

WE TEST: 1" BELT/DISC SANDERS, DISPOZ-A-BLADE SYSTEM

WOODWORKER'S JOURNAL

Vol. 22, No. 3 May/June 1998

Turn-of-the-Century

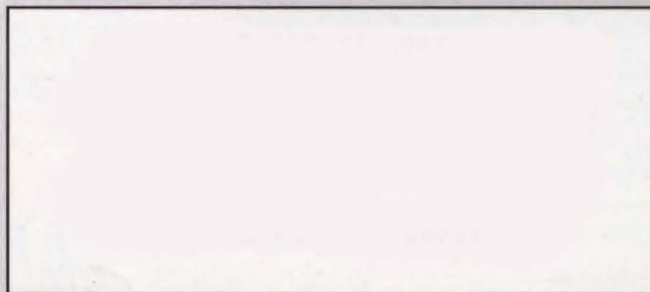
ROUND BARN

Page 24



PLUS...

- Prairie Table Lamp
- Fireplace Mantel
- Curio Cabinet
- Sanding Blocks

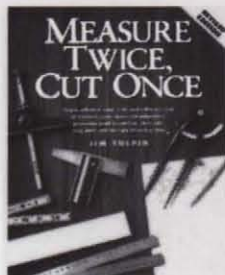


FREE Shipping thru 6/30/98
For INFO OR ORDER CALL 1-800-733-7111
10% to 20% OFF (Listed Items) Fax (973) 473-5236
SUPER SPRING COMBO SALE

**EXCLUSIVE!
FREE OFFER**

**\$23
Value!**

117 pages full color photos and illustrations. Simple effective ways to measure, scale, draw & calculate to guarantee good proportions, clean cuts, snug joints, & right fit everytime! PUT THIS GOLDMINE TO WORK IN YOUR SHOP!



Published by Popular Woodworking
Author - Jim Tolpin

OR 300 Great Shop Tips or Forst Logo cap FREE with any saw or Dado listed & purchased from this ad. You must mention you saw this offer in Woodworker's Journal Magazine, when ordering.
Offer Expires June 30, 1998. One book per order.
ORDER NOW SUPPLIES ARE LIMITED.

CHOPMASTER FOR SLIDING COMPOUNDS & MITER SAWS

New specs, 5° Neg. Pts. & flat, runs out less than .002 for perfect, tight, smooth, splinter-free miter joints.

**TAKE EXTRA
10% - 20% OFF
COMBO SALE!**

NEW SIZES AVAILABLE

	LIST	SALE
Delta Sidekick 6-1/2"x40T5/8"	\$149	\$ 89
Sears 8-1/4" & Delta 8-1/4"x60T5/8"	\$170	\$ 99
Hitachi 8-1/2"x60T5/8"	\$179	\$109
DeWalt 8-1/2" & Ryobi 8-1/2"x60T5/8"	\$179	\$109
Delta 9"x80T5/8"	\$204	\$119
Ryobi-Makita & all 10"x80T5/8"	\$207	\$129
DeWalt, Makita, B&D, Hitachi 12"x80T1"	\$229	\$139
Ryobi-Makita 14"x100T1"	\$266	\$179
Hitachi 15"x100T1"	\$277	\$189

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

BUY 1 BLADE OR DADO AT **10% OFF** SALE PRICE, OR
BUY 2ND BLADE AT **20% OFF** (EQUAL OR LESSER VALUE)
15% OFF DADO AS SECOND CHOICE.

WOODWORKER II— 6" - 7 1/4" - 14"

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

- DOUBLE HARD and 40% STRONGER C-4 CARBIDE
- Ends blade changing
- Ends scratchy saw cuts
- Ends second-step finishing
- Ends cutting 1/16" oversize to allow for RESURFACING
- **BUY AND SHARPEN 1 BLADE INSTEAD OF 3**

5/8" holes, boring thru 1-1/4" add \$7.50. Larger at Time Basis —Shipping \$4.50

WOODWORKER II	LIST	SALE	10%	20%
14"x40TX1"	\$215	\$149	\$134	\$119
14"x30TX1"	\$195	\$139	\$125	\$111
12"x40TX1"	\$183	\$129	\$116	\$103
12"x30TX1"	\$162	\$119	\$107	\$ 95
10"x40TX1/8" or 3/32"	\$156	\$119	\$107	\$ 95
30T 1/8" or 3/32"	\$135	\$ 99	\$ 89	\$ 79
9"x40T	\$146	\$109	\$ 98	\$ 87
30T	\$125	\$ 99	\$ 89	\$ 79
*8-1/4"x40TX 3/32"	\$136	\$ 99	\$ 89	\$ 79
8"x40T 3/32"	\$136	\$ 99	\$ 89	\$ 79
30T	\$115	\$ 89	\$ 80	\$ 71
7-1/4"x30T 3/32"	\$112	\$ 69	\$ 62	\$ 55
**6"x40T 3/32"	\$136	\$ 89	\$ 80	\$ 71

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

FREE \$45 IN SHARPENING COUPONS
GOOD ON ALL FORREST OR OTHER MAKES OF CARBIDE
BLADES OR DADO SETS. Coupons expire 6/30/99.

Must mention Woodworker's Journal magazine for discounts & coupons with purchase.

**\$21
VALUE
STARTS AUG. '97**

**FREE 10" ORANGE PLASTIC
BLADE RUNNER-CARRIER!**
SHIPPED WITH 6", 8" & 10" DADO SETS.
HOLDS UP TO 10 BLADES, 5 PER SIDE
ON CENTER BOLT OR DADOS.

DELUXE DADO-KING!

AS LOW AS \$184 NET

AFTER USING SHARPENING COUPONS

WORLD'S NO. 1 DADO - NO CHIP ON PLYS & MELAMINE

C-4 Carbide Tips — 4 on each chipper with special negative face hooks. Shims & 3/32" Chipper. Cuts 1/8" to 29/32" wide!!

	LIST	SALE	10%	15%
6" D. 5/8" Bore NEW	\$299	\$269	\$242	\$229
8" D. 5/8" Bore	\$321	\$289	\$260	\$245
10" D. 5/8" & 1" Bore	\$389	\$349	\$314	\$297
12" D. 1" Bore	\$499	\$449	\$404	\$382

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

CUTTING PROBLEMS?

Call the factory for
FREE technical help!!

1-800-733-7111

201-473-5236

FLASH NEWS!!

OUR \$79 - \$89 30T & 40T

OUTPERFORMED (E-EXCELLENT)

23 other 40T & 50T premium blades
both foreign & domestic on Ply,
Melamine, MDF and Oak/Rip!

Fine Woodworking Magazine test Oct. 96 page 43

After installing your blade and 5 in. stiffener the vibration in my saw went down another 20%. I ran several pieces of hardwood through the saw, both **crosscut** and **ripping**, and was amazed at the smoothness. It was like cutting butter, maybe smoother. I have never had a saw blade that **cut this smooth**.

Rick Price

BLADE DAMPENERS-STIFFENERS

FOR BETTER CUTS on all brands of blades, use our large 1/8" DAMPENERS-STIFFENERS against one side.

4"	\$21
5"	\$24
6"	\$25

7" AND LARGER AVAILABLE
REDUCES NOISE 50%-75%

DURALINE HI-A/T FOR TABLE & RADIAL SAWS

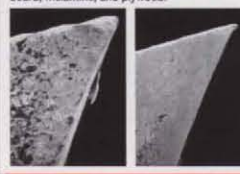
5/8" HOLES. Boring up to 1-1/4" \$7.50 extra.
Larger holes-time basis. Shipping \$4.50.
Faster feed rates & absolute splinter control. Stops splintering on OAK/BIRCH PLY VENEERS & MELAMINE

SIZES AVAILABLE	LIST	SALE	SIZES AVAILABLE	LIST	SALE
7-1/4" x 60T x 3/32" K	\$149	\$129	300mm x 100T x 1/8" x 30mm	---	\$197
8" x 80T x 1/8" & 3/32" K	\$202	\$169	12" x 100T x 1-1/8" K	\$253	\$215
220mm x 80T x 1/8" x 30mm	---	\$167	14" x 80T x 1"	\$232	\$197
9" x 80T x 1/8" & 3/32" K	\$207	\$179	14" x 80T x 1"	\$266	\$226
10" x 80T x 1/8" & 3/32" K	\$207	\$159	16" x 100T x 1"	\$262	\$243
12" x 80T x 1-1/8" K	\$212	\$181	16" x 100T x 1"	\$294	\$243

**SPECIAL COMBO SALE
EXTRA 10%-20%
OFF**

Above 1" bore standard.
**CARBIDE IS THE HARDEST OF THE
C-4 GRADES AND 40% STRONGER, NOT WEAKER!
FOR 50% TO 300% LONGER LIFE.**

Standard C-2 Carbide (below, left) and FORREST still sharp Oxidation and Corrosion Resistant Sub-Micron C-4 Carbide (below, right). Each shown after cutting 3,500 feet of MDF. Similar results obtained cutting particle board, melamine, and plywood.



**STILL SHARP
AFTER 3,500 FEET
OF CUTTING!**

WE RECOMMEND OUR FACTORY SHARPENING as some local sharpening creates problems with MICRO-CHIPPED EDGES reducing blade life & cutting quality.
2-4 DAYS ON THESE AND ALL MAKES OF FLAT FACE & CONCAVE CARBIDE TIP SAWS. Ship via UPS. Typical 10x40T \$17.00, 60T \$19.00. Add return UPS \$5.00, \$1.00 each additional blade.

FOR SPECIAL PRICE COUPONS
MENTION WOODWORKER'S JOURNAL
PHONE TOLL FREE! 1 (800) 733-7111
(In NJ: 973-473-5236) FAX: 973-471-3333

Fine American saw making & sharpening since 1946.

DEALER INQUIRIES WELCOME

Quality is why we're different!

CANADA SALES:
CMR RON COLLIER
3644 SCHUMANN RD.
BAY CITY, MI 48706
800-229-4814
517-684-0402 FAX

FORREST

WESTERN CANADA:
CALL EUROPEAN
SHARPENING
403-287-0550
403-287-1822 FAX

BUSINESS OPEN ACCOUNTS AVAILABLE



FL, NJ, NY Residents Please Add Sales Tax

Shipping Charges with book:

Sawblades \$9; Dado \$10; Stiffener \$2

SAISFACTION GUARANTEED OR FULL CASH REFUND.

(800) 733-7111 or (973) 473-5236

FORREST MANUFACTURING COMPANY, INC. • 457 RIVER ROAD, CLIFTON, NJ 07014 • FAX (973) 471-3333

WOODWORKER'S JOURNAL

Vol. 22, No. 3 May/June 1998



30



34



46

PROJECTS

24 **Cover Story: Round Barn Toy**

A unique toy rooted in Americana

30 **Prairie Table Lamp**

LaVerne Schuring's eye-catching design goes together in a weekend

34 **Fast-Track Curio Cabinet**

An easy-to-build cabinet with an Oriental flair

41 **Shop-Built Sanding Blocks**

Bob Colpetzer makes these well-conceived shop aids from scrap

46 **Maple Fireplace Mantel**

Build a stately frame for a ho-hum prefab fireplace



58

TOOLS AND TECHNIQUES

18 **In the Shop: Specialty Planes (part 2)**

Jim Tolpin shares his knowledge of unusual but useful surfacing tools

58 **Tool Review: 1" Belt/Disc Sanders**

We test 10 different models and pick our favorites

63 **User Report: Dispoz-A-Blade System**

Here's a simple solution for an unpleasant task

FEATURES

54 **Power Up Your Shop with Air**

How to gear up for efficient, economical air tools

64 **Sweepstakes Winner Tours Delta Plant**

41



DEPARTMENTS

4 **Shoptalk**

6 **Reader Letters**

10 **Club Spotlight**

Minnesota
Woodworker's Guild

16 **Shop Tips**

Cover Photo: StudioAlex

SHOP TALK



Designer/craftsman Dick Coers and I visit the round barns at the University of Illinois' South Farms in Urbana-Champaign, Illinois.

Round Barn a Part Of Americana

A lot of our projects have historical ties. The Arts and Crafts baby crib, the Art Deco ear-ring chest, the Craftsman hall tree, the curly maple hunt board, and the numerous Shaker and Colonial furniture pieces that have appeared in *Woodworker's Journal* over the years all have roots in America's past. In this issue, we're presenting another project with equally interesting connections: the round barn toy on page 24.

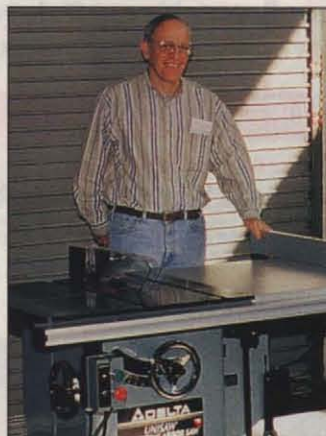
Several of our staff members have farm backgrounds so it's logical that a toy barn would eventually turn up in the magazine. But what kind of barn? What's typical? We settled the issue by picking what is probably the most unique example of agrarian architecture ever

to appear on the landscape—the wooden-framed round barn. To learn more about this design's historical significance and about the University of Illinois' barns that inspired us, see "Circular Logic: The Round Barn In America" on page 28. We hope you'll have as much fun building this toy as we had researching and developing it.

Congratulations, George Tritthardt

That's George smiling in the photo at right, and he has good reason to smile. As winner of the 1997 *Woodworker's Journal*/Delta Sweepstakes, he'd just watched Delta technicians assemble his new Unisaw at the firm's Tupelo, Mississippi plant. To read more about George's visit, see "Sweepstakes Winner Tours Delta Plant," on page 64.

George, who does his woodworking in Mundelein, Illinois (north of Chicago), reports that the pride and dedication shown by the Delta crew in performing their tasks impressed him. He wishes that everyone could see something like this go from an idea on paper to a finished product. George assures us that the new Unisaw will boost his craftsmanship a bunch of notches.



Sweepstakes winner George Tritthardt with his hot-off-the-assembly line grand-prize Unisaw.

Sorry, Wrong Number

Telephone numbers change, and Sil Argentin at Skil-Bosch advises me that we printed an out-of-service number for the firm in the March/April issue. If you wish to contact Skil-Bosch for tool information, dial 800/815-8666.

Charles Sommers

WOODWORKER'S JOURNAL

PRIMEDIA
Special Interest Publications

EDITORIAL

Founder James J. McQuillan
Editor Charles Sommers
Managing Editor Tom Jackson
Associate Editor Doug Cantwell
Contributing Editors Robert Colpetzer
Designer/Craftsman Richard R. Coers
Art Director Dan Scharfenberg
Associate Art Director Keith Griepentrog

ADVERTISING

Classified Ad Manager/Ad Coordinator Carmen Renfro
(309) 679-5017
Marketing Manager Mark Cooksey
(309) 679-5325
Advertising Sales J.F. Van Gilder Co.
Jim Van Gilder, Mike Hill
Publisher's Representatives East/Central
P.O. Box 145, TX 75001
phone (927) 392-1892 fax (972) 392-1893
Richard Sherwood
Publisher's Representatives West Coast
phone (714) 720-0448 fax (714) 720-0234

BUSINESS

President & CEO Steven R. Elzy
Vice President James W. Bequette
Associate Publisher Michael Copping
Chief Financial Officer David Whitwell
Controller Matthew R. Taphorn
Planning Director Eric Plotner
Vice President, Business Development Tom Masterson
Vice President, Human Resources Kathy McCoy
Vice President, Manufacturing Sally McCravy
Senior Production Directors Terry Boyer, Laurie Hahn
Vice President, Circulation Harry Sailer
Circulation Director Janet Timian
Director, Single Copy Sales Terry Oettlein

CORPORATE OFFICES

Woodworker's Journal
2 News Plaza, P.O. Box 1790, Peoria, IL 61656
Subscription Offices/Change Of Address Notification
Woodworker's Journal, P.O. Box 56585
Boulder, Colorado 80328-6777 1-800-765-4119

PRIMEDIA Inc.

Chairman & CEO William F. Reilly
President Charles G. McCurdy
Vice Chairman & General Counsel Beverly C. Chell
PRIMEDIA Specialty Magazines
Vice President & CFO Debra Chirichella
Vice President, Systems Robert M. Cummings
Vice President, Manufacturing Edward J. Egan
Vice President, Human Resources Susan Maucegi
Vice President, Single Copy Sales Mark A. Peterson

Copyright © 1998 PRIMEDIA Special Interest Publications, a division of PRIMEDIA Inc. All rights reserved. *Woodworker's Journal* (ISSN 0199-1892) is published bimonthly in Jan/Feb., Mar/Apr., May/Jun., Jul/Aug., Sept/Oct., and Nov/Dec. by PRIMEDIA Special Interest Publications, Inc., P.O. Box 1790, Peoria, IL 61656. Telephone (309) 682-6626. Periodicals postage paid at Peoria, IL and additional offices.
Subscription Rates: In the United States and its possessions—One year (6 issues): \$21.98; Canada—One year: \$32.08 (U.S. funds), includes 7% GST.
To Subscribe, Renew or Change Address: Write to *Woodworker's Journal*, P.O. Box 56585, Boulder, CO 80328; include mailing label for renewals and changes. For gift subscriptions, include your own name and address as well as those of gift recipients, or call 1-800-765-4119.

Postmaster: Send Change of Address to *Woodworker's Journal*, P.O. Box 56585, Boulder, CO 80328. Materials submitted for editorial consideration will be treated with care while in our possession, but we cannot assume responsibility for loss or damage.

Canada Post International Publications Mail Products Sales Agreement No. 0861065 GST R126520923

Printed In USA



With your choice of fences, 3 or 5 hp motor, single-phase or three-phase, with or without LVC switches. More options than you can shake a stick of cherry at. And now you can multiply everything by two. Two blade tilting options give you 26 different configurations of Unisaw.*



We invented it. And today we can provide parts for almost every Unisaw built since 1937. Sixty years of performance and serviceability is quite a track record. Which brings up the most important option of all. A saw with the Delta name, rather than a lesser machine.

Have it your way. Introducing our new Left Tilt Unisaw. (For the same price as our standard right tilt.) Delta is the only manufacturer to offer this option without charging a premium. Choose either a Biesemeyer® Fence or a Unifence® Saw Guide and you've got the ultimate sawing machine.



Quality is not optional. Every single arbor is flange-faced *after* assembly to reduce run-out. An extra step that other manufacturers don't bother with.



Both right and left tilt saws start at \$1599. But from now until June 30, 1998, Delta will sweeten the deal by sending you a check for an additional \$100. That makes it yours for \$1499.

Right Tilt Unisaw shown here with Unifence Saw Guide.



Choose your weapon.

Left Tilt Unisaw shown here with Biesemeyer Fence.

Yes, we're still making every Unisaw right here in the good ol' USA. And we're still covering them with a full 2-year warranty.



Massive, widely spaced trunnions disperse vibration, machined steel motor and arbor pulleys won't over-heat and expand, lots of cast iron up top with T-slots for miter gage on both sides of the blade. A true workhorse.

**THE
POWER
OF THE
PROS**



DELTA
WOODWORKING MACHINERY
A Pentair Company

Choose from a full arsenal of Unisaws. Some 26 variations to be exact. Now there's a Delta Unisaw to fit everybody.

Call toll free for the name of your nearest Delta dealer. Delta International Machinery Corp., 800-438-2486. And visit our web site at www.deltawoodworking.com.

Proud sponsors of The New Yankee Workshop on PBS.



**TOOL-PRIZE
DRAWING
WINNER!**

READER LETTERS

I wanted a project that I could build with my two sons, and your Governor Winthrop cabinet met my needs. Son John (right in photo) did



the leaded glass work, while son Jim (left) did the finishing and the rosettes. My grandson James also contributed hours of sanding.

I followed your plans except that I added lights, wood trim on the glass shelves, and 3" to the top cabinet's depth.

*James Dickerson
Indianapolis, Ind.*

Tool Prize



For being selected as the winner of the tool-prize drawing, James Dickerson will receive a Bosch 1278 VSK compact belt sander.



I've been a long-time subscriber, first making the school desk in the Sept./Oct. '80 issue for my granddaughter when she was three years old. I just finished the Pennsylvania small chest (May/June '91) for her—she's now a sophomore in college. As you'll note, I made a few changes to simplify the construction. Thanks for many years of enjoyment.

*Harold Fry
Winter Haven, Fla.*



I turned the pen and letter opener (Nov./Dec. '97) from black cherry and made the pen case out of mahogany. The set made a beautiful and exceptional gift for my father-in-law in Vermont. The cherry originally came from his farm.

*Michael Chase
Farmington, Maine*



Ever since I saw the pierced-tin country pine cabinet in the Jan./Feb. '94 issue, I've wanted to try tin-piercing. At the time, we didn't need a large cabinet, but when my wife asked for something to hide the kitchen waste bin, I got my chance.

Instead of installing swinging doors, I made the whole front tilt forward. The basket rests on a shelf that tilts along with the front. Two curved drop-front supports prevent the door from crashing down.

I made the cabinet out of poplar and plywood, and the top is clear-finished pine. I used the pattern from your article. The tin-piercing was fairly easy after a bit of practice, although my arm got tired pretty fast. I enjoyed making this piece and have received many compliments on it.

*Richard Prelasco
North Kingstown, R. I.*

Continued on page 9

**TO THOSE OTHER PALM GRIPS
CLAIMING TO HAVE A LOT OF POWER,
WE HAVE A REPLY: EAT DUST.**



Dual-range Swift-Sand™ system lets you shift between fine finishing and high speed stock removal at a button's touch.



Harness the fury of the most powerful random orbit palm grip in the industry.



Integral dampening system regulates pad speed and helps prevent accidental workpiece damage.



This one tool lets you sand dowels flush quickly and finish cross grain and large panels flawlessly.

Introducing The Bosch 1295 series of random orbit palm grip sanders. Three different models all packed with plenty of extra muscle. You could say the playing field for other palm grips just became very uneven.

BOSCH



ENGINEERED FOR PERFORMANCE™

GRIZZLY INDUSTRIAL

PURVEYORS OF FINE MACHINERY

SPECIAL 2 H.P. DUST COLLECTOR OFFER

TOP QUALITY This is the best 2H.P. Dust Collector on the market - period!

BEST SELLING We've been selling this unit for years. We have all the parts, service and expertise for you to buy in total confidence.

UNBELIEVABLE PRICE While others talk big - we deliver! We have sacrificed nothing in quality. We simply buy direct in huge quantities with no middleman and pass the savings on to you.

SPECIFICATIONS:

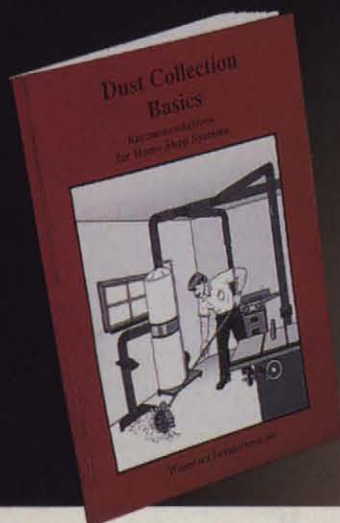
- 2 H.P. 220V electric motor
- 19" Impeller
- Overall height 78"
- Base 21 1/4" x 33 1/2"
- Air suction 610 ft³/min
- 5" main, two 4" intake ports
- Approx. shipping weight 140 lbs.

MODEL G1029

REG. \$279⁹⁵

SALE \$255⁰⁰

F.O.B. OUR WAREHOUSE



FREE
4" x 10' Hose
and Dust
Collection Book

"Dust collection Basics" Book

This incisive book skillfully guides the woodworker through all the steps necessary in the design and construction of an efficient central dust collection system. Fifty pages of concise, carefully illustrated text. **YOUR'S FREE** with purchase of dust collector!



DUST COLLECTION ACCESSORIES KIT #1



- 1-4" x 10' Hose
- 1-Universal Dust Hood
- 2-4" Wire Hose Clamps
- Shipping Weight: 6 lbs., 10 oz.

MODEL G3181

\$19⁹⁵

DUST COLLECTION ACCESSORIES KIT #2



- 2-4" Blast Gates
- 2-4" x 10' Hose
- 1-Table saw Dust Hood
- 1-Universal Dust Hood
- 1-4" Y-fitting
- 10-4" Wire Hose Clamps
- Shipping Weight: 15 lbs., 14 oz.

MODEL G3182

\$51⁴⁹

CALL TODAY FOR YOUR FREE 1998 WOODWORKING CATALOG — ORDER 24 HOURS A DAY!

162698658

1 - 8 0 0 - 5 2 3 - 4 7 7 7

CUSTOMER SERVICE: (717)326-3806 FAX: (800)438-5901 WEBSITE: <http://www.grizzlyindustrial.com>

VISIT OUR 3 SHOWROOM LOCATIONS:

1821 Valencia St., Bellingham, WA • 4651 Hickory Hill Rd., Memphis, TN • 2406 Reach Road, Williamsport, PA

74E

MEDIA CODE



READER LETTERS

Continued from page 6



You've shown several photos of the mail truck bank (Nov./Dec. '95) recently, so I thought I'd show you my fleet. I made them for my grandchildren and myself. I did change the coin slot to the right side. On the opposite side is a plaque inscribed with the child's name and a penny minted in the year of his/her birth.

Bill Westerbeck
Crossville, Tenn.

I have subscribed to *Woodworker's Journal* for over 16 years and have built numerous projects from it in my workshop. This is my walnut version of the Governor Winthrop slant-front desk and cabinet from the Nov./Dec. '92 and Nov./Dec. '95 issues.



Gary Barnes
Saltville, Miss.



Joseph Knedht
Moosic, Penn.



I took the liberty of making the day bed in your May/June '96 issue in Mission style instead of Southwest. The plans were excellent and very easy to follow. By using your "How to Prepare a Cutting Diagram" article, I ended up with just two board feet of waste. My wife and my Norwich terrier have declared ownership, and they tell me it is very comfortable. Thanks.

Toby Sprague
Brattleboro, Vt.



I made this hammered dulcimer as a 4-H woodworking project. It won a blue ribbon at the county fair and a Grand Champion award at our regional fair.

I made the instrument of cherry and maple using the plans from your Jan./Feb. '93 issue. My father, Kenneth, has been our 4-H woodworking project leader for 13 years and also builds projects from your magazine.

Valerie Eddy
Fair Grove, Mo.

With my first grandchild due in January, and the expectant mother having seen the Arts and Crafts-style crib on the cover of your July/August '97 issue, I had little option but to get started immediately.

Precision Marking Protractor

- One-half degree increments
- Removable T-Bar
- Centering Rule
- And more...

This 21st century **Marking Protractor** has micro-line guide holes at every 45°, 30°, 22.5°, 5°, 1°, and 0.5° interval to plot any angle with ease and absolute accuracy. A metal T-Bar and see-through crosshairs provide perfect alignment against the edge of your workpiece. Remove the T-Bar to work on flat surfaces or to use the 6" centering scale. FOUR angle scales, including one for marking narrow stock, suit every need. It's easy on the eyes, incredibly accurate, and just plain fun to use! *Patents pending*

To learn more about INGRA's extraordinary NEW line of precision **Marking Protractors, Marking Rules, Bend Rules, T-Rules, and Centering Rules** call, write, or fax:

Taylor Design Group, Inc.
P.O. Box 810262, Dallas, TX 75381
Tel: (972) 484-5570 Fax: (972) 243-4277
E-Mail: TDGIngra@AOL.com

Stainless steel

VAN DYKE'S RESTORERS®
Supplies for woodworkers and antique restorers

Build a pie safe just like Grandma's! Turn this solid oak kit into a family heirloom by mixing or matching the tins of your choice! 53" H x 40" W x 19" D. Twelve tins needed, must be purchased separately. See main catalog.

WJS6221 - Pie Safe (without shelves) 329.95

Order Toll Free 1-800-558-1234
VAN DYKE'S RESTORERS
Dept. 60058, P O Box 278 • Woonsocket, SD 57385

Say "I saw it in The Marketplace!"
See Page 65

ATTENTION:
THE E-MAIL ADDRESS FOR **EXCEL POLYURETHANE ADHESIVES** APPEARED INCORRECTLY IN THE MARCH/APRIL ISSUE OF WOODWORKER'S JOURNAL.

E-MAIL EXCEL AT:
excelglue@cricket.net



Minnesota Woodworker's Guild



Tom Van Binsbergen's highboy won both Best of Show and the People's Choice award at the Minnesota Woodworker's Guild's annual Northern Woods Exhibition.

Not many woodworkers think of their pastime as a sporting activity—except those who belong to the Minnesota Woodworker's Guild. In December of last year, the group held its first-ever "Thrills and Skills Competition," which included belt-sander races, a hand-planing contest (to see who could plane the longest unbroken shaving from a 16'-long 2x4), a dovetail-cutting contest, and other events.

But aside from these competitive amusements, what makes this group unique is its high-tech approach to guild business and activities. According to Rich Gotz, the guild's president, members convened a website committee in January, 1997 to look into the possibility of creating a site on the worldwide web. By May, the group had a site up and running that includes descriptions of all the group's activities, names of award winners from previous exhibitions, and photographs of members' work. Eventually, the newsletter will be posted as

well. "The site has received some 3,500 hits since opening," says

Gotz, "and we're now averaging about 15 hits a day." You can browse the guild's web page at: <http://www.wavefront.com/~jzinsli/>.

You'll find some good project photos at the site, partly because guild directors recently invested in some quality photographic equipment, including several quartz lights, umbrellas, tripods, and seamless paper. Members can rent the equipment for a small fee and use it to take professional-caliber photos of their work. An extensive article in the newsletter on how to photograph woodworking projects advised members on how to get the best exposures. As a result, guild members have had great success in getting their work published in woodworking magazines.

Free Tablesaw In Every Issue

The guild has also applied modern technology to production of its monthly newsletter. "In December, the guild board decided to give a boost to our fledgling newsletter. We bought a scanner and Microsoft Publisher97, and also increased the number of pages and issues from eight pages four times a year to 12 pages six times a year," says Gotz. "Our vice president, Willis Bowman, assumed responsibility for the newsletter and the changes have been highly acclaimed." With the scanner, the guild can now include color photographs.

One of the more novel attention-getters added to the revamped newsletter was the "free tablesaw." The "saw" was actually a pattern printed on heavy paper that the reader could cut out and fold together to make a 1/10th-scale version of a cabinetmaker's saw. The saw even had a tiny paper blade that you could mount on a dowel and spin by winding it on a string.

Northern Woods Exhibition

In October, the guild holds its big event of the year, the Northern Woods Exhibition. "The coordinators of this event, Tim Johnson, Craig Jentz, and Tom Caspar, devote a tremendous amount of effort to produce this show," says Gotz.

Last year, 42 of the guild's woodworkers displayed 74 pieces of furniture, turnings, intarsia, carving, and other projects. The four-day show, held in the Southdale Center in Edina, also included a dozen demonstrations including dovetailing, chairmaking, sharpening, knife-

Projects From The Northern Woods Exhibition '97

Artemus dresser chest: Donald Grandbois



Boston Queen Anne side chair: Jerry Lilja

FREE Booklet!

Get the Facts on Drying Your Own Lumber

You can put the quality and reliability of the world leader in your shop with a compact, affordable



Our L-Series kilns start at 300 board ft.



Nyle kiln—and this free booklet can help you get started. It's filled with answers on drying times, drying hardwoods and softwoods, and many of the most often asked questions about lumber drying.

To learn more about drying your own lumber, call for your FREE booklet today!

800-777-NYLE

(207)989-4335 FAX (207)989-1101

<http://www.nyle.com>

nyle
DRY KILN SYSTEMS

PO Box 1107 Bangor ME 04402-1107



EASY PAYMENTS AVAILABLE

NEW! INCRA RULES
A NEW Concept in Precision Steel Rules
Precision T-Rules

PRECISE, versatile, and easy to use are the words which best describe the NEW INCRA T-Rule. Think of it as a combination square for marking or measuring that's simultaneously set to every scale position with perfect, instant accuracy. Why? ... Because like all INCRA RULES, we've put micro-fine marking holes and slots at every scale line to instantly locate your sharp pencil or scribe exactly on target with zero uncertainty and no eye strain!

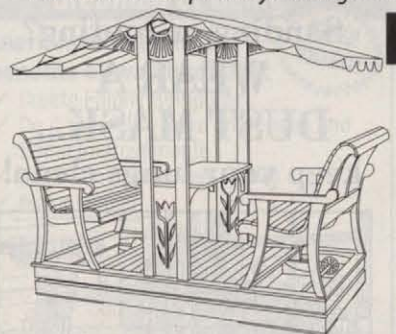
When accuracy counts ... INCRA RULES! Available in 6", 12" and 18" lengths. Patents pending.

To learn more about this extraordinary line of precision Marking Rules, Bend Rules and T-Rules, call, write, or fax: Taylor Design Group, Inc. P.O. Box 810262, Dallas, TX 75381 Tel: (972) 484-5570 Fax: (972) 243-4277

Stainless Steel

BUILD THIS MAGNIFICENT LAWN SWING

This victorian inspired style swing is solid, comfortable, spacious and glides effortlessly.



PLANS and PATTERN

\$1295

ECONOMY PACKAGE
PLANS and PATTERN
and KIT

\$5495



CALL 1-800-915-2601

VIEL TOOLS INC.

P.O. BOX 660, MADAWASKA, ME. 04756-0660

SWING KIT

4 aluminum rails 6" Dia.
2 axles 3/4" Dia. x 41-3/4" L.
8 aluminum rockers
1/8" x 1" x 24"
Fixtures for benches

\$4750

COTON CANOPY

Water and sun proof with snaps.
Choose from 2 flowered prints.
BLUE or GREEN.

\$4995



FREE CATALOG 1-800-684-9371

Pen, pencil & project kits
Wide selection of woods
& pen turning materials
HUT finishes for wood
Sherline lathe systems
Wholesale and retail



continued on page 12

Leigh Isoloc™ Joints



Introducing The Most Innovative New Joinery In Over A Century

Organically-inspired joints have forever eluded even the finest hand-tool craftsmen. Now you can create "impossible" joints like these with only a straight cutter in your router and the Leigh Dovetail Jig equipped with a new Isoloc Template.

For years, woodworkers worldwide have recognized the patented Leigh Dovetail Jig as the undisputed leader in precise, easy-to-use router joinery tools. Now three new patented Isoloc Templates, each with two unprecedented joint patterns, along with the tradition-inspired Multiple Mortise and Tenon Attachment and F1 Finger Joint Template, make the Leigh Router Joinery System the most versatile and innovative joinery tool in your shop.

Mastering a full spectrum of strong and strikingly beautiful joints is now dramatically easy—from design to finish—and it all begins with your telephone. Call toll-free today for a copy of our free 32-page, information-rich catalog.

Call For Your Free 32-Page Catalog Now!

1-800-663-8932

LEIGH

Joining Tradition With Today

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

You get More from:
WOODWORKER'S JOURNAL
 Projects!
 More Tool Tests!
 More Techniques!
 More Fun!



Single drawer Shaker sewing table: Richard Gotz.

