

Shop vacuums put to the test

TAUNTON'S

Fine Woodworking

June 2003

No. 163

Six ways to attach tabletops

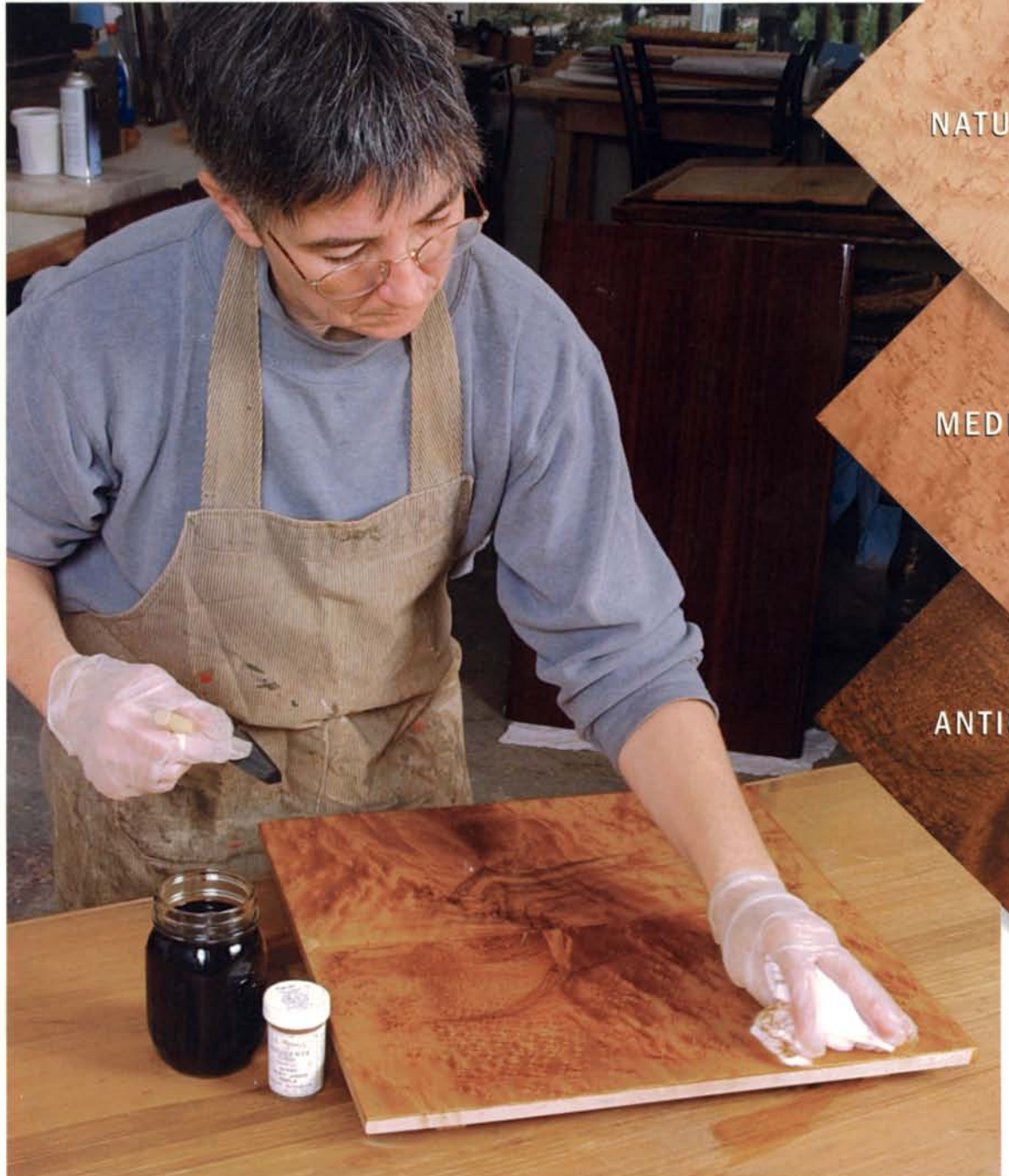
Basic kit
for finishing

Engineering
a chest
of drawers

Why joints
don't always fit

Extend your
tablesaw's
work surface

Simple way
to upholster
dining chairs



NATURAL


MEDIUM

ANTIQU

\$7.99/Canada \$8.99



Three finishes for maple

A baby is lying in a wooden cradle, looking up at a mobile with colorful toys. The cradle is made of dark wood and has a white blanket. A wooden block with the letter 'C' is visible in the foreground.

*You must be very proud.
Is this the first time you've hand-cut dovetails?*

Cradle courtesy of Norm Abram.

Your woodwork gets undivided attention. Inspired creations usually do. And Delta is proud to help by making the best tools for the job. Any job. So get a tool known for innovative design and reliability. Get a Delta. For a full-line catalog call 800-438-2486 (US), 800-463-3582 (Canada), or visit deltamachinery.com.



READER SERVICE NO. 147

 **DELTA**

Your achievement. Our tools.

SWIVEL CHAIR

Bases • Mechanisms • Parts



• No minimum quantity • Online catalog
www.swivel-chair-parts.com

Abacus

Wood Moisture Meters

Wood moisture is a crucial factor that determines usefulness and stability of wood. Pin-type moisture testers measure surface and core moisture to avoid cracking, warping and delamination.

The versatile mini-Ligno meters from Lignomat are ideal for veneer, heavy timbers and curved plywood; a favorite for professional woodworkers and serious hobbyists. Ask about our free brochure for pin and pinless moisture meters.

800/227-2105 **Lignomat USA Ltd.**
 503/257-8957 PO 30145, Portland OR 97294

READER SERVICE NO. 91

Furniture • Cabinetry • Flooring • Stairs • Handrails • Window and Door Frames • Woodcraft



BUILD YOUR BEST WITH THE NEW MILLER DOWEL

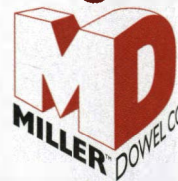


SUPERIOR FASTENERS FOR SOLID WOOD JOINERY

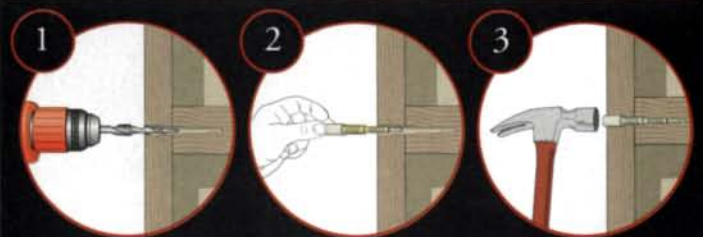
- *Simple – fast and easy to use*
- *Strong – solid, longer lasting joints*
- *Economical – minimal tools required*
- *Versatile – use in any woodworking project*
- *Unique – the only natural fastener designed for insertion from the outside*
- *Excellent results – an appealing and durable alternative to metal fasteners*

Miller™ Dowels are currently offered in two sizes and are intended for use with a corresponding Miller Quick-Drill Bit. Available in White Birch, Cherry, Red Oak and Black Walnut.

MAKE YOUR MARK WITH MILLER™



For more information and how to order call 1-866-WOOD-PEG or logon to www.millerdowel.com



(1) Drill stepped pilot hole

(2) Add glue & insert

(3) Tap down

PORTABLE SAWHELPER™ ULTRAFENCE™ BECAUSE IT DOESN'T PAY TO OWN SECOND BEST

- Fits all miter saws up to 15", perfect for all slide compound saws.
- The only system that is truly accurate and sets up on any terrain in 60 seconds — guaranteed.
 - Steel self-squaring coupler aligns fences with saw to 1/100" accuracy — no other system has it!
 - Flipstop™ fence gage has hairline pointer for extreme accuracy, lever action, Lexan view plate, heavy steel construction.
 - Extension are made of tempered aluminum to support heavy framing lumber.
- Legs store flat under fences and adjust from 30° to 42° — great for uneven terrain.
- Center stand folds flat, includes a quick release mounting plate for saw.
- Supports 500 pounds per side.



Rated #1 by *Fine Homebuilding* magazine in a comparison test.

Available 5' to 9'4" per side measured from blade.

Ref. 4-17-01

AMERICAN DESIGN & ENGINEERING, INC.

1-800-441-1388 St. Paul Park, MN 651-459-7400
www.sawhelper.com

U.S. Patent No. US 6,267,527, U.S. Patent No. D456,700
 TM 2003 Miller is a trademark of the Miller Dowel Company.

READER SERVICE NO. 117

Departments

- 6 Contributors
- 8 Letters
- 16 **Methods of Work**
Stackable chisel chests; Router jig for delicate molding; Circle-cutting jig for the bandsaw
- 22 **Notes & Comment**
Government names wood dust a carcinogen; Making furniture behind bars
- 30 **Tools & Materials**
Powerful new router from Milwaukee; Impressive wooden smoothing planes; Better shop apron
- 86 **Current Work**
A gallery of our readers' woodworking
- 90 **Rules of Thumb**
Troubleshooting problem joints
- 96 **Questions & Answers**
Calculating wood movement in a design; Jointer and planer sizes
- 104 **Master Class**
Carve a flame finial
- 117 **Finish Line**
A starting kit for finishing



Engineering a chest of drawers, p. 36



On the Cover:
Professional finisher Teri Masaschi demonstrates three ways to accentuate the figure in bird's-eye maple. See p. 44
Photo: Mark Schofield



A slim, comfortable slip seat, p. 54



Six ways to attach tabletops, p. 66

Articles

36 Anatomy of a Chest of Drawers

Start with a dovetailed box, then choose among options for drawers, moldings and base

BY WILL NEPTUNE

43 Details define the style

44 Three Finishes for Bird's-Eye Maple

Pop the figure of this wood using dyes, stains, glazes and topcoats

BY TERI MASASCHI

48 The Mighty Wedge

Fixed or loose, wedged joinery adds strength and style

BY JOHN NESSET

ON OUR WEB SITE: Watch a video on wedging a tenon

54 A Slim, Comfortable Slip Seat

This system works for most chairs and uses common materials

BY MICHAEL FORTUNE

59 Shop-Built Extension Tables

Side and outfeed tables fold down to save space

BY DWAYNE J. INTVELD

62 Scratch Stocks

Use these handmade tools to shape small details on furniture

BY ROB MILLARD

66 Attaching Tabletops

Six methods to control and direct wood movement

BY MARIO RODRIGUEZ

ON OUR WEB SITE: Watch a video on making beveled cleats

72 Small Stand is a Lesson in Curves

Cut joinery first, then saw the curves

BY STEPHEN HAMMER

80 TOOL TEST Shop Vacuums

Newest machines are quieter and offer more features

BY ROLAND JOHNSON



Making wedged joints, p. 48



A lesson in curves, p. 72



Shop vacuums tested, p. 80

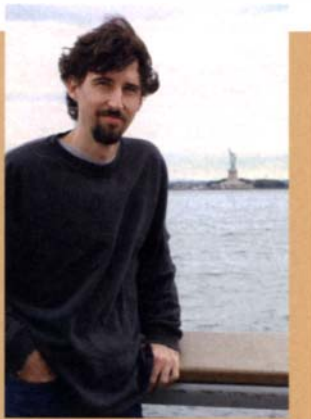
Visit our web site: www.finewoodworking.com



The Taunton Press
Inspiration for hands-on living®

Contributors

Stephen Hammer (“Small Stand is a Lesson in Curves”) came to furniture making by way of the guitar. In 1992 he was a musician looking for a better instrument. But a high-end guitar cost as much as a three-month course in guitar-making, so Hammer grabbed at the chance to make his own. A few years later he moved to New York City to further his playing career but soon learned he needed a day job to make ends meet. He found one as a carpenter and spent the next seven years doing residential renovation. However, he always wanted to get back to the precise craftsmanship he had experienced in luthier school. In 2001, Hammer read about a 12-week program at The Center for Furniture Craftmanship in Maine. Since taking the course, he has been building furniture on commission as well as high-end cabinetry at his shop in the Red Hook section of Brooklyn.



Dwayne J. Intveld (“Shop-Built Extension Tables”) has enjoyed woodworking since high-school shop class. Currently an engineering manager for a construction-equipment manufacturer, Intveld designs and builds custom cabinets and furniture in his free time and particularly enjoys projects that make his shop more efficient. Home construction is another of his passions, and in the late 1970s he spent nights and weekends for two years building his current residence, an octagonal ranch overlooking the Mississippi River. He also maintains a connection to his farm upbringing by collecting miniature farm toys and contemplating restoration of his dad’s first tractor, a 1952 John Deere Model A.



Teri Masaschi (“Finishes for Bird’s-Eye Maple”) has a busy but satisfying life in the dry mountains east of Albuquerque, N.M. Her restoration and refinishing business, The Tijeras

Collection, occupies most of her time and is forcing her to expand her shop. She teaches finishing at a Santa Fe college and at various woodworking schools around the country in the summer. She recently adopted a pair of kittens and is hoping Lu Lu Ray Brown and Sneaky Pie Brown stay close to home and avoid the fate of previous cats that met hungry coyotes.

For 18 eventful months, **John Nessel** (“The Mighty Wedge”) managed a renovation of his cabin in Nova Scotia, on the shore of the Bay of

Fundy. Meanwhile, there were three consecutive solo exhibitions near his home base in Minneapolis, Minn. These exhibitions combined Nessel’s photographs, some written pieces and his woodwork, including a bench that was on the back cover of *FWW* #155. Now he’s at work on a collaboration with the Russian carvers Svetlana and Leonid Zakurdayev, who live nearby in St. Paul. Nessel



said when that is done, he’s headed for Nova Scotia to do nothing but watch whales, eat scallops and lobsters and warm himself by the woodstove until he’s bored sick enough to start work on a shop there.

Rob Millard (“Scratch Stocks”) decided when he was 14 years old that he wanted to be a carpenter. After he finished school and did framing and trimwork for several years, his career path took a turn toward furniture making. It began when he bought a copy of *FWW* #117. He read Randall O’Donnell’s article about making a highboy and decided that was something he wanted to do. Millard is entirely self-taught, and he’s accomplished an impressive body of work in the past several years. He is a member of the Society of American Period Furniture Makers. You can view some of his work on their web site (www.sapfm.org) or on his own site (www.americanfederalperiod.com).

Fine Woodworking

PUBLISHER

Timothy D. Schreiner

EXECUTIVE EDITOR

Anatoie Burkin

ART DIRECTOR

Michael Pekovich

MANAGING EDITOR **Matthew Teague**

SENIOR EDITOR **Asa Christiana**

ASSOCIATE EDITORS

William Duckworth

Thomas G. Begnal, Mark Schofield

ASSISTANT EDITORS

Matt Berger, Karen E. Wales

SENIOR COPY/PRODUCTION EDITOR

Thomas McKenna

COPY/PRODUCTION EDITOR

Julie Rlsint

ASSOCIATE ART DIRECTOR **Kelly J. Dunton**

ASSISTANT ART DIRECTOR **Rodney Diaz**

IMAGING SPECIALIST **William M. Godfrey**

SHOP MANAGER **John White**

EDITORIAL ASSISTANT **Christopher X. Baumann**

CONTRIBUTING EDITORS

Tage Frid, R. Bruce Hoadley, Christian Becksvoort, Mario Rodriguez, Gary Rogowski, Mike Dunbar, Lon Schleining, Garrett Hack

CONSULTING EDITOR **Chris Minick**

METHODS OF WORK **Jim Richey**

INDEXER **Harriet Hodges**

GROUP PUBLISHER **Jon Miller**

SR. MARKETING MANAGER **Alan Whitney**

MARKETING MANAGER **Karen Lutjen**

SINGLE COPY SALES MANAGER **Mark Stiekman**

CIRCULATION MANAGER **Jeanne Todaro**

ADVERTISING DIRECTOR

David Gray

SENIOR NATIONAL ACCOUNTS MANAGERS

Linda Abbott, John Dyckman

NATIONAL ACCOUNTS MANAGER

William M. McLachlan

ADVERTISING SALES SUPPORT ASSOCIATE

Christina Kryzanski

WOODWORKING BOOKS & VIDEOS

EXECUTIVE EDITOR **Helen Albert**

Fine Woodworking: (ISSN: 0361-3453) is published bimonthly, with a special seventh issue in the winter, by The Taunton Press, Inc., Newtown, CT 06470-5506. Telephone (203) 426-8171. Periodicals postage paid at Newtown, CT 06470 and at additional mailing offices. GST paid registration #123210981.

Subscription Rates: U.S. and Canada, \$34.95 for one year, \$59.95 for two years, \$83.95 for three years (in U.S. dollars, please). Canadian GST included. Outside U.S. and Canada, \$41.95 for one year, \$73.95 for two years, \$104.95 for three years (in U.S. dollars, please). Single copy, \$7.99. Single copies outside the U.S. and possessions, \$8.99.

Postmaster: Send address changes to *Fine Woodworking*, The Taunton Press, Inc., 63 South Main St., P.O. Box 5506, Newtown, CT 06470-5506.

Printed in the USA

HOW TO CONTACT US:

Fine Woodworking

The Taunton Press, 63 S. Main St., P.O. Box 5506,
Newtown, CT 06470-5506 (203) 426-8171
www.finewoodworking.com

Editorial:

To contribute an article, give a tip, or ask a question, contact *Fine Woodworking* at the address above or:

Call: (800) 309-8955
Fax: (203) 270-6753
E-mail: fw@taunton.com

Customer Service:

For subscription inquiries, you can:

- Visit our subscriber service section at:
www.finewoodworking.com

- E-mail us: fwservice@taunton.com

- Call our customer support center:

To report an address change, inquire about an order, or solve a problem, call:
(800) 477-8727

To subscribe, purchase back issues, books or videos, or give a gift, call:
(800) 888-8286

Advertising:

To find out about advertising:

Call: (800) 309-8954
E-mail: fwads@taunton.com

Member Audit
Bureau of Circulation



Retail:

If you'd like to carry *Fine Woodworking* in your store, call the Taunton Trade Company at:
(866) 505-4674

Mailing List:

Occasionally we make our subscribers' names and addresses available to responsible companies whose products or services we feel may be of some interest to you. Most of our subscribers find this to be a helpful way to learn about useful resources and services. If you don't want us to share your name with other companies, please contact our Customer Service Department at:

(800) 477-8727

The Taunton Guarantee:

If at any time you're not completely satisfied with *Fine Woodworking*, you can cancel your subscription and receive a full and immediate refund of the entire subscription price. No questions asked.

Copyright 2003 by The Taunton Press, Inc. No reproduction without permission of The Taunton Press, Inc.

The Burgess Edge
Pat. # 5,996,619



The Burgess Edge is a patented, matched pair of router bits that enables the user to edgeband plywood in a unique and superior edgebanding process. The resulting edge resembles a board in appearance and durability

the evolution of edgebanding

Michael Burgess
www.burgessedge.com
E-Mail bmichael@sover.net
Phone: 802 233-1489

READER SERVICE NO. 176

Connecticut Valley School of Woodworking

Classes held: nights, weekends & week-long classes

Sign up for Summer Week Long Classes Now

Steve Kain and Bob Van Dyke section 1: July 7-11
..... section 2: August 11-15
Fundamentals of Furniture Making

Mario Rodriguez July 21-July 25 & September 5-8
Make a Windsor Chair

Teri Masaschi..... July 21-July 25
Furniture Finishing-Start to Finish
Furniture Restoration Techniques... July 28-Aug. 1

Garrett Hack August 4-8
Make a Demi-lune Table

Scott Phillips..... July 19-20
Bombe Style Jewelry Chest

at the Manchester **WOODCRAFT**

249 Spencer St., Manchester, CT 06040
860.647.0303. www.schoolofwoodworking.com

READER SERVICE NO. 184

FREE!



Furniture Parts CATALOG



Table Legs
Bun Feet
Kitchen & Bath Turnings
Table & Vanity Base Kits
Ready to Finish

OVER **100!** Styles!

Call for a free color catalog
800.843.7405

www.tablelegs.com
BOX 329, ST. JOHNSBURY, VT 05819

CLASSIC DESIGNS
by **MATTHEW BURAK**

READER SERVICE NO. 150



is coming.

DELTA X⁵

A new line of woodworking tools
from Delta Machinery.

READER SERVICE NO. 146

Do you build your own tools?

The next *Tools & Shops* is only a few months away, and we are seeking photos of tools that you have built for yourself: handplanes, marking tools, machine tools, benches and more. Please send an image (print, transparency or high-resolution digital file) to *Fine Woodworking*, Tool Gallery, 63 S. Main St., Newtown, CT 06470, or e-mail digital files to cbaumann@taunton.com.

Correction on math formula—In the Methods of Work department of *FWW* #162 (April 2003), on p. 20 it appears that a set of parentheses is missing in the formula for calculating the radius of a circle with a given chord length and rise. The additional set of parentheses around “8×Rise” should avoid any confusion, and the correct formula should be written as follows:

$$\text{Radius} = (\text{Length}^2 / (8 \times \text{Rise})) + (\text{Rise} / 2).$$

Thanks for a fine magazine. We understand that catching all the typos before you go to press is nearly impossible. —*Vergil Givens, via e-mail*

EDITOR REPLIES: Mr. Givens was one of many who notified us of the error in the equation as it appeared in the magazine. Having tested the tip back in the *Fine Woodworking* shop, we knew it worked and were at first baffled by the confusion. So we called Dr. Sheldon Levy, a mathematician and one of the many people who wrote to us with the correction. Dr. Levy pointed out that some calculators will figure out the answer correctly as it was written, but he concurred that the extra set of parentheses should remove any lingering doubt about how the formula ought to be calculated.

Say no to silicone—Thomas Wisshack’s Master Class “Make classic profiles with molding planes” (*FWW* #161, pp. 108-112) advises the reader to clean the shavings out of the throat of a wooden plane by giving the channel “a blast of silicone spray.”

Either he has been a lucky man or perhaps he’s wondered why his planed profiles have spots that reject a finish. Silicone should never touch wood, especially in its unfinished state, or anything that will touch wood. Being lucky is not the same as being smart: Use a blast of air!

—*Jim Shumar, Winchester, Va.*

Hollows and rounds—Enjoyed the article on molding planes, but I have to take exception to several points made therein. The plane shown in use is a “hollow,” not a “cove.” It is part of a set, the other part being, amazingly, a “round.” These planes are pretty reasonable on web sites that deal in old planes (don’t say “antique”; that doubles the price!). Two that I have had great success with are: www.pricelessads.com/tool-guy/planes/planes.w.htm (he trades ads with “Grandpa’s Chest of Wooden Tools”) and www.toolbazaar.co.uk. The English molding planes are more reasonable in price (\$10 to \$20 for a hollow or round), and the steel in the iron seems better, especially if you buy a Mathieson.

—*Bruce Dorn, via e-mail*

A disgruntled reader—Where are you going with this magazine? I thought I knew; but recently, I’m not sure. I was looking forward to this year’s annual *Tools & Shops* issue (*FWW* #160), especially since the first one was so good. I was extremely disappointed. Simply put, it was a real dud.

I don’t care how Matthew Teague manages to work in a small garage. I’d rather see his work and how he does it.

Next, Scott Gibson puts a floor in his shop, and we learn that concrete floors are bad for one’s back and legs. This is news?

Trust me when I tell you that people are not grabbing up copies of *FWW* to discover that the jointer and planer are a team. This is too insipid for words.

Then comes the ubiquitous tool comparison. You waste far too much time and space on the endless review of power tools. Give it a rest.

Near the end of the issue, we get to Current Work, which is great. Lots of great craftsmanship is represented in the department. I would really like to see



The Taunton Press
Inspiration for hands-on living®

INDEPENDENT PUBLISHERS SINCE 1975

TAUNTON, INC.

Founders, Paul and Jan Roman

THE TAUNTON PRESS

President & CEO John Lively

Chief of Operations Thomas Luxeder

Chief Financial Officer Timothy Rahr

Publisher, Magazines Jon Miller

Publisher, Magazines Sarah Roman

Publisher, Books James Childs

Editor In Chief Sue Roman

Creative Director Susan Edelman

Human Resources Director Carol Marotti

Controller Wayne Reynolds

Technology Services Director Edward Kingston

Promotion Director Steven Turk

Fulfillment Director Patricia Williamson

TAUNTON TRADE COMPANY

Director, Kathleen Davis

TAUNTON DIRECT

President, Sarah Roman

TAUNTON NEW MEDIA

President, Sue Roman

THE TAUNTON STAFF

Books: *Marketing:* Allison Hollett, Audrey Locorotondo, Irina Woelfle. *Editorial:* Maria Taylor, Robyn Aitken, Helen Albert, Peter Chapman, Maureen Graney, Carolyn Mandarano, Jennifer Renjilian Morris, David Palmer, Jennifer Peters, Amy Reilly, Erica Sanders-Foegel, Timothy Snyder, Kathleen Williams, Marilyn Zelinsky-Syarto. *Art:* Paula Schlosser, Joanne Bisson, Nancy Boudreau, Wendi Mijal, Lynne Phillips, Carol Singer, Rosalind Wanke. *Manufacturing:* Thomas Greco, Michael Gyulay.

Business Office: Holly Smith, Gayle Hammond. *Legal:* Carolyn Kovaleski. *Magazine Print Production:* Philip Van Kirk, Nicole Anastas.

Distribution: Paul Seipold, Aaron Lund, Sergio Colon, Leanne Furlong, Deborah Greene, Linnea Ingram, Jennifer Licursi, Andrew Lowder, Frederick Monnes, Raymond Passaro, Alice Saxton.

Finance/Accounting: *Finance:* Kathy Worth, Andrea Henchcliffe, Susan Iadarola, David Pond. *Accounting:* Patrick Lamontagne, John Vaccino, Irene Arfaras, Lydia Krikorian, Elaine Yamin, Carol Diehm, Margaret Bafundo, Dorothy Blasko, Susan Burke, James Post, Lorraine Parsons, Priscilla Wakeman.

Fulfillment: Diane Goulart. *Client Services:* Jodi Klein, Nancy Knorr, Donna Capalbo, Renee Pagelson. *Customer Service:* Ellen Grassi, Bonnie Beardsley, Michelle Berry, Katherine Clarke, Alfred Dreher, Monica Duhancik, Margaret Hicock, Barbara Lowe, Eileen McNulty, Patricia Parks, Deana Parker, Patricia Pineau, Betty Stepney, Marylou Thompson. *Data Entry:* Melissa Dugan, Anne Champlin, Joanne Lefferts, Debra Sennfelder, Andrea Shorrock, Tha Sweeney.

Human Resources: Linda Ballerini, Christine Lincoln, Dawn Ussey.

Information Technology Services: Applications Development: Leslie Kern, Marjorie Omalyev, Roger Seliga, Heidi Waldkirch, Carole Ando, Gabriel Dunn, Kathy Martin, Robert Nielsen, Linda Reddington, Lawrence Sullivan, Cynthia Zibelin. **Desktop and Network Support:** Kenneth Jones, Michael Colonari, Michael Lewis, Jay Ligouri, Joseph Manganello.

Marketing: Renu Aldrich, Judith Baker, Tonya Polydoroff, Deborah Johnston, Dominique Clancy, Nancy Clark, Nancy Crider, Ellen Williams Kracht, Alan Whitney, Karen Lutjen, Heather Reynolds, Christine Rosato, Mary Lou von der Lancken.

Operations: Joseph Morits, John Gedney, Jeannette Pascal, Dorothy Simpson, Suzanne Sylvester, Ward Willis, Dean Yusi. **T Room:** Michael Louchen, Geraldine Benno, Anna Pendergast, Norma-Jean Taylor. **Maintenance:** Susan Nerich, Alvin Jack, Lincoln Peters.

Promotion: William Brady, Mary Beth Cleary, Maria LaPiana, Sandra Motyka, William Sims, Donald Torrey. **Promotion Print Production:** Diane Flanagan, John Cavallaro, Dawn Vigliano.

Taunton Creative and Editorial: Creative: Robert Goodfellow, Sarah Opdahl, Pamela Winn. **Editorial:** Jefferson Kolle, Steven Aitken. **Photography:** Scott Phillips. **Video:** Gary Junken. **Prepress:** Deborah Cooper, Richard Booth, William Bivona, David Blasko, James Chappuis, Brian Leavitt, Chansam Thammavongsa. **Advertising Production:** Laura Bergeron, John Garofalo, Steven Molnar, Patricia Petro, Kathryn Simonds, Martha Stammer.

Taunton Direct: Jeanne Todaro.

Taunton New Media: Jodie Delohery, Philip Allard, Christopher Casey, Mark Coleman, Ruth Dobsevege, Kathryn Dolson, Timothy Murphy, Rita Scanlan.

Taunton Trade Company: John Bacigalupi, Trina Bayles, Diana Mackey, Paul McGahren, Eve Pison, Elizabeth Quintiliano. **Single Copy Sales:** Mark Stiekman, Valerie Droukas.

TAUNTON MAGAZINES

Fine Woodworking
Fine Homebuilding
Threads
Fine Gardening
Fine Cooking

Our magazines are for people who are passionate about their pursuits. Written by practicing experts in the field, Taunton Press magazines provide authentic, reliable information supported by instructive and inspiring visuals.

TAUNTON BOOKS

Our books are filled with in-depth information and creative ideas from the finest authors in their fields. Whether you're practicing a craft or engaged in the creation of your home, Taunton books will inspire you to discover new levels of accomplishment.

WWW.TAUNTON.COM

Our website is a place where you can discover more about the interests you enjoy, converse with fellow enthusiasts, shop at our convenient on-line store or contact customer service.

EMPLOYMENT INFORMATION

To inquire about career opportunities, please e-mail us at tauntonjobs@taunton.com or visit our website www.taunton.com. You may also write to The Taunton Press, Human Resources, 63 S. Main St., Box 5506, Newtown, CT 06470.

CUSTOMER SERVICE

We are here to answer any questions you might have and to help you order our magazines, books and videos. Just call us toll-free at 1-800-477-8727.

The Taunton Press, Inc., Taunton Direct, Inc., Taunton Trade Company, Inc., and Taunton New Media, Inc., are all subsidiaries of Taunton, Inc.

Bringing the Science of Ergonomics to Hardware

- Fully concealed, full extension slides
- Typing surface secures in partially or fully extended positions
- Adjustable platform offers three positions for maximum comfort

Deluxe Keyboard Tray System

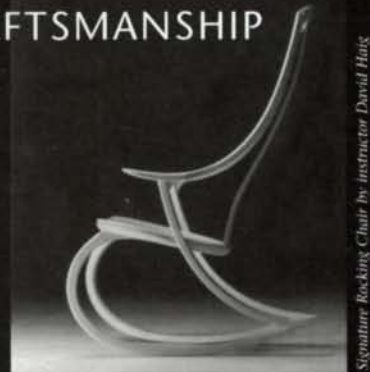
Accuride

www accuride.com

READER SERVICE NO. 170

CENTER for FURNITURE CRAFTSMANSHIP

Providing the best possible education for people who want to design and build functional, beautiful, expressive furniture out of wood to the highest standard of craftsmanship



Signature Rocking Chair by Instructor David Haig

25 Mill Street, Rockport, Maine 04856 ■ 207-594-5611 ■ www.woodschooll.org

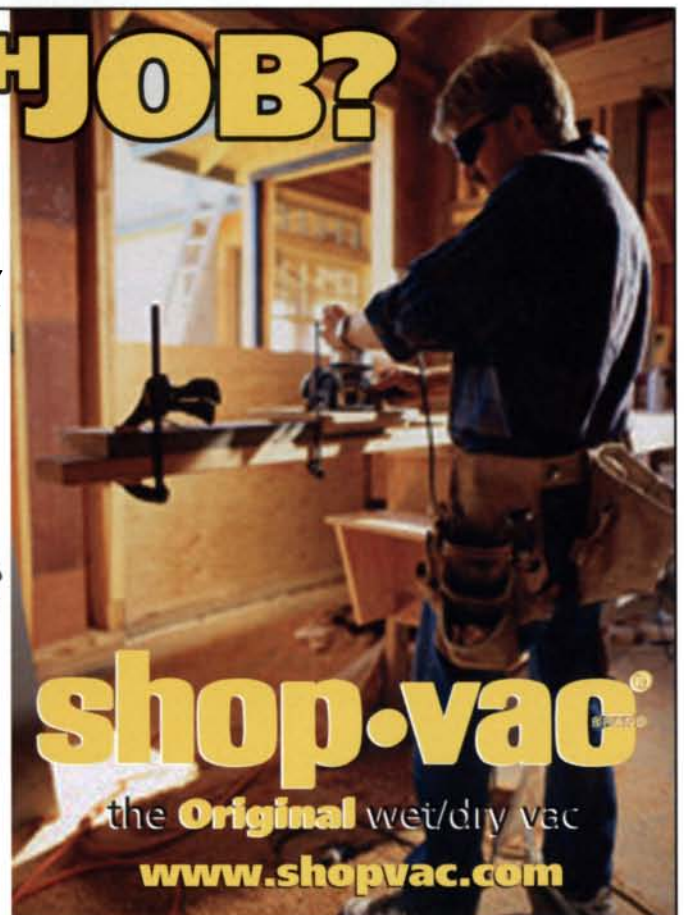
TOUGH JOB?

Shop-Vac® Brand Wet/Dry Utility Vac's can clean up the toughest messes wet or dry, indoors or out. So, bring on the mess and watch us clean it up!



Shop-Vac® is a registered trademark of Shop-Vac Corporation.

©2003 Shop-Vac Corp., Williamsport, PA



shop·vac

the **Original** wet/dry vac

www.shopvac.com

READER SERVICE NO. 39

who made some of those pieces and learn how they did it.

This magazine needs to be about woodworking: the exploration of craftsmanship, the passing of knowledge and the appreciation of the art of woodworking. *Fine Woodworking* used to be a light to the woodworking world. Recently, it's just lite.

—Duane Yoder, Akron, Pa.

EXECUTIVE EDITOR REPLIES: The woodworking community is made up of people with a wide range of skills and interests. The regular issues of *Fine Woodworking* contain the type of information you seek. *Tools & Shops* is a little friendlier to entry- and intermediate-level woodworkers (remember those days?) and dyed-in-the-wool tool junkies (I confess).

Tools & Shops is good reading—Well, you did it again. I got nothing done around the house this past weekend. I couldn't put the *Tools & Shops* issue (*FWW* #160) down and had to read it cover to cover. Just wanted to say thanks!

—David Platz, Lafayette, N.J.

Sudden impact—I would like to comment on Aimé Fraser's article "Installing Modern Wood Screws" (*FWW* #162, p. 49). She mentioned the problem of cam-out, the tendency of the driver bit to occasionally rotate out of a screw slot, marring it. From reading *Fine Homebuilding*, I learned that with impact drivers, 98% of the time you have no cam-out. If you put to work modern drivers on modern screws, the results are fantastic.

I can't understand why everyone doesn't own an impact driver. Since I purchased my 12-volt Makita, I never pick up a drill-driver. As a carpenter, I have yet to see a screw I couldn't drive effortlessly.

Get the word out. Inform the working public still using drill-drivers about these wonderful tools.

—R.S. Conaway, Blackwell, Okla.

Pondering the complexity of it all—My 6-year-old son has his own small workbench in my shop and is always hard at work at some project anytime we are out there. Recently, I told him that I would buy some better chisels for him

given that he is now using a sharpened screwdriver and a stiff-blade putty knife. He glanced up and said, "I already have chisels. I need more wood." I was reminded again how needlessly complicated we make it.

Consider the sharpening debate that rages in perpetuity and how you came upon your method. Mike Dunbar uses a process, "scary sharp," where you use various grits of sandpaper on a flat plate. I've done this: It's fast, cheap, and it works.

James Krenov can cut to the heart of the matter. I've read he prefers Arkansas stones with kerosene drizzled on them. They work well, but it's his caveat that is essential. He says you can carry sharpening too far; and at some point, you are fussing more about your tools than you are working. I've done that.

Toshio Odate would be pleased. I have four waterstones, and they do a fine job. A long time ago, I read that Tage Frid likes Belgian clay stones. The closest I have been to Belgium was Switzerland on my honeymoon; otherwise, I would have one.

On vacation in Hawaii last year, I had my sharpening epiphany. My son and I were watching a street vendor carve detailed figurines out of a dark, fairly dense-looking wood. Then it happened: He paused, poured water on the cement sidewalk and sharpened.

—Rich Arrington, Little Rock, Ark.

Finishing touch to a masterpiece—Jon Leppo's "Rock-Solid Workbench" (*FWW* #162, pp. 50-56) is a real masterpiece. I could only make one recommendation in the hope of making a great bench perfect.

Having had workbench drawers with knobs, I can attest to how they tend to grab every power tool cord at the most inconvenient moments. The improvement that I would propose is to replace the knobs with pulls that can't possibly catch on anything.

—Ted Fink, Shelburne, Vt.

An overlooked moment in workbench history—In his article "The Workbench" (*FWW* #160, pp. 54-59), Graham Blackburn failed to include the epitome of workbench design: the one described by John White.

I've been using my copy of White's "New-Fangled Workbench" (*FWW* #139, pp. 98-101) for about two years, and I assert that it's an example of design genius. Since I'm of the Neanderthal persuasion of woodworking, a good bench is essential.

I didn't realize how essential one actually was until I started using this bench. Some of my workpieces have been strangely shaped, but I've been able to secure every one for cutting or planing on this bench. The long slot down the middle makes it possible to use extra clamps to hold the really weird pieces that would be more challenging on a typical bench.

My hat's off to White for his crowning contribution to 2,000 years of workbench design.

—Bill Beningfield, Lawrence, Kan.

A cleaner air cleaner—I would like to further add to the Methods of Work tip "Inexpensive air cleaner" (*FWW* #160, p. 22). The first thing I would like to share is that the filter works better ahead of the fan, with the fan pulling the air through the filter.

The second helpful hint is to put a piece of Tyvar (housewrap) over the filter. It will pick up the larger dust particles and reduce plugging the filter, extending its life considerably.

—Matt Dedrick, Carman, Man., Canada

Judge or be judged—In the Letters department of *FWW* #161 (p. 8), Craig Arnold suggested that projects featured in Current Work be ranked during a calendar year, and the best given a prize at year's end. To this, the editor replied that this is an excellent idea.

I don't agree. Can't we, for once, have a section of great work by readers displayed and not begin judging them? This reminds me of a friend who carried a magnifying glass with him and viewed




Writing an article

Fine Woodworking is a reader-written magazine. We welcome proposals, manuscripts, photographs and ideas from our readers, amateur or professional. We'll acknowledge all submissions and return those we can't publish. Send your contributions to *Fine Woodworking*, P.O. Box 5506, Newtown, CT 06470-5506.



+ PROJECTS YOU CAN'T WAIT TO START. +



Now you can **WATCH**  exciting how-to shows that teach and demonstrate. **CLICK**  for project details, materials lists, fresh ideas and much more. **PRINT**  step-by-step instructions and **DO** something really amazing.

TO GET DIY ADDED TO YOUR CHANNEL LINE-UP, CALL 877-9GETDIY

diy
do it yourself network
diy.net.com

GO TO DIYNET.COM TO FIND OUT HOW THE ULTIMATE WORKSHOP COULD BE YOURS. MAY 5 - JUNE 16, 2003.

READER SERVICE NO. 178

displayed photos to see if the grain of the film showed in the print. What is wrong with just enjoying the craftsmanship and beauty of the entire piece as it appears?

I sure hope that someone will give some rational thought to selecting the best of the year before it is written in stone. Perhaps the editor should have polled a few of the readers to get their take on the idea of choosing the best. Isn't being published in such a fine magazine as *Fine Woodworking* honor enough? Also, if someone wants to have their project judged, there seems to be a lot of juried shows available.

—Bob Gilda, Bellingham, Wash.

EDITOR REPLIES: Does anyone else care to comment? We're listening.

More on sloping compressor plumbing

—I write in response to the Letter "Sloping compressor plumbing" (*FWW* #162, pp. 10-12). Roland Johnson's initial published statement in which he asserts that air lines should slope away from the compressor was correct, and he shouldn't have conceded to Mr. Smith's suggestion that "it doesn't really matter which way the pipe slopes as long as there is slope."

When installing my shop compressed-air distribution system, the compressor manual was quite specific that proper installation includes sloping lines away from the compressor as well as use of galvanized steel lines to promote condensing of moisture, with a collective drain toward the end. I have seen refrigerated dryers installed to combat poor slope and takeoff problems: The correct method results in only clean, dry air emitted from the line.

One should slope the line away from the compressor so that the flow of air carries any condensed moisture downstream toward the drain. If the line slopes back toward the compressor, a constant flow of air may eventually drive the water uphill and into the tool being used. This will result in a spontaneous blast of water coming out of an air-powered tool.

Granted, if you are using relatively small amounts of air for very short periods of time, sloping the lines toward the compressor probably won't cause much of a problem. On the other hand, in a

situation where you are using high volumes of air for long periods of time, for instance spraying on a finish, the results could be disappointing, to say the least. The situation is greatly compounded when there are multiple and sporadic users of the air supply.

—Jon Beuchert, Colgate, Wis.

Bookcase in a day?—After seeing Steve Latta's article "Bookshelves in a Day" (*FWW* #158, pp. 32-35), my husband and I both really liked the design and decided to make one of our own. We are amateur woodworkers and don't have a workshop, but rather a garage that gets converted to a shop and then returned to garage status at the end of each day. This is our story:

Day 1: The article didn't contain a materials list or a measured drawing needed for the project, so we created both. Also, unlike the author, we didn't have "scraps" of walnut and pine in the workshop, so we had to take a trip to the lumberyard and purchase the needed lumber. With all the materials now on hand, we managed to joint and surface-plane one vertical. Elapsed time for the first day of this endeavor is eight hours.

Day 2: Taking five hours, we completed jointing and planing the verticals and managed to biscuit and glue up one vertical. At this point, my husband started lobbying for a larger jointer so we wouldn't have to glue up the boards to make the 10-in. verticals.

Day 3: After work, we spent 45 minutes biscuiting and gluing up the second vertical.

Day 4: Another 45 minutes in the evening was spent biscuiting and gluing up the third vertical.

Day 5: In the five hours spent on the project today, we were able to sort and mark the wood for the shelves, and joint, surface-plane and glue up two of the shelves.

Day 6: Spent four hours jointing, surface-planing and gluing up two more of the shelves. My husband lobbied for more clamps so we could glue more boards at the same time.

Day 7: We managed to dimension the verticals and four shelves and cut the vertical dados. Also started sanding with a belt sander, orbital and then palm

sander with six different grits. Six hours spent on the project.

Day 8: Four additional hours were spent cutting the dados and continuing sanding.

Day 9: The name of the game was four hours of sanding.

Day 10: Another six hours of our time was spent jointing and planing the three remaining shelves and sanding more.

Day 11: In the five hours of work, we glued up the remaining three shelves and continued to sand more of the pieces of the project.

Day 12: Taking four hours, we dimensioned and cut the dados in the last three shelves and sanded more.

Day 13: Four hours of sanding, sanding and more sanding.

Day 14: And yet again, sanded for six additional hours.

Day 15: We spent six hours applying tung oil to all of the boards.

Day 16: For the second coat of tung oil, another six hours of labor was required.

Day 17: Allowing drying overnight, it took us 30 minutes to finally install the bookshelves.

After 17 days and a total of 75 hours, we both like the finished product so much that we're planning on building two more in cherry for the family room.

—Sue and John Conklin,
Collierville, Tenn.

Water storage of green wood—I

would like to comment on Brian Boggs' reply to the Q&A "Keeping wood green" (*FWW* #159, pp. 108-110). Boggs' points are well taken, particularly for craftsmen who, like Boggs, are production wood-

About your safety:

Working wood is inherently dangerous. Using hand or power tools improperly or ignoring standard safety practices can lead to permanent injury or even death. Don't try to perform operations you learn about here (or elsewhere) until you're certain they are safe for you. If something about an operation doesn't feel right, don't do it. Look for another way. We want you to enjoy the craft, so please keep safety foremost in your mind whenever you're in the shop.

—Anatole Burkin, executive editor

EXPECT TO GET YOUR HANDS DIRTY.

School for Professional Crafts

2 yr. intensive studio program offering degree and non-degree tracks
 • 24 hour studio access • low student/teacher ratio

Worcester  & Becker College

Artists-in-Residence and SPC applications currently being accepted.
 View our full catalog of classes, July workshops & programs online!

25 Sagamore Road, Worcester, MA
 508.753.8183 • worcestercraftcenter.org • beckercollege.edu

READER SERVICE NO. 64

Enjoy the benefits of HVLP with a FUJI!



Introducing the new Q3™ and Q4™ Quiet models.

First ever in the mid-price range.
 Noise reduced by over 50% for a more relaxed spraying environment.
 Systems also include the new Fuji Hi-Flex™ Rubber Hose.

FUJI
 INDUSTRIAL SPRAY EQUIPMENT LTD.

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

Dealer Inquiries Welcome • 800-650-0930 • Website: www.fujispray.com

READER SERVICE NO. 79

THE ORIGINAL CONTRACTOR DUTY SERIES

Model 3512-01, 3512-03



Specifications

3hp 1ph 220V
 3hp 3ph 230/460V
 12"/13" Blade Capacity
 Automatic Brake
 24" Crosscut Capacity
 Auto Return Device
 Complete Guarding,
 Table, Frame Legs

The Original Saw Company

465 3rd Ave. SE • P.O. Box 331

Britt, Iowa 50423

www.originalsaw.com

800-733-4063 • (641) 843-3868

FAX (641) 843-3869

Call for a distributor nearest you

READER SERVICE NO. 130

Introductory offer thru June 2003

Factory Direct

"A little more precision than you'll ever need."

*Ever wish you had something to hold up a router while you used it?

*Ever wonder if the base of the router was parallel to the work?

*Imagine making difficult precision cuts in wood or soft metals with your router suspended in this Radial Arm Mill Router and Shaper (RAMR).



RAMR™ \$650 + Shipping
 Routers not included

RAMR-S™ \$900 + Shipping
 Routers not included

Features

- Multiple built-in vacuum systems
- Cuts dados and louvers (angled slots)
- Cuts mortises
- Cuts tenons
- Pin routing
- Milling of wood and soft metals
- Panel relief
- Molding when using the lower system (router-shaper portion)
- Milling on complex shapes
- Dovetail cutting with purchase of accessory
- Reversible multi-function work surface

Accessories sold separately

- Radial Arm Clamps (ARMS™)
- Vacuum fence for Molding
- Work light
- A variety of changeable work surfaces WITHOUT losing alignment
- New dovetail fixture.



Ten Fingers Corp.™

1-866-458-9673 (toll free)

www.tenfingerscorp.com

READER SERVICE NO. 158

workers requiring substantial quantities of wood. For those whose shop work is subject to conflicting time constraints and only need to keep smaller amounts of green wood available, water storage is not quite as grim as Boggs would have it.

First, if possible, use your green wood with the schedule proposed by Boggs. Most wood-destroying organisms prefer the same temperature range that we do. Accordingly, winter storage of fall- and winter-harvested wood presents little difficulty. Leave the logs in the round with the bark on and their end grain thoroughly coated. Keep out of the sun, wind, rain and damp. For use in late spring, handle early-spring harvests the same way. But if you can't adjust your wood supply and schedule to other demands on your time, water storage is doable.

Seal the end grain. Remove all bark, sapwood—unless you are using it—juvenile wood and pith. Rive or saw the wood into approximately the sizes or multiples of the sizes you need. The soaked bark of most woods quickly creates a loathsome liquor. Store as little wood in as small a storage tank as possible.

Mosquito larvicide is available at garden centers. It is safe and imparts no odor to the wood. If things get out of hand, empty the tank, drain out the water and hose off the wood.

Storing and preserving only the highest-quality wood and appropriate stock sizes eases the task. I use a tank made of exterior plywood coated on the inside with fiberglass and heavily framed on the outside. My tank is outside. It freezes up in the winter; but in Maryland, I thaw it out with running water. A submersible electric water heater can be used.

—John Alexander, Baltimore, Md.

Getting rid of epoxy bubbles—I enjoyed the “Epoxy Inlay” article (*FWW* #159, pp. 73-77). It's an interesting way to both hide defects and enhance the finish of wood. The article mentioned the problem of entrapped bubbles. There are two tricks to eliminating bubbles:

1) Do not mix the epoxy too much, just enough to blend the epoxy.

2) After the epoxy has settled for a few minutes, run a high-temperature flame

over the epoxy and watch the bubbles run for cover. You can use a micro torch, which is powered by propane.

—Michael Shulist, Bolton, Ont., Canada

Magnetic tack cloth—Regarding the Finish Line “Removing surface dust” (*FWW* #159, pp. 129-130): I have favored 0000 steel wool for a final smoothing of a finish, but vacuuming and tack cloths were only partially effective in removing the fine bits of steel wool, especially from corners and areas where the finish might be soft. It occurred to me to use my “fishing magnet” to remove the fine fuzz of metal filings. The one I use was made for retrieving metal objects, including out-board motors that may have fallen into a lake. It consists of two parallel bar magnets, each about 6 in. in length by ½ in. square, separated in a steel case.

By holding it with the thumb opposite the fingers, it is possible to keep the magnet about ¼ in. from the work surface.

—Robert B. Young, Williamsburg, Va.

Chafed by wheat board—I don't usually write letters to refute unsubstantiated claims of environmental heresy, but lately I have seen an increase in the number of people who believe that leaf burning causes global warming. In the “Woodworking Trade Shows” write-up (*FWW* #160, p. 38), there is a brief article about furniture from straw. The author claims that using wheat-straw board to make furniture reduces air pollution. What it does do is reduce the carbon balance in the atmosphere. The carbon that the wheat used to grow came from the air. The natural order of nature would be for the carbon to be returned to the atmosphere for the growing process to begin again. This can happen if the straw is allowed to rot or if it is burned—nothing new is added to the air. This is not to be confused with burning fossil fuels, which does increase carbon.

While I agree that leaf smoke is obnoxious, it doesn't make the air dirtier. I'd rather see the leaves composted and used to help grow the next generation of plants, but the same carbon, regardless of how it gets there, will be in the air.

Making furniture from wheat disrupts the balance, and may actually cause global cooling.

—Jerry Aiello, Orange, Va.

Take a look at the premier web site for buying and selling works in wood; antique and collectible tools

WOODCRAFT[®]
auction.com



WOODCRAFT[®]

For your local woodcraft store, visit www.woodcraft.com, or for a free catalog, call 800 542-9115

Dept.03WW06BB

do you remember way back when?



Every time you open the lid of that old box, the memories return. The stories those old tools could tell.

Cutting, shaping, smoothing, making a joint that fits just so. They've taught you a lot already. That's the nature of woodworking tools, it's where the passion comes from.

After 75 years, we're still passionate about woodworking, too. Join us, as we celebrate the history, creativity, and the passion woodworkers everywhere have invested in our craft.

We remember way back when.

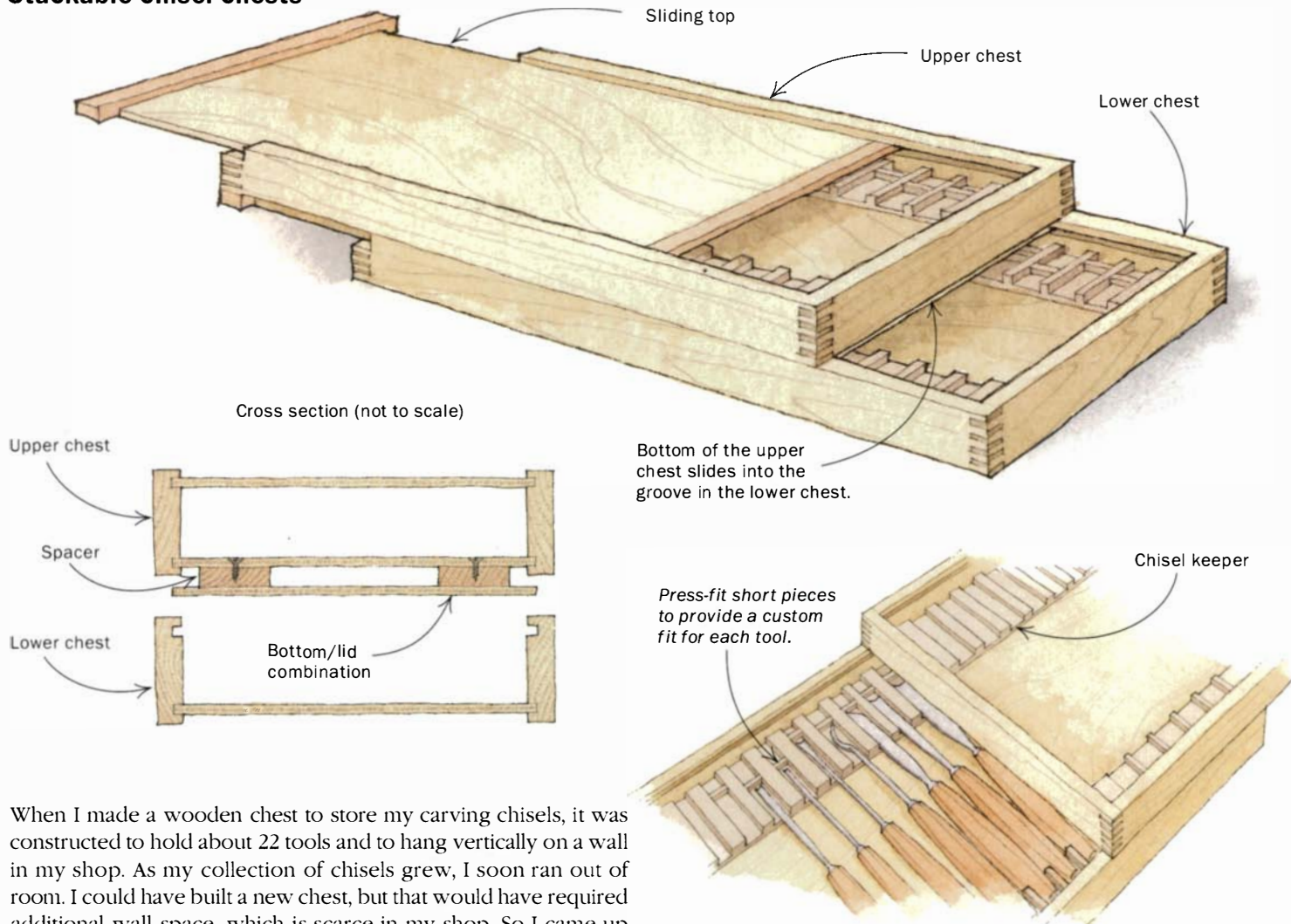
Whether you're a beginner or a master woodworker, experience the finest in woodworking tools, power tools, and education from our catalog, online at www.woodcraft.com, and at your local Woodcraft store.



