIG. B Fence Position
The correct fence position has cutter, fence and top of workpiece all intersecting at Point A.

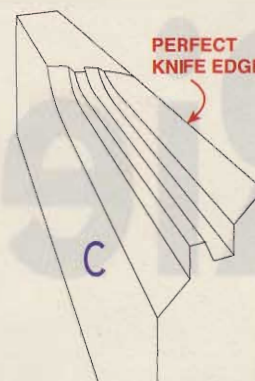
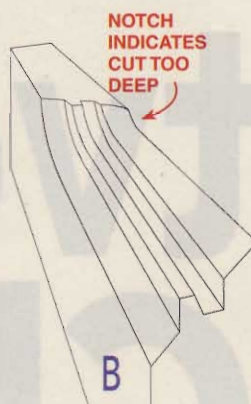
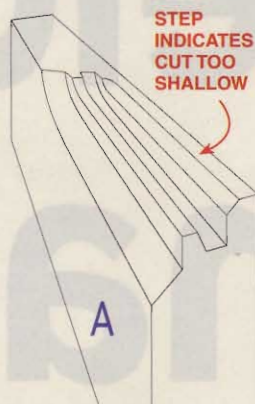
3 TEST THE HEIGHT of the router bit by cutting two test pieces. Hold each piece flat on the router table.



4 ASSEMBLE THE TEST PIECES. When the cutter is perfectly centered, the faces of the two pieces will be aligned. Adjust the bit as needed. **You must have the bit centered on the material before you start working on the fence position.**

Now, set the fence position.

- 5 EXAMINE THE TEST CUTS** to determine if the fence is correctly positioned. If the cut looks like A, the cut is too shallow and the fence must be moved back. If the cut looks like B, the cut is too deep and the fence must be moved forward. Adjust the fence until the cut looks like C; producing a perfect knife edge on the cut.



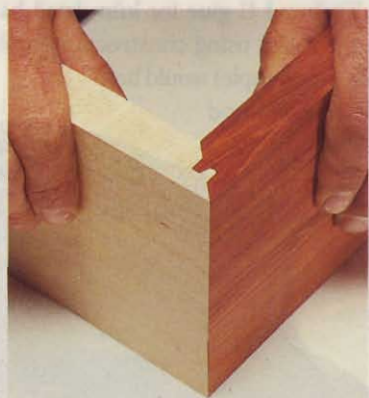
Finally, cut your parts.



- 6 MACHINE YOUR PARTS.** One part is held flat on the table. The mating part is held vertically against the fence.

7 ASSEMBLE THE PIECES.

Your careful machining will result in perfect-fitting corners.



Sources

Router Bits:

CMT, (888) CMT-BITS
Eagle America, (800) 872-2511
Jesada, (800) 531-5559
MLCS, (800) 533-9298
Whiteside, (800) 225-3982
Woodline Arizona, (800) 472-6950

Push Blocks:

Eagle America, (800) 872-2511

Lock Miter Tips

If you follow the steps you'll be able to cut perfect lock miters. Here are some tips to make it even easier:

Use wide pieces. Your project parts must be cut to the right length before cutting the lock miters, but they can be any width. Leave them 1 in. too wide, and cut them to final width after you've done the routing. They'll be easier to handle, and the "blowout" you get on the back of the cut will be cut off when you machine to final width. If your project calls for narrow pieces, 2 in. to 3 in. wide, machine pieces 6 in. to 7 in. wide and rip them to the size you need.

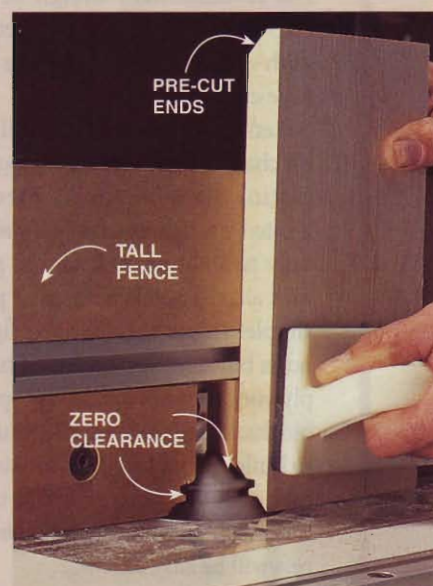
Use a tall fence. Holding a piece vertically against the fence is a lot easier if the fence is high. Use one that's about 7-in. tall.

Use a "zero clearance" fence. Having the opening surrounding the bit as small as possible helps prevent your workpiece from slipping into the opening.

Precut your parts. A 2- or 3-hp router will hog all the material off in one pass, but it's going to be a lot easier to machine the lock miter if you pre-cut your parts on the tablesaw with a 45-degree bevel. Trim off only about 3/8 in. on 3/4-in. stock.

Use push blocks. Neoprene-padded push blocks will make cutting lock miters easier and safer (see Sources, at left).

Make a permanent set up piece. When you have all the set-up done, machine a piece and keep it for your next project. If you want to set up the whole operation for the same thickness of material again, use the set up piece to set the thickness of your work, the height of the bit and to position the fence. You'll still need to do some test cuts and some final tweaking, but you'll be darn close. *AW*



Rietveld Chair

IN 1918 the Dutch cabinet-maker Gerrit Rietveld reduced the idea of a chair to a 3D grid of painted sticks and boards. His revolutionary design became one of the most famous pieces of 20th-century furniture—the Red-Blue chair.

Let's take a new look at it. Although his chair appears easy to put together, getting all those sticks precisely located is tough, especially if you have only two hands. And all the pieces look alike! To make this jigsaw puzzle simpler to put together, I've figured out a building system based on two plywood boards and a few spacing blocks. If, like most people, you want to build a bunch of chairs instead of just one, this system is the ticket. Once you've built the first chair, the rest will be easy as ABC.

The Design

I've revised Rietveld's elegant design to make a chair that's stronger, easier to build, more comfortable to sit in and rugged enough to put outdoors. I've used screws instead of Rietveld's dowels to hold it together, increased the size of the sticks and added a stretcher. We tested our chair with both large and small people, and it gets two thumbs up for comfort. Some said it was perfect for leaning back and playing video games!

Tools and Materials

Building this chair requires only a minimum of tools and experience.

You'll need a tablesaw, planer and router to mill the wood, and a #2 square-drive bit for your drill to put it together. That's it. A drill press and a router table are helpful, but not necessary.

Honduras mahogany is a good choice for this chair. It's easy to cut, sands quickly and is weatherproof, even without a finish. Alternative woods include teak and white oak. Softwoods that are often used for outdoor furniture like cedar, redwood and cypress are probably too weak for this chair and do not hold screws well. If mahogany is too pricey for you, I've scaled the chair so you could use tough construction lumber such as Douglas fir or Southern yellow pine instead. Both are available at most lumberyards and should hold up outdoors if painted.

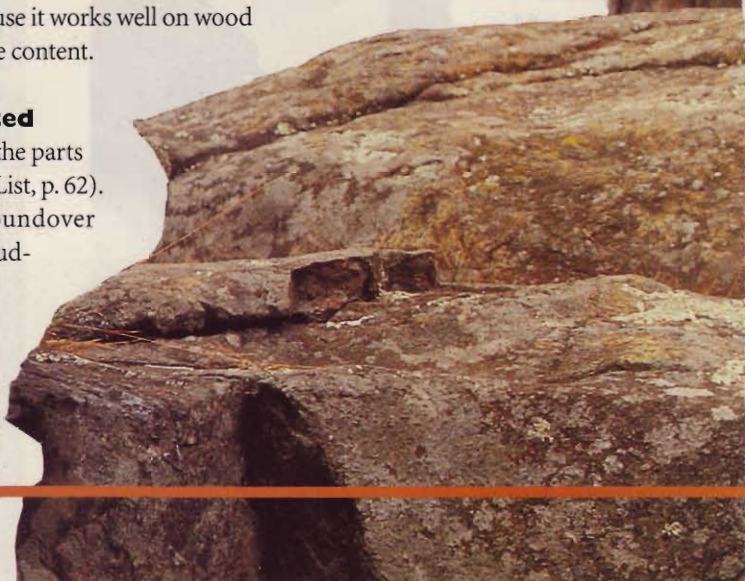
One chair requires about 12 board feet of 6/4 wood and about 10 board feet of 4/4 wood. That's about \$150 per chair for mahogany, \$50 for fir.

If your chair will be outdoors, use stainless steel screws and water-resistant glue. Unlike stainless steel, standard screws will leave unsightly stains on the wood. I prefer Titebond II glue for kiln-dried hardwoods such as mahogany, but if you're using construction lumber, polyurethane glue (Gorilla Glue, for example) would be a better choice because it works well on wood with a high moisture content.

Getting Started

Begin by cutting all the parts to size (see Cutting List, p. 62). Rout a bevel or roundover on every edge, including the ends (Fig. C, Detail 1). A router table makes this repetitious job go much

ART DIRECTION: PATRICK HELF • PHOTOGRAPHY: BILL ZUEHLKE • ILLUSTRATION: FRANK ROHRBACH



By Tom Caspar

**We've turned an
icon of modern
design into a
comfortable,
easy-to-build
outdoor project.**



faster. Make some extra legs and rails, too. You'll need them to make spacers (see Cutting List, below, right) and stop blocks. The spacer you'll use over and over again, spacer #1, is simply a scrap piece of rail. I added a tab to it to make it easy to use (Photo 3). Most of this chair's dimensions are based on multiples of this block of wood.

Don't sand the sticks before you glue them together, or you might accidentally round over the flat surfaces. They must remain flat for a good glue joint.

Now build the two gluing and screwing fixtures (Fig. E) and follow the photo sequence 1 through 12.

Finishing Touches

You don't have to apply a finish to your chair. Mahogany turns a silvery-gray color if left outdoors and stays sound for many years. However, if you'd like to preserve its original color, you can apply a clear exterior oil (see Sources, below) each year. The most vulnerable part of an out-

door chair is the bottom of the legs. Moisture wicking up into the legs can support the growth of wood-destroying fungi. You can slow down that process by liberally coating the end of the legs with epoxy glue.

For More Information

You can see the Rietveld chair's original color scheme on the Web at <http://www.levalet.com/DESF/IMAGES/RIET1-a.HTM>.

FIG. A
Guide Block for Screw Holes

The overlapping joints in this chair are screwed and glued together. This block lays out diagonal pairs of screw holes in five rails (D). Use one side to mark either end of a rail. Flip the block over to mark the other end. Then the two diagonals will run in opposite directions.

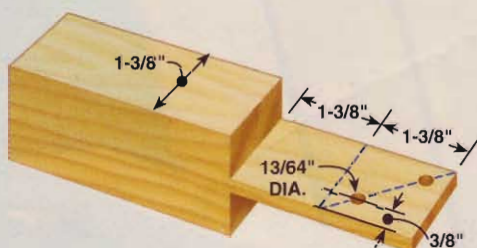
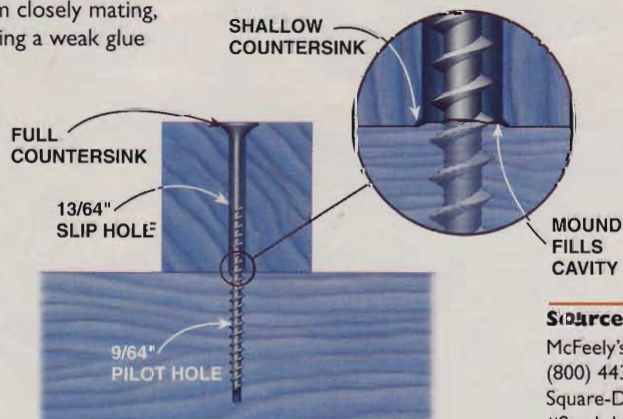


FIG. B
Good Screw Joints

For this chair to last, the screwed and glued joints must be as strong as possible. That means drilling two holes of different sizes before the joint goes together. First, a large diameter "slip hole" goes all the way through the top piece. The screw must be able to slip through it without threading into the wood. A small diameter hole, or "pilot hole," goes into the bottom piece. It should be about the same size as the shaft of the screw, less the threads.

Countersink both sides of the top piece. Here's why: When the screw is driven into the pilot hole a small mound of wood is formed. You create a cavity for this mound by countersinking. Without a cavity, the mound would prevent the two pieces of wood from closely mating, thus creating a weak glue joint.



CUTTING LIST

DIMENSIONS: 40" H x 30-1/4" W x 32" D

Part	Name	Qty.	Dimensions
A	Front Leg	2	1-3/8" x 1-3/8" x 14-3/4"
B	Arm Support	2	1-3/8" x 1-3/8" x 20-1/8"
C	Back Leg	2	1-3/8" x 1-3/8" x 20-1/8"
D	Rail	5	1-3/8" x 1-3/8" x 27-5/8"
E	Arm Rail	1	1-3/8" x 1-3/8" x 30-3/8"
F	Rail	2	1-3/8" x 1-3/8" x 24-7/8"
G	Arms	2	1-3/8" x 4-1/8" x 19"
H	Cleat	1	5/8" x 2-3/4" x 15-1/8"
J	Outer Back	2	5/8" x 5-1/4" x 42"
K	Inner Back	1	5/8" x 5-3/8" x 42"
L	Outer Seat	2	5/8" x 6-5/8" x 16-5/8"
M	Inner Seat	1	5/8" x 5-3/8" x 16-5/8"

Fixtures

A	Between Legs	1	3/4" x 1/4" x 22-1/8"
	Stop Stick A	1	1-3/8" x 1-3/8" x 24-1/8"
B	Between Arms	1	3/4" x 1/4" x 19-3/8"
	Stop Stick B	1	1-3/8" x 1-3/8" x 21-3/8"

Spacers

#1	Basic	3	1-3/8" x 1-3/8" x 3"
#2	Bottom Rail	1	1-3/8" x 4-1/8" x 19"
#3	Top Rail	1	1-1/8" x 1-3/8" x 18"
#4	Rail and Leg	2	3/4" x 6-5/8" x 9"
#5	Seat and Back	1	5/8" x 2" x 16"

Hardware

2	Corner Brackets	1" x 1"
4	Corner Brackets	1-1/2" x 1-1/2"
38	#10 X 2-1/2" L Stainless Steel Screws	
20	#8 X 3/4" L Flathead Screws	
24	#8 X 1-1/2" L Flathead Screws	
6	#8 X 1-1/4" L Flathead Screws	
Materials: Mahogany or Douglas Fir		

Sources

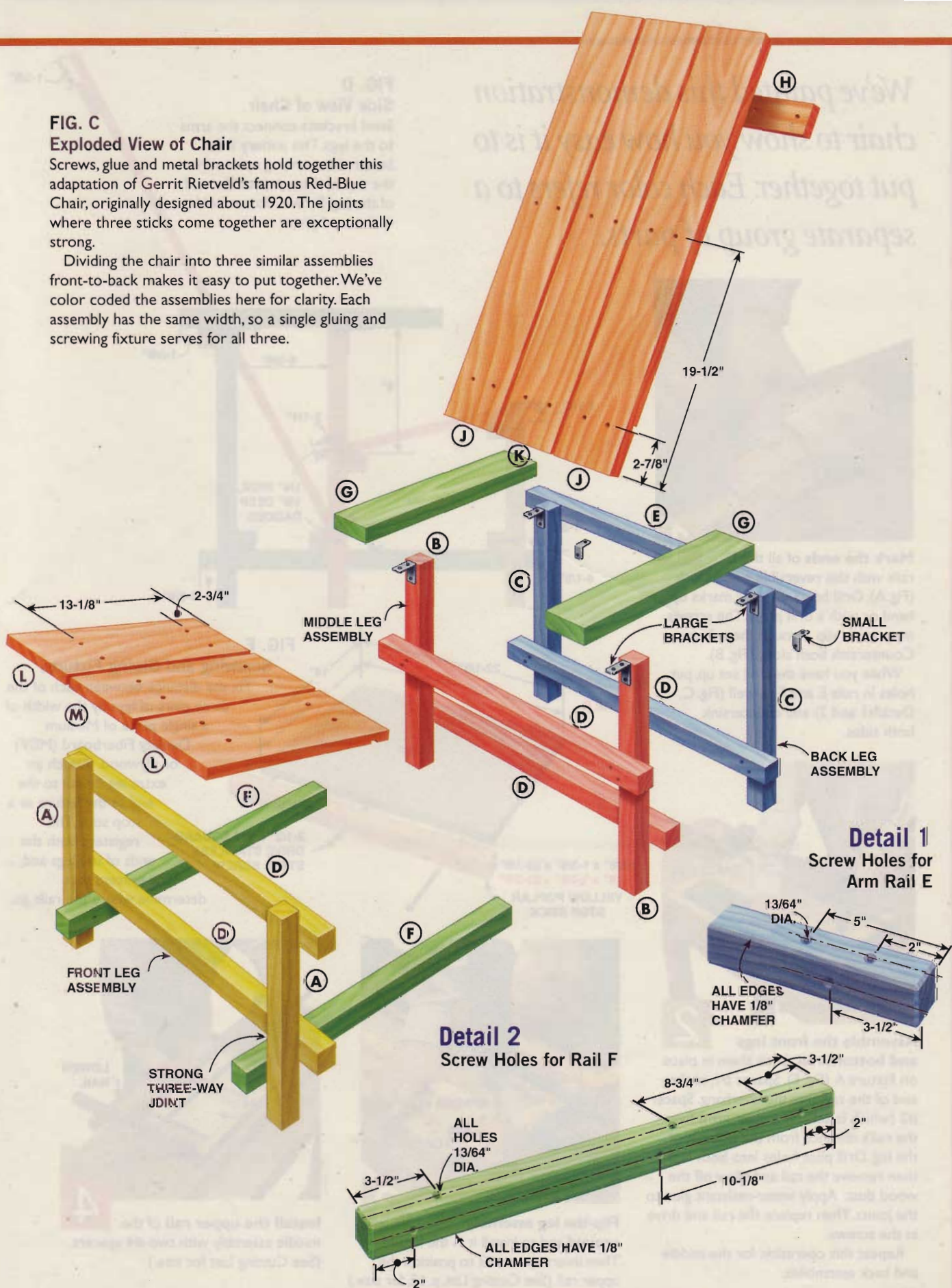
McFeely's
(800) 443-7937
Square-Drive Stainless Steel Screws,
#8 x 1-1/2" #0814-FSS, \$8 /100
#10 x 2-1/2" #1024-FSS, \$15/100

Performance Coatings
(800) 736-6346
Penofin Marine Oil Finish, \$39.25/gal.