Miniature animals: Steve Tomashek

Suspended vessel: Craig Lossing

Wooden geared clock: Dwight Speh

THE WOODTURNERS CATALOG

Choose from:

- Pen Kits & Supplies
- Project Kits
- Vicmarc Mini Lathe
- Turning Squares
- Dymondwood
- Burl & Exotic Pen Blanks
- Henry Taylor and Sorby Tools

Everything you need for woodturning, all at the best prices!



For a **FREE** copy of
THE WOODTURNERS CATALOG
 Call **1-800-551-8876**

CRAFT SUPPLIES USA • www.craftusa.com

SHOP REMINDER:

Sanding or routing?
WEAR A DUST MASK...
 keep your lungs clean!



WOODWORKER'S JOURNAL

CLUB SPOTLIGHT

Continued from page 11



making, carving, and turning. A panel of three woodworkers judge the projects on display, and there's also a "People's Choice" award that drew 1,200 ballots last year. In all, 13 awards were handed out. Member Tom Van Binsbergen won best of show as well as the People's Choice award for the Queen Anne highboy shown on page 10.

The guild holds regular monthly meetings on the third Tuesday of each month except October.



Members usually meet at the location of the person or business providing the demonstration for that particular evening. Recent meetings have spotlighted a violin maker, a boat restorer, furniture conservators, and a timber framer. In February, the club holds a social dinner for members and their spouses. Members are asked to make and bring a wooden toy to donate to the Ronald McDonald

continued on page 15

Holdfast - Ready to work on



Fast, easy to use, operates using compressed air. Holds plastics, woods, solid surface materials, any non-porous material.

Carbide Tip & Insert Router Bits

Screw-on for quick change
Reverse Helix = Downward Shear
Wide variety of sizes available.



Free Catalog - Call Today
1-800-553-9344

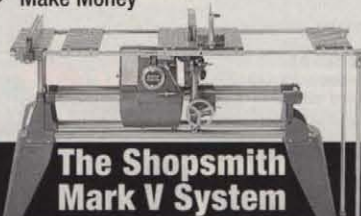
Safranek Enterprises, Inc.
4005 EL CAMINO REAL • ATASCADERO CA 93422

See how you can be the woodworker you've always dreamed of being.

Learn how to enjoy the
benefits of woodworking:

- ✓ Create Family Heirlooms
- ✓ Do It Yourself - Save on Repairs and Home Improvements
- ✓ Have Fun and Relieve Stress
- ✓ Make Money

FREE VIDEO!



**The Shopsmith
Mark V System**

**5 of the most popular woodworking
tools in one compact unit.**

1 SAWING 2 DRILLING
3 SANDING 4 BORING 5 TURNING



To receive your FREE VIDEO
information kit call or write:

1-800-543-7586



Shopsmith Inc.

6530 Poe Avenue • Dayton, OH 45414

E-Mail us at: <http://www.shopsmith.com>

NEW! Inca RULES!
A NEW Concept in Precision Steel Rules
Precision Marking Rules

INCRA has re-invented the steel rule by putting micro-fine marking holes at every scale position to *instantly* locate a sharp pencil or scribe *exactly* on target! Now, instead of squinting at that blur of lines along the edge of your old steel rule, you can instantly put your mark precisely where you want it with zero uncertainty and no eye strain. Even if the lighting is less than perfect or your eyes are tired at the end of the day, you can still be sure that the precision built into every **INCRA RULE** actually shows up in your finished work! When accuracy counts ... **INCRA RULES!** Available in 6", 12" and 18" lengths. *Patents pending*

To learn more about this extraordinary line of precision Marking Rules, Bend Rules and T-Rules, call, write, or fax:
Taylor Design Group, Inc.
P.O. Box 810262, Dallas, TX 75381
Tel: (972) 484-5570 Fax: (972) 243-4277

Stainless Steel

Unique Catalog Fine Woodworking Handtools

Hand tools you never thought existed! They're unique and high quality. Thousands shown. 114 pages includes books and finishing materials. Oh yes, we'll give you a free spokeshave on your first order of \$50.00 or more and keep you on our mailing list for future catalogs. Catalog cost \$5.00.

FREE SPOKESHAVE



VISA or MC **1-800-648-1270**

Frog Tool Co. Ltd. 2169 IL Rt. 26, Dept. K
Dixon, IL 61021

FREE TOOL CATALOG!

Your Best Work Starts With Us...

With over 6,000 of the finest woodworking tools in the world, Woodcraft can help you work more efficiently and skillfully than ever. Call for your Free copy today!

1-800-542-9115

WOODCRAFT®
Helping You Make Wood Work®

www.woodcraft.com
210 Wood County Industrial Park Dept. 98WJ05T
PO Box 1686, Parkersburg, WV 26102-1686



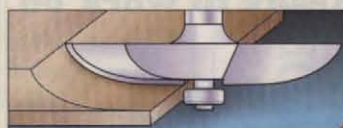
Create Classic Raised Panel Doors

with your 1/4" or 1/2" Router, or your 1/2" or 3/4" Shaper.

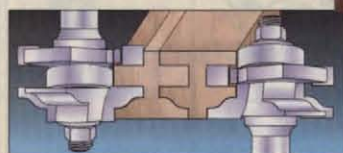
Our professional production quality router bits make it quick and easy to produce attractive raised panel doors. Our reversible combination bit makes a matching rail and stile frame. The panel raising bit with ball bearing guide makes a perfect raised panel every time!

Includes instructions and Professional Tips!

Carbide Tipped!



*Raised Panel Router Bit



*Reversible Combination Rail & Stile Bit
Works with stock from 11/16" to 7/8".

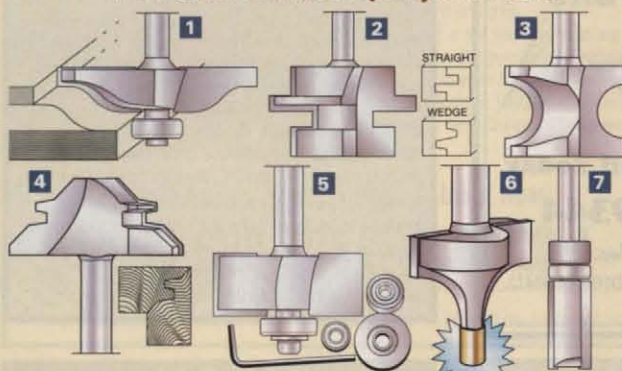
**SAVE!
BUY AN
MLCS SET**

RAISED PANEL DOOR SETS			
SET#	BIT STYLE	LRG. DIA.	SET PRICE
#1301	1/4" Shank Router	* 2"	\$69.95
#1302	1/2" Shank Router	* 3-1/2"	\$79.95
#1303	1/2" & 3/4" Shaper	4-5/8"	\$99.95

*Ball bearing included

1/4" Shank Carbide Tipped Router Bits

Professional Production Quality Guaranteed!



1 OGEE RAISED PANEL

#1423 2" Large Diameter\$29.95

2 TONGUE AND GROOVE

#1333 Straight\$29.00

#1335 Wedge\$29.00

3 BULL NOSE

#1330 1/2" Dia. of Circle\$16.00

#1331 3/4" Dia. of Circle\$21.00

4 LOCK MITRE BIT

#1433

2" Dia., Stock thickness: 1/2" 3/4" ..\$37.50

5 RABBETING KIT

Ball bearing guides allow 4 depth of cuts: 3/8", 7/16", 5/16", 1/4". Set: 1/4" shank rabbeting bit, 4 bearings (3/8", 1/2", 5/8", 3/4") & hex key.

#1425 1-1/4" Large Diameter.....\$25.00

6 BRASS PILOTED

Route into tight spaces and sharp corners. These bits have Brass Pilots, measuring only 5/32" in dia., instead of the usual 1/2" ball bearing.

#1428 1/8" R Round Over\$16.00

#1429 1/4" R Round Over\$17.00

#1430 3/8" R Round Over\$19.00

7 PATTERN/FLUSH TRIM

#1340

1/2" Dia., 1" Cutting length.\$15.00

#1341

3/4" Dia., 1" Cutting length\$17.00

QUANTITY DISCOUNT!

When ordering 3 or more router bits deduct \$1.00 from each!

25 piece Brad Point Drill Bit Set

Drill accurate holes in wood, plastics & composites.

Bit sizes from 1/8" to 1/2" by 1/64" increments. Bits are deep fluted to clear chips quickly.

ITEM #1413

REG. \$34.95 **SALE \$18.95**

METAL CASE & BIT HOLDER INCLUDED!

Biscuit Joining Set

5/32" Slot Cutter-1/4" Shank and 250 #20 Biscuits

"Biscuit Joining with your Router", Instructional sheet included.

ITEM #1385

REG. \$35.00 **SALE \$29.95**

FAST AND EASY

MERLE

The ADJUSTABLE CORNER CLAMP

- Adjustable, uniform clamping pressure on all corners • Great for wide cabinet frames (for center or edges)
- Forces a frame into perfect square • Almost NO capacity limitation, ships with 23 ft. reel of steel banding • Aluminum & Steel construction

ITEM #1420

REG. \$39.95..... **SALE \$24.95**

1/4" Shank Carbide Tipped Round Over/Beading Bit Set

Set includes: 4 Round Over Bits with 1/2" OD bearing: (1/8", 1/4", 3/8", 1/2"), plus 3/8" OD bearing & allen wrench.



ITEM #1434

\$72 Individually.. **SALE \$39.95**

1/4" Shank Carbide Tipped Cove Bit Set

This production quality set includes 4 Cove Bits: (1/8" R, 1/4" R, 3/8" R, 1/2" R).



ITEM #1435

\$65 Individually.. **SALE \$37.95**

SOLID BRASS Router Inlay Set

Makes perfect fitting recesses and inlays!

Easy to use inlay kit follows a 1/4" thick pattern template of almost any shape to produce the recess. Fits Porter Cable®, Black & Decker® or any router with an adaptor for Porter Cable bushings. Kit includes 1/8" solid carbide downcut spiral bit, brass bushing, brass template guide, brass retainer nut & instructions.

ITEM #1426 REG. \$35.95

SALE \$21.95

Expert Technical Help Before & After Sale

FREE CATALOG



Order By Credit Card or Send Check To:
MLCS, Ltd.,
P.O. Box 4053JJ
Rydal, PA 19046

CLUB SPOTLIGHT

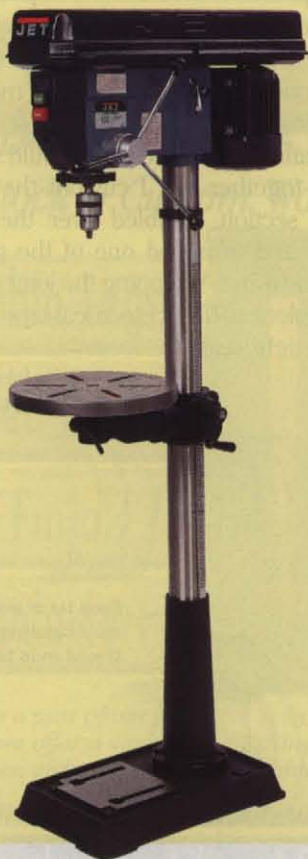
Continued from page 13

house or an area children's hospital. After dinner, an award is given to the guild member who has made the most noteworthy effort toward improving the organization.

For more information about the Minnesota Woodworker's Guild, visit the web site, or call Rich Gotz at 612/544-7278 or Willis Bowman at 612/869-0140. **WJ**

TOOL PRIZE

For participating in the *Woodworker's Journal* Club Spotlight program, the Minnesota Woodworker's Guild will receive this Jet 40" drill press, model #JDP-14MF. This machine is powered by a 3/4-hp motor, and has a built-in work lamp, 12 3/4" table, 1/2" chuck, and a 3 1/4" spindle travel. Speeds range from 200-3,600 rpm. For more information about Jet tools call 800/274-6848, or visit the company's web site at <http://www.jet.com>.



The All New T50PBN[®] STAPLE + NAIL GUN



MADE IN
U.S.A.
HECHO EN E.U.A.



It Packs A One-Two Punch It Staples! It Nails!

Meet the 21st Century ARROW T50PBN

- All Steel Construction with long lasting chrome finish.
- Easy Squeeze double leverage mechanism for professional performance with no loss of driving power.
- Cushioned Non-Slip Hi-Viz Handle. Comfortable to use. Easy to locate.
- Visual Refill Window tells you when to reload.

Packs a Double Wallop

- The new T50PBN shoots 6 different size staples: 1/4", 5/16", 3/8", 1/2", 9/16", and 17/32" Celltile staples. You can handle any job from upholstering a chair to insulating basements and attics.
- It also drives a 5/8" nail so you can decorate a door panel, build a picture frame, or create doll houses and toys for the kids.
- ARROW T50PBN. Solid. Reliable. Perfect for the handyman, the professional, and the hobbyist.



© 1998 ARROW FASTENER CO., INC.

ARROW FASTENER COMPANY, INC., 271 MAYHILL STREET, SADDLE BROOK, N.J. 07663
ARROW FASTENER (U.K.) LTD., 14 BARCLAY ROAD, CROYDON, SURREY CR0 1JN
JADEL DISTRIBUTORS, INC., 6505 METROPOLITAN BLVD. EAST, MONTREAL, QUEBEC H1P 1X9
website: www.arrow-fastener.com

Joint A-billi-T the new matched edge jointer

Woodworkers are abandoning their jointers for the ease, sureness and portability of the Joint A-billi-T.



Joint A-billi-T is just as its name implies, a tool for perfect glue joints. Use your router to cut these joints flawlessly in your shop: dados, rabbets, tapered cuts, squaring panels. Guaranteed square and tight joints starts your project right.

Call today to place your order: **FREE INFO**

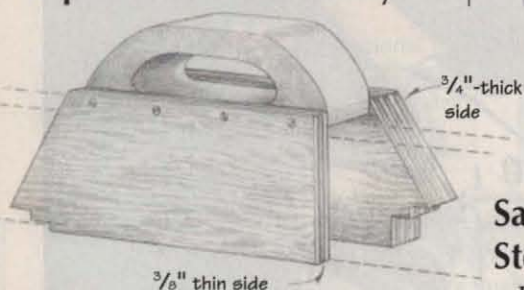
Gudeman Enterprises
P.O. Box 126, Dept. WJ
Goodfield, IL 61742
(309) 965-2183
800-997-1918



**BEST TIP
WINNER!**

SHOP TIPS

Double-Sided Stock Pusher Improves Tablesaw Safety



When ripping narrow stock, it's always a good idea to use a push stick.

Rather than keep a lot of different push sticks on hand, I devised this double-sided model to use on varying sized workpieces. It rides on top of the rip fence so its more stable and safer than regular push sticks.

I made one side of this pusher from $\frac{3}{4}$ " plywood, the other from $\frac{3}{8}$ " plywood so it would clear the blade on narrow cuts. I also cut two notches on each side to accommodate stock of different thicknesses. I sized the pusher wide enough for a snug but easy-to-slide fit on my saw's fence. To keep the stock pusher in good shape, I finished the inside and outside surfaces with Danish oil and a coat of paste wax.

*R.B. Himes
Vienna, Ohio*

Tool Prize

For submitting the best shop tip in this issue, R.B. Himes will receive a Delta 1" belt/8" disc sander, model 31-340.

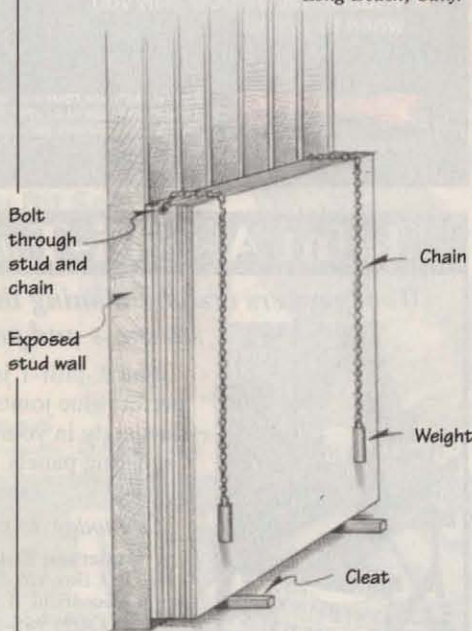


Sash Weights Keep Stored Plywood Straight

Leaned against a wall, plywood sheets will eventually develop a troublesome bow. To avoid problems, I came up with this system for storing plywood flush against the wall and keeping it perfectly vertical.

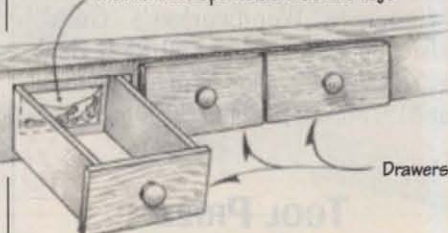
I took two window sash weights, attached chains to them, and anchored the free end of the chains to wall studs. The, I draped them across the front of my stacked plywood as shown. The chain links act as detents, and the weights prevent the sheet from tipping forward. To remove a sheet of plywood from the stack, I just lift up the chain, tilt the stack back a few degrees against my body, and slide the desired piece out.

*Ben George
Long Beach, Calif.*



Store Lock-Out Keys In Back Of Drawer

Manila envelope holds machine keys



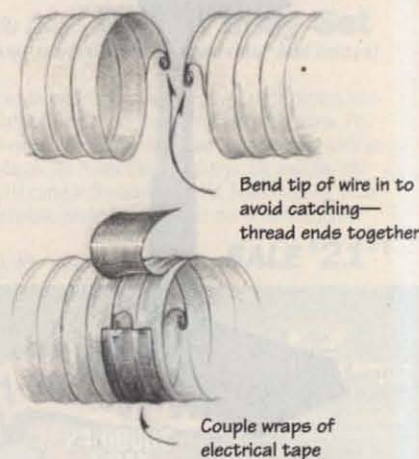
Several of my power tools have lockable power switches, but keeping the keys away from kids (and being able to find them again myself) posed a problem. I finally decided to tape a manila envelope to the back of one of my workbench drawers and store all of the keys in it. Now, I know where the keys are, yet they're out of sight of curious youngsters.

*Howard Moody
Upper Jay, N.Y.*

Shop Vacuum Hose Repair

After stepping on my shop vacuum hose, I thought that I'd have to buy a new one. Then, it occurred to me that the hose was reinforced with a coiled wire and the two sections should screw back together. So, I cut out the damaged section, doubled over the wire ends, and threaded one of the pieces into the other. Wrapping the joint with a wide piece of black electrical tape made an airtight seal.

*John Plank
Waupun, Wis.*



WOODLINE ARIZONA, Inc.
P.O. Box 1530 • Payson, AZ 85547

Great Router Bits and Shaper Cutters!

ALL WOODLINE ARIZONA BITS & CUTTERS FEATURE:
• EUROPEAN CARBIDE • ANTI-KICKBACK DESIGN • SUPER-SLICK FINISH

- All Major Credit Cards Accepted
- Shipping is only \$3.75 per order
- Most items in stock
- Same-day shipping!!
- Order 24 hours-7 days a week **1-800-472-6950**

FREE NEW catalog with over 100 NEW BITS & CUTTERS!

DOING JOINING? WE'RE JOINING HEADQUARTERS!
Best Prices, Best Selection, Top quality!

NEW Don't throw those "shorts" away! Now an affordable router bit **FINGER JOINER WL-1429 only \$39.**

For the Shaper WL-1580 **was \$49.99, Now only \$89.**

GLUE JOINTS in 2 sizes, for up to 5/8" (also is drawer joint cutter)
1/4" shank **WL-1430-1 only \$24.**
1/2" shank **WL-1430-2 only \$24.**

For up to 1-1/4" material
1/2" shank **WL-1430 only \$35.**

For the Shaper
Glue Joint **WL-1706 only \$35.**
Lock Mitre **WL-1581 only \$40.**

NEW "V" FACET & G router bit for up to 1-1/8" material. **WL-1488 only \$30.**

2 PC. SET "V" FACET & G now in 2 sizes for the shaper
3/8" to 5/8" **WL-1571 only \$119.**
3/4" to 1" **WL-1572 only \$139.**

T & G FLOORING CUTTERS
For the Router **WL-1488-1 only \$39.**
For the Shaper **WL-1584 only \$59.**

T&G Router bit For 1/4" to 1/2" material **WL-1488-2 only \$30.**

Router bit CORNER LOCK MITRES in 3 sizes
WL-1420-2 (1/4" shank-up to 5/8" material) **only \$25.**
WL-1420-1 (1/2" shank-1/2" to 3/4" material) **only \$30.**
WL-1420 (for material to 3/4" to 1-1/4") **only \$38.**

NEW Carbide tip ROSETTE CUTTERS
cutting width-2-1/4" \$39. 3-1/4" \$49.

SUPER BUY!!

SUPER SALE!!

CUTTERS and BEARING SETS (to change depth of cut) Two-Flute Cutters in 1/4" or 1/2" shank. Allen wrench incl.

Priced at only **\$15. ea.**
\$39. Set of 3

These great sets are packaged in an attractive wooden box! Available in both 1/4" and 1/2" shank

- 8 pc. Joint Making Set **\$49.**
- 2 Straight Bits, 6 Dovetails
- 6 pc. Roundover Set **\$55.**
- 1/8" 3/16" 1/4" 5/16" 3/8" 1/2" radius
- 5 pc. Cove Set **\$49.**
- 3/16" 1/4" 5/16" 3/8" 1/2" radius
- **NEW 24 pc. SUPER Set only \$129.**

Our **PANEL RAISER WITH UNDERCUTTER**, 5 profiles available: Ogee, Convex, 12" Face Cut w/Otr, Rnd., Traditional, Wave. Dressed with a heat-resistant, super slick finish. Always makes just the right tongue thickness to perfectly match the groove in your Rail & Stile—everytime—what could be easier!!

For your Shaper
3/4" Bore **\$89.**
1-1/4" Bore **\$99.**

3/4" Bore or 1-1/4" Bore Shaper Cutter Panel Raiser **\$59.**

Power for your bench top.

MODEL 412

12 1/2" PLANER

A rugged four-column design and 2 hp motor, combined with our quick change double-sided knives, make this portable unit a jewel of productivity.

Extra long infeed and outfeed tables with stock rollers, combined with the head locking mechanism, minimizes snipe. Hand crank allows minute adjustments of the cutterhead.

Safety features include removable switch key and safety lockout so machine will not run without guards.

4" dust collection shroud comes standard. Lock mechanism allows user both hands free while changing out cutter knives.

2 YEAR Gold Seal WARRANTY

POWERMATIC

Internet: <http://www.powermatic.com> E mail: powermatic@worldnet.att.net
1-800-248-0144

Osborne

Wood Products, Inc.

Stock & Custom Wood Turnings

Table Legs
Bed Posts
Finials
Balusters

Tapered Leg Ensemble

As a part of our extensive selection of wood turnings, we offer a variety of matching leg sets for dining tables, end tables and coffee tables.

Now on the Internet: www.osbornewood.com
call for a catalog • 1-800-849-8876
Hwy. 123 N. • Rt. 3 Box 551 • Toccoa, GA 30577

Do-It-Yourself

AND SAVE MONEY!

- ♦ Heirloom Quality Kits
- ♦ Grandfather Clocks
- ♦ Mantel & Wall Clocks
- ♦ Fully Assembled Available
- ♦ Satisfaction Guaranteed

Send \$1.00 for our color catalog and get \$5.00 off your first kit purchase!

Emperor Clock, L.L.C.
Department 6502
PO Box 1089
Fairhope, Alabama 36533
334-928-2316

Visit our web site at <http://www.emperclock.com>

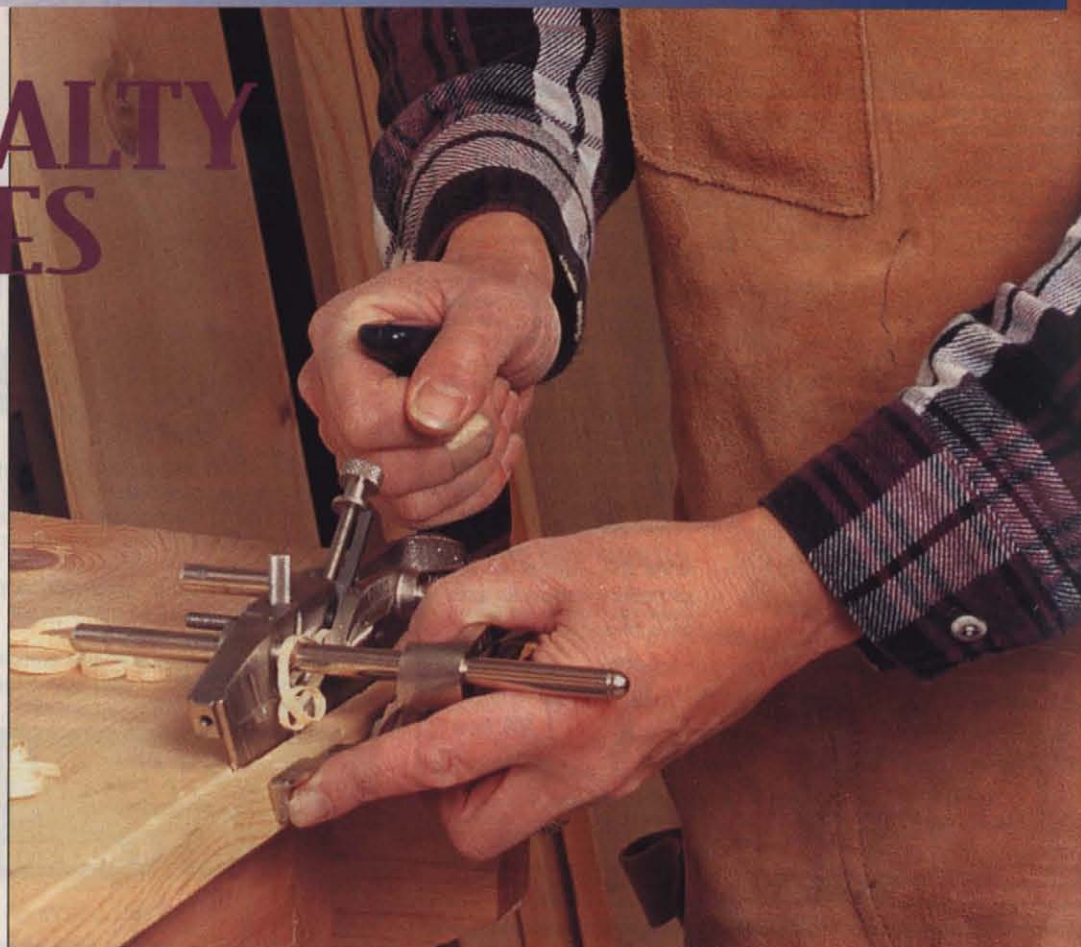


SPECIALTY PLANES

Part 2: Planes for making and fitting joints

by Jim Tolpin

Author plows a 1/4" groove using a plow plane. He finds it more enjoyable and in some cases faster to cut joints by hand using the specialty planes discussed here.



Using hand planes to make and fit joints is not as slow or as tedious a process as you might imagine. If the joint is relatively small and straightforward, hand-planing may even take less time than machining. In fact, I'd wager that I can plane a clean, accurate rabbet on the end of a board in the same time it would take me to install the appropriate tablesaw blade, align the fence (and perhaps install a tall auxiliary fence to better guide the workpiece), make the first cut, and then reposition the blade and fence for the second cut.

But mostly, I like to do hand joinery when I can take the time to enjoy the quiet, focused process of using hand tools. Herein lies the essential joy of woodworking that drew me to this craft in the first place.

Rabbet Planes

Three basic types of rabbet planes are still being made, although you can find numerous wooden varieties as

antiques (*photo A*). The first two, the bench and filister, create the rabbet itself. The third is the side rabbet, an odd-looking plane that presents a blade toward either end of its flat body. As you may have guessed, this tool planes the shoulder of the rabbet, smoothing and widening it. The other two rabbet planes will also do this if you lay them on their side in the rabbet, but the side-rabbet plane references to the board's face. This feature becomes crucial in situations where the rabbet bottom isn't cut parallel to the face.

The bench rabbet resembles a jack plane in size and configuration, but its blade spans the entire width of the body. I use this tool primarily for creating large rabbets and smoothing lap joints. (The side-exposed blade planes right up to the shoulder.) The bench rabbet has no integral guide

fence, so I can change direction if I run into reverse grain.

The filister plane has an adjustable guide fence and a depth stop, which make it the tool of choice for hand-cutting a rabbet. These planes usually have a second blade bed near the front of the body for cutting closer to the end of a stopped rabbet. They also have a cutting spur, a tiny knife that scores the shoulder line of the rabbet ahead of the blade to reduce splintering on cross-grain work.

Photo A: Three types of rabbet planes (l to r): bench, side, and filister.





Photo B: For rabbeting, author finds that a simple guide strip clamped to the workpiece yields a more precise cut than the guide fence supplied with most rabbeting planes.

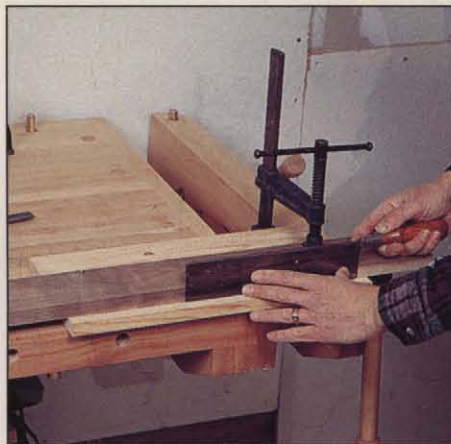


Photo C: Cutting a $\frac{1}{16}$ "-deep kerf with a back-saw before planing, defines the shoulder and minimizes tearout along the shoulder line.



Photo D: To complete the rabbet, lay the plane (a filister shown here) on its cheek on the rabbet bottom and trim the shoulder until you shave off the layout line.

Tuning and Using Rabbet Planes

When sharpening the rabbet plane's narrow blade, make sure you keep the end square or at an acute angle to the sides of the blade. If it ends up out of square, the blade's sides will protrude out the side of the body, interfering with the cut. (See *figure 1*.) Even a slight projection makes it impossible to cut a rabbet that's square to the workpiece, and no amount of adjustment will remedy the problem.

When setting up a filister plane, sharpen the blade to a razor edge. Since this tool lacks a cap iron, you want an extra-sharp blade to minimize the chances of tearout.

To cut a typical rabbet, I don't follow the rules laid out in the instruction manual or by most authors on the subject. I rarely use the filister plane's fence; I never use the cutting

spur; and I don't make strokes the recommended way. Instead, I use my own techniques.

First, I look for the right board. Stock selection is one of those essential trade secrets of old-time woodworkers. If the grain doesn't emerge uniformly in the direction of your most comfortable planing action (from right to left for a right-hander), I wouldn't even try to hand-rabbet it. Also, choose the softest wood you can for the project. Rabbeting with a hand plane may be fun, but only for so long on white oak or sugar maple.

Having chosen the appropriate board, I clamp it flat to the bench with a freshly jointed edge facing outward. I like to have plenty of room for clamping a guide strip, so I don't always rip the board to width until after I've cut the rabbet. Next, I install the guide strip: a straight, square-edged piece of $\frac{3}{4}$ "-thick stock aligned on—not beside—the shoul-

der's layout line. (A thicker board interferes with my grip on the plane.) This guide system gives me more control, and thus a more precise cut, than the fence supplied with the filister plane (*photo B*).

I'm not quite ready to plane, however. First, I define the shoulder by sawing a $\frac{1}{16}$ "-deep kerf with a back-saw, using the edge of the guide rail to keep the saw perpendicular as well as parallel (*photo C*). This provides a shoulder for the first planing cuts and also eliminates any tearout along the shoulder line.

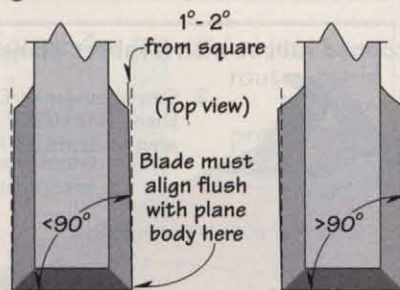
Next, set the plane blade to take a light cut: the wider the rabbet, the lighter the cut to reduce friction. If I'm using the bench rabbet, I check to make sure the cap iron isn't protruding beyond the cheeks of the plane body.

According to standard practice, you start with short strokes at the far end of the board, work your way to the near end, and then finish with several full-length strokes. However, I can't seem to produce a consistently straight and true rabbet this way.

Instead, I start with full-length sweeps, keeping the plane pressed firmly against the guide fence as well as down on the board. I walk with the plane to avoid over-extending my reach, because that can cause the plane to wander from the guide rail. As I work, I check and readjust the blade to ensure that it stays parallel to the plane's sole.

Figure 1

Proper grind on rabbet-plane blade ensures square shoulder



Correct: Slight acute angle ensures that blade sides won't interfere with square shoulder cut

Incorrect: Obtuse angle on blade sides can force plane body away from guide, forming "stair step" with each successive pass

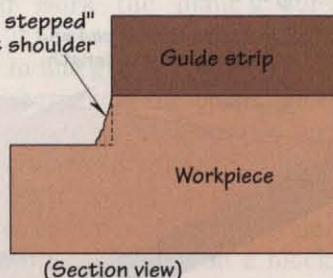




Photo E: Guide rail for cross-grain rabbeting extends well past the board's edges to give better control of the plane. Align guide edge exactly over (not beside) the scribed shoulder line.

This alignment is critical—an out-of-true blade will produce an out-of-true rabbet.

To finish up, I remove the guide rail, lay the plane on its side on the bottom of the rabbet, and trim the shoulder until I shave off the layout line (*photo D*). If I was careful to hold the plane firmly against the full length of the guide fence when I cut the rabbet, the bottom will be parallel to the board's face. If that's the case, then the plane, referenced to the bottom, will square the shoulder to the face.

Cross-Grain Rabbeting

The books also tell you to set up and use the cutting spur whenever you cut across the grain. In theory, this sounds good. First, you pull the plane backwards so the cutting spur slices the fibers and defines the shoulder of the rabbet. Then you begin your sweeps, with the spur cutting the fibers just before the plane blade gets to them.

But I find the spur difficult to sharpen well. If you do manage to put a good edge on it, the spur refuses to stay sharp, which it must be to define a crisp, tear-free shoulder line.

Instead, I do the spur's job by scribing the shoulder line (including the sides of the shoulder on the board edges) with a fresh utility knife. To guide the cut, I clamp a straight length of hardwood to the board, aligning it exactly over—not beside—the scribed layout line



Photo F: Use a bullnose plane to finish a stopped rabbet right up to the stop. To produce a straight cut, author uses two hands, applying firm pressure behind the blade.

(*photo E*). I'll plane to this shoulder line after I've planed to the rabbet bottom and removed the guide rail.

Making a Stopped Rabbet

For this operation, I follow the same steps described earlier for cutting a through rabbet, except that I first define the end of the rabbet by sawing and chiseling out a notch sized to the completed rabbet. To allow the plane to cut as close as possible to the stop, I make the notch long enough to accommodate the fore-sole of the plane. (See *figure 2*.)

After planing the rabbet to the notched area, I switch to a bullnose or chisel plane to finish the rabbet up to the stop (or close to it). Because the sole ahead of the blade on a bullnose is short (and non-existent on a chisel plane), these tools do not easily produce a straight cut. I've learned to use two hands with these planes and apply firm pressure behind the blade (*photo F*).