WOODCRAFT[®]
Helping You Make Wood Work[®]

fine woodworking tools, accessories, expert advice

Stackable chisel chests



When I made a wooden chest to store my carving chisels, it was constructed to hold about 22 tools and to hang vertically on a wall in my shop. As my collection of chisels grew, I soon ran out of room. I could have built a new chest, but that would have required additional wall space, which is scarce in my shop. So I came up with the solution of building a second chest and stacking it on top of the first chest. Now I can hang these two chests in the same space as the original single chest. And when I need a third chest, it will stack on top of the first two. When I need a particular chisel, I remove the chests from the wall and open them on my benchtop.

The drawings show the construction details. Basically, what you need are two identical finger-jointed chests with 1/4-in.-thick plywood bottoms glued into a groove and 1/4-in.-thick plywood tops that slide in a groove. To stack the chests, you simply fasten the top of the lower chest to the bottom of the upper chest with appropriately sized spacers between them to provide a small gap that makes it easier to fit the chests together. The spacers can be

made of 1/2-in.-thick medium-density fiberboard (MDF) or scrap strips of pine, milled to a thickness that can size the gap between the two chests. Glue the spacer strips to the top of the lid of the lower chest, and then with the two chests perfectly registered, screw through the bottom of the upper chest into the spacer strips to lock the combination bottom/lid together.

To make the pieces inside that keep the chisels in place, use a dado blade or a router to crosscut 1/4-in.-deep grooves in suitably wide stock about 5/8 in. thick. To minimize fore-and-aft movement of a chisel within its location, press-fit a small length of 1/4-in. square stock crossways in the groove. These pieces can be

A new reward for the best tip

It is fitting that Gerald C. Lauchle provided the winning tip with his design for stackable chisel chests that can accommodate his inventory of tools: Beginning with this issue, we are awarding a set of hand-forged cabinetmaker's chisels made by Barr Specialty Tools (www.barrtools.com) in McCall, Idaho. Lauchle is a professor of acoustics at Penn State University. His woodworking skills are mostly self-taught, and he especially enjoys period-furniture making. Send us your best tip, along with any photos or sketches (we'll redraw them) to *Methods of Work*, Fine Woodworking, P.O. Box 5506, Newtown, CT 06470-5506.



Collect the Dust!

...before your lungs do.

1.5hp to 15hp Systems

FREE System and Ductwork Catalog!

Let us design your complete dust collection system.

FREE Duct Design
with \$50 Order



1.5hp Component Internal Filter



See Us at AWFS 2003 Booth #738

Buy Direct and Save!
1.800.732.4065

► **Order Online!**
www.oneida-air.com

Oneida Air Systems, Inc. 1001 W. Fayette St. Syracuse, NY 13204

READER SERVICE NO. 58

WoodFIL EPOXY

REPAIR AND REBUILD WOOD FAST AND EASY

WOODFIL EPOXY is a two-part, hand mixable epoxy putty used to repair and rebuild real wood. It completely fills the defect or damaged area and **does not shrink!** Available in six woodgrain colors plus white.

NEW for 2003!

PHONE: 800-837-4971 FAX: 800-778-7006
Visit us on the web: www.kampelent.com

KAMPEL
ENTERPRISES, INCORPORATED

READER SERVICE NO. 177



Vacuum Laminating Technology Inc.

The NEW vacuum-press!

- Easier to use than a bag
- Silicone membrane permits hot & cold lamination
- Fast top loading design

www.vacuum-press.com

Call now
1-800-403-2344



Who Raises Your Router?



Take the guess work out of your router table set-ups. Just crank it up 1/64 of an inch, or tweak it .002" at a time. From the makers of the original Rout-R-Lift and the all new Mast-R-Lift, JessEm helps get it done faster with pure accuracy. Look to JessEm for innovative solutions for those who put the "work" into woodworking!

JessEm
Tool Company

Barrie, Ontario
Canada, North America

For additional product information call 866-272-7492 or visit us online at www.jessem.com email: jessem@jessem.com

Distributor inquiries are highly recommended

READER SERVICE NO. 102

OUR STORY IS YOUR STORY...

"I cannot afford, nor would I put myself in a position of using anything less than the best."

- Jack True, Artist/Designer, True Studios

At Waterlox, we're proud of our line of wood sealers and finishes, products we developed and have manufactured since 1916. Our greatest achievement lies in knowing our customers are completely satisfied.

Their story is our story:

- Unique blend of tung oil and resin
- Durable, beautiful hand-rubbed look
- Simple to apply
- Minimal effort, maximum protection

Ask us about our Original Sealer/ Finish, Satin and High Gloss Finishes. Contact us today by e-mail: info@waterlox.com or call 1-800-321-0377.

www.waterlox.com Worldwide Finishing Solutions

WATERLOX

READER SERVICE NO. 15

handbuilt



PR.28

INVISIBLE 23 GAUGE HEADLESS PINNER
SHOOTS: 15MM (5/8") - 28MM (1 1/8")

\$279 USD

CALL FOR NEAREST DEALER
DEALER INQUIRIES WELCOME
WWW.OMERTOOLS.COM

TO ORDER CALL
TEL: 604.876.9909
FAX: 604.876.3914

OMER
Direct

READER SERVICE NO. 38

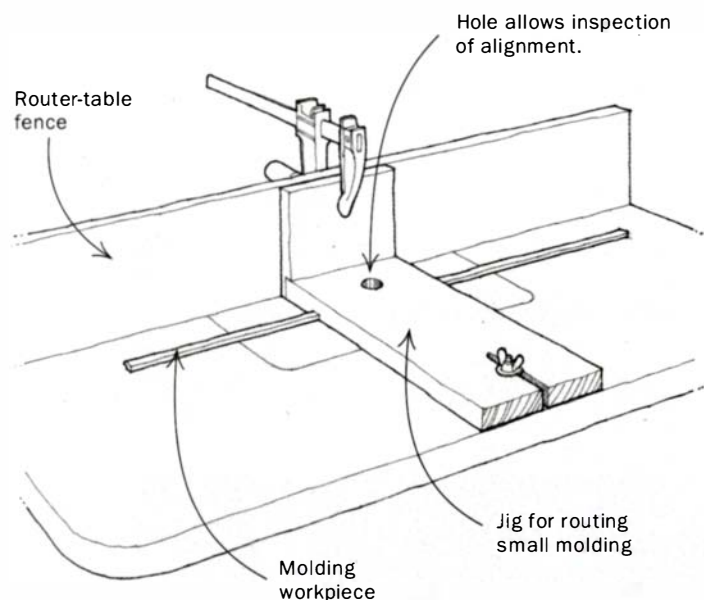
Methods of Work (continued)

pried out if you ever need to fit another chisel in that location. If you wish to organize all of your tools more thoroughly, you can mark the sweep and width of each chisel on these stops for reference.

To hang the chests on a wall, attach a couple of picture hangers to the back of the lower chest and slip these over appropriately spaced screws in the wall. It's also a good idea to attach small rubber-bumper feet to the corners of the lower chest to prevent the hangers from marring the benchtop.

—Gerald C. Lauchle, State College, Pa.

Router jig for delicate molding



I recently needed to mill 70 ft. of delicate molding ($\frac{1}{8}$ in. thick by $\frac{3}{8}$ in. wide) for a reproduction of a 17th-century French harpsichord. My first thought was to rout the molding on the edges of larger workpieces and then rip them to size. But for various quality-control reasons I rejected that approach and came up with this router-table jig instead.

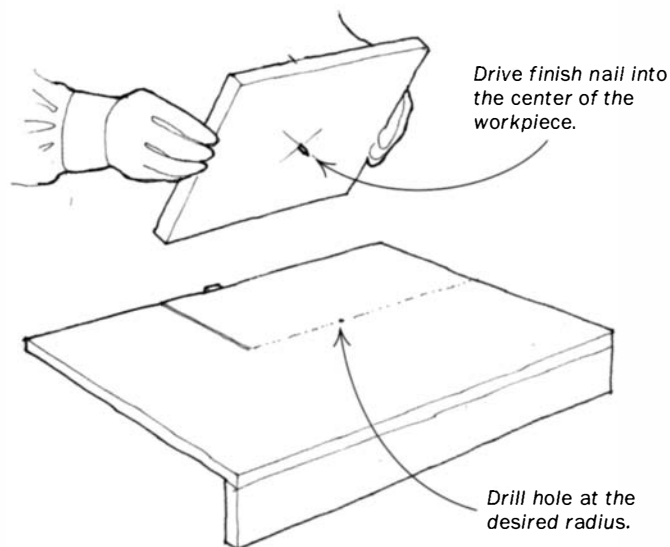
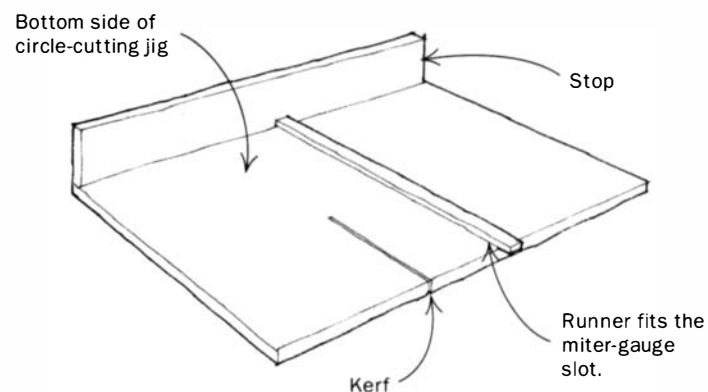
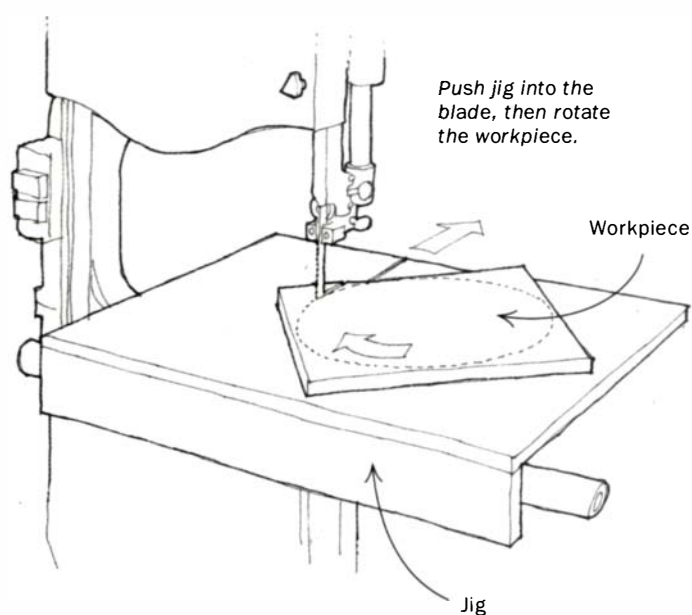
The jig is simply a 5-in.-wide piece of hardwood with a dado cut into the bottom to fit the thickness and width of the workpiece. Drill a 1-in. hole through the top at the location of the router bit to aid in alignment. Finally, add a foot to the fence end of the jig and a slot to the outboard end.

To use, clamp the foot of the jig to the router fence and fasten down the outboard end with a bolt and wing-nut arrangement. This ensures the jig will stay flat on the router table. With a thickness planer, mill the stock to an accurate rectangular cross section that slides fairly snugly through the dado. Adjust the location of the jig relative to the bit using the alignment hole, turn on the router and pull the stock through the jig. It may take several different bits and multiple passes through the jig to make the desired profile.

—Alton H. Clark, Ithaca, N.Y.

Simple circle-cutting jig for the bandsaw

Because the only piece of power equipment I have in my shop is a bandsaw, I try to make the most of it with jigs. When I set out to



make a circle-cutting jig, most designs I found were too complicated, too limited or too expensive. So I came up with a simple, effective jig that can be put together in about 10 minutes. It works as a sled in the miter-gauge slot to make a starting cut in the work-

*Adams Wood Products*TM
LTD., L.P.

STOCK ITEMS
NO MINIMUM ORDERS
-OR-
WE WILL MAKE PRODUCTION RUNS OF YOUR PART

By American Craftsmen

CHAIR LEGS
ACR08 AMD08

BUN LEGS
A0556

FR STYLE QUEEN ANNE LEGS

FINIALS
A0851

913 LEGS

113 REEDED BASE W/206 LEG

404 CHAIR KITS

P.O. Box 728, Dept. Q37
Morristown, TN 37815-0728
Phone 423-587-2942 • Fax 423-586-2188
www.adamswoodproducts.com

FREE COLOR CATALOG

READER SERVICE NO. 101

HEARNE HARDWOODS, INC.
Specializing in
Pennsylvania Cherry

Plain & Figured Cherry from 4/4 to 16/4
Also: Premium Walnut, Figured Maple, wide planks & a large variety of exceptionally fine domestic & imported woods including free form slabs, turning blanks, burls, & instrument lumber.

National & International Shipping

200 Whiteside Dr., Oxford, PA 19363

ph 610-932-7400 fax 610-932-3130

www.hearnehardwoods.com

Toll Free 1-888-814-0007

READER SERVICE NO. 123

ApolloSpray
Discover the Difference

- HVLP Turbines
- HVLP Spray Guns
- Apollocoat Coatings

Call for show schedule and check on our Fabulous Specials

1-888-900-HVLP (4857)
www.hvlp.com/fw

6266

READER SERVICE NO. 194

THE SOURCE FOR BANDSAW ACCESSORIES

Iturra Design : New 2003 Catalog

Free Catalog



- Introducing the **Quick Release** by Carter Products
 - Our new **Blade Gage** bandsaw blade tension meter.
 - **Lenox Pro Master** carbide-tipped and Bimetal blades
 - **Bandrollers**, rip and re-saw fences, improved tension springs, tires, table inserts, circle jigs, and much more.
 - History and comparison between **Delta** and **JET** bandsaws.
- CALL 1-888-722-7078 or 1-904-642-2802**

READER SERVICE NO. 84

Quality Pen Kits and Other Turning Kits



- Designers & Manufacturers
- Wholesale & Retail

THE BereaHardWoods CO. Inc.

Manufacturer of quality writing instruments, components and kits.

CALL FOR FREE CATALOG

6367 Eastland Rd. • Brookpark, Ohio 44142 U.S.A.

Ph: 440-234-7949 • Fax: 440-234-7958 • bereahard@aol.com

www.bereahardwoods.com

READER SERVICE NO. 63

EXCELLENT RESULTS DON'T HAVE TO COST MORE

10" x 40 TOOTH CARBIDE TABLE SAW BLADE

BLADE	PRICE	RIP CUT	CROSSCUT
AGP1040	\$70	Excellent	Very Good

Source: Fine Woodworking Magazine, March-April 2002 Issue

EVERLAST
SAW & CARBIDE TOOLS, INC.

Rail Head Industrial Park
1478 Rail Head Blvd., Naples, FL 34110
1-800-387-5278 • Fax (941) 596-9616
www.everlastsaw.com

READER SERVICE NO. 104



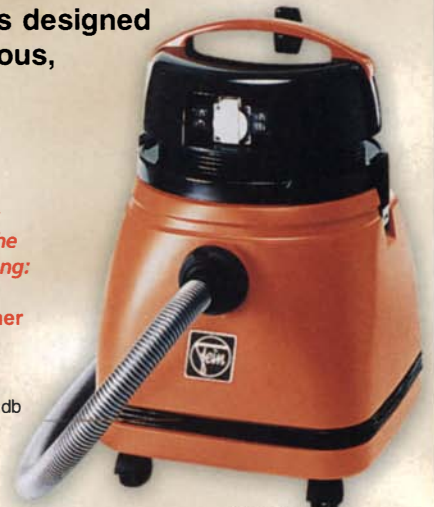
Discover more Fein items online.
www.amazon.com/fein

The Fein Turbo II is designed for heavy, continuous, industrial use.



One of the best vacuums I have seen! The looks, fit and finish and "feel" of the unit give out only one thing: QUALITY!

-An Amazon.com customer from Weston, Florida



#9-55-13
Turbo II Dust-Free Vacuum

- Quiet operation at only 57.8 db
- 2-stage motor with bypass cooling for a longer life
- Auto start for dust extraction when connected to your power tool
- 7.3-gallons solid, 6.8-gallons fluid capacity
- 16-foot long hose, and a fabric boot filter collects dust down to 5 microns



**We will match our competitors price plus beat it by 10% of the difference. Find out more at www.amazon.com/price-match.*

Call for your FREE Tool Crib catalog
1-800-635-5140

amazon.com
tools & hardware

READER SERVICE NO. 186

piece tangential to the circle. When the jig stops against the front edge of the saw table, rotate the workpiece to complete the cut.

The sled is a piece of plywood that's $\frac{3}{8}$ in. or $\frac{1}{2}$ in. thick and a couple of inches bigger than a bandsaw table. Attach a runner to the bottom that fits into the miter-gauge slot, and attach a stop that will engage the front edge of the saw table. Cut a kerf into the sled by running the jig into the blade until it stops. Mark a pencil line 90° from the point where the kerf ends.

To use this jig, drill a small hole on the 90° line at a distance from the sawkerf equal to the radius of the circle you want to cut. Tap a finish nail into the bottom center point of the workpiece and drop the nail into the hole.

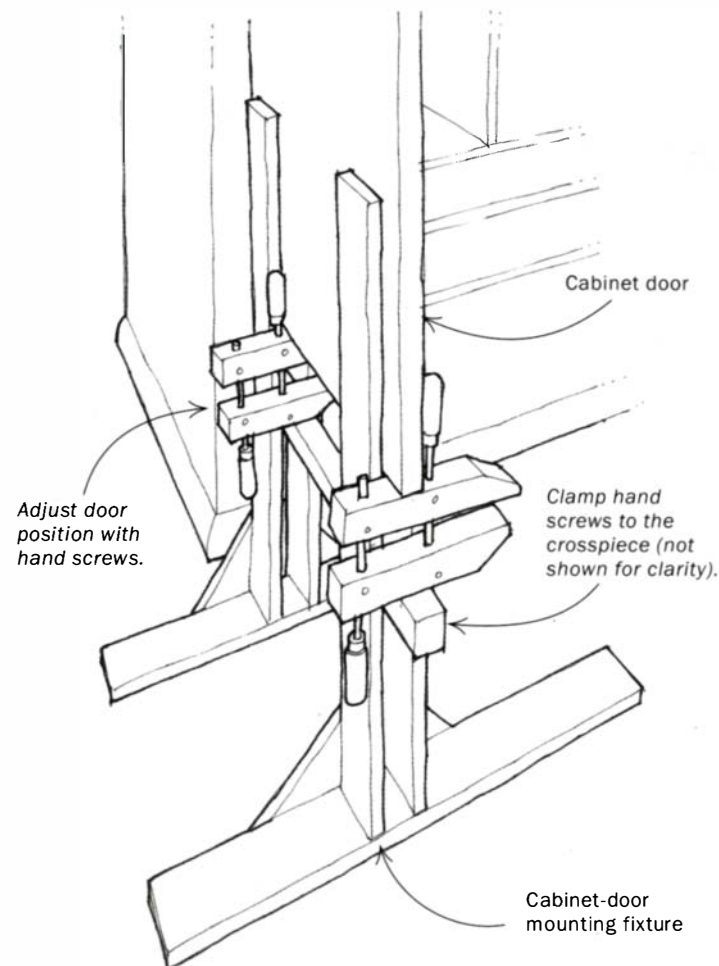
Turn on the saw and run the whole jig into the blade until it stops. Rotate the workpiece to cut a perfect circle every time.

—Benjamin Johnston, Chicago, Ill.

Quick tip: A foam egg carton makes a great carrying case for router bits when you have a project outside your shop. Large bits fit into the compartments just right, and a crumpled paper towel will cradle the smaller bits.

—R. B. Himes, Vienna, Ohio

Fixture for mounting cabinet doors



I work by myself and find it awkward to hold cabinet doors in a perfect position while I mark and mount the hinges. So I made the

device shown in the drawing (below left) that holds the door and allows small adjustments in and out or up and down to put the door into perfect alignment.

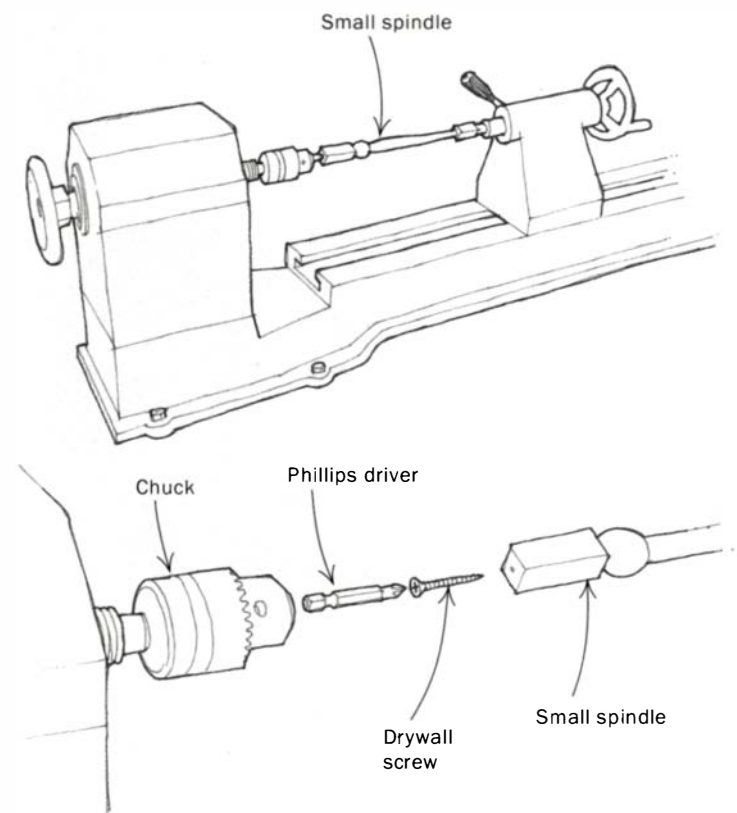
To make this fixture, start by fabricating a simple stand with two uprights and a crosspiece. Each upright should have a pair of arms spaced apart by the thickness of the door. Install the crosspiece several inches below the final door height. Then clamp two hand screws to the crosspiece and use the screws on the hand screws to make fine adjustments in the door's position.

—James Thompson, Union City, Tenn.

Quick tip: To remove sanding dust from a workpiece prior to finishing, cut the toe end off an old wool sock. Slip three-quarters of the sock over the end of a large-diameter shop-vacuum hose and tuck the remaining quarter into the mouth of the hose. Then secure the hose with a rubber band. With this setup you can wipe and vacuum sanding dust directly off the workpiece without marring the surface.

—Ted Baughman, Bothell, Wash.

Lathe drive center for tiny spindles



The common spur center that fits a lathe headstock is too large for small, delicate spindles. To remedy this, first drive a small Phillips screw into the end of your workpiece. Then mount a small Phillips driver into the headstock using a Jacobs or three-jaw chuck. Mate the driver with the screw, bring up the tailstock, and you are good to go. For very small turnings you can eliminate the screw in the workpiece altogether. Simply sharpen the Phillips driver with a file and drive it into the end of the workpiece.

—Jim Vasi, Williamsville, N.Y.

The Cutting Edge

Finally, a saw you can depend on with a name you can trust. Our new MM series bandsaws feature huge resaw capacities, loads of cast iron, and perhaps most importantly... a company that will stand behind it! Call one of our customer representatives today and discover how our cutting edge bandsaws can improve your woodworking.

Mini Max USA

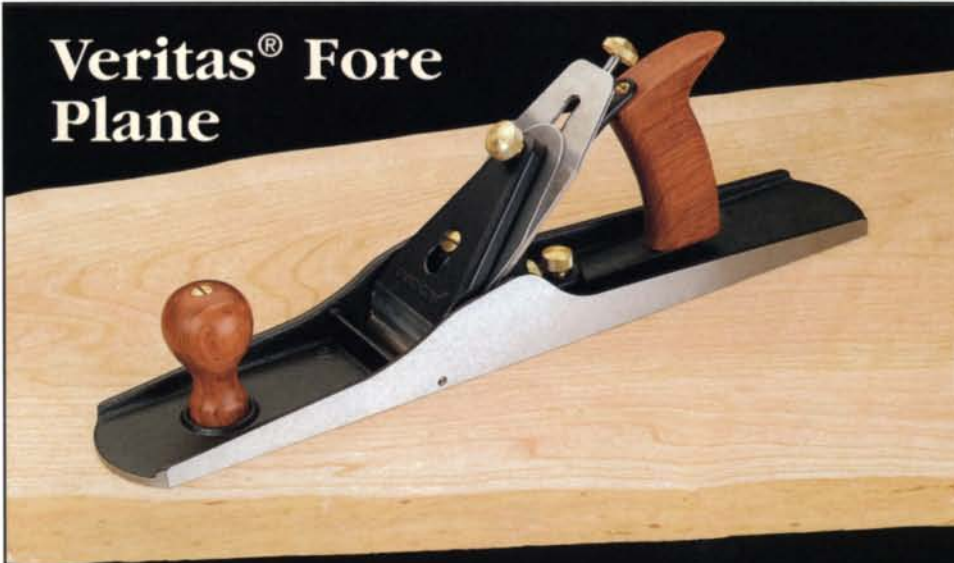
2012 Centimeter Circle Austin, TX 78758
866-WRK-WOOD
 (toll free 866-975-9663)
www.minimax-usa.com



Video Now Available!

READER SERVICE NO. 137

Veritas® Fore Plane



Our newest and largest bench plane, the #6 fore plane is ideal for smoothing and flattening large surfaces, such as panels, tabletops and workbench tops. The 18" long sole will not follow the bumps and valleys that a shorter plane would. Also excellent for a final pass by hand before edge glue-up. Same advanced design as our other bench planes with easy adjustment mechanisms and a frog that extends to the sole, eliminating blade chatter. The cast ductile iron body and frog, hardwood handles, and 2 3/8" wide, 1/8" thick A2 tool steel blade make this plane a workhorse that will last for generations. Patent pending.

05P28.01 Veritas® #6 Bench Plane \$195.00 Shipping and N.Y. sales tax extra.

Lee Valley & Veritas®
 Lee Valley Tools Ltd., 814 Proctor Ave., Ogdensburg, N.Y. 13669

1-800-683-8170
www.leevalley.com

READER SERVICE NO. 138

COLLECTOR'S SPECIALTY WOODS

WWW.CSWOODS.COM



48 SPECIES IN STOCK
 UNIQUE COLLECTION

SHOWROOM / MILLROOM
 WOOD YARD AND SHOP

PHONE: 719-746-2413
 FAX: 719-746-2433
 EMAIL: CSWOODS@CSWOODS.COM

8055 COUNTY ROAD 570
 GARDNER, COLORADO 81040

"ROCKY MOUNTAIN DRY"

READER SERVICE NO. 110



Cancer-fighting tools. Sanders create the very fine dust particles that penetrate deepest into the lungs. But the use of shop vacuums and dust masks can reduce breathable particulates to negligible levels, a government report says.

Government names wood dust a carcinogen

If you have been thinking about upgrading your dust-control equipment but need a push, here's a shove: The latest federal report on cancer-causing substances adds wood dust to the list of known human carcinogens. "Strong and consistent associations with cancer of the nasal cavities and paranasal sinuses were observed both in people whose occupations are associated with wood dust exposure and in studies that directly estimated wood dust exposure," the U.S. Department of Health and Human Services 10th Report on Carcinogens states. The report also connects throat cancer and Hodgkin's disease to wood-dust exposure (to read the full report on-line, go to ntp-server.niehs.nih.gov/default.html).

"It is hard to differentiate between particular wood types," said C.W. Jameson, lead scientist on the report, "because the studies were made in real-world situations, where workers dealt with many wood species over their term of employment." Other studies cited in the report concluded that long-term exposure to wood dust led to "enhanced inflammatory reactions in the nasal cavity," confirming what allergy sufferers and those prone to sinus infections already know.

There are effective measures woodworkers can take to limit their exposure. For example, the use of hand-held electric sanders is identified as one of the worst culprits, but the use of dust extraction reduced breathable dust up to 300 times. Dust-control methods have been well-documented in this magazine and others. Dust collectors and vacuums should be connected to as many woodworking tools as possible, especially those that throw off the finest dust, which hangs in the air the longest and penetrates deepest into the lungs. Also, there are replacement bags and filters that will trap dust down to 1 micron in size. The next line of defense is an air cleaner, which filters out some of the dust missed by a dust collector or shop vacuum. And finally, dust masks and air helmets can reduce exposure.

—Asa Christiana, senior editor

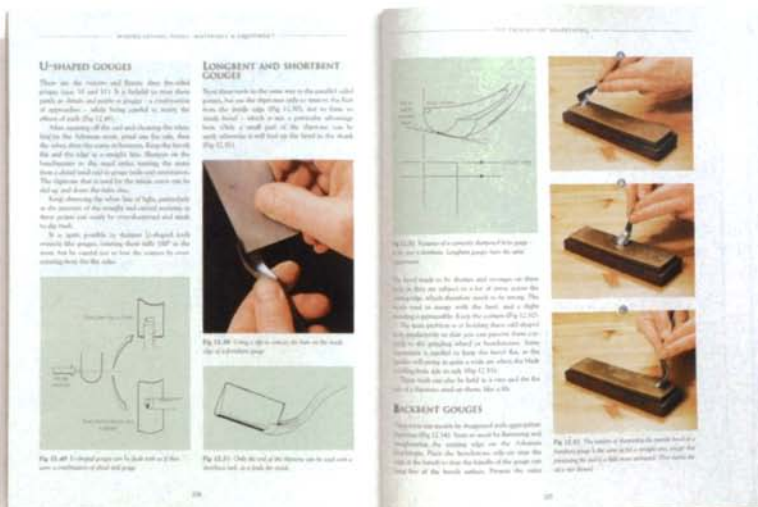
Book review

Woodcarving: Tools, Materials & Equipment by Chris Pye. Sterling Publishing, www.sterlingpub.com; 2002. paperback; 2 vol., \$19.95 each

First published in 1994, Pye's book has been revised and expanded into two volumes. Both are accessible to those picking up a gouge for the first time yet contain details experienced carvers will value. Subjects range from a description of each type of carving tool to detailed methods of making or customizing your own tools.

Pye is open about stating his preferences (such as oilstones for sharpening), but he also gives thorough descriptions of alternate methods (such as waterstones and diamond plates). Both books convey his wealth of experience and his love for the craft.

—Mark Schofield, associate editor



Everything but the carving. This two-volume set by Chris Pye covers all of the tools and materials associated with carving—both hand and power—including sharpening and wood, but it stops short of carving techniques, which are discussed in his other books.

ANOTHER POWER TOOL.

Any project center can hold your power tools. This one can actually power them. Thanks to a built-in, UL-approved 6-outlet power strip (not to mention a 12-foot power cord) you can plug in up to six power tools at once. And convenient built-in holsters keep the ones you're not using close at hand. This ingenious unit also makes it easier to use your cordless power tools. It has designated spaces to house their battery packs, so you can recharge them wherever you happen to be working, while you're working. Several other features simply reinforce

SEARS
Where else?SM

For example, the top of this project center is made up of reversible inserts, each 3/4" thick, giving



you three different work surfaces to choose from: MDF, galvanized or non-slip rubber. Compound-action drawer slides on all four drawers ensure smooth operation, even when fully

Hidden under the work surface is a small-parts storage area—perfect for organizing nuts, bolts, screws, candy bars, etc...

loaded. And they're fully extendable so you can get at everything. Four large 5" x 2" casters (2 locking) make for easy rolling. And our exclusive I-Frame construction provides more strength than flat sides. In a nutshell, this project center makes do-it-yourself projects

a heck of a lot more doable. And best of all, it's priced right at just \$299.99. So check it out for yourself at a Sears or Sears Hardware Store near you. Order it by phone at 1-800-437-9686. Or you can purchase it online at craftsman.com.

CRAFTSMAN
MAKES ANYTHING POSSIBLE®

Making furniture behind bars

For more than three years, a group of New Hampshire furniture makers has ventured behind the walls of the state prison to build a top-notch furniture-making program. Members of the New Hampshire Furniture Masters Association (NHFMA), including *FWW* contributors Garrett Hack and David Lamb, volunteer to teach monthly lessons in advanced techniques. (The NHFMA was featured in *FWW* #147, pp. 75-79.)

The prison-outreach program began when NHFMA member Terry Moore accepted an invitation from New Hampshire Superior Court Judge Kathleen McGuire to visit the prison's Hobby Craft Workshop. Other members followed, and today the shop is a well-lit, well-equipped place used by 60 inmates, with 40 more on the



Instruction in the fine points. Tom McLaughlin, center, gives a lesson in smooth-planing to Eric Grant, left, and Allen Eason, right, New Hampshire State Prison inmates. McLaughlin and other New Hampshire Furniture Masters Association members volunteer to teach lessons in the prison's shop.

waiting list. Participants must have a spotless disciplinary record, and even then they wait 18 months to get in.

The inmates' work is sold at Corrections Creations, the prison's retail store in Concord, N.H., with proceeds split between a charity of the inmate's choice and the prison-workshop program, to keep it completely self-supporting. The inmates also donate many items to Toys for Tots.

Perhaps the greatest testament to the program's success is found in the NHFMA's annual auction catalog, which includes some of the finest work being done today. This year, three inmates' pieces made the cut. Among them was Eric Grant's cherry highboy, which sold for \$8,500. Grant sent net proceeds of \$2,000 to a local youth soccer program to buy nets and goals. His past pieces have raised money for a young girl's brain operation and for a Christian summer camp.

"Prison is a very chaotic place," said Timothy Eldridge, an inmate whose tall Shaker clock made the catalog. "I em-

braced woodworking to give my life some focus and learn what I hoped would be a marketable skill [for life after prison]."

"People say, 'Why these guys?'" said Tom McLaughlin, an NHFMA member who coordinates the program with Moore. "The answer is that all but 40 of the 1,400 inmates [at New Hampshire State Prison] will be back out someday and be someone's neighbor."

—A.C.

Hidden talents brought to light. Inmates made furniture that was accepted into the New Hampshire Furniture Masters Association's auction catalog—Eric Grant's Queen Anne flat-top highboy (left) and Allen Eason's Hepplewhite Pembroke table (right).



Australian School of Fine Furniture

AUSTRALIA'S MOST COMPREHENSIVE 2 YEAR DIPLOMA COURSE IN DESIGNING AND MAKING FINE FURNITURE OFFERED IN THE FORESTED ISLAND STATE OF TASMANIA. NEXT INTAKE JANUARY 2004.

FULLY ACCREDITED INCLUDING PROFESSIONAL TRAINING IN DESIGN, MAKING AND BUSINESS MANAGEMENT. FOR INFORMATION: EMAIL: INFO@ASFF.COM.AU WEB: WWW.ASFF.COM.AU PH: +61-3-6331 0288



READER SERVICE NO. 154

Finish What You Started!

With **ProCoat** Water Based Wood Finishes



- Very Durable
- Interior/Exterior
- Non-Yellowing
- Fast Drying
- Mild Odor

Ideal for woodwork, cabinets, furniture, floors, toys and more!

Call today for a distributor near you!

ProCoat 1-800-866-4857
www.turbinaire.com/procoat

READER SERVICE NO. 140

The Keller Dovetail System:

"Your best choice"
- *Woodworker's Journal*

"The setup is easy, adjustments minimal and the joints perfect. It's the easiest of all the jigs to use and great for production use."

- *Woodworker's Journal*

"In a class by itself."

- *WOOD Magazine*

VIDEO: \$8.95 + \$2 P/H
No test cuts. Fast setup. Unlimited widths. Precision joinery. Classic and variable spacing. Compound angles. Curved dovetails. Box joints. 20 year warranty. Made in USA since 1976.

To find out more, contact your Dealer or



KELLER & CO.

1327 T Street, Dept. F53
Petaluma, CA 94952
1-800-995-2456
707-763-9336

www.kellerdovetail.com

Keller Dovetail System
Simply the best!

READER SERVICE NO. 81

VIRUTEX.COM

601 W.26 St. #302 NY,NY10001
800-868-9663 Fx:212-989-1777

EDGE BANDERS

HOT AIR PRE-GLUED PVC, VENEER POLYESTER, MELAMINE MOTORIZED FLUSH TRIM TOP-BOTTOM & ENDS POWER BELT FEEDER 15 FEET / MIN. 1 MIN. HEAT UP 220 V. 1 PHASE 900 COLOR MATCH 1,2,3 MM TAPES-HDL STRIPS NO COMPRESSED AIR

EDGE BANDER DOUBLE EDGE TRIMMER END TRIMMER AG52 \$350



EB05-\$1,950
EB10-\$2,950
EB10-\$3,400
EB25-\$5,800 1 MM
EB35-\$6,950 3 MM & HDL



LAMINATE-VENEER SLITTERS

MOTORIZED POWER FEEDER \$1500 50 FEET PER MINUTE. 30" WIDE CUT. TWO WHEEL CUTTERS \$18 NO WASTE, SAFE NO NEED TO USE TABLE SAW

LAMINATE VENEER MITER CUTTER \$250



GLUER \$100

WHITE VINYL 4.8" ROLLER 3.5" UPPER ROLLER

CURVE PLANNER

MOTORIZED 3" WIDE 18" CONCAVE 16" CONVEX

18x3" DOOR PLANNER \$350

REVEL FENCE \$40

LINE BORING FIXTURE \$35



DOOR HINGE ROUTER \$350



LOCK MORTISER \$880



\$460

EDGE LIPPING PLANNER

PRECISION FLUSH TRIM 2 1/4" WIDE REVERSIBLE SELF INDEX CARBIDE BLADES FOR PVC HARDWOOD SOLID SURFACE LAMINATE 1/8" CUT RATE CONTINUOUS ADJUST CUT DEPTH GOOD ON CORNERS & AGAINST GRAIN 17 LBS STURDY

READER SERVICE NO. 133

Routerbits.com

Bits, Blades, Books & more...

Shop Online For

Whiteside Router Bits Fisch Forstner Bits Bench Dog Systimatic Saw Blades Books & Accessories

Or Call Toll Free

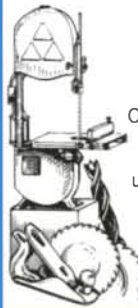
1-888-811-7269

www.Routerbits.com

READER SERVICE NO. 7

FREE TOOL CATALOG

Visit us on the internet at highlandhardware.com



highland hardware
TOOLS FOR WOODWORKING

Our comprehensive tool catalog gives you more than just manufacturer's specs. We provide detailed tool descriptions, useful tips & techniques and a schedule of seminars & hands-on workshops.

CALL FOR FREE TOOL CATALOG
1-888-500-4466

READER SERVICE NO. 97

FELDER® Designed today with tomorrow in mind!

FELDER continues to set industry standards. The new AD 741 is both bigger and heavier while offering further improved accuracy and operator convenience at the push of a button.



Call now for free info
1-800 572 0061

FELDER USA WEST

1851 Enterprise Blvd.
West Sacramento, CA 95691
Call 800-572-0061
Fax 916-375-3194

FELDER USA EAST

2 McCullough Drive
New Castle, DE 19720
Call 866-792-5288
Fax 302-322-9865

www.felderusa.com

THE NEW AD 741

Jointer-Planer Motor 5.5 HP

- Jointer table width 16"
- Total table length 78"
- New patented jointer table adjustment system
- Digital positioning control for planer table
- 4 knife quick change, cutter block
- Planing capacity to 9 1/2"
- 4 spindle guiding for planer table

READER SERVICE NO. 187

Furniture maker wins award he helped create

Eugene Landon, a prolific woodworker and teacher who specializes in 18th-century furniture, was honored with the 2003 Cartouche Award, given by the Society of American Period Furniture Makers.

The award is given annually to honor a woodworker for exceptional achievements. The trophy is a copy of a cartouche carving that Landon himself made years ago for one of his projects.

Landon received the Cartouche Award during the group's annual banquet, held during the "Working Wood in the 18th Century" conference at Colonial Williamsburg, which was co-sponsored by *Fine Woodworking*.

Jim Douhat presented the tribute to Landon during the conference and said, "Gene Landon lives his work. His major ex-

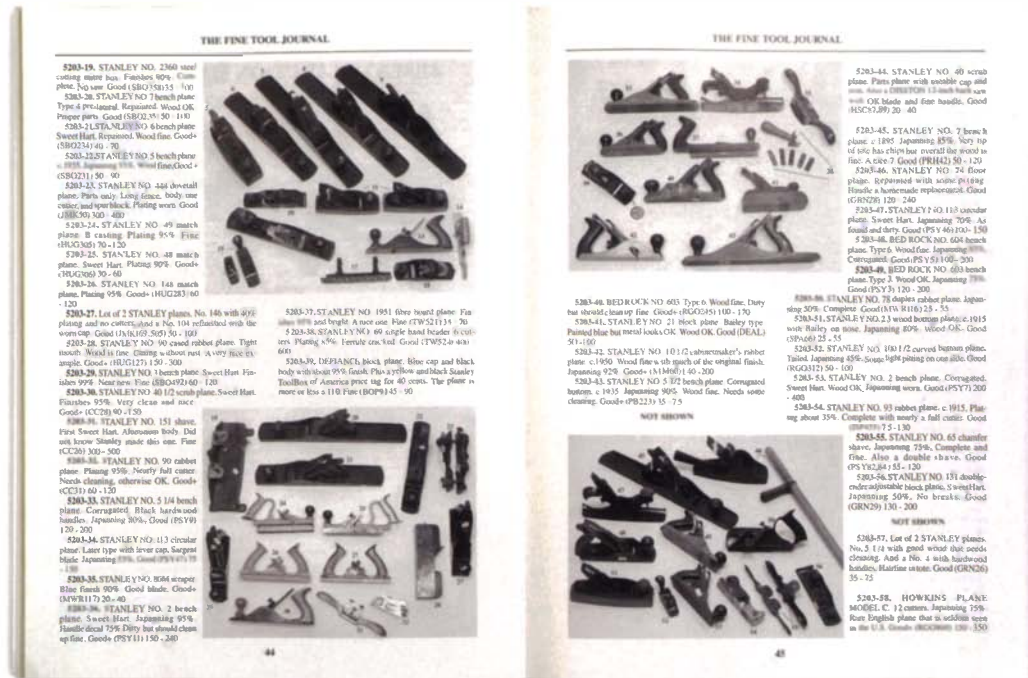


Chosen by his peers. Eugene Landon won the 2003 Cartouche Award, given by the Society of American Period Furniture Makers.

hibit is his home. In his shop he averages 20 reproductions and restorations each year. His work can be found in private homes and major museums throughout the country, including the White House."

Landon, who lives in Montoursville, Pa., also has written a few articles for *Fine Woodworking*.

—Anatole Burkin, executive editor

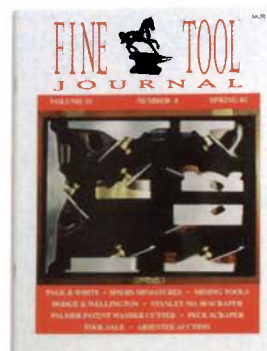


A clearinghouse for classic tools. Along with articles and book reviews, *Fine Tool Journal* offers quarterly tool sales and absentee auctions.

Quarterly journal offers antique tools, auction info

Fine Tool Journal, aimed at collectors and users of antique tools, is also a clearinghouse for old tools in good condition. A yearly subscription of \$29 gets you four issues, each containing articles, book reviews, tools for sale with pictures of most items, and an absentee auction with its own pictures and descriptions. Every tool is rated on a standard scale (Good, Good+, Fine).

"Satisfaction is guaranteed," managing editor Clarence Blanchard said of the sale and auction items. "Our return policy is: Return it."



Fine Tool Journal and its web site (www.finetoolj.com) also contain information about the International Tool Auctions, two large yearly events in Pennsylvania (see *FWW* #135, p. 52) run by Antique & Collectible Tools, the same Pownal, Maine, company that publishes the journal. Each auction weekend is kicked off by a Friday dealer

sale, a great place for hand-tool users to nab excellent working tools at good prices. For more information on *Fine Tool Journal* or the auctions, go to the web site or call (800) 248-8114. —A.C.

Woodworking exhibitions

We frequently receive information regarding upcoming woodworking exhibitions. Lack of space and a lengthy printing schedule make including all of it impractical.

We publish such time-sensitive information in the events section of our web site (www.finewoodworking.com). Please send the information to fw@taunton.com or mail to *Fine Woodworking* Web Editor, 63 S. Main St., Newtown, CT 06470.

Stories and photographs concerning shows that already have taken place, and winners of prizes and awards, should be mailed to Asa Christiana at the above address or e-mailed to achristiana@taunton.com.

JackRabbitTool.com

DRILL **PULL** **DRIVE**

1/2" Countersink - for #12 screws
5/32"
9/64"
1/8"
7/64"

Brass Depth Stop
Locking Body
Mag Ring®
Flip Bits
#2 Phillips
& #2 Square

As Seen On Popular Woodworking Programs
800-445-5969
The Fastest Way to Drill and Drive!

YESTERMORROW
DESIGN/BUILD SCHOOL

Over 100 Courses Year Round
For novices & professionals:
Cabinets & Built-ins
Chair Building
Woodturning
Timber Framing
Joinery
& More...

Free Catalog
888-496-5541
www.yestermorrow.org

Courses for all ages
& skill levels, from
2 days to 2 weeks.

WARREN, VERMONT

Maintain the beauty of outdoor wood furniture for years.

The clear solution to outdoor wood finishing.

Download the brochure.
It's filled with tips and a \$5.00 rebate* towards your next purchase.

Designed for the exacting standards of boatbuilding.

For over 2 decades we've been providing boatbuilders with the highest quality epoxy resins & spar varnishes for their "furniture quality", clear-finished watercraft. These wooden boats continue to look great after several years of extreme outdoor exposure.

Get it right. Get the brochure.

The same techniques can be used to finish many other outdoor wood projects. Your wooden furniture can be exposed to the elements for months without fear of the finish failing. Get your info-packed brochure at: www.systemthree.com/outdoor and create beautiful, lasting, outdoor wood masterpieces

SYSTEMTHREE

Find a dealer near you: **1.800.333.5514**

©2003 System Three Resins, Inc. All Rights Reserved.
* \$5.00 rebate on purchases of System Three Resins, Inc. products over \$25.00 made between 2.1.03 and 6.30.03. Limit 1 per customer. Instructions on rebate coupon must be followed.

READER SERVICE NO. 180

General **Millennium Addition**
10" Table Saw

Call for Price and Availability

FREE
Table, Board, Leg Set & Carbide Blade

More General Machinery

- 15" Band Saw (#490-1) 1HP
- 12" Lathe (#160-2) 1HP
- 12" HD Lathe (#260-VD)
- 8" Jointer (#480-1)
- 6" Jointer (#1180-1) 1HP
- 15" Drill Press (#34-01)
- 14" Planer (#130-1) 3HP
- 20" HD Lathe (#26020-VD)

2025 Beaver Avenue, Des Moines, IA 50310
1-800-835-5084
www.WoodsmithStore.com

READER SERVICE NO. 17

The Easy Rout.

The Leigh Dovetail Jig has it all. Hobbyist or professional, the Leigh D4 Dovetail Jig will ensure you create your best work. Versatility, precision and superb value make the Leigh Dovetail Jig better than the rest. Rout through and half-blind dovetails up to 24" wide in boards up to 1 1/2" thick, with infinitely variable spacing of pins and tails — all on one jig. Plus, rout sliding and angled dovetails easily with the D4. And create decorative Isoloc joints, finger joints, and multiple mortise & tenons effortlessly with Leigh attachments and our exceptional user guides! Make routing easier with Leigh. Call toll free now!

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

Leigh
Joining Tradition With Today

Leigh Industries Ltd., PO Box 357
Port Coquitlam, BC Canada V3C 4K6
Toll free 1-800-663-8932 Tel 604 464-2700
Fax 604 464-7404 Web www.leighjigs.com

The Toughest Glue On Planet Earth

You're beyond simple yellow glues and you don't want a different bottle of glue for every project. You want Gorilla Glue® Bonds wood, stone, metal, ceramics and more. **Incredibly strong and 100% waterproof.**



for retailers near you:
www.gorillaglu.com
1-800-966-3458

READER SERVICE NO. 153

Beauty & Tone
at its Finest

BUILD A GUITAR

~Fine Woods & Tools for Guitarbuilders~

LMI

Luthiers Mercantile International
www.lmii.com • 800-477-4437 • Free Catalog

READER SERVICE NO. 109

LAUNSTEIN HARDWOODS

Manufacturer & Distributor of
3/8" SOLID HARDWOOD FLOORING

Pre-sanded and ready to finish. Available in
RED OAK, WHITE OAK, ASH, HICKORY, HARD
MAPLE, CHERRY, WALNUT
Choice of 4 widths and 3 grades
Unlimited choice of mouldings
Most orders shipped within 24 hrs

LAUNSTEIN HARDWOODS

384 S. Every Road,
Mason, Michigan 48854

PHONE 517-676-1133 FAX 517-676-6379
www.launstein.com

READER SERVICE NO. 12

CMT's Industrial Thin-Kerf Blades

The new standard has arrived!

CMT's new ITK blades give you all the advantages of a thin kerf blade, like reduced drag on your saw and less wasted material, plus the latest in design features:

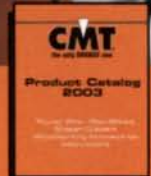
- Micrograin Carbide Teeth • Anti-kickback design
- Laser Cut plate, arbor, and expansion slots
- Tri-Metal brazing, precision balancing & more!

Best of all, these blades are yours at prices that set the competition on its ear! Easy on your wallet, easy on your saw and easy to remember - the new standard of cutting performance is as simple as ITK.

Ask your CMT Distributor about our **ITK Blade Packs**: Big savings on two blades plus our **2050 Cleaner!**



Ask your CMT distributor for the full story about ITK Blades, as well as CMT's selection of router bits, shaper cutters and more. Or contact CMT for your free 2003 catalog, and the name of a distributor in your area.



888-268-2487 • www.cmtusa.com CMT USA, Inc. • 307-F Pomona Drive • Greensboro, NC 27407

READER SERVICE NO. 159

2003 Courses & Instructors

Craftsmanship Series
Windsor Chairs
Design/ Construction
Solid Wood Casework
Design/Technique
Marquetry
Classic Chairs
Relief Carving
6 and 12 week Intensive
Dovetailed Drawers/Boxes

Ted Brown
David Fleming
Craig Stevens
Chris Becksvoort
Garrett Hack
Julie Godfrey
Ron Barter
Chris Pye
Brown & Guests
Michael Burns



Instruction in Fine Woodworking



Rosewood Studio is located in Almonte, Ontario, a quiet country town just outside of Ottawa, Canada's Capital. For more information visit our website at www.rosewoodstudio.com Call Toll Free 1-866-704-7778

READER SERVICE NO. 76

COLLECT DUST HERE.

OR HERE.



Dust is no friend to the serious woodworker. So let's clear the air and set the record straight. New canister dust collectors from JET feature exclusive V-Weave technology and filter dust that's 15 times as small as standard filters. Not only that, JET's new dust collectors have over six times the filtering capacity of standard units. The innovative canister design makes disposal easy. (No more messing with cloth bags.)

And because there is less air resistance with a canister filter, no matter which of the four models you choose – from 650 to 1,900 CFM – you'll get more suction than with a standard

dust collector. Which means you'll collect more dust in the collector. And less in your lungs. To find out more, visit your JET distributor, jettools.com or call 800-274-6848.



Unlike standard filters, V-Weave technology traps particles as small as 2 microns. But what else would you expect from JET?



JET[®]

Powermatic, Performax and JET. A Family of Brands.

Tools & Materials

Milwaukee's new fixed-base router has plenty of power

Milwaukee added a new fixed-base router, model 5625-20, to its power-tool lineup.

As shipped, the router had U-shaped handles. But a pair of palm-grip knobs also was included. To change from one to the other is just a matter of turning a few screws.

When cutting dadoses with the router base against a straightedge, I liked the feel and control of the U-shaped handles. But with the palm-grip knobs installed, my hands ended up lower on the machine, a position that seemed to offer a little more control when making edge cuts with bearing-guided bits. Having both options is a nice feature.

The get up and go is provided by a 15-amp, 3½-hp, variable-speed soft-start motor. A quick push of a release button frees the motor, allowing you to lift the motor straight out of the housing, which is handy for changing bits, even when the router is in a table.

But be careful here. If you push the button when the motor isn't supported, the motor immediately free-falls. It can easily bang a finger. Or, if upside-down in a table, the motor is going to visit the floor quickly.