FIG. C
Exploded View of Chair

Screws, glue and metal brackets hold together this adaptation of Gerrit Rietveld's famous Red-Blue Chair, originally designed about 1920. The joints where three sticks come together are exceptionally strong.

Dividing the chair into three similar assemblies front-to-back makes it easy to put together. We've color coded the assemblies here for clarity. Each assembly has the same width, so a single gluing and screwing fixture serves for all three.



We've painted this demonstration chair to show you how easy it is to put together. Each color refers to a separate group of parts.



1
Mark the ends of all the D rails with this reversible guide block (Fig. A). Drill holes on your marks by hand or with a drill press. The screws must easily slip through these holes. Countersink both sides (Fig. B).

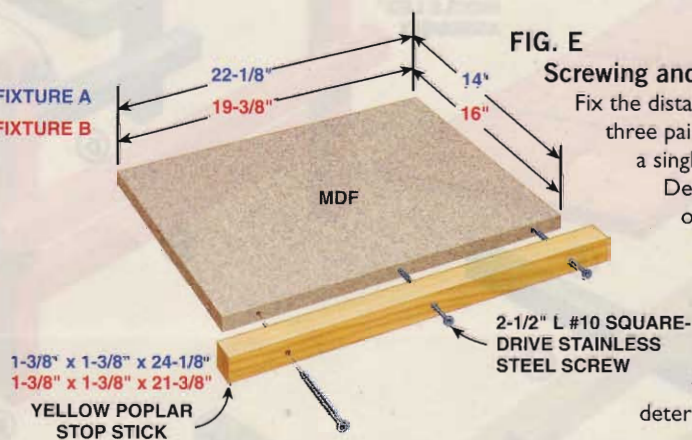
While you have the drill set up, put holes in rails E and F as well (Fig. C, Details I and 2) and countersink both sides.



2
Assemble the front legs and bottom rail. Lock them in place on Fixture A (Fig. E). Spacer #1, at the end of the rail, sets the overhang. Spacer #2 (which is actually a chair arm) fixes the rail's distance from the bottom of the leg. Drill pilot holes into both legs, then remove the rail and blow off the wood dust. Apply water-resistant glue to the joints. Then replace the rail and drive in the screws.

Repeat this operation for the middle and back assemblies.

FIG. E
FIXTURE A
FIXTURE B



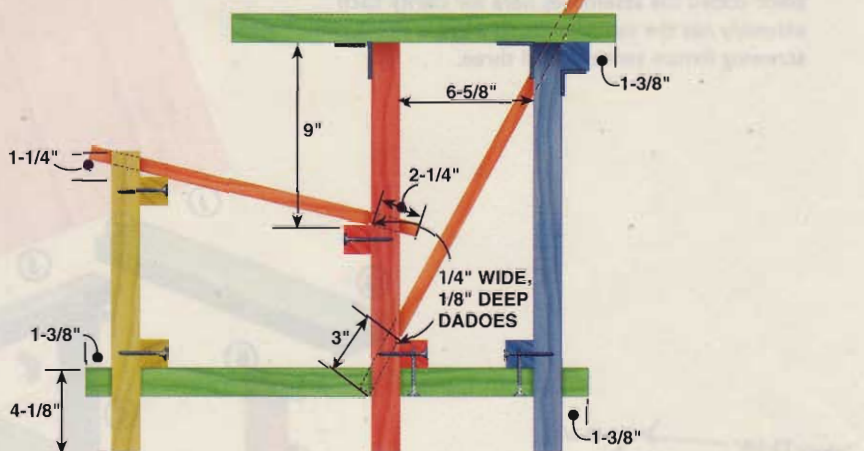
3
Flip the leg assembly around and re-install it in the fixture. Then insert spacer #3 to position the upper rail. (See Cutting List, p. 62, for size.)



4
Install the upper rail of the middle assembly with two #4 spacers. (See Cutting List for size.)

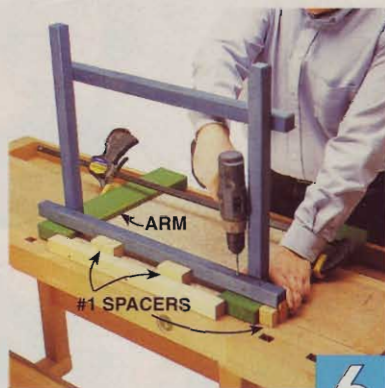
FIG. D
Side View of Chair

Steel brackets connect the arms to the legs. This joinery is far better than running screws from the top of the arm into the end of the leg. Screws do not hold well in end grain.





5
Butt rail E of the back assembly against the stop stick. Place two seat boards under the fixture to raise the stop stick to the level of the rail. Use two spacer blocks #1 to set the overhang.



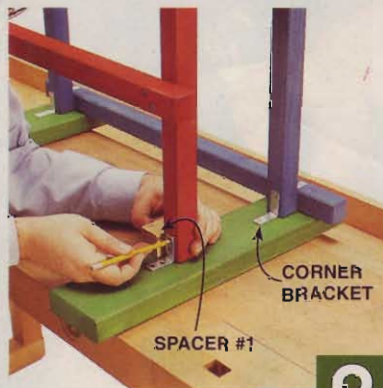
6
Screw the back leg assembly to the arms. Clamp the arms in place across Fixture B. Spacer blocks #1 position the arm rail from the stop stick and set the overhang.



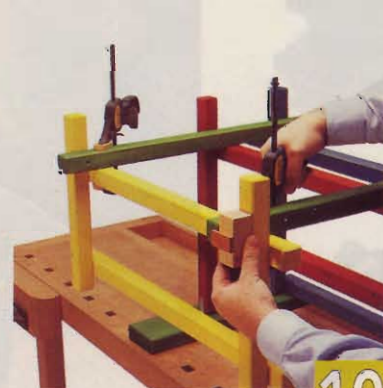
7
Clamp the middle leg assembly in place with spacer #4 (the same spacer you used in Photo 4, but turned the other way around). Spacer #1 sets the legs in from the arm's edge.



8
Drill pilot holes through rail F, then screw and glue it in place. Repeat the same process on the other side of the chair and remove Fixture B.



9
Install three corner brackets on both arms (Fig. C). Use stainless steel screws if your chair's going outside.



10
Clamp the front leg assembly in place. Drill pilot holes into the legs and drive in two screws to temporarily hold the assembly in place. Then remove the clamps, drill the pilot holes into the front assembly's rail and remove the temporary screws. Apply glue to the assembly and drive in all the screws.



11
Add the backboards. Tilt the chair back on a support block made from the spacers. Pre-drill the holes in the backboards and cut registration dadoes in them (Fig. D). Then drill pilot holes into the chair rails and drive in the screws. This is not a glued joint.



12
Insert a thin spacer between the seat boards to keep them parallel. The seat is not glued to the rails. Glue and screw the cleat behind the top of the backboards. **AW**





BELT SANDERS

by George Vondriska



Which **size** and which **motor style** is more important than which brand.

For the woodworker who's shopping for a belt sander, there's a bewildering array of models. We looked at 26 for this test, and that didn't include all of them. In this crowded field, finding the right *size* of sander is the most important choice.

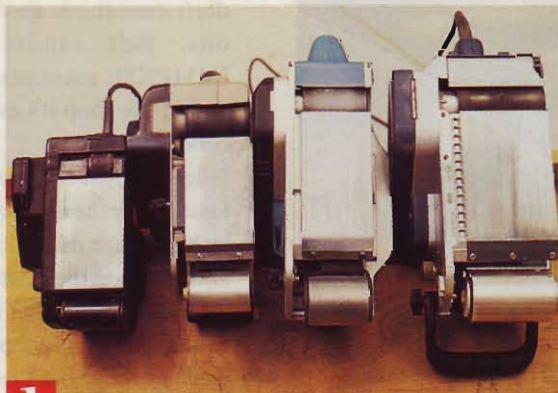
Pick the Size that Fits

Sanding belts (and sanders) come in four basic sizes (shown at right). The first number is the width of the belt, the second the length. Belt size determines the size of the platen; the plate on the bottom of the sander that holds the abrasive against the wood. So a bigger belt means faster sanding. It's also easier to keep a bigger belt flat on a surface.

On the flip side, bigger belts need bigger motors, which means added weight and size. Smaller sanders are easier to use on non-horizontal surfaces and are often preferred by cabinetmakers and carpenters who use them

for scribing cabinets and countertops. Here are the four sizes:

- 3 in. x 18 in. Easy to handle because of its light weight. Great if you often use the sander on vertical or overhead surfaces. The platen is almost the same size as that on the 3 x 21, but these tools are light-duty and best for occasional use. We do not recommend them for regular shop use, because they're less useful for horizontal surfaces (the most common shop use). We have not included them in our chart.
- 3 in. x 21 in. This size is closest to being general-purpose. The platen size gives you a pretty stable machine, without getting too heavy and bulky. If a do-it-all sander that's easy to handle is what you want, get a 3 in. x 21 in.
- 3 in. x 24 in. The platen gets bigger, the amperage goes up, the sander gets heavier, all making this tool more suitable for horizontal surfaces while still manageable on vertical ones. This is a popular sander size in commercial shops and is an excellent choice if you are using it only in the workshop and have strong hands.
- 4 in. x 24 in. The best of the bunch for big, flat



1 SIZE IS A MAJOR FEATURE. There is a trade-off: Large machines (3x24, 4x24) sand faster and are easier to keep flat on the wood; smaller sizes (3x18, 3x21), are lighter and easier to handle, especially on non-horizontal surfaces.



2 **TRANSVERSE AND INLINE** are the two basic designs. Transverse is more powerful, but less maneuverable. Inline is easier to handle and use upside down for small parts, but doesn't have as much power.



3 **THE BIG MOTOR AND NARROW BELT** found on some 3x24 sanders is a combination that yields great power, but the overlapping parts make it difficult to sand flush to a vertical surface.



4 **A SANDING STAND** is available on some models, or you can make your own. The stand makes it easier to hold the machine upside down for sanding small parts and sharpening.

horizontal surfaces. Harder to handle than the other sizes.

Bottom Line: For most people the choice will be between the 3x21 and the 3x24. The 3x21 is a more all-around choice, with the option of inline-design (see below). If you're going to use the belt sander for carpentry, home projects and cabinet installation, in addition to shop work, it is probably your best choice. The 3x24 is more of a dedicated shop tool, with superiority on horizontal surfaces. It's also more expensive.

Dust Collection is a Must

There are a number of belt sanders without dust bags, but don't even think about buying one. Belt sanders make IMMENSE amounts of dust, and in the shop it's essential to collect it.

In our own shop we've even tossed away the dust bags, which leak and are messy to empty, and replaced them with a shop vacuum and flexible hose. Try it; once you get used to the hose, you'll never go back to bags. All of these machines can be adapted to dust hoses, but some of the Makita sanders require you to make your own adapter. Swiveling dust ports are a real convenience and some machines are designed with dust bags that don't get in your way.

Inline or Transverse?

Transverse sanders are the most common type, with the motor on top of the sanding belt and a drive belt on the side connecting the motor and rear drum (Photo 3). They can accommodate a large motor, but tend to be top-heavy. Inline sanders are shaped like a shoebox and have the motor parallel to the belt. This

design is less tippy, lighter in weight and generally easy to operate, but won't handle a large motor. It's much easier to set an inline sander upside-down on your bench for sanding small parts or sharpening, and the sanding frame, available as an option, makes sanding flat surfaces safer.

Most users prefer the transverse simply because for shop use horizontal surfaces are the norm, and the transverse models have more power. However, if you want portability, versatility and you plan to use the tool on do-it-yourself projects as well as in the shop, the inline is a good choice. Handle both types before you buy.

Amps, Power and Speed

Amperage is the best measure of how aggressive the sander will be (see chart, at right.) For panels, more amps equal faster sanding. In delicate sanding situations, like working on veneered material, variable speeds (or at least two speeds) allow you to slow the sander down for more control. It's a useful feature.

A Note on Weight

There's a huge range in weight among these tools: from 6 lbs. to 15 lbs. More than any other portable power tool, however, weight can actually be advantageous in a belt sander. Belt sanders are designed so that the weight of the sander does the work. You should not push down on them, or you will gouge your work and cause premature belt wear.

Again, choosing your sander comes down to how much your tool will be dedicated to horizontal surfaces in the shop (heavy is good) versus how much you anticipate using the tool for carpentry and cabinet installation (lighter is better).

Recommendations

We had three groups of woodworkers test 26 sanders. Our editors had a crack at them and then a panel of six amateur woodworkers of varying skill levels tried them out. Then we gave all of the sanders to a large cabinet shop for a few weeks to hear from the "power users."

In general, editors and testers liked a large number of these tools. Preferences were mainly for small and subjective things, like the position of the dust bag and the heft or the feel of the belt-changing lever. The most significant difference was noise: The Makita 9921 and 9403 were very quiet; the Porter Cable models were about the same as all the other sanders. However, no single tool stood out enough to warrant an Editor's Choice. One sander stood out as a Best Buy (right).

Durability is an important aspect of sanders, because they tend to run for long periods. However, it's almost impossible to measure. Our advice: Buy from a reputable dealer with good service and repair facilities. **AW**



HITACHI SB 75 is an excellent

3 in. x 21 in. sander. It has the highest amp motor in the group, the dust bag works well and it has two speeds. It would be handier if the low end of the speed range were lower, but it works OK. A weak spot is the belt-change lever. It's pointy and hard to pull. Get the bench stand (\$35) to really make this one versatile.

Brand	Belt Size	Price	Amps	FPM (feet per minute)	Dust Bag	Weight in lbs.	Comments
DeWALT DW431	3 x 21	\$190	5.2	475-1100	Y	7	Very quiet. Easy to handle. Good dust bag location. Rear and front handle are a little too close together. (800) 4-DeWalt
CRAFTSMAN 27725	3 x 21	\$130	6	775-1150	Y	7	Inline motor. Long cord. Dust bag stays out of your way. Noisy. (800) 377-7414
RYOBI BE321	3 x 21	\$150	6	755-1148	Y	7	Inline motor. Easy to get at speed control. Dust bag stays out of your way. Noisy. (800) 525-2579
BOSCH 1274DVS	3 x 21	\$185	6.6	550-1100	Y	7	Inline motor. Very comfortable and balanced. Dust bag stays out of your way. (877) 267-2499
MAKITA 9901	3 x 21	\$170	6.7	1246	Y	6	Light and easy to use. Square port on dust bag requires special connector. (800) 462-5482
MAKITA 9900 B	3 x 21	\$185	7.8	1180	Y	10	Extra-long cord. Square port on dust bag requires special connector. (800) 462-5482
HITACHI SB 75	3 x 21	\$170	8.7	1180/1475	Y	10	Excellent value. Big motor. Good balance. (800) 546-1666
PORTER CABLE 352 VS	3 x 21	\$185	8	850-1300	Y	10	Solid, well-made sander. Good balance. Dust bag can be pivoted to any position. (888) 848-5175
PORTER CABLE 360 VS	3 x 24	\$250	12	1000-1500	Y	15	Well balanced. Big motor. Motor overhangs belt edge. Dust bag swivels to any location. (888) 848-5175
BOSCH 1275 DVS	3 x 24	\$230	10.5	1150-1550	Y	12	Love the front handle. Great belt change lever. Motor overhangs belt edge. (877) 267-2499
MAKITA 9924 DB	3 x 24	\$195	7.8	1300	Y	12	16-ft. cord. Square port on dust bag requires special connector. (800) 462-5482
MAKITA 9921	3 x 24	\$230	11	500/1640	Y	12	Very quiet tool. 16-ft. cord. Motor projects past belt. (800) 462-5482
MILWAUKEE 5936	4 x 24	\$295	10	1400	Y	12	Easy belt change. Good balance. (262) 781-3600
PORTER CABLE 362 VS	4 x 24	\$250	12	1000-1500	Y	14	Dust bag can be pivoted to any position. Heavy and aggressive tool. (888) 848-5175
BOSCH 1276 DVS	4 x 24	\$245	10.5	1150-1550	Y	14	Pivoting d-handle on front. Good balance. Dust bag slightly in the way for right-handed users. (877) 267-2499
MAKITA 9403	4 x 24	\$240	11	500/1640	Y	13	Very quiet tool. 16-ft. cord. Good dust collection. Can pivot dust bag. (800) 462-5482
HITACHI SB 10 T	4 x 24	\$240	8.7	1150/1380	Y	11	Light weight in a big sander. Motor is smallest in class. (800) 546-1666
CRAFTSMAN 11792	4 x 21	\$105	7.5	1300	Y	9	Low price for a big platen. Light and easy to maneuver. Will need to shop a little to find belts. (800) 377-7414

Accessories available:

F = Sanding frame

S = Stand

Cherry Pie Safe

by Dave
Munkittrick
and Bruce Kieffer

**This versatile classic goes
together fast with biscuits.**

Pie safes like this one were once commonplace. The pierced-tin panels kept insects out while providing ventilation for cooling baked goods.

Our version is built of solid cherry with a simple, modified-Shaker style that blends easily into most any decor. Adjustable shelves and a pair of drawers make it a versatile storage cabinet. The pierced-tin panels that once cooled pies provide ventilation for a modern sound system. Or, you can use this pie safe to store clothing and take some of the pressure off that overstuffed closet or bureau.