Photo G: Because of its short body and tricky setup, author generally uses the side rabbet plane only to trim limited areas along the shoulder line.

Using the Side Rabbet Plane

The side rabbet plane can be tricky to set up. To cut perpendicular to the board's face, the blade must align parallel with the side sole. Also, to receive sufficient support, its point must not protrude more than $\frac{1}{64}$ " past the edge (bottom) of the plane. (See *figure 3*.) Because there's little room for blade adjustment in the plane body, the shape of the blade is crucial. You may have to reshape and rehone the blade's bevel to make it sit properly.

To use this plane, set the side sole to the rabbet depth by holding the plane in the rabbet. Next, set the depth of cut on the blade facing the direction of cut. Remember to retract the non-cutting blade to avoid rubbing it against the side of the rabbet, which dulls it. To work into the end of a stopped rabbet, unscrew the nose piece just ahead of the blade. Because of the short

Figure 2

Cutting a stopped rabbet with a rabbet plane

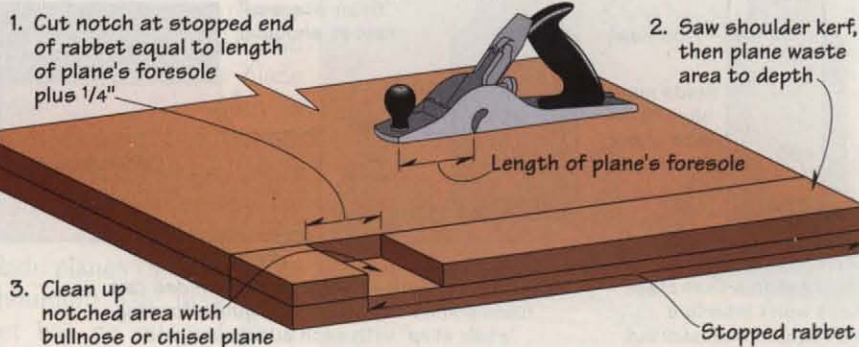




Photo H: Group portrait of shoulder planes: low-body (left) conventional (center), thin-body (back right), bullnose (front right).



Photo I: Lap the sole of an out-of-square shoulder plane using a trued jointer or table saw fence and silicon-carbide sandpaper. Work from coarse through medium to fine grit.



Photo J: To trim a tenon shoulder with a shoulder plane, clamp a backing board to the exit side and make very fine, full-length cuts along the sawn shoulder line.

body, and because I generally use this tool only to trim away limited areas along the shoulder line, I find I have more control if I take short strokes (*photo G*).

Shoulder Planes

Shoulder planes are generally smaller than rabbet planes and have a solid steel or bronze body that's been machined dead-square. Unlike a typical rabbet plane, a shoulder plane has a tight throat opening and a blade bedded at a low angle, two features that help it cut end grain smoothly.

Figure 3 Adjust blade properly on side-rabbet plane

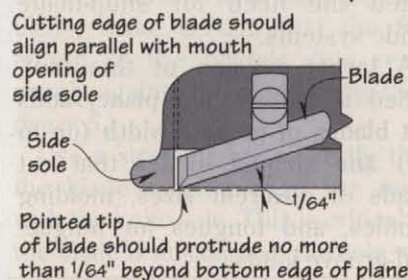
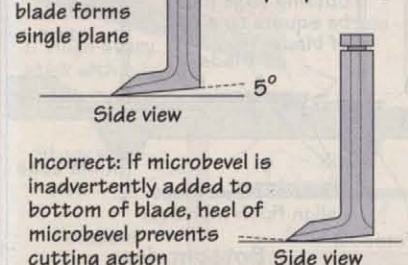


Figure 4 Grind and hone router-plane blade to proper angle



Besides the basic shoulder plane, you'll find three variations: a thin-body, a low-body (sometimes called a trimmer plane), and a combination rabbet/chisel (*photo H*). These tools can be used to trim tenon shoulders (typically end grain), trim rabbet edges (perhaps enlarging a specific area to accommodate a mis-cut panel), and to clean out the bottom of a dado or groove. I use them mostly to square and straighten the shoulders of tenons and lap joints. The heavy, precisely machined body helps ensure that the shoulder is cut perpendicular to the tenon, an essential for obtaining a tight joint.

Setting Up Shoulder Planes

Before putting a shoulder plane into use, check to see that the sole is in fact dead-square to the cheeks. There's little chance that it won't be, but if it appears slightly off, you can lap the sole square. To do this, adhere silicon-carbide sandpaper to the trued fence on a jointer or table saw and work the plane's sole against it, from coarse through medium to fine grit (*photo I*).

When sharpening the blade, hone the end square to the sides. Do not add a microbevel: the resulting high cutting angle would increase the likelihood of tearout on end grain. (The bevel faces up, as on a block plane.) Also, make sure the slot in the blade seats over the adjusting

ring on the depth-adjustment screw and that the edges of the blade align flush with the plane cheeks.

Trimming a Mortise and Tenon Joint

I'll walk you through the process of trimming a tenon to fit snugly in its mortise. First, make certain that the side cheeks of the tenon are parallel to the face of workpiece, paring them with a plane and chisel (a chisel plane is ideal) if necessary. The shoulder plane references to the cheeks, so this step is crucial to forming a square shoulder.

To trim the shoulder, first clamp a backing block to the exit side to prevent tearout. Then, hold the side of the plane firmly against the tenon cheek and make very fine, full-length cuts along the sawn shoulder line (*photo J*). Some woodworkers dispense with the backing block and plane in from either end, but I find it difficult to produce a straight line with this strategy. Use the sole of the plane to check the tenon shoulder for unevenness—any deviation shows up as a gap. When satisfied, square the shoulder cut line to the opposite side of the board and repeat the trimming process.

Router (Dado) Planes

In bygone days, joiners called this plane the "old woman's tooth" because of its unique, tooth-like blade. Its handles are set to either



Photo K: A full-sized and a miniature router plane. Throat of the miniature can be used either open or closed so it's ideal for fine work and cabinetry.



Photo L: The router plane excels at cleaning up the bottom of a machine-cut groove or dado. Cutter depth is adjusted by screw feed and can be placed on either side of the post.



Photo M: The complex-looking plow plane, with its integrated fence, depth stop, and assortment of blade widths, was designed to replace a battery of wooden planes.

side of the blade, ensuring adequate control and a good view of the cutting action (*photo K*). A router plane usually comes with three blades: two square-ended ($\frac{1}{2}$ " and $\frac{1}{4}$ ") and a $\frac{1}{2}$ " pointed. You can also buy a miniature router plane that comes with only a $\frac{1}{4}$ " blade.

Although you can create a dado or groove with a router plane, the tool generally is not used for this. In most cases, a plow plane would be a better choice if you want to do the job entirely with a hand tool. The router plane excels at cleaning up the rough bottom of machine-made dados and cutting shallow mortises for flush-mounted hardware. I use the miniature router plane to cut grooves for inlays, recesses for smaller-scale hardware, and also relief behind small carvings.

Sharpening the tooth-like blade on a router plane takes practice. Its lack of surface area makes it difficult to hold the blade at a consistent angle to the stone. I sharpen the bevel by holding it against the side of my water-wheel stone, which gives me a clear view of the honing action. I hone the bottom of the blade on a flat (horizontal) water stone.

It's crucial that you maintain the proper angle on the bottom. If you accidentally hone a micro-bevel on the heel, it can prevent the blade from cutting, as shown in *figure 4*. If necessary, remove this inadvertent bevel by regrinding and then rehon-ing the bottom to a single angle.

Cleaning Up a Dado

I enjoy using a router plane to clean up the bottoms of machine-cut dados (*photo L*). It's fast, effective, and offers a welcome respite from machine work. To set up the tool for this work, install a chisel-shaped blade as wide as will fit in the groove. Note that this plane offers you a choice of where to face the blade: toward the inside or the outside of the sole. Face the blade outward only if the body will somehow get in the way—for instance, if you have to run the tool into a tight space.

If your plane has a movable post, set it as a stop to control the depth of cut. Adjust the blade to remove a thin shaving, then lock it down with the collar set as low as possible on the mounting shaft to ensure rigidity. After each pass, lower the blade slightly by loosening the clamp and turning the adjusting nut. Note the degree of the turn so you can repeat it to deepen the cut equally in subsequent passes.

Change to the pointed blade for final smoothing. To avoid tearout at the exit of a cross-grain dado, work from the edges toward the middle of the board. When using the router plane to make a shallow mortise, first define the limits of the cut with a chisel. Switch to the pointed blade to make the final smoothing cuts and to get into the corners of a mortise or stopped dado.

Plow Planes

Also called a grooving plane, this complex-looking device has a narrow steel runner/blade holder attached to a push handle (*photo M*). A proud product of the "revolution" in hand-plane technology that took place near the end of the last century, the plow plane was intended to replace the centuries-old wooden plow plane. Because the tool could hold different blades for cutting various narrow rabbets and grooves ($\frac{1}{4}$ " to $\frac{1}{8}$ " wide or less), it could do the work of at least three different wooden planes. The integral fences and depth stops eliminated the need for shop-made guide systems.

A larger version of this tool, called a combination plane, adds flat blades of greater width (up to $\frac{7}{8}$ ") and shaped blades that cut beads of different sizes, molding profiles, and tongues for tongue-and-groove joints.

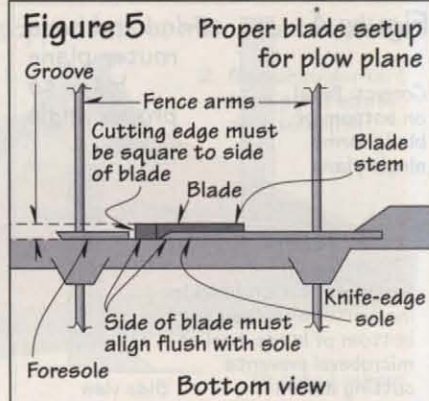




Photo N: To avoid alignment problems with the plow plane, apply firm pressure to the fence with the forward hand and start the groove carefully with a shallow, full-length cut.

Setting Up a Plow Plane

The blade of a plow plane doesn't get much help from the body's narrow sole (which effectively does away with a throat fulcrum), so the cutting action depends largely on a razor-sharp blade. Also, the tool has no cap iron to help stiffen the blade. Instead, it has a blade bevel of 35° (10° steeper than the standard 25°), which allows a thicker blade that more effectively resists vibration and chatter.

When you sharpen a plow blade, always hone it square to its edge—there's no lateral adjustment in the plane body to correct for an out-of-square blade. When installing the blade, make certain that the full length of the blade's side rests snugly against the plane body. (See *figure 5*.)

Use a straightedge to verify that the blade's inside edge lies even with the knife sole. This is critical: if the blade is misaligned, the sole will

rub against the side of the groove, throwing off the cut and making the plane hard to push. Also, set the blade to remove a fine shaving. Never ask it to take a thick cut because this can increase cutting resistance and cause the blade to chatter. It also chokes the throat with shavings and puts more stress on the guide fence, which tends to knock the fence out of alignment.

Plowing a Groove

The advice offered earlier about selecting the proper stock for hand-rabbeting also applies to plowing a groove. For the best results (not to mention a better time), choose clear, straight-grained wood with grain that runs parallel to both the edge and face if possible. Again, choose a species that's amenable to hand-tool work. I don't even try to use the narrow-soled and rather finicky plow plane on difficult to work stock.

Select a blade that equals the width of the groove you intend to cut. Next, mark the grain direction on the workpiece. You want to select a surface that allows you to cut in the direction that suits your handedness. Make sure the fence arms lock firmly to the body. (Some versions thread in, others are held by lock screws.)

Now, set the fence to width. To do this, mark the inset distance for the groove on a story stick and then hold the stick against the adjustable fence and the blade edge. (See *figure 6*.) Next, mark the position of the knife-edge sole. Move the stick

fore and aft along the sole as you tighten down the fence on the arms, double-checking the mark at the blade to maintain the correct inset distance. Use a storystick to set the depth stop as well.

Here again, I go against the common wisdom regarding the best planing action. Several woodworking authors prefer not to rely on the plow plane's integral fence at the near end of the groove. They feel it doesn't provide enough bearing surface to ensure that the groove gets started in the right place. Their solution is to start at the far end, taking gradually longer cuts and working their way back to the near end.

I've found, however, that this strategy doesn't really help much. Instead, I carefully start the groove at the near end with a shallow but full-length cut. If I keep firm pressure with my forward hand against the length of the fence as I push with the other hand, it's not difficult for me to maintain perfect alignment from the start (*photo N*). Then, I just repeat the same cut until the depth stop makes contact and prevents the blade from taking any more shavings. *Wj*

Photographs: Craig Wester

SOURCES

For more information on the specialty planes discussed here, contact:

Lee Valley & Veritas
800/871-8158

Lie-Nielsen
800/327-2520

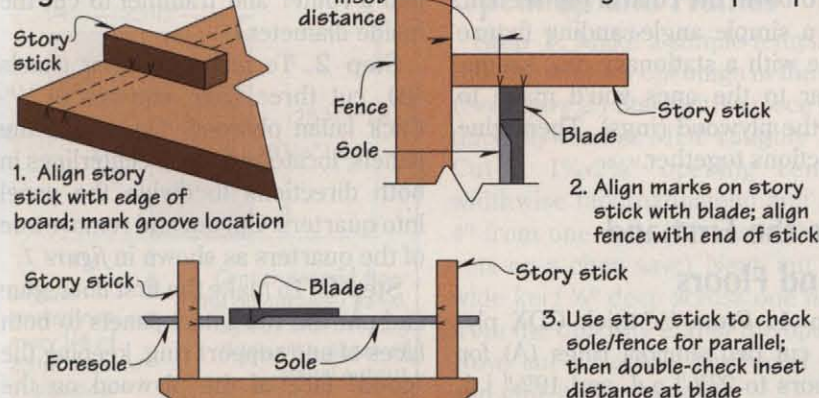
Record
800/267-8367

Stanley
800/648-7654

William Alden
800/249-8665

Woodcraft
800/222-1153

Figure 6



Cutting corners makes sense in this masterpiece of American ingenuity

Round Barn



Before You Start

To engineer this remarkable design in small scale, we replaced the structural framing with several plywood rings and used inexpensive $\frac{1}{8}$ "-thick lauan plywood for the siding and roofing. (For more information on round barns, see "Circular Logic: The Round Barn In America" on page 28.) Fastening this thin material posed a problem, so we decided to "pin" the siding and roofing with $\frac{3}{8}$ " brads.

We found it easiest to turn the cupola. If you don't have a lathe, you can prepare the three sections separately

using a fly cutter on your drill press or a circle-cutting fixture on your bandsaw. To bevel the conical top section, make a simple angle-sanding fixture for use with a stationary disc sander (similar to the ones you'll make to bevel the plywood rings). Then, glue the sections together.

Make the First and Second Floors

Step 1. From $\frac{5}{8}$ "-thick CDX plywood, cut two support rings (A) for the floors to 23 $\frac{3}{8}$ " o.d. and 19 $\frac{7}{8}$ " i.d.

(We used a pivot-point fixture on the bandsaw to cut the outside diameter and a router and trammel to cut the inside diameter.)

Step 2. To make the floor panels (B), cut three 23 $\frac{1}{2}$ " squares of $\frac{1}{4}$ "-thick lauan plywood. On one of the panels, locate and mark centerlines in both directions to divide the panel into quarters. Cut out and remove one of the quarters as shown in figure 1.

Step 3. To make the first floor, glue and pin the two intact panels to both faces of one support ring, keeping the "good" face of the plywood on the

exterior. Center the remaining panel on the second ring and mark the edges of the cutout on the ring. Cut along the waste side of the lines to remove this quarter of the ring. Now, glue and pin the panel to the ring, aligning the cut edges flush.

Step 4. Using a flush-trim bit, rout the panels flush with the rings.

Step 5. From $\frac{5}{8}$ " CDX plywood, cut two $1\frac{1}{2}$ " wide support strips (C) to fit the edge of the second-floor cutout. Cut one strip to fit exactly, then make the other strip $1\frac{1}{2}$ " longer to overlap the end of the first. Glue and pin the strips flush with the cutout edges.

Add Siding To Erect The First Story

Step 1. Cut three 6"-long spacer blocks to support the second floor at the correct height and keep it stable while you assemble the siding. (We used 2x4 scraps.) Arrange the blocks on the first floor, set the second floor on top (so the ring, not the floor panel, is supported), and then center the second floor over the first.

Step 2. To make the siding (D), cut enough $1\frac{1}{2}$ "-wide strips of $\frac{1}{8}$ " lauan ply to make 37 pieces. With the 6" spacers in place, measure the distance from the bottom edge of the base to the top edge of the second floor, then cut the 37 siding strips to this length. (Ours measured $7\frac{1}{16}$ " long.)

Step 3. Glue and pin the siding to the edges of the two rings. To do this, start the first strip flush with the top of the second floor and with one edge of the cutout. Make sure you square

BARN

Bill of Materials

PART	T	W	L	MTL.	QTY.
A Floors—support rings	$\frac{5}{8}$ "	23 $\frac{3}{8}$ " dia.		CD	2
B Floors—panels*	$\frac{1}{4}$ "	23 $\frac{3}{8}$ " dia.		LP	3
C Floors—support strips**	$\frac{5}{8}$ "	1 $\frac{1}{2}$ "	11 $\frac{1}{16}$ "	CD	2
D Siding*	$\frac{1}{8}$ "	1 $\frac{1}{2}$ "	7 $\frac{1}{16}$ "	LP	37
E Window frames*	$\frac{3}{16}$ "	1 $\frac{3}{4}$ "	2 $\frac{5}{8}$ "	P	6
F Roof—lower ring	$\frac{3}{4}$ "	23 $\frac{1}{16}$ " dia.		HP	1
G Roof—upper ring	$\frac{3}{4}$ "	18" dia.		HP	1
H Roof—crown disc	$\frac{3}{4}$ "	6 $\frac{1}{4}$ " dia.		HP	1
I Roofing—lower tier†	$\frac{1}{8}$ "	2 $\frac{15}{16}$ "	6 $\frac{5}{16}$ "	LP	19
J Roofing—upper tier†	$\frac{1}{8}$ "	2 $\frac{13}{32}$ "	8 $\frac{5}{8}$ "	LP	16
K Cupola		3 $\frac{3}{8}$ " dia.	2 $\frac{1}{16}$ "	P	1

*Parts cut to final size during construction. Please read all instructions before cutting.

**Two parts required. Dimensions given are for larger part.

†Initial size of blank. Each blank yields two roofing panels.

MATERIALS LIST

CD—CDX plywood
LP—lauan plywood
HP—hardwood plywood
P—pine

SUPPLIES

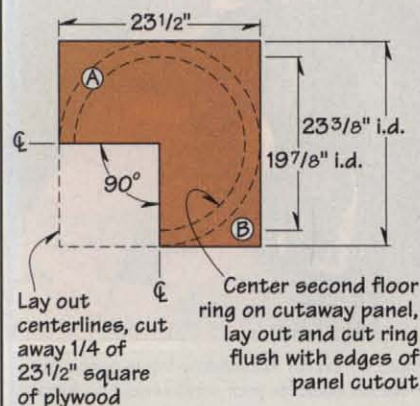
$\frac{5}{8}$ " brads; #6x1 $\frac{1}{4}$ " flathead wood screws; woodburning pen; finishing supplies (orange shellac, enamels, thinner).

the strip to the floors before you pin the bottom end to the first-floor ring. Place the second strip at the opposite edge of the cutout. Now, work from both ends toward the middle, but stop when you have five or six strips left.

Step 4. Dry-assemble your last few siding strips to the barn to check for fit. You may need to remove a bit of width from each strip, or cut a slightly wider strip to replace one of the $1\frac{1}{2}$ "-wide strips. When you're satisfied with the fit, glue and pin the remaining siding in place.

Step 2. To rout the six window openings, fit your plunge router with a $\frac{1}{8}$ " straight bit and a $\frac{1}{16}$ "-o.d. guide bushing. Position the template on the barn siding with the fence resting against the bottom of the first floor. Center it over the fourth strip from

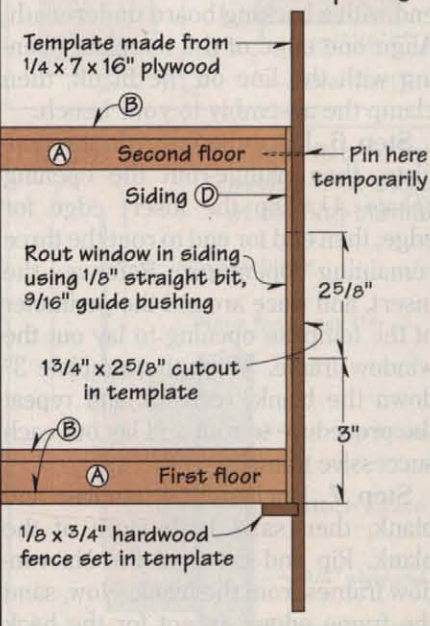
Figure 1 Cut away one-quarter of second floor parts



Rout the Window Openings and Frames

Step 1. Make a simple template to rout the window openings in the barn. (See figure 2.) Start with a piece of $\frac{1}{4}$ "-thick plywood or MDF roughly 7x16". Cut a $1\frac{3}{4}$ x $2\frac{5}{8}$ " opening centered widthwise (approximately) and about 4" from one end. (We made the four cuts on a chop saw.) Next, cut a $\frac{1}{8}$ "-wide kerf $\frac{1}{8}$ " deep across one face 3" from the opposite end of the opening. Now, cut a $\frac{1}{8}$ x $\frac{3}{4}$ x7" hardwood fence and glue it into the kerf.

Figure 2 Make template to rout window openings

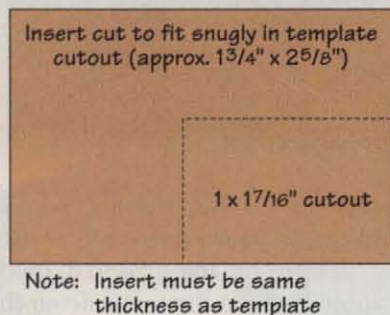


one edge of the cutout, then pin or tack the template temporarily to the second-floor ring. (See figure 2.) Plunge the router bit through the template opening, then rout around the perimeter to cut out the window.

Step 3. Position the second window symmetrically opposite the first (on the opposite side of the barn opening). Rout the remaining four windows in every sixth strip of siding.

Step 4. To make the window frames, remove the fence from the template. Plane a scrap piece of hardwood to match the template thickness, then cut an insert from it that fits snugly into the template opening. Now, cut a $1 \times 1\frac{1}{16}$ " notch in one corner of the insert. (See figure 3.)

Figure 3 Make template insert with cutout for routing window frame openings



Step 5. From $\frac{3}{16}$ "-thick pine, cut a $2\frac{1}{2} \times 24$ " blank for the six window frames (E). Scribe a lengthwise line $\frac{1}{2}$ " from one edge of the blank. Place the template over the blank near one end with a backing board underneath. Align one edge of the template opening with the line on the blank, then clamp the assembly to your bench.

Step 6. Place the insert in the template, then plunge-rout the opening (photo A). Flip the insert edge for edge, then end for end to rout the three remaining openings. Remove the insert, and trace around the perimeter of the template opening to lay out the window frame. Move the template 3" down the blank, reclamp, and repeat the procedure to rout and lay out each successive frame.

Step 7. Unclamp the template and blank, then sand both faces of the blank. Rip and crosscut the six window frames from the blank. Now, sand the frame edges except for the back

outside edge where the frame will join the siding.

Step 8. Fill all of the brad holes in the siding with putty. Sand the siding smooth, and also sand the top ends flush with the second floor. Break all sharp corners.

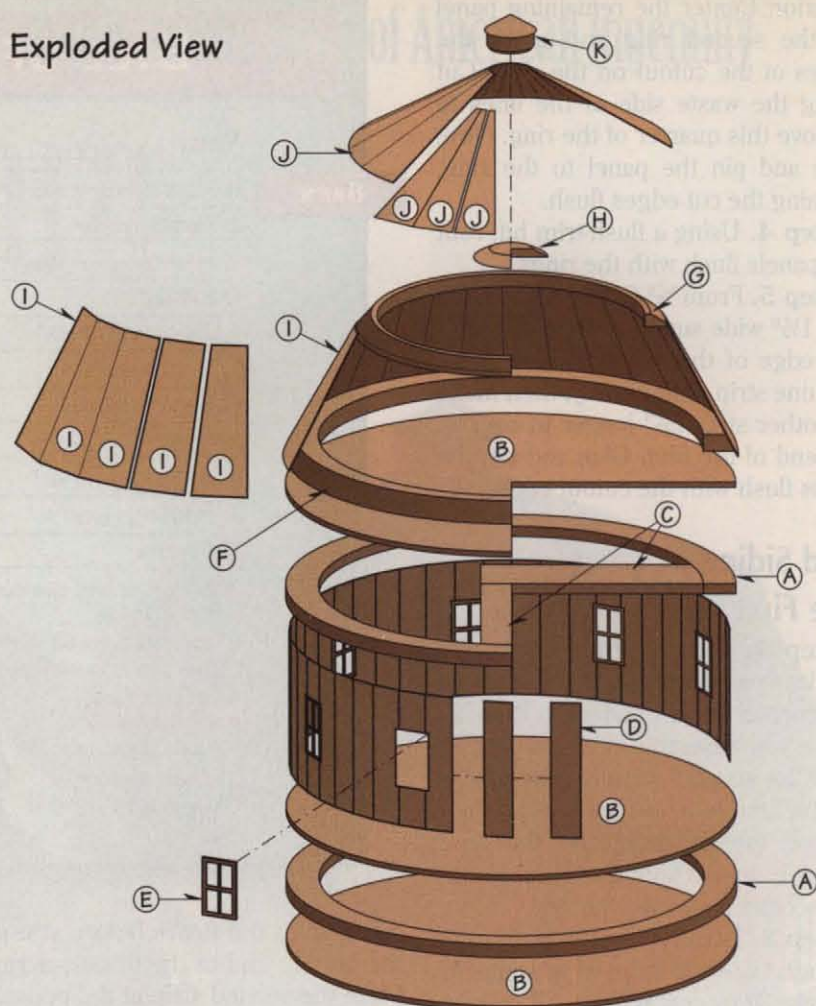
Step 9. Center and glue the window frames over the openings. Secure them with strapping tape until the glue dries.

Make the Roof Supports

Step 1. From $\frac{3}{4}$ " hardwood plywood, cut discs for the lower roof ring (F), the upper roof ring (G), and the crown disc (H) to outside diameters of $23\frac{1}{16}$ ", 18", and $6\frac{1}{4}$ " respectively.

Step 2. Make angle guides for bevel-sanding the roof supports. To do this, cut two 6×14 " pieces of $\frac{3}{4}$ "-thick scrap stock. Bevel-cut one end of each piece to $67\frac{1}{2}^\circ$ ($22\frac{1}{2}^\circ$ from square) and 30° (60° from square) respectively.

Exploded View



Step 3. Position the angled end of the 60° guide $\frac{1}{4}$ " from the disc face on your stationary disc sander or the belt on your upright belt sander. Then, square the guide to the disc face and clamp it to the table. (See figure 4.) Place the large plywood disc (F) against the guide, and bevel the edge around its perimeter. Advance the guide, reclamp, and repeat until the



Photo A: To rout the window-frame openings, make an insert for your window-routing template.



Photo B: This view of the assembled roof shows the beveled, cut-away profiles of the rings and crown disc.

bevel just touches the opposite corner of the disc.

Step 4. Repeat the previous step to bevel the 18" plywood disc (G) to 60°. Next, using a compass, draw a 15 3/4"-diameter circle on the top (beveled) face of this disc. Next, set up the 22 1/2° guide on the disc sander, and sand this face to the 15 3/4" circle. (See figure 5.)

Step 5. Set and clamp the 22 1/2° guide as you did the 60° guide in Step 2. Bevel-sand the edge of the 6 1/4" disc right to the corner.

Step 6. Fit your plunge router with a 3/8" straight bit and a trammel. Cut out the interior of the two large discs to form rings, leaving 1 1/2" of width (20 1/4" i.d. and 15" i.d. respectively).

Step 7. Center the rings and crown disc on the second floor and mark the edges of the 90° cutout on them. Cut out this section on all three parts, keeping your bandsaw blade on the waste side of the lines. (To view the completed rings and disc as they appear in the assembled roof, see photo B.)

Prepare the Roofing

Step 1. From 1/8" lauan plywood, cut 19 blanks for the lower-tier roofing (I) to 2 1/4 x 6 5/8". Cut 16 blanks for the upper-tier roofing (J) to 2 1/32 x 8 5/8". Note: Each blank yields two roofing strips.

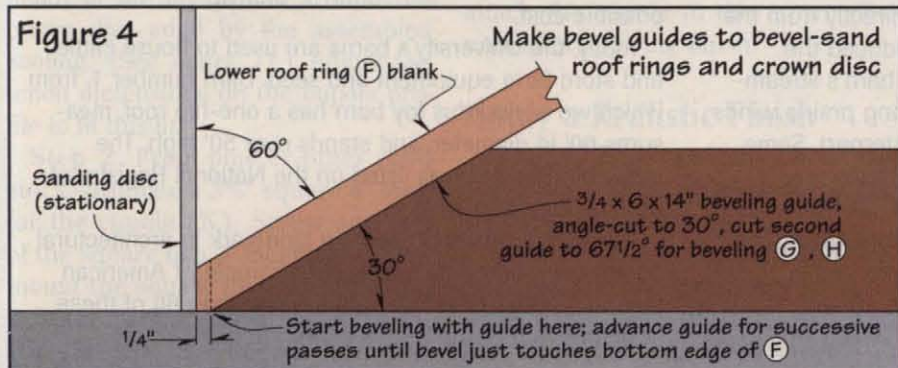


Photo C: Taper one edge of roofing blanks using two fixtures (one for each size), then turn blanks end for end, and (without the fixture) rip the second edge parallel to the tapered edge.

Step 2. On one blank of each size, lay out the strips as dimensioned in figure 6. Make a fixture to trim the angled waste from one edge of each blank. (See figure 7.) Then, trim one edge of all blanks using the two fixtures.

Step 3. Without using the fixtures, rip the opposite edge of all blanks parallel to the angle-cut edge (photo C). To do this, place the angle-cut edge of the laid-out blank against the rip fence and use it to set the fence so the blade aligns with the layout line on the opposite edge of the blank. Repeat the procedure to rip the other size blanks.

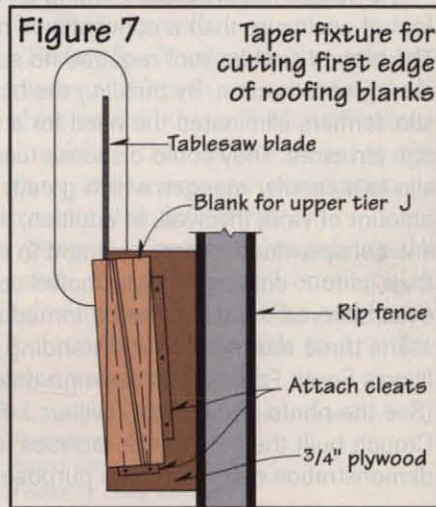
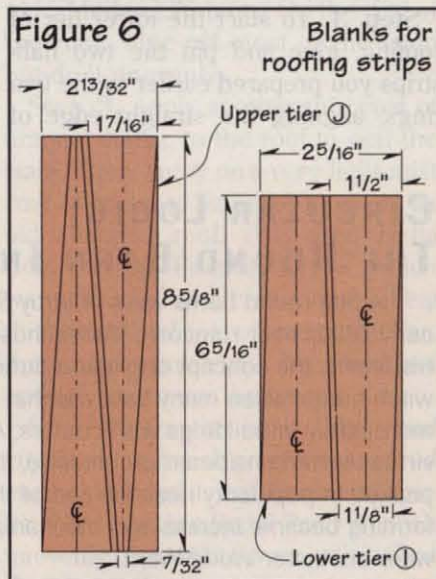
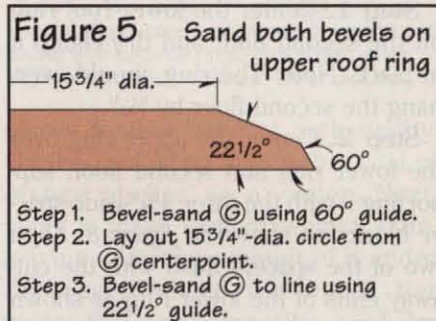
Step 4. Using your two laid-out blanks, make a third and fourth fixture to separate the two roofing strips from each blank. Cut a single blank in half on each fixture, and check the two halves to make sure they're identical (photo D). Adjust the fixtures if necessary, then cut the remaining roofing strips.

Step 5. Lay out a lengthwise centerline on one roofing strip of each size. Using a sharp utility knife and straightedge, slice each part in half. You'll align these two half-strips with the edges of the barn opening on both roof tiers.

Step 6. From scrap material, make spacers to support the upper roofing ring



Photo D: After tapering both edges of the roofing blanks, make a third and fourth fixture to cut each blank size into identical halves.



and crown disc during the roof assembly. For the upper roof ring, cut three $\frac{3}{4} \times 4\frac{7}{8} \times 6$ " pieces to space the ring $4\frac{7}{8}$ " above the second floor. For the crown disc, cut two pieces to $\frac{3}{4} \times 3 \times 7\frac{19}{32}$ " and $\frac{3}{4} \times 3 \times 4 \times 7\frac{19}{32}$ ". Screw these latter two spacers together along their edges to form a 3x3" angle. Stand this angle on end to support the disc $7\frac{19}{32}$ " above the second floor.

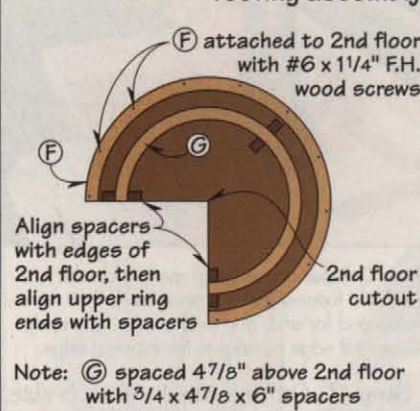
Assemble the Two-Tiered Roof

Step 1. Center the lower roof ring on the second floor and dry-clamp it in place. Note: The ring should overhang the second floor by $\frac{5}{32}$ ".

Step 2. Center the upper ring over the lower ring and second floor, supporting it with the three $4\frac{7}{8}$ "-wide spacer blocks as shown in figure 8. Align two of the spacers flush with the cut-away ends of the lower ring as shown to help you position the upper ring.

Step 3. To start the lower tier of roofing, glue and pin the two half-strips you prepared earlier to the two rings, aligning the straight edge of

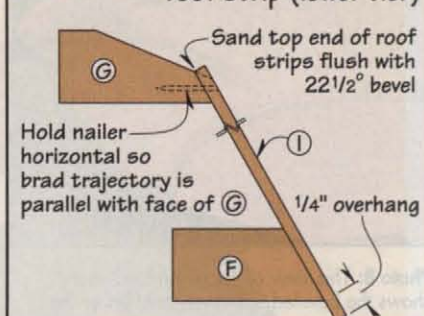
Figure 8 Roof rings set up for roofing assembly



each with the cut ends of the rings on both sides of the barn opening. Position, glue, and pin the strips as shown in figure 9.