Adjusting the bit is about as painless as things get. While supporting



Power to spare. The 3½-hp Milwaukee cut ¾-in.-wide by ½-in.-deep dadoses with little effort.

the motor with one hand, push the motor-release button with the other, then raise or lower the motor to get the cutter in the vicinity of the desired depth of cut. At that point, use the fine-adjustment knob to dial in the exact setting.

Milwaukee also provides a T-wrench to fine-tune the bit setting. Slip the T-wrench through a hole in the sub-base and use it to turn the fine-

adjustment knob. When the router is in a table, the wrench is even more useful. But first, you need to drill a hole in your router table to align with the hole in the subbase.

When checked for arbor runout, the 5625-20 measured 0.0015 in. That compares to an average of 0.0042 in. in a test we did of midsized, fixed-base routers about two years ago. This router is noisier than our average, measuring 100 decibels.

Smooth-cutting smoothers. Two new wooden smoothing planes from plane makers Clark & Williams (top) and Knight Toolworks (bottom) were a pleasure to use.



SIDE BY SIDE

Two impressive wooden smoothing planes

I want a smoothing plane to cut a final polished surface consistently with little or no tearout. Two new wooden smoothers, one by Clark & Williams and another by Knight Toolworks, are impressively dependable tools.

Bill Clark and Larry Williams, finish carpenters turned plane makers, have revived the classic styling of 18th-century wooden smoothers. With a coffin-shaped beech body, a rounded-top single-iron precisely wedged in place and a micro-

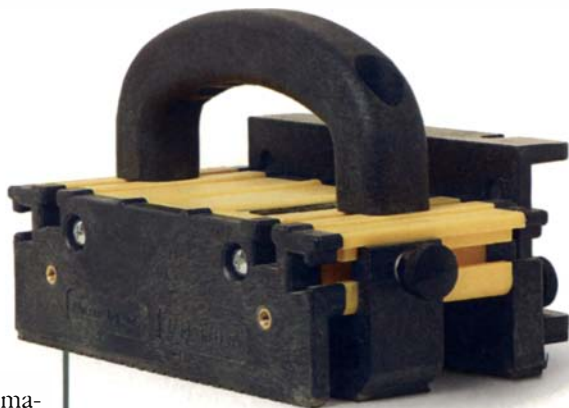
In our vibration test, it received an excellent rating.

This router had plenty of power. With a new 3/4-in.-dia. straight bit in the router, and with the bit set to make a hefty 1/2-in.-deep cut, I was able to cut a dozen long dados with little effort. The Milwaukee 5625-20 sells for around \$350. For more information, contact Milwaukee (262-781-3600; www.mil-electric-tool.com).

—Tom Begnal is an associate editor.



Adjustment from above. A hole in the router subbase accepts a T-wrench (supplied), allowing the bit height to be adjusted from above, a feature that's especially helpful when the router is mounted in a table.



Grr-andiose push block

When ripping stock, a push block or a push stick is an indispensable safety tool. Over the years I've seen versions in all shapes and sizes but none as exotic as the GRR-Ripper from Micro-Jig.

The body of the tool accepts a pair of narrow, fixed side legs and a wider movable center leg. All three of the legs have a rubber sole. Adjusting the center leg side to side between the side legs creates a tunnel through which the sawblade can pass. The handle also adjusts side to side, so the pushing force can be placed where it's going to be most effective. When ripping narrow stock, an adjustable L-shaped plate can be lowered to meet the saw table, which helps prevent the tool from tipping.

In general, the GRR-Ripper worked fine. When cutting narrow stock, the sole bears on both sides of the cut line, so the offcut is carried past the blade, a nice feature.

On the downside, though, when cutting narrow stock, the tool interfered with the blade guard. Also, most pushers have some means to hook over the trailing end of the stock to provide downward and forward pressure. But the GRR-Ripper relies entirely on friction between the sole of the tool and stock, so I had to use more downward force than usual.

The GRR-Ripper also can be used with a router table or jointer. Overall, this was a well-made product. But at \$50 to \$70 each, depending on the model, I think I'll stick with my shopmade push blocks. For more information, contact Micro Jig (407-696-6695; www.microjig.com).

—Dennis Preston is an engineer, woodworker and writer living in Brookfield, Conn.



High-tech push block. The GRR-Ripper push block holds both sides of a workpiece against the table during a ripcut.

scopic throat opening, the design couldn't be simpler or more elegant. The steel of the iron is standard O1, which sharpens easily and holds an edge respectably.

The plane speaks to me of makers who know what they are doing and care a great deal about it. They make smoothers to any pitch you desire (50° is my choice, or 55° for really figured or difficult woods) and some beautiful molding planes as well.

Steve Knight of Knight Toolworks has been tinkering with and improving his bench planes over the past four years. For stability and ease of manufacture, he laminates the plane body; my smoother had a sole of cocobolo with a low body of purpleheart and white oak. While its over-rounded shape might not appeal to everyone, I found it very comfortable.



Plane-iron option. The Knight plane came with an optional Japanese plane iron that sharpened nicely and held an edge well.

Two important design aspects stand out. At the heart of the plane is a Japanese iron that came sharp and held an edge well. And ahead of the mouth is a wedge that kept the mouth tight, allowing the plane to cut fine shavings for a long time.

Not all woodworkers will be enamored with such wooden planes. Neither plane has an adjuster, but setting the iron was easy and can be quickly learned. Try one of these wooden smoothers, and you will be drawn in by their silky action of wood on wood, or the ease with which they cut 0.001-in.-thick shavings and leave polished surfaces on tough woods such as bird's-eye maple.

The Clark & Williams plane costs about \$265. Contact Clark & Williams at (479) 253-7416 (www.planemaker.com). The Knight plane sells for about \$200. Contact him at (503) 421-6146 (www.knight-toolworks.com).

—Garrett Hack is author of *The Handplane Book* (The Taunton Press, 1997).

New drum sander from Craftsman

Faster, more accurate and a lot less physically demanding than using a belt sander, a good drum sander can take the drudgery out of sanding panels and face frames. Recently, Craftsman introduced its model 21518, a drum sander for the home woodworker or one-man commercial shop.

The machine features an 18-in.-wide sanding drum and a frame that's open on the end, which lets you sand stock up to 36 in. wide. The stock must be fed through the machine a couple of times—a first pass sands half of one side of the board, then, with the board turned end for end, a second pass sands the remaining half.

I did all of the sanding for the review using the 80-grit belt that's included with the drum sander. Other grits—50, 150 and 200—can be ordered from Sears Parts (800-366-7278).

With a 13-amp, 1½-hp, 1,720-rpm motor, the sander proved to have adequate power for light sanding duty. Power for the feed belt came courtesy of a variable-speed, low-voltage, d.c. motor. The variable-speed feature made it easy to adjust the feed rate—from 1 to 18 ft. per minute—to suit the material being sanded.

On the downside, this sander required



Sander is a time-saver. With an 18-in.-wide drum, the Craftsman tool can sand a workpiece up to 36 in. wide.

more than its share of adjusting to get it running right. I had to tighten the coupler between the motor and the drum and adjust the drum for parallel with the feed table. Then, after fussing with the tracking of the feed belt, I had to adjust the coupler between the powered feed roller and the gear-reduction motor that drives it.

Also, when sanding full width, the drum sander had to be tilted slightly, effectively creating a wider opening on the outboard end of the drum. This step eliminated the

lap mark where the sanding passes overlapped. But it was a tedious process.

All things considered, though, once the machine was tuned, it did an adequate job finish-sanding stock. Model 21518, sold only through the Craftsman catalog, costs about \$700. For more information, contact Craftsman at (800) 697-3277.

—Roland Johnson builds furniture in Sauk Rapids, Minn., and is author of *Automotive Woodworking* (MBI Publishing, 2001).



Comfort and convenience. Featuring suspenderlike straps, the 15-pocket Ballistic Apron won't irritate the back of the neck, an annoyance common to most shop aprons.

A better shop apron

I usually wear a shop apron when woodworking, a matter of habit brought on by a shop class I took many years ago. A shop apron is a great way to keep essential layout and marking tools within easy reach.

The problem with most shop aprons is that they have a strap that loops around the back of the neck, which can be irritating once you've put 5 lbs. of junk in the pockets. But that's not the case with the Ballistic Apron by FastCap. This nylon apron has a pair of straps that go over the shoulder, cross in the back and loop through rings on the sides, finally tying in the back. The design places all of the apron's weight upon the shoulders, not the neck, making it comfortable enough to wear all day. It has 15 compartments in a variety of sizes as well as a pair of hammer loops.

The apron is available in green or black and costs \$39. To find a distributor, go on-line to www.fastcap.com or call (888) 443-3748.

—Anatole Burkin is the executive editor.

COMMERCIAL CASEWORK

CabParts produces easily assembled, frameless, modular cabinet boxes, custom-sized casework, drawer boxes, adjustable shelves, slab-type doors and drawer fronts plus a modular, wall-hung closet/storage/organizer system. Service nationwide has been provided since 1987.

The CabParts product line is specifically suited for use by Cabinet and Millwork Shops, General and Remodeling Contractors, Building Maintenance Departments, Design/Build Firms, Architects and Project Managers.

Outsourcing your casework requirements from CabParts means:

- increased profitability
- higher productivity
- better cost control
- consistent quality

RESIDENTIAL CASEWORK

CabParts.

Your Casework Made Easy



www.cabparts.com

Confirmat Joinery Dowel Joinery



When properly assembled & installed CabParts meets or exceeds AWI custom grade

For the full story on CabParts or to download a FREE digital catalog please visit our website www.cabparts.com or give us a call at 970.241.7682



READER SERVICE NO. 144

#1 Rated Drum Sander by Independent Experts!



FREE 30-Day Trial!

5-Year Warranty

Prouder Than Ever to be MADE IN AMERICA!

Wide Belt Performance ...at About 1/3 the Cost!

Call today for a FREE report on why Woodmaster's Drum Sander was voted "tops" by *Fine Woodworking Magazine* vs. Performax®, Grizzly®, etc. See how a Woodmaster can cut your sanding time by up to 90%!

Now, our line of 26" and 38" drum sanders includes a new 50" model. These commercial-duty sanders fill the niche between slow hand methods and expensive wide-belt sanders...at about one third the cost. And there's no sacrifice in quality.

Call today and we'll give you the names of Woodmaster owners near you. This way, you can find out, first hand, how a Woodmaster might be just the machine you've been looking for.

Call Today for Free Facts

1-800-821-6651 ext. DS92

Woodmaster Tools, Inc.

1431 N. Topping Ave. Dept. DS92, Kansas City, MO 64120

READER SERVICE NO. 98

Extremely Affordable/Unbelievable Quality

Discover why these European crafted machines from Rojek are fast becoming the tools of choice for America's finest woodworkers.

PK 300V CABINET SAW

- Professional sliding table
- Scoring unit built in
- European riving knife safety
- Superior dust collection

KPS 300 COMBINATION MACHINE

- Table saw/Shaper/Planer/Joiner/Mortiser
- Choice of sliding tables
- Professional precision & accuracy
- Ideal for small shops & basements

MSP 310M PLANER/JOINER COMBINATION

- 12" Joiner & thickness planer
- Fixed joiner tables means no flipping!!
- Reduced changeover & setup

VDA 316 SLOT MORTISER

- Cut deep mortises with ease
- One-handed 360° operation
- 3.6HP motor & reversing switch
- Over 8" lateral travel

Let us make you a believer! Call toll-free:

800-787-6747

for a lifetime of woodworking



Exclusive Distributor in the United States

7901 Industry Dr., North Little Rock, AR 72117

Fax: 501-945-0312 • Website: www.tech-mark.com

COMBINATION MACHINES • SHAPERS • JOINERS • PLANERS • SLIDING TABLE SAWS • SLOT MORTISERS
READER SERVICE NO. 168



Cap keeps out crud. The Intacap helps prevent contaminants from getting into the intake connector of a pneumatic tool.

Caps for pneumatic tools

Air-powered tools spend a life in dusty, dirty and oftentimes damp environments—whether it's the workshop or job site. And once you unplug the hose from the intake connector, foreign material can find its way into your tool, unless you are a neatnik and actually use those plastic storage cases the tool came in.

Somebody came up with a solution for those of us who leave their tools lying around. The Intacap is a rubberlike end cap for the intake connector. When you pull off the cap, an O-ring keeps the cap dangling from the tool so you won't lose it.

Intacaps are available from Woodworker's Supply: (800) 645-9292; www.woodworker.com. A package of five sells for \$9.99. I'd like to see the price come down a bit, but considering that most air-powered nailers cost a few hundred bucks, I suppose \$2 insurance per gun isn't so bad. —A.B.

Plane-setting hammer from Veritas

To understand the need for a plane-setting hammer, one need only look at the abuse that steel hammers have inflicted on vintage wooden planes over the years. Typically, these hard-luck planes suffer from mushroomed blade ends and badly dented bodies, all caused by years of getting struck by a steel hammer.

To protect planes from such a fate, the plane-setting hammer, made by Veritas, might be just the ticket. This tool gets the job done with a softer touch, so it won't damage the blade or the plane body.

The secret to this hammer is its two-faced head—one is brass, and the other is wood. Plus, it's relatively light, weighing only 8 oz.

The brass face is for setting blades. Brass is softer than the blade steel, so any over-enthusiastic strikes are less likely to damage the blade.

When tapping the body of the plane to decrease the depth of cut or set the wedge, the wood face is used. It has enough heft to be effective yet not so much that it can mar the plane body.

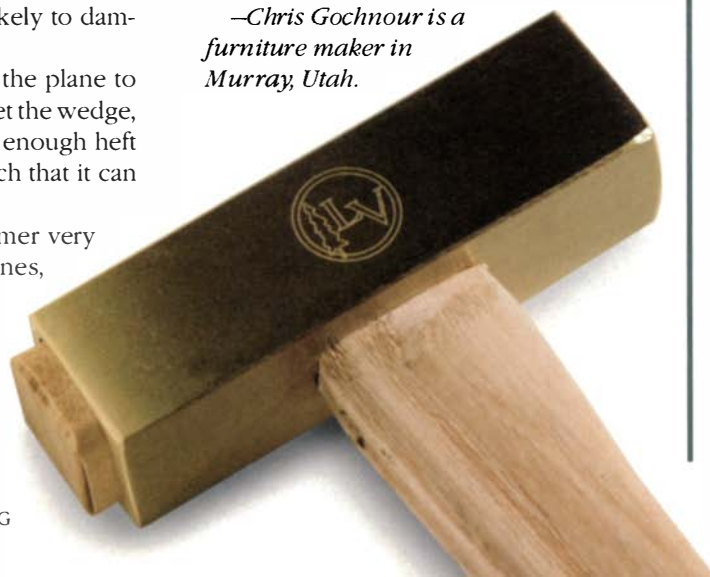
I also have found the hammer very useful for setting bench planes,

adjusting molding planes and tuning my infill smoother. Indeed, in the past, I was reluctant to tap the rosewood infill of the smoother with a steel hammer, and my small wooden hammer simply was too light. But by using the wooden face of the Veritas, I was able to make adjustments without fear of damaging the body.

I also found myself reaching for the hammer to do other miscellaneous shop tasks that required the finesse of a light-duty hammer. It was especially helpful for fine-tuning jig setups and tapping dovetail joints together.

If your handplanes have to be set with a hammer, this is a good one to use. It sells for about \$15. For more information, contact Veritas at (800) 871-8158; www.leevalley.com.

—Chris Gochnour is a furniture maker in Murray, Utah.



A hammer with a velvet touch. This two-faced (brass and wood) lightweight hammer is perfect for striking steel blades or wooden plane bodies.



Glove gets good grip. A tight grip comes a lot easier when you wear one of these inexpensive cotton gloves with latex-dipped palms.

Latex-dipped gloves improve grip

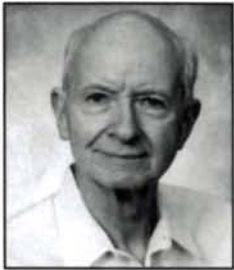
When a good grip would be most welcome, such as when you're trying to tighten a clamp just a little more or twist a tight screw another quarter turn with a screwdriver, these gloves can help. The palms have been dipped in latex, so they grip considerably better than bare skin. Plus, your hand doesn't have to squeeze as hard. But you won't get squeezed by the price—\$11 for a dozen. For more information, contact ABC Safety Mart at (800) 646-5346; www.abcsafety.com. —T.B.



Forrest Saw Blades

America's Best Since 1946!

"You Can Count On Us For Quality, Performance, and Dependability!"



Jim Forrest, President

"For almost 60 years, our company has manufactured top-quality saw blades that eliminate or reduce splintering, scratching and tearouts, and we've offered the finest in-factory sharpening available anywhere. We use only high corrosion-resistant C-4 carbide for extended use between sharpenings. And now all Woodworker I and II blades 10" or larger have 30% more carbide than before...for the longest possible blade life.

"Here's our no risk-guarantee: Purchase any Forrest blade or dado and use it for up to 30 days. If you are not completely satisfied for any reason, return it for a full refund. You have my word on it!"

Jim Forrest

New Discounts!

Save 10% on one (1) blade or dado!

Save 14% on multi-blade/dado orders!

Woodworker II

ALL PURPOSE - table saws and portable circular saws.

Size	Price
The 10"x40T is the only blade rated "excellent" for both rip and cross cuts by <i>Fine Woodworking Magazine</i> (March/April, 2002).	
12" x 40T x 1"	\$131
10" x 40T (1/8" or 3/32" K)	\$121
10" x 30T (1/8" or 3/32" K)	\$101
8 1/4" x 40T (3/32" K)*	\$101
8" x 40T (3/32" K)	\$101
7 1/4" x 30T (3/32" K)	\$ 71
5 3/8"x40Tx10mm (5/64" K)**	\$ 83

Also available: 14"x40Tx1" • 14"x30Tx1" • 12"x30Tx1" • 16"x40T • 9"x40T • 16"x30T • 9"x30T • 8"x30T(3/32"K) • 6"x40T(3/32"K). Call for prices.

*For Sears & Makita **For DeWalt Cordless Portables

Customized Woodworker II

For the advanced table saw operator. Ideal for joinery and special uses!

Size	Price
10" x 40T (1/8" K)	\$132
10" x 40T (1/8" K)	\$132
10" x 40T (1/8" K)	\$132
10" x 40T (5/64" K)	\$141
10" x 20T (1/8" K)	\$ 71

Dado-King

You get flat-bottomed grooves and no splintering—even when crosscutting oak plys and melamine. This award-winning set comes with six 4-tooth chippers (including 3/32" chipper), two 24-tooth outside blades plus shims. Cuts 1/8" to 29/32" grooves.

Size	Price
6" set	\$271
8" set	\$291
10" set	\$349
12" set	\$449

FREE \$21 value! 10" Blade Runner carrying case. Protects and holds up to 10 blades. Ships with 6", 8", or 10" Dado sets. Included free with your order!

Duraline HI A/T

Cuts melamine perfectly. 220mm & 300mm available. Our best plywood blade.

Size	Price
10" x 80T (1/8" or 3/32" K)	\$161
12" x 80T x 1" (1/8" K)	\$181

Also available: 14"x100Tx1" • 14"x80Tx1" • 16"x100Tx1" • 8" • 7 1/4" and others. Call for prices.

Chop Master

Specially designed for sliding compound miter, miter-chop, and radial saws.

Size	Price
7 1/2" x 60T x 5/8" Makita Cordless Slide	\$101
8 1/2" x 60T x 5/8" Hitachi, DeWalt, Ryobi, Freud TR125	\$121
10" x 80T x 5/8" Delta, Bosch, Hitachi, Makita, Ryobi, AEG & all	\$141
12" x 80T x 1" Delta, Hitachi, Makita, B&D, Sears & all	\$151
15" x 100T x 1" Makita, Ryobi	\$199

Also available: 8 1/4" x 60T • 6 1/2" x 40T • 9" x 80T • 14" x 100T. Call for prices.

Woodworker I

Designed for radial arm or tablesaws—fine crosscut.

Size	Price
7 1/4", 8", 8 1/4" x 60T	\$111
10" x 60T	\$131
12" x 60T	\$141

Also available: 9" x 60T • 14" x 60T • 16" x 60T. Call for prices.

Two Easy Ways to Order

Call toll-free

1-800-733-7111

Visit our internet store

stores.yahoo.com/forrestman

(In NJ, 973-473-5236)

Fax 973-471-3333

Se habla español

Western Canada: Call Sharp Tech, Inc. 877-228-0908 • Fax 403-225-3767

Other Canadian Sales: Call CMR - Ron Collier 800-229-4814 • Fax 989-684-0402



DON'T SEE WHAT YOU NEED?
Call us for other blades and dampener discs!

\$15 OFF* OUR EXPERT BLADE SHARPENING!

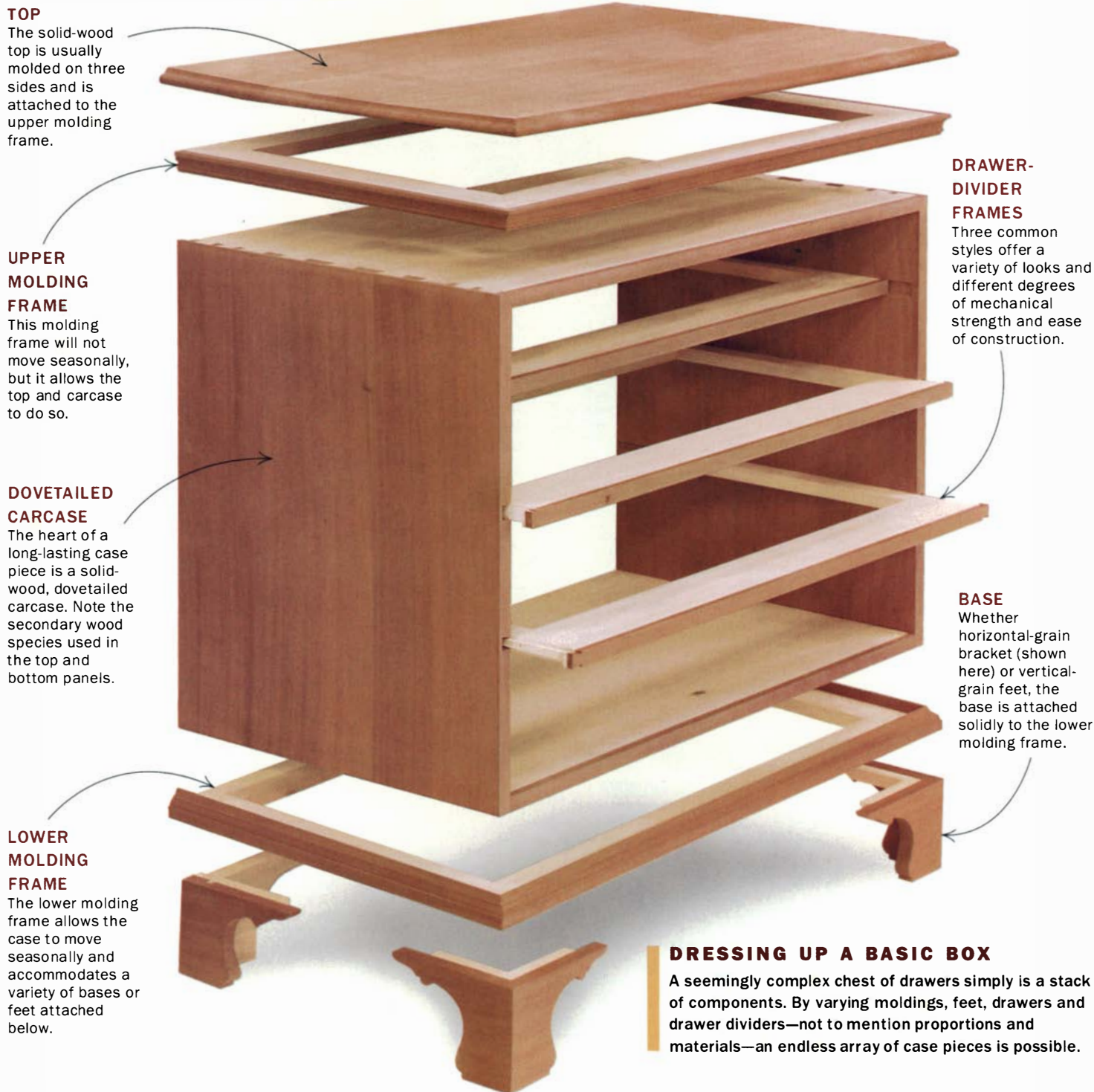
Don't take a chance with micro-chipped edges on your expensive wood! Our in-factory sharpening preserves the life and performance of all types of carbide blades. In fact, Forrest Manufacturing represents the industry standard for fine quality sharpening. Most orders processed in 3 to 5 days. You'll receive \$15 in DISCOUNT COUPONS* for our expert factory sharpening with every new Forrest blade or dado you purchase! Coupons can be used to sharpen any carbide blade. (Please include return UPS of \$7 + \$1 for each additional blade.)

FORREST

Forrest Manufacturing Company
457 River Road
Clifton, NJ 07014

© 2002 Forrest Manufacturing Company, Inc.

Anatomy of a Chest of Drawers



Start with a dovetailed box, then choose among options for drawers, moldings and base

BY WILL NEPTUNE

Case furniture based on a dovetailed box is found in a wide range of styles and periods. While the details vary, many pieces can be built using similar construction solutions. When I build a case, I work from a firm set of ideas—both traditional and modern—that I've found to be reliable and efficient.

The techniques required to make a chest of drawers are mostly common knowledge: dovetails, dadoes, miters, mortises and tenons. The complex appearance is the result of a straightforward sequence of simple steps. At its most basic level, a chest of drawers is a stack of separate assemblies. However, based on moldings (or lack thereof), leg treatments, drawer styles, proportions and materials, a wide variety of case pieces is possible. Like my past articles "Engineering a Table with Drawers" (*FWW* #130, pp. 40-45) and "Sideboard Strategies" (*FWW* #138, pp. 42-49), this one

describes a basic, proven construction approach. The execution is up to you.

Start with a dovetailed case

When preparing your primary stock for the sides of the case, put aside strips to be used later to edge the top and bottom case panels as well as the drawer dividers. Using

wood from the same board will give a uniform look to the case.

A chest of drawers begins with four panels: top, bottom and two sides. The strips of primary wood that edge the top and bottom can be glued onto the secondary-wood panels after rough-milling. Match the grain direction of all parts during glue-up so they can be finish-milled as one piece.

The case is joined with half-blind dovetails, so lay them out for strength, not appearance. You may want extra tails near the edges, especially the front, to resist loads that could pop the front shoulder.

Another trick makes the joinery for the back a little easier. Run the rabbets for the back boards all the way up the sides without stopping. Then rip the top and bottom panels to be flush with this rabbet; the back boards will extend all the way up to the top and bottom of the case but be hidden by the true top, which goes on later. The back

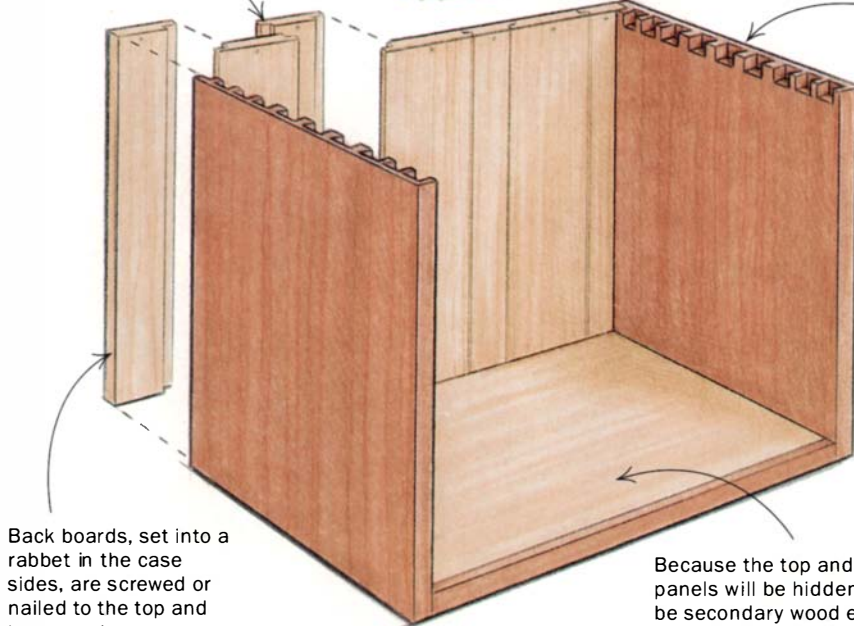
CARCASE AND BACK CONSTRUCTION

The case is joined with half-blind dovetails, which are hidden from view. Traditionally, the back consists of shiplapped boards.

Shiplap joints and slight spaces allow for wood movement.



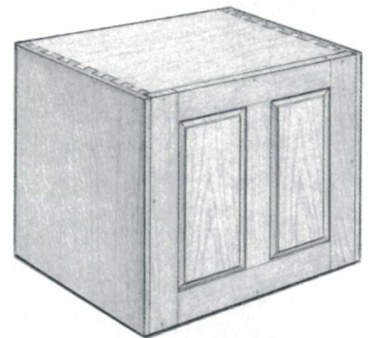
Half-blind dovetails are sized and located for strength, not appearance.



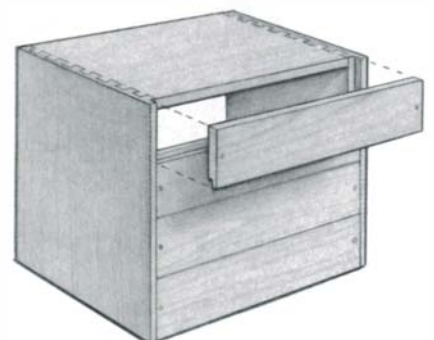
Back boards, set into a rabbet in the case sides, are screwed or nailed to the top and bottom edges.

Because the top and bottom panels will be hidden, these can be secondary wood edged at the front with primary wood.

BACK-PANEL OPTIONS



A more attractive frame and panel can be fit into the rabbet.



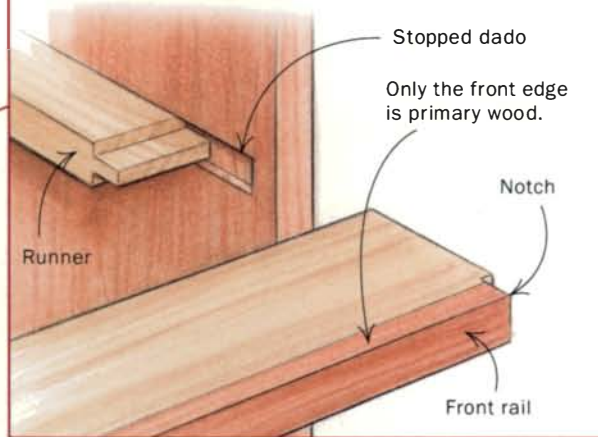
Horizontal shiplapped back boards help prevent tall sides from bowing outward.

DRAWER-DIVIDER FRAMES

Only the front 3 in. or 4 in. are glued to the case, allowing the case sides to move. Choose a frame type based on the desired look and the need for strength.

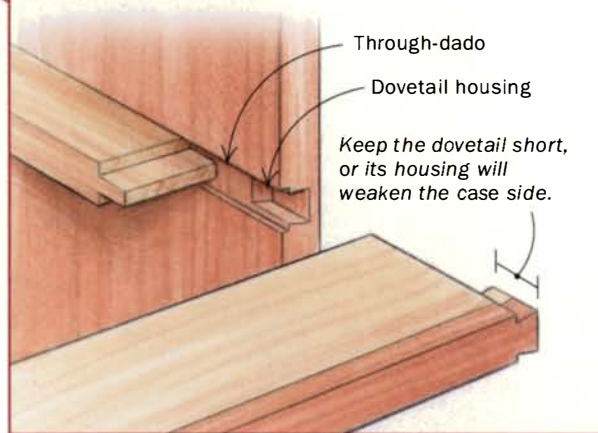
STOPPED DADOES

Basic stopped dadoes offer a clean, contemporary look and the easiest construction.



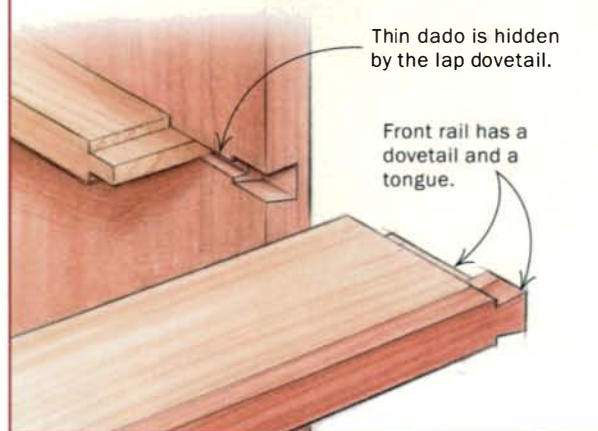
STEPPED DOVETAILED

Stepped dovetails offer a more traditional look and a mechanical connection between the case sides.



DOVETAILED WITH HIDDEN DADOES

Dovetails with hidden dadoes not only tie the case sides together but also offer a clean look.



boards, lapped in some way to allow for wood movement, are screwed to the case.

Drawer dividers: three options

Once the case dovetails have been cut, fitted and dry-clamped, it's time to work on the system of drawer dividers and supports. For function and appearance, the divider frames must stay flat. Again, secondary wood can be used for all but the front edges. Choose the inner secondary wood for stability. Avoid secondary wood that was significantly bowed in the rough, and make the front divider wide for extra stiffness. I make the fronts 3½ in. to 4 in. wide, and the less-critical back dividers 2½ in. to 3 in. The runners can be narrower, about 2 in., because they are held in dados. Leave the parts a bit thick to allow for leveling the frame after gluing.

Although there are other divider systems, typically I use one of the three shown at left. For all three types, I prefer to glue up the mortise-and-tenoned frame first and fit the unit to the case dados. But you also can fit and glue the pieces together in the case, using the dados to align the parts. One last note: The right time to glue up the case is after the dados have been cut but before building and fitting the divider frames.

Stopped dadoes—This simple approach offers a streamlined look and straightforward joinery. The main liability is the lack of sound glue surfaces between the frame

NOTCHING THE DIVIDER



A divider in a stopped dado is inserted from the back. The front rail must be notched to reach the front of the case.

and the case. Usually this isn't a problem, but for a tall case or one with unstable wood, you may want one of the other frame systems that use lap dovetails to tie the ends of the case together. The other types also offer the traditional look of exposed joinery.

Start by laying out and cutting the dados, which are about 1/4 in. deep. I do the layout while the case is dry-clamped, using a story stick to avoid measuring errors. The goal is to get the pairs of dados at equal height and parallel to the inside faces of the top and bottom. Square up the front ends of the stopped dados at an equal distance from the front edges of the case (about 1/2 in.). The front of the frame should be flush to the case edge, but the back should be inset about 3/8 in. from the rabbets to allow the sides to shrink. Gauge the length of the dividers from the bottom of the dados, and cut them about 1/2 in. undersize to make the frames easier to fit.

To join the divider frames, I use mortises with open ends; then the runners need only tenons. When clamping and gluing up the frames, take diagonal measurements to check for squareness, and be sure that the frames are flat. A good tip is to level the joints on the top of the frame first. Then, as you test the frame and slide it into the dados, you can do all of your fitting from the bottom. The front 3 in. to 4 in. of the frame should be snug, but the rest can be eased to make it slide in the dados with less drag.



DRAWERS

The two common drawer styles are flush and lipped. On the lipped style, the drawer front covers the gap for a more refined look.



Match the divider to the drawer. The dovetail with hidden dado offers a clean look for flush drawers (above), while lipped drawers look better with the stepped dovetail (below).



You still need to cut a shoulder in the front of the frame so it can extend past the stopped dados to the front of the case.

Stepped dovetails—Adding lap dovetails to the front of the frame gives it a strong mechanical connection to the case sides.

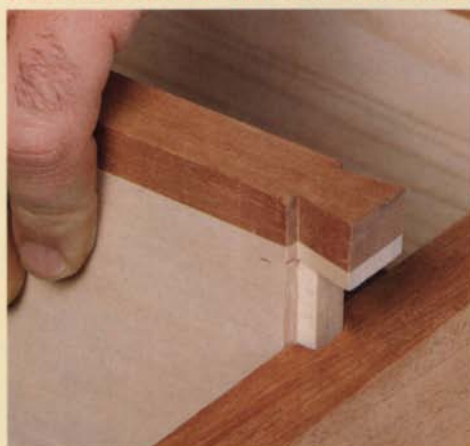
The front rail will resist forces pushing the case sides outward, and it can be used to pull in bowed sides slightly. This traditional solution is called a stepped dovetail because both the dado and dovetail are visible at the front. I like this joint with lipped drawers, where the side lip matches

Scribe for a perfect fit



Slide the divider to the front of the dado and scribe the shoulder. Then cut the notch in the rail.

DOVETAILING THE CASE SIDE



Dovetailed dividers go in from the front. The dado is cut first; the dovetail housing is cut second.



Slide in the dadoed section as far as possible. Then transfer the layout of the dovetail onto the case side.

MOLDINGS AND CASE TOP

The trick is to find a way to attach moldings across the grain of the case sides and the top. Molding frames are the key.

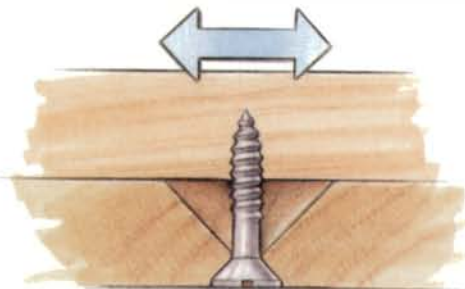
Elongated screw holes along the sides and back edge of the molding frame allow the top to move seasonally.

Elongated holes for the screws that attach the case to the molding frame allow the case to move.

Round holes along the front edge of the case and molding frame keep all three aligned where it counts most.



Elongated screw holes are the answer. These are elongated along the bottom side only, allowing the pieces to shift against each other without coming apart.



the dado depth. Be prepared to spend extra time on these joints, though, because there are many surfaces that must fit at the front edge, and gaps will be obvious.

This joint uses a shallow (about $\frac{3}{16}$ in. deep) through-dado, with a lap dovetail at the front extending into the case side.

Start by penciling in the lap location on the case sides. This gives the length of the front rail. Before gluing up the frame, notch the front rail to leave the stubs for the dovetails. Now build the rest of the frame and shape the dovetails on the front stubs. This joint will show any gaps, so work carefully and test the dovetail fit as you pare. When you install the frame, rub the rear part of the dado with paraffin wax so that any glue that drags back won't keep it from floating.

Lap dovetail with hidden dado—The third frame type uses a narrower through-dado that is hidden at the front by the lap dovetail. This dovetailed frame gives the same mechanical strength as the stepped version but has a cleaner look. When used with flush drawers, it has a neat, logical appearance. This system has another advantage over the stepped dovetail. Because the dovetail fully covers the dado, there are fewer surfaces that must close up. Use a standard dado size that is $\frac{1}{16}$ in. or so smaller than the base of the tail, and make the dados about $\frac{1}{4}$ in. deep.

Once the frame has been made, you



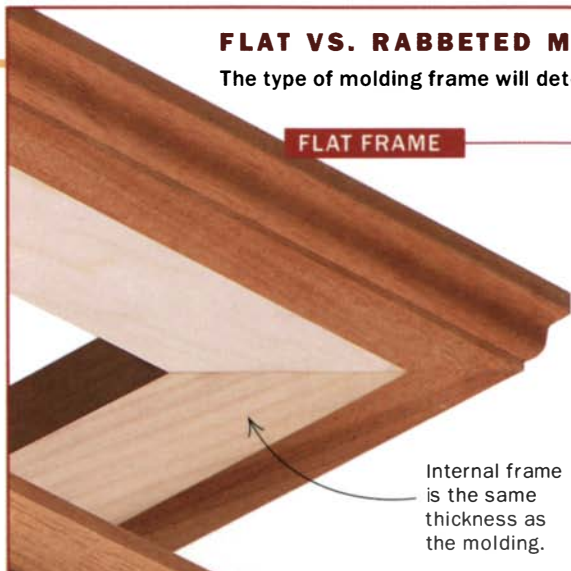
The correct sequence. First, attach the molding frame to the top (above) and then to the case using the elongated holes only. Last, screw all three parts along the front edge (right).



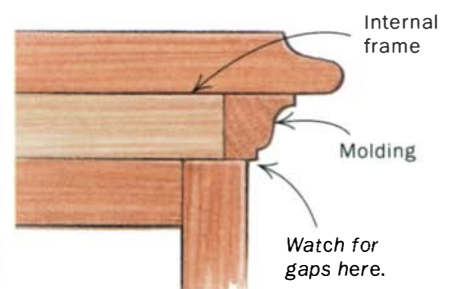
FLAT VS. RABBETED MOLDING FRAME

The type of molding frame will determine how much of the top or bottom edge of the carcass is visible.

FLAT FRAME



Internal frame is the same thickness as the molding.

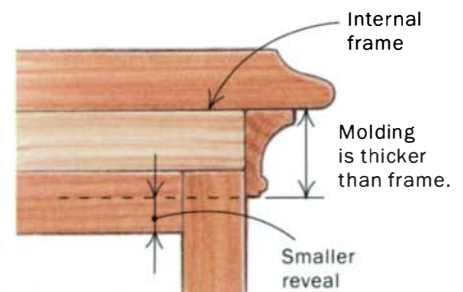


A flat frame is easier to build and fit. But it shows the entire case edge and must lie perfectly flat.

RABBETED FRAME



Molding overhangs the frame, creating a rabbet.



Rabbeted frame leaves the carcass reveal up to you. Also, if the frame doesn't lie perfectly flat, the gap won't show.

need to form the tongues, stopping them at the front and leaving extra wood for the tails. Because the tongues and dados will be hidden, only the shoulders for the dovetails need to be tight, and the tongues don't need to bottom out in the dados; however, the tongues should be snug in thickness, especially at the front.

A few tips for the drawers

Once the frames have been fitted and glued in, you may build and fit the drawers by any method you're comfortable with. Drawer fronts, of course, have a lot to do with the appearance of a chest, so look over the wood and plan the overall grain pattern before you begin.

This article presents two options: a flush drawer and a lipped drawer (see the top photo on p. 43). Both types need stops (the fragile lip molding is there only to cover the clearance gaps). One reason why I locate the stop blocks on the rear dividers is

that it's easy to clamp them in place while testing the drawer. Just remember to size your drawers to make room for the stops. But the great trick here is that putting the stops on a floating frame keeps the drawers flush at the front even as the case changes depth through the seasons.

Ease the transitions with moldings

Visually, top and bottom moldings have a powerful effect. They frame the case with their strong horizontal lines and play of light. Their projection at the bottom gives the base a sense of stability and strength. An upper molding provides a transition to the overhang of the top and also balances the bottom molding.

Many times you'll see old work with moldings attached to the case itself, but these tend to fail over time as the case shrinks. Using separate frames for the moldings will give the same appearance while allowing for case movement.

These top and bottom frames can be built using either of two methods (above). Both can use secondary wood for the inner part of the frame. The first is a simple mitered frame with a molded edge. A more complex, rabbeted frame system wraps over the sides and front edge of the case. With this system you can choose how much of the front case edge shows, giving a wider range of effects.

Both frame systems should overhang the back to allow for expansion of the case. Fasten the frames to the case with screws, tight along the front but with elongated holes along the sides and back to allow the case to move.

Flat frame is quicker to build—The first step for the flat frame is to know the exact dimensions of the molding you want, its projection from the piece and the width of the primary wood. The next step is to glue the primary-wood strips onto the



Molding frame serves as the attachment point for the base.

Secondary wood is used at the back of the base.

Glue blocks

Half-blind dovetail or tongue-and-dado joint

Bracket feet may be flat or molded.

BASES

A strong bottom molding frame serves as a stable platform for attaching the feet, whether bracket style (shown here) or vertical (see the facing page).

Miter joint at front corners

inner-frame stock and then mill the blanks to thickness.

Get the front miters fitting correctly before mortising in the flat, unmolded rear rail. Join the mitered corners with biscuits or stopped splines. Last, mold the desired profile on the outside edge.

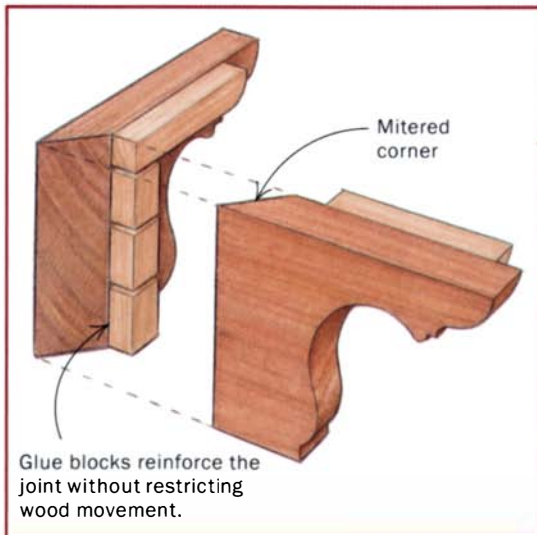
Build the rabbeted frame in two parts—The second frame system is built in two stages. The inner, secondary-wood frame is thinner than the molding, based on how much of the case edge you want covered. I build the frame first, slightly oversize, then trim it to fit the case exactly. Let the back edge overhang to hide seasonal case expansion.

Now form the rabbet with the three thicker molding blanks. Dry-fit the parts carefully, making sure the miters come together exactly at the corners of the case, keeping the end pieces long at first to allow room for adjustment. Then glue the blanks to the edges of the frame and mold the profile. The frame is held with screws as before, with slotted holes to allow for movement.

Attach the top

The top of the case is often molded on three edges and usually has an overhanging back to hide shrinkage and to avoid a large gap between the case and the wall.

If a molding is used below the top, it's important to let the case, the molding frame and the top move independently. All three parts are held tight with screws along the front edge to keep the miters and reveals constant. But along the sides and back, use elongated screw holes between the frame and top, as well as the case and frame. People commonly lift cases by the



Glue blocks reinforce the joint without restricting wood movement.

BRACKET FEET

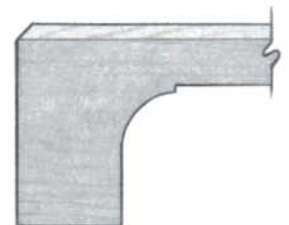
Molded or unmolded, with a wide variety of cutouts, bracket feet are used in many periods and styles. They are glued to the base molding frame (or attached to the case).



FLAT BRACKET FOOT



OGEE BRACKET FOOT



FLAT BRACKET BASE



Details define the style

This construction system will produce a wide variety of case pieces, depending on the combination of the individual elements. An 18th-century piece (top) combines moldings, drawers and feet common to that period. Lipped drawers soften the line of the front. A wide base molding and classic ball-and-claw feet give the piece a broad stance. The top is carefully dimensioned and molded to relate to the rest of the piece.

The bottom chest of drawers offers a more contemporary look with harder lines and surfaces, including a flush front. The curved, tapered legs flare outward, broadening the stance of the piece without looking heavy. The base and top moldings are beveled to complement the style. And the top is chamfered to make it appear thinner and to match the other elements.

These two examples are the tip of the iceberg. You could make the case taller than it is wide, or use a different array of drawers. And consider the effect of other wood species or figured wood for the drawers.

Period or contemporary? The choice of moldings, drawers, feet and hardware offers a wide range of design possibilities.



top edge, so all of these connections should be very strong.

Choose a base

The final bit of woodworking is to prepare a base. For this article I built the two most common systems, each adaptable to many leg styles. Bracket feet are cut from blanks with horizontal grain and are mitered at the front. The other leg style has vertical grain, which usually features narrower legs, often braced by flanking side pieces.

Bracket feet—Start the flat bracket feet with one long board about $\frac{3}{4}$ in. thick. The six blanks should be taken out of a single board, if possible, so the grain pattern wraps around the base, matching at the

miters. It's also nice to use the same board here as you did for the base molding to help hide the joint between the base frame and the feet.

The rear feet are braced with secondary wood. The joint at this back corner can be half-blind dovetails or, more simply, a tongue and dado. The miters for the front parts can be reinforced with a spline, but usually it's enough just to butt them.

Cut and dry-fit the joints before cutting the foot profile. The assembled feet are glued to the base frame. All of the foot and base joints should be reinforced with glue blocks. A single vertical block can cause the foot to crack, so I use three short blocks with $\frac{1}{8}$ in. of space between them.

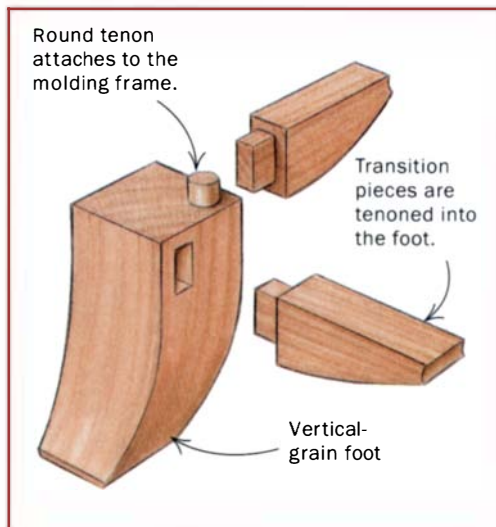
Vertical feet with support pieces—The second construction system is seen in the

saber leg with flanking transition pieces. Its main advantage over bracket feet is that the vertical grain direction allows a strong foot of a much smaller size.

Generally, a round or square tenon is cut in the top of the foot blanks to match a hole or mortise cut through the base frame. The mortise should be located away from the corner of the frame so that the miter joint isn't weakened. The transition pieces are tenoned into the foot. As before, these assemblies are glued to the base frame.

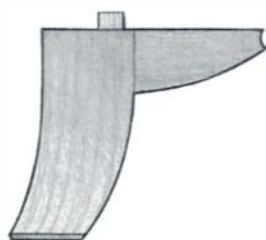
This sums up the approach I rely on for fine-quality casework, but many variations are possible. The great thing about this is that 10 people will use this information to build 10 very different chests, each one a record of that maker's taste and skills. □

Will Neptune is a furniture maker in Acton, Mass.



VERTICAL-GRAIN FEET

Vertical-grain feet come in a wide array of styles, from turned bun feet to 18th-century ball-and-claw feet to more contemporary saber feet. Most have flanking transition pieces.



SABER FOOT



BALL-AND-CLAW FOOT



TURNED FOOT

Three Finishes for Bird's-Eye Maple

Pop the figure of this wood using dyes, stains, glazes and topcoats

NATURAL

BY TERI MASASCHI

I never would claim that working and finishing bird's-eye maple are easy, but few woods can yield such contrasting appearances. At one end of the spectrum is the natural look, with a clear finish bringing out the wood's three-dimensional quality. In complete contrast is the striking look of antique wood, where a century or more

of oxidizing and accumulated patina gives it that certain glow and prominent grain. In between, there is the medium-tone appearance, with the eyes highlighted by the finishing process. Using a selection of dyes, stains, glazes and topcoats, I'll show you how to achieve the appearance of your choice.

The natural look, or "bird's-eye lite"

Good surface preparation is especially key to the desired outcome on bird's-eye maple. This wood does have the tendency to tear out during planing. Using a wide-belt sander for larger surfaces and scraping for delicate details, you can eliminate most of the voids. Subsequent sanding with 120-, 150- and 180-grit paper on a random-orbit sander is all that is necessary to prepare the wood for its finish.

If you enjoy the clean, crisp look of unstained maple, wood selection is critical: There can be no sapwood, mineral streaks or widely different colors of stock, because a natural finish can't hide these discrepancies.

For a light finish, use Danish oil or Water-

lox Original Sealer thinned with mineral spirits in a one-to-one solution. Pour a liberal amount on the wood and wet-sand with 400-grit paper or a sanding sponge, creating an oil-and-sawdust slurry. This will be driven into the eyes, leaving the surface smooth. One application should be sufficient. Additional coats can be added, but more oil makes the maple more yellow.

The topcoat should be nonyellowing like CAB acrylic lacquer, a pale solvent finish such as Behlen's Water White Restoration Varnish, or a water-based lacquer or urethane. All clear coats should be gloss because the flatteners used to manufacture satin and semigloss coatings dull the wood's appearance. If a lower final sheen is desired, the gloss coat can be rubbed out.

The idea behind this method is that the oil enhances the eyes, while the film coating creates a deeper and more dimensional surface than the oil alone can give.

Bird's-eye maple with a medium tone

The first step is to apply a tinted washcoat to the bare wood. This thinned coating,



MEDIUM

ANTIQUE



Create a penetrating oil. Mix equal amounts of Danish oil and mineral spirits. To avoid spills when pouring, keep the opening at the top to allow air to enter and liquid to exit smoothly rather than in irregular gulps.

A NATURAL LOOK



Fill the eyes and smooth the surface. Pour a generous amount of the mixture onto the wood and then sand it in with a 400-grit sanding sponge. The oil-and-sawdust slurry fills voids in the bird's eyes, making them more prominent.



Topcoat with a clear finish. To avoid adding a tone to the natural-looking wood, use a nonyellowing finish, such as Behlen's Water White Restoration Varnish.



A MEDIUM TONE



Combination dye and seal. This 2-lb. cut of premixed blond shellac is diluted with an equal volume of denatured alcohol (left). A few drops of concentrated dye give this washcoat some color (above).



First finish layer. Brush on the dyed shellac. This layer also seals the wood from the next glaze (below).

typically dyed dewaxed shellac, adds a layer of color and creates a barrier coat between the bare wood and a layer of glaze.