Biscuits make the joinery on this project as easy as pie. If you've never made a project of this scale before, or are new to biscuit joinery, this is the perfect place to start. You'll need to know how to make stopped rabbets for the back and dadoses for the drawers, but hanging the flush-fit doors is a breeze with no-mortise

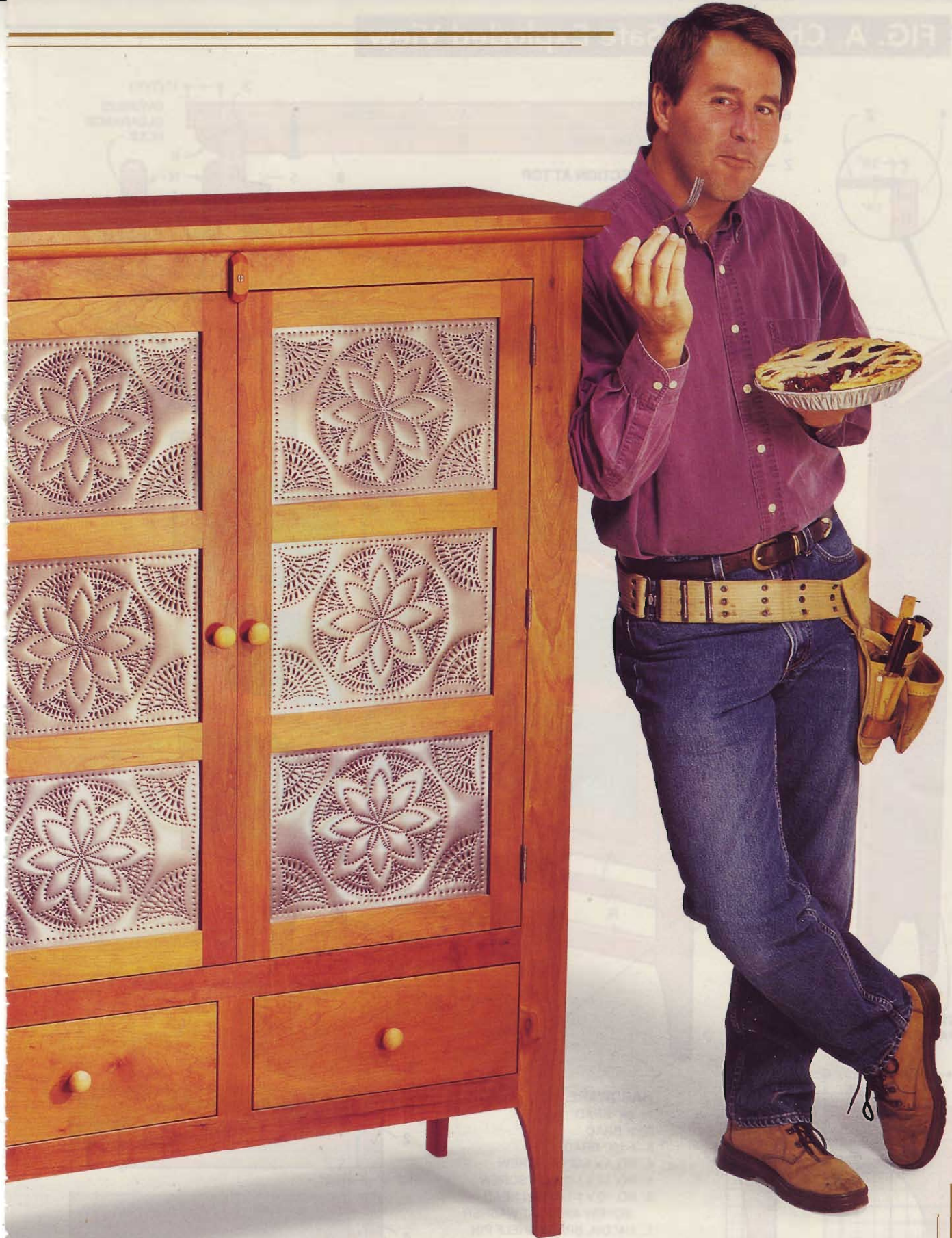
hinges. (If you choose to mortise-in the hinges, check-out our how-to technique in "Flush-Fit Cabinet Doors" on p. 78.)

GETTING OFF TO A GOOD START

You'll need a biscuit joiner, a tablesaw set, a router with a 3/8-in. rabbeting bit and a jig-saw to complete this project. With the exception of the drawer bottoms and back, the whole cabinet is made of solid cherry. One of the tricks to using cherry is to be fussy about your lumber. The color of cherry can vary greatly (that's why it's often stained dark by manufacturers). Select boards with uniform color or ask that the wood you order come from a single tree.

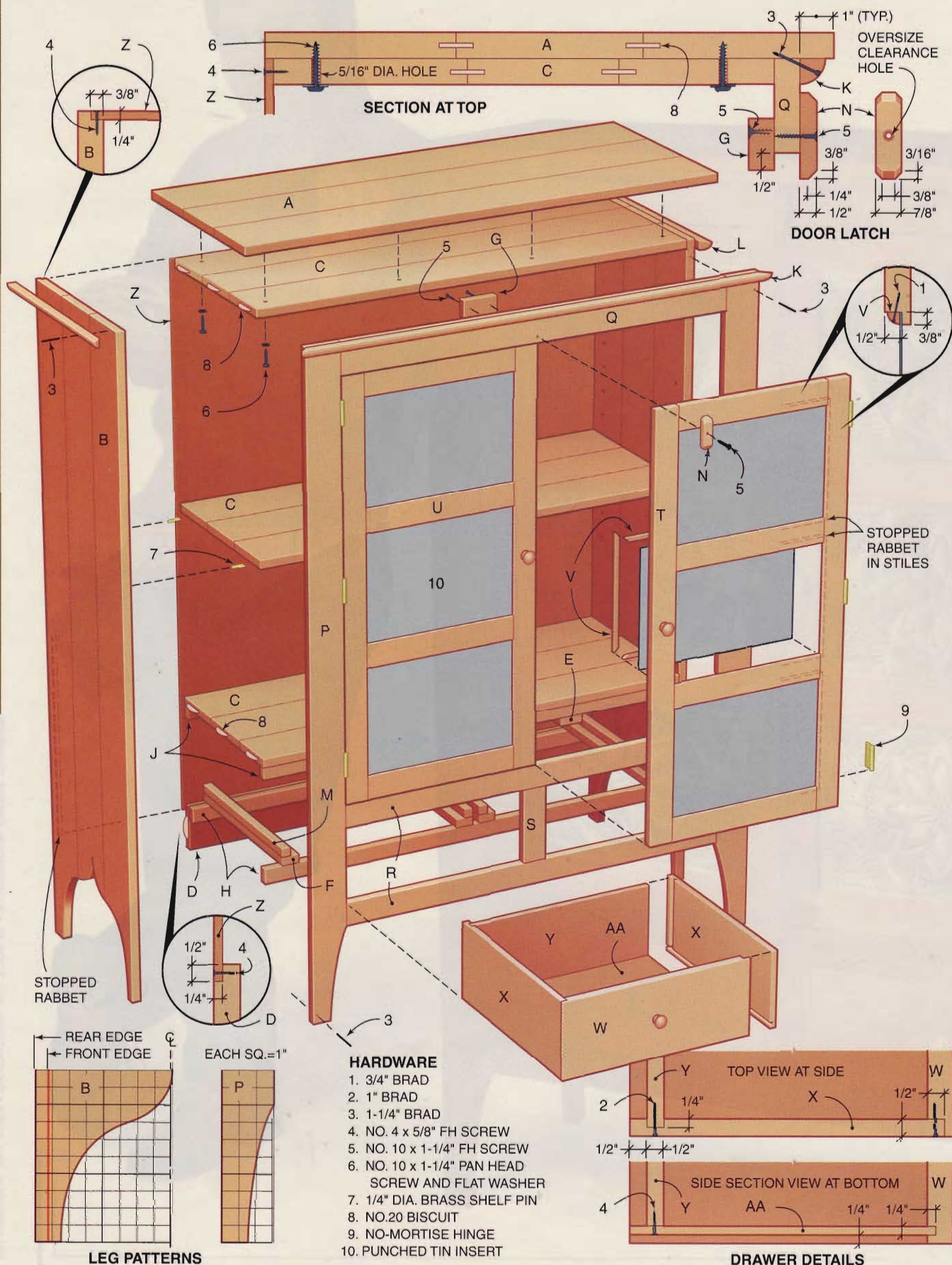
We spent about \$800 on this pie safe. You can shave off some of that cost, (as much as \$180), by punching your own tin (see sidebar on p. 77). Now, let's head for the shop.





ART DIRECTION: JOEL SPIES • PHOTOGRAPHY: BILL ZUEHLKE • ILLUSTRATION: EUGENE THOMPSON

FIG. A Cherry Pie Safe Exploded View



START WITH THE WOOD

Sort your wood for grain and color. Most cherry boards have some sapwood, the off-white wood found on the outer edge of the trunk. Plan your cuts so the sapwood is kept to the inside where it won't show. Select flat, straight-grained wood for the doors and face frame. This is one place you can't afford any warping. Cut the drawer fronts (W) from a single board so the grain flows from one drawer to the next. Choose boards with compatible figure and color for the sides (B) and top (A). Use the less desirable pieces for shelving.

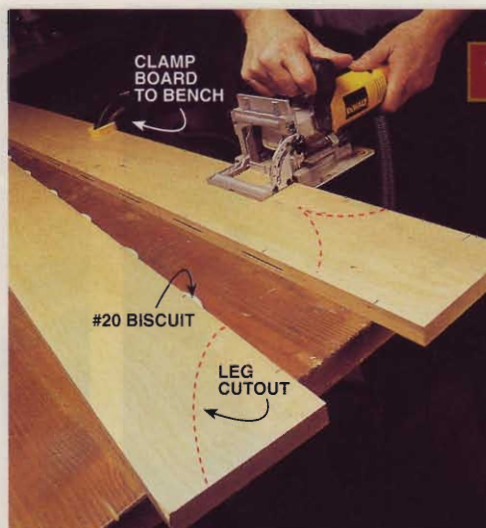
TIPS FOR BETTER BISCUITING

- There are three common sizes of biscuits: #20, #10 and #0. #20 biscuits offer the greatest gluing surface and are therefore the strongest. Use these whenever possible even if it results in the biscuit "breaking out" of the joint (Photo 8). Breakout occurs on the face frame and door frame where narrow rails join the stile. But that's not a problem if you offset the center mark for the biscuits so the breakout won't be seen. We did this on the face frame so the biscuits break out where the drawers and top cover them

Oops!



Somehow we managed to cut a biscuit where none belonged. A careless pencil mark can be mistaken for a biscuit mark when you're cutting your way through a pile of frame members. Here's how we fixed it: Use a compass to mark a 4-in. dia. circle in some 5/32-in.-thick cherry and cut it out on the bandsaw. Glue the circle into the bad slot and clean up any excess glue. After the glue dries, flush-cut the repair.



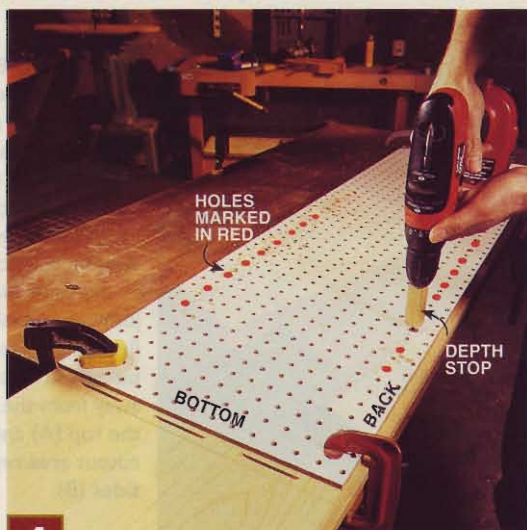
1 CUT THE BISCUIT SLOTS about 6-in. apart for edge joining. The biscuits align the surface of the boards producing flush joints that require little sanding. You don't want to expose a biscuit joint when making your final cuts so keep your biscuits at least 3-in. away from the ends of the top (A) and the leg cutout area on the sides (B).



2 CUT THE SLOTS in the end of the shelf with the base of the plate joiner on the cabinet side. Clamp the shelf on the side so the top edge of the shelf lines up with the top edge of the layout mark on the side. Mark for biscuits in the middle of the shelf and 3-in. in from each end.

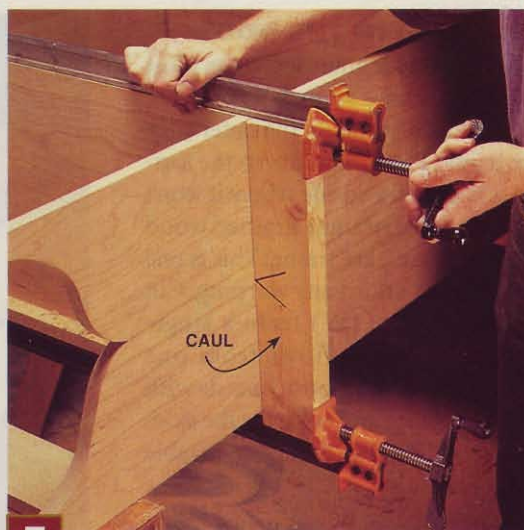


3 CUT THE SLOTS in the side with the plate joiner held vertical and using the markings on the shelf.



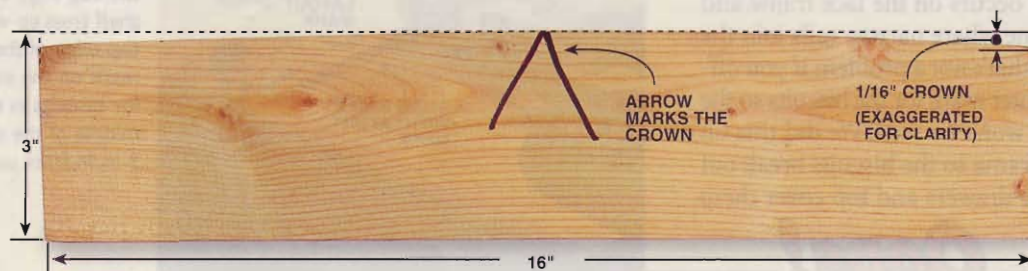
4 DRILL FOR ADJUSTABLE SHELF PINS

using a perf-board template. Mark the bottom and back edge to correctly register the template on the other side of the cabinet. Mark the holes to be drilled (every other hole gives a 2-in. spacing) and use a sharp brad-point bit. Make your own fool-proof depth stop from 3/4-in. x 3/4-in. stock that's drilled down the center and cut to length.



5 CLAMP THE CARCASS ASSEMBLY

using shop-made cauls to distribute clamping pressure across a wide joint. See Photo 6 for how to make cauls.



6 MAKE YOUR CAULS from 2x4s cut to the width of the cabinet. Make sure they are well dried and all four sides are square. Plane or sand a 1/16-in. crown on each caul and mark the crown with an arrow. While you're at it, make some extras and keep them for future use.

(Fig. B). Breakouts on the door frames are covered by the tin panel stops. We offset the top-rail biscuits to keep the top edge of the door clean (Fig. C).

- Assembly with biscuits needs to go smoothly because the biscuits swell quickly once glue is applied. For a more relaxed assembly, use an extended-open-time glue like Titebond's Type II Extended or Liquid Hide Glue (see Sources, p. 77).
- Take the time to dry-fit each assembly using all the biscuits and clamps you'll need for the real thing. You'll be able to rehearse your glue up and red flag any misaligned biscuits.
- Getting glue in the biscuit slots can be a bit messy. Just squirt a bead into

the groove and spread it along both side walls of the slot with a small glue brush (see Sources, p. 77).

THE CARCASS

1. Lay out and cut the biscuit slots for the top (A), sides (B) and shelves (C) (Photo 1).
2. Dry-fit first then glue up and cut to length.
3. Use the leg patterns (Fig. A) to lay out the shapes on the bottoms of the sides. Cut them out with a jigsaw.
4. Use a tablesaw to cut the rabbet on the back rail (D) for the back (Z). Use a router with a 3/8-in. rabbeting bit to cut the stop rabbet on the sides for the back.

5. Lay out the fixed shelf locations on the cabinet sides, then cut the biscuit slots for the shelves and the back rail (Photos 2 and 3).

6. Drill holes for adjustable shelf pins (see Sources, p. 77; Photo 4).

7. Finish-sand all the pieces starting with 120-grit and working your way to 320-grit for an oil finish. If you plan to varnish, stop at 220-grit.

8. Dry-fit and glue the carcass using four clamps and cauls for the shelves (Photo 5) and a fifth clamp for the back rail. Be sure the carcass is glued up square.

9. Glue the drawer kicker cleats (J) to the bottom of the lower shelf. If you own a pneumatic brad nailer,



7 CUT SLOTS IN THE ENDS of narrow parts, like this face frame rail, using a simple jig to steady the work and provide a wider surface for the plate joiner fence. We used a 12-in. x 30-in. piece of melamine with a 3-in. x 18-in. piece of hardwood centered along the edge. Add a couple of hold-down clamps (see Sources, p. 77). Note how the cabinetmaker's triangle identifies the piece being cut as the top rail.

The Cabinetmaker's Triangle

Labeling your project parts with letters and numbers works fine when you're dealing with a few pieces. But if your pile of parts gets mixed up it can take a while to sort things out again. The cabinetmaker's triangle allows you to instantly identify the location and orientation of each individual piece. Here's how it works: Group your frame members face-side up in the same orientation they will have when assembled (stiles are vertical, rails are horizontal, etc.) Mark each group with a triangle that points up towards the top of the cabinet. (With parts like the top and shelves, the triangle will point to the back of the cabinet). The triangle leaves two lines on each piece making identification a snap (See Figs. B and C). If two or more assemblies are identical, like our pair of doors, add an extra line along the triangle's side for the rails and along the bottom for the stiles.