Step 4. Continue gluing and pinning the lower tier of roofing from both ends toward the middle. Stop when you have four or five strips left, and dry-assemble the remaining strips to check for fit. If the strips won't fit in the space, use the taper fixture to remove a slight amount of width from each piece. If the strips

Figure 9 Section view of pinned roof strip (lower tier)



won't fill the entire space, remove $\frac{1}{4}$ " of width from the strips and cut an additional strip to fit.

Step 5. Rasp or sand the top ends of the assembled strips flush with the $22\frac{1}{2}^\circ$ bevel on the upper ring as shown in figure 8. Also, sand the face of the roofing to ease the ridges where the strips meet.

Step 6. Using a fine-tip woodburning pen, burn shingle details in the roofing. To do this, first make a simple trammel with a hole for the pen near one end and a series of indexing holes spaced $\frac{1}{4}$ " apart (photo E). Use a nail that fits snugly in the holes to index

CIRCULAR LOGIC: THE ROUND BARN IN AMERICA

The first round barns were built by Shakers during the early 1800s near Hancock, Massachusetts. According to historians, the concept originated during the days of the witch hunts, when many believed that demons could hide more easily in buildings with corners. Although its many virtues were considered progressive, the round barn peaked in popularity near the end of the last century as farming became increasingly mechanized. Only a handful were built after World War I.

The design requires less framing and bracing per cubic foot of enclosure than a conventional rectangular barn. The hipped circular roof required no support or scaffolding during construction. By building the barn around a central silo, farmers eliminated the need for a separate feed-storage structure. They could dispense feed directly from the silo to a circular manger, which greatly reduced the amount of work involved. In addition, the barn's streamlined shape made it more resistant to strong prairie winds than its four-cornered, gable-roofed counterpart. Some even believed the design to be tornado-proof.

The three round barns still standing on the University of Illinois South Farms in Champaign date from 1907-13. (See the photo above right.) Wilbur J. Fraser and H. C. Crouch built them as model facilities for a 20-acre demonstration dairy farm, the purpose of which was to



The round barn offered economical construction, convenient livestock feeding, and resistance to strong winds. These barns, built by the University of Illinois between 1907 and 1913, served as model facilities for a demonstration dairy farm.

produce the largest amount of milk per acre at the lowest possible cost.

Today, the University's barns are used to house cattle and store farm equipment and seed. Barn number 1, from which we scaled this toy barn has a one-hip roof, measures 60' in diameter, and stands over 50' high. The research complex was listed on the National Register of Historic Places in 1994.

The round barn represents a landmark in architectural engineering and a characteristic example of American ingenuity. Experts estimate that fewer than 60 of these structures still stand in this country today.

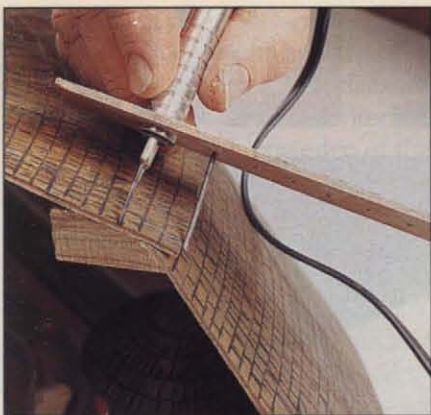


Photo E: Make a trammel to fit your wood-burning pen, then use it to burn concentric courses of shingles in the roofing.



Photo F: Shingle detail shows irregular courses and randomly spaced vertical lines. For proper scale, make individual shingles no more than 1/4" wide.



Photo G: Assembled barn and roof (without cupola) shows careful alignment of roofing and siding with cutaway rings, crown disc. Note slight overhang of roofing at eaves and hip.

each course of shingles. After you've burned the concentric courses, burn lines perpendicular to the courses to form individual shingles. To streamline this process, set the pen on "high" heat and use a stippling motion to create a random pattern. To scale the shingles properly, space these lines no more than 1/4" apart (*photo F*).

Step 7. Align the 7 19/32"-high angle spacer you made earlier with the 90° apex of the second-floor cutout. Place the crown disc on top of the spacer, aligning its cutout with the spacer in the same fashion. (See *figure 10*.)

Step 8. Start the upper tier of roofing as you did the lower tier, gluing and pinning the two half-strips at the edges of the cutout. Then, follow the same steps to complete the upper tier (*photo G*). Note: Do not sand the top ends of the roofing strips as you did on the lower tier, but do sand the roofing face to ease the ridges. Burn the shingle detail as before.

Add the Cupola

Step 1. Measure the diameter and depth of the lip formed around the crown disc edge by the assembled roofing. (See *figure 11*.) Adjust the tenon dimensions on the cupola profile to fit this lip.

Step 2. From pine or other solid stock, laminate a 3 3/8" square 4" long for the cupola (K). Screw one end of the square to a 3" faceplate. Then, mount the square on your lathe and turn the profile shown in *figure 11*. Part or saw the cupola from the

Figure 10 Align crown disc for assembly using 7 19/32"-high angle spacer (top view)

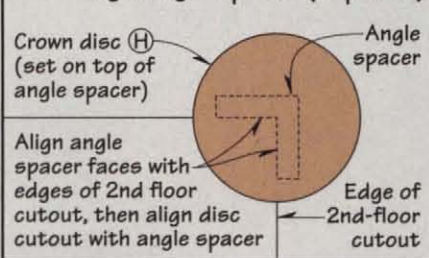
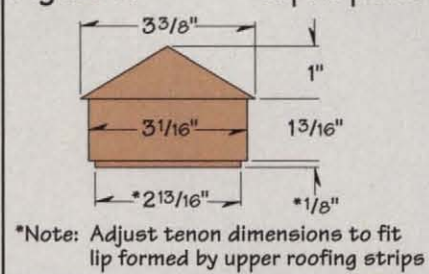


Figure 11 Cupola profile



waste. Note: If you don't own a lathe, cut three separate discs and shape the large disc to profile for the top as suggested earlier in "Before You Start."

Step 3. Woodburn shingles on the cupola roof to match those on the remainder of the roof. Note: Do not attach the cupola to the crown disc until after applying finish.

Apply a Realistic Finish

Step 1. Final-sand any parts that still need it. Make sure you break any remaining sharp edges.

Step 2. To give the barn and roof a realistic weathered appearance, apply a multi-step finish to each part and deliberately make it uneven in

places for the sake of authenticity. On the roof, start with a thin coat of orange shellac as a sealer. Next, apply a glaze coat of walnut stain, leaving a heavier amount of it under the eaves where the upper tier meets the lower tier. (We used Zar #115 Modern Walnut.) On the rest of the roof, wipe off most of the stain but do it unevenly.

Step 3. Apply another thin coat of orange shellac to the roof to seal the stain. Then, spray on a very light mist coat of green to simulate moss on an old shingled roof. (We used Delta Color Mist in Emerald Green, which we purchased at a crafts store.) Seal this with a final coat of orange shellac, then rub the finish with steel wool just enough to remove the gloss.

Step 4. On the barn siding and cupola sides, brush on one coat of red enamel thinned 1:1 with mineral spirits. (We used Ace Regal Red.) Apply it unevenly to simulate worn paint. Coat the exposed plywood edges on the two floors as well.

Step 5. Mask off the window frames and brush on one coat of off-white enamel thinned 1:3 with mineral spirits. The thinner reduces the gloss and increases penetration to create a stain-like effect.

Step 6. Center the cupola on the crown disc. Then, drill countersunk holes up through the disc and screw the cupola in place with #6x1 1/4" flat-head wood screws. 

Photographs: StudioAlex, Charles Sommers
Illustrations: Dana Quiram
Project design: Dick Coers
Written by Doug Cantwell

PRAIRIE TABLE LAMP

Light, shadow, and
hardwood accents
produce harmony
in opposition



Before You Start

Designer LaVerne Schuring, Jr. says he spent a lot of time planning the combination of four woods he uses in this lamp. The woods and design details work nicely together, so it's best to stick with these same materials so as not to lose the effect. For a more sedate variation, however, he substitutes cherry for lacewood on the post.

The lamp calls for standard electrical supplies and a rheostatic dimmer switch. (See the supplies list in the Bill of Materials.) For the shade, LaVerne uses Spectrum glass, but any light, fairly neutral-colored "art" glass will work.

Make the Post

Step 1. Surface 4/4 lacewood stock to $1\frac{3}{16}$ " thick ($\frac{7}{8}$ " if possible). Cut four $3\frac{1}{4}$ x 17" pieces. Then, tilt your tablesaw

blade to 45° and bevel-rip both edges of these pieces to 3" finished width to form the post sides (A).

Step 2. Glue and assemble the sides to form a square, edge-mitered post. (We used four band clamps.) After the glue has dried, unclamp the post and remove any squeeze-out.

Step 3. Cut a centered $\frac{3}{4}$ " groove $\frac{3}{8}$ " deep in each face of the post. (See figure 1.) To do this, first measure the

actual width of your post face, then subtract the $\frac{3}{4}$ " groove width and divide by two. Set the rip fence this distance from your tablesaw blade. Cut a kerf on each face to establish one edge of the groove, then turn the post end for end and repeat. Replace the blade with a dado head set to the same height, and test it on a piece of scrap. Now, clean out the interior of the four grooves.

Step 4. Prepare a $\frac{3}{4} \times 1\frac{1}{2} \times 17$ " piece of Honduran rosewood. Note: For safety and accuracy, install a splitter on your tablesaw for the following procedure if it doesn't already have one. Rip four $\frac{1}{16}$ "-thick slices from the edge for the post inserts (B). (You could also cut the inserts from veneer.) Sand the faces smooth. From scrap, prepare $\frac{5}{8} \times \frac{5}{8} \times 17$ " clamp cauls, then glue an insert into the bottom of each groove. Clamp the inserts using the cauls.

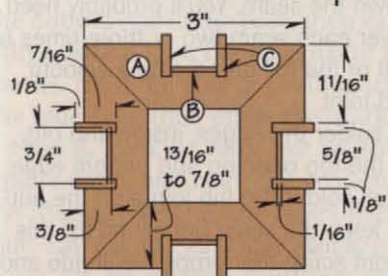
Step 5. After the glue has dried, cut a $\frac{1}{8}$ "-wide kerf $\frac{1}{16}$ " deep along both edges of each groove to accept the maple accents. To form a clean joint between the insert and the accents, overlap the insert edge by $\frac{1}{16}$ ". (See figure 1.) To do this, set the rip fence $\frac{1}{16}$ " closer to the blade than you did earlier (to establish the insert groove edges) and use the same technique.

Step 6. Before you add the accents, sand the post faces to 240-grit. (We used the stationary belt sander to avoid rounding the corners.)

Step 7. To make the accents (C), prepare a 3×17 "-wide piece of $\frac{1}{16}$ "-thick maple. Rip eight $\frac{1}{8}$ "-thick slices from the edge. Apply glue to the bottom edge and back face of each accent and insert it into a kerf. To clamp, adhere masking tape to the inside face of the accent, pull it over the edge and around

Figure 1

Section view of assembled post



LAMP

BILL OF MATERIALS

PART	T	W	L	MTL. QTY.
A Post—sides*	$1\frac{3}{16}$ "	3"	$16\frac{1}{2}$ "	L 4
B Post—inserts*	$\frac{1}{16}$ "	$\frac{5}{8}$ "	$16\frac{1}{2}$ "	R 4
C Post—accents*	$\frac{1}{8}$ "	$\frac{9}{16}$ "	$16\frac{1}{2}$ "	M 8
D Base	$1\frac{5}{16}$ "	$9\frac{3}{8}$ "	$9\frac{3}{8}$ "	C 1
E Shade supports*	$\frac{3}{8}$ "	$1\frac{3}{4}$ "	$18\frac{1}{16}$ "	R 2
F Supports cleats*	$\frac{3}{8}$ "	$1\frac{3}{4}$ "	$\frac{1}{2}$ "	R 4
G Cavity panel**	$\frac{1}{4}$ "	4"	4"	CP 1
H Knob	$\frac{1}{2}$ "	$\frac{1}{2}$ "	$\frac{7}{8}$ "	R 1

*Parts cut to final size during construction. Please read all instructions before cutting.

**Sized to fit rabbeted cavity.

MATERIALS LIST

L—lacewood (quartersawn)
R—Honduran rosewood
M—maple
C—cherry
CP—cherry plywood

SUPPLIES

#6x $\frac{3}{4}$ ", 8x1", #8x2 $\frac{1}{2}$ " flathead wood screws;
#8x1 $\frac{1}{2}$ " roundhead screws; $\frac{1}{2}$ "-o.d. flat washers; rheostatic light switch (low-profile with long stem); 18" length of $\frac{3}{4}$ "-o.d. all-thread lamp pipe; $\frac{1}{4}$ -p threaded nut; lamp socket; lamp cord with plug; $\frac{1}{4}$ "-thick colored glass (four panels, approx. 9x17"); $\frac{1}{4}$ " copper foil tape; lead solder; black patina for lead solder.

the post corner, and secure it to the adjacent post face.

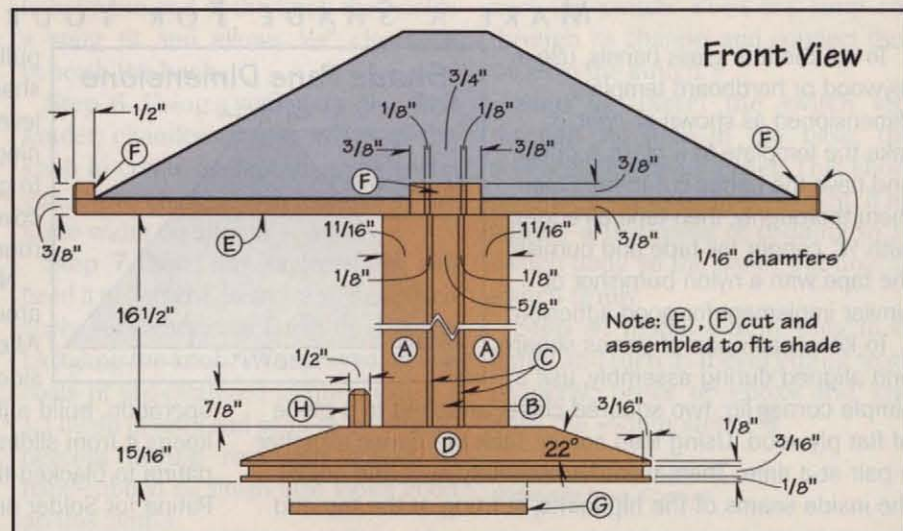
Step 8. Remove the masking tape and square both ends of the post to $16\frac{1}{2}$ " finished length. (We used the cutoff saw for this, supporting the post with spacers to ensure accurate cuts.)

Prepare the Base

Step 1. Surface a piece of 6/4 cherry to $1\frac{5}{16}$ " thick. From this, rip and crosscut a $9\frac{3}{8}$ "-square blank for the base (D).

Step 2. Lay out an off-centered cavity on the underside of the base blank to house the rheostat. (See figure 2.) To determine the necessary depth and size of the cavity, procure your switch in advance and measure its stem length and dimensions. Don't go any deeper with the cavity than necessary, and keep in mind that you'll bevel the top of the base.

Step 3. To form the cavity, remove most of the waste with a large Forstner or spur bit. Next, clean up the cavity walls using a



router, pattern bit, and simple shop-made template.

Step 4. Measure the thickness of your rheostat switch. Then, using a rabbeting bit, rout a $\frac{3}{8}$ "-wide rabbet around the cavity edge to accept a bottom panel. Make the rabbet deep enough so the panel that fits in this rabbet will hold the switch firmly in position when it's installed. (See figure 2.)

Step 5. For an optional visual detail you may wish to rout a $\frac{1}{16}$ " chamfer around the bottom edge of the base. Next, cut a $\frac{3}{16}$ " groove $\frac{3}{16}$ " deep $\frac{1}{8}$ " from the bottom edge. You can either rout this or make two passes on the tablesaw, moving the fence for the second pass.

Step 6. To bevel the base's top face, move your tablesaw's rip fence to the side of the blade opposite its direction of tilt. Set the fence $\frac{1}{2}$ " from the blade and tilt the blade to 20° from perpendicular. Then, stand the base on edge with the bottom face against the fence and bevel all four sides.

Step 7. Lay out a hole for the switch stem on the flat area of the base top

(over the cavity) where shown in figure 3. Center it on the diagonal corner line formed by the bevels in the 1"-wide perimeter of the flat (the part that won't be covered by the post). Center it between the post corner and the bevel corner as well. Caution: Before you drill, position the switch in the cavity to make sure this hole location will work. Then, using a brad-point bit and backing block, drill a hole that measures $\frac{1}{32}$ " larger than the stem's diameter.

Step 8. Lay out and drill a centered hole through the top of the base into the cavity for the lamp pipe. (We drilled a $\frac{7}{16}$ " hole for our $\frac{3}{8}$ "-o.d. pipe.)

Step 9. Using a $\frac{3}{8}$ " straight bit and a table-mounted router, cut a stepped channel in the base for the lamp cord where shown in figure 2. When routing in from the back edge, set the bit's height just shy of the top edge of the $\frac{3}{16}$ " groove. Then, cut two progressively higher steps to allow the cord to reach the switch terminal.

Step 10. Next, sand the base to 240-grit. Be careful to keep the bevels crisp.

Add the Shade Support

Step 1. To make the two shade supports (E) and four cleats (F), surface a piece of rosewood to $\frac{3}{8}$ " thick. From this, cut two $1\frac{3}{4} \times 21$ " blanks.

Step 2. Cut a centered dado across both blanks for a half-lap joint. (See figure 4.) To get an accurate fit, first check the actual width and thickness of the parts, and make the dado half as deep as the blanks' thickness.

Step 3. Lap the two support blanks together temporarily to check for fit. If the fit looks good, lay out and drill a centered $\frac{7}{16}$ " hole for the lamp pipe through both lapped pieces. At the same time, lay out and drill eight countersunk shank holes for #8x1" flathead wood screws through the blanks where shown in figure 4.

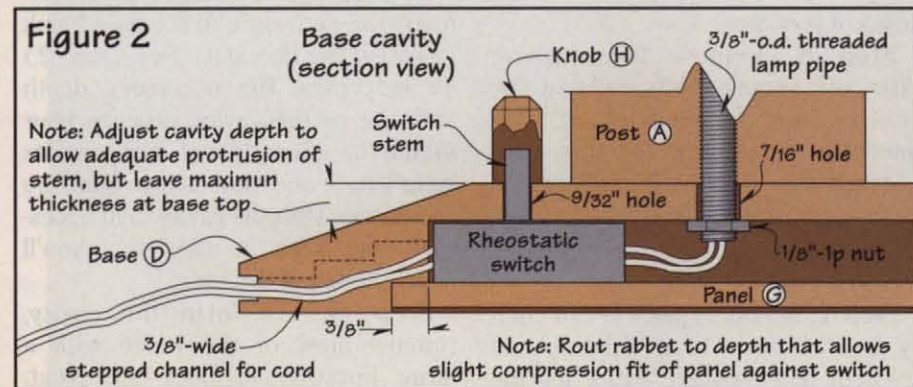
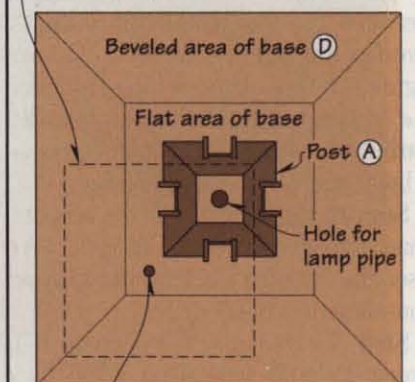


Figure 3 Location of hole for switch stem (top view)

Cavity located, sized to fit switch, wiring and allow proper placement of stem hole

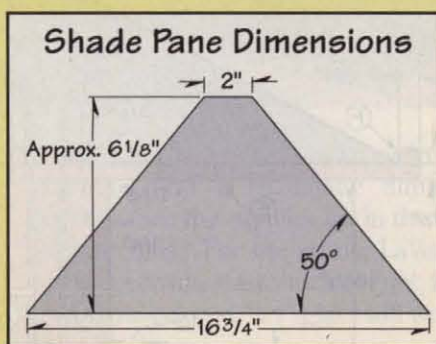


Center hole for switch stem on diagonal corner line halfway (approx.) between post and bevel corners

MAKE A SHADE FOR YOUR LAMP

To cut the four glass panels, use a plywood or hardboard template dimensioned as shown at right; or, take the template to a glass supplier and have the panes cut there. Clean them thoroughly, then tape all edges with $\frac{1}{4}$ " copper foil tape and burnish the tape with a nylon burnisher or similar implement for good adhesion.

To keep each pair of panes square and aligned during assembly, use a simple corner jig: two squared cleats attached to a piece of flat plywood. Using lead solder, tack the panes together a pair at a time. Then, turn the assembly over and solder the inside seams of the hip joints, starting at the top and



pulling towards the bottom edge of the shade. Note: Make certain that the seam is level to prevent the molten solder from running down the seam. You'll probably need to go over each seam two or three times to cover all of the foil and create a smooth, rounded joint.

Next, solder the edges, inside and out, around the top opening and bottom edge. After that, solder the hip joints on the outside. To keep the seam horizontal for this operation, build a jig from scrap that props the shade and keeps it from sliding. Now, clean up the flux and apply a patina to blacken the solder. (We used Novacan Black Patina for Solder and Lead.)

Step 4. Disassemble the support blanks and sand the faces to 240-grit.

Step 5. Before you proceed with the support cleats, build the shade as described in "Make a Shade For Your Lamp" *opposite*.

Step 6. Center the shade over the dry-assembled supports. Pencil a line across the support along each edge of the shade. (See figure 5.) Using a 1/2"-wide straightedge, mark a second line 1/2" from the first. Disassemble the supports, and crosscut both ends of each part 1/8" beyond this outside line. Save these waste pieces to make the cleats (F).

Step 7. Reassemble the supports, and center the shade on them using the four inside pencil lines. Next, face-glue the waste pieces to the top faces of the supports, aligning them with the shade edges but allowing a bit of clearance (1/32"). Make sure the edges align, then spring-clamp them.

Step 8. Using your 1/2"-wide straightedge, mark each glued-up cleat 1/2" from its inside end. Crosscut the cleated supports 1/16" outside this line. Sand each cleat/support end to the line.

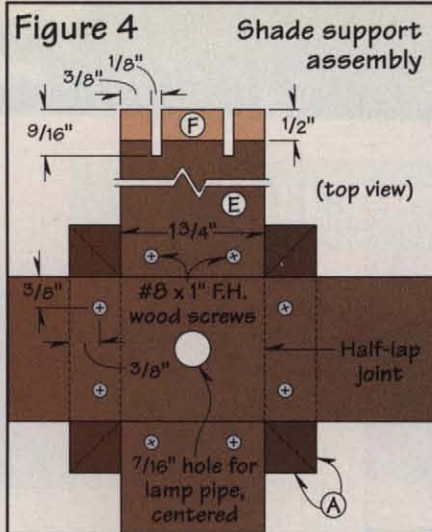
Step 9. Using a 45° chamfer bit in a table-mounted router, cut a 1/16" chamfer around the end of each cleat/support.

Step 10. Cut two decorative kerfs in each cleat/support end as dimensioned on the Front View and figure 4. To do this, use a 1/8"-wide (square-toothed) rip blade on your tablesaw elevated to 9/16". Fit your miter gauge with a wooden extension and stop block. Stand the support on end with the bottom face against the extension as shown in figure 5.

Assemble the Lamp

Step 1. Center the post on the base, then mark each corner position very lightly with a pencil. Apply a slow-set cyanoacrylate (CA) glue to the bottom end of the post, then carefully position it on the base using the marks. Hold the post in position until the glue sets, then erase the marks.

Step 2. Turn the base/post assembly upside down, and mark the position of the 3"-square post on the base's underside. Lay out and, drill four shank/pilot holes for #8 screws, centering them (approximately) on the four post sides. For the cavity locations, use 1 1/2" round-head screws with 1/2"-o.d. washers.



Outside the cavity, use 2 1/2" flathead screws and counterbore the holes slightly. Wax the screws, then drive them.

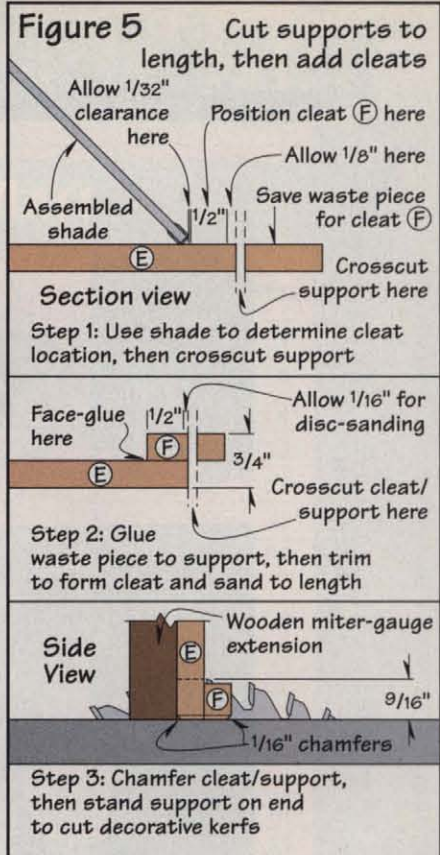
Step 3. Glue and clamp the lapped shade supports together. Next, center the supports on the post top and mark their location. Use slow-set CA to glue them in place. Drill pilot holes into the post through the support shank holes, then drive #8x1" flathead wood screws.

Step 4. From 1/4" cherry plywood, cut a panel (G) to fit the cavity. Sand it smooth, then position it in the opening. Drill holes around the edge for #6x3/4" flathead wood screws, angling them into the corner of the rabbet. Drive the screws, then remove them.

Step 5. To make the knob (H), prepare a short length of 1/2"-square rosewood stock and trim it to 7/8" long. (See the Front View.) Fit your switch into the cavity and insert its stem through the hole as far as it will go. Measure the length and actual diameter of the protruding stem. Size and drill a centered hole in one end of the knob that yields a snug fit and allows 1/32" clearance beneath the knob.

Step 6. Using a stationary disc/belt sander, chamfer all four edges of the knob to create an (approximate) octagon. Now, chamfer the top end to the same width on all four sides.

Step 7. Sand any surfaces that still need it to 240-grit. Remove all dust, then apply your choice of finish to all parts including the knob. (We sprayed on two coats of pre-catalyzed lacquer, using a 1:1 blend of satin and semi-gloss with 10 percent drying retardant added. A hand-rubbed oil finish also looks good on this lamp.)



Install the Socket And Switch

Step 1. Screw your lamp socket onto one end of the lamp pipe. Insert the pipe through the supports, post, and base. Mark the bottom end to allow 1/4" of protrusion into the cavity, then cut the pipe to length.

Step 2. Reinsert the pipe, then thread a nut onto the bottom end and tighten it to secure the pipe and socket. Feed the wires from the socket through the pipe, trim them to length, then connect the switch. Feed the lamp cord through its channel and connect those wires to the switch.

Step 3. Insert the switch stem through its hole in the base, then screw in the cavity panel. This should produce a slight compression fit. If not, adhere a thickness of padding to the switch body so the panel will hold the switch firmly.

Step 4. Install a bulb, plug in the lamp, and turn it. If everything works properly, press or epoxy the knob onto the switch stem. 

*Illustrations: Dana Quiram
Written by Doug Cantwell*



Black lacquer panels and trim sets off the attractive bird's-eye maple front and dramatically grained birch back. Glass shelves allow interior light to illuminate the builder's collection of personally turned projects.

Fast-Track Curio Cabinet

A European-style cabinet with a dash of Far Eastern flavor

Some people believe that building fast necessarily means building cheap. Here's a project that proves otherwise. Our designer/craftsman, Dick Coers, designed and built this cabinet in his spare time just a week and a half before unveiling it at an art show. The cabinet was scaled so that the major panels could be cut from a single sheet of $\frac{3}{4}$ " plywood. He joined most parts with biscuits and pocket-hole screws, hung the doors on European hinges, and mounted the drawers on metal glides. Thanks to these quick-and-clean production methods, the cabinet was ready to display when the show opened.

To give the basic box some style, Dick used bird's-eye maple for the door frames and drawer fronts and crafted his own pulls from walnut and purpleheart. This complement of woods, set off by a satin black lacquer on the sides, lends the cabinet a subtle Far Eastern accent.

Before You Start

If you're so inclined, you can house a television (up to 27") in this cabinet, but you'll need to cut a hole in the $\frac{1}{4}$ " plywood back to create clearance for the rear of the set. This opening will vary for different makes and models, so we leave the dimensions up to you. You'll find that the drawers are already sized to store video cassette tapes.

Before you buy material, note that Dick chose red oak plywood with a plain-sliced veneer for a specific design purpose. Under a black lacquer finish, the open pores of the oak create a dramatic pattern. This doesn't show up well in our photo, but it adds considerably to the cabinet's appeal. If you apply colored lacquer to a smooth, close-grained plywood, it resembles plastic laminate. So, stick with oak or another open-grained plywood unless you intend to finish the entire piece with a clear coat.

BILL OF MATERIALS

PART	T	W	L	MTL.	QTY.
CASE					
A Sides* **	¾"	20 ¾"	59 ½"	OP	2
B Top* **	¾"	20 ¾"	34 ½"	OP	1
C Middle shelf* **	¾"	20 ½"	34 ½"	OP	1
D Partition—front	¾"	3 ⅝"	34 ½"	O	1
E Partition—back	¾"	2 ¾"	34 ½"	O	1
F Partition—sides	¾"	2 ½"	14 ¾"	O	2
G Back*	¼"	35 ¼"	56 ¼"	BP	1
MOLDINGS					
H Crown†	⅝"	2 ⅜"	96"	O	1
I Base†	¾"	3 ¼"	88"	O	1
J Fill strip—top*	⅞"	¾"	36"	O	1
K Fill strip—bottom*	¾"	3 ¼"	36"	O	1
DOORS					
L Rails	¾"	2 ¼"	13 ⅝"	M	4
M Stiles	¾"	2 ¼"	39 ⅞"	M	4
DRAWERS					
N False fronts*	¾"	7 ⅜"	36"	M	2
O Fronts/back	½"	7"	33 ½"	M	4
P Sides	½"	7"	19 ½"	M	4
Q Bottoms*	¼"	19 ¼"	33"	BP	2
SHELF FRAMES					
R Fronts	¾"	1 ½"	34 ⅞"	M	2
S Backs	¾"	2 ½"	34 ⅞"	M	2
T Sides	¾"	2 ½"	17 ⅞"	M	4
PULLS					
U Posts	⅛"	1 ¼"	¾"	W	12
V Handles	½"	⅜"	5 ½"	P	6

*Parts cut to final size during construction. Please read all instructions before cutting.

**Width includes ⅝"-thick edge-banding on front edge.

†Multiple parts required: total rough length specified here.

MATERIALS LIST

OP—oak plywood
O—oak
BP—birch plywood
M—maple
W—walnut
P—purpleheart

SUPPLIES

#6x1¼" face-frame (pocket) screws; #6 x 1¼", #8 x 1", #8x1½", #8x1¼" flathead wood screws; #20 biscuits; 1" brads or 3d finish nails; 14-gauge copper wire; finishing supplies; ⅞" French antique glass (doors); ¼" plate glass (shelves); clear silicone caulk. (For cabinet hardware, see our Source list at end of article.)

*Parts cut to final size during construction. Please read all instructions before cutting.

**Width includes $\frac{1}{8}$ "-thick edge-banding on front edge.

†Multiple parts required: total rough length specified here.

MATERIALS LIST

OP—oak plywood
O—oak
BP—birch plywood
M—maple
W—walnut
P—purpleheart

SUPPLIES

#6x1 $\frac{1}{4}$ " face-frame (pocket) screws; #6 x 1 $\frac{1}{4}$ ", #8 x 1", #8x1 $\frac{1}{2}$ ", #8x1 $\frac{3}{4}$ " flathead wood screws; #20 biscuits; 1" brads or 3d finish nails; 14-gauge copper wire; finishing supplies; $\frac{1}{4}$ " French antique glass (doors); $\frac{1}{4}$ " plate glass (shelves); clear silicone caulk. (For cabinet hardware, see our Source list at end of article.)

For the $\frac{1}{4}$ " plywood back, Dick found one of those unusual birch panels with dramatic grain. If you're going to fill your cabinet with a television set, you needn't be choosy

about the back panel's appearance. But if you intend to use the piece as a curio cabinet, we suggest you select plywood that looks good through the glass doors.

Step 3. From solid 3/4"-thick oak, cut the partition front (D), back (E), and sides (F) to the dimensions listed in the Bill of Materials, but leave the sides about 1/2" over-long for now. Using a pocket-hole jig, drill 15° pocket holes on the bottom face of

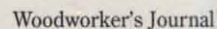
each side. (See the Exploded View and *photo A*.) Join the parts and drive the pocket screws. If you don't own this tool, you can join these pieces with biscuits. Note: If you prefer, substitute a $\frac{3}{4}$ " plywood panel for the partition. This will increase your plywood requirements to more than one full sheet, but you could use lesser-quality material since it will be concealed. Trim the panel to the same dimensions as the shelf.

Step 1. Assemble the partition using glue and pocket (face-frame) screws. Trim the completed frame to 20½" wide.

Step 2. Lay out and cut mating #20 biscuit slots in the sides, top, shelf and lower partition where dimensioned on the Exploded View. Note: Before you slot the partition, check the pocket-screw locations to make sure your biscuit joiner won't slice into the screws. Reposition these slots if necessary. Sand the interior faces of these parts to 220-grit.

Step 3. Glue, biscuit, and clamp the sides, top, shelf, and partition. Use a clamping caul with a slight crown on its bearing surface to apply pressure on the middle of the center shelf. Square the cabinet and allow the glue to dry.