Either dissolve some blond shellac flakes or cut Zinsser's SealCoat by 50% with denatured alcohol to form a 1-lb. cut. For each 4 oz. of shellac, add a drop or two (depending on the desired intensity) of a concentrated dye such as TransTint or Wizard Tint. Honey amber or Vandyke brown are beautiful colors on bird's-eye maple. An alternative to tinting the shellac would be to use darker shades of shellac, such as orange or buttonlac. In either case, apply the shellac evenly with a brush or spray gun, let dry and scuff-sand with 320- or 400-grit paper.

Now apply a second layer of color using a shading and glazing stain. These heavy-bodied pigment glazing stains are designed to go over sealed surfaces only, being too thick and opaque for raw wood. Glazing stain has enough oil in it to be wiped off a sealed surface easily, leaving only a thin layer of color or glaze. On large surfaces it creates subtle changes in color tones, and if left heavy in corners and profiles, it gives the appearance of built-up patina. I use a warm brown such as Behlen's burnt-umber shading and glazing stain.

After wiping off the surplus, let it dry for at least three hours. Then add another washcoat of undyed dewaxed blond shellac



A second layer of color. Brush on a shading and glazing stain, then wipe it off. Leave a thin layer of color with a little extra glaze in the corners and voids to give a more interesting look to the piece.

ANTIQUÉ MAPLE



Dye, then seal. Apply a water-based dye (left). When it's dry, seal it with a coat of dark dewaxed shellac, such as buttonlac.



The first glaze. Apply burnt-umber shading and glazing stain to the sanded shellac. Allow it to penetrate, then wipe the surface, leaving residue in any voids.



to set the glaze before topcoating with a solvent- or water-based gloss finish.

Multiple layers of color give an antique look

Woodworkers who have built a beautiful period piece with bird's-eye maple face a challenge to re-create the 18th-century tone and, at the same time, pop the figure in a transparent way.

Begin with a coat of water-based honey-amber maple dye. First wet the surfaces with water, and when they're dry, dewhisker them with 220-grit sandpaper on a felt or cork block. This not only eliminates raised grain but also allows greater stain absorption. The dye stain penetrates deep into the wood, creating a perfect tone that will shine through the subsequent layers of color. Washcoat with a dewaxed dark shellac such as garnet or buttonlac, allow it to dry and then scuff-sand.

Apply a generous amount of burnt-umber shading and glazing stain, let it sit for a few minutes to bite into the surface, then wipe it off smoothly to leave a thin glaze of color on the surface and more color lodged in any details. Let it dry for three hours and then washcoat with dewaxed blond shellac



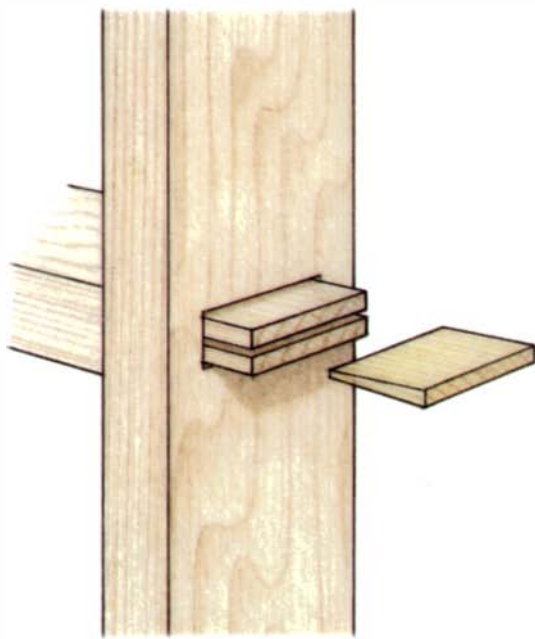
The second glaze. Mix raw-umber and black shading and glazing stain thinned with mineral spirits. Brush on the mixture and wipe it off. Residue left in crevices imitates an antique look (right).



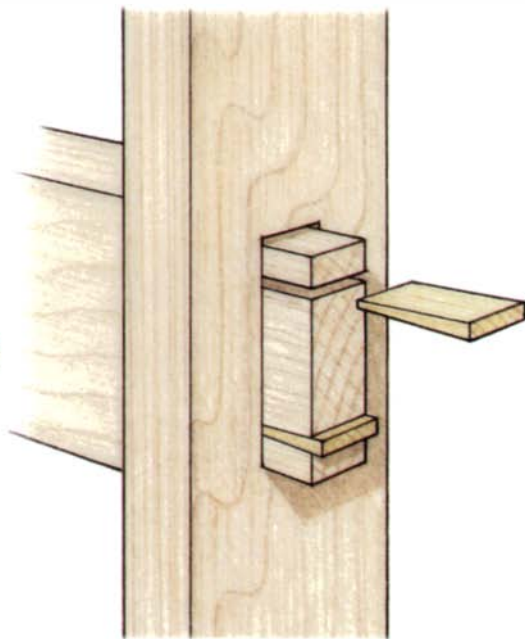
to set the glaze. Antique reproductions respond well to this process, which can be repeated to deepen the caramel tone that antiques usually have. After the desired tone has been reached, a second glaze can be added to age the piece. Mix raw-umber shading and glazing liquid with black shading and glazing or Sherwin Williams' Gilsonite (also known as asphaltum), and thin with mineral spirits to a brushing con-

sistency. Apply this mixture over most of the piece and into all of the corners and crevices. Wipe off the bulk of the glaze, leaving dark lines in the deep recesses. This completes the visual perception of antique bird's-eye maple. Seal with a washcoat of dewaxed shellac and finish with a gloss clear coat. □

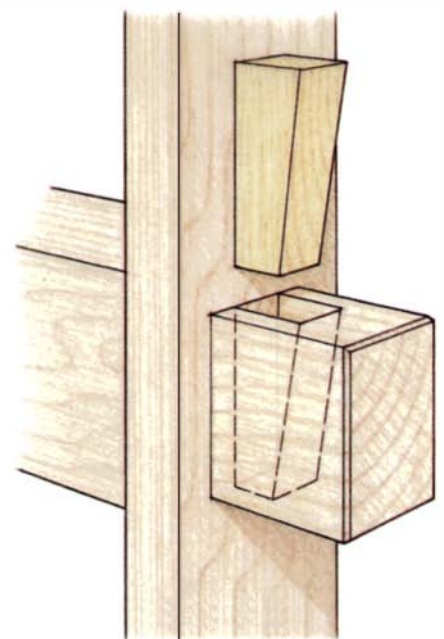
Teri Masaschi is a professional finisher, restorer and instructor who lives near Albuquerque, N.M.



SINGLE FIXED WEDGE



DOUBLE FIXED WEDGES



SINGLE LOOSE WEDGE

The Mighty Wedge

Fixed or loose, wedged joinery adds strength and style

BY JOHN NESSET

Since antiquity, wedges have served as an important means of joining wood. Low-tech but effective, they remain a useful and attractive element of joinery, evoking a rustic past when life (we like to think) was simpler and more straightforward. Like dovetails and other exposed joinery, wedges convey a sense of solid, honest craftsmanship, even to the uninitiated.

A whole book might not be enough to detail every application for the mighty wedge, but I'll cover the two major types in their basic single and double forms. From there, furniture makers can derive other variations.

Wedges fall into two general categories: fixed and loose. Both types are driven into through-tenons to reinforce the joint. Fixed wedges generally are driven into the end grain of a tenon with glue added for reinforcement, then trimmed flush. They are appropriate where the wedge risks working loose.

Loose wedges are driven into a mortise that goes crossways through a protruding tenon. Loose wedges are not glued or fastened, so they must be oriented so that gravity and/or friction will

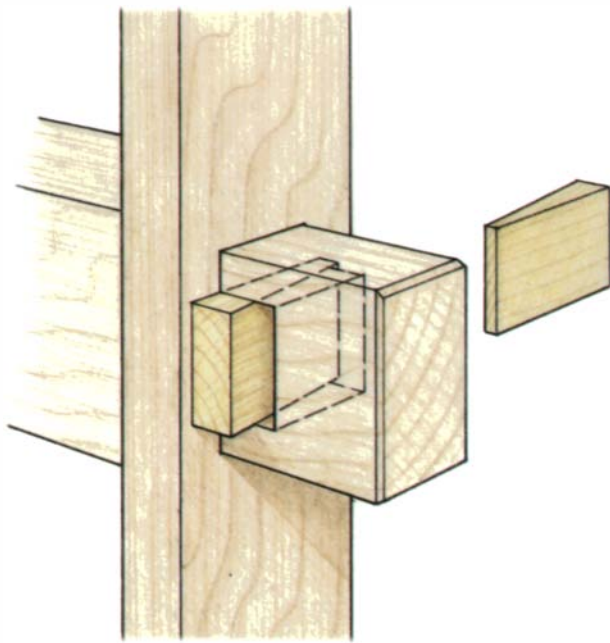
keep them in place. They are used for two reasons: to create a knockdown joint and for decorative effect.

Wedges and grain alignment

Whichever wedge type you choose for your project, you must take into account grain direction. The hard-and-fast rule is that a wedge must be oriented in the mortise so that it applies pressure against the grain, not across it. As young Abraham Lincoln demonstrated in his famous fence-building project, pressure applied across the grain splits the wood. In the case of fixed wedges, this fact of life will determine whether you need a single wedge or double wedges (see the drawings on the facing page).

A single fixed wedge

It's worth spilling some extra ink about this first type of wedge, as it will illustrate many of the general principles for all wedged joints. For example, for any of these wedged joints, start with a carefully fitted, square mortise and tenon. For a fixed wedge (or



DOUBLE LOOSE WEDGES

wedges), leave the tenon just a little long, so it protrudes from the mortise $\frac{1}{4}$ in. or so.

The magic angle is 5°—The most important thing to know about wedges, fixed or loose, is to cut them at an angle of 5° or less. In this range, friction alone will hold the wedge to the tenon. Also, if the two halves of the tenon are bent too far by a thick fixed wedge, they will be weakened at the base, thus weakening the joint.

Of course, wedges driven into the end grain of a tenon will be subjected to pressure (from racking forces and seasonal expansion and contraction) that would overwhelm friction alone, which is why the bond should be strengthened with glue.

Angle the mortise and slot the tenon—I like to cut a flare into the mortise to accommodate the wedging action, creating a dovetail of sorts and locking the joint. But often it is quite acceptable not to angle the mortise. In this case, just use a thinner wedge—cut closer to 2° or 3°—to increase the pressure against the sides of an already snug mortise.

A 5° angle works well for single fixed wedges, spreading each half of the tenon outward $2\frac{1}{2}^\circ$ (see the drawing on p. 50). The top of the mortise wall should be angled on each side to accommodate the wedging action. This offset is laid out on the edges of the mortise, on the outside face of the workpiece.

To chop the angled mortise wall, first pare away the edge of the mortise, steadily creeping back toward the scribe line and down toward the bottom edge of the mortise. The goal is to reach the line and the bottom edge at the same time with a straight surface in between. Use the edge of the chisel to check the cut for flatness.

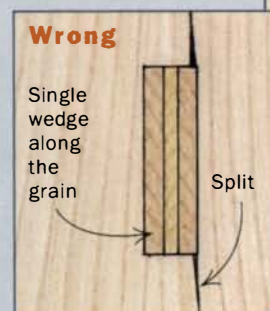
Next you'll want to saw a thin kerf in the tenon to receive the wedge. A handsaw leaves the right size slot. But before sawing this slot, drill a hole a little larger than the kerf through the tenon where the base of the slot should end up: about $\frac{1}{8}$ in. from the tenon's

Orient wedges to avoid splitting

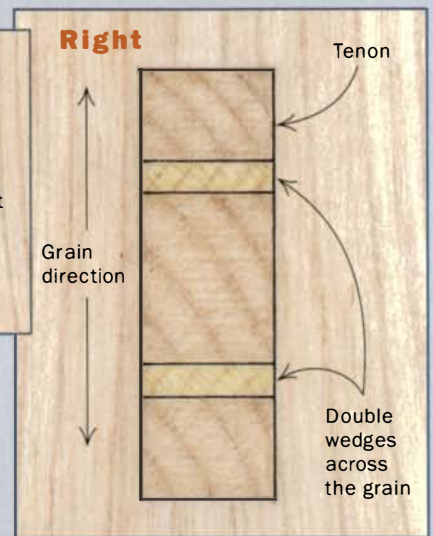


A wedge must push the tenon against the end grain of the mortised piece to avoid splitting the wood. So the orientation of the tenon—along the grain or across the grain—determines the number and orientation of the wedges.

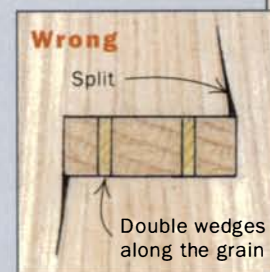
TENONS ALONG THE GRAIN



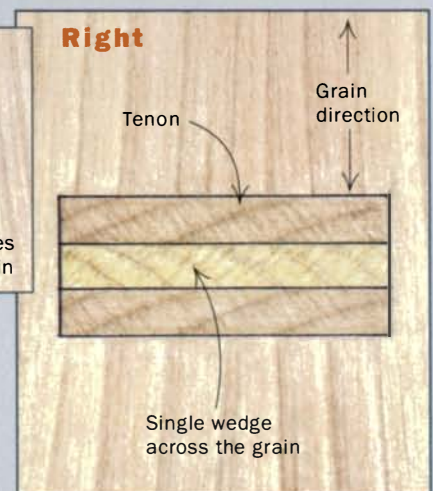
If the tenon is in line with the grain, a double wedge is called for. A single wedge set across the middle of this tenon would split the mortised piece.



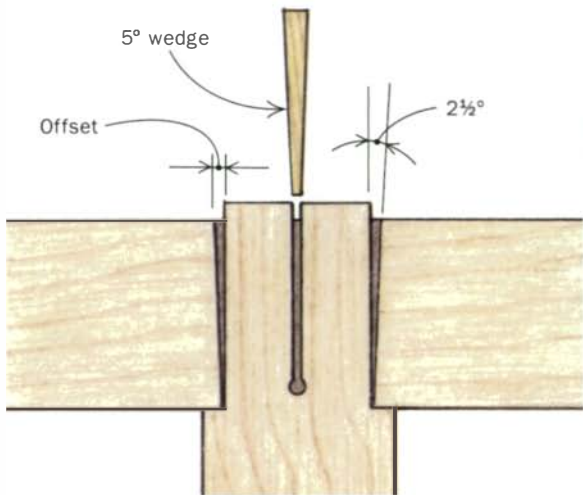
TENONS ACROSS THE GRAIN



For a tenon across the grain, a single wedge is needed. Double wedges would force the grain to crack or split.



FIXED WEDGES ARE GLUED IN PLACE



ANGLE THE MORTISE



Lay out the offset of the angled mortise. After determining the offset at the top of the mortise, scribe lines to indicate where the angled cuts begin (above). Work steadily back toward the scribe line (right) and down toward the bottom edge of the mortise.



SINGLE FIXED WEDGE

A 5° wedge requires each face of the mortise to be angled at 2½°. Draw a cross section of the joint to determine the amount of offset at the top of the mortise.

PREPARE THE TENON FOR WEDGING



Drill a hole to prevent the tenon from splitting. Clamp the workpiece vertically in a handscrew. Then drill a hole through the width of the tenon.



Saw a kerf down to the hole. A hand-saw leaves an appropriately narrow kerf in the tenon.



A trick for a clean, flush joint. To prevent tearout when planing a tenon flush, score a line around the base of the tenon.

shoulder. This hole helps prevent the tenon from splitting beyond the slot when the wedge is driven in.

Wedge basics—When choosing the wood for a fixed wedge, avoid very soft species such as pine, basswood or redwood. Instead, steer toward species such as yellow poplar, maple and elm, which will stand up to hard pounding without splitting. Use

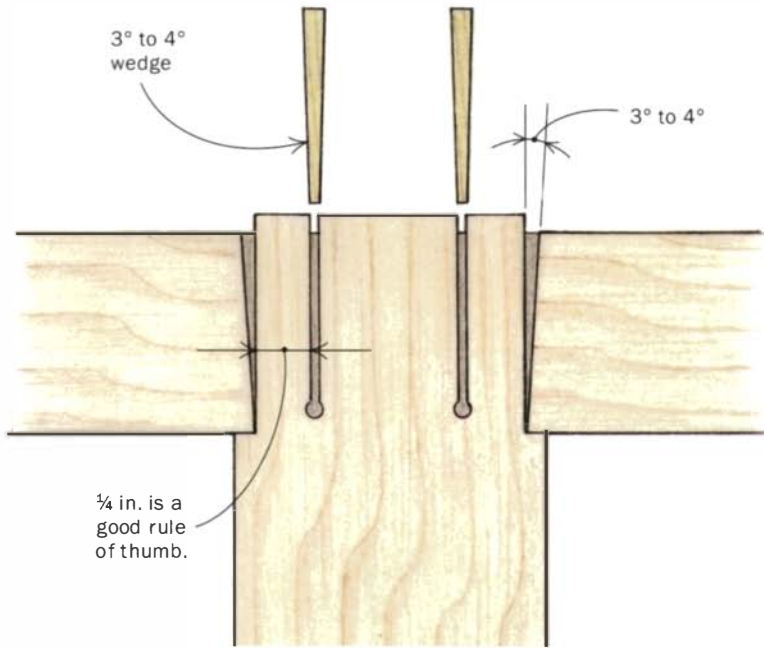
straight-grained wood for the same reason. If you use an oily wood like ebony, clean it thoroughly with acetone immediately prior to gluing.

Cut the wedge exactly as wide as the tenon. Then lay out the appropriate wedge angle and saw it any way you like. Handplane it if the cut is rough. The thickness of the wedge will be determined by where you crosscut it. To allow for the wood to compress slightly, you should add a bit to the overall thickness. There is an easy way to do this: Square off the bottom of the wedge at a point where it is a hair (roughly ½ in.) thicker than the sawkerf.

Sharpen the squared edge to a point to make it easier to start in

Watch it on the web

To see a video on wedging a tenon, go to www.finewoodworking.com.



DOUBLE FIXED WEDGES

Each wedge in a double array displaces its end of the tenon by the full thickness of the wedge.

the slot. Then square off the thick end of the wedge at a point where it will protrude from the top of the tenon.

Driving in a wedge—Assembling and gluing-up fixed-wedge joints can be nerve-wracking. I often clamp the assembly to keep the joint square and tight while the wedges are pounded home.

Do a test-run first, making sure that clamps won't come undone when you start waling away with the hammer. Drive in the wedge slightly to check its fit. Then pull apart the joint and apply glue to all surfaces, including some inside the sawkerf and on both faces of the wedge at its narrow end. Then insert the wedge and drive it in with a hammer. The hammering sound will change when the wedge is home, and you should see the tenon halves press tightly against the walls of the mortise.

If the wedge is wider than the head of the hammer that you're using, protect the wedge head with a block of wood as you drive it home. Be careful to hold the block square as you pound on it. When the glue dries, trim the protruding wedge and tenon flush.

Double fixed wedges

With a few additional considerations, the procedures for single fixed wedges apply to double fixed wedges. Like single wedges, double wedges are used in through-tenons both to add strength and to give a decorative touch, but double wedges are oriented across the tenon, making them much narrower.

I use a 3° or 4° angle for double wedges, which is the same amount the tenon sections will bend and the mortise wall will be angled (see the drawing above).

Basically, the wedges go in near the ends of the tenon. But ex-



Angle the ends of the mortise. The layout and chopping techniques are the same as when angling a mortise for a single fixed wedge.

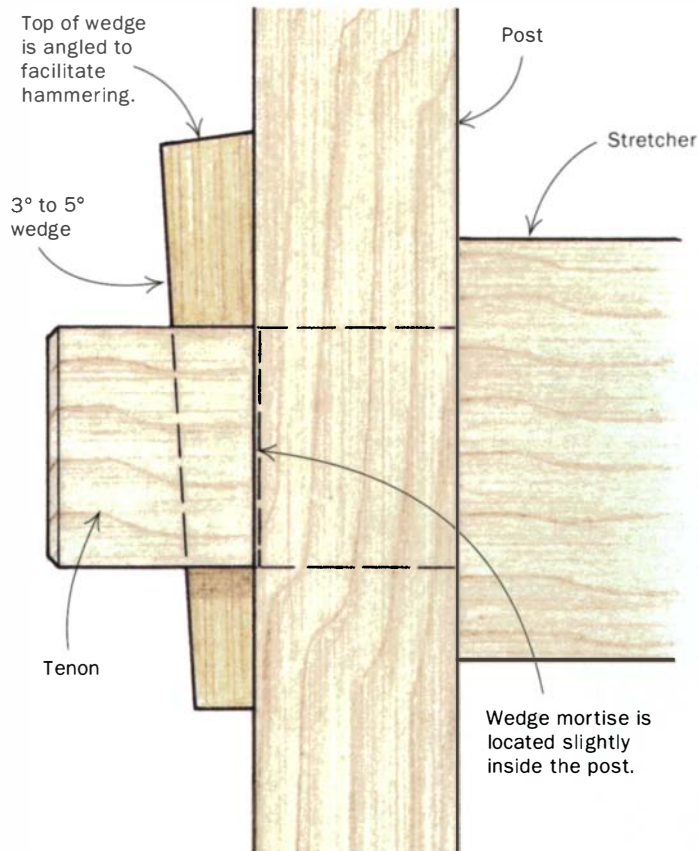


Sometimes clamps are needed. Nessel uses clamps to keep the tenon shoulders snug and square while he drives home the wedges.

LOOSE WEDGES CAN BE DISASSEMBLED

SINGLE LOOSE WEDGE

This wedge should be oriented vertically so that gravity pulls the wedge downward when the joint wiggles, tightening it. One side of the wedge mortise is angled to match the wedge.

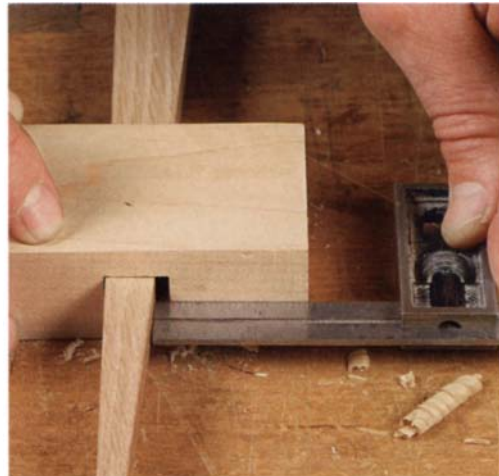
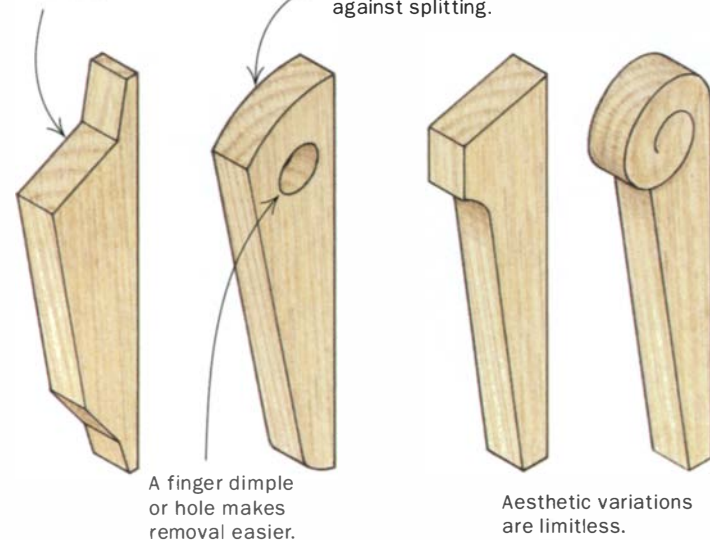


LOOSE WEDGES ADD STYLE

There are many possible variations on the loose wedge, some functional, all decorative.

This wedge protects the post from the blows of a hammer.

A curved top surface protects against splitting.



Another method for laying out the mortise angle.

First chop a square mortise through the tenon and make the wedge stock. Insert the wedge and measure the gap at the loose end. That gap is the same amount that the mortise must be offset to match the wedge angle.



actly where to place them is a factor of how flexible the wood is. They should not be so close to the ends that the bent pieces will be weak at their base, but they should not be so close to the center that the outer pieces won't spread easily. A good rule of thumb is $\frac{1}{4}$ in. from the end of the tenon.

Drive in the wedges equally, each a little at a time. Otherwise, the wedges will look uneven when the tenon is trimmed flush.

Loose wedges can be single or double

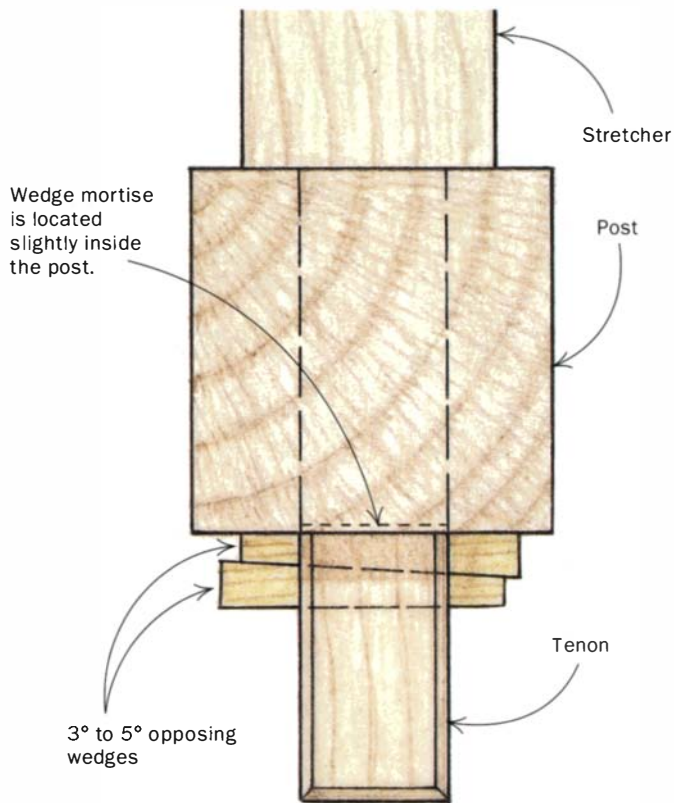
As I said earlier, loose wedges offer a greater decorative effect and a sturdy knockdown joint, suitable for a trestle table, a bed frame or the base of a workbench, among other applications.

Many of the principles that apply to fixed wedges also apply to loose ones. The 5° limit holds true, and the wedging action must apply pressure against the end grain of the mortised piece. However, unlike fixed wedges, which are driven in with the grain of the tenon, loose wedges are driven in perpendicularly to the grain and should be made from wood as hard or harder than the stock that they wedge to minimize compression against the end grain.

Single and double loose wedges are oriented differently. The single loose wedge generally is oriented vertically, allowing gravity to work in its favor. Double loose wedges, on the other hand, are

DOUBLE LOOSE WEDGES

This type is used when the tenon is too tall to hold a long vertical wedge. The wedge mortise is horizontal and is left square because it holds two opposing wedges. Gravity won't tighten the wedges, but the mortise is easier to cut.



Try the fit, looking for gaps. The wedges may need light planing to adjust their fit in the mortise.



Then mark them to length. These wedges will end just inside the edge of the post.

oriented horizontally in a square mortise, wedging against each other. An occasional tap might be necessary to retighten the joint.

The familiar trestle base offers a typical application—connecting the long stretcher to the posts—for either type of loose wedge. A long, shouldered tenon at each end of the stretcher goes through the post, protruding sufficiently from the other side to accommodate a mortise for a wedge or wedges.

Start with a square, snug mortise and tenon, and a square mortise for the loose wedge(s).

Single loose wedge is vertical—Single wedges, with their thick ends sticking up in plain sight, often are stylized for greater decorative effect (see the bottom drawings on the facing page).

For the single wedge, cut a square mortise vertically through the protruding tenon. Then angle the mortise face that is farthest from the post to match the wedge. I usually go with an angle of 3° to 5°. Cutting a taper into the wall of this long, narrow mortise is trickier than tapering the short mortises for fixed wedges, but the technique is the same. Lay out the offset on the wider end of the mortise, and begin removing the corner, working back toward the bottom edge and your layout line. Check the mortise wall often with a small straightedge to make sure you are keeping it straight.

A mortising chisel will work better than a paring chisel, tracking along a straighter line as you chop downward.

It's important to have clean, square corners inside the wedge mortise; otherwise, the wedge will catch and could split the tenon.

Double loose wedges are another solution—If the tenon is just too tall or thin for a long vertical mortise, use double loose wedges oriented horizontally. Double loose wedges work by locking against each other as well as against the mortise. One wedge is inserted from one side and one from the other, and both are driven in until the two angled faces lock. Orientation is horizontal instead of vertical because the bottom wedge would work loose and fall out in a vertical configuration. With each edge of the wedges and the edges of their mortise neatly chamfered, the double wedge makes a useful, strong and attractive joint.

I cut double loose wedges at a similar angle as singles, but I leave them thinner than single wedges when cutting them to length. This way, the two wedges can fit in a smaller, neater-looking mortise. Double wedges also are usually wider than single loose wedges, to offer more friction between their faces. □

John Nessel is a furniture maker in Minneapolis, Minn.

A Slim, Comfortable

This system works for most chairs and uses common materials



An upholstered slip seat complements a beautiful chair. Using modern materials, it's not difficult to construct an elegant seat that will remain comfortable for decades.



In 1979 I spent five months designing and making a prototype dining chair that I hoped would be comfortable for three or four hours at a time. Part of that effort involved creating an upholstered seat that was up to this formidable task but was thin enough that it would not overpower the chair's design. Simply gluing foam to a plywood seat was not only uncomfortable but also had all the grace and style of a muffin top. What resulted was a simple upholstery detail that I have used in a wide variety of chairs ever since, in thicknesses up to 2½ in. And my original seat has held up nicely these 24 years.

Slip seats are an upholstered, padded alternative to solid wood or woven seats, offering greater comfort and a range of looks as endless as the variety of fabrics available. Another advantage is that they can be removed easily for reupholstery. In the past, slip seats were made using traditional upholstery techniques and materials, such as horsehair. I use simple techniques and commonly available, modern materials without compromising the look and feel of a well-made traditional seat.

My slip seat consists of three different densities of foam on a thin plywood platform, which is slotted to allow it to flex and conform to the person using the chair.

Cut slots in the seat platform

I use ¼-in.-thick plywood for the seat platform of dining chairs, while larger chairs that are designed to be used in a living room may have ½-in.-thick platforms. I always use Baltic-birch plywood for seat platforms because it has more laminations than other plywoods and the core is free of voids and quite strong.

Cutting a series of slots front to back on the platform makes it much more flexible and thus comfortable. The slots are ¾ in. wide, approximately 2 in. apart and extend to within 2 in. of the perimeter (see the drawing on the facing page). Then install T-nuts on the top side, which allow the upholstered platform to be attached and removed as needed.

For an inset slip seat like the one shown at left, the platform should come up ⅛ in. short all

Slip Seat

BY MICHAEL FORTUNE

around the inside of the seat frame. Foam and fabric added later will fill the gap.

Build up the foam layers

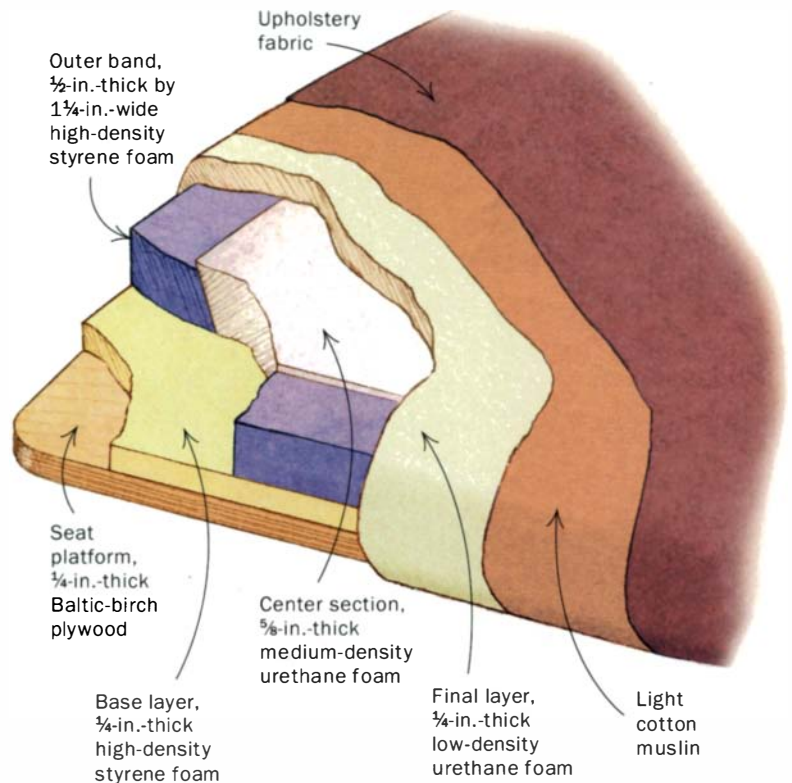
Moving from bottom to top, the foam layers go from high- to low-density (firm to soft). The closed-cell, high-density styrene foam used as the base layer of the seat is sold as sleeping-pad material for camping. It is available at camping-supply stores in thicknesses ranging from $\frac{1}{4}$ in. to $\frac{3}{4}$ in. To attach and laminate the foam pieces, I use spray adhesive, following the directions on the can for a permanent bond.

Put down a base layer of dense foam—Start the upholstery sequence by determining how thick (and comfortable) you want the final upholstered platform to be, then choosing the appropriate thicknesses of foam to get you there. For a dining chair, a final thickness of 1 in. to $1\frac{1}{4}$ in. is appropriate, so I start by attaching a layer of $\frac{1}{4}$ -in.-thick high-density styrene foam to the plywood platform. (The fractional sizes given here are approximate, because the materials I buy in Canada come in metric sizes.) Thicker seats can be made simply by increasing the thickness of this base layer and building up the outer band of firm foam that follows.

Apply the foam oversize, then trim it with a knife, scissors or the bandsaw (fine-tooth blade) so that it is proud of the plywood by $\frac{1}{16}$ in. The next step is easily overlooked (to the embarrassment of the person sitting down in the chair), and that is to provide some

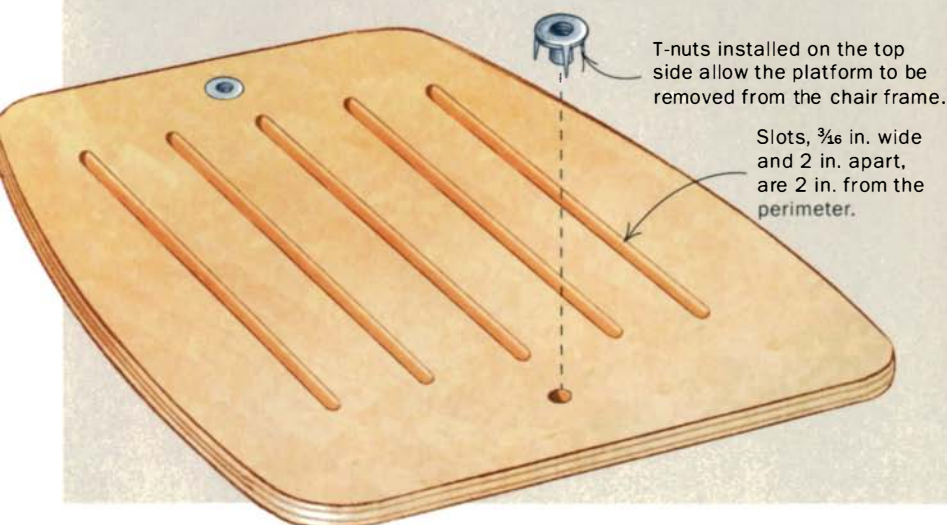
SEAT ANATOMY

This slip seat, made from plywood and a few types of foam and fabric, has a thin, flat profile, yet it's comfortable and durable.



START WITH A FLEXIBLE FOUNDATION

The seat platform starts with $\frac{1}{4}$ -in.-thick Baltic-birch plywood and can be adapted to fit many types of chairs and seat configurations, from versions that overlay the seat frame to platforms that are inset into the seat frame.



Slots add some give to the stiff material. These can be cut a number of ways, but Fortune prefers to use a template-guided router for consistent results.

BUILD UP LAYERS



Punch five holes for air to escape. Align these with the slots in the plywood platform below.



Cut the outer band of foam. Angle the bandsaw table to cut two beveled pieces from a single strip. Apply it flush with the outside edges of the platform, beveling the ends for neat joints.

air vent holes in the foam. Locate the slots in the plywood and, using a ½-in.-dia. hole punch, create five or six vent holes around the surface for air to escape. Without the vent holes, the upholstered insert becomes a whoopee cushion.

Add an outer band of high-density foam—To avoid the rounded, muffin-top look, the next step creates a firm dam around the perimeter of the seat. This is done by attaching a band of high-density foam, about ½ in. thick by roughly 1½ in. wide. If you are unable to find ½-in.-thick material, you can build up layers of thinner material.

It is important to bevel the inside edge of this outer band to ease the transition between the high-density styrene foam and the medium-density urethane foam that will fill the center. Without the bevel, the change in firmness will be too abrupt.

The high-density foam can be cut on the bandsaw with a fine-tooth blade. First, cut strips 2¾ in. wide. Then tilt the table to 45° and rip the strips into equal parts. Attach the front piece first, followed by the sides and finally the back. Bevel the ends of the pieces so that they mate nicely with each other.

Fill the center with urethane foam—The next step involves filling the center with medium-density urethane foam. I get low- and medium-density urethane foam from a local fabric store. For the center section, use urethane foam that is slightly thicker than the dense foam used for the outer band. For a perimeter

thickness of ½ in., for example, I recommend that the urethane foam be ⅝ in. thick.

Cut the foam about ⅜ in. bigger than the opening all the way around and leave the edge square—not at a 45° bevel. Spray adhesive on one side of the urethane foam and on its edges. Then spray the center surface of the seat, including the 45° edge but not the remaining top surface. Attach the square-cut edges of the urethane foam to the 45° edges of the band, working in from the corners. The center of the urethane foam will form a bubble. Press down the bubble into the center area in a uniform manner. There may be small bumps around the edges, but these will be evened out in the next step.

Add one last layer—The next step is to wrap the surface in ¼-in.-thick, low-density urethane foam. Lay the seat platform upside down on a piece of thin urethane foam cut about 2 in. larger all around. Spray the exposed 2-in. band of foam and the edges of the platform, and then lift the foam so that it bonds to the edges, avoiding large wrinkles at the corners. Lay a knife flat on the plywood and trim the excess foam flush to the surface.

Cover the platform

The seat platform should be wrapped with thin, neutral-colored cotton muslin in preparation for the upholstery fabric. The cotton muslin can be stretched lightly with medium effort and stapled to the underside of the platform, followed by the upholstery fabric. A



Start at the corners. Using spray adhesive on all of the mating surfaces, attach the corners of the center section of medium-density foam to the corners of the high-density outer band.



Work in toward the middle of each edge. Be careful to mate each square edge of the center section as smoothly as possible with the beveled edge of the outer band.



Last, press down the center section. Working from the edges toward the center, compress the softer, oversize center section as evenly as possible.

good hand stapler will work, but an air-powered stapler that shoots narrow staples is much easier to use, particularly if you intend to make a lot of upholstered chairs. I use a Haubold stapler with ¼-in.-long wire staples, which tend to drive in completely, holding the fabric firmly.

Care has to be taken to read the upholstery fabric. There may be a pattern that should be kept centered or stripes that should be kept straight. If the fabric has a nap, it should point toward the back of the chair so that the person using the chair is less inclined

to slide out. Use only upholstery fabric to cover a slip seat. Fabric made for clothing or drapery will become threadbare quickly.

The fabric is attached in much the same way that an artist's canvas is stretched onto a frame: Start in the middle, stretching the fabric front to back, and tack down just the center of the front and back edges. Then stretch the fabric side to side and tack down the middle of the side edges. Now work toward the corners, adding a few staples at a time as you move outward. The tension used to stretch the fabric should be equal on all sides. When you reach the

ONE LAST LAYER



First, ease the edges of the dense outer band. This material is easily machined, sliced and sanded.



A final layer of foam smooths the bumps. Lay the seat platform upside down on ¼-in.-thick low-density urethane foam. Apply glue only along the sides of the platform and the exposed foam. Then pull up the foam evenly against the sides, being careful to avoid bumps and gathers.



WRAP IT UP

The first fabric layer is cotton muslin. Stretch the fabric across the middle, from front to back, placing a few staples in the middle of the front and back edges. Then stretch it side to side and attach it the same way.



Work toward the corners, a few staples at a time. When you are near the end of an edge, skip ahead to the corner before doubling back to fill in the staples between. This should help you avoid deep wrinkles.

corners, pull the fabric around tightly, trying to avoid overlaps and wrinkles. Finish off this upholstery job by covering the bottom of the platform with black polyester cloth.

Options for installing the seat

The slip seat can be supported in a number of ways, depending on the application. Most of my chairs have slip seats that are fully or at least partially set into the seat frame. To support these, I glue a plywood ring into the seat frame. It serves two purposes: supporting the seat platform and strengthening the seat frame. Like the seat platform, the thickness of the plywood seat ring is determined by the overall size of the chair. As the seat frame is assembled, the ring is set into a deep groove about $\frac{5}{8}$ in. below the top edge. Then the upholstered platform is squeezed into the space above the ring, hiding the edges of the platform.

An alternative to inseting a slip seat into a seat frame is to let the upholstered platform hang over the front rail of the seat frame. In this case I usually attach a curved wood lip under the front edge of the platform, strengthening it and creating a plush look. If the slip seat must overlay the seat frame, it can be attached to wood blocks that are glued inside the frame.

To attach the seat platform to the wood blocks or plywood ring, you must locate the attachment holes. I cut pieces of $\frac{1}{4}$ -20 threaded rod about $\frac{3}{4}$ in. long and sharpen one end of each by filing it. To mark the location of the platform T-nuts, I thread the sharp bolts into the T-nuts and press down the upholstered platform into position. Then I drill the clearance holes in the seat ring and attach the slip seat with round-head machine screws.

The result is a smooth, seamless, low-profile seat that will remain comfortable for many years. □

Michael Fortune is a studio furniture maker in Toronto, Canada.



Staple the upholstery fabric the same way. The two tabs of white tape indicate the alignment of the stripes.



Last, cover the back with black polyester. Staple it down and trim the excess.

Shop-Built Extension Tables

Side and outfeed tables fold down to save space

BY DWAYNE J. INTVELD

When using a tablesaw to cut a large workpiece or a full sheet of plywood, it's important to provide extra support surfaces for the stock. But like many woodworkers, I don't have enough room in my shop to have extension tables permanently fixed in place. So after I recently added a new fence system to expand the ripping capacity of my tablesaw, I built a side table that readily folds down out of the way when not needed. This foldable table allows easy access to my grinding wheel, which is located adjacent to the tablesaw.

And while I was at it, I replaced my somewhat flimsy portable outfeed roller with a sturdy outfeed table that folds down behind the saw. I have the option of opening

it in two stages, depending on my needs at the time. The first stage provides a 36-in. main outfeed table; the next stage produces a secondary outfeed table that adds about another 30 in. to the main table, handy for extralong stock.

Although the side and outfeed tables enhance the versatility of my tablesaw, the impact on shop space has been minimal. With both tables open, a 4x8 sheet of plywood remains supported throughout the entire cut. Yet, when folded, the tables add little to the footprint of the saw.

A few caveats to consider

Remember that the drawing dimensions are based on building the tables to fit my 10-in. Powermatic 66 tablesaw, which sits on a 2-in.-tall wood frame. The extra couple of inches raises the top of the table to 36 in., a height better suited to my 6-ft. 4-in. frame.

Also, the rip-fence system on my tablesaw is made by Biesemeyer. If you use a different type, unless it's a Biesemeyer clone, you'll likely need to modify the way the tables connect to the saw, especially at the outfeed end.

Finally, because the outfeed table sits just behind the saw when folded up, the table

won't work with a saw that has a motor or any other obstruction sticking out the back. The side table, however, should be adaptable to any saw.

Side table

The side table consists of a tabletop, a connector that joins the tabletop to the saw and a side leg frame that supports the tabletop when it's open.

The table and the connector are made of a maple frame rabbeted to accept ¾-in.-thick particleboard. To create a smoother surface with extra durability, I added plastic laminate to the top face.

To make the leg frame, I cut grooves in 1¼-in.-thick maple rails and stiles to accept a ¼-in.-thick maple plywood panel. For added strength, I glued the panel into the grooves.

Once the leg frame was assembled, I joined it to the outboard end of the tabletop with a piano hinge. When folded, the leg frame ends up neatly housed in the



Foldable outfeed table. Intveld used torsion-box construction to build the outfeed tables, a technique that makes them both light and strong.



tabletop frame, held in place by a pair of double-ball catches.

Although not shown here, I added a 1½-in. square leg between my shop floor and the right end of the Biesemeyer front rail. The leg provides additional support for the rail when the side table is opened. To allow for length adjustment of the leg, I installed a threaded insert in the bottom end of the leg, then I added a carriage bolt with a locking nut into the insert. The length of the leg can be fine-tuned to an uneven floor simply by threading the carriage bolt in or out.

Outfeed table

I built the main and secondary outfeed tables using torsion-box construction, a technique that sandwiches strips of gridwork between thin outer skins. The resulting structure is strong and stiff—

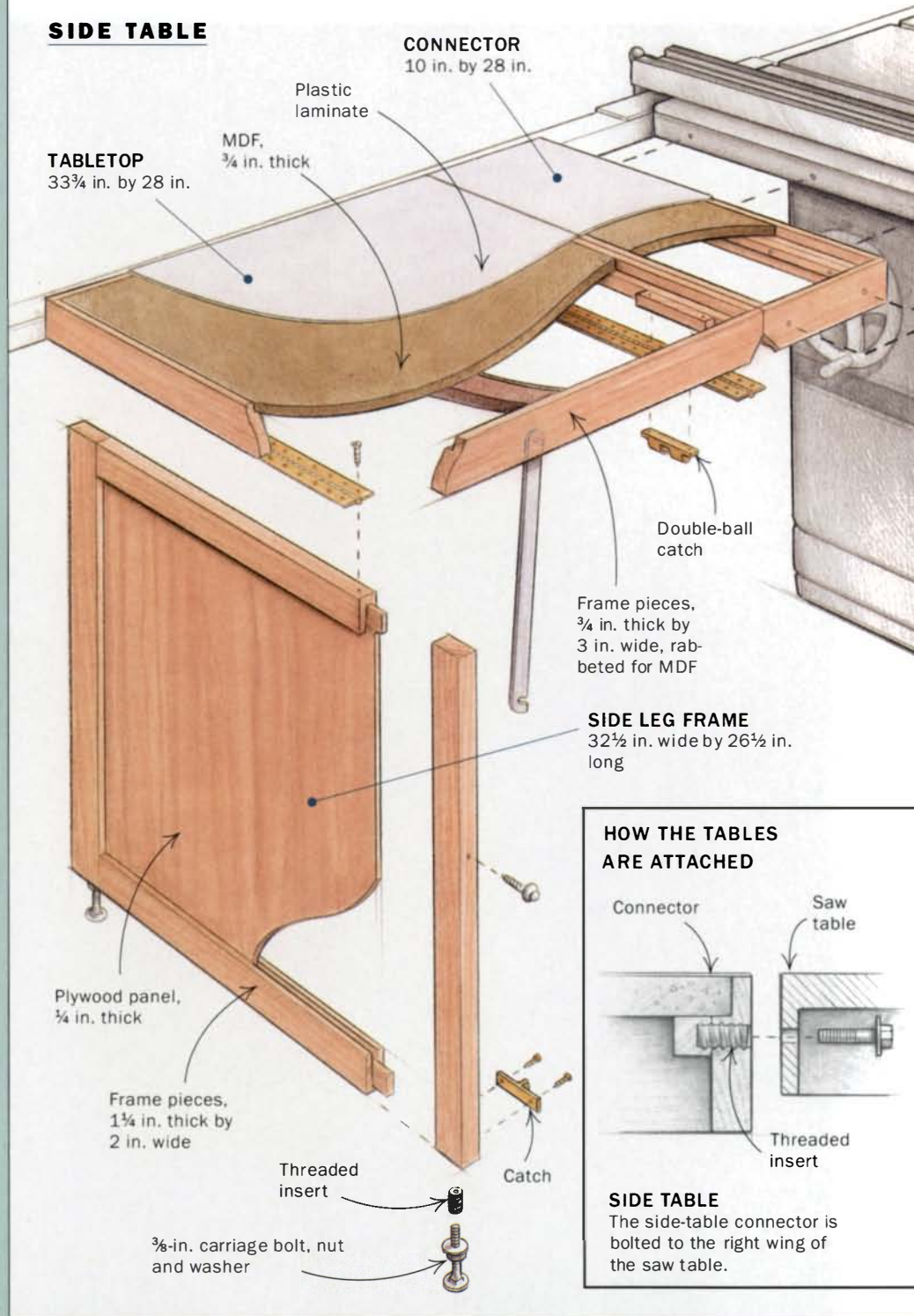


The tables almost disappear. Shop space grows considerably when the extension tables fold down.

much like a honeycomb—yet it's relatively lightweight.

First I made the four-sided maple frames of the torsion boxes, then I glued one of the ¼-in.-thick medium-density fiberboard (MDF) skins to each frame. I then filled these shallow boxes with strips of ¾-in. by ¾-in. pine, half-lapped and glued to the MDF. On the main tabletop, the grid includes two wider strips. These wide strips align with the two miter-gauge slots on the tablesaw when the tabletop is mounted to the saw. The wider stock allowed me to rout a pair of grooves in the top to provide clearance for the miter-gauge bar.

Once the gridwork was in place, I was ready to add the second skin to the top of the boxes. First, a coat of glue was applied

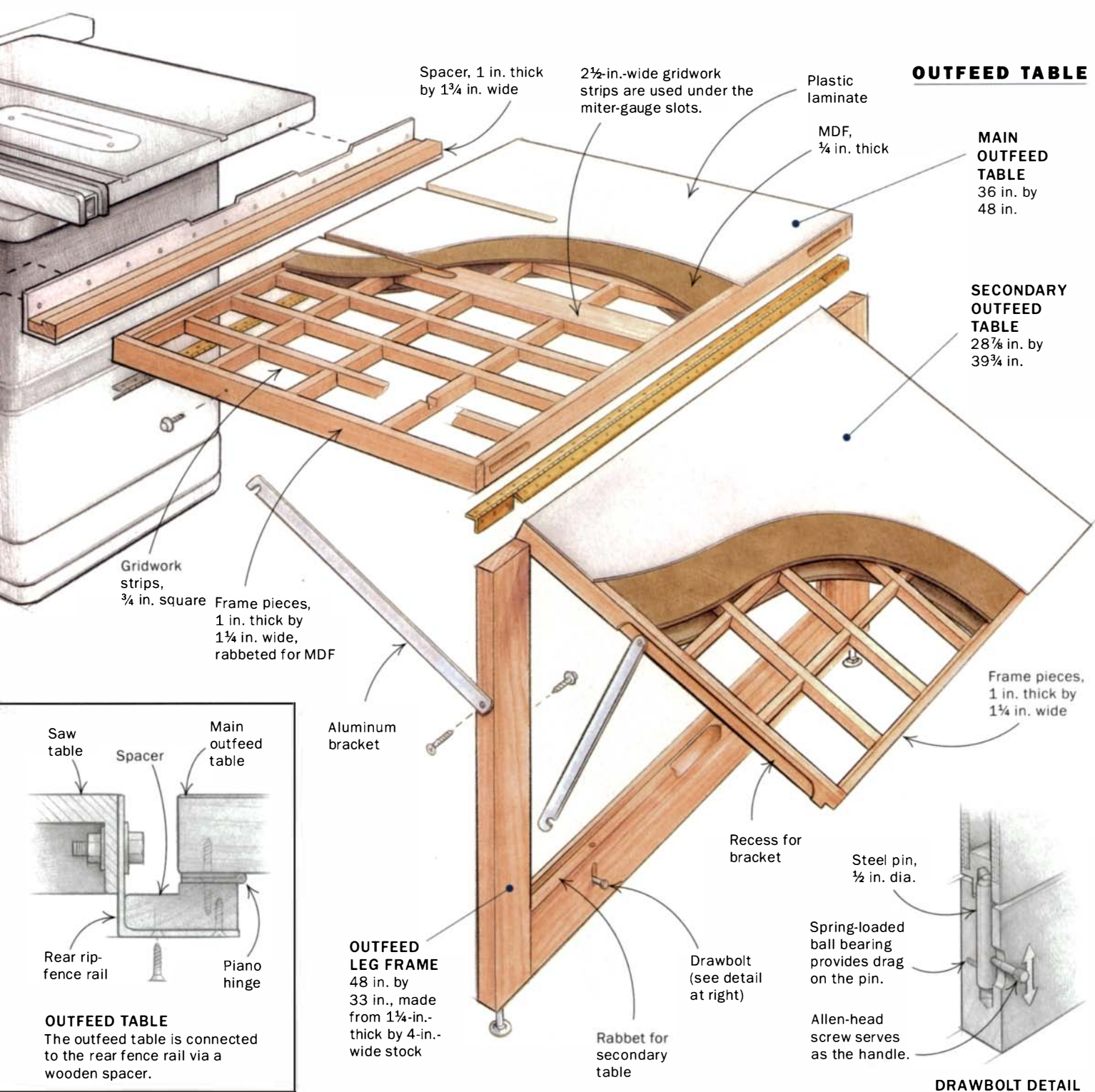


to all box and gridwork surfaces that would mate with the skin. I put the skin on top, then added a few bricks, which provided all the clamping pressure I needed. After that, I applied plastic laminate to both faces of each tabletop.