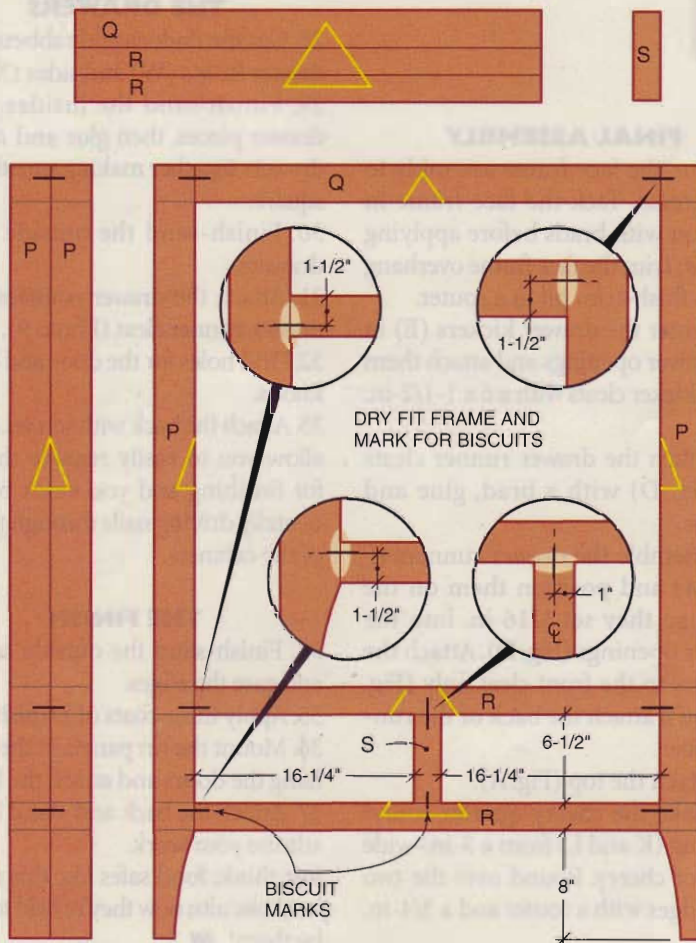
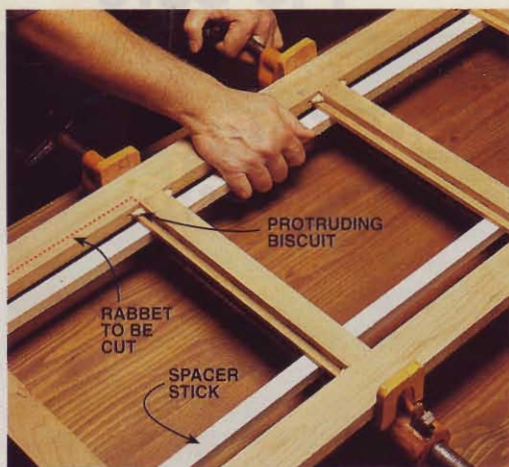


FIG. B Face Frame Layout

Group the stiles and rails together and orient them as they will be on the cabinet. Use a square to mark the precise position of each rail on the stiles. Make these lines light and long to distinguish them from your biscuit marks. Now, decide where an offset is needed to disguise any biscuit breakout. To figure out how much to offset the bottom rail, for example, subtract the width of the rail (2 in.) from the width of the slot made by the joiner (2-3/4 in.). If you centered the biscuit on the rail, the slot would breakout 3/8 in. on each side. To keep the biscuit inside the drawer opening, you'll need to offset the cut 3/8 in. towards the opening. Add 1/8 in. for insurance and you have an offset of 1/2 in.



8 ASSEMBLE YOUR DOOR FRAMES

on a perfectly flat surface using identical clamps. This helps ensure a flat door and saves all kinds of headaches later. Spacer sticks hold the frame up off the clamps (so it won't get stained) and in line with the clamp screw pressure (so it won't get twisted). Note how the biscuits protrude into the panel rabbets. They'll be removed later when the rabbets are completed with a router.



9 MARK THE POSITION OF THE DRAWER RUNNERS

on the lower back support cleat. Have the drawer in place with even margins around the opening and enough room between the slides and drawer sides for smooth operation. Remove the drawer and fasten the runners with screws.

tack the cleat in place first so it won't slide around when you apply the clamps. (Brad nailers can be like a third hand during assembly. See "Brad Nailers," p. 43, for more information.)

THE FACE FRAME

10. Lay out the face frame, as shown in Fig. B.

11. Cut the biscuit slots (Photo 7) and dry fit the face frame.

12. If you are mortising in your hinges, now's the time to lay out and cut the hinge mortises on the inside edges of the face stiles.

13. Lay out and cut the leg profiles on the bottom of each stile (Fig. A).

14. Begin the glue up with the drawer divider mullion (S) and the lower rails (R). Then glue the rest of the face frame together.

15. Trim the protruding biscuits and finish sand.

FINAL ASSEMBLY

16. Glue the face frame assembly to the carcass. Tack the face frame in position with brads before applying clamps. Trim the face frame overhang with a flush-trim bit in a router.

17. Center the drawer kickers (E) in the drawer openings and attach them to the kicker cleats with a 6 x 1-1/2-in. screw.

18. Attach the drawer runner cleats (H, Fig. D) with a brad, glue and clamps.

19. Assemble the drawer runners (F and M) and position them on the cleats so they set 1/16 in. into the drawer openings (Fig. D). Attach the runners to the front cleat only (Fig. D). You'll attach the back of the runners later.

20. Attach the top (Fig. A).

21. Make the cherry quarter-round molding (K and L) from a 3-in.-wide piece of cherry. Round over the two long edges with a router and a 3/4-in.

round-over bit. Rip the moldings off the piece and cut to fit. Glue and nail the front molding in place. Nail the side moldings in place but only glue the miter joint and the first couple of inches at the front of the case. This will keep the miter joint tight but still allow the carcass to move with the seasons.

THE DOORS

22. Use a tablesaw to cut the rabbets on the back edges of the door rails (U).

23. Cut biscuit slots, dry-fit, glue and clamp the door frames (Photo 8).

24. Finish the rabbets on the doors with a router and a 3/8-in. rabbeting bit—this will also trim the protruding biscuits. Square the corners with a sharp chisel.

25. To fit the doors see "Flush-Fit Cabinet Doors" on p. 78.

26. Make the door latch (N) and mount it and the door stop (G, Fig. A.)

27. Make the tin panel stops (V) and miter to fit in place, but don't attach them yet.

THE DRAWERS

28. Cut the dadoes and rabbets in the drawer fronts (W) and sides (X).

29. Finish-sand the insides of the drawer pieces, then glue and nail the drawers together making sure they are square.

30. Finish-sand the outside of the drawers.

31. Attach the drawer runners to the drawer runner cleat (Photo 9).

32. Drill holes for the door and drawer knobs.

33. Attach the back with screws. Screws allow you to easily remove the back for finishing and you won't be accidentally driving nails through the side of the cabinet.

THE FINISH

34. Finish-sand the outside surfaces and ease the edges.

35. Apply three coats of Danish oil.

36. Mount the tin panels in the doors, hang the doors and attach the knobs.

37. Attach the back and stand back to admire your work.

Just think; food safes like this used to hold biscuits; now they're held together by them! **AW**

FIG. C Door Frame Layout

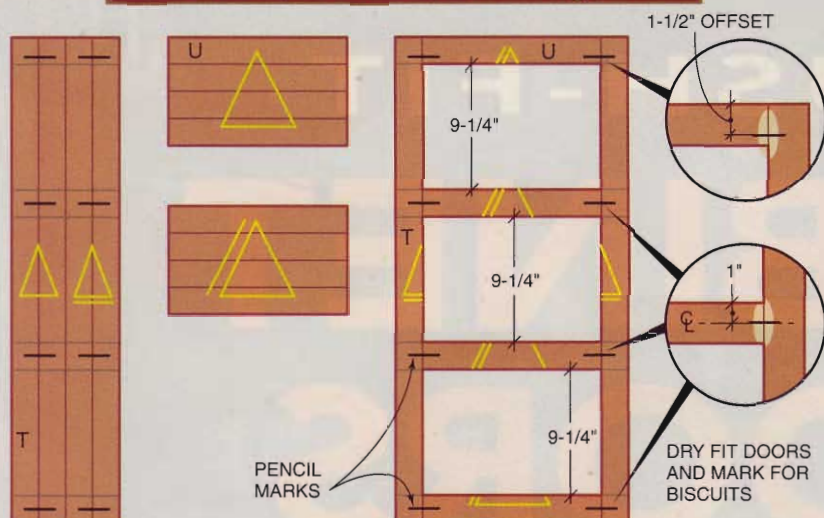
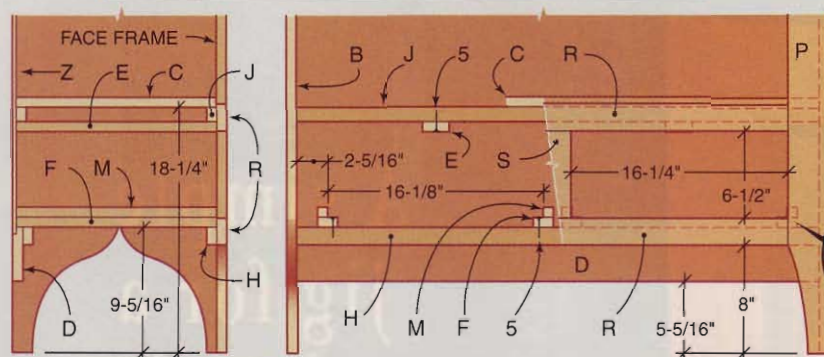


FIG. D Interior Construction



CUTTING LIST

PIE SAFE 57-3/4" H x 42-1/2" W x 16" D

Part	Name	Qty.	Dimensions
CARCASS Cherry Hardwood			
A	top	1	3/4 x 17 x 42-1/2
B	sides	2	3/4 x 15-1/4 x 57
C	shelves	5	3/4 x 15 x 39
D	back rail	1	3/4 x 4 x 39
E	drawer kickers	2	3/4 x 2 x 15
F	drawer runners	4	3/4 x 1-1/2 x 15
G	doorstop	1	3/4 x 1-1/2 x 3
H	drawer runner cleats	2	3/4 x 1-5/16 x 39
J	drawer kicker cleats	2	3/4 x 1-1/16 x 39
K	molding	1	3/4 x 3/4 x 42
L	molding	2	3/4 x 3/4 x 16-3/4
M	drawer runners	4	3/4 x 3/4 x 15
N	door latch	1	1/2 x 7/8 x 2-1/2
FACE FRAME Cherry Hardwood			
P	face stiles	2	3/4 x 3 x 57
Q	top rail	1	3/4 x 2-3/4 x 34-1/2
R	lower rails	2	3/4 x 2 x 34-1/2
S	drawer divider mullion	1	3/4 x 2 x 6-1/2
DOORS Cherry Hardwood			
T	door stiles	4	3/4 x 2 x 35-3/4
U	door rails	8	3/4 x 2 x 13-1/4
V	tin panel stops	24	3/8 x 3/8 x 15
DRAWERS Cherry Hardwood			
W	drawer fronts	2	3/4 x 6-3/8 x 16-1/8
X	drawer sides	4	1/2 x 6-3/8 x 15-1/2
Y	drawer backs	2	1/2 x 5-7/8 x 15-5/8
CHERRY PLYWOOD			
Z	back	1	1/4 x 39-3/4 x 48-3/16
AA	drawer bottoms	2	1/4 x 14-3/4 x 15-5/8

SOURCES

4/4 Cherry, 100 bd. ft.
1/4" x 4' x 8' cherry plywood;
1 sheet
Paxton Hardwoods, (800)
522-3305.

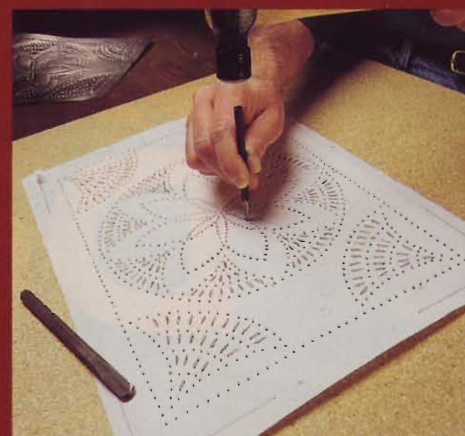
Titebond II Extended, 1 gal.,
#16.50.20, \$26
Titebond Liquid Hide Glue,
1 quart, #16.50.01, \$7.50
Small glue brush, #16.60.25,
\$2.50 for 10; \$10 for 50
Hold-down clamps, #16.60.05,
\$12 each
Highland Hardware, (800)
241-6748

Sixteen 1/4"-dia. brass shelf
supports, #27111; \$2.50
Three pewter no-mortise
ball hinges, #130191, \$2.75
each
Woodcraft Supply,
(800) 225-1153

Four 1/4" dia. wood knobs,
AF-S969C, \$1.20 each
Van Dyke's, (800) 558-1234

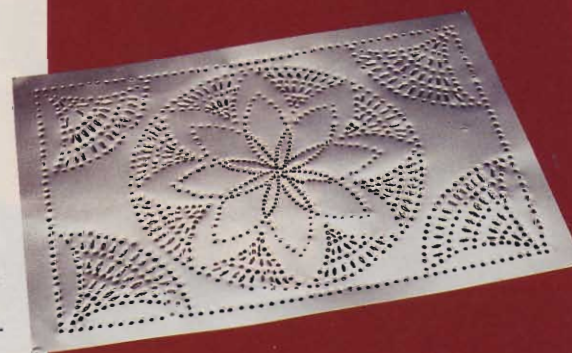
Six pierced-tin panels "Lace-
work #1" 10-in. x 14-in.,
\$30.95 each, Country Accents,
(570) 478-4127.

Punch your own Tin!



You'll save money and have fun doing it. Everything you need is available at Country Accents (see Sources, at left): 10-in. x 14-in. tin blanks (\$3.50 each); the pattern (Lacework #1, #1004P, \$2); the hole punch (T-0359, \$4.95); and the lampmaker's chisel (T-0259-3/8, \$7.25). Expect to spend 30 to 40 minutes punching each panel. Don't try to do all six in a row or you'll feel like punching more than tin. Take it easy and spread the job over a few days.

Wear a pair of gloves when handling the tin to keep from etching in fingerprints. Tape the pattern to the tin with masking tape. Use pushpins to hold the work down on a piece of particleboard and have at it. Complete instructions come with every order.



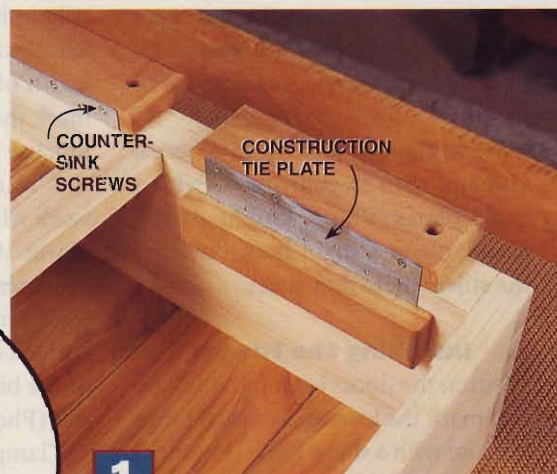
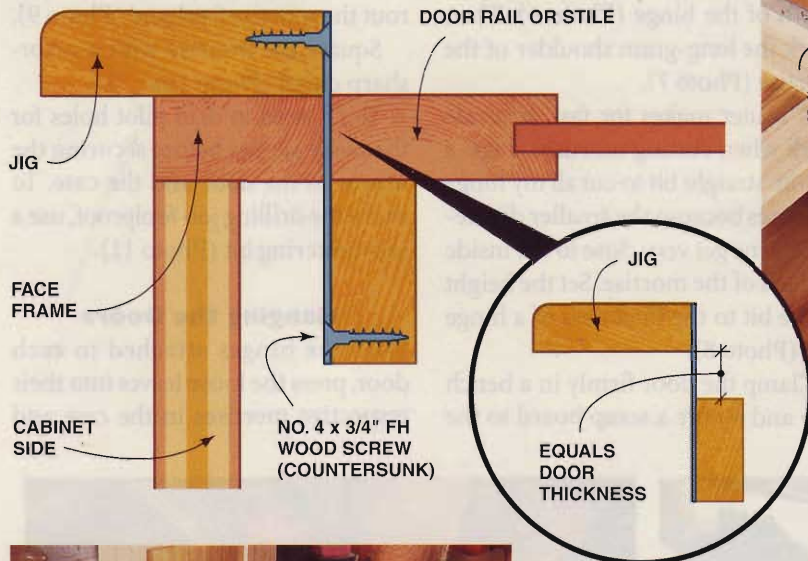
FLUSH-FIT CABINET DOORS

EDITOR: DAVE MUNKITTRICK • ART DIRECTION: JOEL SPIES AND BARBARA PEDERSON • PHOTOGRAPHY: ANDY RAE • ILLUSTRATION: EUGENE THOMPSON

A simple jig for a perfect fit!

Flush-fit or inset doors are found in a wide variety of furniture styles from Philadelphia highboys, to Shaker cupboards, to sleek contemporary pieces. The greatest challenge in hanging a flush-fit door is achieving an even gap between the doors and the cabinet while accurately locating the mortises for the hinges. After all, there are no adjustment screws on butt hinges and there's no door lip to cover the cabinet opening.

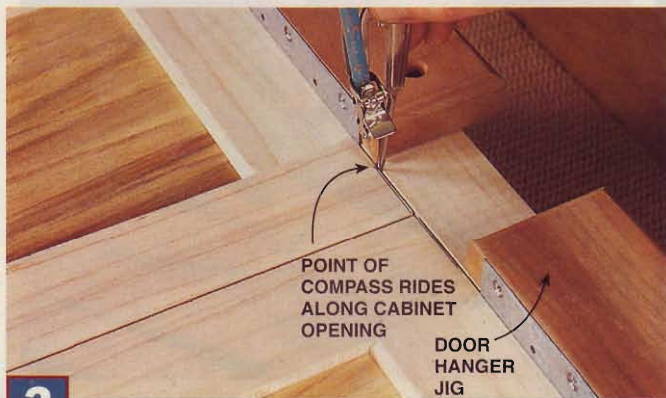
The good news is that a few savvy techniques and a nifty jig (Photo 1) will have you hanging these doors like a pro. In this article, I'll show you how to achieve the perfect fit every time. We'll even cover fixing goof-ups.

FIG. A**DOOR HANGER JIG****1****SHOP-MADE DOOR HANGERS**

hold the doors in place so you can scribe for a perfect fit. They're constructed from two blocks of hardwood and a metal tie plate. Tie plates are used to join house framing and are available from home centers.