Step 4. Rout a $\frac{3}{8}$ " rabbet $\frac{1}{4}$ " deep in the back edges of the case to accept



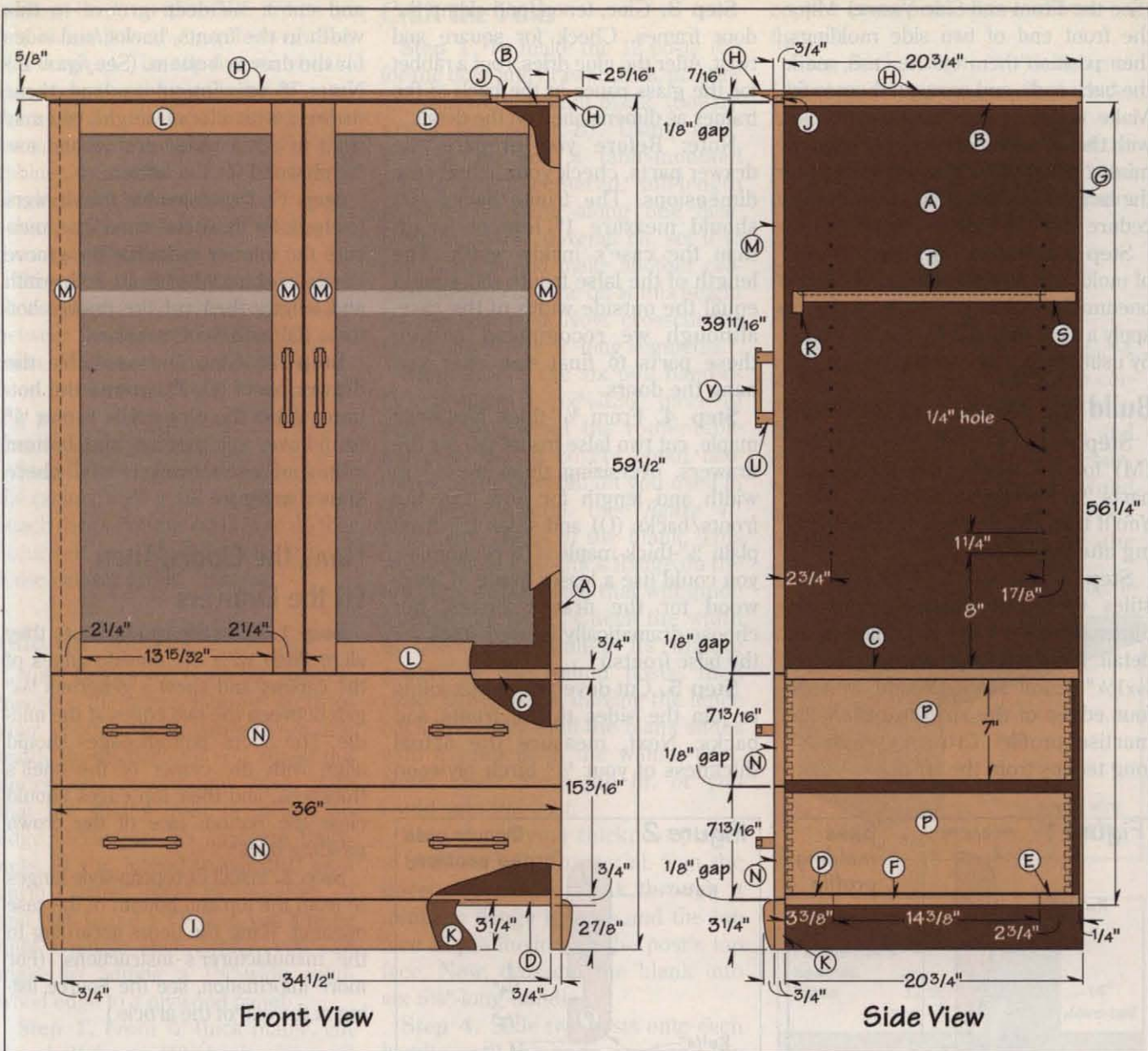


Photo A: Shelf frames are pocket-screwed and glued together, then rabbetted along the top inside edge to accept the plate glass. A small bead of silicone caulk holds the glass in place.



the $\frac{1}{4}"$ plywood back. Square the rabbet corners and around the center partition with a chisel, or round the back-panel corners to fit the radiused corners.

Step 5. Measure the rabbet opening in the back of the cabinet. From $\frac{1}{4}"$ birch plywood, cut the back (G) to fit, but don't attach it yet.

Make the Moldings

Step 1. Surface a piece of oak stock to $\frac{5}{8}"$ thick for the crown molding (H), then cut it to $4\frac{7}{8} \times 48"$. Use a panel-raising bit to rout the profile on both edges as shown in Exploded View detail. Next, rout the $\frac{1}{4} \times 1\frac{1}{2}"$ groove

down the middle. Turn the piece over and rip it in half to form two identical molding strips. Now, rout the top inside edge of each strip using a $\frac{3}{8}"$ round-over bit.

Step 2. Cut enough $\frac{3}{4} \times 3\frac{1}{4}"$ oak stock to make approximately 88" of base molding (I). Rout the molding to the profile shown in figure 1. (We used a large table-edge bit for the long curve and a $\frac{5}{8}"$ round-over bit for the short curve.)

Step 3. From $\frac{3}{4}"$ -thick oak, cut the fill strips (J, K) to fit where shown on the Side View. Secure these to the case with glue and brads or finish nails.

Step 4. Lay out and miter the front crown molding to fit the top of the case.

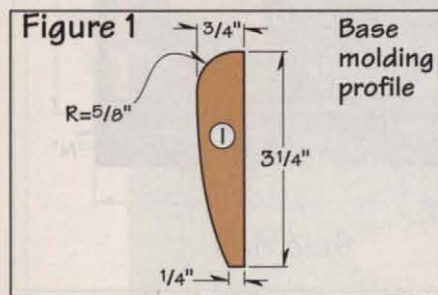
(See the Front and Side Views.) Miter the front end of two side moldings, then position them on the case, mark the back ends, and crosscut them to fit. Make sure the moldings align flush with the plywood edges, as any gaps or miscut pieces will show up plainly on the lacquered cabinet. Repeat this procedure to fit the base moldings.

Step 5. Glue and assemble both sets of moldings to the case. You can use a pneumatic brad nailer, but if you plan to apply a clear finish, avoid the nail holes by using clamps and cauls instead.

Build the Doors and Drawers

Step 1. Cut the rails (L) and stiles (M) for the doors, but make both parts $\frac{1}{8}$ " over-long for now. Note: You'll trim the doors to fit the opening after assembly.

Step 2. Mortise the door rails and stiles to accept floating tenons as dimensioned on the Exploded View detail. Next, cut approximately 20" of $\frac{3}{8} \times 1\frac{1}{4}$ " tenon stock. Round over all four edges of the strip to match the mortise profile. Crosscut eight 2"-long tenons from the strip.



Step 3. Glue, tenon, and clamp the door frames. Check for square and twist. After the glue dries, rout a rabbet for the glass panes in the back of the frames as dimensioned on the detail.

Note: Before you prepare the drawer parts, check your actual case dimensions. The fronts/back (O) should measure 1" less in length than the case's inside width. The length of the false fronts (N) should equal the outside width of the case, although we recommend cutting these parts to final size after you hang the doors.

Step 4. From $\frac{3}{4}$ "-thick bird's-eye maple, cut two false fronts (N) for the drawers, oversizing them by $\frac{1}{4}$ " in width and length for now. Cut the fronts/back (O) and sides (P) from plain $\frac{1}{2}$ "-thick maple. (To economize, you could use a lesser grade of hardwood for the drawer boxes, but choose dramatically figured stock for the false fronts.)

Step 5. Cut dovetails or box joints to join the sides to the fronts and backs. Next, measure the actual thickness of your $\frac{1}{4}$ " birch plywood

and cut a $\frac{3}{16}$ "-deep groove to this width in the fronts, backs, and sides for the drawer bottom. (See figure 2.) Note: If you intend to load these drawers with a lot of weight, you may want to cut a wider groove and use $\frac{3}{8}$ " plywood for the bottom.

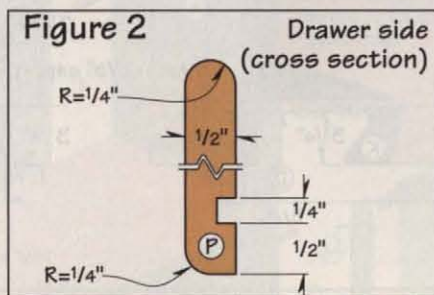
Step 6. Dry-assemble the drawers to check for fit. At the same time, measure the interior including the groove depths. Subtract $\frac{1}{16}$ " from both width and length, then cut the drawer bottoms (Q) to these dimensions.

Step 7. Glue and assemble the drawer parts (O, P) around the bottoms. After the glue dries, rout a $\frac{1}{4}$ " round-over on the top and bottom edges of each drawer box where shown in figure 2.

Hang the Doors, Then Fit the Drawers

Step 1. Trim the two doors so they align flush with the outside edges of the cabinet and show a generous $\frac{1}{16}$ " gap between the two edges at the middle. The doors' bottom edges should align with the center of the shelf's thickness, and their top edges should clear the bottom face of the crown molding by $\frac{1}{8}$ ".

Step 2. Install European-style hinges 3" from the top and bottom of the case opening. Hang the doors according to the manufacturer's instructions. (For more information, see the Source listing at the end of the article.)



THE SECRET TO FITTING A FALSE DRAWER FRONT

All drawers require some trial-and-error alignment so they'll fit and slide smoothly in their openings. In this European-style cabinet, we've used a false-front drawer (a four-sided box with an extra face attached) that rides on metal glides. The technique for fitting these differs from the method used with wooden guides or runners. Here's how it works.

1. Slide the four-sided drawer boxes into the cabinet on their metal glides.

2. Locate and drill $\frac{5}{32}$ " pilot holes through the false fronts (countersunk on the back face) for the screws that will later secure the drawer pulls.

3. Place a $\frac{1}{8}$ "-thick spacer between the base molding and the bottom edge of the lower false front, then position the front against the drawer box and align it properly with the cabinet sides.

4. Screw the false front to the drawer temporarily by driving two $\#8 \times 1\frac{1}{2}$ " wood screws through the holes you just drilled.

5. Place the $\frac{1}{8}$ "-thick spacer on the top edge of the lower false front, then position the upper false front against its drawer and align it with the sides of the cabinet. Screw the false front to the drawer. Check the fit and action of both drawers. Adjust if necessary.

6. Remove the drawers and drill eight countersunk $\frac{5}{32}$ " pilot holes (two rows of four holes, equally spaced) from the inside of each drawer into the backside of its false front. Remove the temporary screws holding the false fronts to the drawers and spread glue on the mating parts. Reattach the fronts to the drawers with the temporary screws. Then, drive $\#8 \times 1$ " flathead wood screws to secure the false fronts from inside the drawer.

Step 3. Trim the false fronts to final size. Allow a $\frac{1}{8}$ " gap between the two drawers. The top drawer should also clear the door rails by $\frac{1}{8}$ ", and the ends should align flush with the outside cabinet edges. Note: For our cabinet, we cut the false fronts from a single board but rotated one front to achieve a "book-matched" display of the sapwood figure.

Step 4. To locate the upper drawer slides, place a $7\frac{3}{4}$ "-wide spacer board between the slide and the bottom partition. Position the lower slides directly on the partition. Note: Install a mating pair of slides on each drawer so they center in the openings.

Step 5. Insert the drawer boxes into the cabinet, then fit the false fronts and attach them. For tips on how to do this accurately, see "The Secret to Fitting a False Drawer Front", *opposite*.

Add the Shelves

Note: Before you build the shelves, measure the actual interior width of your cabinet. If it varies from the width shown here ($34\frac{1}{2}$ "), adjust the dimensions accordingly. Also, note that the shelf's front is turned on edge to increase its apparent thickness. If you intend to use this as a curio cabinet, build two shelves. If you plan to put a TV in it, you'll need only a single shelf, which you can make by adding a $1\frac{1}{2}$ "-wide solid-wood edge to a plywood panel.

Step 1. From $\frac{3}{4}$ "-thick maple, cut the shelf fronts (R), backs (S), and sides (T) to dimension.

Step 2. Drill 15° pocket holes in the bottom faces of the sides where shown on the Exploded View. Then, glue and pocket-screw the shelf parts together.

Step 4. After the glue has dried, rout a $\frac{3}{8}$ "-wide rabbet $\frac{1}{4}$ " deep around the top inside edge of each shelf frame to accept a plate-glass pane. Square the rabbet corners with a chisel.

Step 5. Make a drilling template for the shelf-pin holes from scrap. (We drilled $\frac{1}{4}$ " holes to match the pins on our shelf supports.) Drill two rows of 17 holes each, spacing them $1\frac{1}{4}$ " (32 mm) apart as dimensioned on the Exploded View.

Craft the Pulls

Step 1. To make the 12 posts (U) for the door and drawer pulls, prepare an $1\frac{1}{16} \times 1\frac{1}{4} \times 14$ " walnut blank. (See *figure 3* and *photo B*). Using a $\frac{1}{4}$ " straight bit, and a table-mounted router, cut a centered, full-length groove $\frac{5}{16}$ " deep along one face. Switch to a 14° dovetail bit, set it to cut $\frac{3}{8}$ " deep, and make another centered pass. Leave the bit at this height for the next step. Now, crosscut the blank into twelve $\frac{3}{4}$ "-long segments.

Step 2. For the six pull handles (V), prepare a $\frac{1}{2} \times \frac{9}{16} \times 36$ " piece of purpleheart. Reset the router-table fence so that it covers about two-thirds of the dovetail bit you used in the previous step. (See *figure 4*.) Rout both edges of the blank. This will produce a $\frac{1}{8}$ "-thick flange on the top edge of the piece that will guide it along the fence. Check the width of the blank against its mating groove in the walnut posts, then make light passes, moving the fence back gradually until the blank slides with a snug fit in the walnut post. Note: Don't force the fit, or you could split the post.

Step 3. Set your thickness planer to remove $\frac{1}{32}$ " of material. Run the dovetailed handle blank through it until the flange is gone and the top face aligns flush with the post's top face. Now, crosscut the blank into six $5\frac{1}{2}$ "-long handles.

Step 4. Slide two posts onto each handle until the ends overhang the posts by $\frac{1}{4}$ ". Clamp the pieces in this position, then drill $\frac{1}{16}$ " holes for the

copper cross-pins where shown on *figure 3*.

Step 5. Cut twelve $1\frac{5}{16}$ " lengths of 14-gauge copper wire. Tap these cross-pins them into the holes you drilled in the previous step. Sand the pin ends flush, then final-sand the pulls, lightly breaking the corners and edges.

Sand the Cabinet And Apply Finish

Step 1. Sand all exterior surfaces to 220-grit. Lightly break sharp corners and edges. Pilot-drill the pulls, then screw them to the doors and drawers where shown using countersunk $\#8 \times 1\frac{1}{4}$ " flathead wood screws in the doors, $\#8 \times 1\frac{3}{4}$ " screws in the drawers. Now, remove the pulls until later.

Continued on page 40

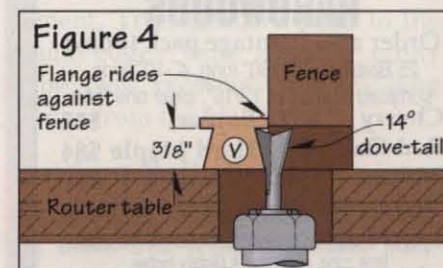
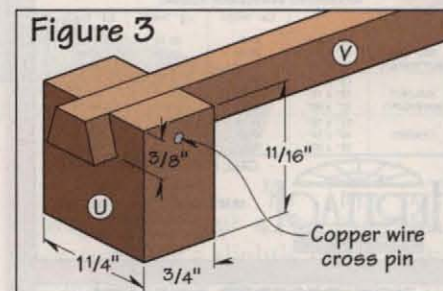
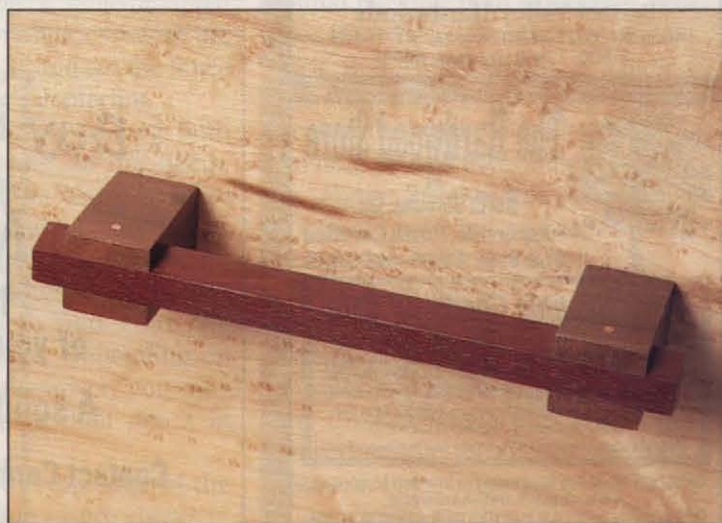


Photo B: Shop-made purpleheart handles with walnut posts locked in place with copper wires complement the bird's-eye maple face and add a Far Eastern detail to the cabinet.



Bringing the hardwoods
of the world right to
your door step!

Hardwood Showcase

Special Mail-Order Section

Call or write to these fine companies
for prices and information to suit
your hardwood needs. Then, just
phone in your orders and they'll
ship right to your door.

*Shopping for wood has
never been so easy!*

SCROLLSAW WOOD
15% off!

Visit our website!
www.heritagewood.com
And see more products at
www.woodmagazine.com

PLUS! Got
80 full sized ornament patterns
FREE with each order over \$50

*15% off Fall 1997 prices
Mention this ad when ordering

HARDWOOD SCROLLSAW BLANKS

		1/4" THICK	1/2" THICK	3/4" THICK
RED OAK	12" x 12"	\$3.91	\$6.19	\$6.87
BUTTERNUT	12" x 16"	\$6.19	\$6.83	\$7.96
	12" x 20"	\$6.46	\$6.87	\$9.06
WALNUT	12" x 12"	\$4.09	\$6.50	\$7.36
MAHOGANY	12" x 16"	\$6.56	\$6.71	\$9.78
	12" x 20"	\$6.16	\$10.09	\$12.24
CHERRY	12" x 12"	\$5.74	\$7.65	\$8.59
	12" x 16"	\$7.61	\$10.20	\$11.43
	12" x 20"	\$9.52	\$12.75	\$14.32

CALL FOR ORDER OR CATALOG
1-800-524-4184
HERITAGE BUILDING SPECIALTIES
285 N. CASCADE
FERGUS FALLS, MN 56537

**YOU DESERVE QUALITY
HARDWOODS**

Order an advantage pack today!
25 Board ft., 30"-60" long, 4"-10" wide,
surfaced 2 sides to 13/16", clear one face

Cherry \$87 Poplar \$62
Red Oak \$84 Hard Maple \$84
Walnut \$99 Mixed \$87

Thin Stock Packs Also Available

We pay UPS shipping to most destinations in the Eastern
time zone, other areas slightly higher.
Discover, Visa/MC Accepted. Free catalog w/order.

Bristol Valley Hardwoods
4054 Rt. 64, Canandaigua, NY 14424
1-800-724-0132 (ext. 0596)

The Hardwood Store
of
North Carolina, Inc.
Gibsonville, North Carolina
Toll Free 1-888-445-7335

Pennsylvania Cherry on Sale:
100 board feet of Cherry delivered*
East Coast \$300 West Coast \$350
Cherry is 1" thick in the rough, kiln dried, graded No. 1 Common,
with minimal sap. Excellent for projects requiring 6 foot and
shorter clear cuttings. Random widths 4-8".

*Delivered to a business or closest trucking terminal. Other restrictions may apply.

Call Toll-Free 1-888-445-7335 for a complete price list or check out our web site:
www.netpath.net/~hardwood
Check our web site regularly to be on top of any special purchases we may have.

Curio Cabinet

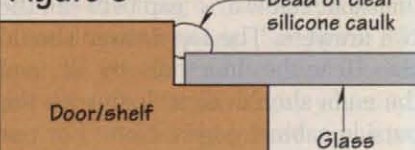
Continued from page 39

Step 2. Spray a coat of clear satin lacquer on the doors, drawers, shelves, pulls, and back panel. Mask the rabbet for the back panel, then spray the case with two coats of thin lacquer primer. Allow it to dry, then sand the primer with 320-grit paper. Next, spray on several thin coats of black lacquer. Apply only enough to achieve even coverage and color. Lightly sand between color coats with 1200-grit paper (available at auto-parts stores) to knock down dust nibs. Note: Keep the lacquer well-thinned and don't overdo it—you want the color coat thin enough that the oak pores will show through. Now, spray-apply one coat of clear satin lacquer over the color coat.

Step 3. As an option, install a light bar as shown in photo B. (See the Source list for a supplier.)

Step 4. Measure the rabbeted shelf and door openings, subtract 1/16" from both dimensions, and then have a glass dealer cut the panes. (We used 1/8" French antique glass for the doors and 1/4" plate glass for the two shelves. For more strength, use laminated glass for the latter.) Place each pane in its rabbet and secure it with a bead of clear silicone caulk around the perimeter as shown in figure 5. The silicone holds the pane as securely as solid stops and also prevents it from rattling.

Figure 5



Step 5. Secure the back panel in the rabbeted opening using brads or finish nails. Then, reattach the pulls to the drawers and doors.

Photographs: StudioAlex

Illustrations: Dana Quiram

Written by Tom Jackson

SOURCE

Shelf supports, 1/4", walnut finish. Pack of 20. Catalog no. 33902. \$3.69 per pack, plus s/h. To order, see below.

Full-extension box drawer slides. Black, 20" length, catalog no. 89707. \$16.49 per set, plus s/h. To order, see below.

Decorative lighting strip. Black, 20" long, self-adhesive mounting pads, cord, bulb, and switch. Catalog no. 17956, \$27.99, plus s/h. To order, see below.

European-style hinges. Snap close, 100°, full overlay. Catalog no. 34645. \$8.99 per pair, plus s/h. Order from:

The Woodworkers' Store
800/279-4441

Buy it!  Sell it!

MARKET PLACE

If you have something to sell,
or you're looking for something special.

A solid value at an incredibly LOW COST.

Contact Carmen Renfro, Classified Advertising Manager
(309) 679-5017

Shop-Built Sanding Blocks

by Bob Colpetzer



These easy-to-build blocks take a lot of the aggravation out of hand-sanding and make your abrasive supplies last longer.

In spite of all the innovative sanders that have appeared on the market over the last 10 or 15 years, I still encounter jobs for which hand-sanding proves to be the fastest and most effective solution. Most of us routinely keep some sort of simple block nearby that we wrap with sandpaper when the need arises. But when it comes to more specialized hand-sanding operations, we don't often have anything for them. I've found, though, that sanding small parts, smoothing end grain, easing sharp edges, and other "odd jobs" can be done better using less abrasive with a specially shaped sanding block.

During my years as a woodworker and shop instructor, I've come up with several designs for sanding blocks. Most have evolved to meet specific needs, but all take standard, everyday abrasives. I hope you'll find at least one of them useful in your shop.

A Basic Quarter-Sheet Sanding Block

This general-purpose block uses a quarter-sheet of standard sandpaper

($4\frac{1}{4} \times 4\frac{1}{2}$ "). The abrasive simply wraps around the block so you can change it quickly. Gripping the block with a hand squeezes the abrasive into the coves on the edges and keeps it taut (*photo A*).

Step 1. To make the basic sanding block shown in *figure 1*, rip and cross-cut a 3×15 " piece of 1"-thick hardwood. Note: I start with this length in order to rout the coves safely. It also gives me enough stock to make three blocks at one time.

Step 2. Set up a table-mounted router with a $\frac{1}{2}$ "-radius core-box bit. Elevate the bit to $\frac{3}{8}$ " and set the fence $\frac{3}{8}$ " from the cutter's centerline.

Step 3. Rout a cove along both edges (not the ends) of the blank. To do this, stand the blank on edge with one face against the fence. Rout the first edge, rotate the blank end for end, keeping the same face against the fence, and rout the opposite edge. Note: Depending on your router's horsepower, you may want to work up to final depth in several passes.

Step 4. Sand the top edge of the cove to a $\frac{1}{16}$ " radius where shown in

figure 1. Next, cut a pad from $\frac{1}{8}$ "-thick cork that's slightly larger than the bottom face of the blank and adhere it to this face using contact cement. Trim the cork flush to the blank edges with a sharp utility knife. Now, crosscut three $4\frac{1}{2}$ "-long blocks from the blank.

Sanding-Belt Block

From time to time, I run into sanding tasks that require a wider abrasive or an abrasive with a more substantial backing than sandpaper provides. For these jobs, I've designed a block that snugly holds a sanding belt. Sanding belts work nicely because the cloth backing and abrasive hold up well even under extreme use. *Figure 2* shows dimensions that fit a 3×24 " belt, but you can modify them for use with other belt sizes.

Step 1. From $\frac{3}{4}$ "-thick hardwood stock, rough-cut a 3×14 " blank. Cut a piece of $\frac{1}{8}$ "-thick cork that measures $\frac{1}{2}$ " wider and longer than the blank's face. Contact-cement this pad to the blank, then trim the excess (*photo B*).

Step 2. Square one end of the block on your tablesaw, then cut a $1\frac{1}{2}$ "-long



Photo A: The coved edges on this quarter-sheet sanding block help keep the abrasive tight.

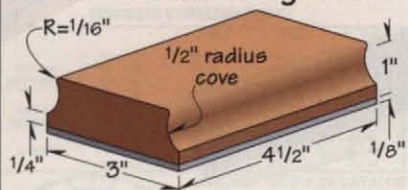


Photo B: Use a backing board and sharp knife to trim the excess cork from the blank.



Photo C: To ensure a perpendicular hole, clamp the parts firmly to the drill-press table.

Figure 1
1/4-Sheet Sanding Block



piece from that end. Crosscut the remaining piece to $9\frac{7}{8}$ " long.

Step 3. Lay out hole centerpoints on both ends of the $1\frac{1}{2}$ " piece and on one end of the long piece. (See *figure 2*.) Drill the holes as dimensioned (*photo C*). Note: The $\frac{3}{16}$ " shank holes should center in both the $\frac{3}{4}$ "-deep counterbores and the $\frac{3}{8}$ "-deep spring holes.

Step 4. Rout a stopped, $\frac{1}{2}$ "-radius cove centered along both edges of the long block. Stop the cove $\frac{1}{2}$ " from both ends.

Step 5. Insert the compression springs into the holes in the long block, then assemble the two parts. Clamp the assembly to compress the springs, but don't obstruct the counterbores. Next, drive a #8x3" roundhead wood screw into each hole until the head is recessed slightly below the surface (*photo D*). Remove the clamp.

Step 6. Using a $\frac{3}{8}$ " round-over bit, radius both ends of the assembled block. To make it easier to rout the counterbored end, I temporarily plugged the holes with lengths of $\frac{3}{8}$ " dowel and trimmed the dowels flush with the end before routing. Afterwards, I compressed the end to extract the dowels.

Step 7. To mount a sanding belt, compress the springs and then start the belt over both ends of the block. Once started, the belt slides on the rest of the way (*photo E*).

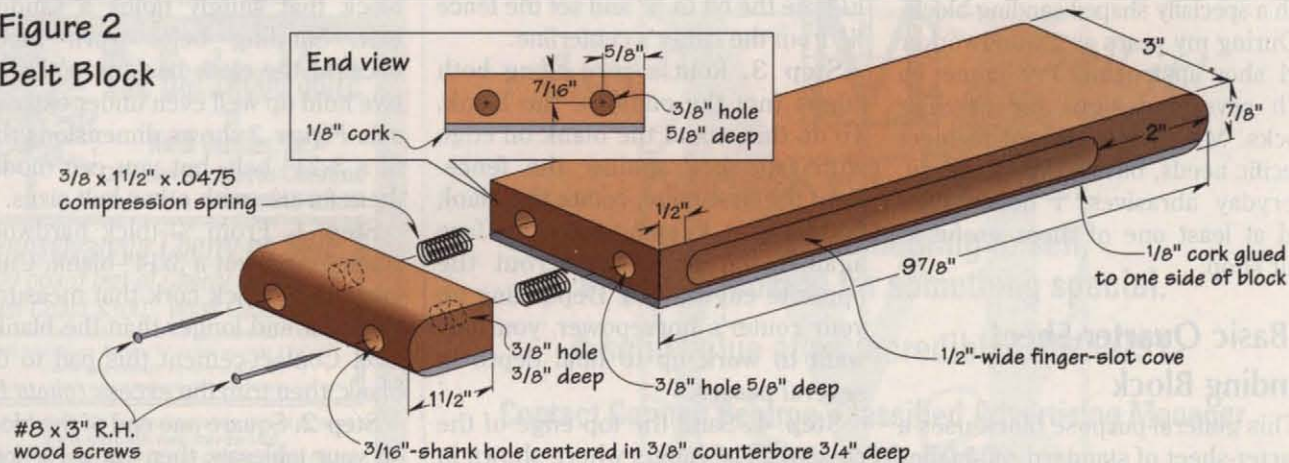


Photo D: Use a band clamp to compress the springs and hold the parts together while you drive the screws.



Photo E: Compress the springs to start the belt on the block, then simply slide it on the rest of the way.

Figure 2
Belt Block



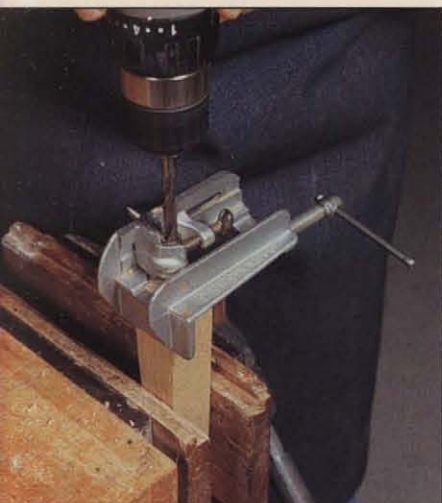


Photo F: A doweling jig helps ensure that the hole will be drilled perpendicular.



Photo G: To prevent tearout when drilling the 1" hole, use a backing block.



Photo H: Lay out a flat in the $\frac{7}{16}$ " hole, then square-cut it to hold a $\frac{1}{4}$ " hex nut securely.

Long Abrasive File

As its name and shape suggest, this versatile tool works like a file and, in some cases, replaces a file. I use it to sand end grain on smaller parts, sand plugs flush, and quickly break sharp edges on project parts. The abrasive can be changed easily and, because I sized the tool to take a 24"-long strip, I can use up torn portable belt-sander belts that I've salvaged.

I've applied cork to one face of the file for jobs that require a slight cushion under the abrasive, such as softening sharp edges or sanding a radius. I use the unpadded face when I want a dead-flat surface for sanding bevels or end grain.

Step 1. From $1\frac{1}{4}$ "-square hardwood stock, cut a 12"-long blank. Contact-cement an oversized piece of $\frac{1}{8}$ "-thick cork to one edge of the blank, then trim it flush.

Step 2. Using the dimensions shown in *figure 3*, lay out the taper line. Bandsaw the taper almost to the line, cutting as straight as possible. Then, joint the taper to the line. Note: For safety, use a push block and joint "downhill" with the grain.

Step 3. Set the miter gauge on your tablesaw to trim the wide end of the tapered piece square with its centerline. Next, locate the exact center on this end, and drill a perpendicular $\frac{7}{16}$ " hole $1\frac{3}{4}$ " deep (*photo F*).

Step 4. Lay out and drill a centered 1" hole through the untapered face of the piece. (I used a 1" spur bit in the drill press and backed the piece to prevent tearout. See *photo G*.) Next, crosscut the tapered piece to $11\frac{1}{4}$ " long using the same procedure you followed in the previous step to square the cut to the centerline.

Step 5. Lay out and drill a $\frac{7}{16}$ " hole through the piece where shown in the figure. Next, lay out and square-cut the side of the hole toward the large end of the taper using your scrollsaw (*photo H*). Note: A $\frac{1}{4}$ -20 hex nut should slide into this hole but not turn. (See *figure 4*.)

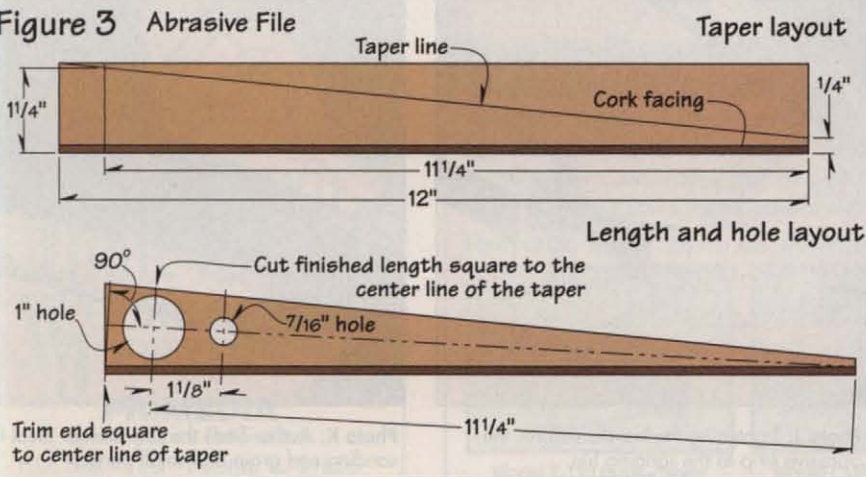
Step 6. Crosscut a $1\frac{1}{4}$ " length of 1" dowel, then lay out and drill a $\frac{5}{16}$ " hole centered crosswise. (I used a V-block to hold the dowel for drilling.) Clamp the dowel end to end in a handscrew clamp, keeping the jaws clear of the dowel's centerline. To cut the dowel perpendicular to the drilled hole, insert a length of $\frac{5}{16}$ " dowel into the hole and then visually adjust the dowel parallel to the saw table before tightening the clamp. Now, rip the 1" dowel lengthwise along the centerline (*photo I*).

Step 7. To make the handle, cut a 4" length of $1\frac{3}{8}$ "-square hardwood. In one end of this blank, drill a centered $\frac{3}{16}$ " hole $1\frac{1}{2}$ " deep.

Step 8. Mount the handle blank on your lathe using a spur center on the end opposite the hole. Bring a ball-bearing cone center to the drilled hole. Turn the handle to the profile shown in *figure 5*. Finish the handle, then install a $2\frac{1}{2}$ "-long $\frac{1}{4}$ -20 hanger bolt in the handle's hole.

Step 9. Sand the narrow end of the tapered piece to a radius. To attach the handle, slide a $\frac{1}{4}$ x20 nut into the pocket and align it with the $\frac{5}{16}$ " hole. Slide the half-dowel over the hanger

Figure 3 Abrasive File



bolt and insert the bolt into the hole on the tapered piece, turning it until it engages the nut.

Step 10. Wrap a length of 1¼"-wide abrasive around the file. Fold the ends of the strip under the half-round dowel and tighten the handle (*photo J*). If the abrasive strip does not tighten securely, shorten it.

A 1" Strip Sander

I made this tool because I'd grown weary of trying to hold a narrow piece of abrasive snugly against a small block (*photo K*). It holds a 1x11" strip that I cut from standard 8½x11" sheets of C-weight sandpaper. The strip can be changed quickly, and the spring tension keeps it snug, which helps prevent tearing. I've made two of these blocks to handle different sanding tasks—one with a padded cork face and one without.

Step 1. From ¾"-thick hardwood, cut a 1x7" blank. If you want a padded surface, cement a strip of cork to one face, then trim it flush with the edges.

Step 2. Square one end of the block, then crosscut a ⅞"-long piece from the squared end. Crosscut the remaining piece to 4¾" long.

Step 3. Using the dimensions shown in *figure 6*, lay out hole centerpoints on one end of the sander body and the sander head (*photo L*). Counterbore the two holes in the outside end of the sanding head to ½" deep. Center and drill shank holes the rest of the way through the piece. Next, drill the spring hole in the inside ends of the head and body, making it ¼" deep in the head, ⅝" deep in the body. Join the two pieces and, using the shank holes in the head as guides, drill ⅜" pilot holes ½" deep in the body.