Outfeed leg frame adds support—The outfeed leg frame is made up of a single rail mortised into a pair of stiles. A piano hinge serves as the remaining side of the

frame, and it provides a means to mount the leg frame to the main outfeed table.

The secondary outfeed table nests inside the leg frame, mounted to the same hinge. But to allow the top to pivot independently of the leg frame, I cut one leaf of the hinge in two places, with the cuts made just inside the edges of the stiles. By the way, two ½-in. rabbets—one on the rail and one on the secondary table—work together to create a simple stop.



A pair of drawbolts keeps the leg frame and secondary table together as a single unit while swinging to an opened or closed position. I couldn't find drawbolts that suited my needs, so I ended up making my own.

Fill gap with a spacer—The outfeed table is supported by the rear rail of the Biesemeyer fence. I shortened the rear rail's length to 45 in. so that it attached only to the table of the saw and the connector

piece for the side table. Also, I enlarged the holes used to mount the rail to the saw. The larger holes gave me wiggle room to fine-tune the height of the table.

A spacer, made from maple, was added to the rear rail to elevate the outfeed table so that it ends up flush with the saw table. The lengthwise rabbet in the spacer provides clearance for the bolts that secure the rail to the saw. To attach the spacer, I bored 3/16-in.-dia. holes, spaced 8 in. apart, through

the rail. Then I screwed the spacer to the rail with #12 roundhead wood screws.

At this point, I applied varnish to all exposed maple surfaces. Then I adjusted the carriage-bolt feet to get everything level. After that, and probably for the first time ever, I actually looked forward to cutting a full sheet of plywood. □

Dwayne J. Intveld is an engineering manager living in Hazel Green, Wis.

Scratch Stocks

Use these handmade tools
to shape small details on furniture

BY ROB MILLARD

They don't have to be pretty. These are some of the scratch stocks Millard has made using scraps of wood for the handles and bandsaw blades or old scrapers for the cutting blanks.

The scratch stock is a simple tool with an impressive ability to dress up furniture with distinctive decorative elements that are exactly the right shape and size. I made my first scratch stock years ago from a piece of oak scrap, and I've made a number of others since then. My shopmade tools aren't as fancy as some commercially available beading tools, but they work, which is all that I require of them.

With scratch stocks, you can shape a wide range of moldings in both straight and curved work. The tool does have some limitations, though. Being slow, a scratch stock is not the right tool for a large run of molding. Also, it's hard to start or stop a scratch stock in the middle of a board (leaving you with some handwork); nor does it work as well across the grain or on softwoods. A scratch stock is best suited for smaller shapes, but with a closely matched

handle you can create some fairly wide moldings. Another approach is to use several different cutters, in stages, to obtain a surprisingly complex molding.

Start with a basic scratch stock for beads

The simplest scratch stock I make is an L-shaped piece of oak with a bandsaw kerf cut into it and two screws for clamping the cutter in place. I chamfer the guide edges of the handle to facilitate using it on concave curves with a tight radius. I make the cutters from old cabinet-scraper blades or used bandsaw blades. I first apply layout fluid (the metal dye that some people call bluing) to the cutter blank. I use a machinist's carbide-tipped scriber to draw the profile and then begin filing to those lines using coarse files. Don't allow too much of the cutter to protrude above the vise; otherwise, it will



BEADS



FLUTES AND REEDS



WIDE MOLDINGS

flex, causing the file to screech and dull quickly. I finish with fine files, being careful to maintain a square cutting edge.

You can put a slight bevel on your cutter to improve the cutting action. But the bevel limits you to using it in only one direction, taking away one great advantage of the scratch stock—its ability to handle reversing grain. I also hone the faces to remove burrs. For this I use a fine, pocket-size diamond stone. I usually end up having more than one profile on a cutter, and I always keep them for future use. When laying out the cutter profile, the more the blade is supported by the handle, the better the cutter will work.

Use scratch stocks for a variety of shapes

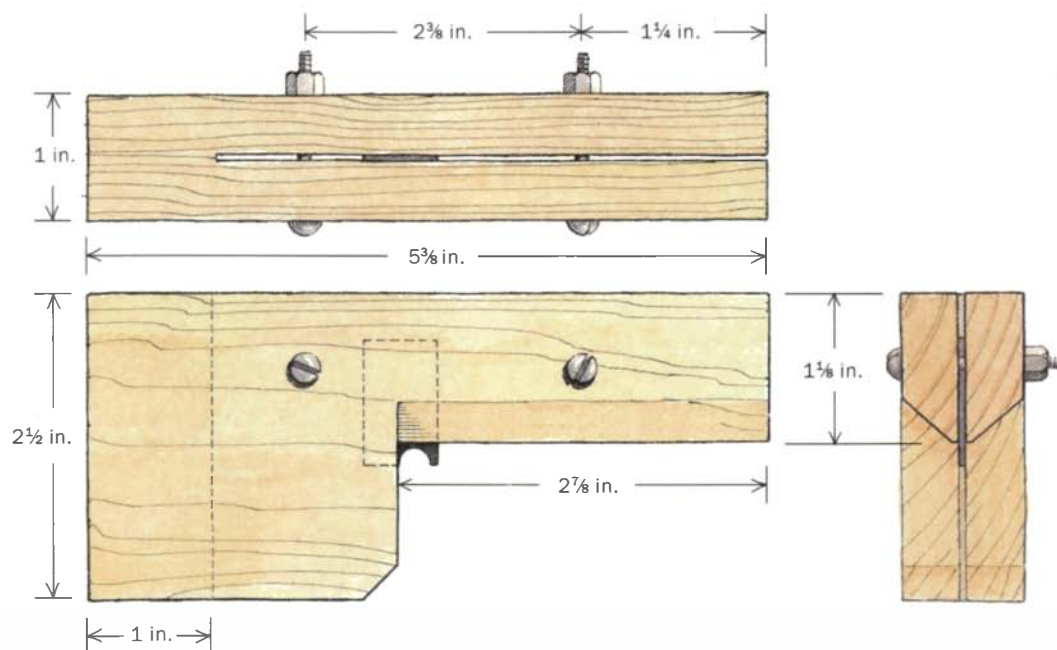
Using a scratch stock couldn't be simpler: Apply light downward pressure as you firmly push the scratch stock forward or draw it

toward you. At first, it helps to tilt the tool slightly in the direction of the cut, but you should make the last pass with it as close to vertical as possible to ensure a uniform profile. When possible, the cutter should be installed so that the handle will act as a stop when the full profile has been reached. Once the cutter starts to dull, it will produce dust as opposed to fine shavings. At that point you'll have to file the edge lightly and hone the face again. If I'm making more than one length of molding, I typically go over each piece one last time with a freshly sharpened cutter. Following that procedure keeps the profiles consistent.

Because I make period furniture, I often have to reproduce moldings that don't correspond to profiles available in shaper or router bits, or that I don't have an appropriate molding plane for. I remove the bulk of the waste from a given profile using a router,

A BASIC SCRATCH STOCK FOR BEADING

An L-shaped body works well to make simple beads. The cutter is placed right into the corner, where the two wood edges stabilize the blade for a clean, consistent cut. The long edge is chamfered, so the cutter can be tilted to start the shaping.



Narrow bandsaw kerf is just right. Split the body of the scratch stock down the middle but stop the cut 1 in. shy of the end. The cutters are pinched in the kerf and held in place with two machine screws and nuts.

MAKING A SCRATCH-STOCK CUTTER

You can make cutters using scrap metal from card scrapers and old bandsaw or hacksaw blades.

1 Add some color to the steel cutting blank. Layout fluid (also called bluing) makes it easier to see scratch marks that define the shape of the cutting edge.



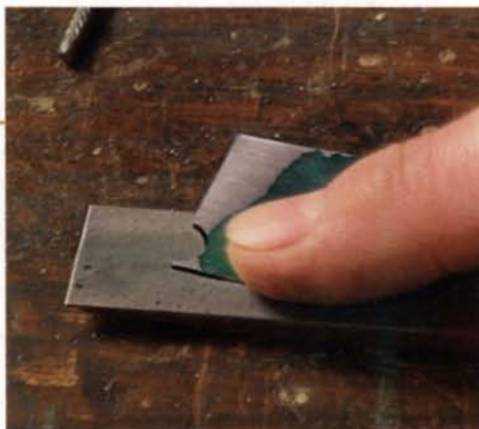
2 Drafting templates come in handy. Scribe shapes on the cutting blanks using a machinist's scriber.



3 Start with coarse files. Remove metal waste quickly with a coarse file, then improve the cutting edge with a finer tool.



4 Hone the blank to remove any burrs. A pocket-size diamond stone is ideal for sharpening small cutting blanks.



then refine the profile with a scratch stock. For me, this has the added benefit of giving a handmade look to the molding.

With extremely careful use, the scratch stock can produce moldings that rival those made by machine, and in some cases surpass them, because a steel scratch-stock cutter can be filed to a much finer point than carbide tools. Also, the variety of shapes that you can make is virtually limitless.

Applied cock beads—For making applied cock beads, I use two different methods. One is to work the bead on a piece of wide stock and rip it off, and the other is to clamp the scratch stock in a vise and pull a piece of material already cut to thickness over the cutter. This second method is also the one I use for cock beads that are applied to curved work. Here again, you must be careful of the cutting direction to avoid tearout.

Reeds—My favorite use for the scratch stock is to cut reeds in turned Sheraton legs (see the photos on the facing page). This makes quick work of reeded legs, as long as the profile of the leg is a gentle taper. (A more bulbous turning requires carving the reeds by hand with a chisel because of the dramatic change in its radius.) I made a wood fixture from plywood and lumber scraps that I clamp to the bed of my lathe. The fixture acts as a guide for a scratch stock to keep it running down the centerline of the leg and more or less parallel to the taper of the leg. By using the indexing feature of the lathe, I can quickly shape the required number of 12 reeds. The ends of each reed still need to be carved by hand, and the profiles refined with chisels and a scraper.

Flutes and coves—Fluted columns can be made with the same setup, but the process requires more care because more of the cutter protrudes from the handle, as it also does on large coves, which causes the tool to chatter. If the flutes don't run all the way through the tops and bottoms of columns, you are left with a considerable amount of hand-carving to do. But for period furniture the result is still visually superior to router-cut flutes and coves. With a scratch stock, you're limited to fairly small cuts ($\frac{1}{4}$ in. or $\frac{5}{16}$ in.) because of the

TWO OPTIONS FOR APPLIED BEADS



Move the scratch stock against the workpiece. Make the cut in multiple passes, with light downward pressure as you go. On the final few passes, hold the blade as vertically as possible. Rip the bead from the stock.

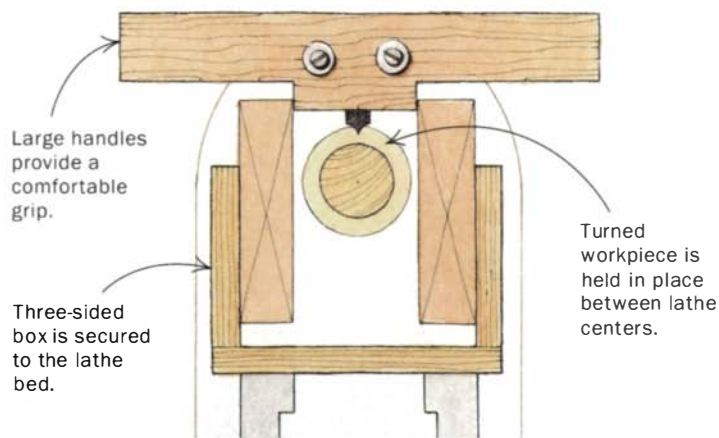


Move the workpiece against the cutter. With the scratch stock clamped in a vise, make multiple passes. This method works well for delicate workpieces, such as cock beads that will be applied to curved surfaces.



SCRATCH STOCK FOR REEDS AND FLUTES

Millard reeds a leg by mounting an open-ended, three-sided box on the lathe bed. The handle of his scratch-stock beading tool fits within the box and rides along the top edge of the open end. This setup allows him to control the cut better and make reeds that run straight along their length.



Some additional handwork is often necessary. Transitional areas, such as where these reeds start and stop at the top and bottom of the legs, often require additional shaping with chisels and scrapers.

flexing of the cutter, unless you construct a shaped handle that provides more support.

Curved work—For use on curved work, I install the cutter in the scratch stock so that I use the short side of the handle as the driver, to lessen the tendency to rotate the tool too much when turning around a curve. With curved work, the grain changes directions continuously, so you'll have to pay close attention to the direction in which you push the cutter so that you get the best finished surface. And even then, at the areas where the direction changes, you will probably need to refine the shape of the scratch cut with carving tools.

Complex moldings—With a properly made handle, you can work a molding up to at least 1½ in. wide, after removing much of the waste with a series of rabbets using a router, a shaper or a dado set on the tablesaw. The handle should at least roughly

follow the shape of the molding profile, leaving about ¼ in. to ⅜ in. of the cutter exposed. You also can make the profile in stages—much as you would work a complex molding with a series of router bits. The limitation here is that you must have two edges that you can use to guide the scratch stock accurately. □

Rob Millard builds one-of-a-kind reproduction furniture in his garage shop in Dayton, Ohio.



WIDE MOLDINGS

Scratch stocks work best when removing only small amounts of wood. For larger or more complex moldings (such as the cove shown here), Millard often uses molding planes or small routers first, following with an appropriately shaped scratch-stock cutter to scrape the surface clean.



Attaching Tabletops

Six methods to control and direct wood movement

BY MARIO RODRIGUEZ

Attaching a top to its base is a critical aspect of table design and construction. Regardless of the method you choose, it should meet the following criteria: The top must be firmly attached to the base; the top must remain flat; a solid-wood top must be allowed to move seasonally; the attachment method shouldn't compromise the design of the table or complicate its construction. I'll describe six ways of attaching a tabletop that meet these requirements, along with the reasoning behind each method.

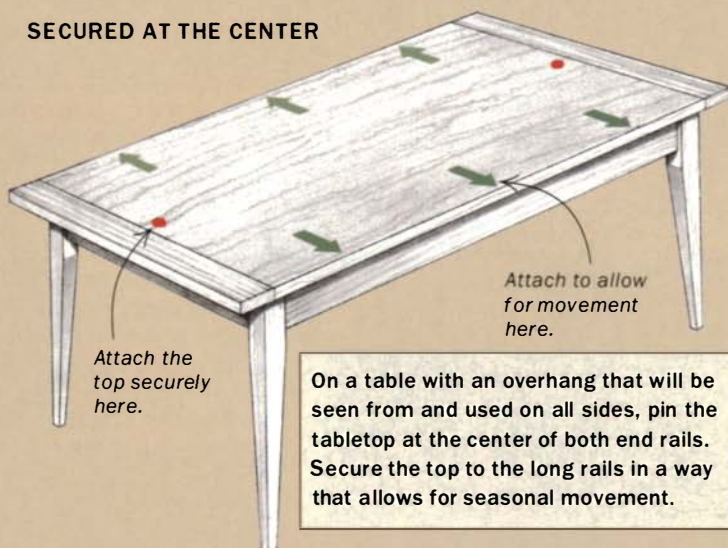
The most important factor to consider when deciding how to attach a tabletop is wood movement. We all know that solid wood

Mario Rodriguez is a contributing editor.

Controlling wood movement

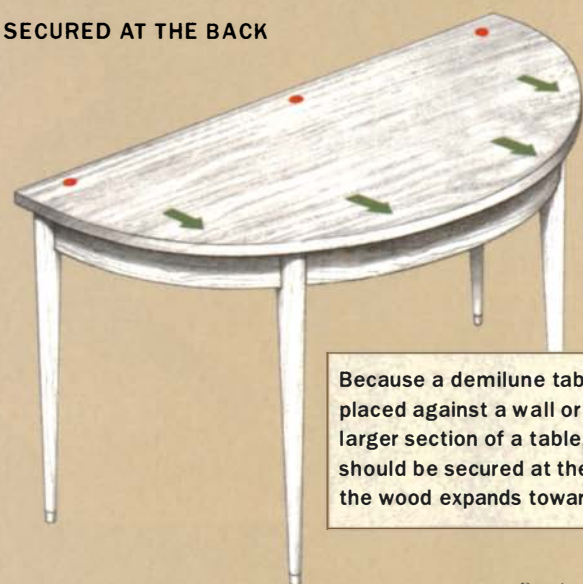
While you cannot prevent a solid-wood tabletop from moving seasonally, you can direct this movement so that it doesn't disrupt the looks or the use of the table. Below are examples of how to secure the tabletop to the frame to control expansion and contraction.

SECURED AT THE CENTER



On a table with an overhang that will be seen from and used on all sides, pin the tabletop at the center of both end rails. Secure the top to the long rails in a way that allows for seasonal movement.

SECURED AT THE BACK



Because a demilune table often is placed against a wall or locked to a larger section of a table, the top should be secured at the rear so the wood expands toward the front.

moves seasonally across the grain. It's a fact; you can't do anything to stop it. In the summer, a board will expand across its width because of an increase in humidity. During cold months, the same board will shrink and become narrower. If no allowance is made to control or direct this seasonal movement, a tabletop might buckle, or worse, crack and split.

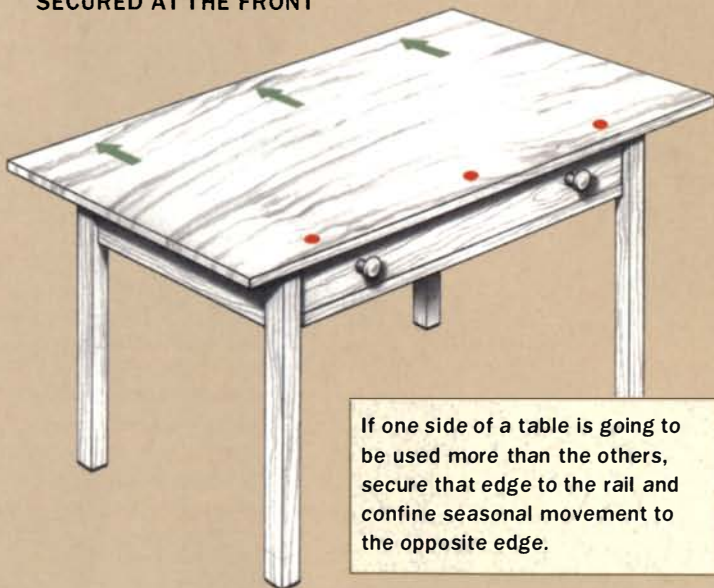
When calculating how much a board will move, I usually allow from 1/8 in. to 3/16 in. for every 12 in. of width. Therefore, I would anticipate that a 42-in.-wide tabletop might move about 1/2 in. overall. This is only a general guide, and certain factors must be taken into account. For instance, in parts of the country with low humidity, wood movement might be minimal.

Another factor is the type of wood you're using: Cherry moves less than white oak but more than mahogany, while flatsawn wood moves more than quartersawn. For more on this subject, read *Understanding Wood* by R. Bruce Hoadley (The Taunton Press, 2000).

Once you accept that the tabletop will move, you can control or direct this movement so that it doesn't disrupt how the table works or looks (see the drawings below). For a freestanding table with a uniform overhang, I anchor the top to the base at the center of the end rails. That way, any cross-grain movement will occur evenly along each long-grain side. On a demilune (half-round) table, I pin the back edge of the top, which typically is placed against a wall. Conversely, on a writing table I might fix the top along the front of the table so that movement occurs toward the rear.

For this article, I have illustrated six methods of securing a tabletop (right and pp. 68-71). The methods are listed by ease of installation, starting with the simplest. The hardware for two of the methods can be purchased relatively cheaply from hardware catalogs, while the rest can be made from shop scrap. This is a low-budget process.

SECURED AT THE FRONT



If one side of a table is going to be used more than the others, secure that edge to the rail and confine seasonal movement to the opposite edge.

POCKET HOLES



This method is probably the oldest way of attaching a tabletop. It involves drilling into the rail a 1/2-in. flat-bottomed pocket hole at a 10° angle. Then a smaller pilot hole (to accommodate the shank of a #8 wood

screw) is drilled into the center of the pocket hole.

Common on antique furniture, pocket holes make no allowance for wood movement, which may explain the number of cracked and split tabletops. On small solid-wood tops (up to 9 in.) or veneered plywood tops, pocket holes can be the only attachment method. On larger pieces, they should be limited to areas needing movement restricted.



Pocket-hole jig. Construct a small jig to hold the rail at approximately 10° while drilling pocket holes with a Forstner bit.



A hole in the pocket. Drill a smaller-diameter pilot hole for the screw that will be driven into the tabletop.



METAL TABLE CLIPS

These clips, also known as S-shaped clips or simply as tabletop fasteners, are probably the easiest and quickest method for attaching tabletops. They fit into a groove or slot cut on the inside face of a rail.

The easiest method is to cut the grooves in the rails on the tablesaw. The grooves must be cut before the base is assembled.

The clips are installed after the base has been assembled. Place one end of the clip into the groove and screw the other end into the underside of the tabletop. Because the groove runs the length of the rail, any number of clips can be used. This method nicely accommodates any cross-grain wood movement whether the clips are parallel or perpendicular to the tabletop's grain: The clips on the end rails move along the groove as the wood moves, while the clips on the front and back rails move in and out of the groove.

An alternate way to install the clips is to cut slots in the rails using a biscuit joiner. This method removes less wood from the rails, and it has the added advantage of being doable after the base of the table has been glued up.



Grooves or slots. The clips are installed in grooves cut on the tablesaw or in slots cut with a biscuit joiner.



Secure but free to move. Driving the screws too tight will prevent the wood from moving and defeat the purpose of using the clips.



FLAT TWIN-CIRCLE CLIPS

Also known as a desktop or figure-eight clip, this unobtrusive fastener requires only a shallow flat-bottomed recess in the top edge of the rail. The diameter of the recess should accommodate that of the clip, but the recess should be drilled to place the center of the clip past the edge of the rail. This location will let the clip pivot slightly, allowing for cross-grain wood movement.

For large tabletops, you can increase the clip's ability to move side to side by chiseling away a little of the rail on both sides of the clip. However, because the clips do not handle wood movement perpendicular to the rail very well, they are best confined to end rails. Like the metal table clips (above), these fasteners should be relegated to casual, day-to-day furniture pieces.



Precision drilling. The recess for twin-circle, or figure-eight, clips, should be close to the inside edge of the rail to allow for movement.

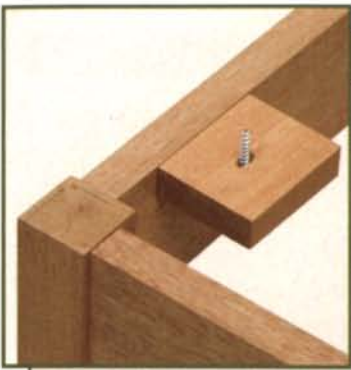


Attached to the rail. The twin-circle clips can be screwed to the rail either before or after the base has been assembled. Check that the clips are free to move.



Attached to the tabletop. These fasteners are best fitted to either small tables or to the ends of large tables. They do not allow for much wood movement when fitted perpendicular to the grain of the tabletop.

SIMPLE WOODEN BLOCKS



These wooden blocks are either glued or screwed to the inside of the rail and screwed to the tabletop. This type of fastener offers the advantage of using shop scrap that matches the piece.

The blocks need to be tailored to each location around the rails: Blocks at the center of each end rail can have just a single screw hole because there is no wood movement here, and they can keep the top centered on the rail. Blocks at the extremity of each

end rail will require a slot that runs parallel to the rail, while those attached to the front and rear rails will have slots perpendicular to these rails. In all cases, ensure that the blocks are designed so that the long grain—not the end grain—is glued to the rails.

Two methods work well when gluing the blocks to the rails: With the table base the right way up, glue and clamp the blocks using a straightedge to ensure that the block tops are level. The other method is to lay the base upside down on a flat surface covered with wax paper and then rub the glued blocks onto the apron until they stick tight. When the glue has dried, tear off any paper that has stuck to the wood.

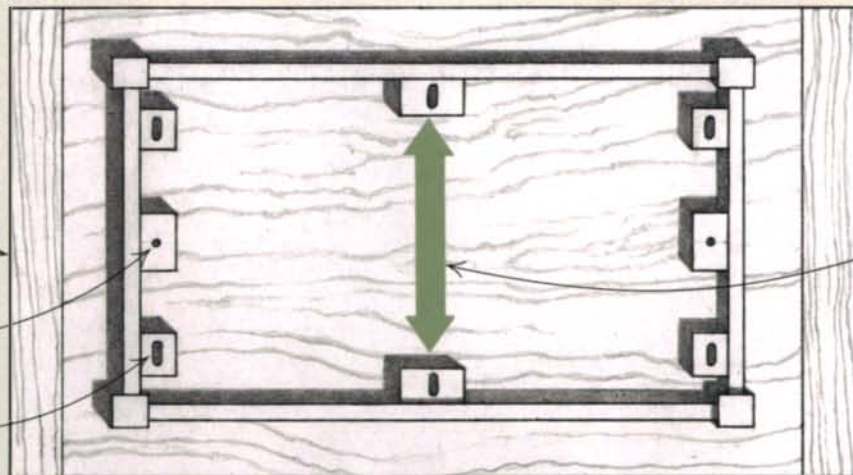
SCREW SLOTS ALLOW FOR MOVEMENT

The position of the block relative to the rail dictates whether the block has a round screw hole to prevent wood movement or a slot to allow the top to move seasonally.

Tabletop →

Block is secured to prevent wood movement.

Block is slotted to allow wood movement.



Direction of the top's expansion



Attaching the block. With the rail sitting on a flat surface covered with wax paper, rub the glued block on the rail until it adheres. When the glue has dried, remove any paper that has stuck to the wood.

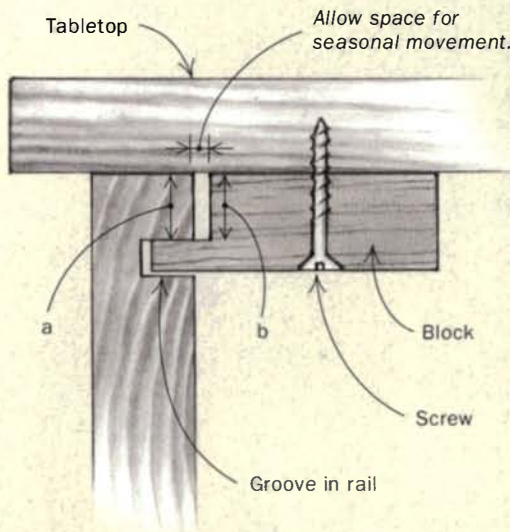
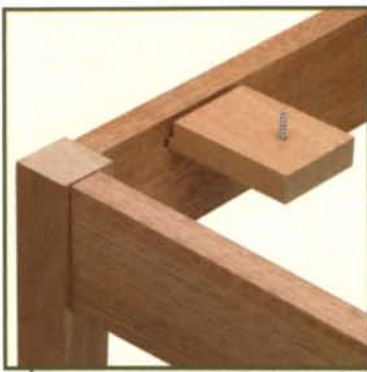


Room at the corner. Near the corner of the end rail, the block needs to have a slotted hole parallel to the rail. Make sure that the long grain, not the end grain, of the block is glued to the rail.

TONGUE-AND-GROOVE BLOCKS

This type of fastener is made from project leftovers. These blocks are attached to the tabletop with screws and have projecting tongues that engage corresponding grooves cut into the rails. The rail grooves are slightly larger than the width of the blocks, allowing for movement and preventing the tabletop from splitting.

By carefully laying out the placement of the blocks and milling properly sized grooves, a more tailored and carefully crafted appearance is achieved. The best way to cut the grooves is with a router guided by a fence bearing on the rail. Properly spaced, tongue-and-groove blocks work very well for all sizes of tabletops.



Make sure that the distance (a) is fractionally greater than (b) to ensure that the tabletop is tightly attached to the frame but still free to move.



Two blocks in three cuts. Make a cut about $\frac{3}{8}$ in. deep in each end of a piece of wood. Next, cut perpendicular to the first cut to remove a small block of waste. The push block prevents the waste block from being thrown back when it is cut from the workpiece. Last, cut the piece of wood in half to produce two tongue-and-groove blocks.

Cut the groove. Select a straight bit slightly wider than the tongue of the block and, using a guide fence, rout a series of grooves in the rails.



Attach the blocks. The tongues of the blocks engage with the grooves in the rails. Then the blocks are screwed to the tabletop.

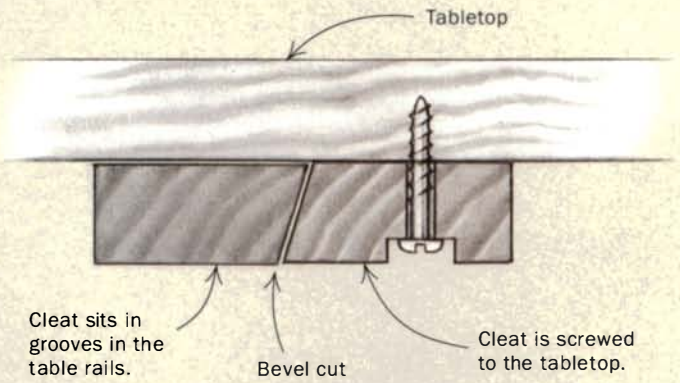




BEVELED CLEATS

This attachment method provides a clean appearance. First, rip a 3-in.-wide hardwood strip with the tablesaw blade tilted to a 15° angle. Then cut tenons on both ends of one piece and rout matching grooves in the side rails.

When the table base has been assembled, the tenoned cleat is inserted but not glued into both rails. Make sure that the wider side of the angled cut is placed against the tabletop. With the base positioned on the upside-down tabletop, take the other section of wood that was ripped, crosscut it slightly shorter than the distance between the rails, and place it next to the other cleat. Screw it to the tabletop using a single hole in the middle and slots near the ends of the cleat to allow for wood movement. On small tables, the top is attached at each end, but for tables more than 48 in. long, a third center support is necessary.



The tenoned half is attached to the rails, and the second half is screwed to the top. The bevel creates resistance to the top being lifted.



One cut makes two cleats. Select a piece of wood 3 in. wide and a little longer than the end rails of the table. With the blade at a 15° angle, rip the board in half.



Tenons slide in to the grooves. One cleat sits in grooves in the side rails. The wide side of the board should be against the tabletop.



Meeting on the bevel. Slide the second cleat against the first one and screw it to the tabletop. The center screw can be fixed, but screws closer to the edges should be in slotted holes to allow for wood movement.

Watch it on the web

For a video on making beveled cleats, go to www.finewoodworking.com.

Small Stand is a Lesson in Curves

Cut joinery first, then saw the curves

BY STEPHEN HAMMER

One way to add interest to a case piece is to add a gentle curve to the front plane. I wanted to explore this element of furniture making while attending a 12-week class at the Center for Furniture Craftsmanship in Rockport, Maine, so I designed and built this cherry cabinet, finding ways to curve the door and drawers that did not require steam-bending or veneering. The drawer fronts and the door frame are sawn out of thicker stock, and the door panel is coopered to match that curve—methods well-suited to the average small shop.

Arriving at a final design for a piece of furniture is often a laborious task. However, a few preliminary steps made this process easier and more successful. First, small thumbnail sketches allowed me to visualize the overall form quickly and easily. The thumbnails led me to a curved-body design with an overhanging top. Next, I drew the cabinet at quarter scale, where I set the top height at 35 in., then determined the width of the piece.

The appearance of this cabinet depended upon the leg shape being correct. I based the leg shape on the classical column, which curves slightly inward, starting one-third up the column height. Called an entasis, this narrowing is meant to keep the eye from thinking that the column is concave—an optical



A CASE BOTTOM THAT STAYS PUT

Double stub tenons and tongue-and-groove joinery will keep the bottom panel flat and stable.



First, rout the mortises and grooves in the side assembly. Move the router in the proper direction, and the cutting force will keep it pressed against its guide.



Cut the tenons on the bottom panel. Transfer their layout directly from the mortised side assembly. Make the cheek and end cuts, then saw out the waste.



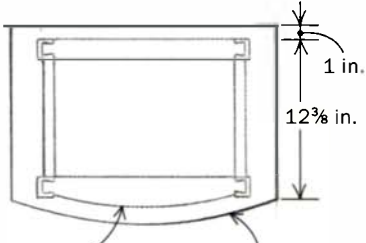
Rout between the tenons to form the wide tongue. Carefully mark the starting and stopping points on the router-table fence.



Test-fit the joinery. Trim the joints as necessary to eliminate any gaps between the panels.

CURVED-FRONT STAND

The stand is cherry, with book-matched, solid-wood panels.



Radius of drawer, door, top stretcher and bottom panel, 30 3/4 in.

Radius of top, 31 1/8 in.

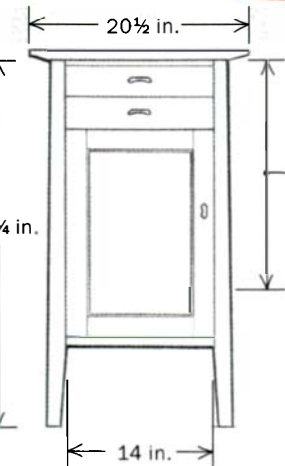
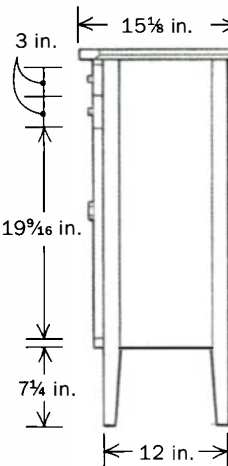
Top front stretcher, 5/16 in. thick by 2 3/8 in. wide

Tongue, 3/4 in. thick by 3/8 in. long

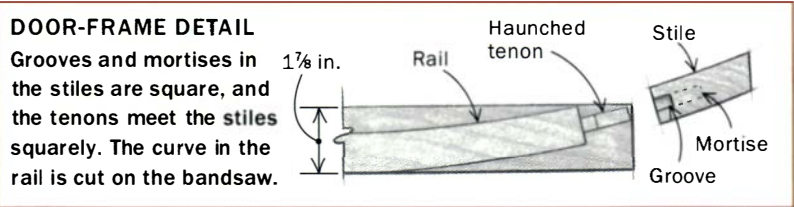
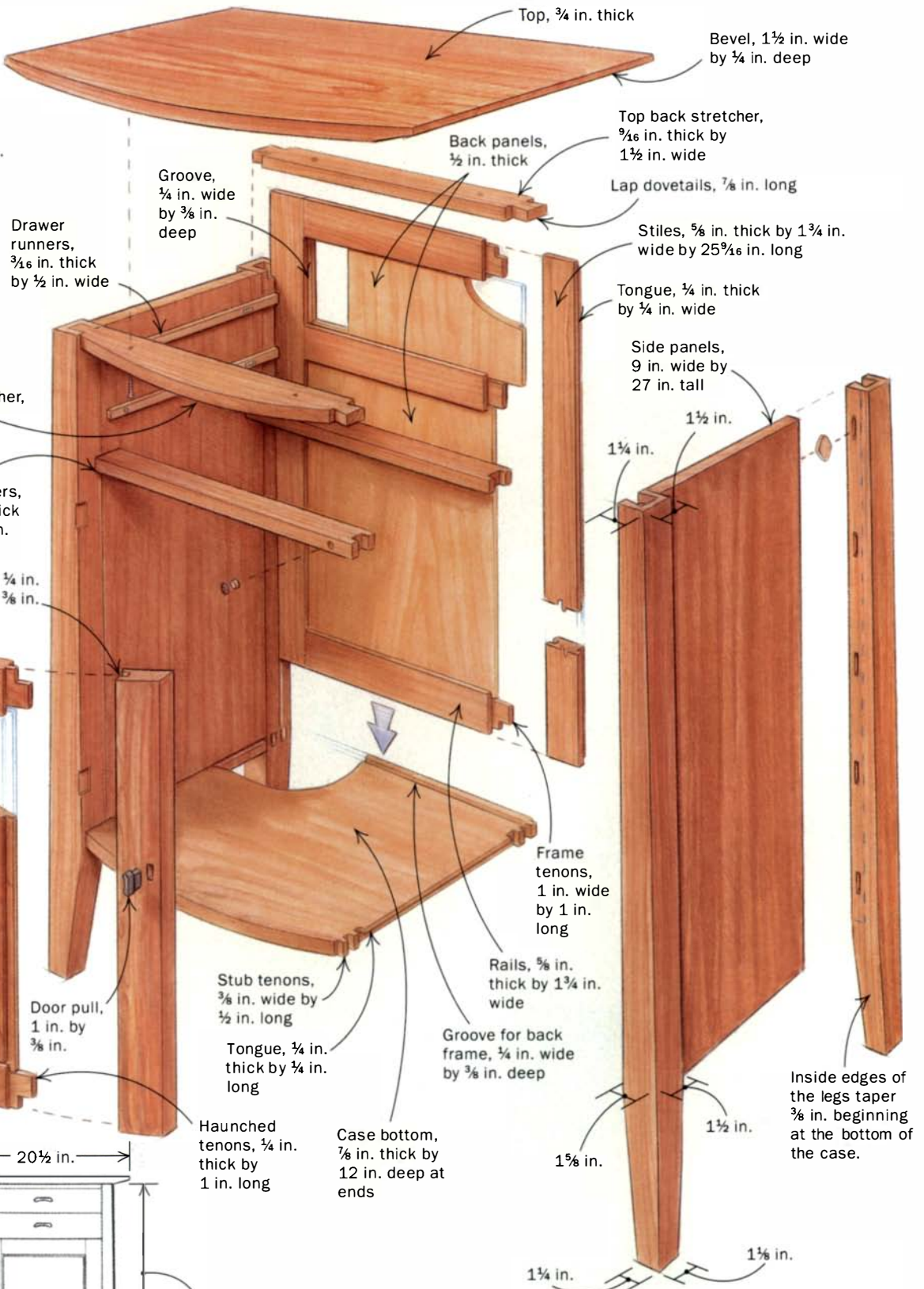
Reveal, 1/8 in.

Door panel, 1/2 in. thick

Rails and stiles, 3/4 in. thick by 2 in. wide



Outside of legs curve inward 3/8 in. beginning 11 in. from the bottom.



DOOR-FRAME DETAIL
Grooves and mortises in the stiles are square, and the tenons meet the stiles squarely. The curve in the rail is cut on the bandsaw.

CURVED DRAWER FRONTS



TEMPLATE FOR THE FRONT CURVE

The drawer fronts, the door, the top front stretcher and the bottom panel all share the same curve. Use a piece of template stock long enough to contain the curve's center point.



Make a simple curve-cutting jig with a stick clamped to the saw table and a screw driven through the pivot point. The blade should be buried about halfway into the stick. Pivoting the workpiece delivers a smooth, uniform curve.

illusion that happens when a column's sides are parallel.

A piece often changes when you take it off paper and put it into three dimensions. To work out the leg details, I made a full-scale mock-up in poplar, filling in the rest of the cabinet with cardboard cutouts. I curved the outside of the legs gently to the top, reducing the overall thickness by $\frac{3}{8}$ in. The bottom inside edges of the legs taper toward the floor, starting from the case bottom. I tried different door and drawer dimensions by drawing them onto the cardboard.

It may seem like a lot of extra work to build a mock-up, but the process saves time during construction because you can focus on building the piece instead of revising its design. Also, you can refer to the mock-up for dimensions. My final step was a full-scale drawing to work out the joinery details.

Choose wood carefully and then build the case

The case consists of two solid sides joined to the legs, a solid bottom and a frame-and-

Cut half-blind dovetails from square stock before curving the front on the bandsaw.

panel back. (The grain of the top, sides and bottom runs in the same direction, so it will expand and contract together.) The front door is a curved frame and panel, and the two drawers are side-hung.

I often buy $12/4$ or larger lumber and resaw everything I need out of a few planks to get consistent grain and color. When milling the stock, leave it $\frac{1}{8}$ in. oversize in width and thickness and 1 in. oversize in length, then stack and sticker the pieces for about a week so that air can circulate around them. If the boards move during that time, there still will be enough wood left to correct slight cupping or twisting.

Begin construction of the case by assembling the sides. I used biscuits to register the panel flush to the legs on the inside plane of the cabinet. Before the panel and legs are glued up, shape the legs on the bandsaw and smooth the curves and tapers with a handplane and scraper. Use double-faced tape to mate the legs for



First, lay out the curve. This will determine how deep the dovetails can go.



Cut all of the tails, then transfer the layout to the drawer front. Clamp the drawer front flush with the benchtop.



Cut the front curve on the bandsaw. Cut right to the line, then smooth the curve with a block plane and sandpaper.

shaping on the bandsaw, and then clamp them together for the handwork.

Before the sides were glued up, I put a handplaned surface on all parts. I also prefinished as much as possible before glue-up. Prefinishing makes glue cleanup easier and protects the surfaces. I recently have begun using Tried & True Varnish Oil for all of my work. It is pleasant to work with and safe for kitchen pieces.

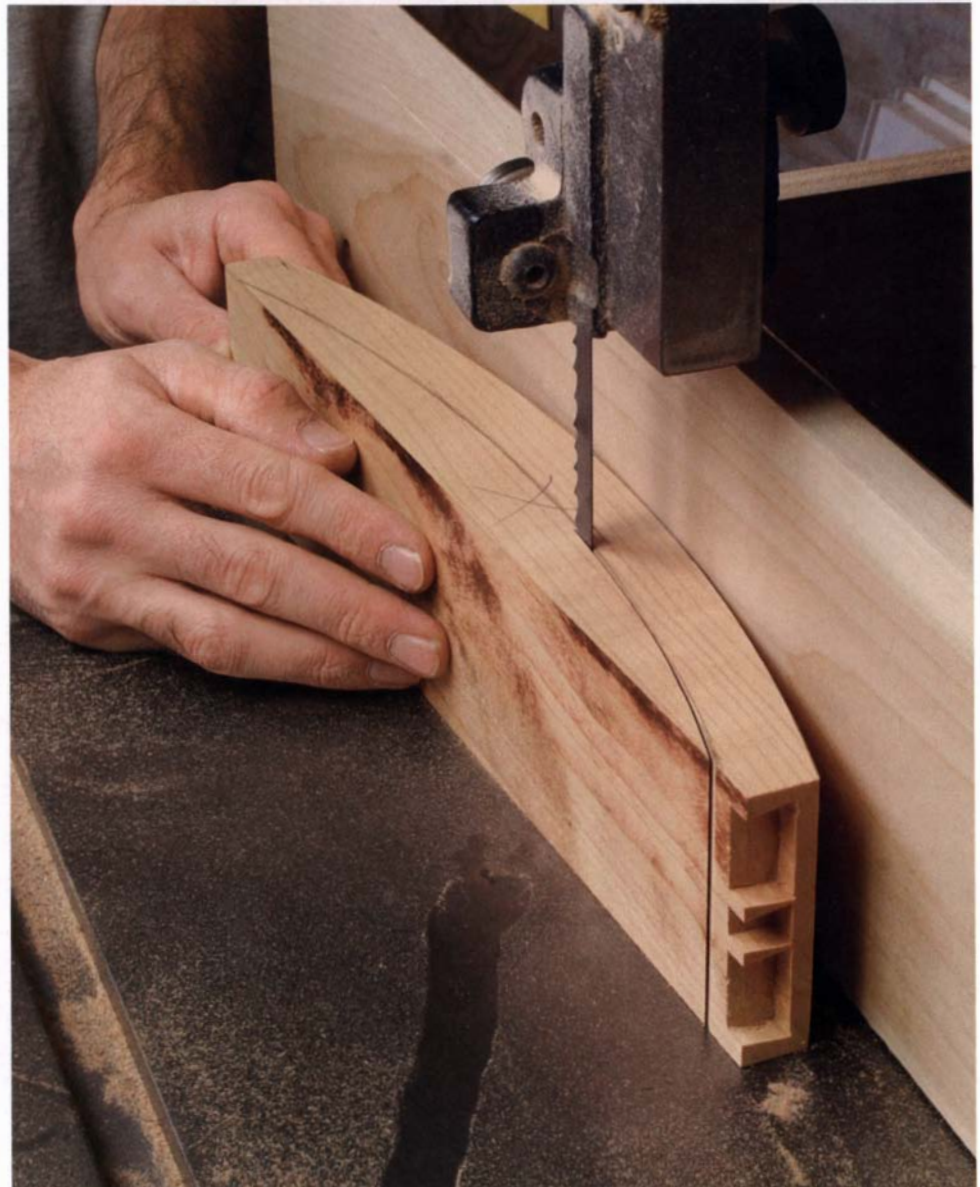
Joinery is next—Once the side panels have been glued up, do all of the joinery for the case. Two stretchers dovetailed to the tops of the legs anchor the top to the case. The front stretcher is curved with the front plane of the cabinet.

First, cut the dovetails on the ends of the stretchers. Then transfer their shapes to the legs using a sharp knife. I used a plunge router freehand to rough out the sockets in the legs, getting close to the line and then finishing with a chisel.

The bottom stretchers and the case bottom are joined to the legs with double mortise and tenons. This strong joint helps counteract the racking forces that can weaken a cabinet over time. The case bottom is joined to the side panels with a wide tongue and groove to counteract warping.

The bottom stretchers are not needed to support the side-hung drawers, but they stiffen up the cabinet. The front one also acts as a doorstop, so it is set back from the front plane of the cabinet and holds a rare-earth magnet that acts as a catch for the door. The door also receives a magnet.

Use a plunge router fitted with an edge guide and a 1/4-in. up-cutting spiral bit to cut



An easy way to cut the inside curve. Lay out the desired curve. Then ride the rip fence as shown to follow that curve, creating a consistent thickness. Use the offcut as a sanding block.

A COOPERED DOOR PANEL



1. MAKE A CLAMPING FORM AND MARK OUT THE STAVES

Coopering is a way to create a curved, book-matched panel from solid stock. After assembling a clamping form based on the curve template, lay out the overall width of the curved panel, then divide the arc into six even sections.

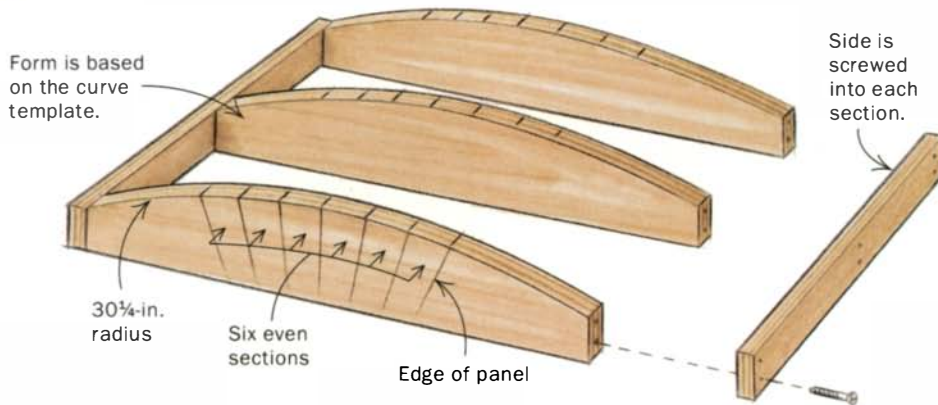


Figure out sections and angles right on the form. Use a center divider to draw lines straight down from each division.

all of the mortises. The fronts of the legs can be used as square reference surfaces for the edge guide.

Nothing ruins work faster than a router gone awry, so move the router in the direction that keeps the fence pulled tightly against the leg. Plunge-cut the front and back of each mortise, then remove the center material. Finally, take a pass through the entire mortise to clean up the sides.

Next, cut 1/4-in. grooves into the bottom

of the side panels to accommodate the tongue on the case bottom.

With the mortises and grooves complete, it is time to cut and fit all of the double tenons and tongues. First, use a marking knife to transfer the measurements for the tenons directly from the mortises. Cut and dry-fit all of the joinery. If any of the shoulders are not tight, use a chisel to pare them back, angling the shoulder inward so just its edge meets the mating piece.

Finally, shape the front edge of the bottom panel to the 30 3/4-in. radius of the cab-

inet's front plane. I made a template first, large enough to hold the center point.

Make the back and assemble the cabinet

Before the case can be assembled, you must make the frame-and-panel back, cut a tongue around its outside edge and cut a groove for it in the back of the case—in the bottom, in the legs and in the stretcher. Another option would be to forgo the tongue and glue the back into a simple rabbet in the back of the case.



A curved door frame

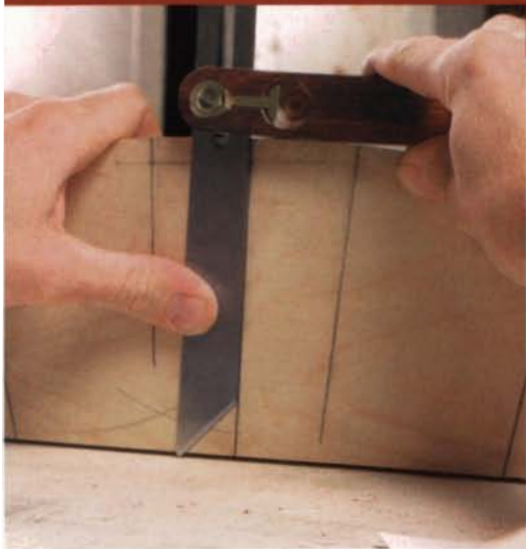
Because the stiles are basically square, cutting their grooves and mortises is straightforward. But the curved rails—with angled tenons and a groove that follows the curve—are trickier.



Cut the tenons on the rails while the stock is square. Make the cheek cuts first (left), then make the shoulder cuts (above).



Curved fence to rout a curved groove. After cutting and smoothing the curves in the rails, use the curve template to make a curved fence for the router table. Keep the workpiece steady on the table as you slide it along the fence.



Use a sliding bevel to find the angle for jointing and ripping the staves. Balance the tool on the center of a section as shown to find the angle.

During glue-up, assemble everything but the back panel and the top back stretcher. Then you can slide in the back panel and glue the stretcher in place on top of it.

For the back panel, I resawed a board to create a book-match, and then I crosscut the panel to form top and bottom sections. I used mortise-and-tenon joinery for the frame. Rabbet the edges of the panels to fit a groove in the frame, but leave a 1/8-in. gap all the way around for expansion and contraction. It also makes an attractive shadow line.

Build the curved-front drawers

The main feature of this cabinet is the curved front. You should start with the drawers, then fit the door once the drawers have been installed.

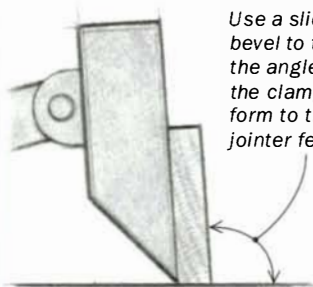
It is important to cut all of the dovetails for the drawers before shaping the curved fronts. It is much easier to lay out and cut dovetails in square parts. I used standard half-blind dovetails in the front and through-dovetails in the back. Mark the curves on the fronts before laying out the half-blinds. This ensures that the tails don't break through when you are shaping the front. I prefer the pins to be very narrow and unequal in their spacing so there is no mistaking that they are hand-cut.

For the half-blind dovetails at the front, mark the pins from the tails with a knife, then use a router freehand to waste out as much of the socket as your nerves can handle before finishing with a chisel. For all



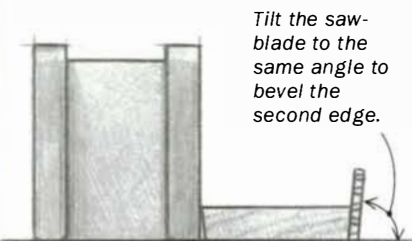
Glue up the panel. Lay the staves on the form to make sure all of the joints close perfectly. Use bar clamps and strap clamps as shown to draw the staves together and down against the form. Use a yellow glue with extended working time.

2. BEVEL AND GLUE THE STAVES



Use a sliding bevel to transfer the angle from the clamping form to the jointer fence.

Joint and rip the staves. First, rip the staves on the bandsaw to minimize waste and preserve the grain match across the panel. Next, bevel one edge of each strip on the jointer (above). Finally, bevel the second edge on the tablesaw (below) to ensure parallel edges.



Tilt the saw blade to the same angle to bevel the second edge.



COOPERED DOOR (continued)

Smooth the panel across the grain. On the outside (right), take off the corners with a block plane until you don't hear or feel any bumping. Then switch to scraper and sandpaper. On the inside (below), a card scraper quickly turns six flats into a smooth curve.



dovetails, I try to do as little paring as possible. It is important to mark accurately, then cut right to the line. By the way, lay out the dovetails so that the groove for the drawer bottom doesn't hit any of the pins.

With the dovetails cut, you can shape the drawer fronts. Rough-cut the shape on the bandsaw, and then finish the work with a handplane and scraper. I like to curve the inside of the drawer front as well for a more refined look, although this means the drawer bottom also must have a curved edge. After laying out the inside curve, use the bandsaw's rip fence to make the cut (see the bottom photo on p. 75). Then use the offcut as a sanding block.

Next, cut the groove in the front and the sides for the drawer bottom using a 1/4-in. bearing-guided slot cutter in the curved drawer front. Cut the drawer back short enough to let the bottom run under it. The grain must run across the width of the drawer so that the bottom can expand toward the back.

The drawers ride on runners that are screwed to the interior of the cabinet, so you'll have to rout grooves into the sides of the drawers. After the drawers have been assembled, use a spacer block to locate the drawer runners. Then use the same spacer

block to set up the tablesaw for a stopped groove in the sides of the drawers. Locate the runner for the bottom drawer first, placing the spacer block on the middle frame member. After that drawer has been hung, use the spacer to measure up from the top of it. For each of the runners, the front screw can be fixed, but the rear screw hole must be slotted to let the case side expand and contract.