**2****FIRST, TRIM THE EDGES**

on the jointer. Set the infeed table for a light cut (1/32 in. or less), and joint all four edges. A scrap block steadies the door and prevents end-grain tearout.

**3****POSITION THE DOORS**

on hangers and check the fit of the doors to the case. The hangers hold the doors flush with the cabinet face and establish a 1/16-in. gap. Set the compass to the largest gap, then mark around the doors with the compass.

Fit the Cabinet Hinges First

First things first. Whether you're making a cabinet with a face frame or one without, cut the mortises for the hinge leaves in the frame or case sides before assembly. This saves hassles later when rails or cabinet tops can get in the way. I use the same technique for mortising the case as I do for the doors.

Make the Doors

I always dimension my doors so they are the exact size of my case opening. This approach lets me fine-tune the fit of the doors to the cabinet once it's built.

Flat and square doors prevent untold headaches later. Be sure to work on a flat surface when you glue up your doors, and center the clamping pressure over the joints. Before the glue sets, check each door for square by measuring its diagonals.

Trim the Door to Fit the Case

At first the doors won't fit into the case opening because there's no gap. That's OK. This two-step trimming procedure allows you to get the perfect fit:

The first step is to joint all four edges of each door (Photo 2). Periodically check the fit, and joint until you have a gap of roughly 1/16 in. all around between the door and the case.

The second step is to fine-tune the fit of the doors to the case. Position each door into the case on a pair of shop-made hangers (Photo 1 and Fig. A).

Chances are, your doors won't fit the opening with precise, even gaps all around. To make the gaps perfect, use a

compass to mark the doors (Photo 3). The hangers prevent the compass from scribing across the entire width of the door, so use a straightedge to finish.

Next, clamp the door in a bench vise and trim to your marks with a hand plane (Photo 4). For paired doors, plane a slight back bevel on the stiles where they meet.

Installing the Hinges

Position the doors back into the case and mark the locations of each hinge mortise with a sharp knife (Photo 5.)

Back at the bench, square your

knife marks across the edge of the stile with a square and a sharp pencil. Set a marking gauge to the desired width of the hinge (Photo 6). Then mark the long-grain shoulder of the mortise (Photo 7).

A router makes for fast, accurate work when cutting mortises. I use a 1/4-in. straight bit to cut all my hinge mortises because the smaller diameter lets me get very close to the inside corners of the mortise. Set the height of the bit to the thickness of a hinge leaf (Photo 8).

Clamp the door firmly in a bench vise and secure a scrap board to the

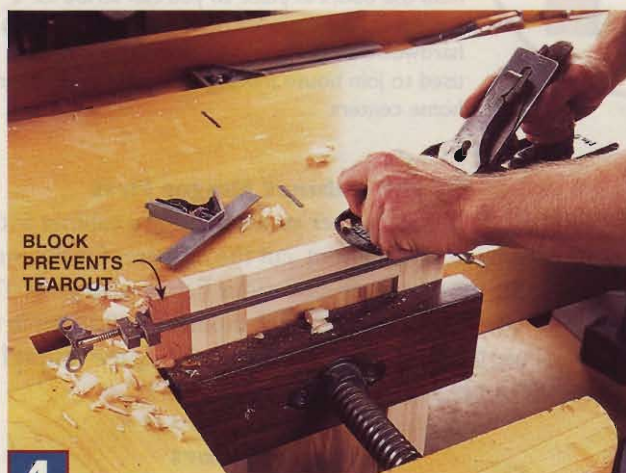
benchtop. The scrap board's surface must be flush with the edge of the door to support the router base. Now rout the mortise freehand (Photo 9).

Square the mortise with a razor-sharp chisel (Photo 10).

You'll need to drill pilot holes for the hinge screws before securing the hinges to the door and the case. To make the drilling job foolproof, use a self-centering bit (Photo 11).

Hanging the Doors

With the hinges attached to each door, press the loose leaves into their respective mortises in the case and



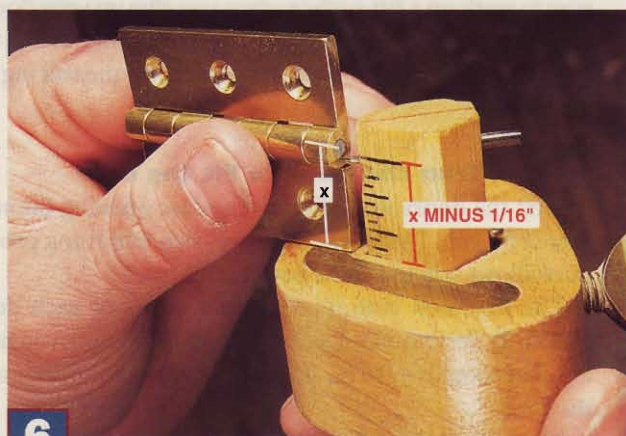
4

PLANE THE EDGES to your compass marks to true the doors. Use a sharp bench plane set for a light cut. Maintain a square edge by checking your cuts with a square.



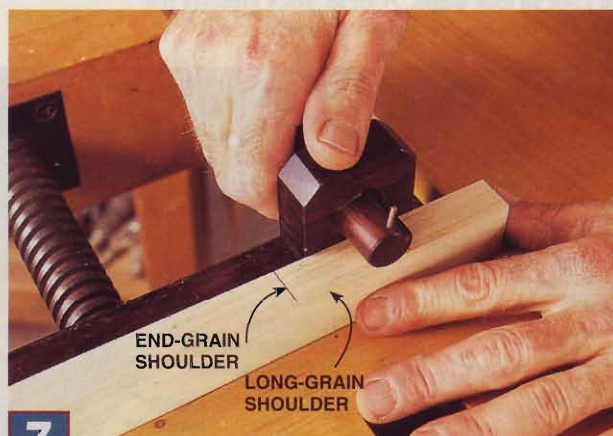
5

MARK FOR HINGES by positioning the door into the opening with the door hangers. With the hinge stile tight against the case, transfer the shoulder locations of each hinge mortise with a sharp marking knife.



6

HOW DEEP should you install butt hinges into a door and case? The rule of thumb is to measure from the center point of the hinge barrel to the outside edge of one leaf, then subtract about 1/16 in. This layout ensures that the door won't bind on the face of the cabinet when opened.



7

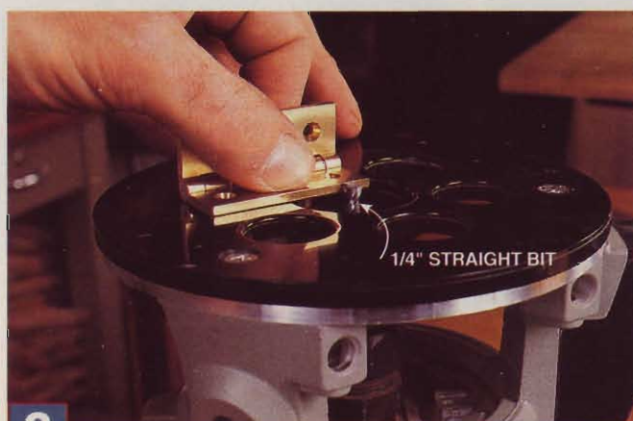
SCRIBE THE LONG-GRAIN SHOULDER with the marking gauge to finish the hinge mortise layout.

install the screws. Now open and close the doors and inspect the fit. Your doors should swing as smooth as silk, with the doors flush to the face of the cabinet, and even gaps all around. If you notice some unevenness, a little judicious sanding with some 180-grit sandpaper wrapped around a block can usually fix the problem. Once you're satisfied with the fit, mark the doors for knobs or pulls and install these along with your favorite catch hardware. Case closed. **AW**

Oops!



Uh-oh! We accidentally trimmed too much off one edge of a door. Luckily, it was a long-grain edge and there's a simple fix. Re-joint the edge, then glue on a thin strip to increase the door's width. The strip should match the stile in grain and color and be slightly oversize in width and length. Trim it to fit after the glue dries. You'll never see the fix!



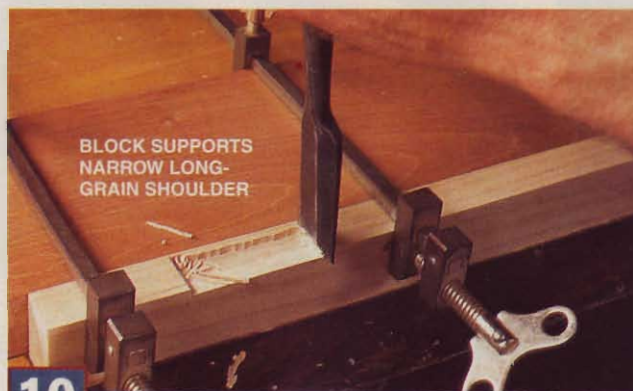
8

SET THE BIT DEPTH by laying a hinge leaf on the router's baseplate. Route a test mortise on a piece of scrap and check for fit. The hinge leaf should be flush with the top of the mortise. A 1/4-in. straight-tip bit is a good choice for routing the mortise.



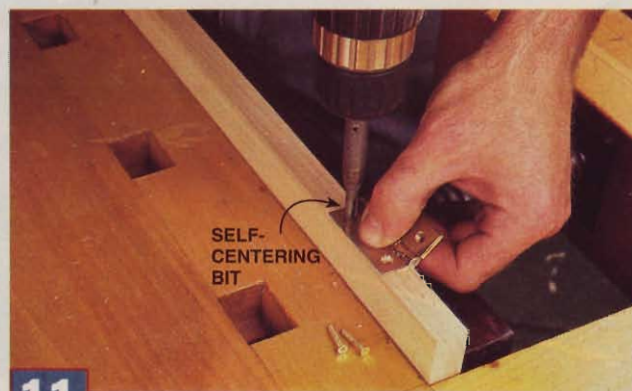
9

ROUT THE HINGE MORTISE freehand, staying about 1/16 in. inside your layout lines. For a really clean cut, move the router in the opposite direction that you would normally route: a technique called climb cutting. Routing in this manner prevents tearout, and it's easy to control the router because the cut isn't very deep and the bit diameter is relatively small. A scrap block clamped to the bench steadies the router's baseplate.



10

SHAVE THE SHOULDERS by chopping lightly with a sharp chisel. It's best to sneak up on your layout line, making several thin cuts until you reach the end-grain shoulder line. Clamp a block behind the long-grain shoulder to support this delicate area and take multiple cuts until you reach the shoulder line. Finish up by paring into the corners to clean up any left-over slivers of wood.

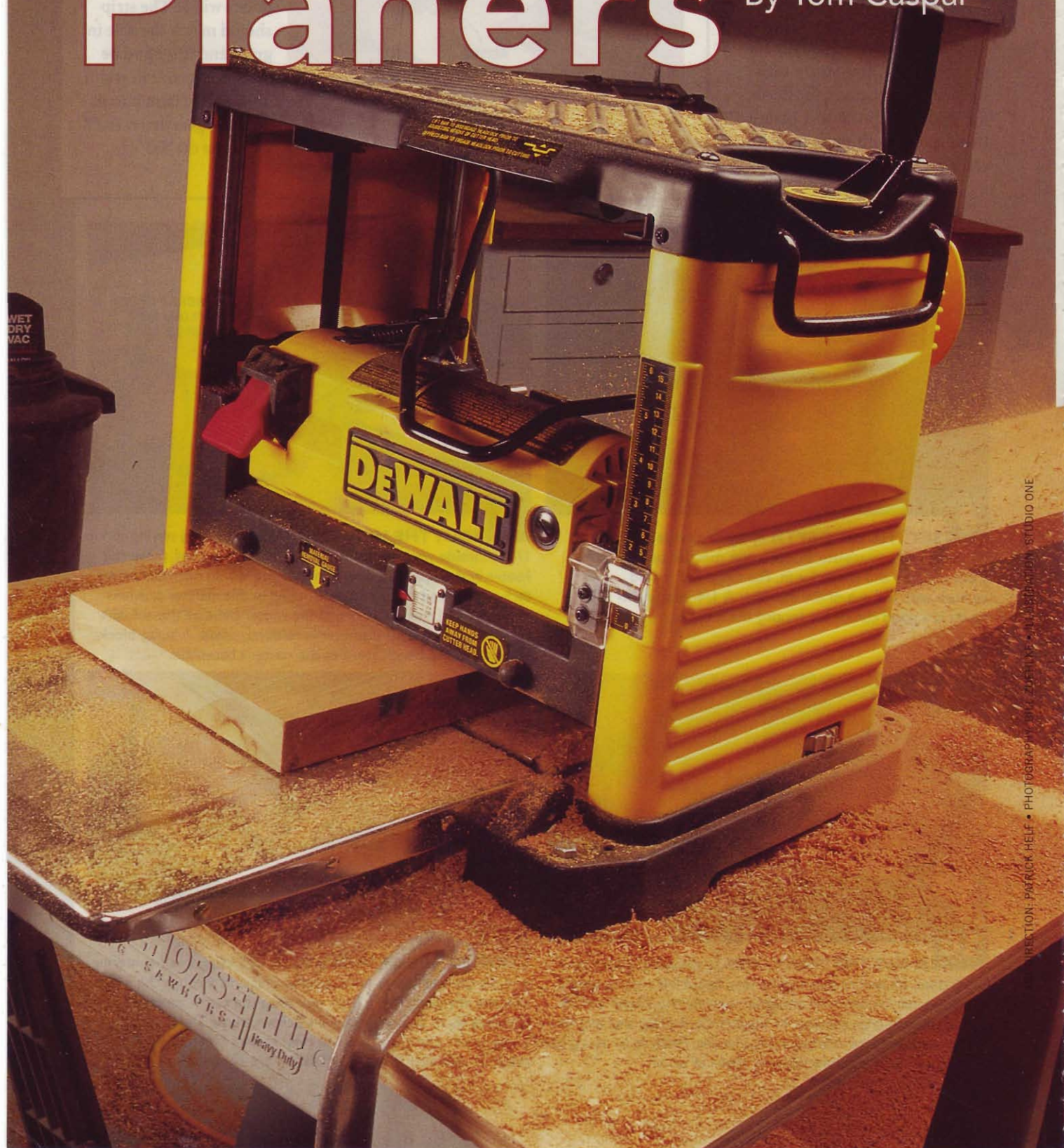


11

DRILL FOR HINGE SCREWS using a self-centering drill bit. Lay each hinge in its mortise and drill through the hinge and into the door. Rub a little wax onto the screw threads to lubricate them before driving the screws home. **Tip: Brass screws break easily! Use the same size steel screws first and install the brass screws after fitting and finishing are complete.**

TOOL TEST Portable Planers

By Tom Caspar



Gettin' better all the time.

A planer is a basic tool if you work with solid wood. Until recently, planers were large cumbersome machines that cost an arm and a leg. No more. Portable planers have changed all that for anyone with a small shop. You can tuck these relatively inexpensive machines away in a cubbyhole. If you use supports, they can handle almost any size board. The latest generation of portable planers are amazing machines.

Portable planer design is still evolving. The first machine on the market was the two-post Ryobi AP-10, a small capacity, lightweight machine introduced in 1987. Delta produced the first four-post machine, the 22-540, in 1991 and the first portable planer with a head lock, the 22-560, in 1997. Four posts are now standard on all models. Three machines now have head locks, but each mechanism is different.

The move to four posts and the introduction of a head lock is a response to the principal problem with portable planers: snipe—that bite out of the end of a board.

Snipe and Head Locks

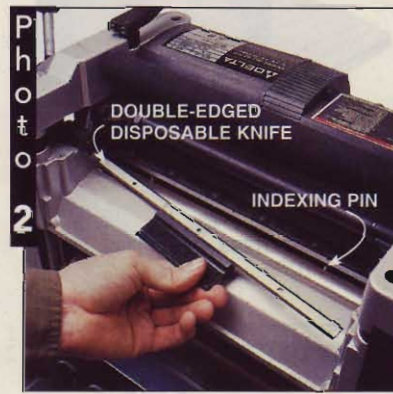
All the planers we tested produced an incredibly smooth surface. They all work on the same principle: Two powered rollers feed a board through the planer while a cutterhead, equipped with a pair of knives, rotates at a very high speed.

However, the smooth surface often begins or ends in snipe. The depth of snipe can be anywhere from the thickness of tissue paper to the thickness of a manila folder. (See p. 85 for more on where snipe comes from and how to deal with it). We wanted to know: Considering recent innovations in design, do all portable planers snipe?

The short answer is yes, they all snipe. But some snipe less than others. Planers with traveling heads and head locks really do snipe less often and less



A HEAD LOCK minimizes the amount of snipe but won't eliminate it. The Delta 22-560 head lock shown here is easy to use.



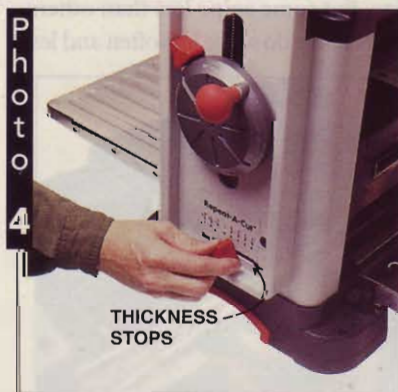
INDEXED DISPOSABLE KNIVES make it easy to get off to a fresh start. They drop right in place.

Portable Planers



A DEPTH-OF-CUT INDICATOR tells you how much wood you're going to take off in each pass. This is very helpful, especially the first time through. This indicator, on the DeWalt DW733, is foolproof and easy to read.

All the planers produced an incredibly smooth surface, but they all snipe, too.



PRE-SET DEPTH STOPS can prevent you from making a big mistake. In the heat of production it's easy to misread a machine's scale and end up with boards that are too thin. Shown here is the Ridgid TPI 300, which has more stops than other machines.

deeply than similar machines without head locks.

A head lock is designed to reduce the amount of snipe by locking the cutterhead assembly in place (Photo 1). It works this way—you turn a crank handle to set the depth of cut, push down the head lock lever and then run your boards through the machine. When you want to make another pass, you must reverse the head lock lever before turning the crank that sets the depth of cut. Crank, lock, plane, unlock, crank. It's a little dance you have to get used to.