Step 4. Lay out the taper angle, then bandsaw it to shape. Hand-plane or scrape the sawn taper to remove any saw marks (*photo M*). Next, cut the 60°-angled slots where shown to hold the ends of the abrasive strip. I use C-weight abrasive paper because it fits nicely in kerfs made with a #9 scroll-saw blade.

Figure 5

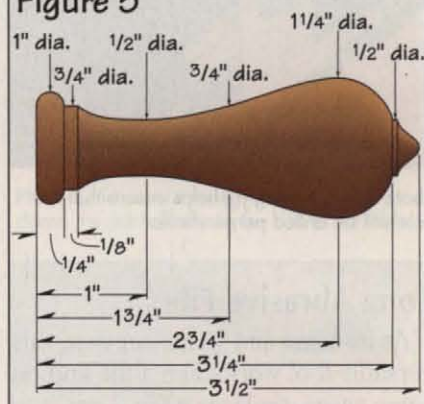


Figure 4
Abrasive File

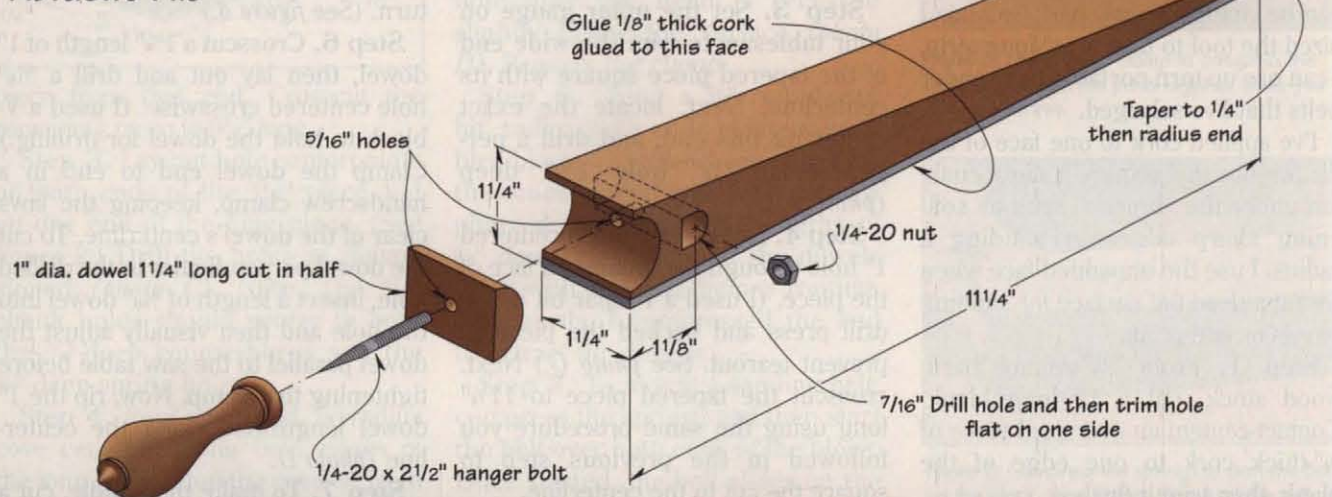


Photo I: Author uses a handscrew clamp to hold the 1" dowel while ripping it lengthwise.



Photo J: Tightening the handle secures the abrasive strip to the sanding file.

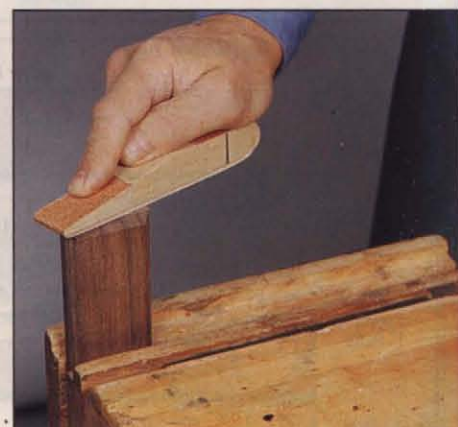


Photo K: Author finds the strip sander ideal for sanding end grain and small parts.

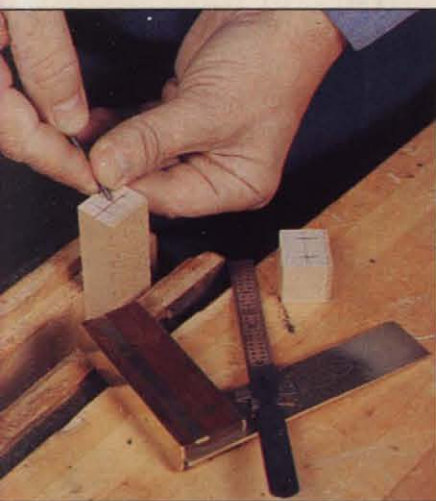


Photo L: Carefully lay out hole centerpoints for the screws and spring.

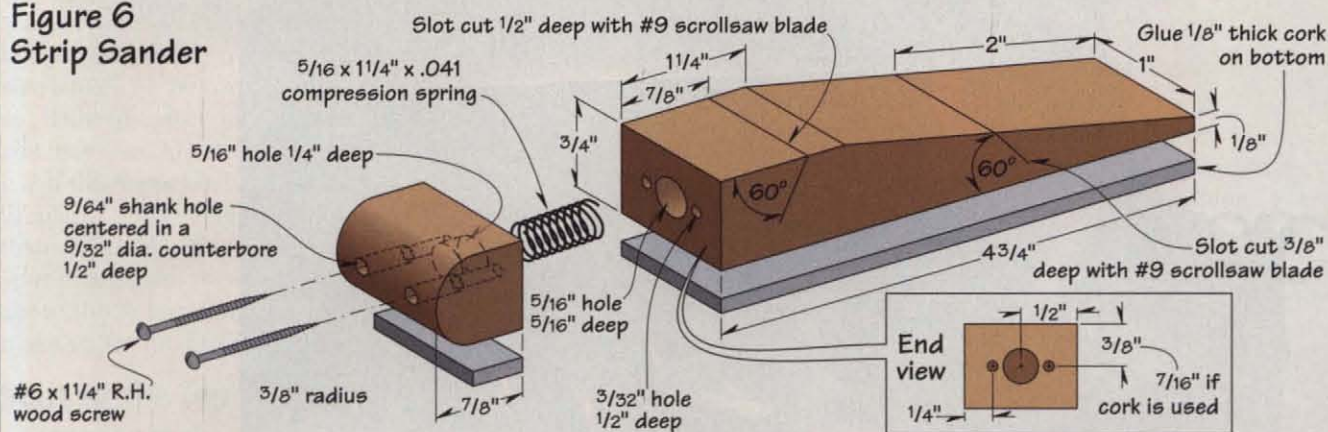


Photo M: Hand-plane or scrape the taper's face to smooth it.



Photo N: While depressing the spring-loaded head with one hand, insert the free end of the abrasive strip into the second slot.

Figure 6 Strip Sander



Step 5. Assemble the strip sander by inserting the spring in the body hole, then placing the head over the spring to compress it. Drive the screws until their heads are recessed just below the end of the sander head.

Step 6. Draw a full radius on the end of the head. Then, stand the head

on edge and sand it to this shape using a vertical belt sander or disc sander.

Step 7. Install a 1x11" strip of abrasive in the strip sander. I find it easiest to insert one end of the strip in the slot at the head end, then wrap the strip around the head and tapered end, holding the strip in position between

my thumb and index finger. I then compress the spring, remove the slack from the strip with my thumb, and insert the loose end into the second slot with my other hand (*photo N*). **WJ**

Photographs: By the author

Illustrations: Dana Quiram



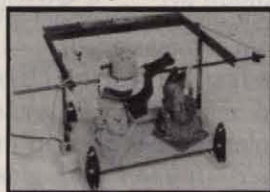
WRITE TO US!
WOODWORKER'S
JOURNAL
PRIMEDIA
Special Interest Publications
P.O. Box 1790 • Peoria, IL 61656

For All Your Woodcarving & Sign Carving Needs

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

Intermediate models include the K-Star, a two-spindle heavy duty bench model, and the Northstar, a heavy duty floor model available in one to eight spindles. **Write or call for more information.**

Terrco, Inc. 222 1st Ave NW, Watertown, SD 57201 605-882-3888 Fax 605-882-0778



Model T-110 Dupli-Carver



Model CM614 Sign Carver



Multi-Spindle Carving Machine

MAPLE FIREPLACE MANTEL

by Brian Smith



Author selected maple for his fireplace mantel to blend with a fairly neutral decor but still add the warmth and character of naturally finished wood.

Nothing says "home" like an inviting hearth. A long, deep mantel gives a fireplace the necessary focus and also supplies some highly visible shelf space for an heirloom clock, family portrait, or other equally treasured piece. For a couple of weeks out of the year, it can also pro-

vide anchorage for Christmas stockings (with a few inches of overhang to keep them from getting singed).

For my new home, I built this classically detailed mantel with pilasters (half-depth columns) to dress up the rather ordinary firebox and glass screen installed by the builder. The

maple I chose might strike you as nondescript, but I wanted it to blend nicely with the room's fairly neutral decor and still provide some of its own warmth and character. Three coats of Waterlox oil rubbing finish brought up the grain and toned the light maple to a pale amber color.

Design Considerations

Puny mantels tend to look fake. In earlier architecture, mantels were usually part of the structure, holding up the wall above the fireplace. Although few of the ones built these days earn their keep structurally, I still like to size a mantel generously. A 7" to 9" height usually suits an average living or family room. A 6" to 9" depth accommodates most clocks and memorabilia and looks suitably proportional to the height.

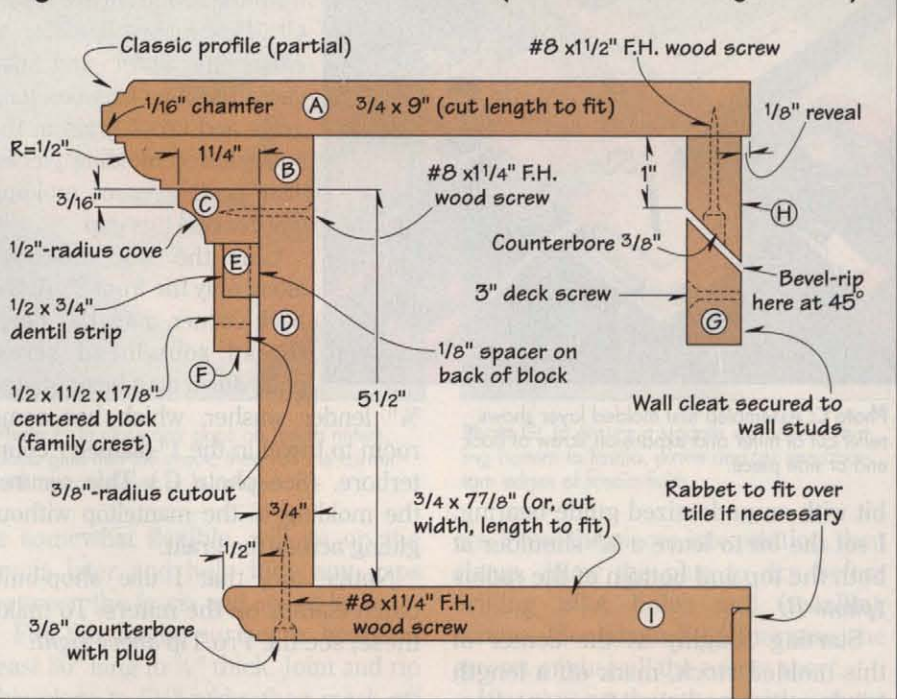
A mantel doesn't need pilasters (half-columns that "protrude" from the wall) to look complete. For this reason, I'll build and install them as a separate, optional step. (See "Make a Pair Of Pilasters" on page 50.)

If you have an elevated firebox and built-up hearth like mine, the pilasters won't need to be longer than 36" or so. If the fireplace sits at floor level, you may want to tile the area between it and the mantel bottom. These days, fireplaces don't usually measure more than 30" high, but you'll still want your manteltop to stand 54" to 60" above the floor. Tiling this area helps make up for the height discrepancy.

Start At the Top

I started with the largest, most visible part—the mantel's top slab. I then fitted the remaining parts to it, working my way toward the floor. (See figure 1 for a sectional view of the completed mantel. Use this figure as a reference for part dimensions.) For the manteltop (A), sur-

Figure 1



face a kiln-dried 4/4 board to just a hair over 3/4" thick. Determine an appropriate length, then joint, rip, and crosscut it. (Mine measured 9x67".)

Next, sand both faces to 100- or 120-grit with an aggressive random-orbit sander. Maple often absorbs finish unevenly, but I've found that sanding away .01" or so after thickness-planing removes mill marks as well as any grain that had been compressed or torn below the surface (photo A). Applying turpentine or paint thinner just before oiling also helps minimize the muddiness caused by uneven finish absorption.

Go over the piece again with 180- and then 220-grit. Normally, you'd finish out with 320-grit, but that would be wasted at this point, since the board may pick up a scratch or two during assembly.

Using the bottom half of a bit with a classical edge profile, rout the ends and front edge of the mantel-

top's top face. This produces a cove topped by a small shoulder. (See figure 2.) The cutter profile on my bit measures 1/2" top to bottom. Next, rout a 1/16" chamfer along the bottom edge to complete the top.

Add the First Molded Layer

For the first molding course (B), prepare a 90" length of 3/4 x 2 3/4" stock. (See figure 1.) Rout one edge with a 1/2"-radius beading bit or a round-over



Photo A: To minimize blotchy finish, "deep-sand" the stock after planing to remove about .01" of material. This removes mill marks, torn and compressed grain.

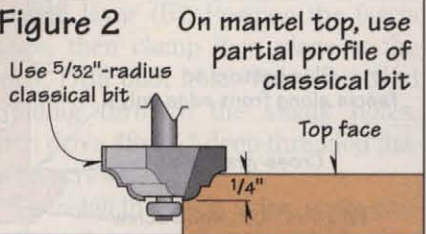


Photo B: Rout edge of top molded layer with 1/2"-radius beading bit (or a round-over bit with an undersized bearing).



Photo C: Assembled first molded layer shows relief cut at miter and expansion screw at back end of side piece.

bit with an undersized guide bearing. I set the bit to leave a $\frac{1}{8}$ " shoulder at both the top and bottom of the radius (photo B).

Starting roughly at the center of this molded stock, mark off a length $\frac{1}{2}$ " shorter overall than the manteltop. (The top, in other words, should overhang this layer by $\frac{1}{4}$ " at each end. My molding measured $66\frac{1}{2}$ " long.) Miter both ends accurately.

Extend the blade of a combination square $\frac{1}{4}$ ", and use it to position the molding along the front edge of the top. Dry-clamp it in place with spring clamps. Next, miter the front ends of the side pieces but leave them overlength at the back. When the miters close and the side pieces lie parallel to the ends of the top, mark and crosscut these pieces to finished length. When cutting and fitting the side moldings, trim them accurately (or even $\frac{1}{32}$ " short) so they don't hold the mantel away from the wall.

Allow the Mantel Room To Move

The mantel sits over a potent but intermittent heat source that also leaks in cold, damp air between uses. Because of these extremes, the top and bottom of the mantel will expand and contract measurably. To compensate, I bored and counterbored each side of the top molding for an "expansion" joint instead of risking a full-length glue joint. (See figure 3.) Later, I did the same for the bottom part.

To ensure a snug fit at the visible outside corner on the wide molding, I

make a relief cut halfway in from the inside corner (photo C). This makes it easier to close the miter and also eases tensions between long grain and cross grain in the two mitered molding pieces. The next layer of molding will conceal this gap.

Glue the side moldings along only the front 2". At the back corner, a #8x $\frac{1}{4}$ " deep-thread roundhead screw pulls down on a heavy-gauge $\frac{3}{4}$ " fender washer, which has some room to travel in the 1"-diameter counterbore. (See photo C.) This secures the molding to the manteltop without gluing across the grain.

Notice too, that I use shop-built pinch clamps on the miters. To make these, see the Pro Tip above right.

The First Round Of Assembly

Next, dry-clamp the parts to check the fit of the first three molding pieces to the manteltop. If you find that you've cut any of the side moldings too short, you can compensate by resetting the blade of your combination square to increase the top's overhang and reposition the pieces.

Starting at one end, apply glue to the front 2" of the side molding. Set the overhang using the combination square, then clamp it in place with two 3" spring clamps. Next, run a generous bead of glue down the middle of the front molding, smear a dab on the miter, and clamp the piece in place.

PRO TIP

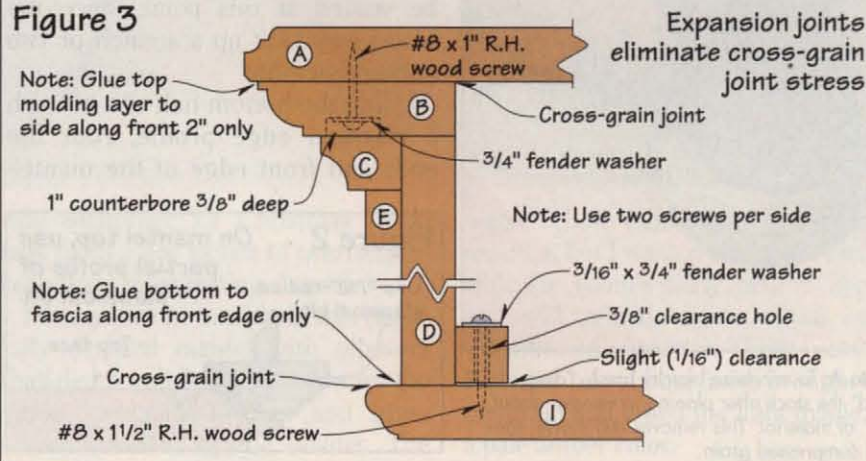
To make pinch clamps like the ones I used on the small mitered moldings, drill a $\frac{7}{64}$ " hole through both jaws of a 3" spring clamp, then drive a $1\frac{1}{2}$ " drywall screw into each hole. These may look crude, but they work well and leave only pin-sized holes. I remove the holes by laying on a bit of wet paper towel and touching it with the tip of a hot iron.



Photo D: The grain lies parallel on coved and beaded layers, so coved layer assembly does not require expansion joints.

Now, the other side molding goes on, again with only the 2"-long bead of glue near the front end. Spring-clamp it in place, then drill pilot holes into the underside of the top, centering them in the two counterbored clearance holes. Drop the fender washers in place and drive the screws.

Figure 3



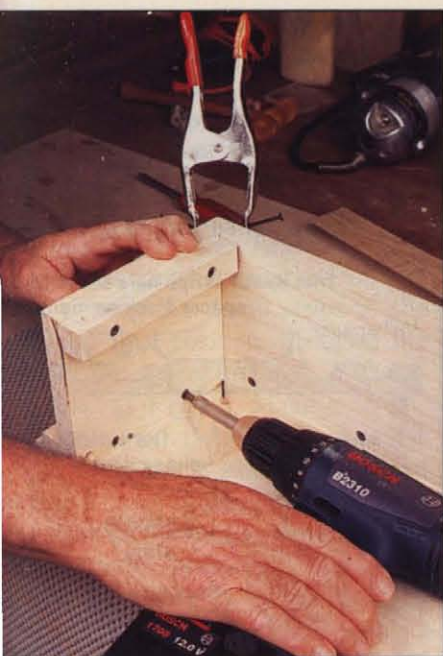


Photo E: Screw fascia sides to cove layer after glue has dried. Note 1x1" block attached to side, which will provide for expansion joint between fascia and bottom.



Photo F: To close any gaps on fascia miters, daub glue into the crack, then roll the corner with a screwdriver or burnisher.

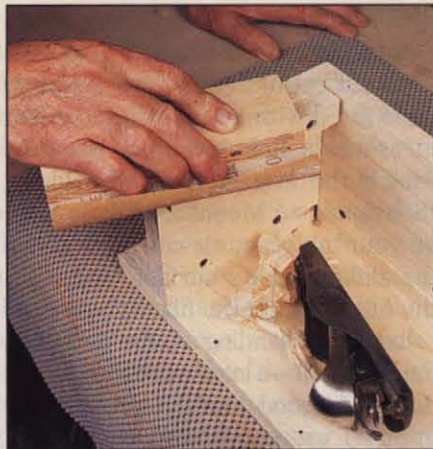


Photo G: To ensure a smooth surface for joining bottom to fascia, plane and/or sand bottom edges of fascia flush.

Add the Cove Layer

To make the next layer (C), prepare another 90" length of $\frac{3}{4}$ "-thick stock that's at least 2" wide to start. Install a $\frac{1}{2}$ " piloted cove bit (which usually has a $\frac{5}{16}$ " cutting height) in a table-mounted router. Make several passes, increasing the cutting depth until you have a $\frac{9}{16}$ " cove and a $\frac{3}{16}$ "-thick shoulder. (See figure 1.) Now, rip the cove molding to $1\frac{1}{4}$ " wide.

To size the pieces for length, measure from the shoulder on the first layer's bead. As before, inset this second layer $\frac{1}{4}$ ". Miter the three cove pieces, again leaving a bit of extra length at the back ends of the side pieces.

Dry-clamp the second molding layer (C) to the first (B). If this reveals any gaps between the layers, flatten one or both surfaces using a hard, flat block wrapped with 100-grit sandpaper. The grain on these two moldings lies parallel, so you needn't use expansion joints. Align, glue, and clamp the cove layer using spring clamps (*photo D*).

Make the Fascia

In making the mantel, I tried to keep alignment demands to a minimum. Instead of proceeding with the dentil layer next, I applied the tall fascia (D), or facing layer. The dentil strip, which

is somewhat flexible, will go on the fascia later and help hide any gaps between the fascia and cove layer.

For the fascia, surface a board at least 80" long to $\frac{3}{4}$ " thick. Joint and rip this piece to $5\frac{1}{2}$ " wide, then mark off an 8" length at both ends to allow for the sides. Using a trim-to-fit approach, miter-cut the front piece from the remaining 64" of stock. Make minute mitered trim cuts until the front piece fits neatly into place behind the cove molding, its top edge butting against the bottom face of the first molded layer. (See figure 1.)

Next, miter the front ends of the fascia sides to rough length. Measure for exact length, then square-cut their back ends to finished length. On the back face of the fascia parts, drill and countersink shank holes $\frac{3}{8}$ " from the top edge, spacing them 6" apart on the front and $2\frac{1}{2}$ " apart on the sides.

Before assembling the fascia parts, cut two 1x1x6" blocks and glue them to the inside face of the fascia sides, inseting them $\frac{1}{16}$ " from the bottom edge (*photo E*). Later, you'll use these blocks to create expansion joints for the bottom.

To attach the fascia front, apply beads of glue to the back edge of the cove layer (C) and bottom face of the beaded layer (B). Position the fascia piece, then clamp it in place at the ends. Drill pilot holes into the cove molding through the shank holes, then drive #8x1 $\frac{1}{4}$ " deep-threaded flat-head screws.

To install the fascia sides, apply glue to the miters as well as the molded lay-

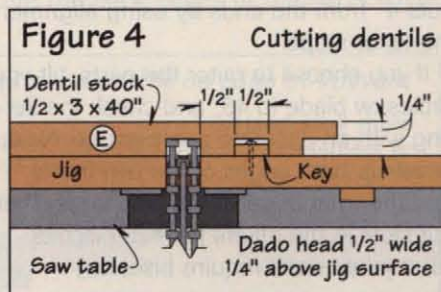
ers. Press the pieces into position, then clamp. Allow the glue to dry before drilling pilot holes and installing screws. (See photo E.) Otherwise, the screws might pull the miters apart.

If you've cut the miters with a sharp blade and accurate jig, the joints usually close up very well. Tiny gaps can be closed during the curing process (or later) by carefully daubing glue into the crack and then rolling the mitered corner with a burnisher or screwdriver (*photo F*).

If necessary, use a block plane and sandpaper to even up the bottom edges of the fascia parts (*photo G*). If you find that any of the parts protrude beyond the back edge of the mantel-top, a bit of careful belt-sanding should fix the problem. Sand the fascia to 320-grit and it's ready for the dentils.

Give Your Mantel Some Teeth

Dentils really dress up a piece, and they're easy to make and install. For the scale of this project, $\frac{1}{2}$ "-wide teeth separated by equally wide, $\frac{1}{4}$ "-deep dados look strong yet elegant. A 40" length of $\frac{1}{2}$ x3" stock will make all the



dentil stock (E) you need and provide extra to fix any mistakes.

To cut these dentils, use a sliding table fitted with an indexing key that measures a hair less than $\frac{1}{2}$ " wide. Attach the key $\frac{1}{2}$ " from the blade. (See figure 4.) Mount a $\frac{1}{2}$ " dado head on your tablesaw, elevate it $\frac{1}{4}$ " above the sliding table's surface, and dado the full length of the blank.

Instead of sanding all the dado bottoms smooth—a lot of work that doesn't do much good since it crosses the grain—I use one of two techniques. Either buff the dados with a purple Scotch-Brite pad or smooth them with a toothbrush-style brass brush. Both methods remove loose particles and spruce up the dados' appearance.

The recessed rough surfaces of these crosscut dados will soak up a

lot of finish. To save time and get better results, I brush a coat of oil into the dados before ripping the dentil stock into $\frac{3}{4}$ "-wide strips. After smoothing the dados and ripping the strips, sand the dentil faces and edges to 150- and then 220-grit using a hard block.

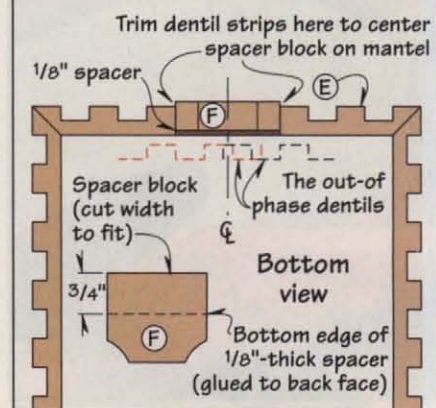
Simplify Dentil-Fitting With a "Family Crest"

Dentils do, however, present a fitting problem. Both ends of each piece (the long front piece, anyway) should ideally culminate in a full-width tooth. You can achieve this—or come pretty close—by calculating the dentil/dado width in advance to fit the finished length of the piece. As an easier alternative, you can pre-dado the dentil

stock (as I did) and adjust the stock to fit by "cheating" inconspicuously.

After preparing the $\frac{1}{2} \times 3 \times 40$ " dentil stock, rip it into three $\frac{3}{4}$ "-wide strips.

Figure 5 Use spacer block to solve dentil-fitting problem



MAKE A PAIR OF PILASTERS

Half-depth columns support the mantel visually and frame the fireplace. You can go with a simple three-sided, butt-joint design as I did, trimming the top and bottom ends with molding. However, if I had to do it over again, I'd dress them up a bit more.

For one, I'd miter the pilaster corners to enhance the appearance of solid columns. Miters this long can be challenging, but biscuits and accurate setups will minimize problems. I would also flute the faces for a *molto classico* look. (See the figure at right.)

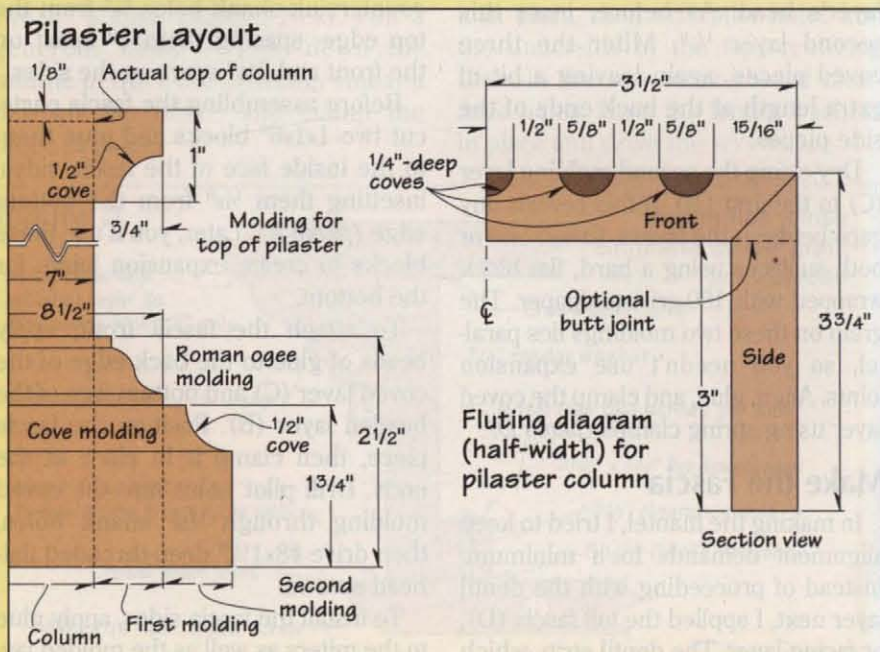
From $\frac{3}{4}$ "-thick stock, prepare a 7"-wide front and two 3"-wide sides for each pilaster. (Make the sides $3\frac{3}{4}$ " wide if you're mitering.) Since you've already hung the mantel, you've established the column height. However, to avoid alignment problems, I subtracted $\frac{1}{8}$ " from that length and offset the top molding during final fitting to hide the gap.

Now, flute the front faces using a $\frac{5}{8}$ " or $\frac{3}{4}$ " core-box bit set to cut $\frac{1}{4}$ " deep. Set your router-table fence to center the first cut, then use a couple of $\frac{1}{2}$ " spacers to index the two outer flutes. Turn the piece end for end and repeat to add the fourth and fifth flutes. Start and finish these cuts 4" from the ends by using alignment marks or stops.

If you choose to miter the parts, tilt your tablesaw blade to 45° and check the setting with an accurate angle gauge. Next, bevel-rip both edges of the two fronts and the front edge of the four sides. Then, cut slots in the miters for #20 biscuits. (Butt joints don't require biscuits.)

Glue, biscuit, and clamp the sides to the fronts to form two three-sided columns. (I used a dry spacer between the back edges of the sides.) Next, prepare the moldings for the top and bottom and miter them to fit. Then, glue and clamp the moldings to the columns. Sand the flutes smooth with sandpaper-wrapped dowels. Then, sand and finish the pilasters using the same procedure you followed for the mantel.

Fasten four 2x2s to the wall positioned to fit snugly inside the inner edges of the column sides. Apply epoxy, yellow glue, or silicone caulk to the inside faces of the column sides and position them. Brace or tape them in place until the adhesive cures.



Miter one end of two strips to a full-width tooth. Arrange the strips on the fascia, aligning the miters with the corners and allowing the opposite ends to overlap at the center. Mark each end at a point that will leave at least a half-tooth and allow a centered gap of 1½" to 2". (See *figure 5*.) Then, crosscut them where marked.

Dry-clamp the dentil strips to the fascia in final position. Measure the gap for the spacer block (F), or "family crest" as I call it. Make a "crest" that suits your tastes. I simply cut a piece of ½"-thick stock, then glued ⅛"-thick material along the top area of the back face to make it stand proud of the dentils (*photo H*).

I bored out a ⅜"-radius quarter-round at each lower corner using a Forstner bit. You might prefer to mold

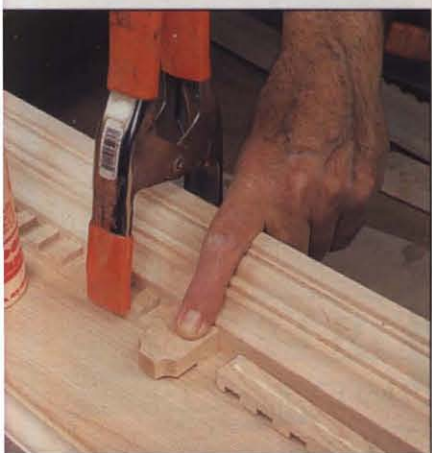


Photo H: Instead of trying to end up with a full tooth at both ends of the front dentil strip, use two half-length strips with a decorative block in the middle to solve the spacing problem.

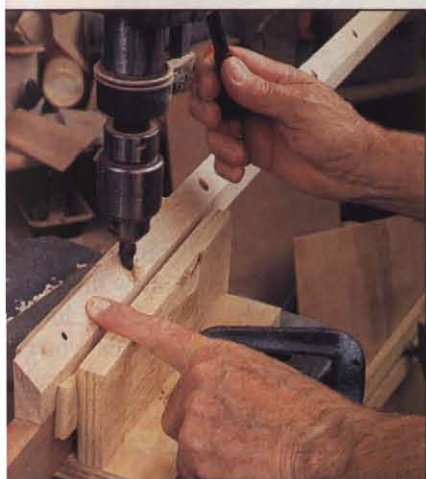


Photo I: To attach the mounting cleat along the back edge of manteltop, drill and counterbore shank holes in the cleat's beveled edge. Note the fence used to hold the workpiece firmly.

the edge or shape and carve an actual shield. Just remember not to size it for width until after dry-assembling the dentils to the fascia.

Use your third dentil strip to make the side pieces. The sides on my mantel had to measure 7⅞" long, so I knew I'd end up with a dado at one end. (One tooth plus one dado equals 1", so anything longer than 7½" but shorter than 8" will end on a dado.) I went ahead and mitered the front ends of these pieces to a full tooth and let the back ends take care of themselves, since they aren't very conspicuous anyway.

Pre-Install the Mounting Cleat

An overlapping-bevel wall mount can secure any kind of box to a wall. It also allows one person to set the mounting cleat level and at the right height on the wall and then place the mantel on top.

To make the parts, rip a straight piece of ¾"-thick hardwood to 3½" wide. Crosscut it to fit between the fascia sides. Next, set the rip fence 2½" from the blade and tilt the blade to 45°. Bevel-rip the piece to form the wall-mounting cleat (G). The off cut (H) attaches to the manteltop. Drill and counterbore the beveled edge of the mantel cleat (the narrower one) for #8x1½" screws (*photo I*).

Clamp the mantel cleat (H) to the manteltop's underside, inseting it ⅛" from the back edge where shown in *figure 1*. Drill pilot holes and screw the cleat in place (without glue) for a trial fit. If everything fits, remove the cleat for now to give yourself full access to the inside of the mantel. You'll attach it later.

Prepare the Bottom To Allow For Movement

To make the mantel bottom (I), surface, rip, and crosscut a piece of

¾"-thick maple that measures ½" wider and 1" longer than the three-sided box formed by the fascia. The bottom should protrude ½" beyond the fascia at the front and sides.

Shape the molded profile on the bottom in three steps. (See *figure 6*.) On the first two steps, I work up to full cutting height in several passes. Hand-sand the sharp edge where the ogee and round-over meet to form a smooth radius. You don't need a large or true radius to make it look good—just a consistent one.

If you have tile surrounding your fireplace, or would like to add tile to enhance your new mantel, prepare for it now by rabbeting the back edge of the bottom. (See *figure 1*.) This will form a neat juncture that hides any gap. Make the rabbet a bit wider than the tile thickness so the tile won't hold the mantel out from the wall.