Cut the door joinery, then add the curves

As with the drawer fronts, the door curve is shaped after the joinery has been completed. Mill the rails and stiles thick enough to contain the curve, then mark out the curve and mortise-and-tenon joinery. Lay out the tenon shoulders on an angle that will meet the stiles squarely. That way, the edges of the stiles can be square, and its mortises and groove will be easy to cut. The rail is where the joinery gets more complex.

Now you can cut the frame members to rough shape on the bandsaw. The inside and outside of each rail can be shaped and smoothed with the same techniques used on the drawer fronts.

When the curved frame is smooth and even, cut the grooves for the door panel.

Be careful here: You must cut a curved groove in the rails and a straight groove in the stiles, and the grooves must mate precisely at the corners. The groove in the curved rails can be made on the router table, using a curved fence (see the bottom right photo on p. 76).

Coopering the panel—The panel is coopered to fit inside the shaped frame. Using the frame as your pattern, trace the curve on paper and build a simple clamping form (see the drawing on p. 76). The form curves outward, not inward, so you can see if the visible glue joints are coming together properly.

Use the form to determine the size and bevel angle for each piece, or stave. I wanted the panel to be book-matched, so I resawed a board into two thinner pieces and then cut three strips from each. I used a combination of bandsaw, jointer and tablesaw to mill the pieces to size and bevel the edges, minimizing waste to maintain the grain match between them.

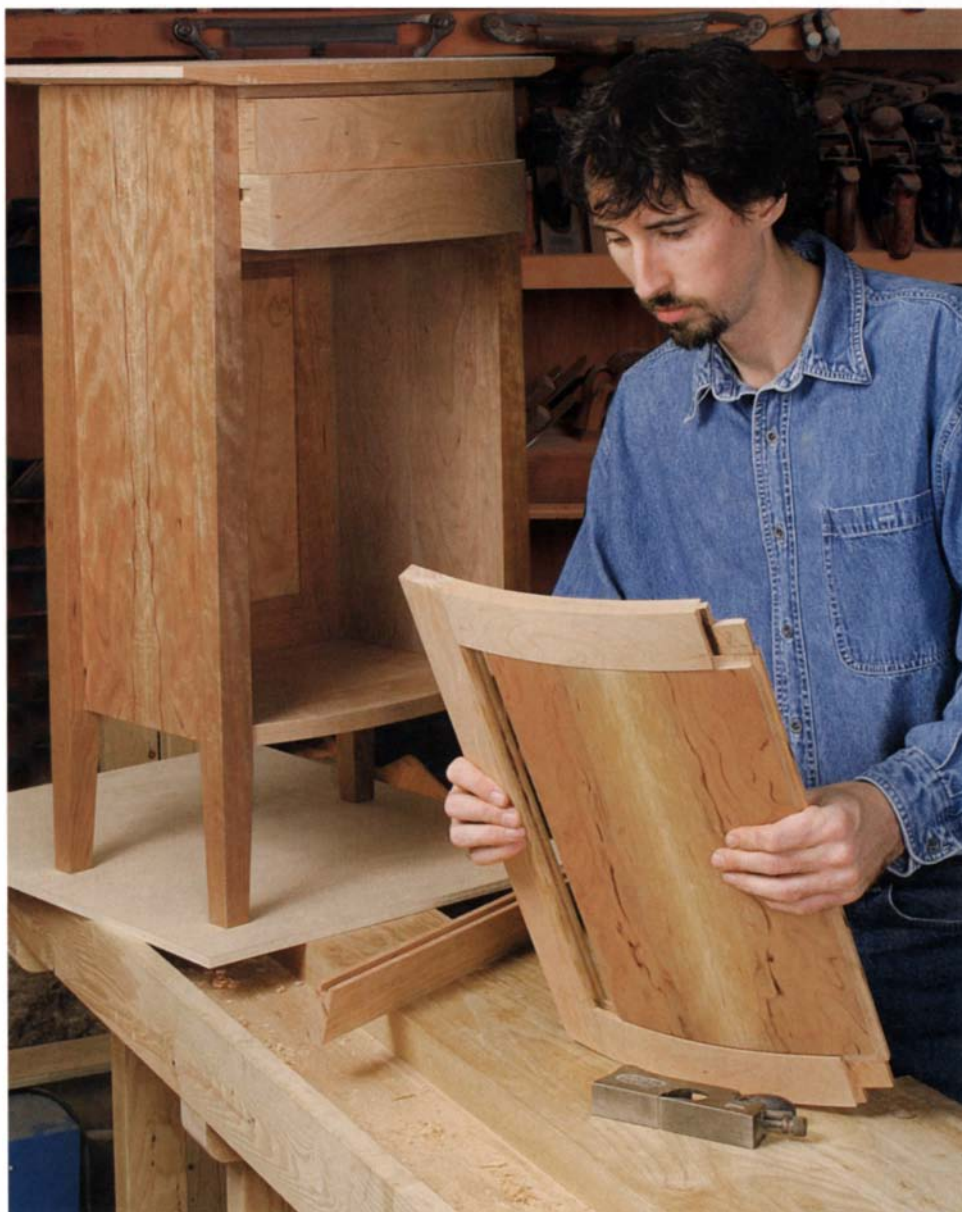
Position the boards on the form to check the joints. If necessary, do some fine-tuning with a handplane to ensure the joints fit perfectly. You can glue up the entire panel at once, using bar clamps to pull all of the



With the concave side down, trim the panel to size. Use a sled for crosscutting, with the blade at its highest point.



Rabbet the curved edge. Use a good dado set and keep the panel in contact with the table at the cutting point. The rabbet also may be cut on the router table.



Prefinish the panel and dry-fit the door. Use a shoulder plane to fine-tune the joinery.

pieces together and strap clamps to keep them from opening outward.

After the panel has been glued up, smooth the beveled surfaces to a fair curve. Shape the panel using a handplane and a scraper, then sand. After sanding I used Abralon pads up to 4,000 grit to give it a polished look. Last, glue up the door and bevel its edges to fit the opening.

Rare-earth magnets serve as door catches. Bore a hole in the door and cabinet frames to accommodate the magnet and a wood plug above. With the magnet in place, bore a larger hole for the plug to create a better glue surface. Trim the plug flush and cover it with a circle of leather, which gives the door a soft stop.

Attach the door using high-quality butt hinges mortised into the frame (see *FWW* #159, pp. 52-57). I inset the door $\frac{1}{8}$ in., making the necessary adjustment to the hinge mortise on the door.

Top off the cabinet

The only things left to do are the top and the pulls. The top is book-matched, glued up and then shaped. Bevel the underside of the right and left sides. The front edge overhangs the drawers by $1\frac{3}{8}$ in., so its radius is that much larger.

The finish on the top is critical, because any flaws will be reflected. Make sure you have lots of light when doing the smoothing. Then screw the top onto the top stretchers from beneath. It will move in the same direction as the rest of the case, so you don't have to slot the screw holes.

The final touch for this piece is to add carved ebony pulls. Getting the design right for these was a long and frustrating ordeal, but they are one of my favorite elements. I cut the facets on the bandsaw and formed the curves with a sanding drum. Leave small tenons on them to mortise into the door and drawers. □

Stephen Hammer is a furniture maker in Brooklyn, N.Y.

Shop Vacuums

Newest machines are quieter and offer more features

BY ROLAND JOHNSON

Dust is an unfortunate by-product of woodworking. One of our best defenses is the shop vacuum. Woodworkers appreciate the vacuum for its versatility in the workshop. It can pick up as well as blow dust out of hard-to-reach corners and is commonly used as a dust collector for small power tools.

From the legion of shop vacuums on the market, I selected 13 that range in price from under \$100 to about \$700: Alto Wap SQ and SP; Craftsman 17922 and 17924; Fein 9.77.25; Festool CT 33 E; Milwaukee 8927 and 8955; Porter-Cable 7814; Ridgid WD16650 and WD1735; Shop-Vac QL600D and QUL625.

A number of new features distinguish today's crop of shop vacuums from their predecessors. For one, significant strides have been made to reduce that shrieking whine that grates on the ears and nerves of the operator. My old shop vacuum could reach decibel levels of about 94—nearly the same level as thunder. It could drown out even the loudest woodworking machine in my shop. Though all of the vacuums I looked at were quieter



ALTO WAP SQ AND SP



CRAFTSMAN 17924 AND 17922



than those of a few years ago, the Fein, the Festool, both Alto Waps and the larger Craftsman all were paragons of aural restraint. With decibel levels ranging from 58 to 69 (the level of a normal conversation), cleaning the shop became an almost serene experience.

Other noteworthy features available on many of the machines presented here are auto start and variable-suction force. Though not new, these often overlooked features are worthwhile for people who work a lot with orbital or belt sanders. Auto start allows you to plug a machine into the power outlet on the vacuum's control panel. Then, as you switch the machine on or off, it will cue on or cut off the vacuum's motor. The auto-start feature isn't appropriate for use with a larger tool because it will draw too many amps and blow fuses, but it comes in handy for light-duty applications. Variable-suction force allows the user to adjust the speed of the vacuum motor, which lets you clean off your benchtop without worrying about sucking up hardware.

For this comparison, I looked at the utility of each machine based on endurance, adaptability and ergonomics. This sampling will provide you with a pretty good idea of what to expect from a variety of available brands and help you decide what size and features are best suited to your needs.

Vacuums all have adequate power

No shop vacuum has the power or longevity to replace a dedicated dust-collection system. But a number of them will work well enough as portable dust collectors for benchtop machines in small shops or as backups to larger systems.

To collect wood dust from machines that generate significant amounts of it, a vacuum requires a moderately powerful motor, the ability to take a large-diameter (2½ in. dia.) hose and a good-size collection tank that's reasonably easy to empty.

Some manufacturers test power by seeing how tall a column of water the machine can suck. But my approach to testing was more low tech; I used each of the machines in a variety of situations around the shop and noted my observations. I found that all of the

Vacuum as dust collector



The shop vacuum also serves as a portable dust collector. Depending on the shop, it may be the only means of dust collection or it may be a backup to a larger system.



FEIN 9.77.25



FESTOOL CT 33 E



MILWAUKEE 8955 AND 8927



Filter types affect airflow

Pleats increase efficiency. Pleated paper filters offer a sizable increase in surface area, which allows the machine to breathe easier.



Gravity works. Milwaukee's quarter-sphere-shaped filter utilizes gravity to keep big particles of dust from collecting on it.



More room for debris. Filters located at the top of the vacuum (Festool, shown, and Porter-Cable) don't take up valuable space inside the dust-collection tank.

vacuums had adequate power, as long as I kept the filter from clogging. And then it hit me. What separated the titans of suction from the rest of the pack was not necessarily power but endurance. The design of the filtering system is a critical path to long-lasting performance.

Filter types and designs affect performance

As the vacuum tanks filled with sawdust, some of the machines proved better at maintaining good suction than others. In general, the better performers had filters situated horizontally above the tank, away from the debris, so they came in contact with debris only when the tank was nearly full. From an engi-

neering standpoint, this design was a clear winner. Placing the filter on top of the unit keeps it breathing right and does not rob the tank of volume because its filter is not taking up interior space.

Within my test group, only the Porter-Cable and the Festool have the filtration systems above the tank. In addition to having an optimum filter location, both the Porter-Cable and the Festool have filter-shaking mechanisms that work with their pleated paper filters. The base of the filtration compartment holds a push rod with small fingers that protrude between the filter pleats. By pulling and pushing the rod, the operator can knock off big stuff from the filter without opening the tank. The Porter-Cable goes one step further, providing an access door for easy removal of that filter without having to open the tank.

Most of the vacuums I looked at have cylindrical, pleated paper filters that attach to the base of the motors and project downward into the tanks. This type of filter gets phys-



PORTER-CABLE 7814

RIDGID WD16650 AND WD1735

SHOP-VAC QL600D AND QUL625

ically submerged in sawdust, ultimately reducing its airflow.

Some of these filters can be covered with a foam sleeve to extend filter life. The Fein and both of the Alto Wap machines offer these sleeves. In addition, the Alto Waps have a couple of cloth covers available that line the tank. They were great at collecting fine wood dust, and the cloth was simple to shake out when dust overload caused a noticeable loss of suction.

Though not located entirely above the collection tank, the filtration system of the Milwaukee 8927 was ingeniously simple and effective. Its quarter-sphere-shaped filter hangs from the top of the collection tank. The round shape utilizes gravity to keep debris from building up on it as the tank fills, but the tank was cumbersome to empty. Overall, though, the 8927 was solid. Every switch and connector had positive action. For use as a dust collector, it requires an adapter to fit a standard 2½-in.-dia. hose. It carries a hefty price tag, yet it remains a popular choice among home-based woodworkers.

When to use large vs. small hoses

Hose diameter is critical to the function of a vacuum, particularly when the machine is used as a dust collector. A 2½-in.-dia. hose will carry the volume and size of debris that planers and router tables produce. All of the units, except the big Milwaukee (which needs an adapter), are equipped with either a port or an adapter to accept a standard 2½-in.-dia. hose. This hose size will handle most debris. Larger hoses, coupled with extension wands, are best for sweeping the shop floor.

A small hose diameter, however, is best for using a shop vacuum with small portable tools, such as sanders and saws. The Festool, designed for light-duty dust collection, is a convenient size and has a variable-speed motor, auto-start capability and the most flexible hose of the bunch. Its 7-gal. tank proved more than adequate for light-duty dust collection and had plenty of suction power to sustain hours of sanding. The Festool combines a thumb-controlled slide gate with a motor-speed switch that allows you to tweak suction force. It gave me good latitude while attacking a variety of jobs around the shop.

Exhaust should be a breeze

The Craftsman 17924, both Milwaukees, the Ridgid WD1735, the Shop-Vac QUL625 and the Festool have exhaust outlets that can be used as a source of high-velocity air. The Ridgid WD1765, made by the Emerson Tool Co., has a detachable blower that could be handy for clearing leaves or blowing chips into a pile.

Unfortunately, those exhaust outlets can increase the airborne dust in your shop. I don't like skyward exhaust ports; inevitably, I will lean over the blast and get a face full of dust. Side exhaust



Making a good connection

A fast and firm grip. The push-and-lock spring catch connection on the Ridgid models is fast, easy and keeps a good grip.



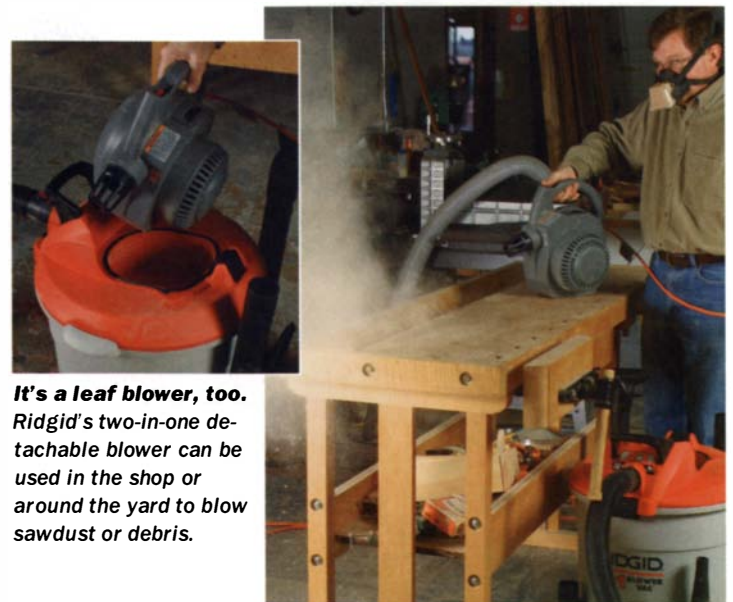
A tight fit. Threaded screw-on ports on the Shop-Vacs hold fast, even when they're pulled around by their hoses.

ports can send billowing clouds of wood flour through the shop should I inadvertently point it at a dusty shelf.

The Shop-Vac QUL625 and the Festool have ports that, when not used for high-velocity air, are closed, and the air is diverted through diffusers for a "soft" exhaust. The Alto Waps, the Fein, the Porter-Cable and the Shop-Vac QL60OD also have diffusers that turn the exhaust blast into a gentle breeze.

Details that make a difference

Five of the shop vacuums that I tested get around on four casters, while the other eight rely on front casters (or, in the case of the little Milwaukee, a single front caster) and two fixed wheels at the rear, like a shop cart. Most of the dolly-style carriers also have a handle. If you have a habit of leading around your vacuum by its



It's a leaf blower, too. Ridgid's two-in-one detachable blower can be used in the shop or around the yard to blow sawdust or debris.



Plug into auto start. A receptacle right on the vacuum will turn the machine on and off in concert with the tool.



Variable suction adds control. Regulating motor speed gives scope to cleaning and light-duty dust collection.

Shop vacuums head to head

MODEL/CONTACT INFO	COST	AMPS	CAPACITY	AUTO START
ALTO WAP SQ (201) 262-0412 www.ultimategarage.com	\$495	13	10 gal.	Yes
ALTO WAP SP	\$695	13	15 gal.	Yes
CRAFTSMAN 17922 (800) 349-4358 www.craftsman.com	\$79.99	11	12 gal.	No
CRAFTSMAN 17924	\$449.99	9	12 gal.	No
FEIN 9.77.25 (800) 441-9878 www.feinus.com	\$415	10	14.5 gal.	Yes
FESTOOL CT 33 E (888) 337-8600 www.festool-usa.com	\$445	10	7.9 gal.	Yes
MILWAUKEE 8927 (262) 781-3600 www.milwaukeetools.com	\$599.95	7	21 gal.	Yes
MILWAUKEE 8955	\$227	8	10 gal.	No
PORTER-CABLE 7814 (888) 848-5175 www.porter-cable.com	\$306	9	15 gal.	Yes
RIDGID WD16650 (800) 474-3443 www.ridgidwoodworking.com	\$119	12	16 gal.	No
RIDGID WD1735	\$139	12	16 gal.	No
SHOP-VAC QUL625 (570) 326-3557 www.shopvac.com	\$119	11.9	16 gal.	No
SHOP-VAC QL600D	\$314.95	10	12 gal.	No

*Decibel readings taken at low and maximum power

hose, you'll need a machine that does not ride on a rear-axled cart. Also, look for a hose that locks into its port. Each of the smaller units presented here followed me without resistance. The Festool and the Alto Wap SQ, with their built-in rear axles, proved to be smooth, hose-driven come-alongs. The large Craftsman, both of the Milwaukeees and the Porter-Cable are not built to be used this way.

Emptying the tank was a chore with some of the machines. I had to remove the accessories from their various mounts or lift their tanks out of their caddies before emptying them. If I failed to do this, I wound up fishing the tools out of the sawdust bin. The Ridgid WD1735 has tool mounts on the tank cover but still relies on a cart-handle-mounted caddy for storage. I found the best solutions to this annoyance on the Craftsman 17924 and the Festool. The Craftsman has a caddy that can be removed and a tank that

can be separated from its cart. The Festool has storage boxes that clamp onto the vacuum base and are easily removed.

Most of the vacuums come with two-piece extension wands for floor sweeping, but with the exception of the Craftsman 17924 and the Alto Waps, the wands are annoyingly short.

Forcing quantities of wood dust through a plastic tube is a good way to demonstrate how static electricity is produced. If you end up being the conduit for that discharge, the shock won't hurt you, but it is irritating. The Porter-Cable, the Alto Waps and the Festool all have grounding devices for the hose, eliminating shocks.

How do you choose?

Every one of the shop vacuums tested provided adequate performance. So, even though we all have a different approach to de-

VARIABLE-SPEED MOTOR	NOISE LEVEL*	WEIGHT	HEIGHT (ON BASE)	EXHAUST	COMMENTS
Yes	59-66 dB	24 lbs.	20 in.	Diffused around motor housing; very soft	Quiet; has variable-speed motor; overall, was a standout in the crowd
No	63 dB	33 lbs.	26 in.	Diffused around motor housing; very soft	Well-designed feel, from base to hood latches; unfortunately, has no variable-speed motor
No	76.5 dB	27 lbs.	19 in.	Side port; adequate	Low center of gravity gives good stability; good value for the price
No	69 dB	52 lbs.	34 in.	Side port; adequate	Body and accessories prone to rust; motor draws fewer amps than others of its size
No	65.5 dB	36 lbs.	29½ in.	Diffused around motor housing; very soft	Removable cloth filter gave good performance while vacuuming dust; quiet; fairly priced
Yes	58.5-68.5 dB	32 lbs.	22 in.	Diffused around motor housing; very soft	Loads of accessories available; quiet; has variable-speed motor
No	75 dB	56 lbs.	40 in.	Side port; adequate	Designed for commercial use; should last a lifetime; good filter design
No	79 dB	32 lbs.	38½ in.	Exhaust port on top; harsh	Three-wheeled base was awkward at times; durable; noisy; skyward exhaust port was annoying
No	74.5 dB	34 lbs.	30 in.	Side diffuser; very soft	Good filter location; well-engineered filter-removal system; impressive commercial design at reasonable price
No	75 dB	26.3 lbs.	27 in.	Side port; adequate	Removable blower capability makes model an especially good value
No	78.5 dB	21 lbs.	27 in.	Side port; adequate	Large latches and light, no-lip tank made emptying a breeze
No	74.5 dB	25 lbs.	26 in.	Diffused side port; very soft	Easy-to-use switches; 2 dB quieter than its predecessors
No	72 dB	25 lbs.	29 in.	Diffused side port; soft	Motor is less powerful than others in this price range but is fine for light-duty dust collection

ciding which vacuum is best for our workshops, I'll share a few of my favorites.

I found the Porter-Cable 7814 to be a well-designed machine. Though a little louder than some, its accessible filter system, relatively light weight, large collection tank, bayonet-style locking hose connector, exhaust diffuser, static grounding and auto-start feature made it a strong finisher. I just wish a larger-diameter hose were standard equipment.

If I needed another shop vacuum and money were no object, the Alto Wap SQ would be my choice. Its purring, quiet motor, auto-start feature and variable-speed motor made it hard to beat. The small tank and small hose were drawbacks for all of the heavy-duty dust collection I require, but the machine felt like it had been built for the long haul. A close second to the Alto Wap SQ was the

well-appointed Festool. However, it came with more accessories than I needed.

Finally, there is the Craftsman 17922. With this basic, low-cost machine (\$79.99), you can clean your shop and then easily store the vacuum. It's a good bargain.

Like any machine, the design of a shop vacuum is a study in compromise. No single unit carries every perfect characteristic. But in learning of the advent of new features and gaining a better understanding of the strengths and weaknesses that are inherent in today's machines, you should be able to proceed with confidence as you choose which shop vacuum will provide the best overall value for you. □

Roland Johnson runs a custom woodworking shop in Sauk Rapids, Minn.

Current Work

Current Work provides design inspiration by showcasing the work of our readers. For more details and an entry form, visit our web site at www.finewoodworking.com. Send photos and entry forms to Current Work, *Fine Woodworking*, 63 S. Main St., Newtown, CT 06470.



◀ **John C. Packard** Sea Cliff, N.Y.

This entertainment cabinet (27 in. deep by 54 in. wide by 96 in. tall) made of crotch mahogany took 400 hours to complete. Built for a client who lives in New York City, the cabinet's design was inspired by the interior of the 1920s classic revival elevator that services the client's building. "I duplicated most of the details, right down to the reeded Gothic columns and teardrop detail at the crown," said Packard. The cabinet has a rubbed-out lacquer finish.

Joe Stearns Traverse City, Mich. ▶

The design for this coffee table (23 in. deep by 46 in. wide by 17 in. tall) evolved through several variations. "My design ideas come from my formal study of architecture," Stearns said, "as well as general observations of good functional art and graphic design and a decided leaning toward organic forms." The table is made from panga panga with a four-way book-matched curly cherry veneer top that features ebony inlay. The finish is oil and varnish with a sprayed-lacquer top.





◀ **Jim McLain** Socorro, N.M.

After the tragic events of Sept. 11, 2001, McLain was inspired to create this wood turning. The 12-in. sphere, titled *Windows to the World*, is made of spalted maple, holly, bloodwood and ebony and took 100 hours to complete. The segmented form comprises 320 pieces of wood. The finish is Waterlox and tung oil.



Lauren Waters Nelson, B.C., Canada ▲

Waters made this china cabinet (20 in. deep by 43 in. wide by 78 in. tall) as her year-end project for Selkirk College's fine-woodworking program. The piece, made of cherry and curly maple, took 350 hours to complete. "I chose the graceful form of a tree to give shape to this cabinet, with the flowing lines, tree trunk and etched-glass branches to support an arched top that echoes the curve of a mature tree's canopy," said Waters. The cabinet has a lacquer finish.



Dale Kirstine Magalia, Calif. ▲

Kirstine built this reproduction mahogany lowboy (18½ in. deep by 29 in. wide by 30 in. tall) for his daughter and son-in-law, to be used as a bedside table. The piece's cabriole legs are accentuated with slipper feet, while the bottom center drawer features a carved shell, which was Kirstine's first attempt at shell carving. The lowboy has an oil-and-varnish finish.



◀ **Casey Jones** Schofield, Wis.

Jones' daughter needed something with a lot of room to store all of her jewelry, so he built this cabinet (8½ in. dia. by 18 in. tall) for her. Made of cherry, maple and cocobolo, the cabinet has a cylindrical design because Jones felt that would be the most efficient use of space. The nine drawers and the necklace compartment have magnetic catches. The magnets countersunk in the drawers and door correspond with magnets countersunk in the divider. The finish is sprayed polyurethane.

Mark Bellonby Mason Neck, Va. ▶

"This piece has a strong architectural character with an Art Deco flavor," Bellonby said. The cabinet (22 in. deep by 45 in. wide by 82 in. tall) is constructed out of solid and veneered Honduras mahogany with a solid Gabon-ebony top cornice and ebonized Honduras-mahogany moldings and cock beads. The MDF-substrate doors feature veneered marquetry of Macassar ebony, pommele sapele, redwood burl and figured pear and maple. The design is an adaptation of the Deco elevator doors at the Chrysler Building in New York City. The cabinet has a varnish finish. Photo by Carol Bellonby



◀ **Bo Hagood** Portland, Ore.

"Simple is hard to do," said Hagood. "When I designed this piece, I challenged myself to keep it simple, focus on proportion and elegance and have a natural finish." The product of Hagood's self-imposed challenge is this chest of drawers (16 in. deep by 27 in. wide by 36 in. tall). Made of pearwood, the piece features slight finials on the legs and turned and sculpted African-blackwood drawer pulls. The finish is wipe-on polyurethane.



◀ **Taimi Barty** Fort Bragg, Calif.

Based on the silver chest cabinet that James Krenov made 40 years ago, this stand of drawers (15 in. deep by 19 in. wide by 53 in. tall) was built to serve as a room divider. Barty used narra, western maple and Port Orford cedar to make the piece, which took 650 hours to complete. Titled *Ode to Full Circle*, the stand has nine through-drawers that slide in both directions. The piece has a shellac-and-oil finish.



J. Albert Hudson ▲
Knoxville, Tenn.

Hudson, a woodworker of some 60 years, built this reproduction Newport tall clock (11 in. deep by 22½ in. wide by 94 in. tall) for himself because he had always wanted one. Eventually, it will be left to one of his grandsons. Made of fiddleback and crotch Oregon black walnut, the piece features a broken-arch top with carved capitals and fluted leaf finials and a block-and-shell carved waist door flanked by fluted quarter columns. The crotch-panel base is chamfered and has lamb's-tongue corners. The ogee bracket feet feature blind-dovetail miters. The clock has a hand-rubbed oil finish topped with three coats of wipe-on varnish.



Milton K. Arrow Binghamton, N.Y. ▲

Arrow built this Bible box (22 in. deep by 14 in. wide by 9 in. tall) after reading an article in *Antiques* on Lancaster County Bible boxes. The box is made of walnut and features inlays of holly, maple and cedar. "The biggest challenge in making the box," said Arrow, "was creating the design in the given space, because some of the arcs have three different centers." The box has an oil finish.

Troubleshooting problem joints

BY PHILIP C. LOWE



Wondering why your edge joints don't line up or why that dovetail drawer won't sit flat? Or why your perfectly cut mortise and tenons in that table base leave the legs splaying? Often the fault lies not with the way the joint was made but in the way that you initially prepared the stock. The key is properly milling the stock to avoid problem joints.

Edge joints

When joining two boards edge to edge, four common errors can occur.

One such problem is when two boards placed edge to edge reveal spaces at one or both ends of the boards. Gaps at the end mean that one or both edges have a convex shape along their length. But a gap in the middle means one or both edges have a concave profile. In both cases the solution is to check the profile by using a dedicated straightedge or by testing the edge of the boards on a flat machine top such as that on a jointer.

Sometimes the two boards have edges that meet perfectly, but the surfaces fail to line up. You can align the boards by pressing on the one that is higher, but this can transfer irregularities from one board into the whole panel. The problem is that one of the boards has a bow in it. A straightedge will reveal one surface to be concave and the opposite surface to be convex. The best solution is to return to the jointer and planer to reflaten the stock.

The fourth defect in an edge joint is when the two edges meet perfectly but rock when placed on top of each other. If the edges are square, you will need to trace the problem back one step further. Check the surface of the board for flatness. More than likely, you will find that the surface against which you placed the head of the square has a wind or twist in it. The

EDGE-JOINT PROBLEMS

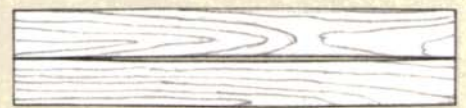
To obtain a seamless joint, both boards must be perfectly straight, flat and square.

GAPS AT THE END



A convex edge on one or both boards is caused by poor or insufficient planing. A small gap in the last 2 in. of the joint probably is an indication of snipe from the jointer.

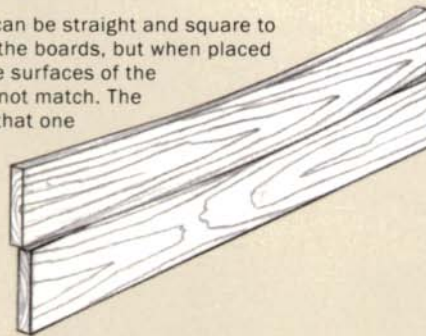
A GAP IN THE MIDDLE



A concave edge on one or both boards often is caused by handplaning, where the tendency is to put more pressure into the middle of the board.

UNEVEN FACES

The edges can be straight and square to the face of the boards, but when placed together the surfaces of the boards will not match. The problem is that one or both boards are bowed.

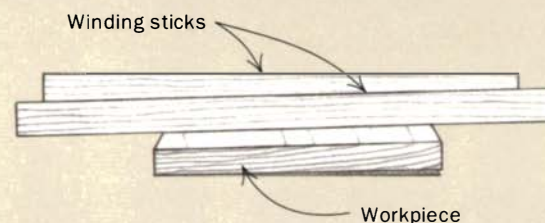


No bow here. To test whether a board is bowed, use a straightedge that is longer than the board.

BOARDS THAT ROCK



The edges can be straight and square to the faces of the boards, but when placed together the boards will not lie flat. The problem is that one or both boards are twisted.



Twist detective. Winding sticks laid across each end of a board magnify any twist in the board.

Gemini Carving Duplicator

**"The Professional's
Woodworking Secret"**



Videotape demo
available
Call for details



**Fast
Rugged
Accurate**

Allred & Associates, Inc
11 Teasel Lane - Skaneateles NY 13152
+1 315 252-2559 fax: 252-0502

Visit our extensive website:
www.wood-carver.com

READER SERVICE NO. 1



POWERMATIC

WE HAVE
IT ALL IN
WOODWORKING
SUPPLIES



GENERAL



**WoodWorkers
Depot**

3001 RAMADA WAY, GREEN BAY, WI 54304
1-800-891-9003 FAX (920) 336-8683
www.woodworkersdepot.com
PROFESSIONAL QUALITY AT A WAREHOUSE PRICE



DELTA
CMT JET
EQUIPMENT & TOOLS

READER SERVICE NO. 74

NEW!

The Leigh FMT Mortise and Tenon Jig

Create mortises and tenons in one quick, easy setup!

Unique patented guide system • Joints from a tiny 1/16" x 3/32" to 1/2" x 5" in stock up to 3" x 5 1/2" • Easy fingertip adjustment of joint tightness, recordable and repeatable • Make angled and compound angled joints • Rout perfectly aligned double, triple and quadruple joints • Use virtually any plunge router • Uses 1/2" shank cutters • Cam-action speed-clamps • Integral dust port for vacuum



Call For Your Free Leigh FMT Brochure Today! 1-800-663-8932
Leigh Industries Ltd., PO Box 357, Port Coquitlam, BC, Canada V3C 4K6
Tel. 604 464-2700 Fax 604 464-7404 Web www.leighjigs.com



LEIGH
Joining Tradition With Today

READER SERVICE NO. 120

MULTI-FENCE SYSTEM

ac-cu-rate *va-kyə-rət \adj*
1: careful and exact 2: free
from mistakes or errors,
precise 3: the HTC
Multi-Fence System



ACCURATE BY DEFINITION.

When you need accuracy, dial it in with the HTC Multi-Fence System. One full turn of the Micro-Adjustor knob moves the fence 1/16". Half a turn moves 1/32", and so on down to less than 1/128". Now that's accurate! That's HTC.



For your nearest dealer and FREE catalog,
call toll-free 1-800-624-2027



© HTC Products, Inc. 2003

READER SERVICE NO. 120

Pink Ivory
Dagame
Brazilian Rosewood
Pear
Plum
Burls
Snakewood
Bubinga
Koa
Satinwood
Cocobolo
Padauk
Rosewood
Bloodwood
Ziricote
Purpleheart
C. Ebony
Pau Rosa
Camphor

Quality Exotic Wood

»TURNERS«
Thick Planks for Bowls/Squares

»CABINET MAKERS«
Individually Selected Lumber
for
Furniture / Boxes / Inlays

Over 70 Species
www.bereahardwoods.com
The Berea Hard Woods Co.
6367 Eastland Rd. • Brook Park, OH 44142
P 440-234-7949 F 440-234-7958

Pernambuco
Mac. Ebony
E.I. Rosewood
Bocote
Curly Maple
Quilted Maple
African Ebony
Zebrano
Lacewood
Lignum Vitae
Osage
Tulipwood
Blackwood
Mahogany
Jelutong
Holly
Wenge
Goncalo Alves
Many More...

"It's a matter of pride for both of us"

READER SERVICE NO. 62

Professional Finishing Made Easy!



**Turbine & Compressor HVLP
Spray Guns & Equipment**

**Ideal for the hobbyist and
the professional!**

Ask about our unique
Variable Speed Turbines!

Call today for a distributor near you!

TURBINAIRE 1-800-866-HVLP
www.turbinaire.com • sales@turbinaire.com

As used by
Scott Phillips



READER SERVICE NO. 141

square shows the edge of the board to be square to the surface, but the square cannot reveal a twist in the surface. This can only be revealed on a flat surface or by using a pair of winding sticks.

Mortise-and-tenon joints

There are numerous ways a mortise-and-tenon joint can be affected when the lumber is not prepared correctly. For example, when you assemble a table frame and dry-fit the legs to one rail, one or both legs angle inward or outward and are not parallel.

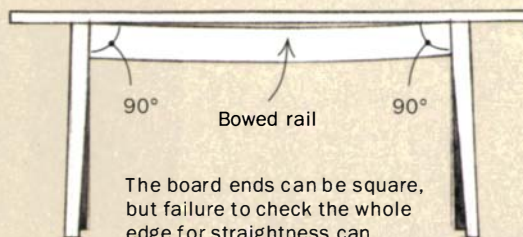
Track down the problem, disassemble the legs from the rail and check that the shoulder is square to the edge of the board. Splay can be introduced into a leg by the end of the rail not being square. A lot of people cut a board to length and assume that it is square. They then use the end of the board as a reference to scribe the shoulder lines using a marking gauge, or using this end against the fence or the table if cutting the tenons on the tablesaw. The unsquare end will be transmitted into unsquare shoulders, which in turn will introduce splay or twist into the leg. The solution is to use a square to check the ends of the boards.

If the end of the rail is square, examine the straightness of the rail's edge. Check the one you placed the head of the square against when laying out the shoulders. Use a long straightedge or place the board on a machine tabletop. A curved edge will introduce an angle into the shoulder. If the lower edge of the rail is convex, the legs will splay; if it is concave, the legs will an-

MORTISE-AND-TENON PROBLEMS

Not all flared legs are intentional. Poorly prepared stock can leave legs canted in and out.

SPREADING LEGS

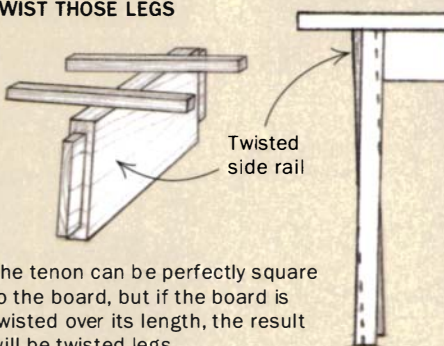


The board ends can be square, but failure to check the whole edge for straightness can result in legs that splay.



Square but not straight. A combination square will show you that the end is square to the board's edge. It will not reveal whether the edge is flat over its entire length.

TWIST THOSE LEGS



The tenon can be perfectly square to the board, but if the board is twisted over its length, the result will be twisted legs.



Right angle, wrong tool. A combination square can tell you if a board's edge is exactly 90° to its adjacent sides, but it will not be able to detect twist in a board.

gle inward. The reverse is true when testing the top edge.

Another common problem is a mortised and tenoned face frame that doesn't lie flat. After taking apart the joint, make sure the tenon is parallel to the surface of the board. If it checks out fine, you then need to test the rail for flatness. If you find the reference surface has a twist, you transfer

this twist into the tenon because you are working off an imperfect surface.

Dovetailed drawers

Frustration can mount when you assemble a drawer and find a space in the end of the dovetails, or when you have a drawer box that is twisted and doesn't sit flat. As with previous joint problems, the faults can be traced back to the improper preparation of the lumber. A gap at the end of the dovetail is most likely created by the end of the board not being square.

If the overall edge of a drawer side is concave or convex, the drawer box will twist when assembled. Once again, check the overall straightness of the edge before cutting the joint.

The other way in which a twist can occur is when the drawer side is planed with a twist in the surface. This always puts the drawer front and back in wind to one another. Once the drawer has been assembled, planing material from the bottom edge of one side in turn makes the drawer front tilt; if enough material is removed from both sides of the drawer, the bottom can rub on the frame. □

A PROBLEM DRAWER



If the end of the board is not square to the edge, one or more corners of an assembled drawer will not sit flat.





We Manufacture & Service
SHAPER KNIVES
MOULDER KNIVES

We now distribute
FREEBORN
Cutters

Williams & Hussey
Profile Knives

FOLEY BELSAW • MOULDER HEADS
RBI & WOODMASTER KNIVES
LOCK EDGE COLLARS
ROSETTE CUTTERS
CUSTOM ROUTERS &
CUSTOM CUTTERS

Quick Turnaround Time
Top Quality Products
at Competitive Prices

W. Moore Profiles LTD.
1 Commercial Drive,
P.O. Box 752, Florida, NY 10921
www.wmooreprofiles.com
1-800-228-8151

Serving the Industry for over 10 Years - Fax (845) 651-1097

READER SERVICE NO. 25

Heavy Glass
Table Tops

FACTORY DIRECT DISCOUNT PRICING



■ Table tops
■ Shelves
■ Doors
■ Display Cases
■ Entertainment Centers
■ Tempered Glass
WGB ■ SHAPES ■ THICKNESSES ■ EDGE DESIGNS
Use Reader Service For FREE Catalog

TABLE TOPS BY PHONE SATISFACTION GUARANTEED!

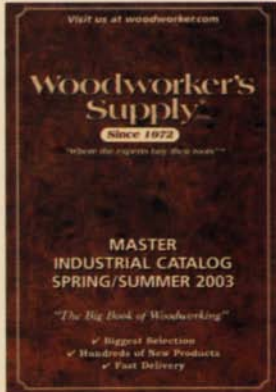
SALES 1-800-288-6854

READER SERVICE NO. 55

If you are in a woodworking business... this could be the most valuable tool in your office™.

Please call
1-800-645-9292
for your 528 page catalog.

FREE
to woodworking businesses.



visit us at woodworker.com

READER SERVICE NO. 27

CUSTOM MILLED MOULDINGS
ANY Width • ANY Length • ANY Thickness • ANY Profile • ANY Species

Choose from red or white oak, cherry, teak, mahogany, walnut, wenge, cocobolo, gonzalo alves, heart pine or dozens of others – all milled to your specifications for interior or exterior trim, paneling, rails, flooring, stair parts and more.

Call for a prompt price quote.
Call For FREE Catalog!

M.L. CONDON COMPANY Inc.
248 Ferris Avenue, White Plains, NY 10603
Phone: (914) 946-4111 • Fax: (914) 946-3779

READER SERVICE NO. 125

HIDA TOOL & HARDWARE

1333 SAN PABLO AVE. BERKELEY, CA 94702
510-524-3700 1-800-443-5512 hidatool@hidatool.com



Mitsukawa brand; ryoba & dozuki hardwood saws for furniture & cabinet makers.
Ryoba: 195mm & 210mm (21 teeth on cross-cut)
Dozuki: 210mm & 240mm (27 teeth on cross-cut)

Visit our website at www.hidatool.com

READER SERVICE NO. 118

BW BRIDGEWOOD
The Woodworker's Edge...
Quality is more affordable than you think!



BW-15BS 15" Bandsaw
don't let its low price fool you, this amazing bandsaw is designed and built to provide trouble free operation cut after cut.
FEATURES: Heavily ribbed cast iron frame. 3/4 hp motor is mounted directly to cast iron frame for smooth operation. Two blade speeds: 2000 or 2600 SFM. Cast aluminum wheels with rubber tires. Non-rocking steel stand. Miter gauge.

BW-15P 15" Planer
economically priced yet built like larger professional planers.
FEATURES: 3 hp motor. 3 knife cutterhead. Jackscrew knife adjustment. Enclosed base with wheels for mobility. 15" x 6" planing capacity. Table moves up and down—cutterhead stationary for smoother cuts. Three stock support rollers front and back. 2 speed feed rate. Magnetic switch.

BW-6R 6" Jointer
acclaimed a "best buy" among 6" Jointers by a professional woodworking publication
FEATURES: 1 hp motor. 3 knife cutterhead. Jackscrew knife adjustment. Enclosed base with 4" chip collection hookup. Precision ground 6" x 45" cast iron tables. Rabbering table and ledge. Cast iron fence tilts in both directions to 45° with positive stops at 45° and 90°. Cast iron hand wheels.

TSC-10CL 10" Table Saw
the perfect table saw for contractors or smaller shops.
FEATURES: Left-tilting arbor reduces chance of kickback. 1-1/2 hp motor with quick release connection plug. 10" dia. blade capacity. Miter gauge with T-slot. Large cast iron table with a solid extension wing. Beveled front table edge for smooth miter gauge operation. 4" dust collection hookup.

BW-002A Dust Collector
portable, compact unit can solve your dust collection problems at a very low cost
FEATURES: 2 hp motor. 1059 CFM. 1 Micron filter bag. 43.5 gallon collection bag. Bags attached with quick release metal straps. Metal impeller (not plastic).

New! enclosed base with wheels

FREE Catalog

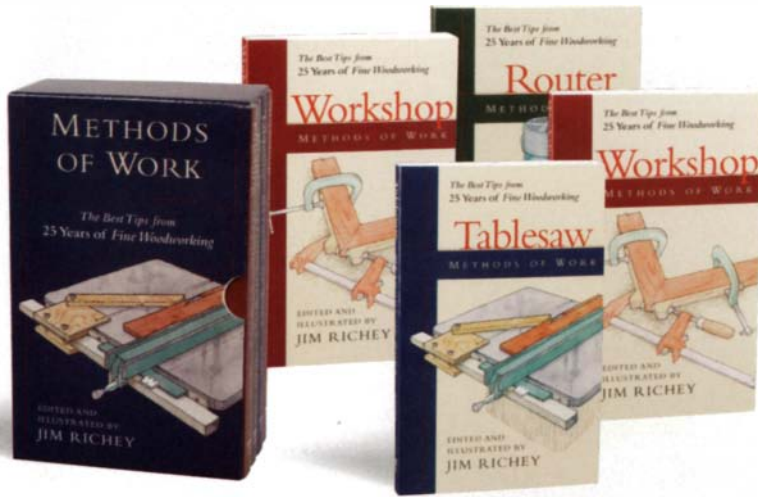
WILKE MACHINERY COMPANY
MACHINERY • PARTS • SERVICE • GREAT LEASE PLANS
MACHINERY • POWERTOOLS

For information and a **FREE catalog** contact us by toll free phone:
1-800-235-2100
visit our web page:
www.wilkemach.com
write or visit our showroom:
3230 N Susquehanna Trail, York, PA 17402-9716

READER SERVICE NO. 160



We've just shaved



Methods of Work Slipcase Set

The Best Tips from 25 Years of *Fine Woodworking*
4-volume set includes:

- Tablesaw • Router • Finishing • Workshop

Get the inside story on improving skills and results from experts with this treasury of hands-on help culled from 25 years of our most popular column.

Product #070586 Paperback, **now \$39.95**

Already over 20% off regular, single-book prices when you buy the 4-book set.

Workshop Classics Slipcase Set

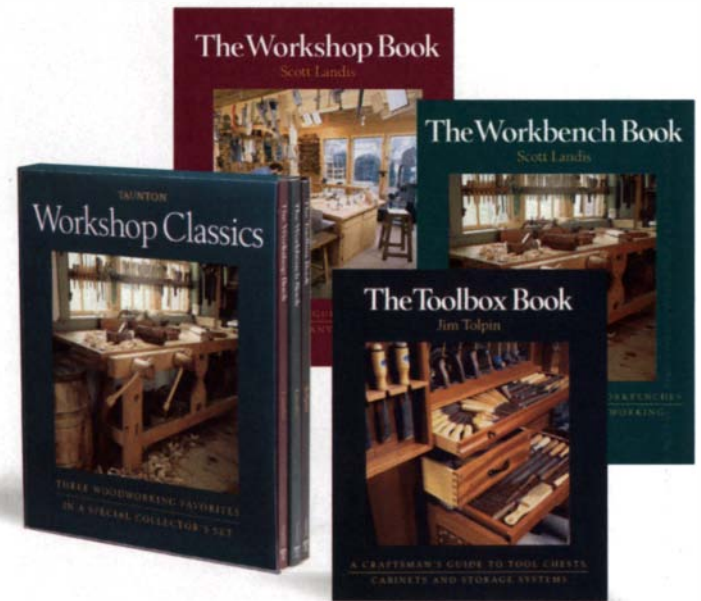
3-volume set includes:

- The Workbench Book • The Toolbox Book
- The Workshop Book

See how others, past and present, use traditional and creative means to build useable workspaces, set up shop, store, and transport tools.

Product #070655 Paperback, **now \$59.95**

Already discounted off regular, single-book prices when you buy the 3-book set.



Essentials of Woodworking Slipcase Set

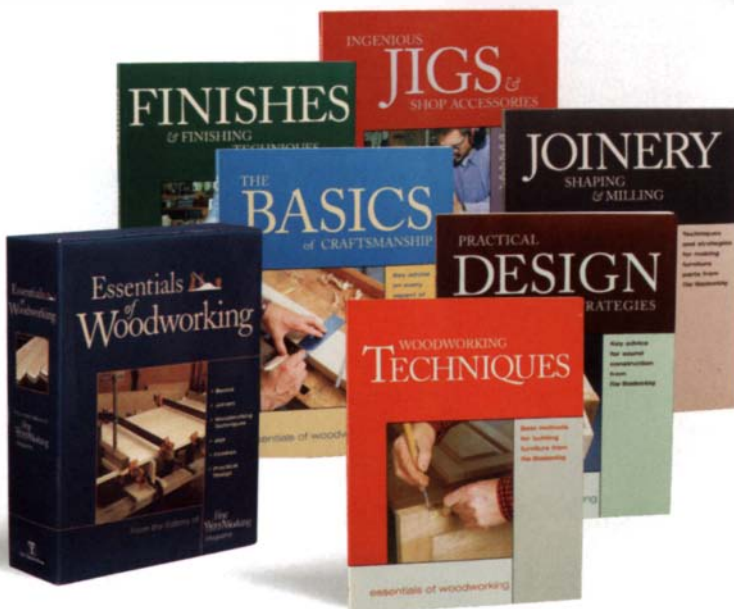
6-volume set includes:

- Basics of Craftsmanship
- Practical Design Solutions and Strategies
- Joinery, Shaping & Milling
- Ingenious Jigs & Shop Accessories
- Woodworking Techniques
- Finishes and Finishing Techniques

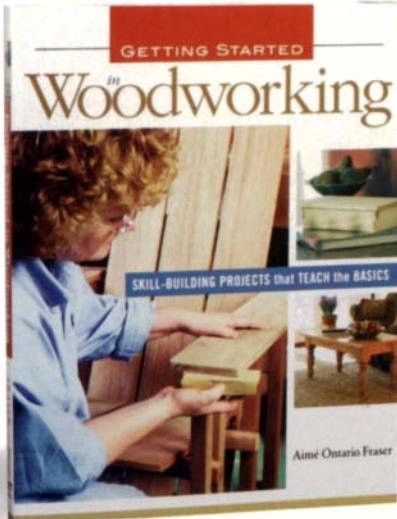
The cornerstone of your library, this essential reference is comprehensive enough for beginners and detailed enough for advanced woodworkers.

Product #070654 Paperback, **now \$79.95**

Already over 20% off regular, single-book prices when you buy the 4-book set.



20% off these prices.



New

Getting Started in Woodworking

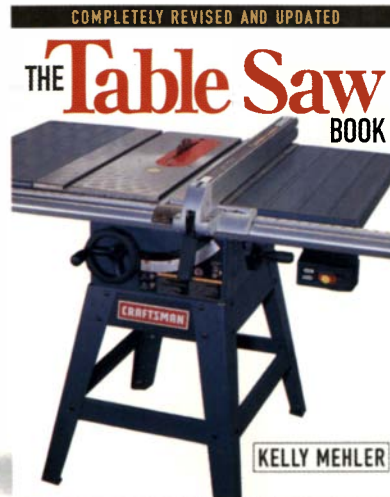
Aime Fraser

Learn basic woodworking by completing projects you'll be proud of! User-friendly instructions and skill-building exercises help you master each step.

Product #070674

Paperback \$19.95

now \$15.96



New

Table Saw Book, 2nd edition

Completely Revised and Updated

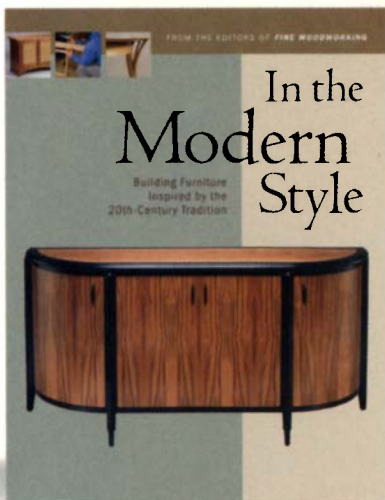
Kelly Mehler

This must-have reference is more valuable than ever. Get the facts on table saws: specific models, features, and how to choose the right one.

Product #070552

Paperback \$19.95

now \$15.96



New

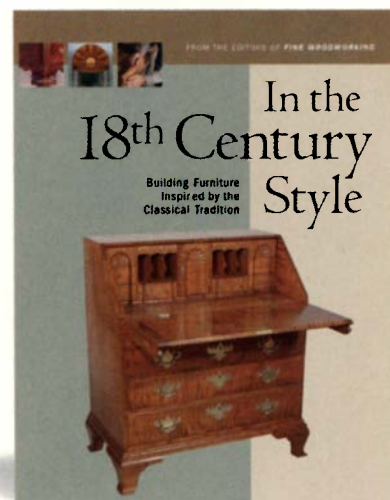
In the Modern Style

Editors of Fine Woodworking
Explore the artistic vision and techniques behind the cutting-edge designs that are new classics, including: curved work, veneering, inlays, bent plywood and more.

Product #070698

Paperback \$24.95

now \$19.96



New

In the 18th Century Style

Editors of Fine Woodworking
Take an in-depth look at the great cabinetmakers of America's golden age. Master the secrets of reproducing Federal, Queen Anne, Chippendale, and Sheraton styles.

Product #070530

Paperback \$24.95

now \$19.96

Order now! Offer expires July 1, 2003

Call toll free: 866-288-4241

Online at: www.finewoodworking.com/sale



The Taunton Press
Inspiration for hands-on living®

Calculating wood movement in a design



I am building a table out of quartersawn red oak. The tabletop is 90 in. by 42 in., and the grain runs parallel to the short dimension, not the long one.

I would like to border the table with a separate frame—not unlike a picture frame—so that the lumber core of the table floats within the frame, which also will hide the end grain on the edges. Can this be done without having expansion and contraction problems later on?

—Russell Seaman, Bluffton, S.C.

Christian Becksvoort replies: It sounds as though you like to flirt with disaster. When it comes to wood movement brought on by changes in humidity, red oak is a pretty bad actor. You're certainly

going in the right direction by choosing quartersawn stock, but that alone will not be enough to bring you success with the design you described.

I can think of only two circumstances under which this might work using solid lumber. First, at a time of year when moisture in the air is at its maximum, you could make all of the boards in the panel very narrow, and not glued but splined together (sort of like an old barn door). That way, the movement would be better contained within each piece, and you could end up with a series of small gaps between each splined board.