Snipe-Free Machines, But at a Price

Two planers with fixed heads and long, solid tables stand out from the crowd. The good news is they rarely sniped boards less than 5-ft. long. The bad news is that they're expensive and take up more storage space because they don't have fold-up tables. They're also awkward to use with long boards. Support stands must be raised and lowered along with the table.

The Knives

The type of knives in a portable planer is not yet standardized. You have two choices. Some planers use single-edged knives that can be re-sharpened. Others use double-edged knives that can be reversed when one edge gets dull. The single-edged knives and some of the double-edged knives can be resharpened and used over and over again, while other double-edged knives are disposable. Both types cost about the same in the long run. A new set of disposable double-edged knives runs about \$30 to \$40, roughly as much as sharpening a set of single-edged knives twice.

Some knives are easier to install than others. We like the machines that have indexed knives (Photo 2). They click right in place. The other machines use gauges to set the knives. They work quite well and are only slightly less con-

venient than indexing pins. We also like the planers whose cutterhead locking bolts sit above the knives and are easy to get to.

Depth-of-Cut Indicator and Depth Stops

We like two features that make several portable planers more foolproof. We all know that an error in planing can be quite costly and frustrating.

The first feature is a simple depth-of-cut indicator that tells how much wood the planer will remove from your board (Photo 3). This is important to know because you can mistakenly set a portable planer to take a cut that it can't reasonably handle. All portable planer motors draw about 15 amps, so they all deliver about the same amount of power. This isn't enough power to hog off deep bites in wide boards. It's possible to overload the motor or pop a breaker if you're not careful. Before you run a board through the planer for the first pass, stick its end under this indicator and you'll know for sure how much wood you'll be removing.

Secondly, we like a set of depth stops that allow you to pre-set the final thickness of your board (Photo 4). With this feature, you can't accidentally plane your boards too thin, a disaster that has befallen just about everybody who has ever used a planer.

Capacity, Weight and Size

All the portable planers handle boards up to 12-in. wide. Some manage 12-1/2-in. boards and the Ridgid TP1300 has a 13-in. capacity.

The cutterheads of all the planers can travel up and down about 6 in. While you're not likely to find 6-in.-thick wood to plane, you will find this large capacity handy for planing the edges of boards. You can stand 3/4-in. or thicker boards on their sides and plane them all to exactly the same

(text continued on p. 86)

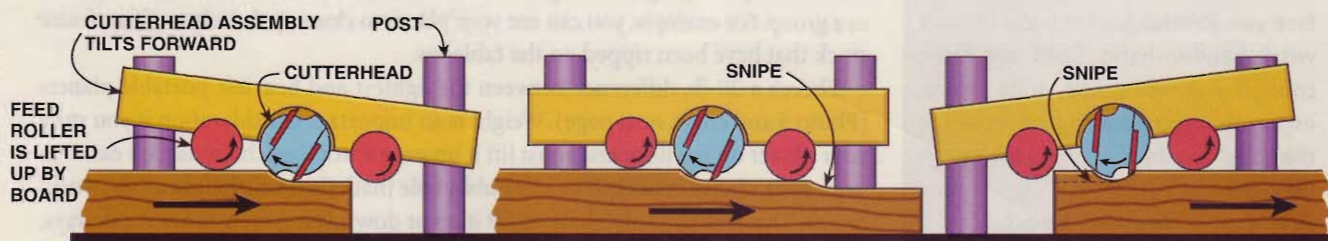
Dealing with Snipe



Snipe is a bite taken out of the end of a board. (A particularly bad case is shown here.) The length of the snipe is always about 2 in.—the distance from a feed roller to the center of the cutterhead. Portable planers may snipe the front or the rear of a board, but never in the middle.

Fig. A The Source of Snipe from a Portable Planer

The cutterhead assembly rides up and down on four posts in most portable planers. The assembly can tilt forward or backward because there is a small amount of play between it and the posts. When the assembly tilts, it cuts slightly deeper than normal, and you get a sniped board. The purpose of a head lock is to minimize this tilting.



Snipe at the front of a board is produced by the forward tilt of the cutterhead assembly. The tilt shown here is greatly exaggerated.

The board is cut evenly when both rollers are engaged and the cutterhead is level.

Snipe at the end of a board is produced by a backward tilt of the cutterhead assembly.

Snipe can be beat.

Here's how:

- **Call a truce and live with it.**

Cut your rough stock 5 in. longer than necessary and trim off the ends when you're done planing.

- **Feather the ends by hand.**

Use a belt sander, hand plane or scraper to remove the sharp transition from the sniped end to the rest of the board.

- **Outwit your planer.**

Take advantage of the fact that the planer won't snipe in the middle of a board (Fig. A). Make a train of many boards that are all exactly the same thickness and pass them through the planer one after another (photo at right). Only the lead board and the last trailing board, which can both be scrap wood, will be sniped by the planer. If your boards are fairly short, you'll need a helper to catch the boards as they come out of the machine. You'll have your hands full feeding the other end.



A TRAIN OF BOARDS will banish snipe from your good wood. The trick is to fool the planer into thinking it's cutting one very long board by feeding many boards through in one operation, each butted up to another. Infeed and outfeed supports that are precisely level with the main bed of the planer keep individual boards from drooping.

Portable Planers

What a Portable Planer Cannot Do

■ It isn't a jointer.

Planers don't make wood flat. Surprised? It's a common misconception that you can shove a piece of rough lumber into a planer and get a flat board out the other end. Unfortunately, it doesn't work that way.

Like the saying goes, "garbage in, garbage out." If you put a cupped, twisted, or bowed board into a planer, you'll get approximately the same shape board out the other end.

Use a jointer first to flatten one face of a board. Then put the board in the planer, face down. A planer's job is to make the second face parallel to the face you jointed. Jointers and planers work hand-in-hand. Both are basic tools if you work with solid wood, especially if you want to save money in the long run by starting with rough lumber.

■ It can't hog off wood.

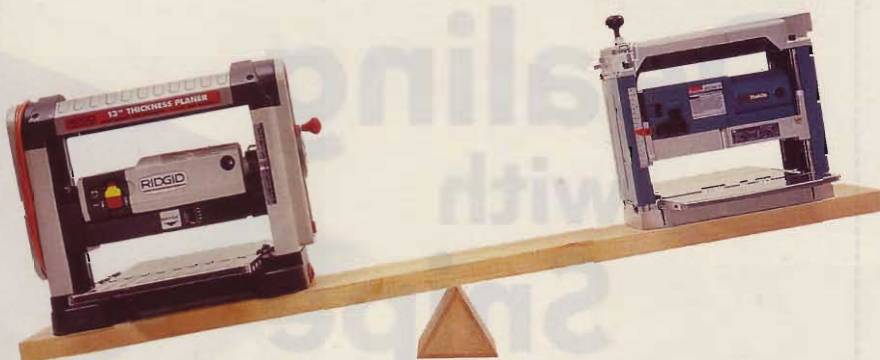
Portable planers aren't as powerful as their stationary counterparts. You can't hog off 1/8 in. from wide boards. In order to avoid tripping your circuit breaker or overheating the motor, you need to listen to the machine as it cuts. Portable planers work best with very small bites, like 1/32 in.

■ It won't be set up right from the box.

The convenient fold-up infeed and outfeed tables of a portable planer come at a price. You have to carefully level them with the main bed before the machine is ready to go. It's a tedious adjustment on every machine.

Due to manufacturing differences, some machines come with a cutterhead that isn't precisely parallel with the main bed. Whether yours will be perfect is in the luck of the draw. The cutterhead may be a few thousandths of an inch off over its full width and make a board unequal in thickness from side to side. Most manuals describe how to level the cutterhead (see chart, next page).

Photo 5



SOME PLANERS ARE MUCH HEAVIER THAN OTHERS. The lightest, the Makita 2012NB, weighs in at 62 lbs., while the heaviest is the Ridgid TP1300 at 84 lbs. All have carrying handles.

(continued from p. 84)

width. It helps to gang them together in a bunch and put them through the planer as a group. For example, you can use your planer to clean up the edges of face frame stock that have been ripped on the tablesaw.

There's a 20-lb. difference between the lightest and heaviest portable planers (Photo 5 and chart, next page). Weight is an important consideration if you store your planer on the floor and must lift it up onto a workbench for use. It's easier to store your planer on a shelf or in a cubbyhole that's the same height as the workbench. This way you won't have to lift it up or down, but merely move it sideways. If your storage space is tight, check out the wide range of planer sizes (Photo 6 and chart, next page).

Dust Collection

You must have good dust collection to plane the smoothest surface on your wood. Without adequate suction, chips carried around the cutterhead can be compressed between the outfeed roller and the planed board resulting in an indented or bruised surface. That's particularly a problem with soft woods like pine.

Use a 650 CFM (cubic foot per minute) or greater dust collector and a 4-in. hose. All the planers we tested have optional dust hoods. They cost about \$30 to \$40 extra, but are well worth it. Planers make a tremendous amount of wood chips. If you don't have a separator, check your bag often. It can fill up before you know it. **AW**

Editor's Note: New planers from Craftsman, Ryobi and Tradesman are due on the market this spring. They were not available for our test.

Photo 6

SIZE OF THE
RIDGID PLANER



PORTABLE PLANERS

FOLD UP into a compact package, perfect for stowing away in a small shop. The Lobo CT-318 is among the smallest and the Ridgid TP1300 is the largest.

MODEL	SPECS			MAJOR FEATURES				COMMENTS	MINOR FEATURES	CONTACT
	STREET PRICE	WEIGHT	SIZE (LxWxD with chip deflector)	HEAD LOCK	CHIP-DEPTH INDICATOR	PRE-SET STOPS	TYPE OF KNIVES			
✓ Delta 22-560	\$330	65 lbs.	16x22x13	Yes	No	No	Indexed DED	Compact, easy knife change	A, J, K, L, M	(800) 438-2486
✓ DeWalt DW733	\$400	81 lbs.	18x21x15	Yes	Yes	Yes	SER	Well-designed features	A, C, D, E, G, J, K, L, M	(800) 4-DEWALT
✓ Ridgid TP1300	\$400	84 lbs.	20x26x18	Yes	Yes	Yes	DED	Well-designed features	A, B, C, D, E, G, J, K, N	(800) 474-3443
\$ Delta 22-540 Type 2	\$270	64 lbs.	16x21x15	No	No	No	DED	Basic model	A, J, K	(800) 438-2486
Grizzly G1017	\$370†	78 lbs.	18x22x13	No	No	No	SER	Durable steel construction	Bx2, F, H	(800) 523-4777
Jet JWP-12-4P	\$325	70 lbs.	19x22x15	No	No	No	DER	Basic model	A, F, H, M	(800) 274-6848
Lobo CT-318	\$360	65 lbs.	18x20x14	No	No	No	SER	Very compact	A, F, H, P	(800) 786-5626
Makita 2012NB	NA	62 lbs.	16x19x13	No	Yes	Yes	DED	Very legible features	A, C, D, E, J, K, L	(800) 4-MAKITA
Powermatic 412	\$360	70 lbs.	19x22x14	Yes	No	No	Indexed DED	Easy knife change, large tables	A, E, F, H, L, M	(800) 248-0144
Hitachi P12R	\$900	75 lbs.	21x20x20	No	Yes	No	SER	Fixed head	A, J, K, L	(800) 706-7337
Makita 2030SZ	\$1,300	79 lbs.	21x21x23	No	Yes	No	DED	Fixed head	A, J, L	(800) 4-MAKITA

✓ Editor's Choice
\$ Best Buy
† Includes stand
NA Not Available

Style of knives:
DED Double-edged, disposable
SER Single-edged, resharpenable
DER Double-edged, resharpenable

Guide to Minor Features

A 4-in. dust port
B 2-in. dust port
C Scale on crank

D Paddle-style switch
E Tables longer than average
F Rollers on tables
G Cord and tool storage
H Adjustment for setting

cutterhead parallel to bed
is explained in manual
J Legibility of scale above
average
K Manual above average

L Easy-to-tighten knives
M 12-12-in. wide capacity
N 13-in. wide capacity
P Cutterhead assembly rides
on the case, not 4 posts

Our Favorites

Editors' Choice: The Ridgid TP1300 is available at Home Depot. It's a large machine but loaded with well-designed features such as a convenient-to-reach cutterhead lock.



Editors' Choice: The DeWalt DW733 features easy-to-read scales, thick knives that can be resharpened and a lever-action cutterhead lock.

Editors' Choice: The Delta 22-560 combines a cutterhead lock, small size for compact storage and indexed knives that are easy to change.



Best Buy: The Delta 22-540 Type 2 is a no-frills planer and can often be found at a discounted price.

Product Reviews

Better than Dowels?

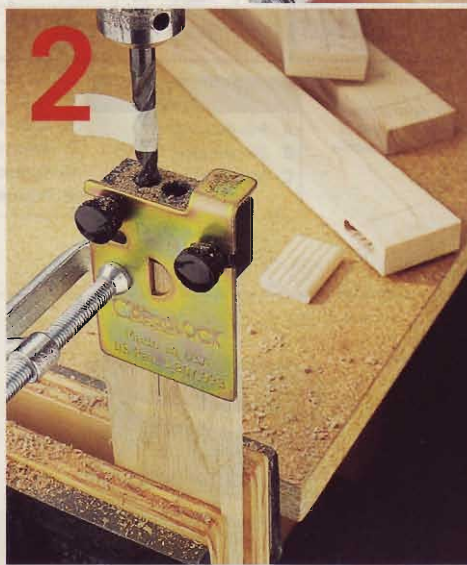
If you're looking for a strong, simple joinery system, here's a simple answer: beadLOCK. All you need is a drill.

This jig allows you to drill a series of overlapping holes in each of the mating parts. The parts are joined with inexpensive pre-molded tenon material available from the manufacturer, Journeyman Tool.

I had great success with beadLOCK on face frames and leg and rail assemblies. I figured a brad-point bit would be a must, but a twist bit worked fine. Unlike a doweling jig, the beadLOCK doesn't center itself on the material, it registers from one face. This makes it easy to keep the best faces of your project parts lined up. The whole thing is pretty fool-proof, even for a beginner.

You can buy the beadLOCK with either a 3/8-in. or 1/2-in. drill guide. It comes complete with a set of shims so you can offset the mating parts, like those in a leg and rail joint. If you want to stick with dowel joints, you can also use the beadLOCK as a doweling jig. You get the best of both worlds, at a price that's hard to beat.

Set the beadLOCK to your layout lines, clamp it to your work and drill three holes. Tape on the bit ensures uniform depth. The jig's configuration prevents using a stop collar.



Slide the drill guide to the second position and drill two more holes.



3/8-in. system	\$30
1/2-in. system	\$33
Dual set	\$47

3/8-in. x 36-in. pre-molded tenon	\$5.50
1/2-in. x 36-in. pre-molded tenon	\$6

Tools On Sale, (800) 328-0457
Trendlines, (800) 767-9999
Woodcraft Supply, (800) 225-1153
www.beadLOCK.com

Assemble your parts with the special birch tenon material.

Product Reviews

Impressive New Jointer

Grizzly has a new 6-in. jointer that's loaded with features, at a very attractive price.

It has a 47-in. table, a 4x29-in. fence and a 1-HP motor (most jointers this size have 3/4-HP). The knife-setting system is unique in that it has both springs and jack screws, making it easier to adjust. But best of all is the switching: A magnetic switch on a conveniently placed post, with positive off-lock and even a "running" light. No more stooping or leaving the machine running by mistake.

The machining on the tool we tried out in our shop was excellent, with good surface finish on the tables, smoothly moving fence and controls, excellent flatness across the tables and fence and a tough paint job.

The best feature of all, though, was the price: \$445.

Call Grizzly Tools at (800) 523-4777



Wide Belt Performance ...At About 1/3 The Cost!



**5-Year
Warranty**

**Free
30-Day
Trial!**

**Made in
U.S.A.**

Cabinet shop owners across the U.S. call Woodmaster's 26" and 38" drum sanders *"the best kept secret in woodworking."* These commercial-duty sanders fill the niche between slow hand methods and expensive wide belt sanders. And there's no sacrifice in quality. But don't take our word for it . . . call today for free information and the names of Woodmaster owners nearest you. This way, you can find out first-hand how a Woodmaster sander might be just the machine you've been looking for.

1-800-821-6651 ext. DB58

Woodmaster Tools, Inc. 1431 N. Topping Ave. Dept DB58
Kansas City, Missouri 64120
www.WoodmasterTools.com

Enjoy the benefits of HVL P with a SUPER System!



- High transfer efficiency
- Soft, easy to control spray
- Compact and portable

Our SUPER model offers you the most powerful 3-stage turbine motor made by Ametek-Lamb.

"Quality of atomization rated 9.8 out of 10... This system includes an excellent three-stage turbine... the gun atomizes beautifully and has a full range of features."

— American Woodworker

FUJI
INDUSTRIAL SPRAY
EQUIPMENT LTD.

65 Martin Ross Ave, #5, Toronto, Ontario, Canada M3J 2L6
1-800-650-0930 • Fax: (416) 663-6238 • <http://www.fujispray.com>

AMERICAN WOODWORKER

Visit our website at:

www.americanwoodworker.com

Offering you complete how-to
information to ensure your
project's success

Green Wood Stabilizer

I like turning bowls from green wood. I go out to the back 40, cut myself a sizable chunk of wood and go to it. What I don't like is when the finished product cracks so badly I can see through it. Pentacryl, from Preservation Solutions, is the answer for turners, carvers or anyone who wants to stabilize green wood.

Pentacryl is a polymer compound that soaks into wood. It can be brushed or sprayed on, or you can immerse the wood in a bucketful. Immersion gives you the best results. Use the stuff right out of the bottle—no mixing is required. And unlike PEG, it's a liquid at room temperature; so no heating is required. Total time for complete absorption depends on the wood, but plan on about one day of immersion per inch of material thickness. Once it's into the wood, Pentacryl stabilizes the wood cells to reduce or eliminate both warping and cracking.



The manufacturer says they haven't found a finish yet that won't stick to Pentacryl—another advantage over PEG. The stuff is considered non-toxic, but isn't registered as food grade. Plans are in the works for a food-grade version.