Drill and counterbore shank holes for #8 screws along the front edge of the bottom's underside—but not across the ends. Center the holes ⅞" from the front edge, spacing them every 9" or so. This will align the holes with the center of the fascia's bottom edge.

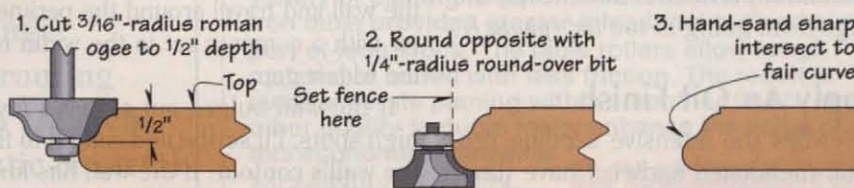
Don't anchor the ends of the bottom with screws—you'd be inviting trouble. This wide board will expand and contract across the grain, while the long grain of the fascia sides will remain stable. Instead, make expansion joints using screws, washers, and oversized clearance holes as you did before. (See *figure 3*.)

To make these joints, drill two ⅜" holes vertically through each of the blocks you glued to the fascia sides. (No need to counterbore them here.) Later, you'll insert screws and washers through these slots and drive them into the top face of the bottom.

But first, position the bottom on the fascia, centering it end to end and aligning the back edges of the parts. Dry-

Figure 6

Rout and sand profile on edge of bottom



clamp it in place, then drill pilot holes through the shank holes into the fascia front. Drive two or three screws to hold the bottom in assembled position. To make alignment easier during the actual glue-up, I drew pencil lines across the back edge of the bottom where it joins the fascia sides and used them to align the piece.

Then, using a short awl or nail in these cramped spaces, mark pilot-hole centerpoints on the top face of the bottom, centering them in the holes you drilled in the blocks. Disassemble the parts, then pilot-drill the bottom where marked.

Assemble the Bottom To the Fascia

The challenge here is to avoid smearing glue along the visible front edge of the bottom as you bring the piece into position. To keep things neat, I position myself behind the inverted mantel so I can align the back edges of the parts as well as the pencil marks made earlier. Center a thin bead of glue along the bottom edge of the fascia front—not the sides—then ease the bottom carefully down into position.

Working quickly, drive the screws along the front edge. Then, insert #8x1½" roundhead screws fitted with ⅜x¾" fender washers through the clearance holes in the fascia blocks. Using a stubby screwdriver or offset driver, drive the screws into the bottom. If you do accidentally smear glue or have squeeze-out along the front, wait until it's almost hardened, then gently chisel it off.

Using a ⅜" Fuller plug cutter, I cut plugs for the screw holes from maple stock that matches the bottom. I made pencil lines on the plugs to help me align the grain, then rolled them in yellow glue and tapped them into the counterbores. A piece of clear ¼"-thick acrylic sheet helps protect the parts from the mallet blows and also keeps the plugs from going in too far (*photo J*).

Apply An Oil Finish

Besides the intensive sanding program mentioned earlier, I have three

additional finishing secrets: generous coats of Waterlox oil, purple Scotch-Brite pads, and lots of elbow grease—all applied gently. But before you do any finishing, glue and screw the beveled mounting cleat to the manteltop.

I lightly buff the mantel with a Scotch-Brite pad before starting and dust it thoroughly so any pad residue won't discolor the wood. Then, I flood on lots of oil with a rag or foam brush, wait a half-hour, and add more on the dry spots.

After another half-hour, I wipe the finish down with a lint-free cloth and let it set up overnight. The next day, a light buffing with the Scotch-Brite knocks down the high spots, and then a second coat of oil goes on. This time, the maple will absorb only about half as much as on the first round.

For the third coat, I start with a light Scotch-Brite scrub. I dust the mantel, then apply oil with a clean, lint-free cloth. With a closed-pore wood like maple, this third coat brings the finish to a nice medium gloss.

Install Your Mantel

Locate the wall studs, then center the wall cleat above the fireplace and mark the stud locations on it. Determine the mantel's appropriate height, then level and secure it to the wall using 3" deck screws.

The wall in my new home surprised me by offering such a flat surface that the mantel snugged right up to it, with no more than a ⅛" gap anywhere (*photo K*). A big gap would call for scribing. To scribe, hang the mantel on the wall and travel around the perimeter with a compass set to the width of the widest gap.

If the wall bulges out at just a few high spots, I'll scribe and sand it to fit the wall's contour. If the wall has low



Photo J: To protect parts from the mallet and prevent plugs from going in too deep, author uses a scrap of ¼" sheet acrylic.

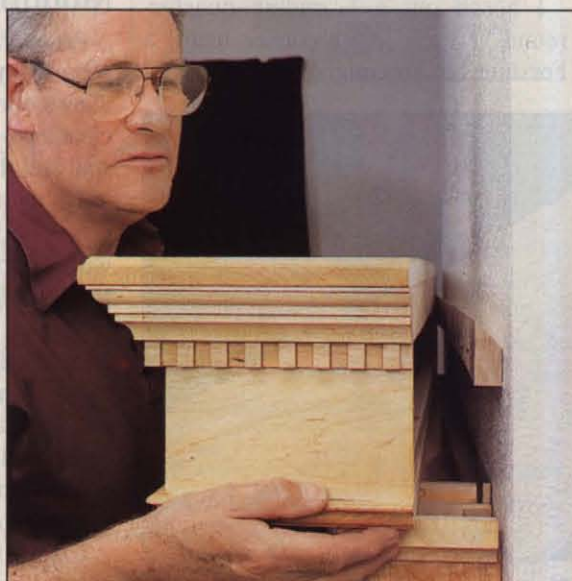


Photo K: Level and screw the beveled wall cleat to studs using 3" deck screws. Mating bevel on mantel's back cleat fits down over the wall cleat.

spots, it may be better to caulk those areas or build up the corresponding stretches of mantel with solid wood, then shape the add-on pieces to fit the hollows.

If you find that the mantel doesn't sit as level as the wall cleat, loosen the wall-cleat screw(s) on the high side one turn at a time. This will allow the mantel cleat to drop down a bit lower behind the wall cleat. Once you've established the mantel's height, add half-depth columns like those described in "Make a Pair Of Pilasters" on *page 50*. 

Photographs: Sven Hanson
Illustrations: Dana Quiram

HOT NEWS

We'll Make You A Pro for Under \$2000

- Abrasive plane knotty, rough-sawn hardwoods without chip-out or planer ripple.
- Dimension uneven glue-ups to within .010" uniform thickness.
- Power sand wide surfaces to a flawless finish - no more hand-held belt sanding.

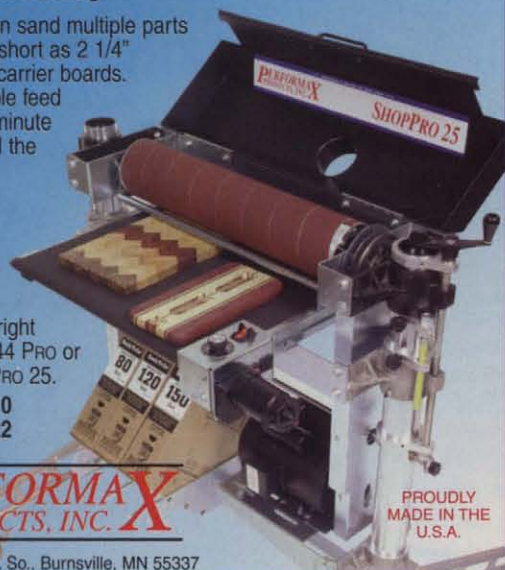
Plus, production sand multiple parts and pieces as short as 2 1/4" without jigs or carrier boards. Infinitely-variable feed rate 0-10' per minute lets you control the finish.

Produce professional-looking results. Call today to select the Pro that's right for you - a 22-44 Pro or the new SHOPPRO 25.

1-800-334-4910
1-612-895-9922

PERFORMAX
PRODUCTS, INC.

12257 Nicollet Ave. So., Burnsville, MN 55337



PROUDLY
MADE IN THE
U.S.A.

Econ-Abrasives

WE MAKE ABRASIVE BELTS ANY SIZE, ANY GRIT!

Standard Abrasive Sheets

CABINET PAPER

	50/pk	100/pk
60D	\$18.70	\$30.00C
80D	15.60	27.80C
100 thru 150C	14.60	26.60C

FINISHING PAPER

	80A	\$11.15	\$18.90C
100 thru 280A	10.00		16.20C

NO LOAD PAPER(white)

100 thru 400A	\$12.25	\$21.25C
---------------	---------	----------

"C" = 100 SHEETS

Velcro® Vacuum Discs

8 Hole pattern for Bosch sanders

Dia.	Grit	Price
5"	60	\$.48 ea
5"	80	.46
5"	100 thru 320	.45



*Available in 5 hole pattern *

*Wide Belts*Rolls*Flap Wheels

*Pump Sleeves*PSA Discs

*Router & Wood Bits*Wood Glue

*MasterCard, VISA, C.O.D. or Check

*SATISFACTION GUARANTEED!!!

*CALL FOR FREE CATALOG

- TX add appropriate sales tax

- Continental U. S. shipping add \$5.50

ABRASIVE BELTS

Please Specify Grits

1X30	\$.81 ea.	3X24	\$.93 ea.
1X42	.81 ea.	3X27	.96 ea.
1X44	.81 ea.	4X21 3/4	1.06 ea.
2 1/2X16	.85 ea.	4X24	1.10 ea.
3X18	.86 ea.	4X36	1.35 ea.
3X21	.90 ea.	6X48	3.50 ea.
3X23 3/4	.93 ea.	6X89X80	6.24 ea.

OTHER SIZES ON REQUEST

HEAVY DUTY SPRING CLAMPS

Clamps come w/PVC tips and grips.



Size	Price
4"	\$1.75 ea
6"	2.25
8"	3.50

JUMBO ROUTER PAD(24" x 36")

It will not allow small blocks of wood to slip out under router or sanding applications.

ROUTER PAD
ONLY \$8.95ea.

JUMBO BELT CLEANING STICK ONLY \$8.80

Econ-Abrasives

P.O.Box 1628

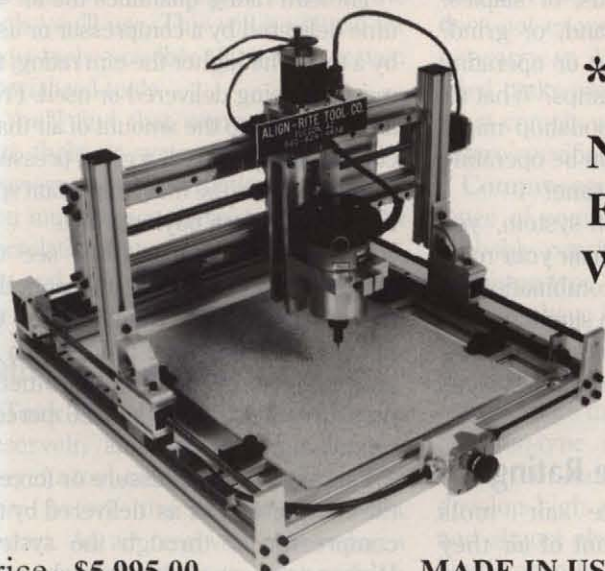
Frisco, TX 75034

(972)377-9779



TOLL-FREE ORDERING LINE (800)367-4101

CNC 24 ROUTER PORTABLE COMPACT CNC



*
N
E
W

Price - \$5,995.00

MADE IN USA

24 X 20 X 6 Travel range

High tolerance precision routing

Accepts collets from 1/16 to 1/2 inch

Rout wood, solid surface, plastic & metal

ALIGN-RITE (888)-624-1942 FAX (520)-624-6737

15" PLANER



For the small production shop or the home craftsman, this Powermatic 15" Planer can handle a wide variety of planing requirements. The one piece cast iron table provides greater infeed and outfeed support of long stock. The table rollers allow rough material to be fed with less friction. The result is more accurate planing with a smoother finish. Many other quality features really enhance the value of this economical machine.

McMINNVILLE, TN

1-800-248-0144

POWERMATIC®



Power Up Your Shop With

AIR POWER

Air tools offer a practical alternative for woodworking shops, big or small

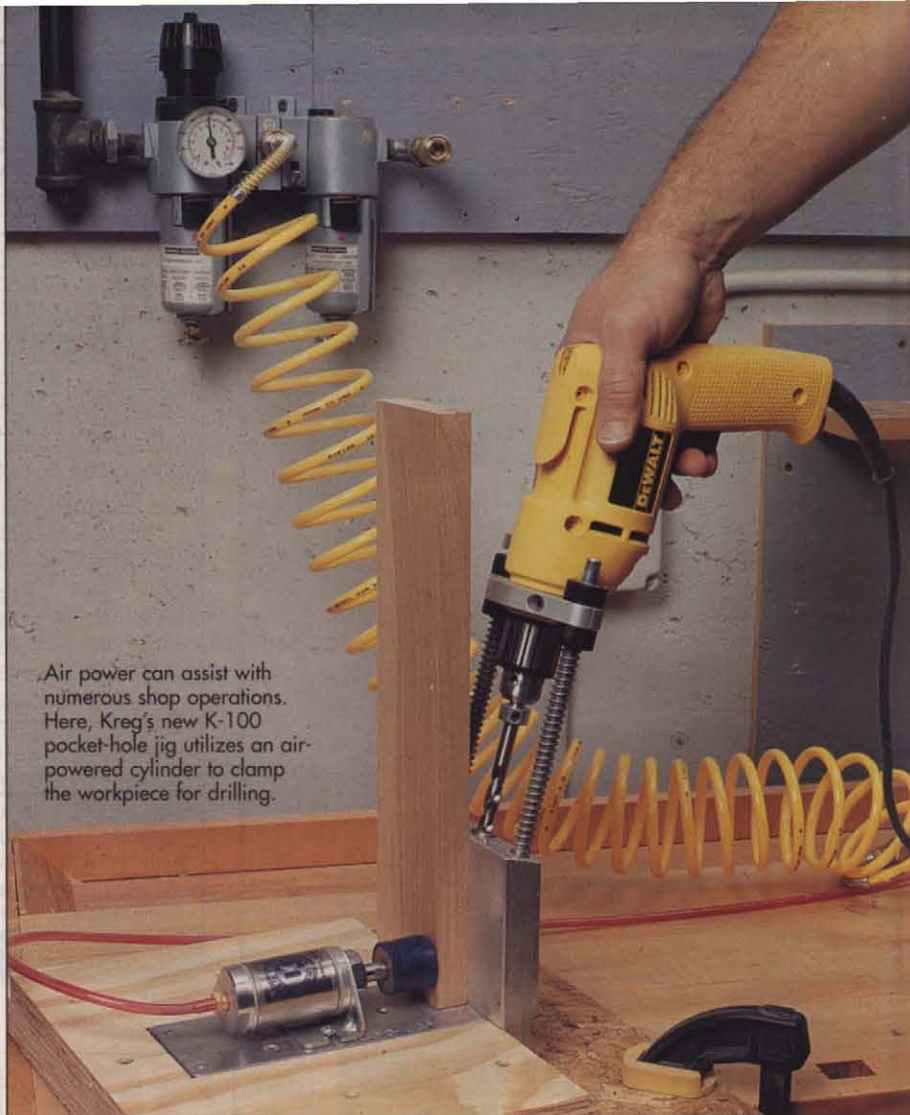
Compressed air can be used effectively in many woodworking operations. Last fall, we installed a new air system in the *Woodworker's Journal* shop and then began tooling up for it. We'd had an air compressor before, but we planned this new system to help us take full advantage of air power's versatility.

Adding air to your work area can be as simple as rolling a portable compressor into the shop and attaching an air hose to it, or as elaborate as installing a stationary unit along with permanent air lines, filters, and regulators. Costs will vary widely depending on your needs, but expect a medium-capacity system to set you back about the price of a good benchtop tool.

Individual air tools cost relatively little. We routinely see staplers, brad-drivers, drills, orbital sanders, sandblast guns, and venturi-type vacuum pumps, to name a few, going for less than \$100 each.

Selecting An Air-Powered System

First, list the air tools that you'd like to use. Do you want to spray-apply fin-



Air power can assist with numerous shop operations. Here, Kreg's new K-100 pocket-hole jig utilizes an air-powered cylinder to clamp the workpiece for drilling.

ishes? Drive nails, brads, or staples? Will you drill holes, sand, or grind? How about sandblasting or operating jigs outfitted with air clamps? What air tools outside of the woodshop might you want to use? Will you be operating more than one tool at a time?

To choose the right system, you need to know how much air your most demanding tool (or combination of tools you're likely to run simultaneously) will require. Then, pick a compressor with an output that slightly exceeds that requirement.

Understanding the Ratings

Manufacturers rate air tools according to the amount of air they need to operate, and compressors by the air they produce. The rating includes two critical measurements: air volume in cubic feet per minute (cfm) and air pressure in pounds per square inch (psi).

The cfm rating quantifies the air volume delivered by a compressor or used by a tool. The higher the cfm rating, the more air being delivered or used. Free-air cfm refers to the amount of air that a compressor pumps at a given pressure. This number is the most important spec to consider when buying a unit.

In some literature, you'll see the abbreviation scfm. This indicates that the engineers have standardized the machine's free-air cmf rating to an air temperature of 68°F, a barometric pressure of 14.7 psi, and 36 percent relative humidity.

Psi refers to the pressure or force of the compressed air as delivered by the compressor or through the system. Higher pressure obviously packs more air into a given space and delivers more power.

The two terms of the rating translate into productive work for you like this: the higher the scfm rating, the more

paint you can apply in a given amount of time. The higher the psi rating, the heavier the paint you can spray.

Most manufacturers report compressor performance ratings for their equipment. Unfortunately, specifications are not standardized from one manufacturer to another, so you often have to interpret. Comparing a published rating of 6.9 scfm at 90 psi for one compressor with a rating of 11.4 cfm at 40 psi for another is like comparing apples with oranges. It makes direct comparison difficult.

Determining Air Requirements

The table at *right* lists average air requirements for a number of different tools. If you know the actual values for a specific tool, use those numbers.

When sizing a compressor, note the highest free-air consumptions (cfm) of the tools you're likely to use. These generally will be the tools that use air almost continuously, such as sprayers, sanders, and drills. The tool that topped our list was an air-hungry sandblast gun, so we knew we needed a compressor capable of producing at least 6 cfm at 90 psi.

A compressor should also be able to maintain a minimum pressure equal to the highest consumption rating of the tools you'll use. This will be 90 psi for most tools, possibly 120 psi for certain specialized tools.

You'll find that some manufacturers rate their air systems by horsepower. However, this information doesn't tell you much, since there's only a limited correlation between a horsepower rating and the actual air power delivered by a compressor.

Other Considerations

Tank size: An air tank serves as a reservoir, and the larger it is, the longer a tool can be run at a given pressure before the compressor must restart. An air reservoir also reduces the compressor's run time, which helps decrease wear and maintenance.

Base your choice of tank capacity on the cfm requirements of your tools: if you have continuous-use tools, get a system with a larger tank. Remember to factor in secondary con-

AVERAGE FREE-AIR CONSUMPTION		
Tool	Maximum Pressure Required* (psi)	Average Free Air Consumption* (scfm)
Blow gun	40-90	1-2.5
Die grinder (carving)	30-90	4-12
Drill (3/8")	70-90	4-6
Impact wrench (3/8")	70-90	3
Nailer	70-90	1.5-9.6
Paint spray gun	10-70	1-7.5
Pressure washer	40-90	7-8
Sandblast gun	30-90	2-4
Sandblast gun/hopper	40-90	2-6
Sander (disc)	70-90	6-8
Sander (straight line)	90-120	6-8
Tire chuck	10-50	1.5

*Average values. Check with the tool manufacturer for actual air consumption of the model being considered.

siderations as well, such as how much space you have available for the equipment, whether you want portability, and how much you want to spend.

Some air tanks carry ASME labels, which means the tank has been rated and certified as safe by the American Society of Mechanical Engineers. Systems sold for farm and residential use, and those in which the pressure does not exceed 100 psi, generally do not carry an ASME rating. ASME-certified tanks are required in shops that must comply with OSHA standards or where specified by local codes.

Compressor type: Of the several types of compressors available, you'll probably consider either a diaphragm or piston-type unit. Diaphragm compressors have limited capacity, both in psi and cfm. These units typically are the small, continuous-operating, portable compressors that don't have a tank.

Piston-type reciprocating compressors, the most common type, can develop high pressures and volumes and almost always come with a tank. Until recently, most piston-type compressor pumps were oil-lubricated. The Campbell Hausfeld compressor is one such oil bath-lubricated, piston-type unit (*photo A*).

Some compressors, such as the Sears Craftsman, do not require oil

lubrication (*photo B*). Their pistons, cylinders, valves, and heads are made of permanently lubricated materials. The Craftsman unit also employs a direct motor drive, so it has no belts to adjust or maintain.

The merits of either type of system can be argued, but their relative success depends on the application, maintenance, and operating conditions. Millions of each type are used suc-



Photo A: The Campbell Hausfeld stationary compressor we installed in our shop is an oil bath-lubricated, piston-type unit.

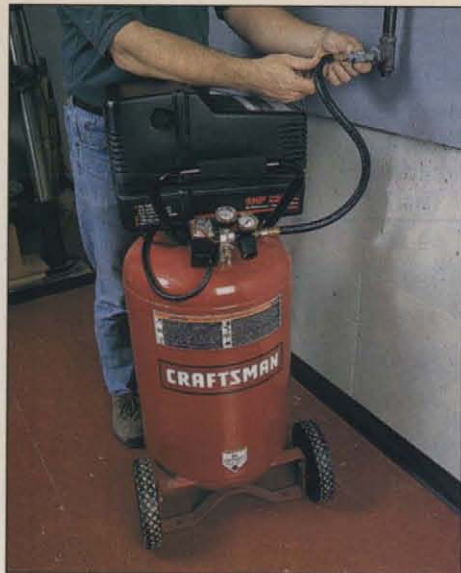


Photo B: This Sears Craftsman portable upright compressor has permanently lubricated parts.

cessfully in shops and on job sites every day.

Electrical wiring: You can buy single-stage, tank-mounted compressors with single-phase motors wired for 60Hz alternating current. Models with motors in the $\frac{3}{4}$ -hp range typically come wired for 115-volt operation. Units in the 1- to $1\frac{1}{2}$ -hp range often are wired for dual voltage so they can be operated with either 115 or 230 volts. Motors rated at 2 hp and larger must be wired for 230 volts, and some even require three-phase service.

A compressor motor adds a heavy current drain to an electrical system, especially when it starts. You may find that your shop's wiring and circuitry need overhauling to accommodate this. It's generally best to dedicate a circuit solely to the compressor or install a new, higher-amperage circuit for it. If in doubt, check with an electrician.

Compressor recovery: You won't find a reference to this in any literature specifications, but the time it takes a compressor to recharge its tank after depletion can be important. If a system recovers slowly and you continue to use air, the compressor may end up operating almost continuously, or you may even have to stop working and wait until it does recover sufficiently.

Components Of An Air System

If you expect to run continuous-use tools such as a sprayer, sander, drill, or

hammer chisel that need high pressure and volume, a larger stationary compressor like the Campbell Hausfeld unit we installed in our shop may be a good solution. (Model C1Q71060V. See photo A.) This 230-volt, four-cylinder unit products 14.3 scfm at 135 psi, or 16.8 scfm at 90 psi, and incorporates a 60-gallon ASME-rated tank.

You may, however, require less air or use it less often, or you may prefer the convenience of a portable compressor. If so, consider a mobile unit such as the Sears Craftsman (model no. 919.165220) shown in photo B. You can roll it right to the bench where you're working or connect it to a stationary air-distributing system when needed. You'll still have the portability whenever you need air outside the shop.

Note that this unit stands upright, so it requires less floor area than older-style units with horizontal tanks. The compressor is a direct-driven, single-cylinder oilless pump mated to a 22-gallon ASME tank. The manufacturer rates it at 8.6 scfm at 40 psi, 6.4 scfm at 90 psi, with a 130 psi maximum.

Planning For Efficient Air Distribution

A well-planned system should deliver air power efficiently wherever you need it. Inefficient systems often result in higher operating costs, improper or erratic tool operation, shorter component life, and reduced capacity.

For our shop, we elected to use 1"-o.d. iron pipe. This material is safe, readily available, easy to work, and competitively priced. Copper (and in some cases plastic) pipe may be used, but check your local codes.

To install your system, you'll need a variety of hangers, fittings, and couplings (*photo C*). While installing the pipe for our system, we had problems sealing some foreign-made couplings, even with pipe-joint compound. You may want to keep this in mind when you purchase your hardware.

The 1" pipe we used may be a bit oversized, but we didn't want the air line to limit the system. Because of resistance and other factors, pressure drops off as the air travels farther from the source. Engineers generally try to



Photo C: A permanently installed air-distribution system requires $\frac{3}{4}$ "- or 1"-o.d. pipe and a variety of fittings, couplers, and hangers.

hold this pressure drop-off between compressor and tool to less than 10 psi.

For a 5-hp or smaller compressor and a distribution system that totals less than 200' in length, $\frac{3}{4}$ "-o.d. pipe is recommended. With compressors larger than 3-hp and systems totaling over 200' of line, use 1"-o.d. pipe. If your compressor is rated at 7-hp or higher, go with $1\frac{1}{4}$ "-o.d. pipe.

Most air tools connect to the compressor or air line by way of a hose (*photo D*). Although convenient, hoses can become a restriction and cause air-starvation problems with some tools. One manufacturer's test showed that a 20' length of $\frac{1}{4}$ "-i.d. hose lost almost 2 psi per foot at 25 cfm. The same length of $\frac{3}{8}$ "-i.d. hose, however, lost less than $\frac{1}{2}$ psi per foot.

For most applications, you'll get better tool performance by using the largest-diameter hose you can afford (preferably $\frac{3}{8}$ "- or $\frac{1}{2}$ "-i.d. with $\frac{3}{8}$ " connectors) and limit length to 25' or less.

Self-coiling air hoses excel for close work and in situations where long, heavy hose would be awkward. (See the yellow coil in photo D.) We also use short leader hoses (called pigtails or whips) to connect tools to a conventional air hose (shown in the photo). Most hose wear occurs at or near the tool connection and is caused by stretching, kinking, and abrasion. Using these short, inexpensive leaders at the main wear point helps extend the life of longer, more costly hoses.

Quick couplers and connectors permit fast, easy wrench-free connection of air lines and tools (*photo E*). You install these components on the hose ends and tools, and they can be made up into a variety of combinations.



Photo D: Buy the largest-diameter air hose you can afford. The black coil is Sears' new 1/2"-i.d. high-performance rubber with 3/8" male/female connectors (catalog no. 16205). The yellow, self-coiling nylon air tube (catalog no. 16220) carries a 200-psi working pressure, an 800-psi burst-strength rating. The 2'-long 3/8"-i.d. leader (catalog no. 16207) has a 300-psi working pressure and 1200-psi burst-strength rating.

Air System Guards

Regulators control the air flow and pressure in the distribution system, so you can adjust pressure to match the needs of any tool (*photo F*). Its important to use the correct pressure for a tool, and regulators also help hold the pressure constant despite any fluctuations of the inlet air. Most tools will operate beyond their recommended pressures, but this can cause excessive wear and waste compressed air.

In-line filters remove oil, condensed water, scale, and other contaminants from the compressed air to keep them from getting into tools and spray guns. Engineers recommend installing a large filter in the main distribution line near the tank as well as another smaller filter in the line close to the tool.

A filter and regulator are often combined into a single unit, as in Campbell Hausfeld's filter/regulator/lubricator



Photo E: Quick couplers and connectors make it easy to connect and disconnect tools and hoses. Several types are available, so make sure yours match.

kit (model PA2078) shown in *photo G*. Combining these components simplify operation, save space, and reduce the number of couplings needed for installation.

As its name indicates, the filter/regulator shown here also incorporates a lubricator. Many air nailers, drills, sanders, and similar tools require lubrication during use, and supplying the lubricant in the compressed air is an ideal way to accomplish this.

The lubricator automatically injects an oil mist into the air stream as it flows through the unit. The adjusting screw on top controls the oil flow rate. In our shop, the outlet on the right side of the unit (as shown in *photo G*) serves as the oil-rich air source connection. We connect only the tools requiring lubrication to this outlet.

This lubricating oil can, unfortunately, contaminate wood surfaces. However, good tool maintenance helps prevent most problems. Also, more and more tools these days are being designed to work without lubrication, thereby decreasing the chances of fouling a workpiece.

If a wall-mounted lubricator isn't feasible for your shop, you can plumb a small in-line oiler into the hose leading to the tool. These small, relatively inexpensive units work effectively, although they require more attention and service than the larger units.

With light-duty usage, a drop of air-tool oil injected directly into the tool's air inlet once a day may be sufficient. Just make certain that the oil runs down into the air motor or tool, not back out the inlet.

If you're tired of tangling with conventional clamps, the no-hands convenience offered by vacuum clamps and jigs should appeal to you. The vacuum-charged template shown in *photo H* holds the workpiece, eliminating the need for clamps, screws, double-faced tape, or hold-downs on the router table. The vacuum-assisted clamp on the Kreg jig shown in the lead photo on *page 54* instantly locks and releases the workpiece with the push of a foot-operated air switch, leaving the operator's hands free for other tasks.

You can buy vacuum clamping fixtures, or make your own, to fit almost



Photo F: Pressure regulators help maintain constant air pressure and also let you set the optimum operating pressure for the particular tool in use.



Photo G: Campbell Hausfeld's in-line control incorporates a filter, regulator, and lubricator kit. Filters protect air-powered tools by removing water and other contaminants.



Photo H: Compressed air passing through a venturi generates enough suction to clamp the workpiece to this router template.

any job. To operate vacuum jigs and clamps, you need a venturi pump that connects to an air line; the compressed air passing through the venturi creates the vacuum.

To shop-build these fixtures, you need some flat, non-porous stock, a few feet of hose, some closed-cell foam tape, and a couple of inexpensive connectors. (For additional information on making vacuum clamps, see the March/April '97 *Woodworker's Journal*, pages 18-25.) 

Photographs: Randall Sutter, Kevin May
Written by Charles Sommers



1" Belt/Disc SANDERS

No woodshop should be without one of these versatile and inexpensive tools

by Doug Cobb

The key to good craftsmanship often lies in the small details, and a belt/disc sander gives you the capability to remove just a whisker of material with great precision. You can close up gaps in joints, adjust the fit of mating parts, sand bevels and chamfers on tiny pieces, and even sharpen certain edge tools. The adjustable tables provide a steady work surface and let you sand accurate, repeatable profiles.

Since almost every major manufacturer offers at least one version of this tool, we rounded up a representative batch to see how they performed. Nine of the 10 sanders we evaluated take a 1"-wide belt (30" or 42" long) and either a 5", 6", or 8"-diameter disc.

Take a quick glance at these machines, and you'll notice some design differences. I'll start with a few general comments about what you should look for in a belt/disc sander, then give you a closer look at how the individual sanders worked.

What To Look For

For discussion purposes, I've divided these machines into two basic categories: small sanders with 30"-long belts and larger models with 42"-long belts. The 30" units all have 5" discs, while the 42" models carry 8" discs,

except for the Grizzly and Sears no. 226712, which have 6" discs.

Size: Note that there's not a great price difference between some of the large and small sanders. I found the larger tables generally more comfortable to use, and the larger discs didn't load up as quickly as the 5" discs. The larger machines, however, weigh more, some between 60 and 70 pounds, which makes them a hefty carry. Their larger footprint also eats up more surface area, a factor to consider if you have limited shop space.

Speed: Although differences in speed (feet per minute on the belts and rpm on the discs) did not affect vibration as much as belt quality did, I liked the slower-running machines

better. The faster machines sand more aggressively and afford less control of the work than I would prefer, considering that they're designed for detail work. The faster speeds also break down abrasives more rapidly so you need to use the more costly, higher-quality belts and discs on these sanders.

Tilt Capability: The tables on the sanders I tested all tilt to at least 55°, and a few of them can be adjusted to 65° or more. The 65° tilt comes in handy if you want to sharpen chisels and plane irons (*photo A*). The 55° tilt doesn't cause a serious hardship, since you can put an angled scrap block under your tool to achieve the proper sharpening angle. However, if you expect to do a lot of touch-up

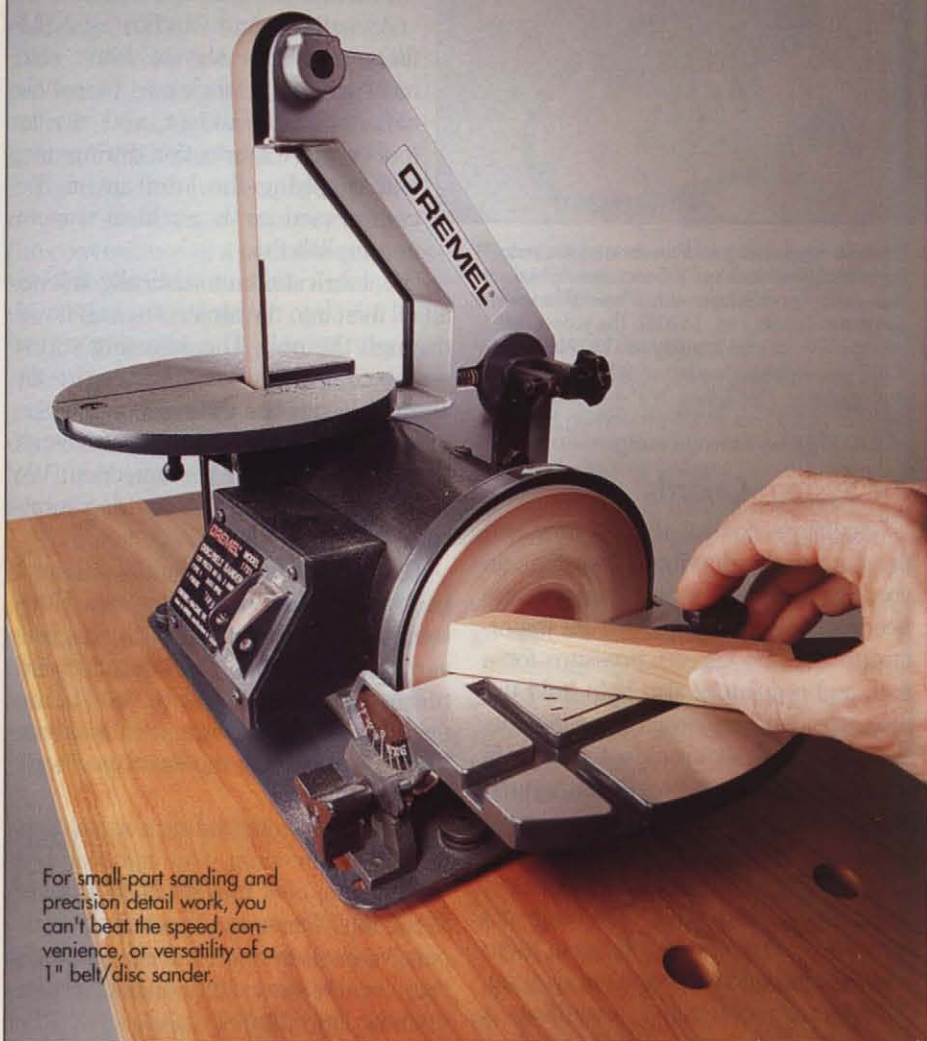




Photo A: For sharpening, the belt table must tilt to at least 65°, or you can use a wooden block machined to the proper angle.

sharpening on your edge tools, the extra tilt does make this job easier.