Second, this design might work if the entire tabletop is encased in a thick layer of liquid plastic to stop all moisture gains and losses.

But let's face the facts: Even quartersawn red oak, 90 in. wide, will move roughly 1½ in. given that the moisture variation between damp summers and dry winters will change the moisture content in the wood from 12% to 4%, an overall difference of 8% between the seasons. In most parts of the country, those figures are fairly typical. If these boards are glued into a solid panel, you will need at least a ¾-in.-wide expansion slot at both ends of the table—quite a gap for dust and crumbs to collect in. Putting a frame around that much solid lumber is not a plan that I would ever be

comfortable with. You can understand why so many antique dining tables were made with veneered tops.

As an alternate (and more conventional) design using solid lumber, I would recommend that you forget about building the frame around the tabletop and that you run the grain with the 90-in. length of the top. Then you will have only a little less than ¾ in. of movement across the 42-in. width to deal with when deciding how to go about attaching the top to your table base.

[Christian Becksvoort is a contributing editor.]

Jointer and planer sizes

I recently read the articles in your Tools & Shops issue (FWW #160) on 6-in. jointers and 12-in. planers. One of the articles states that the first step in preparing a square board is to joint one flat face and then run the board through a planer with the freshly jointed face down against the planer bed, which will produce a flat, uniformly thick board. My question is this: With planer widths starting at a minimum of 12 in. for portables, and going up from there for the larger industrial units, why are most of the jointers advertised only 6 in. to 8 in. wide? You would think that a 12-in. jointer would be an ideal companion for a 12-in. planer. Am I missing something? Also, is there a technique that would allow me to joint the surface of a 12-in.-wide board by making two passes on a 6-in. jointer?

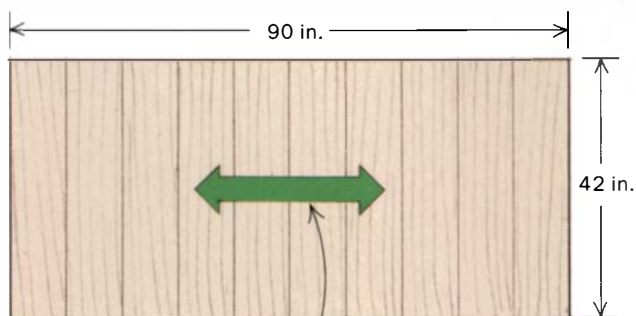
—Al Gegaregian, Portola, Calif.

Gary Rogowski replies: I've had a theory for years that the people who work at tool companies don't see discrepancies like the one you just pointed out as a problem, because most of them are engineers or sales staff. They're not woodworkers, so thinking through the process of how to make wood flat and straight just never occurred to them.

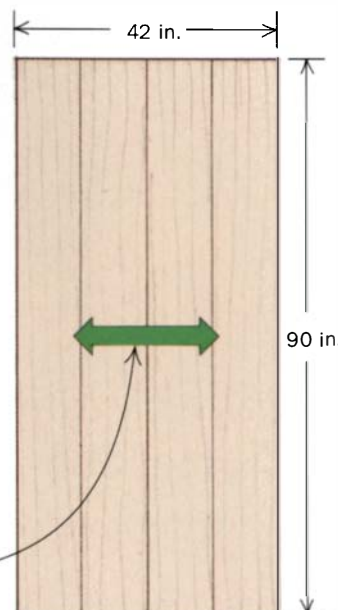
I don't think you're missing anything, and your reasoning is correct: A 12-in. jointer is the ideal companion for a 12-in. planer. The problem is, I think, partly one of economy and partly one that exists because of uneducated consumers. I've been told that in the 1960s, Sears sold a 6-in. planer for a time, but the company

HOW MUCH WOOD MOVEMENT TO EXPECT

With the moisture content of wood changing from 4% (dry, heated winter air) to 12% (un-air-conditioned summer air), furniture made of solid lumber can shrink and swell considerably.



A 90-in.-wide tabletop could expand and contract as much as 1½ in.



A 42-in.-wide top could move about ¾ in.

You Did It Yourself

Using Raised Panel Doors,
Dovetail Drawer Boxes or
Complete Cabinet Kits
from

Scherr's
Cabinet and Doors, Inc.

531 5 Highway 2 East • Minot, ND 58701
Ph. (701) 839-3384 • Fax (701) 852-6090
email: doormker@minot.com



www.scherrs.com

READER SERVICE NO. 11

RAZOR SAW
It cuts FASTER! EASIER! MORE
ACCURATELY!

Order now, only \$25.95 post paid!

Craftsmen around the world
Have discovered the secret of
better quality work. The Razor
Saw cuts by pulling, and will
give a cleaner, more accurate
cut in half the time.

Purchase a RAZOR SAW now
and we will include our 72
page catalog of the world's
finest woodworking tools. Or
send \$3.00 for a two year sub-
scription to our Catalog.

The Best handsaw for ALL woodworkers!
www.japanwoodworker.com
Dept D2

THE JAPAN WOODWORKER

1731 Clement Ave. • Alameda, CA 94501 • 1-800-537-7820

READER SERVICE NO. 49

T E N R Y U P R O S E R I E S

**"The cuts were so quiet and
effortless it felt like I forgot
to raise the blade"**

Hal Taylor, Museum Quality Works of Art, Hartwood, VA

Hal's comment is typical of
the many we receive from
craftsmen who have tried
our Pro Series blades.

Each blade features:

- Expertly-tensioned, fully-hardened tool steel plates for true run
- Fine grit honing of carbide edge for clean, smooth, and easy cuts
- Resin bond-filled expansion slots for extremely quiet cuts

- High-grade, wear-resistant carbide tips for long life

Tenryu Pro Series blades are also available for cutting plastic and non-ferrous metals. So save your ears and make life easier with Tenryu blades. Ask for them at your favorite dealer or call 800-951-SAWS.

TENRYU AMERICA, INC.
www.tenryu.com

FOR YOUR SAFETY:
Follow machine and
manual safety
instructions.



Making quality saw blades since 1910

TENRYU

READER SERVICE NO. 106

Lamello

The Best Joiners!

- Cutter height adjustable in 0.004" steps.
- Stop square with grid for absolute parallel attachment.
- The professional's choice.

**Tops for accuracy, safety,
flexibility and comfort.**



Top 20S
With Step
Memory
System

The Best Biscuits!



- .0013% defect rate. . .
Never throw a biscuit out!
- Flat cross ribs for easy insertion.
- Gridded surface for uniform glue spreading.

Look for the Lamello
name on your biscuits.

**Purchase online at www.csaw.com
or call 1-800-252-6355!**

COLONIAL SAW
MACHINERY SALES AND SERVICE

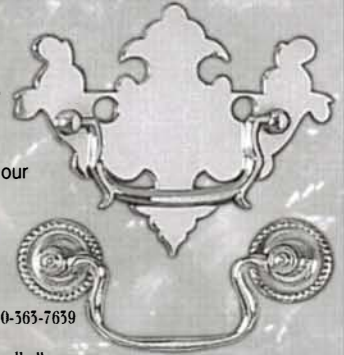
READER SERVICE NO. 132

Finest Quality Reproduction Brass and Iron Hardware

Since 1932, BALL AND BALL has been manufacturing the finest quality antique reproduction furniture hardware, builders hardware, lighting fixtures, and fireplace accessories available. Call for our 108-page catalog, available for \$7.00 (catalog cost refunded on first order).



Ball and Ball
463 W. Lincoln Highway
Exton, PA 19341
Phone: 610-363-7350 • Fax: 610-363-7639
Orders: 1-800-257-3711
Visit our website - www.ballandball-us.com



READER SERVICE NO. 87

EuroShop

By Agazzani Since 1938

Sale!

- 7 Models Available from 16" to 36"
- Resaw Capacities from 10" to 21 1/2"
- Electronically Balanced Cast Iron Wheels
- Durable Vulcanized Tires
- High Rigidity Frames
- Foot Brake with Micro Switch

"I own four bandsaws and I like the EuroShop bandsaw the best"
- SAM MALOOF

EAGLE TOOLS

800-203-0023
www.eagle-tools.com

Fine Woodworking
Machinery & Tools
Since 1988

READER SERVICE NO. 174

couldn't sell enough of them to make the product line profitable, so it was discontinued. A 12-in. planer is only slightly larger than a 6-in. version, and both need feed rollers, chipbreakers and pressure bars. So inch-for-pound, it's cheaper and more economical to make the larger sizes. Jointers are simple machines in some ways, but larger jointers need much larger (and heavier) bed castings. Those larger beds add considerable costs to the manufacturing and shipping expenses.

Here's the background on my mention of uneducated consumers: I called a machinery dealer, Rand Robinson of Barbo Machinery in Portland, Ore. He said that about half of the people buying a jointer want one strictly for edging purposes. As an example, he cited calls he's received asking for 2-in. jointers. So it seems fair to conclude there are a number of woodworkers who don't know they must face-joint wide boards before sending them through a planer.

To answer your other question, I know at least two techniques for flattening wide boards on a narrower jointer. The first is a method that I seldom use and that I even hesitate to recommend, but it often is listed in the owners' manuals that come with 6-in. and 8-in. machines. You must remove the cutterhead guard to joint the wide board as if you were taking a big rabbet off one side of the board. After as many passes as it takes to get that part of the board flat, you are left with a ledge that must be brought down with a handplane. The second (and more common) technique is to rip the stock into two widths, face-joint them separately, and then glue them back together before planing them to thickness. If you use this technique, it's a good idea to leave some extra length on the boards so that you can slide them back and forth to get the best grain match possible when gluing them back together. [Gary Rogowski is the director of the Northwest Woodworking Studio in Portland, Ore.]

How flat is flat?

I've noticed lately that a lot of people seem to be advocating wet-or-dry sandpaper on glass or a granite slab lubricated with water as a method for

WHEN THE WOOD IS WIDER THAN THE JOINTER

Flat faces on wide lumber. If you cannot afford to mate a 12-in. jointer with a 12-in. planer, there are other solutions to getting flat faces on wide lumber. One method requires you to remove the cutterhead guard, which is not safe. The easier and safer technique—cutting the board into two smaller pieces—is shown here. Joint one edge and place the board on the jointer to mark where to make the rip cut.



Cut to a manageable size. Establish a straight edge by jointing one edge and then ripping the board in half.



Then joint the lumber. Joint the same face and mating edges on each of the two pieces. Glue them back together, matching the grain (right), and then plane the reassembled board down to its desired thickness.





FLAMINGO
Specialty Veneer Co.
visit us at
www.flamingoveneer.com
EXTRAORDINARY VENEER
EXTRAORDINARY SERVICE
Tel 488.374.9319 Fax 488.273.4899
A subsidiary of The Harrington Woodworking Co.

READER SERVICE NO. 70



VENEERING and CLAMPING with VACUUM
VACUUM PRESSING SYSTEMS, INC.
553 RIVER ROAD
BRUNSWICK, MAINE 04011
207-725-0935 / FAX 207-725-0932
800-382-4109

The leader in vacuum technology for woodworking offers a complete line of innovative products for:

- VENEERING
- LAMINATING
- CLAMPING

NEW products include:
FlipTop Frame Presses,
Inflatable Bladders
and Videos

READER SERVICE NO. 14

SUPERSHOP 10-IN-1 WOOD & METAL SHOP
Own a Complete, PRO-QUALITY WOOD SHOP In Just 12 SQUARE FEET!
HIGH QUALITY, AFFORDABLE ALTERNATIVE for TIGHT SPACE wood shops!

- Equal or BETTER QUALITY than one-function equipment...costs less, too!
- 10 most-used tools in 1: table saw, lathe, drill press, more!
- 2-1/2 times MORE MASSIVE than other combo machines.
- 30-Day RISK FREE Trial & Industry-Leading Warranties.

CALL TOLL FREE 1-800-476-4849

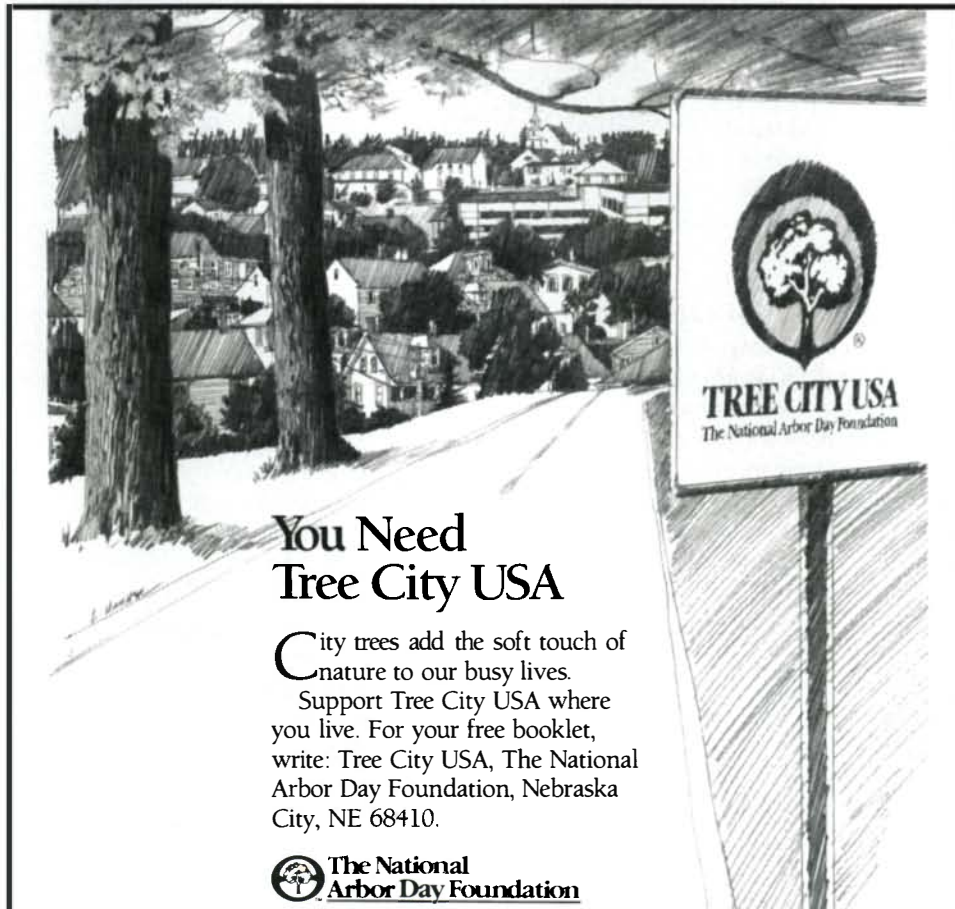
READER SERVICE NO. 107

SQUARE DRIVE SCREWS

- Square Drive Beats Driver Bit Slippage
- Hardened Steel for Extra Strength
- Deep Thread for Super Grip
- Stocking Over 750 Sizes & Styles

McFEELY'S
SQUARE DRIVE SCREWS
PO Box 11169 • Lynchburg • VA 24506
www.mcfelys.com or 1-800-443-7937

READER SERVICE NO. 115



You Need Tree City USA

City trees add the soft touch of nature to our busy lives. Support Tree City USA where you live. For your free booklet, write: Tree City USA, The National Arbor Day Foundation, Nebraska City, NE 68410.

The National Arbor Day Foundation

WOODLINE USA OFFERS YOU MORE... LIFETIME WARRANTY / GUARANTEED LOWEST PRICE
All Woodline USA Products Feature Tough Micro Grain Carbide

66 Piece MASTER SET

This collection features our most popular router bits made. The Master Set is designed to handle the demanding rigorous duty of a full cabinet shop and is broad enough to fill the needs of the occasional weekend. These are the bits you have been looking for at the right price with the quality you need, guaranteed.

SUPER BUY 1/2" Shank WL-2066 or 1/4" Shank WL-2065
OUR PRICE ONLY \$199 set

3 Piece CABINET DOOR SET

- 2-pc Roman Ogee Rail & Stile
- 3 1/4" Panel Raiser
- 1/2" Shank Router Bits

Other Profiles Available Same Low Price
WL-2019-1 \$129 VALUE
OUR PRICE ONLY \$69 set

5 Piece MOULDING SET

1/2" Shank Router Bits WL-2011 \$175 VALUE
OUR PRICE ONLY \$99 set

WOODLINE USA
Formerly Woodline Arizona
E-mail: woodline@woodbits.com
Visit us at our Web site: **WOODBITS.COM**

GREAT ROUTER BITS AND SHAPER CUTTERS BEST SELECTION / BEST PRICE!
ORDER TOLL FREE
1-800-472-6950
WOODLINE USA • P.O. BOX 298 • TEMECULA, CA 92593

- INDIVIDUAL BITS ALSO AVAILABLE • ALL MAJOR CREDIT CARDS
- PRIORITY SHIPPING: \$3.75 FOR UP TO \$99 / \$4.75 FOR \$100+
- MOST ITEMS IN STOCK • SAME DAY SHIPPING

PREMIUM CARBIDE

- Tough Micro Grain Carbide
- Euro Anti-Kickback Design
- Super-Slick Non-Stick Finish
- Super Low Prices

ALL WOODLINE USA SETS ARE PACKAGED IN BEAUTIFUL WOOD BOXES

FREE CATALOG See our great selection of Bits and Cutters
1-800-472-6950
QUALITY Guaranteed

READER SERVICE NO. 113

sharpening chisels and plane blades. This method seems to work great, but I'm left wondering just how accurate the substrate needs to be. For example, I noticed one of the catalogs selling a granite slab ground to a tolerance of no more than 0.0001 in. over the span of its surface. My question is this: How flat is flat enough? Couldn't you just use a benchtop or a piece of plastic laminate glued to particleboard as the surface for the sandpaper?

—Greg Spencer, Fort Collins, Colo.

Garrett Hack replies: Let me preface my answer to your question by posing another one: Why is flatness of your sharpening surface (stones or sandpaper) important? As long as the back surface of your chisel or plane iron meets the bevel at a distinct line, you will end up with a sharp edge. After a single sharpening, a slightly convex line to the back—which you can produce easily on a stone worn hollow or on a sandpaper lapping plate not flat—really won't affect the performance of either a chisel or a plane.

The problem comes with resharpening time and again. A curved back or a sharpening surface not flat means you will have a hard time getting an even polish on the back and maybe on the bevel, too. You'll be rocking the cutting blade, polishing some areas and missing others. Sharpening will take more time, it will be frustrating, and over time the edge will become inconsistently sharp.

Because the back of your tools will conform to the surface they're sharpened on, the flatter your stones or sandpaper lapping plate, the better. A benchtop or plastic laminate on particleboard is probably not very flat. Thick plate glass often is used because it's fairly cheap and reliably flat. Granite is even better because it is stiffer. Then there is the reality that the sandpaper isn't made to a precise thickness (plus there could be uneven bits of grit or glue under it). That is why I recommend sandpaper lapping plates only for rough-flattening of your chisel or plane irons, and moving to a stone of some kind for more precise polishing. Years ago I found a cast-iron machinist's table at a tag sale, and I use it with sandpaper for rough-

FLATTER IS BETTER FOR FINAL SHARPENING

Hack uses sandpaper on an old cast-iron machinist's table for rough-sharpening chisels and plane irons. He follows that process by honing edges on various sharpening stones, and he periodically flattens those stones on a diamond plate. A short time spent flattening the stones saves more time later when sharpening cutting edges.



sharpening. I always follow that process by sharpening cutting blades on stones.

How flat is flat enough? I regularly polish down to 3 microns and sometimes to 1 micron, which is about the equivalent of 0.000039 in. I doubt that the entire surface of my finest stone (or strop) is as flat as this, but to get a consistent polish on the back again and again, some parts of them must be. To make your sharpening easier and more consistent, keep your stones flat with regular maintenance on a diamond plate. [Garrett Hack is a woodworker in Thetford Center, Vt.]

Dealing with mothball odors

I have a maple dresser that is approximately 30 years old. My grandparents used mothballs in the lower three drawers. Any clothes that I put in these drawers smell like mothballs within a day or so. The drawer sides are solid maple, and the drawer bottom is maple-veneer plywood. Is there any way to get rid of the mothball smell for good?

—John Walsh, Kensington, Conn.

Chris Minick replies: Mothballs rank right up there with the worst ideas of all time. They are smelly, the vapors permeate everything that comes in contact with them, the stink persists for what seems like forever, and there is evidence that suggests they may be a health threat, too.

There are two different types of moth-

balls sold today—those that contain naphthalene as the main ingredient, and those that are made from paradichlorobenzene. Both chemicals are unique in that they transform, at room temperature, directly from a solid to a gas without going through a liquid state. It's the gas that kills the moths. But those vapors also absorb into the wood, the clothing and anything else that may be in the dresser. Once the solid mothballs are removed from the dresser, the wood will eventually “off gas” and return to its natural nonstinky state, but that process can take decades. Applying a finish coating over the stinky wood to encapsulate the smell is a good solution; but you must choose the correct finish, or the stink will return. Varnish will not work because the vapors eventually will migrate through the coat of varnish and back into the air inside the drawer.

Do not despair, though: There is a simple solution to your smelly problem—shellac. Shellac has a unique chemical structure that forms a vapor-impenetrable barrier that effectively traps the mothball smell inside the wood. No vapor transmission, no stink. Simply finish the inside of the drawers with two or three coats of shellac, and the problem will be solved. Incidentally, a coat or two of shellac also will eliminate that musty mildew smell often found in antique furniture.

[Chris Minick is a consulting editor.]

New from ...

Lie-Nielsen TOOLWORKS INC.

BOGGS SPOKESHAVE \$125

P. O. Box 9, Warren, Maine 04864
1-800-327-2520 www.lie-nielsen.com

READER SERVICE NO. 6

www.woodfinishing.org

People travel across the US to train at **Dakota County Technical College's National Center for Wood Finishing Technology**. FIND OUT WHY...

- **Unique 9 Month Program** offers hands-on training in: Furniture Restoration, Production Finishing, and Furniture Service Tech.
- **2nd Annual Wood Finishing Conference** set for May 16-17, 2003
- **Summer Seminars:** short, educational seminars beginning in July

Call toll-free 1-877-937-3282 Visit the Web www.woodfinishing.org



EOE

READER SERVICE NO. 47

Keep your Fine Woodworking back issues looking brand new.

Store your treasured copies of *Fine Woodworking* in slipcases for easy reference again and again! Bound in dark blue and embossed in gold, each case holds more than a year's worth of *Fine Woodworking*.

Only \$8.95 (\$24.95 for 3, \$49.95 for 6).
Add \$1.50 per case for P&H. Outside the U.S., add \$3.50 each (U.S. funds only). CT residents add 6% sales tax.

To place an order using your credit card, call 1-800-888-8286 or send your order and payment to:
Taunton Direct, Inc., P.O. Box 5507
Newtown, CT 06470-5507

For the serious woodworker and professional.

ProTop COMPLETE
(p/n FTB400)
ProTop Complete floor standing system includes our 36" ProFence router fence, a ProTop Standard router top and a ProTop Cabinet. (Shown with optional Drawer Bank and Cab-Loc mobile leveling system)

ProLift 28
Router Adjustment System (p/n PL1002)
Perfect for the Porter-Cable 7518 router and 4.2" diameter fixed base router motors (except plunge routers). Fits 3.5" dia. and smaller fixed base motors with adapters.

MADE IN USA

benchdog.com **FREE CATALOG 1-800-786-8902**

READER SERVICE NO. 127

THE STANDARD IN SANDERS

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

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

Clayton tackles the toughest sanding jobs...smoothly.

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

CLAYTON

Spindle Sanders

ROYAL OAK, MI 48068-0520
READER SERVICE NO. 119

500 Wooden Bowls

Bobby Phillips
Spalted maple; turquoise rim

CALL FOR ENTRIES

Send high-quality color slides or transparencies of your work for possible inclusion in an exciting full-color book showcasing the best work in the field. To be published by Lark Books in 2004. Original works considered that range from traditional, functional bowls to conceptual interpretations. No entry fee. Accepted artists receive full credit and complimentary copy.

Postmark deadline: JULY 10, 2003

For guidelines send SASE to:
500 Bowls, Lark Books, 67 Broadway, Asheville, NC 28801

To access forms on our website:
<http://www.larkbooks.com/submissions/ArtistsEntryForms.asp>
E-mail: 500bowls@larkbooks.com

LARK BOOKS

READER SERVICE NO. 164

The Ultimate Molder!

- Straight, Round, Elliptical
- Simple, Easy, Safe
- 100 Standard Knives
- Custom Knives Available
- Quality Construction
- Made in the USA

Ask About Our Video!

Williams & Hussey Machine Co., Inc.
800.258.1380 (USA)
603.654.6828

Visit us online at www.williamsnhussey.com

READER SERVICE NO. 61

AWFS® Fair

July 31 – August 3, 2003

Anaheim Convention Center
Anaheim, California



The Largest U.S. Show for the Industry in 2003:

- ▶ See the latest new products; take advantage of show specials from over 800 exhibiting companies
- ▶ Be one of over 30,000 industry professionals attending the 2003 show; network to form new alliances and strategies
- ▶ Get SMART — **S**pecial **M**achinery **A**nd **R**elevant **T**echnology programs give you unique, in-depth, non-commercial presentations of equipment from around the world
- ▶ Learn from experts — valuable seminars targeted to shop size... in business, safety/environment, products/materials, technology, techniques, and design
- ▶ Keep your competitive edge in the face of global changes in the industry



Student Design Contest showcases the best of the nation's high school and college woodworking furniture designers.

• New in '03 • New Product Showcase and Awards • New in '03 • First-Time Exhibitor Showcase • New in '03 • Safety Showcase • New in '03 •



• New in '03 • New Product Showcase and Awards • New in '03 • First-Time Exhibitor Showcase • New in '03 • Safety Showcase • New in '03 •

Register Online www.AWFSfair.org

For exhibitor and attendee information: Email fair@awfs.org • Fax a request to: (323) 622-0321

• Call: (800) 946-AWFS • Or write to us: AWFS • 5733 Rickenbacker Rd. • City of Commerce, CA 90040 USA

Produced by the Association of Woodworking & Furnishings Suppliers®, the owners of the AWFS® Fair since 1957.



Visit **Fine Woodworking** in booth 520.

The Woodworker's Dream!

Over 40,000 Woodworking Products



**BEST PRICES • WIDEST SELECTION
ALL FROM STOCK**

Call For Our FREE 900+ Page Catalog!

Outwater Plastics Industries, Inc.

1-888-772-1400 (Catalog Requests)

1-800-631-8375 (Sales & Product Information)

1-800-888-3315 (Fax)

New Jersey • Arizona • Canada

www.outwater.com

READER SERVICE NO. 145

One company, one focus...

Preserving your hard work for future generations.

At woodfinishingsupplies.com, we have over 500 products to choose from to help you do your next project proud. Each product we choose to sell must first pass our tests for quality, ease of use and value. Our website and catalog are packed full of information and help is only a phonecall or email message away. Be sure to visit our online wood finishing forum. There are NO order minimums, NO handling charges, and low shipping rates.

WOODFINISHINGSUPPLIES.COM

1-866-548-1677

FAX: 507-280-6510

info@woodfinishingsupplies.com

READER SERVICE NO. 156

Total Pleasure

each runner and kicker, each frame and panel of the carcass go together so square and true that there's no problem fitting the drawers



and well fitting drawers are also what you make with the

WoodRat®

ring 1-877-WOODRAT

check out www.woodrat.com

READER SERVICE NO. 173

Working Together

GENERAL INTERNATIONAL

GENERAL

10" Tilting Arbor Saw 350-5750

8" Deluxe Jointer 80-90

5/8" Hollow Chisel Mortiser 73-050

20" Wood Turning Lathe 280-090

www.general.ca

READER SERVICE NO. 71

Carve a flame finial



Finials have been used for centuries as finishing touches on the pediments of case pieces. During the 18th century, as wealth increased in the American colonies, elaborately carved furniture became popular as a display of opulence.

Cabinetmakers in each colony developed furniture and carved motifs for their clientele that were unique to their region. This flame finial is an example of the style found on Pennsylvania furniture from the third quarter of the 18th century.

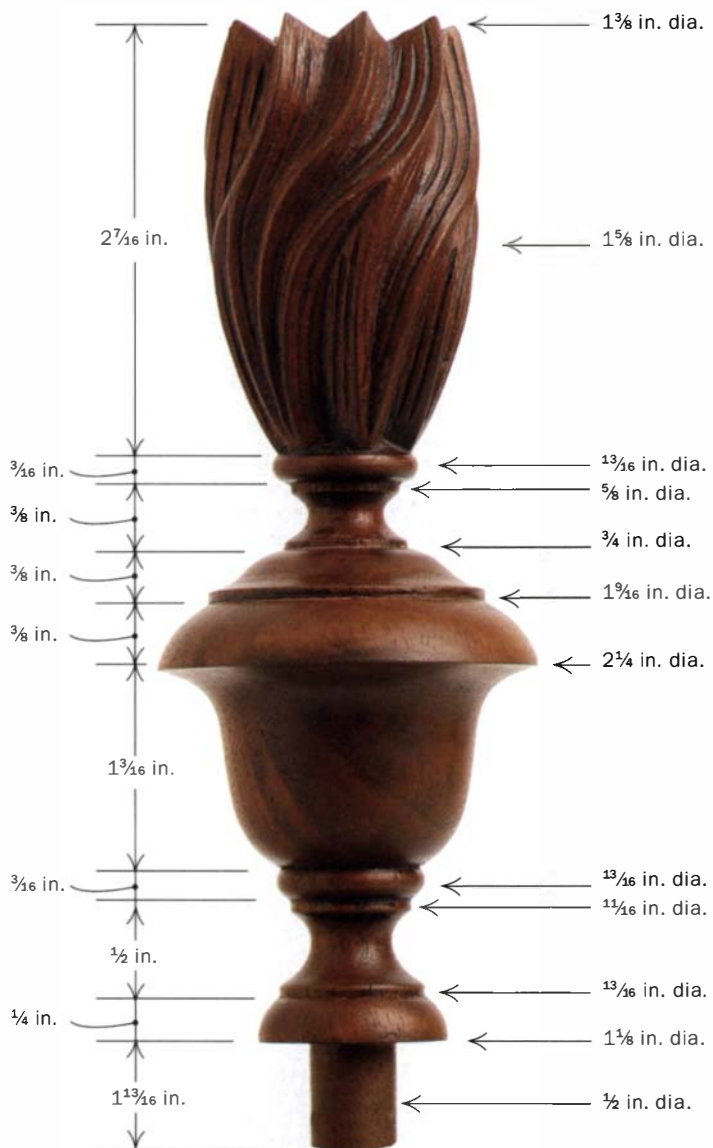
Although a finial appears to be a complex form, it's not difficult to carve when a logical approach is taken. Making this flame finial involves only four steps: turning, sketching, carving and detailing.

Turning is always made more precise with a story stick. This simple tool speeds up layout and helps ensure that multiple turnings will be identical. The stick is marked with perpendicular lines at the location of each bead and fillet. I chisel a small notch where each line intersects the stick's edge.

Start by turning the blank

Begin by selecting clear, straight-grain stock for a turning blank. Solid stock is the best choice; glued-up stock has seams and mismatched grain and color that will distract from the completed turning. Also, it's more difficult to carve glued-up stock because the grain direction makes abrupt, unpredictable changes at the glue lines.

When making finials for large casework such as chests



FORM THE FINIAL



Dimension the turning. First turn the blank to the largest diameter. Then use a story stick to mark out the dimensions.



Form the flame and urn. Complete the turning of the finial, leaving a tenon at each end. The tenons will be used later to secure the work during carving.



Smooth things out. Burnishing the completed turning with chips closes the grain and gives it a nice, natural polish.

ACCURACY FOR SALE!

CARTER BAND SAW GUIDES

- More accurate
- Less blade friction
- A fit for all popular saws 14" and up
- Conversion Kits for most saws



Toll Free: 888-622-7837

Carter PRODUCTS CO. INC.
2871 Northridge Drive NW
Grand Rapids, MI 49544
(616) 647-3380 • FAX: (616) 647-3387
E-mail: sales@carterproducts.com
Website: www.carterproducts.com

READER SERVICE NO. 33

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

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

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

Microplane
Sharper Cutting Tools®

www.microplane.com
info@microplane.com

READER SERVICE NO. 3

OXFORD
PREMIUM SPRAY LACQUER

KEEP FROM REACH OF CHILDREN
STAYS PUT ON 32 FLUID OUNCES • #4086

NOW YOU CAN ORDER ON-LINE!

- Oxford Premium Spray Lacquers
- Oxford Hybrid Varnishes
- Oxford Polyurethanes
- Homestead Dyes
- Mirka Abrasives
- Spray Equipment
- Polishing Materials

or call 1-800-752-9922

www.targetcoatings.com

READER SERVICE NO. 23

Teardrop Trailer Plans

Build your own classic camping trailer!
The ultimate woodworking project

- NO WELDING REQUIRED!
- FULL GALLEY IN REAR
- 8' Cubby

Complete plans include built-in icebox, stove, water tank, 12V electric system, cabinets, floor hatch for porta-potty. Sleeps two inside the cabin, 4' x 8', 900 lbs.

Kuffel Creek Press • www.kuffelcreek.com
PO Box 2663 • Riverside • CA 92516 • fax 909/781-9409

READER SERVICE NO. 162

WHITECHAPEL LTD

THE WORLD'S FINEST HARDWARE

Free 216 page color catalog: 1-307-739-9478
Web: whitechapel.com

French armoire hinges available in six sizes.

READER SERVICE NO. 129

Keep your Fine Woodworking back issues looking brand new.

Store your treasured copies of *Fine Woodworking* in slipcases for easy reference again and again! Bound in dark blue and embossed in gold, each case holds more than a year's worth of *Fine Woodworking*. Only \$8.95 (\$24.95 for 3, \$49.95 for 6). Add \$1.50 per case for P&H. Outside the U.S., add \$3.50 each (U.S. funds only). CT residents add 6% sales tax.

To place an order using your credit card, call **1-800-888-8286** or send your order and payment to: Taunton Direct, Inc., P.O. Box 5507, Newtown, CT 06470-5507

Imagination Not Included!

Video Now Available!

What do you get when you choose a combination machine created by a company with over 50 years of experience? Endless possibilities! Our combinations put power and precision at your finger tips... at an affordable price. The editors at *Fine Woodworking* magazine agree. They recently named the Mini Max CU 300 Smart the best machine in its class. Call today and discover why the only limits you'll have with this machine are those of your own imagination.

Call Toll Free **866-WRK-WOOD**
(866-975-9663)

Mini Max USA
2012 Centimeter Circle, Austin TX 78758
www.minimax-usa.com

READER SERVICE NO. 136

and secretaries, I prefer to turn the flame and urn separately because the narrow cove at the base of the flame weakens the turning. This method also allows you to turn another flame easily if you're not satisfied with the first. After carving, the two can be joined with a mortise-and-tenon joint formed on the lathe. This small clock finial can be made as one piece.

Sketch the flame

Drawing the design is an important first step in carving. Good layout allows you to work through the design details and proportions beforehand, and also gives you direction as you're working.

Fortunately, the layout for this finial is relatively easy. It involves repeatedly sketching cyma curves around the turning perimeter. Spacing the curves is important, and it's easily accomplished with dividers.

Begin the layout by penciling in the first curve. You'll find it easier to sketch the curve if you pivot the pencil from your wrist or the knuckle of your little finger. The transition point at which the curve changes direction is just below the midpoint of the turning. You'll probably find it easier to invert the turning to draw the upper portion of the curve.

When you're satisfied with the first curve, use it as a guide to sketch in the 14 remaining ridges around the turning's perimeter.

Before carving, study your layout and check for spacing and irregularities in the curves. The layout doesn't require mechanical precision, but the lines should flow gracefully as they spiral toward the top. Spacing should look somewhat uniform, but it doesn't need to be perfect. The idea is to create a carving that is well proportioned with pleasing free-form curves.

Carve the design

The flame finial is really just a series of ridges and Vs. Each of the cyma curves that you sketched earlier becomes a ridge, and the area between a pair of ridges forms a V. Carving the flame is now simply a matter of removing the area between the ridges.

If you keep some key points in mind as you carve, success is virtually assured. First, keep the tools sharp: Sharpness is critical to control of the tool. I keep a leather strop on my bench and hone the edges periodically. Second, always carve with or across the grain, not against it; oth-

LAY OUT THE FLAME



Divide to conquer. Mark out six points at the flame base with a pair of dividers.



Sketch the first curve. It's important that this curve be pleasing to the eye.



Locate the flame tips. Step off and mark nine equal spaces with dividers at the top.

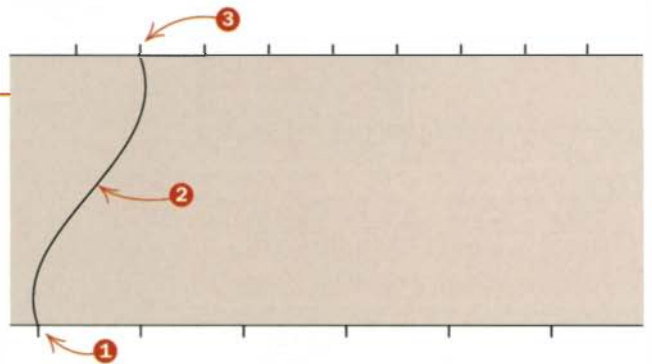


DEMISTIFYING THE FLAME DESIGN

The completed pattern for this carving consists of 15 ridges formed from six points at the base and nine points at the top. If you follow the three-step approach below, what seems complex will become easy. The layout is presented here as if it were a flat design.

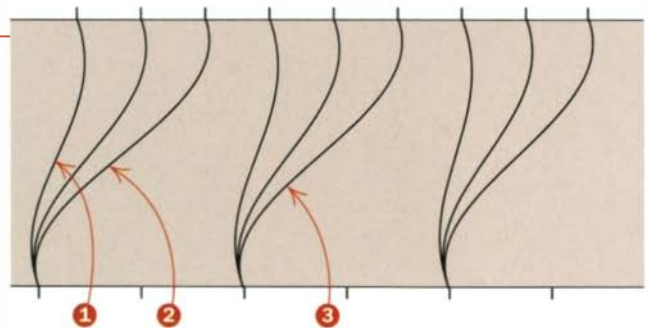
STEP ONE

1. Mark off six equidistant spaces at the base of the flame.
2. Draw a smooth, flowing cyma curve, beginning at the base and working upward.
3. At the top of the curve, mark off nine equally spaced points.



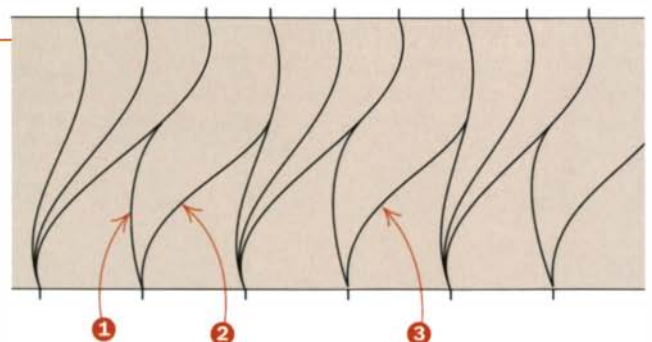
STEP TWO

1. Starting at the same point at the bottom, sketch a second curve upward and to the left of the first, connecting to a point above.
2. Draw a third line from the same point upward and to a point at the right.
3. Skipping a bottom point, repeat this three-curve pattern twice.



STEP THREE

1. Starting at an unused point along the bottom, pencil in a curve that merges with the ridge to the left.
2. Draw a second curve and have it merge into the ridge on the right.
3. Repeat for the remaining unused points along the bottom.




Kreg

POCKET HOLE SYSTEMS

Have you discovered the Pocket Hole Advantage?

Visit KREGTOOL.COM today to learn how the speed, strength and simplicity of pocket hole joinery can complement your woodworking skills. Our "Virtual Trade Show" features a **FREE** video demonstration of the tools and techniques in action!



The **DRILLER** mark of quality. www.kregtool.com
1-800-447-8638

Kreg

READER SERVICE NO. 163

MAKE YOUR SHAPER AND MOULDER KNIVES

with the new **VIEL PROFILE COPYING GRINDING MACHINE**

VHS VIDEO \$9.95 (credited against machine purchase)

- Grinds knives directly in the toolholder
- Makes distortion-free profiles

\$699.00 Only

VISA **CALL 1-800-915-2601**

VIEL TOOLS INC.
P.O. BOX 660, MADAWASKA, ME. 04756-0660

READER SERVICE NO. 57

PRECISION WOODWORKING TOOLS

GENERAL INTERNATIONAL

EXCEPTIONAL PRICING SERVICE & VALUE

MADE IN CANADA

The only High Quality, Heavy Duty Line of Woodworking Equipment Table saws, Jointers, Mortisers, Lathes, Drill Presses and accessories including Modulus Scoring Saw Attachment

..... www.woodworktools.com

ASHMAN TECHNICAL LTD.
351 Nash Rd., N. Hamilton Ontario, CANADA L8H 7P4
Phone: 905-560-2400 • FAX: 905-560-2404 • 1-800-668-5721

READER SERVICE NO. 44

PRO-V



Professional Vacuum Bagging Kit

Includes electronically controlled 5 CFM, vane type vacuum pump, 54"x109" seamless urethane vacuum bag and 10' of vacuum hose. **No compressor needed.**

888-342-8262 **VAC-U-CLAMP**
www.vac-u-clamp.com

READER SERVICE NO. 167

Get FREE Shipping* on Ductwork

Oneida Air Systems

FREE Color Catalog 1.800.732.4065



* 48 States - \$50 Min. - Some Restrictions Apply

On-Line Ordering www.oneida-air.com

READER SERVICE NO. 185

JOIN TODAY!

Taunton PLUS

Exclusive members-only privileges for readers of *Fine Woodworking*

We are pleased to offer TauntonPlus, a special online program that delivers extra benefits, to you—and it's absolutely free! TauntonPlus is our way of saying "thank you" to you and all of our many loyal readers of Taunton magazines. These exclusive members-

only benefits include: sneak previews of upcoming issues, exciting book offers, insider news, discussion forums, seasonal specials, online extras—and much more! Sign up today and enjoy these valuable benefits with our compliments.

It's yours absolutely free...just sign up online at www.taunton.com

erwise, the wood will splinter and tear. As you carve, remember that each layout line becomes a ridge. Also, it's important that the line formed by the bottom of the V is smooth and flows in harmony with the ridges. As you deepen each V, adjust this line, if necessary, to flow smoothly.

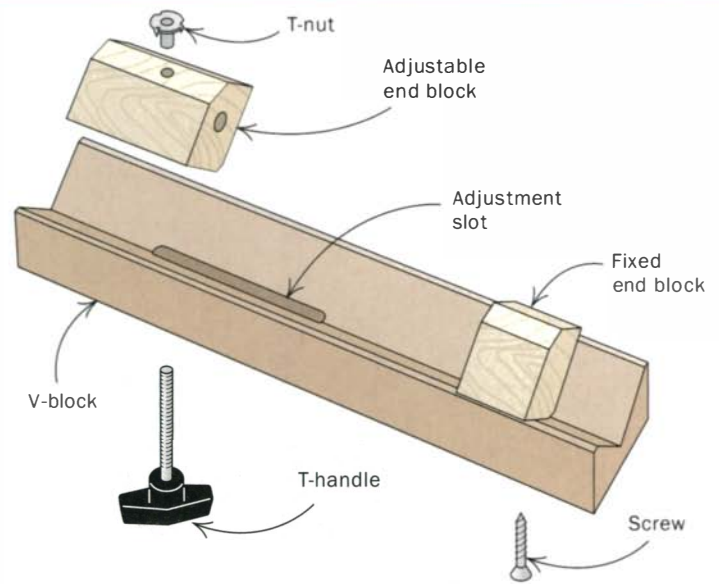
Avoid carving too deep at first. Once you've carved the entire circumference of the turning, you'll have a better feel for the look you're trying to achieve, and you can deepen the cuts as necessary. Unlike many other areas of woodworking, carving isn't a process of cutting to precise dimensions. Instead, it's a matter of creating balanced, flowing lines, which can't be gauged or measured but are judged by a critical eye. In this case, each line should spiral along its length in an uninterrupted cyma curve.

As the carving progresses, the only re-

CARVE THE FLAME

A SIMPLE, EFFECTIVE CARVING JIG

Before you begin carving, take a few minutes to build this jig. Essentially a V-block with a built-in clamp for securing your work, the jig can be held in your bench vise.



Where and how to start. Begin by carving with a 1/2-in. #2 gouge across the grain toward the bottom of each V. Alternate the cuts from both sides to remove the wood cleanly.



A flowing V takes shape. Work from the center of the V out toward the ridges and from the base of the flame to the tip. Cutting across the grain will leave the surface slightly coarse, but the technique removes wood quickly.



Refine your work. When you're satisfied with the initial carving, smooth the surface of each curve by cutting with the grain using the same gouge. Then sever the end grain at the base between the flames with a 3/4-in. bench chisel.

maintaining portion of the original turned surface will be each ridge. Be careful to leave the ridges intact, or you'll spoil the flow of the curve that you created on the lathe.

Add the details

The final touch is to carve the tiny veins on the surfaces of the flame. These shallow grooves break up the otherwise flat surface and give the finial greater visual interest.

When applying a finish, bring out the details with a glaze; either dark wax or a thick stain in a dark color that matches the rest of the finish works well. Brush the glaze over the finish and remove the excess with a rag. The trapped glaze that remains will emphasize the details of the carving. □



Give the flame character. Draw each vein, beginning at the outer edges. Depending on the width, each surface has two to three veins. With a steady hand, carve each vein with a 1.5mm #11 gouge. The veins toward the inside may not flow entirely from top to bottom but fade out as the surface narrows.



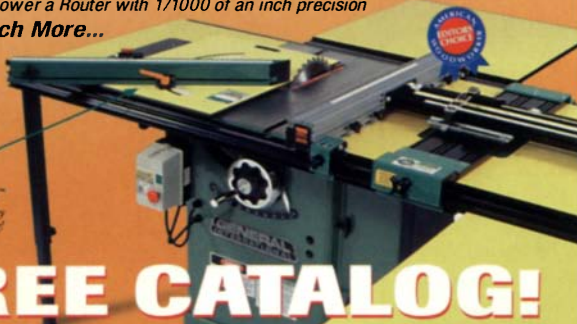
ROUTER & TABLE SAW SYSTEMS

- **Combination Router & Table Saw Fences**
Micro Adjustable, Accurate to 1/1000 of an inch
- **Router Tables, Table Saw Extension and Floating Infeed/Outfeed Tables**
Available in Solid Phenolic or Melamine
- **Complete Table Saw Upgrade Systems**
Available for virtually all Cabinet & Contractor Saws
- **True Zero Clearance Miter/Cutoff Sled**
Micro-Adjustable, Positive Detents Every 1/2 Degree
- **Table Mounted Router Lift System**
Raise & Lower a Router with 1/1000 of an inch precision
- **And Much More...**

Router Table Systems Available



Jointech Routing Center



SMART MITER™
Voted Best New Tool by Popular Woodworking!

FREE CATALOG!

CALL TODAY!

1-800-619-1288

www.jointech.com

JOINTECH
ULTRA-PRECISION WOODWORKING SYSTEMS

Authorized Dealer For
GENERAL INTERNATIONAL

READER SERVICE NO. 51

NORTHWEST
TIMBER

STEP UP TO THE FINEST FIGURED MAPLE, AND WESTERN WALNUT ON THE PLANET



*Furniture by Michael Elkan

*photo: Eric Griswold

- **FIGURED MAPLE**, quilted, curly, spalted, burled, birdseye and figured flooring
- **WESTERN WALNUT**, curly, marbled, crotch, burled and vertical grained
- **CURLY CHERRY**
- **PORT ORFORD WHITE CEDAR VG** (OLD GROWTH SALVAGED LOGS)
- **MYRTLEWOOD**, musical grade, lumber and slabs

NORTHWEST TIMBER

(541) 327-1000 • WWW.NWTIMBER.COM

READER SERVICE NO. 37

WOODWORKER'S MART

See ad index on page 116 for reader service number.

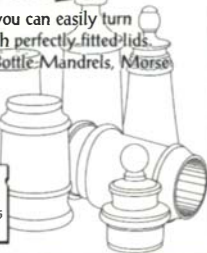
Treen Mandrels

Treen (trē'an)
Made of "tree"; wooden

With TREEN MANDRELS you can easily turn beautiful bottles and boxes with perfectly fitted lids. System includes 1-1/4" Lid & Bottle Mandrels, Morse Taper & special fittings for lids.

For more information, see our website at www.bealltool.com or call or write:

Dept. FW
The Beall Tool Company
541 Swans Rd., NE Newark, OH 43055
1(800)331-4718 Fax 1(740)345-5880



TOP-RATED SEA KAYAKS

Rugged, Ultra-Light,
Beautiful

Leader in Kayak Kits
Since 1986



PYGMY
BOATS, INC.

CALL OR WRITE FOR OUR FREE COLOR CATALOG

(360) 385-6143, P.O. Box 1529, Dept. 98
Port Townsend, WA 98368
www.pygmyboats.com

Need a precise and
affordable tool for
routing furniture
joints?



Visit us...
we are the WoodRat® specialists!

www.chipsfly.com

Advanced Piano Technology



Advanced tuning, regulating, voicing, and rebuilding of grand pianos. Applicants will have some type of training in piano technology - from an established technician, part- or full-time program, or completion of a correspondence course. Selection based on proficiency in tuning, repair, regulation, and overall experience. Accredited member ACCSCT. September 2003 start date.

New summer workshops also offered.

NORTH-BENNET-STREET-SCHOOL

An Education in Craftsmanship
39 North Bennet St. • Boston, MA 02113 • www.nbss.org

Need wood?

VISIT
woodfinder



Over 350 quality suppliers!

www.woodfinder.com

No computer? Call toll-free 1-877-933-4637

CUSTOM ROUTER BITS, CUTTERS & KNIVES
2 week or less delivery

LIBERTY LINE

WHEN IT COMES TO ROUTER BITS
WE KNOW WHAT WE'RE TALKING ABOUT.

RIDGE CARBIDE TOOL CO.

"Industry Leader In Custom Router Bits"

FAX us your custom drawings toll free at
1-888-RCT-TOOL (728-8665) or
mail drawings or wood samples

RIDGE CARBIDE TOOL CO.

595 New York Ave., PO Box 497, Lyndhurst, NJ 07071
Send \$3 for complete 100 page Stock Tool Catalog
or see us at www.ridgecarbide.com

800-443-0992 rcttool@bellatlantic.net

School of Woodworking
 DISCOVER the ART of
HAND TOOL WOODWORKING
 1-15 day Courses to Advanced Levels
 2003 Catalogue of Courses • (254) 799-1418
WWW.CFEESCHOOL.COM

... A PROPER SHOP APRON
 ALL DAY COMFORT, PROTECTION
 SPLIT LEG, X-BACK STRAPS
 STURDY 11OZ. NATURAL CANVAS
 REINFORCED CORNERS
 BRASS GROMMETS
 BELLOWS POCKETS
 FOR TAPE, TOOLS

\$34.95
 \$5.00 S&H

CANVASGOODS
 1-866-742-5223

THE ST. JAMES BAY TOOL Co.
 Norris Style Planes
 Finished or Cas ngs
 Antique Tools
 Bought & Sold
 Free Catalog
800-574-2589
www.stjamesbaytoolco.com


 122 E. Main St.
 Mesa, AZ 85201
 480-835-1477

ORIGINALFURNITUREPLANS.COM



If You're Shopping for a
TORMEK®
Call Us First!

- All Accessories in Stock
- 5 Year Extended Warranty
- Technical Assistance

SHARPTOOLSUSA
 1106 VALLEY RIDGE DRIVE
 GRAIN VALLEY, MO 64029 **800-872-5489**
SharpToolsUSA@att.net www.SharpToolsUSA.com



The Cutting Edge, Inc.
 Fine Hand Tools For Turners
 Carvers & All Woodworkers


 Hollow Turning


 Planes & Handtools


 AutoMach


 Henry Taylor Carving & Turning Tools


 Power Carving

www.cuttingedgetools.com
 7123 SouthWest Fwy Houston TX 77074
713/ 981-9228


BELCHER
 Veneer Company


- All Species
- All Backers
- All Sizes

FREE SAMPLES
Toll Free 866.6 VENEER
 866.683.6337
 31505 Grand River Avenue . #10. Farmington MI 48336

Specialtytools.com
 Your one stop source for tools
 Woodworking, Plastic Laminate, Solid Surface
www.specialtytools.com

1.800.669.5519 FAX: 1.800.660.7371

Educating America's Woodworkers
 for over 23 years!


Scholarships Available

Ph: 440-548-3491
 Fax: 440-548-2721
www.conoverworkshops.com

Furniture That Floats
noahs Cedar Strip, Plywood, Canoe & Kayak Kits,
 Boat Building Supplies
www.noahsmarine.com 416-232-0522 Free Catalog



BEVEL BOSS
 "When the angle isn't 90° I reach for the Bevel Boss. It's a simple tool that lets me set my T-bevel accurately to within 1/4°."
 Chris Beckvoort, Contributing Editor to Fine Woodworking



3" End Scale • 12"-Rule, 1/16" Grads On Back • Easy To Read & Use
877-472-7717 • www.sutherlandtool.com

TROPICAL EXOTIC HARDWOODS OF LATIN AMERICA
www.anexotichardwood.com
 ESTABLISHED IN 1975, 100 SPECIES OF EXOTIC WOOD!
 QUESTIONS 760-434-3030


 • FACTORY DIRECT
 • LUMBER
 • SQUARES
 • SLABS
 • LOGS
 • BOWL STOCK

TROPICAL EXOTIC HARDWOODS OF LATIN AMERICA
ORDERS: (TOLL FREE) 888-434-3031

The best sawmill value...ever. **\$3895**
 FREE INFORMATION - USA & CANADA
1-800-661-7746 EXT. 384 **NORWOOD**



OSBORNE Wood Products, Inc.
 Your Source for Quality Wood Turnings!