32 oz. bottle; \$15

gallon; \$45

Call Preservation Solutions (207) 563-5414

TECHNOLOGY UPDATE

Computerized collar creates world's first radio-controlled dog?

Small U.S. company develops technology that uses radio waves and a microprocessor on your dog's collar to replace expensive fencing, cruel chains and leashes...keeping your dog safe and free!

by Guy Yeardon

PetSafe Instant Fence gives you the ability to set up a safe and secure area for your pet to play, without the time and expense conventional fences. Most fences can cost thousands of dollars and can affect the appearance of your property. In many new neighborhoods, they aren't even allowed. Electronic fences that use wires and special collars can cost nearly as much to have professionally installed, usually well over a thousand dollars. PetSafe Instant Fence is a revolutionary new concept that is clearly the best value in pet containment.

Safe, secure and totally portable. This is the safest, most secure fence you can buy for your pet. It is far superior to alternative containment methods, because there are no wires to bury and because the pet cannot "run through" the warning zone. When the collar picks up the signal from a buried wire, a stubborn or poorly trained dog can learn to break out. With PetSafe Instant Fence, there is no "other side" to run to, since the only safe area lies inside the containment circle. Compared to conventional fences, which dogs can jump over or dig under...PetSafe Instant Fence is unbeatable. What's more, it's totally portable. You simply unplug it and take it with you to your new house, while visiting friends or

even while traveling. No more ties, cages or boarding costs—your pet can enjoy vacations as much as you.

The humane solution. PetSafe Instant Fence will provide greater happiness and freedom for you and your pet. No more cages, dog runs or tie-outs. No more waiting for you to go for a walk on a leash. Your dog will be able to run and play throughout the yard.

Easy installation, simple training. PetSafe Instant Fence emits a radio signal that extends up to 90 feet from the transmitter. While the signal area forms a circle, you can adjust it to keep your pet in your yard. The system has a variety of safety features to protect your dog. Patented coding in the software prevents any accidental electric pulse in the event of a power shortage. The boundary area remains stable, never fluctuating with disturbances within the signal area. If your pet is poorly trained and gets out of the containment area for over 30 seconds, the correction pulses will cease and the receiver will revert to a beep. Training is simple and a video is included to walk you through the process. Once you have adjusted the signal to the desired strength, mark



the boundary by placing the small training flags at the edge of the signal area. The training takes only minutes a day, and dogs generally learn their boundary within a few weeks. After thirty days, you can begin to remove the flags gradually.

It's risk-free...and only Comtrad has it. Why wait to take advantage of this breakthrough technology? PetSafe Instant Fence comes with a one-year limited warranty from Radio Systems, and it's backed by Comtrad's exclusive risk-free guarantee. Try it for yourself, and if you are not satisfied, simply return it within 90 days for a full "No Questions Asked" refund.

Exclusive limited time offer! Order today and get a factory-direct discount on PetSafe

Instant Fence:

Three credit card payments of ... \$99.95 \$19 S&H

Please mention promotional code 7551-17640.

For fastest service, call toll-free 24 hours a day

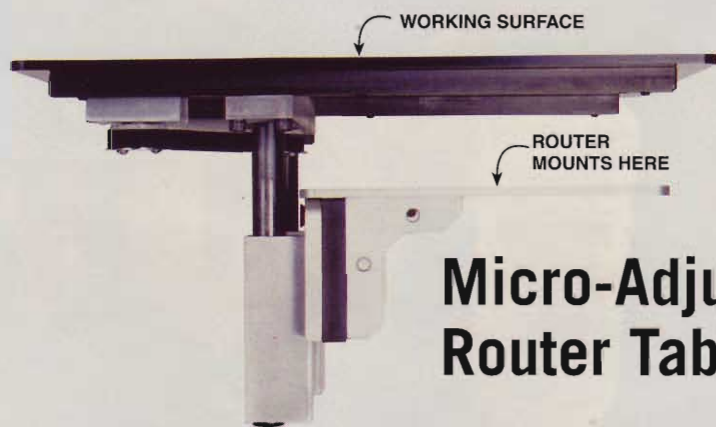
800-992-2966

www.comtrad.com

2620 Waterford Lake Drive, Suite 102 Midlothian, VA 23112



Product Reviews



Micro-Adjust for Router Tables

Every time you adjust the bit in your router table you have to bend over, reach under the table, unlock the router, make the adjustment, lock the router, stand up and make a test cut. Then you start the process all over again. What a pain.

This unique new device from JessEm, the Rout-R-Lift, eliminates all this hassle. You can adjust the router bit height from the top, in very small increments.

With the Rout-R-Lift your router travels up and down in a carriage. To adjust the bit height, you insert a small crank into a hole in the top of your table, and turn. The carriage travels a total of 2-1/2 in. Each revolution of the crank gives you 1/20 in., which allows very fine adjustments. When the height is correctly set, remove the knob.

The main plate on the Rout-R-Lift is made from anodized alu-

minum and is 3/16 in. x 11-3/4 in. x 14-3/4 in. You'll have to set this plate into your router tabletop. If you need to use your router hand held, JessEm says it's easy to remove your router from the mechanism. This is a very handy device, with only one drawback—the \$220 price tag.

JessEm Tool Company
(800) 436-6799 or www.jessem.com

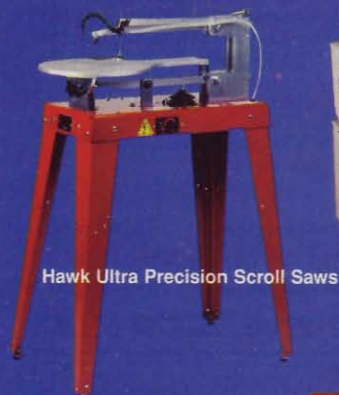


LOSE THE HASSLES

RBI GIVES YOU WOODWORKING MACHINERY THAT IS...

- Designed to be easy to use
- Over 70 years of building quality tools
- Backed with excellent customer service
- Covered by a great warranty
- All American Made

RBI gives you the best value for your woodworking dollar!



Hawk Ultra Precision Scroll Saws



RBI 4-in-1 Universal Planers



26" & 38" Drum Sanders

Panel Master II

rbindustries, inc.

1801 Vine Street • Harrisonville, MO 64701
www.rbiwoodtools.com

K512

Call 1-800-487-2623 for your FREE fact kit!

• Shipping \$3.75 per order
• Same-day shipping!!
• All major credit cards
WOODLINE ARIZONA, Inc.
PO Box 1530 • Payson, AZ 85547 **1-800-472-6950**
Great Router Bits and Shaper Cutters
Micro-Grain Carbide • Euro Anti-Kickback • Super-slick finish

MAKE YOUR OWN WINDOWS

WITH OUR 3-PIECE SASH CUTTER SETS

These sets allow you to make sash using a butt joint, dowels or tenons.



1/2" shank Router Bit 3-pc. set
WL-1364-S
only \$89.00 set

3/4" bore Shaper Cutter
3-pc. set w/bearing
WL-1364-SCS
only \$139.00 set

"SASH MAKING" VHS Video
WL-V-4 only \$12.95 ea.

4-WING CUTTER FOR SMALL "ROUND" BISCUITS. Great for face frames, picture frames, etc.

CUTTER plus 250 SMALL BISCUITS
WL-1342-2 only \$20.00

EXTRA BISCUITS 250 ct. only \$8.00

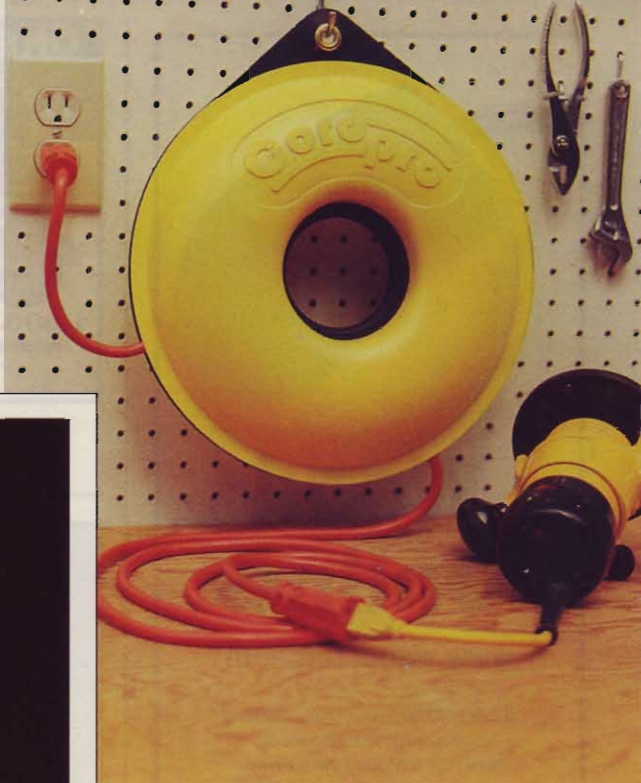
www.woodbits.com
e-mail: cutters@netzone.com

FREE Catalog
600 items

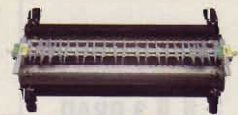
Keep Cords Coiled

Tired of having a rats' nest of cords laying around? Getting a \$10 Cordpro in your life can help.

This doughnut-shaped reel accepts up to 100 ft. of 16/3 cord,



Think Jig.



The World's Best Router Jig System

Thinking Jig? Think Leigh.
Whether you're a hobbyist or a

professional, the Leigh Jig will help you create your best work. Versatility with precision make the Leigh Dovetail Jig better than the rest. Rout through and half-blind dovetails, with variable spacing of pins and tails, on one jig. Create decorative Isoloc joints, finger joints, and multiple

mortise & tenons easily with Leigh attachmenrs. And our easy-to-follow user guide will help make it happen fast! Call toll free now to learn more.

LEIGH

Joining Tradition With Today

Call For Your Free Leigh Catalog Today! 1-800-663-8932

Leigh Industries Ltd., PO Box 357, Port Coquitlam, BC, Canada V3C 4K6 Tel. 604 464-2700 Fax 604 464-7404 Web www.leighjigs.com

80 to 100 ft. of 14/3 and 50 to 70 ft. of 12/3. The manufacturer says it'll even take 50 ft. of 1/4-in. air hose. You can unwind either end. It's as simple as plugging in one end of the cord, putting the Cordpro on the ground and pulling the opposite end. You can also hold the Cordpro in your hand and selectively unwind either end. Winding the cords back on is just as simple: Grab the doughnut hole and start winding the cord.

The Cordpro is made from tough HDPE plastic; the same stuff pickup truck bed liners are made from. An interior divider is the key to keeping cords neatly coiled.

There's an important safety factor to remember when using the Cordpro. Using any extension cord while it's coiled up can create excessive heat, melting insulation on the wires. Yes, it *does* happen! Follow the amperage recommendations that are included with the Cordpro to make sure you're using it safely.

Call (800) 700-6784 or check out www.cordpro.com



Quiet Shop Vacuum

Never thought you'd see those words in the same sentence, did you? Fein says their new Mini-Turbo is one of the quietest vacuums out there. Use it like you would any wet/dry vacuum, without losing your hearing.

Fein has been making a great shop vacuum for about three years; their model 9-55-13. If you've been eyeing that one, but holding off because of price, have a look at the Mini-Turbo. This scrappy little brother offers similar features, including the same motor, for only about \$150.

You can connect the Mini-Turbo directly to power tools for great pick up right at the source. "By-pass construction" means the motor won't overheat even when the vacuum is constricted by small ports on portable tools.

The Mini Turbo has:

- a 6-gal. barrel
- a 10.5 foot hose (longer than most)
- a floor nozzle, crevice tool and upholstery tool
- a very fine 1-micron filtration

However, it does not have the tool-actuated switch that the 9-55-13 has.

Fein (800) 441-9878

Sanding A \$230 SAVINGS dust free



Proudly made in the U.S.A.

SEE YOUR DEALER FOR OUR NEW VIDEO

PERFORMAX
PRODUCTS CORPORATION

Call 800-334-4910 for the dealer nearest you or visit our website at www.PerformaxProducts.com

Add 32" wide sanding capacity to your shop and we'll throw in a dust collector at a great price.

The **PERFORMAX 16-32® Plus** drum sander will surface, dimension, and finish sand.

The **JET 650 cfm** dust collector with a 5 micron bag will pick up even the smallest particles.

Offer good while supplies last.

16-32 Plus shown with optional INFEED & OUTFEED TABLES, METAL STAND and CASTERS.



JUMBO SIZE

YOUR BAND SAW!

ONLY \$149.99

Enhance your creativity in a big way with the first bandsaw table and fence available anywhere. From the 24" x 24" work surface to the circle-cutting jig, you'll get more from your band saw.



T-design fence adjusts for band saw drift



Resaw attachment (sold separately)



Circle cutting jig cuts up to 26" diameters

ROCKLER®

WOODWORKING AND HARDWARE

Department 109T1

The NEW name for...

The NEW name for...

By Phone

By Foot

By Net

1-800-403-9736

1-877-ROCKLER

www.rockler.com

Better Fire Extinguisher

If you have a fire in your shop, the biggest mess is sometimes not from the fire, but from the extinguishers used to put it out. Ordinary dry extinguishers can leave a residue that bakes on and becomes *very* difficult to remove. Kidde's new Fire Out Foam fire extinguisher is an improvement. The foam can simply be rinsed off your tools after a fire.

It's an ABC extinguisher, so it's good for fighting wood, liquid and electrical fires. Kidde says the foam is easier to use for those of us who aren't fire fighting professionals. It leaves a film on combustibles that helps prevent re-igniting, something other extinguishers don't do.

Get it at home centers and hardware stores for about \$40.

www.kidde.com AW



POWERMATIC
CORPORATION

See us at IWF 2000,
Aug. 24-27 booth #4420

DUST COLLECTORS

1200
CFM

**Exclusive
built-in
floor sweep!**

1-1/2 HP motor,
safety switch, two
4" outlets, radial
fin steel impeller,
casters

MODEL 73
#1791070

3HP motor, adjustable
outlets (one 8", one 6",
or three 4"), industrial
push button switch,
5 micron upper cloth
bag, easy-to-release
spring clamps.

MODEL 75
#1791071-1ph
1791073-3ph



1900
CFM

**Customize
your outlets
three ways!**

Convenient front
handle, cloth bags,
1 HP motor, safety
switch, casters, one
4" outlet, cloth bags

MODEL 471
#1791236

650
CFM

Call (800) 248-0144 for your nearest dealer

Web site: www.powermatic.com

E-mail: powermatic@worldnet.att.net

Small Shop Tips



Pegged Tablesaw Tools

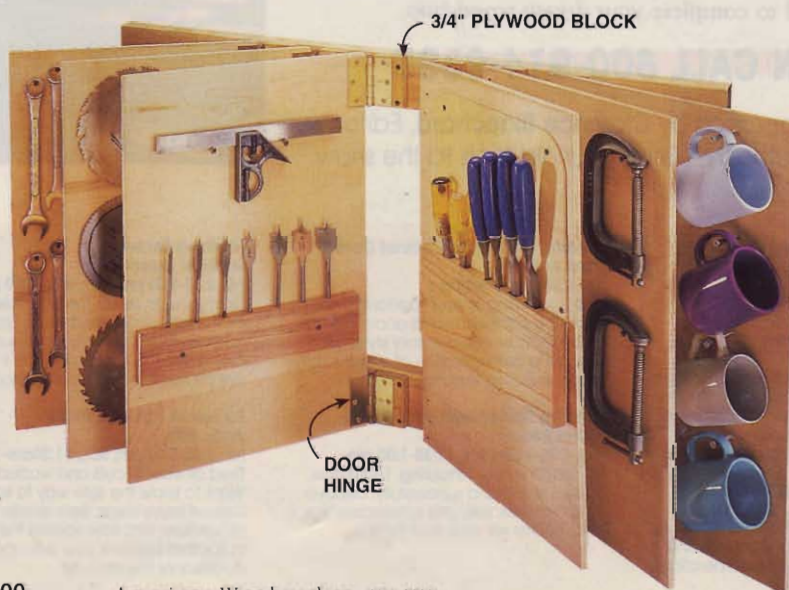
For a nifty way to keep tablesaw accessories in reach, attach perf-board panels to the tablesaw stand. Drill holes in the legs of an open metal stand and bolt the perf-board in place.



Tablesaw Worktable

Turn your tablesaw into extra workbench space with a piece of 3/4-in. plywood. Attach wood strips around the plywood edges for a snug, no-slide fit on the metal table.

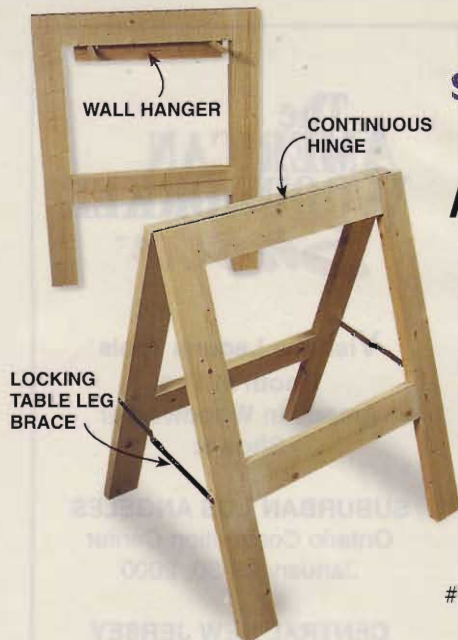
Caution: Always crank the blade below the surface and unplug the tablesaw before using it as a workbench base.



Tool Storage Book

Put a ton of tools up on the wall in this tool “book.” Hang 1/2- or 3/4-in.-thick plywood “pages” 4 in. apart on horizontal 2x4s with 3-in. door hinges. Screw and glue 3/4-in. plywood blocks between the hinges and the 2x4s so the pages can pivot without binding. The pages shown here are 16 in. wide by 24 in. long—build yours whatever size you need.