Horizontal sanding: Three of these units, the Grizzly G3105 and two of the Sears Craftsman models, have a belt-sanding assembly which rotates to 90° for horizontal sanding (*photo B*). By rotating the arm to this position, you can use the table as a backstop, which provides more control as well as versatility.

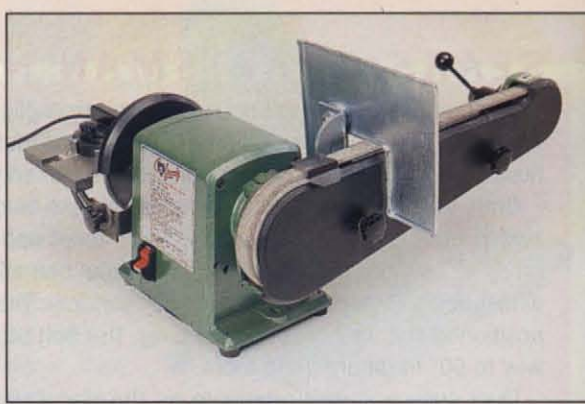


Photo B: The two-wheel models rotate down into a horizontal position, which adds considerably to their versatility.

THE 30" SANDERS UP CLOSE

DELTA 31-080

As usual, this firm supplies a clearly illustrated, easy-to-follow manual. The machine and all parts were packed well, although the set screw for the top idler pulley shaft was missing.

The heavy-gauge steel in the base gives the tool a substantial feel and helps dampen vibration. The corrugated-aluminum belt table and non-corrugated disc table were both flat and well-finished. A guard over the top belt wheel helps keep dust out of the operator's face, and the collection port, when connected to a vacuum, did a good job of rounding up most of the sanding dust. The belt supplied with this machine had a heavy seam that generated a lot of noise and reduced sanding control.

SPECIFICATIONS

Motor amps: 2.6

Table tilt, belt/disc: 55°/45°

Speeds, belt/disc: 3150 fpm/ 3450 rpm

Street price: \$115



DREMEL 1731

This machine came well-packed with a good manual and a long list of optional accessories, including a buffing belt with compounds and a sharpening jig for drill bits. Both tables were ground flat and finished nicely. Unlike the other 30" sanders, the Dremel has a round belt table and a curved front edge on its disc table. This proves useful when you have to rotate a workpiece to sand a curved profile on its ends.

Dremel outfits the disc table with a unique miter gauge that has an adjustable head, and a fixed 30° backstop. Grooves cast into the tabletop indicate angle settings. The belt table has a sliding insert that lets you adjust the space between the belt and the table. (See *photo below*.) I had to shim the insert with four thicknesses of paper, however, to make it align flush with the rest of the table.

Dremel engineers have positioned the belt table's lock-down lever on the left side for easier access. They've also mounted the on/off switch on the front of the machine, which eliminates the hazard of having to reach over the top of the machine. However, a plastic dust shield on the switch makes it a bit hard to operate.

Dust collection was adequate on the belt, but the disc needs a shield under it to better confine the dust. Dremel gets high marks, however, for its smooth-seam belts, which ran with very little noise or vibration and gave me good sanding control.

SPECIFICATIONS

Motor amps: 2

Table tilt, belt/disc: 60°/45°

Speeds, belt/disc: 3150 fpm/3450 rpm

Street price: \$125



SEARS/CRAFTSMAN NO. 22676

The manual for this unit needs to be more explicit on assembly. It gives written instructions that refer you to an exploded-view diagram, but no explanatory photos. This shouldn't pose a problem for most new owners, but I did have to reassemble one component due to the skimpy instructions.

Both tables are corrugated cast aluminum and have a well-finished surface. The front-mounted switch has lock-down capability. This model appears to be a scaled-down version of the firm's 42" sander, and it uses a two-wheel belt assembly rather than the three-wheel design found on the other 30" sanders. This design allows the belt to be positioned flat for horizontal sanding. The belt table on this unit also tilts all the way to 90° for sharpening tools.

Dust collection was adequate on the disc, but the belt has no collection port. I found the quality of the Sears belt good, but it runs 25 percent faster than any of the other small sanders I tested. Also, this was the only sander that bogged down and stalled on me, so I'd prefer a beefier motor.



SPECIFICATIONS

Motor amps: 2.6

Table tilt, belt/disc: 90°/50°

Speeds, belt/disc: 4260 fpm/3450 rpm

Street price: \$85

TRADESMAN 8184

Assembling this unit took me almost 40 minutes, mostly because of inadequate instructions. The parts list consists of just a hand sketch, and many of the part numbers were difficult to read. If I had installed it, the grommet foot in the front right position would've interfered with the dust-collection port. I also had to knock out some casting flashing in the curved slots on the disc table in order to assemble and adjust it.

The Tradesman has a corrugated-aluminum belt table and a smooth aluminum disc table, both well-finished. The miter gauge for the disc table felt solid and substantial. The guard over the top wheel on the belt assembly keeps dust out of the operator's face, and the collection ports picked up most of the dust.

The sanding belt supplied with this unit was made by the same firm that supplies the small Delta belt. Its thick seam made a lot of noise and interfered with my sanding control. The motor, although lower in amperage than those on the other models, provided adequate power.

SPECIFICATIONS

Motor amps: 1.8

Table tilt, belt/disc: 55°/45°

Speeds, belt/disc: 3150 fpm/ 3450 rpm

Street price: \$195.95

WOODTEK B130R

This machine was the only one I tested that did not have a disc-sander. I found the assembly instructions easy to follow, although the photographs weren't clear. I had to bend the belt platen a bit to square it with the table, but that wasn't a big deal. The corrugated aluminum table had a good finish grind.

The curved wheel guard effectively blocked the dust coming off the top wheel, even though it wasn't shown or referenced in the manual. Woodtek supplies a very good belt with this machine (the same as on the Dremel), which made sanding pleasant and controllable.

The only problem I had with this machine was the extra-hard tension on the spring-loaded idler that you depress to change the belts. Operators with small or weak hands may have to struggle to push it in. This extra tension didn't seem to offer any advantage over those machines that have less idler tension.

SPECIFICATIONS

Motor amps: 2

Table tilt, belt: 55°

Speeds, belt: 3150 fpm

Street price: \$73



THE 42" SANDERS UP CLOSE

DELTA 31-340

Delta ships an excellent manual with this machine. All of the parts fit well except for the platen on the belt sander. It would not align with the belt until I widened the slot in the table.

The cast-iron tables had a rougher grind than those on other models and would not wax well. Both of them have miter slots, and Delta supplies a nice, solid miter gauge. The disc table centers on the disc, although I'd prefer more surface to the left half of the disc, since that's where you do most sanding. The disc table can be removed for access to the entire face of the disc. Delta uses levers to adjust and tighten the tables (rather than cap screws or other small devices), definitely a user-friendly detail. (See photo at left.)

The dust collector worked well, and belt changes went smoothly. The unit comes with a high-quality, flat-seamed belt. Even though this machine seemed noisy, it was solid and heavy enough to provide lots of control. Part of this control, however, results from the sander's operating speed, which is slower than that of all the other large sanders in the test except for the Jet.



SPECIFICATIONS

Motor amps: 6

Table tilt, belt/disc: 55°/45°

Speeds, belt/disc: 3000 fpm/1725 rpm

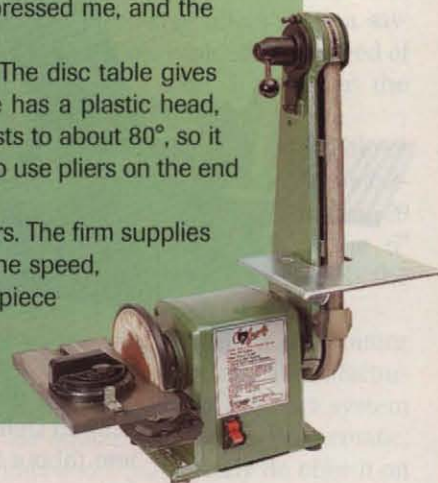
Street price: \$260

GRIZZLY G3105

Grizzly also supplies an excellent manual. The instructions, photos, and labeling all impressed me, and the firm goes the extra mile to emphasize safety and product support.

The machine has a stamped-steel table for the belt and a cast-iron table for the disc. The disc table gives you more work surface and better support at the left end than Delta's. The miter gauge has a plastic head, which detracts somewhat from the sander's otherwise solid character. The belt table adjusts to about 80°, so it will accommodate sharpening chores. An allen wrench locks the table in place, but I had to use pliers on the end of the wrench to get enough torque to secure the cap screw.

Power was adequate, although the motor is smaller than those on the other large sanders. The firm supplies high-quality 3M belts with this sander, which is fortunate, because it runs fast. Despite the speed, however, the motor ran quietly with minimal vibration, and I felt that I had sufficient workpiece control. Dust collection worked well on the disc, but the machine has no port for the belt.



SPECIFICATIONS

Motor amps: 3.5

Table tilt, belt/disc: 80°/45°

Speeds, belt/disc: 4680 fpm/3450 rpm

Street price: \$120

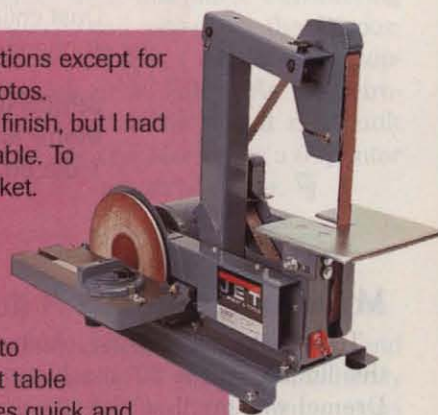
JET JSG-1

The manual provided for this machine needs a revamp. There were no assembly instructions except for installing the switch, which was already installed. I had a hard time following the blurry photos.

Jet has sized the stamped-steel belt table generously. The cast-iron disc table has a nice finish, but I had trouble aligning it properly so that the disc wouldn't rub the table. Likewise for the belt table. To solve the problem, I had to place a washer between the machine frame and the table bracket.

The disc table locks into its support base with a pair of small wing nuts. I couldn't tighten these sufficiently by hand, so the first thing I'd do is replace them with a good set of ratchet-type clamp handles. Also, the table doesn't cradle into any machined surfaces, which makes me suspicious of its accuracy and alignment.

On the plus side, I did find this machine's relatively slow belt and disc speeds a pleasure to work with. Power was adequate, and Jet supplies high-quality belts with the unit. The belt table rotates downward sufficiently for tool-sharpening, and the tension lever made belt changes quick and easy. Unfortunately, this machine has no dust-collection port for either the disc or the belt.



SPECIFICATIONS

Motor amps: 9

Table tilt, belt/disc: 90°/50°

Speeds, belt/disc: 2500 fpm/1720 rpm

Street price: \$179

SEARS/CRAFTSMAN NO. 226712

As with the other Craftsman sanders I tested, the manual for this one needs improvement. The written instructions refer you to an exploded-view drawing, but there are no step-by-step illustrations.

Both of the corrugated-aluminum tables had a nice finish grind. This machine shares a lot of design features with the Grizzly unit, including the two-wheel design that permits horizontal belt-sanding. The manufacturer also supplies a long allen wrench that makes it easy to lock the belt table. The belt platen can be removed for contour-sanding.

The motor provides adequate power, but both the belt and 6" disc run extremely fast. However, the smooth-seamed belts that come with this machine kept the speed from being a problem. Dust collection worked well on the disc, but the belt doesn't have a collection port.

Belt changes went smoothly, thanks to the belt-tension release lever. The switch mounts on the front of the unit and can be removed. The price tag compares favorably with those on some of the 30" sanders, making this machine a good value.



SPECIFICATIONS

Motor amps: 4

Table tilt, belt/disc: 80°/50°

Speeds, belt/disc: 4680 fpm/3450 rpm

Street price: \$120

SEARS/CRAFTSMAN NO. 226380

This sander, unique among those I tested, offers both 1" and 2" belts and matching platens. Like the other Sears units, this one comes with a marginally helpful manual. The corrugated aluminum disc table and the cast-iron belt table have been nicely finished. Sears supplies a substantial miter gauge with this model that has slots in the head for attaching a wooden extension.

The hefty 8-amp motor provides plenty of power, and the designers wisely slowed the belt speed to allow more control.

The belts that come with the machine are of decent quality, but they had enough of a seam to cause some vibration. The belt table tilts to 90° for easy sharpening of edge tools, and I found the 2"-wide belt especially useful for sharpening wide chisels and plane irons. A lever

locks the belt table in place, so you don't have to search for a wrench.

The 8" disc runs too fast for my taste—3450 rpm as compared to half that speed on the Jet and Delta 42" units. The first sample of this sander I received had a serious runout problem (about 1/16" in the disc) that made it too wobbly to test adequately. A replacement disc, however, solved the problem.

Dust collection worked well on both the disc and belt ports. A tension-release lever made belt changes quick and easy, and the lockable switch is front-mounted.

SPECIFICATIONS

Motor amps: 8

Table tilt, belt/disc: 90°/50°

Speeds, belt/disc: 3100 fpm/3450 rpm

Street price: \$190

My Favorites

There are many good choices in this lineup. Of the 30" machines, the Dremel was my first pick. Its design and convenient features made me think a woodworker had a hand in its development. If you prefer a 90° tilt on the belt table and horizontal belt-

sanding capability, go with the Sears no. 22676. If you don't need the disc-sanding capability, the Woodtek will give you reliable belt-sanding at a great price.

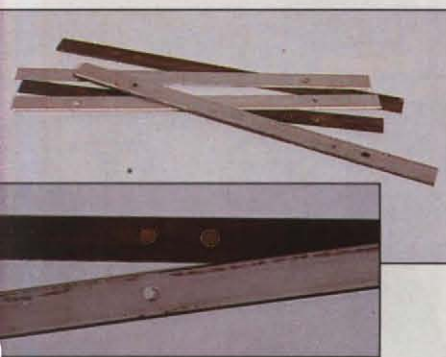
Of the larger (42") sanders, I like the 2x42" Sears model (no. 226380). For second place, I'm calling it a

three-way tie between the Delta, Grizzly, and Sears no. 226712. Delta's unit has more power and a larger (8") disc, but the Sears and Grizzly machines offer good value for the money. **WJ**

Photographs: Kevin May

Dispoz-A-Blade System Simplifies Jointer and Planer Knife Changes

by Bob Colpetzer



The Dispoz-A-Blade system consists of a set of knife holders (the black steel) and double-edged disposable knives.

Not many of us look forward to the day when the jointer or planer knives need resharpening. We know how much work it is to pull the knives, we begrudge the downtime while they're out for sharpening, and then we anguish over the painstaking job of resetting them. Now, fortunately, there's a product that eliminates these headaches.

Esta-USA recently introduced the Dispoz-A-Blade system for jointers and planers. With this new and unique system, anyone can change and align knives easily without jigs or complicated blade-setting operations. Initially, you replace the original knives with a new double-edged disposable knife and a steel holder. On this first installation, you set the height of the knife/holder assembly the same way you'd set a conventional knife. Then, when it comes time to change knives again, you leave the holder in place and simply reverse the knives. This job is simple because indexing pins on the holders align with slots on the knives. The knives are automatically set at the right height as soon as you slip them over the indexing pins.

Installation a Breeze

Installing the Dispoz-A-Blade on my three-knife Foley-Belsaw planer was simple and straightforward. I loosened the gibs, removed the original knives,

and then cleaned the gibs and cutterhead slots with solvent to remove accumulated dust and pitch. Next, I assembled the two-part units by slipping the knives over the indexing pins on the holders. Magnets in the holders secure the knives and help keep them from slipping off the locating pins.

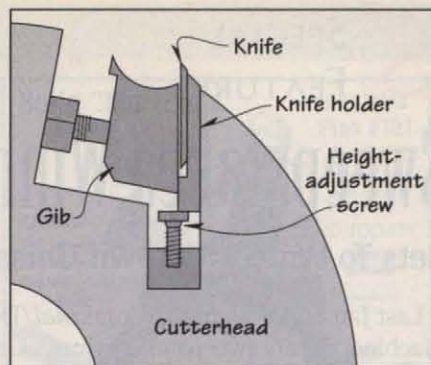
I then placed each holder into its cutterhead slot and set the knife height by turning the support screws in the cutterhead. The holder sits on these support screws, so once you set it, the knives will always reinstall at the same height. For planer or jointer heads that support the knives with springs, Esta offers Accu-Set support screws to replace the springs.

Changing the knives after the first installation took me about 15 to 20 minutes. Naturally, this will depend on your equipment, and you may be able to do the job in even less time. I prefer to reinvest some of the time I'm saving double-checking my procedure.

How It Performed

In the process of planing several hundred linear feet of various types of lumber, I've found that Dispoz-A-Blade knives produced an excellent surface finish. They're ground and honed perfectly and gave superior results, much better than conventional knives that I've taken in for professional sharpening. Esta's disposable knives hold a good edge even when used on abrasive woods such as teak or when subjected to an occasional knot.

When sections of the knives do sustain nicks, I simply shift the blades and offset the nicks so I get a smooth cut again. I purchased their high-speed steel blades, although you can get a specially formulated cobalt steel in certain knife sizes for surfacing abrasive or hard exotic woods. Both types of knives fit the same holder, so you can keep a set of the cobalt knives on hand for those occasional tough planing tasks.



My Verdict—A Bargain

The cost of retrofitting my 12" planer with three holders and two sets of double-edged knives totaled \$217.97, including shipping and handling. This may seem exorbitant at first glance, but the blade holders account for the lion's share of this initial layout. Esta's double-edged 12" HSS knives run \$9.71 each, so for roughly \$30 I have two sets of knife edges. Compared to the \$27 that I pay to have a set of three conventional single-edged knives sharpened, the Esta alternative offers quite a savings. Add the convenience and speed of knife changes, and I consider the Dispoz-A-Blade system a bargain.

If you have a 6" or 8" jointer, three holders and a single set of double-edged knives cost \$130.32 and \$153.99 (plus shipping) respectively. The 6" replacement knives run \$5.32 each, the 8" knives \$7.08.

If you're shopping for a new jointer or planers, check with the manufacturer to see if they offer the Esta system as an option. Currently, Powermatic, Bridgewood, and Grizzly do offer it on some of their machines. Considering the quality and ease of use that Dispoz-A-Blade provides, I expect other suppliers will soon follow. As for retrofitting, Esta claims that it can outfit almost any machine, from a 6" jointer up to a 36" industrial planer. 

Photographs: the author

Call For More Information

Before calling, have the make and model number of your machine handy as well as the knife dimensions (TxWxL) to assist Esta technicians in determining the appropriate kit.

Esta-USA
800/557-8092



Sweepstakes Winner Tours Delta Plant

by Dick Coers

Gets To Watch His Own Unisaw Being Built

Last January, *Woodworker's Journal*/Delta International Machinery 1997 sweepstakes winner George Tritthardt and his wife Frances traveled from their Mundelein, Illinois home to Delta's Tupelo, Mississippi plant to watch as technicians put together George's grand prize, a New Yankee Workshop version of the Unisaw.

As the Tritthardts looked on, accompanied by Delta plant manager Frank Boettcher and myself, an efficient team of workers placed the gray cabinet of George's saw on the assembly line. Then, step by step, they bumped, tapped, and bolted some well-machined parts into a completed saw. All parts went together smoothly and well within tolerances. George won't be disappointed when he uncrates the machine in his shop.

After the Unisaw was assembled and all the photos taken, plant manager Boettcher treated us to a tour of the Tupelo factory. Besides Delta's four tablesaw models, more than 30 other products are made in this large, modern facility. At our first stop, we watched computer-controlled laser machines cutting sheet-metal parts from 4x8' panels with efficiency that would dazzle an expert layout man. Even the tiny slivers of waste metal had an artistic perfection about them.

At the automatic lathes, Frank explained that technicians measure and track a sampling from each batch of parts. I'm no statistician, but the parameters of variation among these samples seemed very small to me.

In the gray-iron area, we watched as tabletops underwent a double milling procedure (prior to surface-grinding) designed to reduce stress-related movement. In the machining center, we saw computer-controlled units machining trunion parts. Some of the units had 95 different cutters available to perform the necessary machining. According to



Sweepstakes winner George Tritthardt and his fully assembled prize, Delta's New Yankee Workshop version of Unisaw.

Frank, these machines can identify which part is in the fixture and even detect the first signs of dullness in a cutter.

As an engineer, I found it especially interesting to watch the saw arbor flanges being machined. Delta performs this operation with all the bearings and parts already pressed into the casting. To minimize runout, technicians spin the shafts at a high rpm, then bring the cutting tool into contact with the face.

Our final tour stop was the coating line. Here, computer-controlled applicators blow epoxy-based powder onto the parts before sending them into an oven. The baking "melts" the powder, creating a durable, run-free paint finish.

Back in the crating area, George wanted to catch a last glimpse of his new saw, especially now that his personal identity tag had been attached to confirm ownership. Our hats off to George, the crew at the Tupelo plant, and Delta International—we know he'll enjoy his new Unisaw.



George and wife Frances watch as a Delta technician bolts the tabletop to the cabinet during assembly of his saw.



George and Frances Tritthardt, the Delta team that assembled George's tablesaw, and author (far right).



There's something you can do today that will have a profound impact in the new millennium.

You can plant trees with Global ReLeaf.

Trees clean the air, purify the water, furnish the earth with oxygen and provide shade to reduce the effects of global warming.

Please dig in. If you can't plant your own tree, or if you want to do more, Global ReLeaf will plant 10 trees for every \$10 you donate. Just call (800)873-5323 today or visit our website at www.amfor.org

Help an important idea take root.



Global ReLeaf 2000 is a campaign of AMERICAN FORESTS, the nation's oldest citizen conservation organization, founded in 1875.

AMERICAN FORESTS
GLOBAL RELEAF 2000

P.O. Box 2000, Washington, DC 20013



MARKET PLACE

Save Money

sawing your own lumber.



Make Money

sawing for others.

Saw trees up to 36" D. or 45' L.
(w/optional bed extension(s))

1-800-553-0219

Wood-Mizer 8180 West 10th Street Dept. MM40
Indianapolis, IN 46214-2400
www.woodmizer.com

Free \$2 Catalog

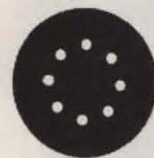
*With the purchase of All Products Video # \$10.00

Personal sawmills from: **\$4495**

Supergrit® SANDPAPER

WWW.SUPERGRIT.COM

HOOK & LOOP DISCS



4 1/2"	8 Hole	\$12.00/50
5"	5 or 8 Hole	\$12.50/50
6"	6 Hole	\$17.50/50
5"	Solid "E"	\$15.00/50
6"	Solid "E"	\$18.00/50
12"	Solid "E"	\$12.00/6

BELTS-A.O. RESIN

1x30	\$.75	4x24	\$1.10
1x42	\$.75	4x36	\$1.40
3x21	\$.85	6x48	\$3.50
3x24	\$.90	6x89	\$6.20

SHEETS—9"x11", A.O.

60D, 80D	\$14/50
120C, 150C	\$23/100
180A, 220A	\$19/100

ABRASIVE ROLLS

PREMIUM PSA DISCS

RED HILL CORP.
P.O. BOX 4234
GETTYSBURG, PA 17325

FREE 28 PAGE CATALOG
& incredible close-out sheets.

800-822-4003

Create A Classic Cradle

With Our Full Size Plan You Can Build This Swinging Baby Cradle.



Size 21x35x39

VISA/MC 1-800-292-8296.
Free catalog. Ready made spindles available.

#J62

\$14.95

Armor Box 445 E.Northport NY 11731

WOODEN WHISPER PLAY SYSTEMS™

Dept. DA1A98
1792 Ruth St.
Maplewood,
MN 55109



Featured on
TLC's
HOME PRO
Plans \$39.95

Com'l Quality

Build "Merrilegs"

Full-size
Plan #121
\$18.50
(catalog free
with order)

CATALOG
200 full-size
professional
furniture plans
— \$3.00

SEND TODAY!



Fine Furniture Plans Since 1968
FURNITURE DESIGNS, INC., Dept. JZ58
1827 Elm Dale Ave., Glenview, IL 60025
1-800-657-7692



Lighthouse

64"H 16"W 30"L
Plan #197
\$8.00
\$3.00 S/H

Windmill

4'H 28"W 28"L
Plan #195
\$8.00
\$3.00 S/H
Templates



SPECIALTY FURNITURE DESIGNS

797 W. Remus Rd., Dept. WJ29
Mt. Pleasant, MI 48858 • **1-800-892-4026**
Color Catalog \$3.00, FREE with order. Visa/MC/Disc. MI add 6%

CUSTOM ROUTER BITS CUTTERS & KNIVES

2 week or less delivery

Toll-Free Fax Drawings: 1-888-RCT-TOOL (728-8665)

Mail drawings or wood samples:

Ridge Carbide Tool Co.

P.O. Box 497, 595 New York Ave.

Lyndhurst, NJ 07071

(800) 443-0992

"Industry Leader in Custom Router Bits"

Send \$3 for complete 100 page

STOCK TOOL CATALOG

Woodworkers Only



**Spring
Inventory
Sale**

**Save
up to
60%**

SAVE ON SELECT SIZES

25X34 • 30X46

40X56 • 50X116

- America's #1 Arch-Type Manufacturer
- 20 Year Warranty • Easy Financing Available
- Easy Do-It-Yourself Construction
- Free 16 Page Brochure

STEELMASTER.

Save Thousands

Call Today 1 800 888-4606

WIRELESS DRIVEWAY ALARM



A bell rings in your house anytime someone walks or drives into your place.

- Free Literature -

DAKOTA ALERT, INC.

BOX 130, ELK POINT, SD 57025
605-356-2772



Rate: \$2.50/word (20-word/\$50 minimum).
All caps add .20/word. Boldface (standard or all caps) add .50/word. Payment must accompany order. Send copy and check/money order payable to **Woodworker's Journal** or Fax copy to 309-679-5057 and use VISA/MasterCard.
For classified discount program, write or call **Woodworker's Journal**, Carmen Renfroe, Classified Advertising Manager, PO Box 1790, Peoria, IL 61656; 309-679-5017. Display advertising kit available on request.
Deadline for next issue: June 22, 1998.

BUSINESS OPPORTUNITIES

EARN EXTRA INCOME! Assemble woodcrafts and more at home in your spare time. Variety of work. Call: 800/377-6000 Ext. 6670.

\$200 DAILY Woodworking at home. Unusual - Proven - Enjoyable. Send for exciting free details. Pine/WJ, 897-3 Mammoth, Manchester, NH 03104-4521.

LET THE Government Finance your woodworking related small business. Grants/loans to \$800,000. Free recorded message: 707/449-8600. (KX9)

HARDWARE

HORTON BRASSES: High quality authentic reproduction furniture hardware. Always in stock. Brass, wood, iron. Manufactured in Connecticut, no minimum order. Catalog: \$4. Nooks Hill Road, Dept. WJ, Cromwell, CT 06416; 860/635-4400.

INSTRUCTION

LEARN USING VIDEOS: Furniture Upholstering, Repairing Vinyl, Velour, Leather, Plastics, and Windsor Repair. Merv's Training Video. Ph/Fax: 1-800/249-6012. Internet: <http://www.gglbbs.com/mtv>

LUMBER

"GOOD WOOD" PA Hardwoods. 15 native species, many sizes, 1/8" to 3" thick. Free catalog. Croffwood Mills, RD 1 Box 14J, Driftwood, PA 15832; 814-546-2532.

MISCELLANEOUS

BEAUTIFUL USA 3'x5' SELF-UNFURLING FLAG. PLANS-white plastic and 5" gold eagle. Lifetime service. Color photo shows finished product. Send \$7. K&A Systems, PO Box 492, Wadsworth, OH 44281.

For more information on this cost effective way of selling your product through classified ads, contact Carmen Renfroe, Classified Advertising Manager at 309/679-5017 or fax 309/679-5057.

NEW CONCEPT for two litre bottle holder. Unique and easy to build. For detailed plans send \$6 check or money order to: New Concepts, 3500 North Causeway Blvd. #160, Metairie, LA 70002.

INVENT SOMETHING? Improve a product? Complete patenting and presentation services. Quality. Confidentiality. Free information. Friendly service. The Franklin Forge 1-800/501-2252.

SPRAY-ON SUEDE. Free brochure, sample enclosed. Inexpensive **NEW MINI FLOCKER.** DonJer Products, Ilene Court, Bldg. 8R, Bellemead, NJ 08502; 800/336-6537.

POST OFFICE Box Bronze Doors: No. 1 \$6.50, No. 2 \$7.50, No. 3 \$8.50. Add \$1 each shipping. Send SASE to Hubbert Woodcrafts, PO Box 1415, Fletcher, NC 28732; 704/687-0350. Visa/Discover. **WOODWORKERS, LET** the government pay for your new or existing home. Over 100 different programs available. Free recorded message: 707-448-3210. (8KX9)

MUSICAL INSTRUMENTS

DULCIMER HARDWARE, woods, accessories, kits, pins, strings, wrenches, machine heads, Delrin, and brass rod. Since 1974 Folkcraft Instruments; 1-800/433-3655. www.folkcraft.com

PLANS/KITS

WOODWORKING PLANS, computer desk and chair. Workbench, patio furniture, tables, chairs, novelty items, toys. Catalog \$1. LLEWJ, POB 908, Cornville, AZ 86325.

ANTIQUE SPINNING WHEEL PLANS. Full size \$19.95. I made mine on my ShopSmith! MC/Visa/Ck/MO to: RR Plans, PO Box 1554, Taylors, SC 29687-1554. Fax #: 864/292-5029

TOOL ACCESSORIES

FREE BANDSAW BLADE & CATALOG with order of five blades or more. Fax 800/323-0079. Or write C.M. New York Tool, PO Box 1229, Long Island City, NY 11101.

TOOLS/EQUIPMENT

STRAIGHT LINE LUMBER FAST using your shaper or woodmaster, RBI, or tablesaw. Three different easy build plans. Satisfaction guaranteed. \$9.95. Sun Hardwoods, PO Box 142, Mountain Grove, MO 65711.

APOLLO SCROLL SAW BLADES, best blades available. For information contact SLEEPY HOLLOW CRAFTS, 102 Fawnbrook Drive, Greer, SC 29650; tel.: 864/968-8864.

TOY PLANS/SUPPLIES

TOYS OF WOOD, Trains, Planes, Construction Equipment. Free Plans, Pattern Info. Tarjany Designs, Box 8846, Dept. B, Calabasas, CA 91302.

WOODENTOY PARTS, patterns, kits, books. Catalog \$1.00. Special offer: catalog and two patterns \$4.00. Woodentoy, Box 40344-WWJ, Grand Junction, CO 81504.

For more information on this cost effective way of selling your product, contact Carmen Renfroe, Classified Advertising Manager at 309/679-5017 or fax 309/679-5057.

Get Involved!

Join your local
Woodworker's Club!

WOODWORKER'S JOURNAL

**Are you moving?
Take us with you!**

Write to:
Woodworker's Journal
P.O. Box 56585,
Boulder, CO 80328

Include mailing label for changes.



LIST OF ADVERTISERS

Align-Rite	page 53
Arrow Fastener	page 15
Craft Supplies U.S.A.	page 12
Delta International Machine Co.	page 5
Econ Abrasives	page 53
Emperor Clock Co.	page 17
Forrest Manufacturing Co.	page 2
Frog Tool Company	page 13
Grizzly Imports Inc.	page 8
Gudeman Enterprises	page 15
Hut Products for Wood	page 11
Jet Equipment & Tools Inc.	page 68
Leigh Industries	page 12
Makita USA	page 67
MLCS Ltd.	page 14
Nyle Corp.	page 11
Osborne Wood Products Inc.	page 17
Performax Products	page 53
Powermatic	page 17
Safranek Enterprises	page 13
Skil-Bosch Corporation	page 7
Smithy	page 13
Taylor Design Group (Incra Jig) ..	pages 9,11,13
Terrco Inc.	page 45
Van Dyke Supply	page 9
Viel Tools Inc.	page 11
Woodcraft Supply	page 13
Woodline Arizona	page 17
Hardwood Showcase	page 40
Marketplace	page 65



LIGHT IT UP!



Powerful **Makita**
Motor Lasts up to
Five Times Longer

All Ball Bearing
Construction
for Durability

Makita
Exclusive
Externally
Accessible
Brushes

Keyless Chuck

18 Torque
Settings

Push Button
Forward/Reverse
Switch

Total Control
Trigger for
Precise Variable
Speed Control

330 in./lbs.
of Torque
for Maximum
Performance

Flashlight Offer
Available with
World's First Nickel
Metal-Hydride
(Ni-MH)
2.2 Ah Battery Drill
which provides up to
15% longer run time.

FREE
14.4V
FLASHLIGHT

with
purchase of
ANY
Makita **14.4V**
Cordless
Driver-Drill.

Up to
\$56.00
Value

Mfg. Sugg. Retail Price



To receive
your **FREE 14.4V Makita Flashlight**

Purchase: Any Makita 14.4V Cordless Driver-Drill. (6233DWAE, 6233DWBE, 6233DWAEX, 6233DWAEXX, or 6333DWAEX)

Fill In: Name and address information. (to the right)

Enclose: 1. This Mail-in Coupon.
2. The UPC Symbol (bar code) from purchased 14.4V Cordless Driver-Drill.
3. A dated sales receipt with price and purchase date circled.

Mail To: Makita U.S.A., Inc.
Flashlight Offer
14930 Northam St.
La Mirada, CA 90638

Name

Address

City

State

Zip

Phone #

Occupation



14.4V Cordless Driver-Drill purchase must be made between April 1, 1998 and June 30, 1998. Flashlight claims must be postmarked by July 31, 1998. Please allow 6 to 8 weeks for processing. While supplies last. Offer good in U.S. only and void where prohibited, taxed, or restricted by law. Only original proof of purchase (UPC symbol) and sales receipt may be submitted. Resellers of Makita products are excluded from this promotion.

If you have any questions
regarding this offer
please call (714) 522-8088.

Battery not included

Makita
POWER TOOLS FOR THE LONG RUN

Makita
POWER TOOLS FOR THE LONG RUN

The right tool The right time



The right choice!

"The first thing we noticed was that the fit and finish were exceptional"

-Fine Woodworking Magazine

"Good performance and value, Delta and Powermatic, look out"

-American Woodworker Magazine

The JET contractor-style saw is the right choice for all the right reasons. Check out these standard features: a quick release precision JETFENCE®; a totally enclosed fan-cooled motor; an up-front heavy duty push button switch; a built-in 4" dust hood; and a quick connect plug that requires no wiring. The JET contractor-style saw is also available with a cast iron wing and a 30" or 52" XACTA™ Homeshop fence. Make the right choice, choose JET.

J E T
EQUIPMENT & TOOLS