Small Shop Tips



A Great Sawhorse

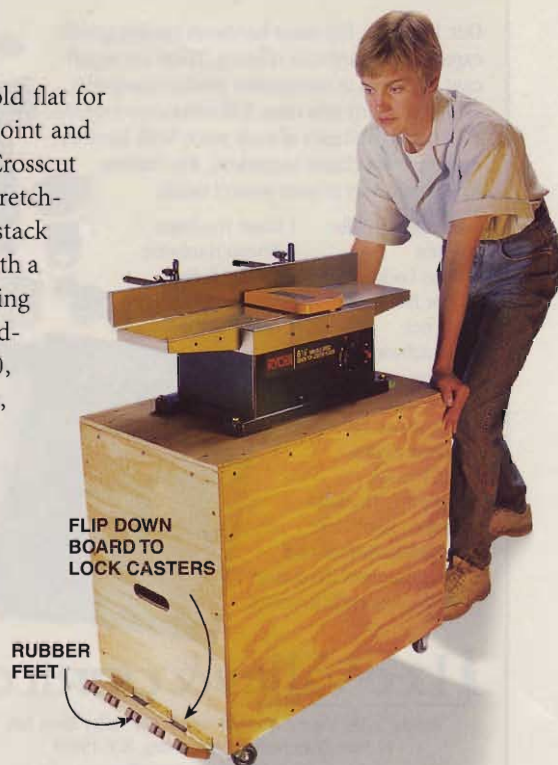
These sawhorses are sturdy *and* they fold flat for easy storage. Building them is a snap: joint and plane 2x4 stock to 1 in.; then rip to 3 in. Crosscut at 30 in. for the legs and 18 in. for the stretchers. Use a biscuit joiner and double stack #20 biscuits at each joint. Assemble with a 1-1/2-in. continuous hinge and locking table leg braces (available from Woodworker's Hardware, 800-383-0130, hinge, #LA11248 14A, \$5.78; leg brace, #SO446/14 2C, \$19.04 per pair).

Power Tool Caddy

This plywood stand for power tools is compact and mobile. To lock the stand in place, just flip down the hinged board at the base.

Cut the hinged board wide enough so it will lift the casters off the floor when you flip it down. Screw it on the bottom of one of the end panels using 3-in.-wide butt hinges and attach rubber door bumpers for added slip resistance.

When you're planing or jointing (in the direction of the flipped-down board) the stand can't move.



Dust Collection

Eliminate Fine Dust Problems!

**1.5 hp*
with
Integral
Fan/
Blower &
Filter
Cartridge**



*U.S. Patent
NO. 5,746,795.

**Affordable!
Hobbyist or Pro**

**Free Engineered Duct
Design & Tech. Assistance**

- 15 years of experience.
- 1 year limited warranty!
- Economical ductwork packages.

Industrial Systems 1.5hp & up.

See why woodworkers call the 1.5hp dust collector the **"Best Invention Ever"**

Call, Fax or Email for a **FREE BROCHURE**
Visit us at www.oneida-air.com Email: info@oneida-air.com

ONEIDA AIR SYSTEMS, INC.™

(315) 476-5151 FAX (315) 476-5044
1001 W. Fayette St. Syracuse, NY 13204

HEARNE HARDWOODS

Specializing in
Pennsylvania Cherry

Plain & Figured Cherry from 4/4 to 16/4

Also: Premium Walnut, figured Maples & a large variety of exceptionally fine domestic & imported lumber including free form slabs, turning blanks, burls, & Instrument grade lumber.

200 Whiteside Drive, Oxford, PA 19363

Toll Free 888-814-0007 Fax 610-932-3130

National & International Shipping



HARDWARE Reproduction Brass and Iron Hardware



- Lighting Fixtures • Fireplace Accessories •
- Furniture Hardware • Builder's Hardware •



For details, call, write or
visit our web site:

www.ballandball-us.com

Or, send \$7.00 (refunded on 1st
order) for our 108 page catalog.

463 W. Lincoln Highway • Exton, PA 19341
Phone: 610-363-7330 • Fax: 610-363-7639
Orders: 1-800-257-3711

Quiet Your Shop Vacuum

A "muffler box" tames the roar.

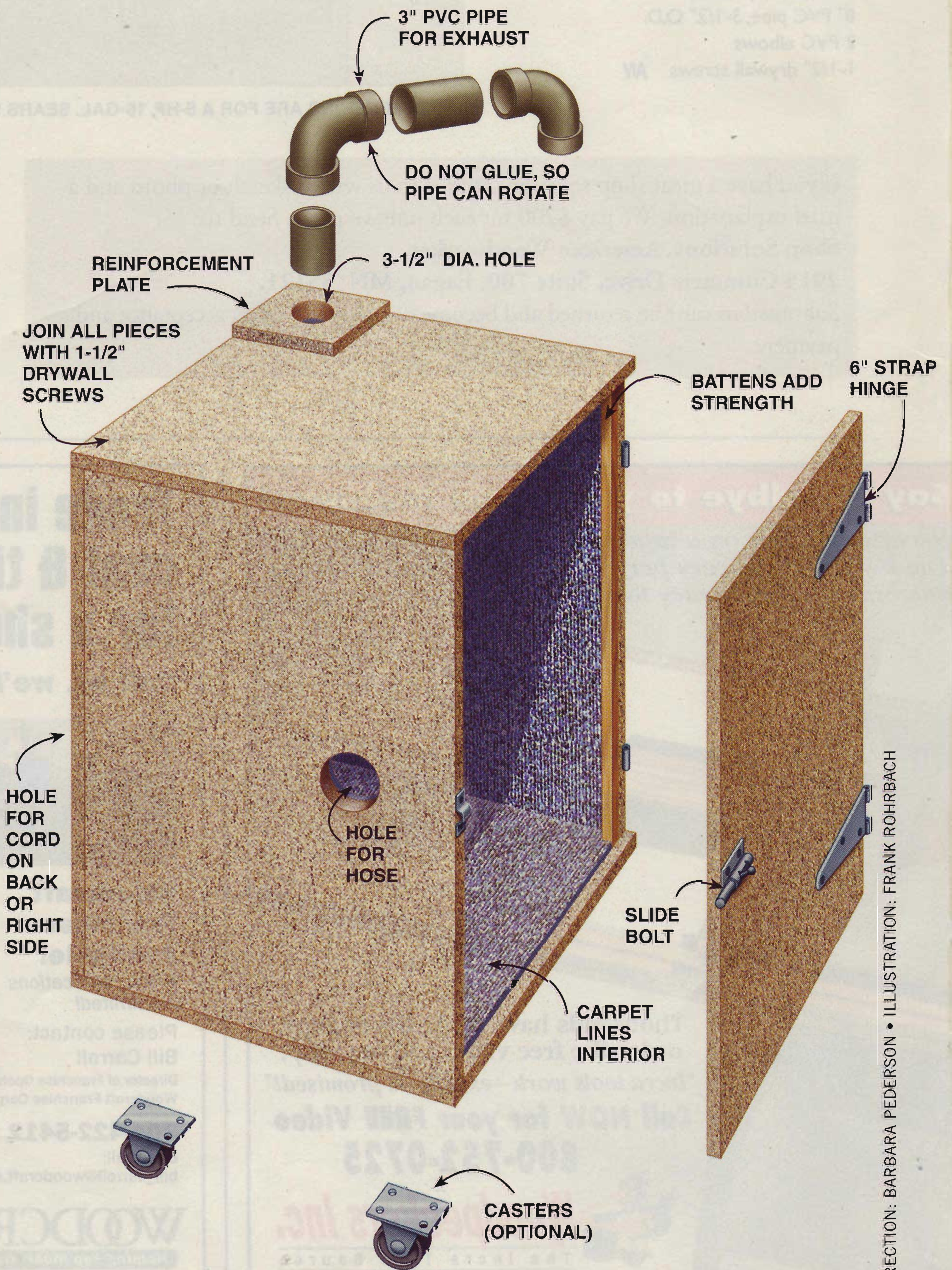
This solution was sent to us by Jack Beste, President of WoodWrite, a company that makes automated pen lathes. His customers spend hours turning exotic woods, using a shop vacuum for dust control. The noise was terrible.

The solution they've come up with is what we call a muffler box. It's dirt simple, dirt cheap (\$40), but man, does it work! It's just a box, made from plywood or MDF, lined with old carpet and fitted with an exhaust hole on top. The casters and the pipe to direct the exhaust are optional.

The noise reduction from this muffler box is *amazing*. It's easy to have a normal conversation with the vacuum running right next to you, and to have the vacuum running for long periods of time without driving you batty. We don't know what this box does to the longevity of your vacuum's motor, but we have reports of people having their vacuum going all day long for days without ill effect.

You could build this box with the exhaust on the side so it doubles as a rolling worktable, or trick it out with holders for hose and tools. With a small \$40 shop vacuum inside, you'd have yourself an inexpensive dedicated vacuum for your sanders and other portable power tools. Possibilities galore. This thing works.

Submitted by Jack Beste.
WoodWrite, Ltd.
(888) 966-3974
www.WoodWriteLtd.com



continued on page 115

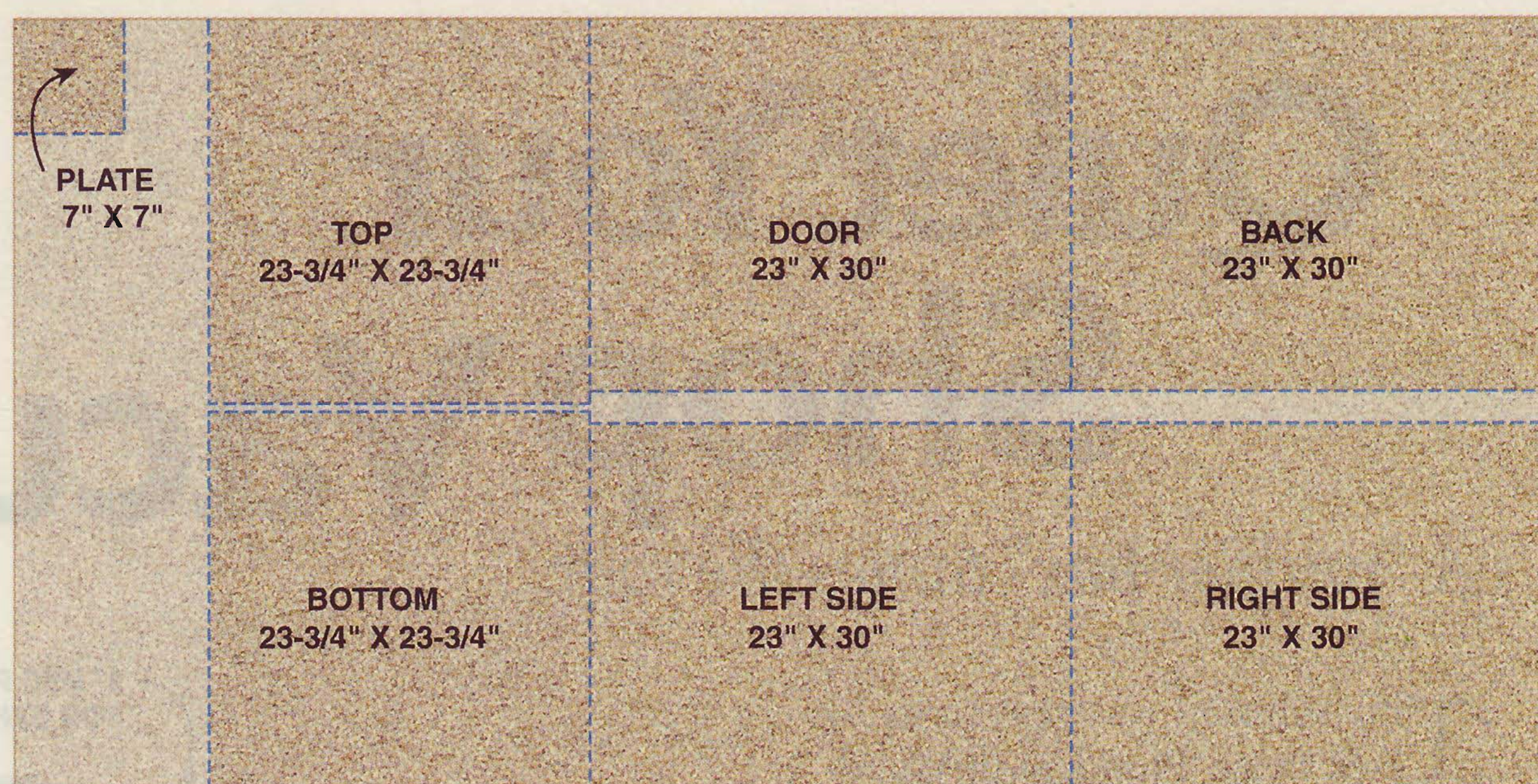
Shop Solutions

MATERIALS LIST

1 sheet 3/4" x 3/4" MDF or plywood
 4 battens of solid wood, 3/4" x 3/4" x 29"
 4 battens of solid wood, 3/4" x 3/4" x 20-1/4"
 old carpet to line interior

HARDWARE

1 pr. 6" strap hinges
 1 slide bolt
 4 casters (optional)
 8" PVC pipe, 3-1/2" O.D.
 2 PVC elbows
 1-1/2" drywall screws **AW**



DIMENSIONS ARE FOR A 5-HP, 16-GAL. SEARS SHOP VACUUM. ALTER TO FIT YOUR MACHINE.

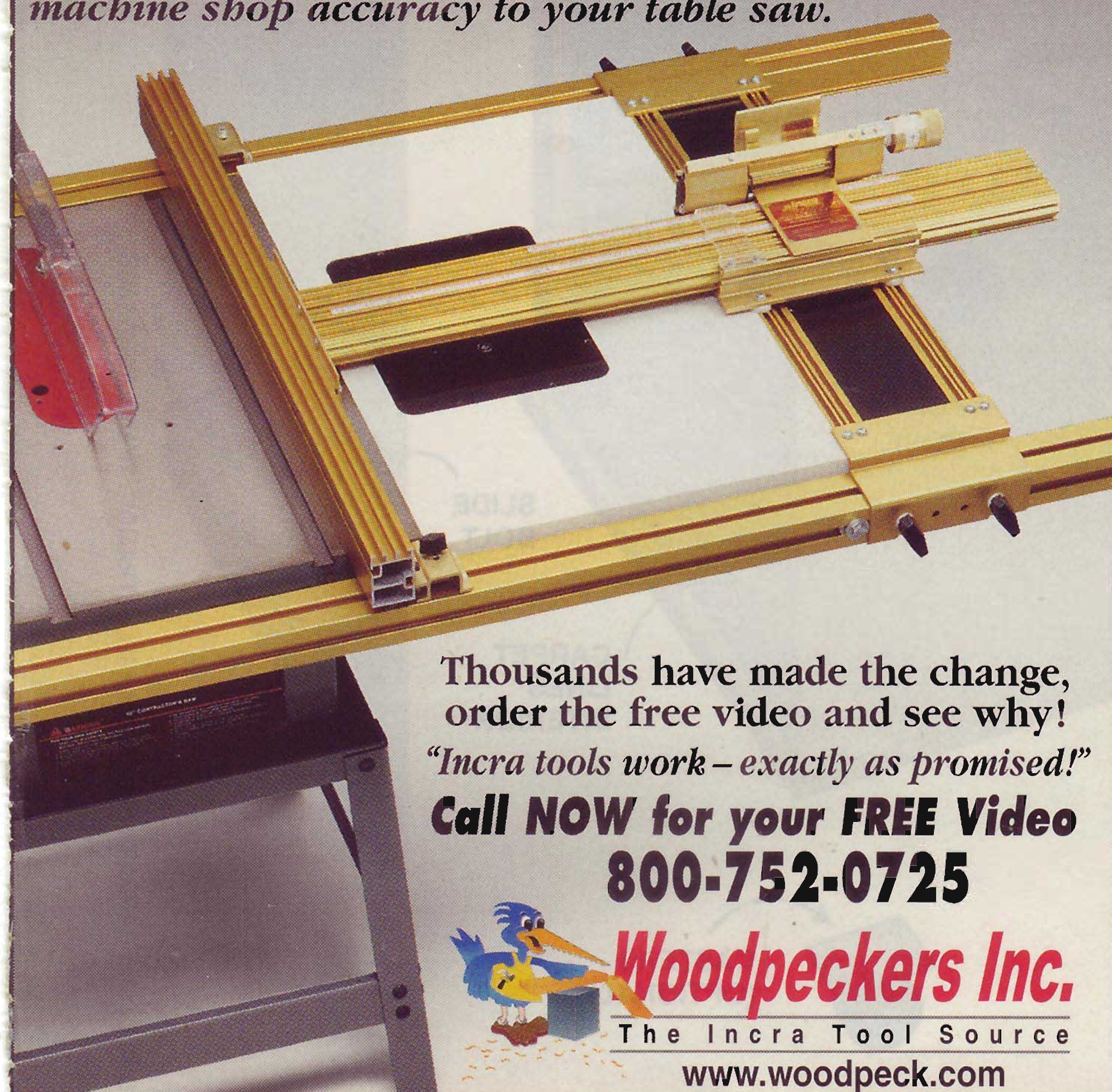
If you have a great shop solution, send it to us with a sketch or photo and a brief explanation. We pay \$200 for each one we print. Send to:

Shop Solutions, American Woodworker,
2915 Commers Drive, Suite 700, Eagan, MN 55121.

Submissions can't be returned and become our property upon acceptance and payment.

Say Goodbye to your Tape Measure!

Never again rely on a tape measure to set your fence. The INCRA-TS delivers perfectly parallel, repeatable machine shop accuracy to your table saw.



Distributed by Woodpeckers, Inc.
 P.O. Box 29510 ♦ Parma, Ohio 44129 ♦ 800-752-0725

Trade in your coat & tie for a shop apron.

Call us, we'll tell you how!



Woodcraft Franchises Available!

Premium locations are limited!

Please contact:
 Bill Carroll
 Director of Franchise Operations
 Woodcraft Franchise Corp.

304-422-5412

or e-mail:
 bill_carroll@woodcraft.sbrinc.com

WOODCRAFT
 Helping You Make Wood Work®

5300 Briscoe Road, P.O. Box 245
 Parkersburg, WV 26102-0245

F00WA03Q