Kitchen Island Legs & Much More

Call for a catalog: 1-800-746-3233
 or visit our website at www.osbornewood.com

8116 Highway 123 North
 Toccoa, GA 30577





cookwoods.com
 TOLL FREE 877.672.5275

COCOBOLO - HAWAIIAN KOA - BOCOTE
 MYRTLE - FIGURED MAPLE
 PLUS MANY OTHER RARE EXOTIC SPECIES.

Arbor Day..A Great Idea Grows

In 1872, J. Sterling Morton gave the world a great idea. He created a holiday unlike any other, Arbor Day.

This year, plant Trees for America. For your free brochure, write: Trees for America, The National Arbor Day Foundation, Nebraska City, NE 68410.



The National Arbor Day Foundation™
www.arborday.org

Classic European Woodcarving
 Single and group instruction available
 With Master Woodcarver - Videos - Tools - Patterns - Supplies - Everything
Nora Hall
 www.norahall.com - Toll Free 1-866-392-3416 - nora@norahall.com



AFRICAN EXOTIC HARDWOODS
 • BEST PRICES - DIRECT FROM SOURCE
 • EXOTIC LUMBER, BLANKS AND BURLS
 • LARGE OR SMALL ORDERS WELCOME
 • SHIPPED PROMPTLY NATIONWIDE
 CONTACT FABS AND MIKE TODAY (828) 658-8455 TEL.
CORMARK INTERNATIONAL (828) 645-8364 FAX.
 181 REEMS CREEK ROAD, WEAVERVILLE, NC 28787



MISUGI DESIGNS



Japanese Tansu & Cabinet Hardware
 Japanese Woodworking Tools
 Japanese Paper

Visit us at:
www.misugidesigns.com
 Tel: 707-422-0734 / Fax: 707-425-2465

When Only The Finest Veneer Will Do...



Certainly Wood
 Phone: 716-655-0206 Fax: 716-655-3446
 www.certainlywood.com

Let Reader Service work for you. Receive information direct from your choice of advertisers by using the Reader Service form located next to the inside back cover.

Fine Architectural Millwork & Joinery



HARRIS Woodworking
 Certified Member AWI
 Domestic & Exotic Hardwood Lumber & Plywoods
 Custom Milling
 Toll Free 1-888-288-4611 | www.harriswoodworking.com

WIN A GRIZZLY TABLE SAW IN OUR CRAFTSMAN CONTEST

The plans for this queen sized bed are CAD generated with pages of instructions. Nightstand included as a bonus.



AMERICAN FURNITURE DESIGN
 P.O. BOX 300100 ESCONCADO, CA 92030
 BED PLAN \$21.95 +\$3.50 S&H
 CATALOG \$3.00
 760 743-6923
 www.americanfurnituredesign.com

WOOD RIVER VENEER

Architectural & Cut to Size Panels, Faces, 2 Plys & Veneer

800-875-7084
 www.woodriverveneer.com

The ULTIMATE SAW FENCE!

- GUARANTEED
- EASY REMOVAL
- EASY REPLACEMENT
- ALWAYS PARALLEL **MICRO-RIP 2000**
- SIMPLE INSTALLATION
- NO TAPPING

800-630-8665(TOOL)



www.microrip2000.com
 CALL FOR FREE DEMO VIDEO

CUSTOM BRANDING IRONS
 HIGH QUALITY, DEEP ENGRAVED BRONZE DIES
 LONG LASTING - INDUSTRIAL DUTY HEATERS
NOT THE CHEAPEST - QUALITY COSTS MORE
FREE BROCHURE AND SAMPLE BRANDS

ENGRAVING ARTS 800-422-4509 fax: 707-984-8045
 P.O.Box 787 www.brandingirons.net
 Laytonville, CA 95454 e-mail: clem@brandingirons.net

BARTLEY

Museum quality Reproduction kit Furniture in Shaker, Queen Anne, and Chippendale styles in Tiger Maple, Cherry, Walnut & Mahogany Woods. Build your own masterpiece & Save hundreds \$\$\$\$!

Use Bartley Gel Finishes to finish your masterpiece.

Catalog at 1-800-787-2800
 www.bartleycollection.com



Quality German Workbenches
1-800-32Bench



Diefenbach Benches
 33498 East US Highway 50
 Pueblo, CO 81006
 www.workbenches.com

As seen in FWW issue #160 Tools & Shops pg 91
 Dealer inquiries also welcomed



CALVO BRASS MALLET
 Calvo Studio 186 East Main St. Gloucester, MA 01930
 www.calvostudio.com Order Info. 978-283-0231

THE BEST OLD AND NEW TOOLS IN THE WHOLE WORLD

www.antiquetools.co.uk
www.uktoolshop.com

CROWN PLANE COMPANY
 TRADITIONAL BENCH MADE PLANES
 JACK...SMOOTH...SCRUB...SCRAPERS...BLOCK
 CHAIRMAKERS TRAVISHERS...COMPASS PLANES
 18 Chase Street South Portland, ME 04106
 (207) 799-7535
 Order Online www.crownplane.com



BARR SPECIALTY TOOLS



www.barrtools.com
1-800-235-4452
 CALL FOR FREE CATALOG

THE FURNITURE INSTITUTE OF MASSACHUSETTS
 Philip C. Lowe, Instructor/Director
 A 2-year Hands-on Program with Master Furniture Maker
 116 Water Street Beverly, MA 01915 (978) 922-0615
Summer Workshops available
 www.furnituremakingclasses.com



TECH-WOOD, INC.
 Domestic & Imported Hardwoods
Holly, Blackwood, Mesquite, Koa
 + 60 other species, 4/4-16/4
 Burls, Slabs, Thin Lumber
717-933-8989

MAKE A WINDSOR CHAIR
 with Michael Dunbar
Learn with the Master.
 Craftsman - Teacher - Author
 — 31 Years —



Week-long Workshops Held Year-round
 44 Timber Swamp Road
 Hampton, NH 03842
603-929-9801
 thewindsorinstitute.com

DIMESTORE COWBOYS
 Handforged Handcrafted Hardware
 info@dimestorecowboys.com • 505-244-1493
 407 Second Street SW Albuquerque, NM
 www.dimestorecowboys.com

accurate and tear out free system/shelf pin holes in all materials with your plunge router professional appearance 32mm European system or traditional 1" centers
MEG PRODUCTS phone/fax 609-587-7187
 9 John Lenhardt Road Hamilton Square, NJ 08690
 www.megproducts.com

Got Dust?
 Own a sliding compound miter saw? We have a solution!
 www.downdrafter.com
 800-251-0544

blum Grass mepla
 www.cabinetparts.com
 The one stop source for all your cabinet needs
 Accuride Salice KV
 Wilsonart Laminates

BAUHAUS APPRENTICESHIP INSTITUTE
 Apprenticeship: Art-Furniture Construction/Design, one year-fulltime, hands-on, professional, no tuition / no salary.
 756 Hannah St., Forest Park, IL 60130, (708) 488-8398
 www.LF.org/bhai2000

Andrews Toolworks
 Huge Selection of Stock and Custom Router Bits
 www.routerbitsonline.com • 800.821.8378
 esales@andrewstoolworks.com

QUARTERSAWN HARDWOODS & HIGHLY FIGURED LUMBER
 Ash, Cherry, Hard Maple, Red Oak, White Oak, Walnut, Sycamore, Mahogany, Hickory, and Birch.
 Also, many Exotic Species in Stock.
NEW We now have Curly Bubinga, Curly Makore, + other figured exotics.
WEST PENN HARDWOODS, INC.
 (888) 636-WOOD (9663)
 www.westpennhardwoods.com

www.toolsforworkingwood.com
 Hand tools for the serious woodworker
 Complete catalogue on-line
 27 W 20 St. #507, New York City 800-426-4613

3M™ Power Visor
 Includes Battery Charger
Airware America
 Box 975, Elbow Lake, MN 56531-0975
 3M Authorized Distributor
 e-mail: airware@runestone.net
 www.airwareamerica.com
 Free Info 1-800-328-1792
 Ideal for wood dust

Connecticut Valley School of Woodworking
 hands-on woodworking & furniture making classes nights, weekends & week-long classes
 860.647.0303
 at the Manchester www.schoolofwoodworking.com
WOODCRAFT 249 Spencer St., Manchester, CT 06040

GOOD HOPE HARDWOODS, Inc.
 "Where Fine Woodworking Begins"
 4/4-24/4 Custom Cut Wide Matched Sets
 Custom Flooring Available
 Specializing In:
 Figured & Plain Cherry, Walnut & Claro Walnut, Tiger Maple & 58" Wide Bubinga
 Plus Many Other Species
 1627 New London Rd., Landenberg PA 19350
 Phone 610-274-8842/Fax 610-255-3677
 www.goodhope.com
 We Provide Personalized Service

WOODJOY® TOOLS
 Fine Tools to Enhance Your Skill & Ability
 P.O. Box 204, Swansea, MA 02777
 508-669-5245
 www.woodjoytools.com

CATALOG for WOODTURNERS!
 Call Toll Free...
 (800)-683-8876
 Fax...(828) 859-5551
 E-Mail...packard@alltel.net
 Packard Woodworks - PO Box 718 - Tryon - NC 28782

MIKRON
 Manufacturer of the most versatile moulder in the world
 www.mikronmachinery.com

DUST BOY, INC.®
 1 and 2 HP Dust Collectors
 • Cast Aluminum Blowers
 • High Efficiency
 • Extremely Quiet
 • Portable
 • 5 Year Warranty
 Visit: www.dustboy.com
DUST BOY, INC.
 P.O. Box 278
 Arcanum, OH 45304
 Free Brochure & Layout Information Available
 Fax (937) 692-8266
 800-232-3878

EXOTIC & DOMESTIC HARDWOODS
 LUMBER • PLYWOOD • VENEERS • TURNING BLOCKS • BURLS
FINE WOOD CARVING:
 • Architectural Moldings • Capitals • Corbels • Onlays
 • Door Panels • Fireplace Mantels • Specialty Molding
 We specialize in small to medium size orders!
 Over 80 species of hardwood in stock.
Wood-Ply Lumber Corp.
 100 Bennington Ave., Dept. FW
 Freeport, NY 11520
 CALL FOR PRICE LIST:
 800-354-9002
 FAX 516-378-0345
 www.woodply.com

Fine European Hand Tools
 www.diefenbacher.com
 Diefenbacher Tools • 12132 Old Big Bend • St. Louis, MO 63122
 Free Hand Tool Catalog • 800-326-5316

WEST SYSTEM®
 BOATBUILDERS SWEAR BY IT, and so will you.
 Strong, waterproof WEST SYSTEM® Brand epoxy is more than a 2-part adhesive. It's a complete system of resin, hardeners, fillers and additives from which you can easily create the perfect bonding, coating and sealing agents for your wood or composite project.
 For a free copy of the 30-page WEST SYSTEM® User Manual & Product Guide, write:
 Gougeon Brothers, Inc.
 Dept. 44, P.O. Box 908
 Bay City, MI 48707
 989-684-7286 www.westsystem.com

Craftsman Workshops
 Summer Workshops in Oregon with Craig Stevens, Brian Boggs, Phil Lowe, Teri Masaschi, Gary Rogowski
 503.284.1644
 www.northwestwoodworking.com
THE NORTHWEST WOODWORKING STUDIO

The Fine & Creative Woodworking Program at ROCKINGHAM COMMUNITY COLLEGE

is an internationally recognized associate degree & certificate program. Instruction in hand-tools, furniture, construction, shop start-up, operation & much more.

PO Box 38, Wentworth, NC 27375-0038
Phone: (336) 342-4261, ext. 2178.
www.rcc.cc.nc.us/woodwork/homepage.html
AAEEOC

TWO CHERRIES

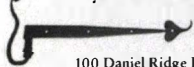
Huge selection of hand forged woodcarving and bench chisels



Robert Larson Co.
San Francisco
800-356-2195
www.rlarson.com
Since 1858

www.customforgedhardware.com

Kayne and Son Custom Hardware, Inc.



100 Daniel Ridge Road Dept. FW
Candler, NC 28715
(828) 667-8868 or 665-1988
Fax: (828) 665-8303



Catalog \$5.00

Windsor Chairmaking Classes

With Marc Blanchette

207-667-1818

125 High St. Ellsworth, ME 04605

On Maine's Coast by Acadia National Park

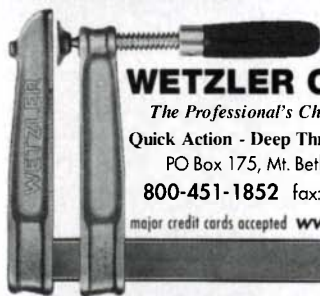
chairmaker@midmaine.com



DOWNLOAD FREE PLAN

7 Must-Have SHOP JIGS

www.PlansNOW.com



MADE IN USA
Free catalog available

WETZLER CLAMPS

The Professional's Choice since 1928

Quick Action - Deep Throat - Bar - Band
PO Box 175, Mt. Bethel, PA 18343

800-451-1852 fax: 570-897-5891

major credit cards accepted www.wetzler.com

Keep your Fine Woodworking back issues looking brand new.

Store your treasured copies of *Fine Woodworking* in slipcases for easy reference again and again! Bound in dark blue and embossed in gold, each case holds more than a year's worth of *Fine Woodworking*.

Only \$8.95 (\$24.95 for 3, \$49.95 for 6).

Add \$1.50 per case for P&H. Outside the U.S., add \$3.50 each (U.S. funds only). CT residents add 6% sales tax.

To place an order using your credit card, call 1-800-888-8286 or send your order and payment to:

Taunton Direct, Inc., P.O. Box 5507
Newtown, CT 06470-5507

GILMER WOOD CO.

Quality Domestic & Exotic Lumber

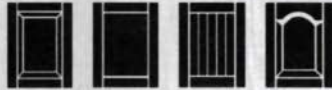
- Logs, blanks, squares
- Over 50 species in stock
- Thin woods, Assortments, Books
- Musical Instrument woods

Phone 503-274-1271

2211 NW St. Helens Rd. Portland OR 97210
Fax 503-274-9839 www.gilmerwood.com



BRING THE OUTDOORS, INDOORS



MANUFACTURERS OF QUALITY CABINET DOORS AND DRAWER FRONTS SINCE 1980 • CUSTOMIZED TO FIT YOUR CUSTOMER'S LIFESTYLE
PHONE: 1-800-273-8600
FAX: 1-800-565-5019

MASS BAY WOOD PRODUCTS, INC.
131 Fisher Street P.O. Box 497 • Franklin, MA 02038

Leigh Dovetail Jig Legacy Ornamental Mill

Tool Classes

MARKSTOOLSCHOOL.com

352 588 4948

DOVETAILED DRAWERS

Reasonably priced method to distinguish your cabinets.

- Custom-sized width and depth
- 1/2" solid maple, assembled and sanded
- 2-coat catalyzed finish available
- Quick service, shipped UPS



EAGLE WOODWORKING

1130 East Street, Tewksbury, MA 01876-1459
FAX (978) 640-1501 (800) 628-4849

TIMBER WOLF™

Band Saw Blades

Swedish Silicon Steel ~ 1/8" - 2"

www.Suffolkmachinery.com

Free Catalog ~ 800-234-7297



AMERICAN SCHOOL OF FRENCH MARQUETRY

UNIQUE PERSONAL INSTRUCTIONS
YEAR-ROUND WEEKLY CLASSES

619-298-0864

www.WPatrickEdwards.com

3815 UTAH STREET SAN DIEGO CA 92104

SOLID START, Elegant Finish.

OLD GROWTH

Quartersawn White Oak, Curly English Sycamore and American Sycamore

NEW and Matching, Tight Grained Veneers.

Precision sawn figured lumber, bookmatched flitches and NOW matching, tight grained veneers.

TALARICO HARDWOODS
610-775-0400
www.talaricohardwoods.com
22 Hardwood Lane
Mohnton, PA 19540
VISA / MasterCard

Innovative British Classics Unique Hand Tools

m-powertools.com

European Hand Tools
"Lynx...the very finest hand saws."

Ph (204) 889 8211
Fax (204) 895 9976
"Also, Two Cherries Firmer Chisels"
www.europeanhandtools.com

We've Reinvented the Clamp

www.porta-vise.com

SELF-ADHESIVE FELT
70% WOOL
TAPES • STRIPS • TABS • DOTS

APPROX. 1/16" & 1/8" THICK
BROWN, GREEN, BLACK
WHITE, AND SILVER GRAY

1-800-796-2333

JDANN
PRODUCTS DIV.

9611 SOUTH COTTAGE GROVE AVE.
CHICAGO, IL 60628
FAX 773-375-2494

KREMER
PIGMENTS
Milk Paint

- natural milkpaint medium(#SCH50088) • mixes with all pigments
- traditional wood paint • 1 litre/\$18.30

Free catalog of woodfinishing supplies

Kremer Pigments Inc. • 228 Elizabeth Street
New York, NY 10012 • (800) 995 5501
www.kremer-pigmente.com

OAKWOOD VENEER CO.

- Specializing in exotic and burli wood veneer
- Flexible paper-backed wood veneer
- 170 species in stock • Sheet sizes up to 5' x 12'

CALL FOR FREE SAMPLE! • Warehouse Showroom
800-426-6018 • Fax 248-542-9973
3642 W. 11 Mile, Berkley, MI 48072
www.oakwoodvener.com

NOBODY BEATS ABRASIVES "R" US PRICES!

★ ★ Made in the U.S.A. ★ ★
We also make Discs - Sheets - Shoprolls - All Size Belts. Buy Direct from the manufacturer and Save Big Money! 65/35% Poly Cotton Aluminum Oxide Washable Material.

Phone: 800-525-1878
805-983-1818
Fax: 805-983-2899
Website: AbrasivesRUs.com
E-mail: AbrasivesRUs@cs.com

PORTABLE SANDING BELTS

SIZE	UNIT	100-FINER	80	60	50	40	36	24
3X18	50	.49	.51	.53	.55	.58	.62	.83
3X21	50	.59	.60	.61	.62	.71	.74	.85
3X24	50	.64	.65	.66	.75	.79	.84	.93
4X24	50	.90	.92	.95	1.05	1.09	1.12	1.20

Charge it - We accept all major credit cards
Mastercard, VISA, Discover, AMEX

BRAZILIAN CHERRY
LUMBER, FLOORING & PLYWOOD

PRIME QUALITY HARDWOOD LUMBER & FLOORING
THOUSANDS OF BOARD FEET
ALL DIMENSIONS
MANY UNUSUAL SPECIES IN STOCK

RARE EARTH
HARDWOODS
IMPORTER / MANUFACTURER

Tel 800-968-0074
Fax 800-968-0094


www.thetoolchest.com

1000's OF BOOKS COVERING

- Woodworking - All Aspects • Tools & Their Uses
- Home Remodeling & Maintenance
- Contracting • Projects For Home & Recreation

THE TOOL CHEST • 45 Emerson Plaza East • Emerson, NJ 07630
201-261-8665 1-800-617-TOOLS Fax: 201-261-3865
FREE USA SHIPPING • BOOK ORDERS OVER \$25

A Woodworker's Dream



Learn to build Shaker-inspired furniture with our finest craftsmen. One-on-one or group instruction available with classes to fit your schedule from one day to multi-week lengths.

DANA ROBES WOOD CRAFTSMEN
Lower Shaker Village, P.O. Box 707, Enfield, NH 03748
800 722-5036 • Fax: 603 632-5377 • www.danarobes.com

Branding Irons

Handcrafted by... as low as \$59.95

Signatures, logos, names. Any size or design. Optional temperature controller, drill press mount. Our personal service will save you money. Same-day quotations. Quick turnaround from order to delivery.

BrandNew Industries, Inc
1-800-964-8251 www.brandnew.net


GOBY Wide lumber - 4/4 through 16/4
WALNUT PRODUCTS Turning - Carving Stock
5016 Palestine Rd. Gunstocks
Albany, OR 97321 Instrument Grade Lumber
VIEWING BY APPOINTMENT ONLY No Minimum Order
(541) 926-1079 WebSite : www.gobywalnut.com

LARRY'S CLAMP The Fast & Easy Way To Flatten Boards For Gluing



620-231-0185
www.larrysclamp.com

CALL TODAY FOR A FREE BROCHURE!



WINDSOR CHAIR WORKSHOPS
in historic Oley Valley, Pennsylvania
Free camping/trout fishing on site
Jim Rendi, Tel: 610-689-4717
www.philadelphia-windsor-chair-shop.com
pphilwindsor@aol.com

Groff & Groff Lumber
Exceptionally Fine Furniture & Instrument Grade Woods

PREMIUM WALNUT, CHERRY, CURLY CHERRY, BIRDSEYE AND TIGER MAPLE

Sawmill Direct • Slabs to 40" Wide • 75+ Unusual Native & Imported Species • Matching Flitches • Burls & Turning Blocks
Order 75 Domestic and Imported Species 4/4 - 16/4
Custom Flooring & Wainscoting • Reclaimed Pine & Chestnut
No Order Too Large or Too Small
858 Scotland Road, Quarryville, PA 17566
1-800-342-0001 • 717-284-0001 • Fax 717-284-2400
National & International Shipping

Project Kits
Step-by-Step Plans with Hardware
WoodsmithStore.com

An Education in Craftsmanship

For careers in:

- CARPENTRY
- PRESERVATION CARPENTRY
- CABINET & FURNITURE MAKING
- PIANO TECHNOLOGY
- VIOLIN MAKING & RESTORATION

Financial aid for qualified students. Accredited member ACCSCT. Short workshops are also offered.

NORTH BENNET STREET SCHOOL
39 North Bennet Street • Boston, MA 02113
(617) 227-0155 • www.nbss.org

CLASSIFIED

The Classified rate is \$8.50 per word, 15 word min. Orders must be accompanied by payment, ads are non-commissionable. The WOOD & TOOL EXCHANGE is for private use by individuals only; the rate is \$15/line, minimum 3 lines. Send to: **Fine Woodworking Classified Ad Dept., PO Box 5506, Newtown, CT 06470-5506. FAX 203-426-3434, Phone (800) 926-8776, ext. 3310. Deadline for the July/August issue is April 25, 2003.**

Business Opportunity

WOODSHOP IN RESTORED UPSTATE New York Victorian barn, 45 acres, my dad's fantasy property, many many extras, zoned commercial. Call for details: (607) 746-3018.

Finishes

SPRAY-ON SUEDE. Line boxes in seconds. Free brochure (sample enclosed). DonJer Products, 13142 Murphy Road, Winnebago, IL 61088. 800-336-6537. www.donjer.com

Glues & Adhesives

HIDE GLUE, all grades. Bjorn Industries, Inc., 551 King Edward Rd., Charlotte, NC 28211. (704) 364-1186. www.bjorn.net

Hardware

DO IT YOURSELF Replacement hardware for cabinets, furniture, windows and closets. www.bainbridgemfg.com

www.hannahshandles.com Soft rubber drawer pulls, sea life, farm animals, dinosaurs, southwest theme and more. Visa, MC, Discover, Amex. Handmade replacement handles for furniture. (509) 745-8320.

www.profhdwr.com Online Catalog; hinges, fasteners, sanding products, optivisors. Professional Hardware. Visa, MC, Discover.

Hand Tools

ANTIQUÉ & USED TOOLS. Hundreds of quality handtools. Many Stanley + parts. Visa/MC. BOB KAUNE, 511 W. 11th, Port Angeles, WA 98362 (360) 452-2292. At www.antique-used-tools.com

PETE NIEDERBERGER- Vintage planes & parts, Always user friendly. Send \$5 for tool list #1. Box 887, Larkspur, CA 94977. (415) 924-8403. pniederber@aol.com

FREE CARVING TOOL CATALOG: 1-888-901-8099 or (507) 332-9801. P.O. Box 611, Faribault, MN 55021. www.stubaidirect.com

ANCIENT & MODERN TOOLS. Woodworking, metal working and other. Users and collectors. www.pennyfarthingtools.co.uk

Help Wanted

FURNITUREMAKER: 3 yrs. min. cabinet/furniture experience. Journeyman training program. \$20K plus performance bonuses. (508) 993-4800. (MA) www.adriance.com

FLORIDA KEYS: Work and play in America's tropical islands. Local building contractor looking for quality-minded woodworker to purchase existing cabinet shop. Unique opportunity for motivated individual to operate own business. Further info: Fax: 305-852-9939.

Instruction

LEARN FURNITURE MAKING DURING your vacation in NH. Personal tuition, one-on-one, for beginners or experienced hobbyists. Tailored to your requirements. Weekdays or weekends. www.andersonfurniture.com

MARQUETRY INSTRUCTOR -highly qualified, gentle humorist, will travel. T. Breeze VerDant (802) 258-9820. tbreeze@sover.net

COME TO LEARN IN SCOTLAND - The Chippendale International School of Furniture offers a 30 week intensive career programme in Design, Making and Restoration. For further information phone: 011-44-1620-810680 or visit www.chippendale.co.uk

SUMMER WORKSHOPS: Fine woodworking design and techniques. Beautiful northern Vermont. Shelburne Craft School (802) 985-3648. www.shelburnecraftschool.org

SCHOOL OF CLASSICAL WOODCARVING. Elected British Master Carver, Ian Agrell, teaches carving for furniture and architecture from his San Francisco workshop. Information from www.agrellandthorpe.com or (415) 381-9474.

TEACHERS-EARN ONE COLLEGE CREDIT! Unstoppable shops workshop. July 24-26. Featured in *Fine Woodworking* #154, p. 24. (970) 824-8847.

APPRENTICESHIP Winner of *Fine Woodworking* Magazine's Apprenticeship Program Award in Professional Artisan Furniture making/designing in rare solid woods. Tuition. Jeffrey Greene. (215) 348-5232. (PA) nolegsneeded.com/greeneandgreene.html

WOODWORKER ACADEMY, comprehensive entry level workshops and precision improvement are our specialty. San Francisco area (510) 521-1623 or www.woodworkeracademy.com

NEW ENGLAND SCHOOL of Architectural Woodworking. 35-week career training in architectural wood-working or 6-week summer intensive for the serious enthusiast. (413) 527-6103. (MA) www.nesaw.com

MASTERPIECE SCHOOL OF FURNITURE offers 1-3 year program in traditional furniture making, Mendocino Coast, California. Summer classes available. Ph./Fax (707) 964-8798. www.masterpieceschool.com

HANDS-ON WORKSHOPS in beautiful Maine. Basic and Advanced. Twelve-week intensive. Center for Furniture Craftsmanship (207) 594-5611. www.woodschooll.org

WOODTURNING INSTRUCTION: Russ Zimmerman's Punta Gorda, Florida workshop or yours. (941) 575-4337 or www.learntoturn.com

TRADITIONAL HIGH-END FURNITURE design, finishing, carving, inlays. No tuition. Year apprenticeship. East Texas. (903) 769-1017.

LONNIE BIRD'S SCHOOL OF FINE WOODWORKING Hands-on woodworking in an inspirational setting. lonniebird@earthlink.net, (865) 484-1145. www.lonniebird.com

BLUE RIDGE MOUNTAINS, VA. One-year apprenticeship available to motivated individual. Saturated learning environment. Accommodations available, tuition. For more information call: Michael Maxwell, (540) 587-9543.

BOOT CAMP! 6 week summer intensive. Organizational, mechanical skills of cabinetmaking, home shop set up. (413) 527-6103. www.nesaw.com

BENJAMIN HOBBS Furniture Making Classes. Queen Anne and Chippendale chairs, chests, beds, tables, more. Hertford, NC. (252) 426-7815. www.hobbsfurniture.com

Machinery New/Used

USED PORTABLE SAWMILLS! Buy/Sell. Call Sawmill Exchange: 800-459-2148, (205) 661-9821. US & Canada. www.sawmillexchange.com

Miscellaneous

GLASS SOURCE FOR WOODWORKERS. Glass and mirror custom cut, beveled, edged, etched, or grooved to your specifications. Shipped direct from our shop to yours. Call for free brochure, inquiries, or to place an order. Glass Source 1-800-588-7435.

Musical Supplies

BUILD YOUR OWN violin, guitar, or dulcimer! Free catalog featuring kits and all the tools, finishing supplies and instructions needed to build your own instrument. Stewart-MacDonald, Box 900-F, Athens, OH 45701. Call 800-848-2273. www.stewmac.com

PLANS KITS & SUPPLIES FOR musical instruments; harps, dulcimers, psalteries, banjos and more. Music-maker's Kits, Dept. FW, PO Box 2117, Stillwater, MN 55082. (651) 439-9120. www.musikit.com

Plans & Kits

WILDLIFE INTARSIA PATTERNS - Visit us at www.wildlifeintarsiadesign.com or call: (708) 788-6455 to get our free catalog.

FULL-SIZE PLANS for building fine furniture. Catalog \$3. Furniture Designs, Inc., CK-53, 1827 Elmdale Avenue, Glenview, IL 60025. 1-800-657-7692. www.furnituredesigns.com

FULL SIZE FURNITURE LAYOUTS Drawn by: Philip C. Lowe. Catalog \$3. (978) 922-0615. 116 Water Street, Beverly, MA 01915. www.furnituremakingclasses.com

CARLYLE LYNCH MEASURED DRAWINGS-Museum and private collection furniture plans by Carlyle Lynch. Catalog \$2. P.O. Box 13007, Arlington, TX 76094. (817) 861-1619.

Power Tools

LAMELLO BISCUIT JOINERS and Accessories/Parts/Repairs. Best prices, most knowledgeable. Call us for all your woodworking & solid surfacing needs. 800-789-2323. Select Machinery, Inc. www.selectmachineryinc.com

NAILERS AND STAPLERS at www.nailzone.com Top brands of tools and fasteners. Visit our website. (800) 227-2044.

Wood

MAINE EXOTIC FIGURED LUMBER- bird's-eye, curly maple and flame birch. Cut to your specifications. Contact Good Woods, (207) 736-6077, Fax 207-736-6066.

MESQUITE Cheap. (915) 585-7693.

ATTENTION VA/MD AREA WOODWORKERS. K/D quartersawn sycamore, red & white oak. Cherry, walnut, elm, apple, and other domestic hardwoods. Herbene Hardwoods, Leesburg, VA. (703) 771-3067.

WALNUT SLABS/CROTCHES 18-in. to 80-in. wide to 16-ft. long. Figured claro, myrtle, elm, sycamore. Black acacia. (408) 847-8433. 877-wal-slab. From our sawmills. Gilroy, CA. www.bakerhardwoods.com

OREGON'S FINEST MAPLE, redwood and buckeye burl. Quality materials for the carver, turner & box maker. Lumber available in fiddleback & curly maple 4/4 to 16/4. (503) 394-3077. www.burlwoodonline.com

FLORIDA'S FINEST 100+ species, great quality inventory, sizes; personal selection/service. ALVA HARDWOODS, (239) 728-2484, 1-888-894-6229.

REDWOOD BURL, RARE EXOTIC burlwood. Direct from logger. Table and clock slabs, turning blocks. Burl Country: (707) 725-3982. Fax 707-725-3306. www.burlcountry.com

QUALITY NORTHERN APPALACHIAN hardwood. Custom milling. Free delivery. Bundled, surfaced. Satisfaction guaranteed. Niagara Lumber, 800-274-0397 (NY) www.niagaralumber.com

SAWMILL DIRECT 100 species of exotics, turning, lumber, logs, slabs, musical instruments TROPICALEXOTIC HARDWOODS OF LATIN AMERICA, LLC: Toll Free (888) 434-3031 www.anexoticahardwood.com. See our other ad in this issue for more information.

FLAMEFIGUREDWOODS.COM Every fitch photographed - see exactly what you're buying! 1-888-528-4372.

EISENBRAND EXOTIC HARDWOODS - Wide selection of imports. Reasonable prices. Quality guaranteed. FREE brochure. 800-258-2587. (CA) www.eisenbran.com

DOMESTIC AND IMPORTED EXOTICS. For musical instruments, pool cues, knife handles and custom furniture. Price list. Exotic Woods, 1-800-443-9264. www.exoticwoods.com

CALIFORNIA'S FINEST BURLWOODS: Massive inventory, many varieties, all sizes, any use, direct, guaranteed. Established 30-years. Burl Tree, 800-785-BURL.

TIGER MAPLE, MAHOGANY, CHERRY: plain and figured. Wide boards, matched sets, 4/4 to 24/4. 200-ft. minimum. (570) 724-1895. www.irionlumber.com

BIRD'S-EYE AND CURLY MAPLE, 4/4 to 12/4 lumber, flitches, turning squares and blocks. Black walnut, cherry/quartersawn, and curly oak lumber. Dunlap Woodcrafts, Chantilly, VA. (703) 631-5147.

FLORIDA-FROM ASH TO ZEBRAWOOD with milling available, including custom, antique restoration and curved moldings. Hardwood Lumber of Lakeland. (863) 646-8681. FREE 877-710-3900.

ALASKAN YELLOW CEDAR, clear Douglas fir. For more info go to www.easycreeklumber.com or call (541) 344-3275.

LONGLEAF (HEART) PINE LUMBER. Resawn from salvaged timbers. Lumber, flooring, stair-tread material and hardwood bow-staves. Lee Yelton: (706) 541-1039. (GA)

FIGURED CLARO WALNUT slabs, planks, blocks, dimensions suitable for small to very large projects. California Walnut Designs. 800-660-0203. www.woodnut.com

RED OAK (species Q. Belutina), 15/16-in. F2S, dried \$119-\$189/bf, samples avail., small or large quantity. (916) 765-4284.

WOOD AND TOOL EXCHANGE

Limited to use by individuals only.

For Sale

Fine Woodworking Techniques, issued as bound vols. 1-9 (#1-55) plus #68-160, complete. Excellent condition, \$550. plus shipping. PO Box 6327, Hamden, CT 06517.

Fine Woodworking #1-138. \$400. *Woodworker's Journal* vols. 6-20. \$200. *Workbench* '85-'98. \$150. All plus shipping. (402) 553-3802.

HEAVY DUTY SASH & DOOR EQUIPMENT. Mortiser, tenoner, moulder & access. \$13,000 takes all. (412) 351-2934. (PA)

INCA: 10-in. tablesaw c/w sliding table, mortiser, tenon jig; 10-1/4-in. jointer planer extra blades; 10-in. bandsaw; all excellent condition. Best offer (905) 845-4922 evenings.

Fine Woodworking issues 1-161. Excellent condition. \$500 plus shipping. (613) 530-1559.

Fine Woodworking 81 issues; 79-161 (minus 158). Very good condition. \$225 plus shipping. Call (949) 249-7794. (CA)

ROSEWOOD- lumber, slabs, cants, large quantity & select 16,000+ bd. ft. - sizes from L 5-in. to 14-ft.; W 3/4-in. to 26+-in.; T 3/8-in. to 11-in. Figured, quartersawn, birdseye, turnstock. (916) 987-7127 / 412-3183. vaniwagen@hotmail.com

CUBAN MAHOGANY. Genuine swietenia mahogani, 1-in. to 4-in. thick, \$10 to \$20 bd. ft., depending on grade, size. Limited amount available. (905) 329-5196 or (905) 935-5196. cubanmahogany@hotmail.com

Fine Woodworking #19-156 excellent condition. \$350 or best offer plus shipping. (831) 373-2669. E-mail: joechsel@ix.netcom.com

Fine Woodworking, #1-151 plus first 100 index, exc. condition. \$450. Plus shipping. Also, for sale Stanley #1 Mint in custom case, \$800. (772) 879-6329. (FL)

DELTA 43-822 shaper spindle cartridge assembly new in box \$210. 43-442 Safe Guard II, 43-557 set new \$40. 43-985 cutter, new in box \$85. (406) 782-1793.

INDEX TO ADVERTISERS

Use reader service card - inside back cover.

For quick access to their websites, go to ADVERTISER INDEX at www.finewoodworking.com

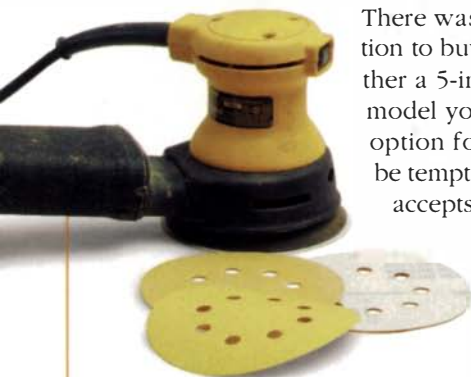
Reader Service No.	ADVERTISER, page #	Reader Service No.	ADVERTISER, page #	Reader Service No.	ADVERTISER, page #	Reader Service No.	ADVERTISER, page #
	AWFS Fair, p. 102	103	Dana Robes Wood Craftsmen, p. 114	12	Launstein Hardwoods, p. 28		Sawheler, p. 3
	Abacus Chair Parts, p. 3	147	Delta Machinery, p. 2	138	Lee Valley & Veritas, p. 21	11	Scherr's Cabinet & Doors, Inc., p. 97
122	Abrasives R Us, p. 113	146	Delta Machinery, p. 7		Leigh Industries, p. 27	143	Sears Craftsman, p. 23
170	Accuride International, p. 9		Dewalt, p. 18a		Leigh Industries, p. 91	69	Sharp Tools USA, p. 110
101	Adams Wood Products, Inc., p. 19	19	Diefenbach Benches, p. 111	6	Lie-Nielsen Toolworks, p. 101	39	Shop-Vac Corporation, p. 9
83	Airware America, p. 112		Diefenbacher Tools, p. 112	91	Lignomat Moisture Meters, p. 3	26	Specialty Tools, p. 110
1	Allred & Associates, Inc., p. 91		Dimestore Cowboys, p. 112	109	Luthiers Mercantile Intl., p. 28	139	The St. James Bay Tool Co., p. 110
186	Amazon.com/ToolCrib, p. 19	169	Downdrafter, p. 112	125	M.L. Condon Lumber, p. 93	30	Suffolk Machinery, p. 113
36	American School of French Marquetry, p. 113	124	Dust Boy, Inc., p. 112		M-Power Tools, Ltd., p. 113	107	Super Shop by Smithy, p. 99
82	American Furniture Design, p. 111			4	MEG Products, p. 112	151	Sutherland Tool, p. 110
192	Antique Tools, p. 111	174	Eagle Tools/Agazzani, p. 97		Marc Blanchette Windsor Chair, p. 113		System Three Resins, p. 27
194	Apollo Spray, p. 19	131	Eagle Woodworking, p. 113	59	Mark's Tool School, p. 113	2	Talarico Hardwoods, p. 113
44	Ashman Technical, Ltd., p. 107	189	European Hand Tools, p. 113	88	Mass Bay Wood Products, Inc., p. 113	23	Target Enterprises, p. 105
154	Australian School of Fine Furniture, p. 25	104	Everlast Saw & Carbide Tools, p. 19	115	McFeely's Square Drive, p. 99		Taunton Books, p. 94-95
87	Ball & Ball, p. 97	187	Felder USA, p. 25	3	Microplane, p. 105	168	Tech Mark, Inc., p. 33
	Barr Specialty Tools, p. 111	70	Flamingo Specialty Veneer, p. 99	42	Micro-Rip 2000, p. 111	31	Tech-Wood, Inc., p. 111
5	The Bartley Collection, Ltd., p. 111	152	Forrest Manufacturing, p. 35	96	Mikron Woodworking Machinery, p. 112	158	Ten Fingers Corporation, p. 13
161	Bauhaus Apprenticeship Institute, p. 112	79	Fuji Industrial Sprayers, p. 13	117	Miller Dowel Company, p. 3	106	Tenryu America, Inc., p. 97
149	The Beall Tool Co., p. 109	114	The Furniture Institute of Massachusetts, p. 111	137	Mini Max, p. 21	142	Thewindsorinstitute.com, p. 111
22	Belcher Veneer Co., p. 110			136	Mini Max, p. 105	21	The Tool Chest, p. 114
127	Bench Dog, p. 101	71	General Manufacturing Co., Ltd., p. 103	10	Misugi Designs, p. 111	188	Tools for Working Wood, p. 112
63	Berea Hardwoods, p. 19	155	Gilmer Wood Company, p. 113	50	Noah's, p. 110	181	Tropical Exotic Hardwoods, p. 110
62	Berea Hardwoods, p. 91	9	Goby's Walnut Wood Products, p. 114		Nora Hall, p. 111	140	Turbinaire, p. 25
	BrandNew Industries, p. 114	48	Good Hope Hardwoods, p. 112	165	North Bennet Street School, p. 109	141	Turbinaire, p. 91
176	The Burgess Edge, p. 7	153	Gorilla Glue, p. 28	43	North Bennet Street School, p. 114	167	Vac-U-Clamp, p. 107
159	CMT-USA, p. 28	80	Gougeon Brothers, p. 112	37	Northwest Timber, p. 109		Vacuum Laminating Tech., Inc., p. 17
110	CS Woods, p. 21	78	Groff & Groff Lumber, p. 114	99	Northwest Woodworking Studio, p. 112	14	Vacuum Pressing Systems, p. 99
184	CT Valley School of Woodworking, p. 7	120	HTC Products, Inc., p. 91	8	Norwood Sawmills, p. 110	57	Viel Tools, Inc., p. 107
121	CT Valley School of Woodworking, p. 112	193	Harris Woodworking, p. 111		Oakwood Veneer, p. 113	133	Virutex.com, Inc., p. 25
	Cabinetparts.com, p. 112	123	Hearne Hardwoods, Inc., p. 19	38	Omer Direct, p. 17	25	W. Moore Profiles, p. 93
144	CabParts, p. 33	118	Hida Tool & Hardware, p. 93	58	Oneida Air Systems, p. 17	55	WGB Glass, p. 93
116	Calvo Studio, p. 111	97	Highland Hardware, p. 25	185	Oneida Air Systems, p. 107	15	Waterlox Coatings Corp., p. 17
166	Canvas Goods, p. 110	84	Iturra Design, p. 19	130	The Original Saw Company, p. 13	18	West Penn Hardwoods, p. 112
33	Carter Products, p. 105	20	J.B. Dawn, p. 113	89	Originalfurnitureplans.com, p. 110	66	Wetzler Clamp Company, p. 113
	Center for Essential Education, p. 110		Jack Rabbit Tool, p. 27	157	Osborne Wood Products, p. 110	129	Whitechapel, Ltd., p. 105
	Center for Furniture Craftsmanship, p. 9	49	The Japan Woodworker, p. 97	145	Outwater Plastics Industries, p. 103	160	Wilke Machinery Co./Bridgewood, p. 93
92	Certainly Wood, p. 111	102	JessEm Tool Co., p. 17	54	Packard WoodWorks, p. 112	61	Williams & Hussey, p. 101
126	Chips Fly, p. 109	182	Jet Equipment, p. 29	135	Philadelphia Windsor Chair, p. 114	108	Wood River Veneer, p. 111
150	Classic Designs by Matthew Burak, p. 7	51	Jointech, p. 109	67	PlansNow.com, p. 113	128	Woodcraft Supply, p. 14-15
119	Clayton Machine Corp., p. 101	177	Kampel Enterprises, p. 17		Porta-Vise, p. 113		Woodfinder by Woodrose, p. 109
132	Colonial Saw Company, p. 97		Kayne & Son, p. 113	60	Pygmy Boats, Inc., p. 109	156	WoodFinishingSupplies.com, p. 103
35	Conover Workshops, p. 110	81	Keller & Company, p. 25			24	Woodjoy Tools, p. 112
95	Cook Woods, p. 110	163	Kreg Tool Company, p. 107	53	Rare Earth Hardwoods, p. 114	113	Woodline USA, p. 99
85	Cormark International, p. 111	16	Kremer Pigments, p. 113	100	Ridge Carbide Tool Co., p. 109	98	Woodmaster Power Tools, p. 33
65	Crown Plane, p. 111	162	Kuffel Creek Press, p. 105	111	Robert Larson Co., Inc., p. 113	179	Wood-Ply Lumber Corp., p. 112
32	The Cutting Edge, Inc., p. 110			94	Rockingham Community College, p. 113	173	WoodRat, p. 103
178	DIY Network, p. 11	75	Laguna Tools, p. 119			17	Woodsmith Store, p. 27
47	Dakota County Technical College, p. 101	164	Lark Books, p. 101	76	Rosewood Studio, p. 28	68	WoodsmithStore.com, p. 114
		105	Larry's Clamp, p. 114	7	Router Bits on the Web, p. 25	74	Woodworker's Depot, p. 91
				56	Routerbitsonline.com, p. 112	27	Woodworker's Supply, p. 93
						64	Worcester Center for Crafts, p. 13
						180	Yesterday, p. 27

A starting kit for finishing

Just as a Goddard-Townsend chest can't be built with only a saw and a chisel, a good finish requires more than a can of boiled linseed oil and a few rags.

Many woodworkers lavish attention on their woodworking tools but don't give much thought to their finishing supplies. With that in mind, I asked four finishing experts—professional finishers Jeff Jewitt, Peter Gedrys and Teri Masaschi, and consulting editor Chris Minick—what they recommend as a basic tool kit for finishing.

Start with good surface preparation



POWER SANDING

You'll need a 5-in. or 6-in. random-orbit sander with some form of dust collection. Go with a hook-and-loop attachment system.

There was unanimous recommendation to buy a random-orbit sander, either a 5-in. or 6-in. model. Whatever model you pick, make sure it has an option for dust collection. You may be tempted to purchase a sander that accepts pressure-sensitive adhesive (PSA) discs because they are cheaper than hook-and-loop discs. Don't: It is a false economy for most amateurs. Unless you are sanding huge projects, you will find yourself moving up to the next grit with half the life still left on the disc you just used. A hook-and-loop disc can be remounted and

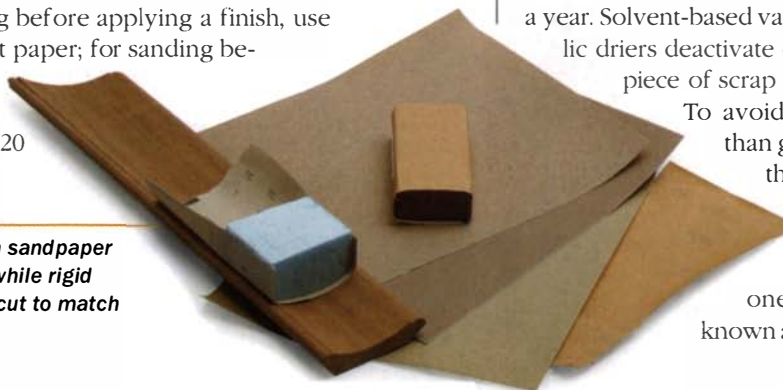
reused, but a PSA disc most likely will not adhere again and must be thrown away. You'll need a supply of discs with grits of 100, 120, 150, 180 and 220.

Hand-sanding is inevitable—Not only will you need to hand-sand small areas and molding, but you'll also have to hand-sand between coats of finish. A cork or felt block helps you maintain a flat surface while sanding, and it saves your fingers. An alternative suggested by Minick is to use 1½-in.- or 2-in.-thick rigid foam insulation, usually colored blue or pink. You'll find plenty of insulation scraps in construction-site trash containers. A benefit of the foam is that it can be sawn to match contours.

For the final sanding before applying a finish, use 180- or 220-grit garnet paper; for sanding between coats, use aluminum-oxide paper in grits of 220, 320

HAND-SANDING

A cork block wrapped in sandpaper helps flatten surfaces, while rigid foam insulation can be cut to match molding profiles.



and 400. Make sure the paper is steared, or nonloading; otherwise, the finish will clog the paper quickly.

Don't be afraid of dyeing

Some may question why beginning finishers should dye or stain their work. All four finishers believe that adding color to some woods is such an integral part of finishing that it should be learned early on.

Gedrys favors water-based dyes for their light-fastness, arguing that it is very little extra work to raise the grain prior to the final sanding. The others say premixed non-grain-raising (NGR) dyes, such as those made by Solar-Lux, are easier to use and compatible with all clear finishes.

These are the first half-dozen colors that you will need in a basic finishing kit:

1. Green—to kill the salmon pink color often found in mahogany as well as to tone down the overly red color of many cherry stains
2. Medium yellow—the first dye applied to a piece to unify the color tone of different boards
3. Medium brown—to lower the brightness of a stain and make it look more natural
4. Dark brown such as mission brown
5. Reddish cherry brown
6. Black—in most dyes this is actually a very dark blue and will cool down other colors.

You'll need a few clear finishes

Unlike fine wines, finishes don't age well, so don't let your shop resemble a cellar with dozens of cans gathering dust. Shop-mixed shellac has a shelf life of about six months. Premixed shellac, if unopened, can be used until the expiration date on the can; but once the can has been opened, the finish should be used within about a year. Solvent-based varnishes last about two years, as the metallic driers deactivate over time. Apply any doubtful finish to a piece of scrap and see if it dries hard or remains sticky.

To avoid wasting finish, purchase quarts rather than gallons and start with one of the following three finishes.

Danish oils are easy to apply—For a close-to-the-grain appearance, apply one of the many oil/varnish/solvent blends known as Danish oil, such as those made by Watco



ADDING COLOR

Dye concentrates are the most flexible way to add color. Non-grain-raising dyes are easiest to use, and water-based dye powders are cheapest.

Finish Line (continued)

AN ASSORTMENT OF FINISHES



Oil/varnish combinations. Generally known as Danish oil, these finishes can be applied and wiped off with a rag for a low-luster, open-pore finish.

Shellac comes in two forms. Premixed is easier to use but has a limited shelf life. Dry flakes last much longer and come in a variety of colors.

Tough finishes. For surfaces subject to frequent contact, alkyd varnish or polyurethane provides a durable finish.

rub out the finish, avoid using spar varnish, which is formulated to remain softer and more flexible to survive outdoor elements.

Buy a quart of denatured alcohol and a quart of mineral spirits to thin the respective finishes and to clean the brushes when you're done.

A good finish needs a good brush

It is best to match the brush to the finish and the project. Synthetic bristles are cheap and

or Waterlox. They require minimal skill to apply and give an acceptable appearance, but on the downside, they provide minimal protection.

Shellac is the most versatile finish—Shellac is sold in flake form or premixed varieties. It can be used as a barrier coat to seal softwood knots, as a sanding sealer, as a stain controller to minimize blotching, as a layer between incompatible finishes (in its dewaxed form) and as a beautiful finish in its own right.

The best way to start is with Zinsser's SealCoat, which has a slightly orange tone. It is dewaxed and comes as a 2-lb. cut (the equivalent of 2 lbs. dry shellac flakes to 1 gal. denatured alcohol). For best results, dilute it with one part denatured alcohol to two parts SealCoat. For the last coat, cut it to a 1:1 ratio.

Once you get accustomed to using shellac, sample the variety of colors available. These range from almost-clear super blond to dark buttonlac and seedlac that instantly give an aged appearance to a piece. The dry flakes last almost indefinitely.

Varnish is a durable tabletop finish—Neither Danish oil nor shellac provides sufficient protection for tabletops subject to heavy use.

easy to clean, and today's synthetic brushes are equal in quality to all but the most expensive natural-bristle brushes. The bristles should be 2½ in. to 3 in. long and taper to a point to facilitate proper flow from the brush and to minimize bubbles in the finish. Buy a 3-in.-wide brush for large, flat areas, and a 1½-in.-wide angled sash brush for detail areas such as legs, moldings and edges.

If you favor water-based finishes, try a foam brush that costs only a dollar or two. For solvent-based varnishes, you may want to invest in a 2-in. or 3-in. natural-bristle brush, either china (hog) bristle or a more expensive blend of bristles. For applying the final thinned coat of shellac or varnish, Masaschi recommends a brush with Taklon bristles, such as that used for watercolor washes.

Tools for rubbing out the finish

To degloss a finish, it's easiest to rub it out with 0000 steel wool, preferably Liberon's brand, which lasts longer and cuts evenly. To achieve a high-gloss finish, you can use the traditional pumice and rottenstone or the newer Abralon abrasive pads. Start with 500 grit and work your way through 1,000, 2,000 and finally 4,000 grit, using mineral oil as a lubricant. A final step can be to use automotive compounds to give a swirl-free, wet-look gloss.

Applying a good paste wax protects the surface from scratches as well as improves the feel.

Your total outlay for the above supplies will be a few hundred dollars, and as Winston Churchill said in another context: "Give us the tools, and we'll finish the job." □



BRUSHES

From the top: A 3-in. synthetic-bristle brush covers large surfaces. A 1½-in. angled sash brush copes with smaller areas. An artist's wash brush can lay down a final thin coat of finish, leaving almost no brush marks.

For maximum durability, apply a solvent- or water-based polyurethane varnish. Minick favors Minwax Fast-Drying Polyurethane because it flows nicely off the brush, dries quickly and does not have the plastic look of many polyurethane varnishes.


If, like Gedrys, you have a strong dislike of polyurethane, try an alkyd varnish. However, you must be prepared to thin it with mineral spirits to get the alkyd varnish to flow out evenly from the brush. If you are planning to



RUBBING OUT

An easy, low-luster finish. Rubbing out the finish with good-quality 0000 steel wool lubricated with wax polish yields a smooth, low-luster finish.

High-tech high gloss. For a glossy finish, use cushioned abrasive pads starting at 500 grit and moving up to 4,000 grit. Buffing with an automotive compound gives the highest gloss.



Don't Blink!

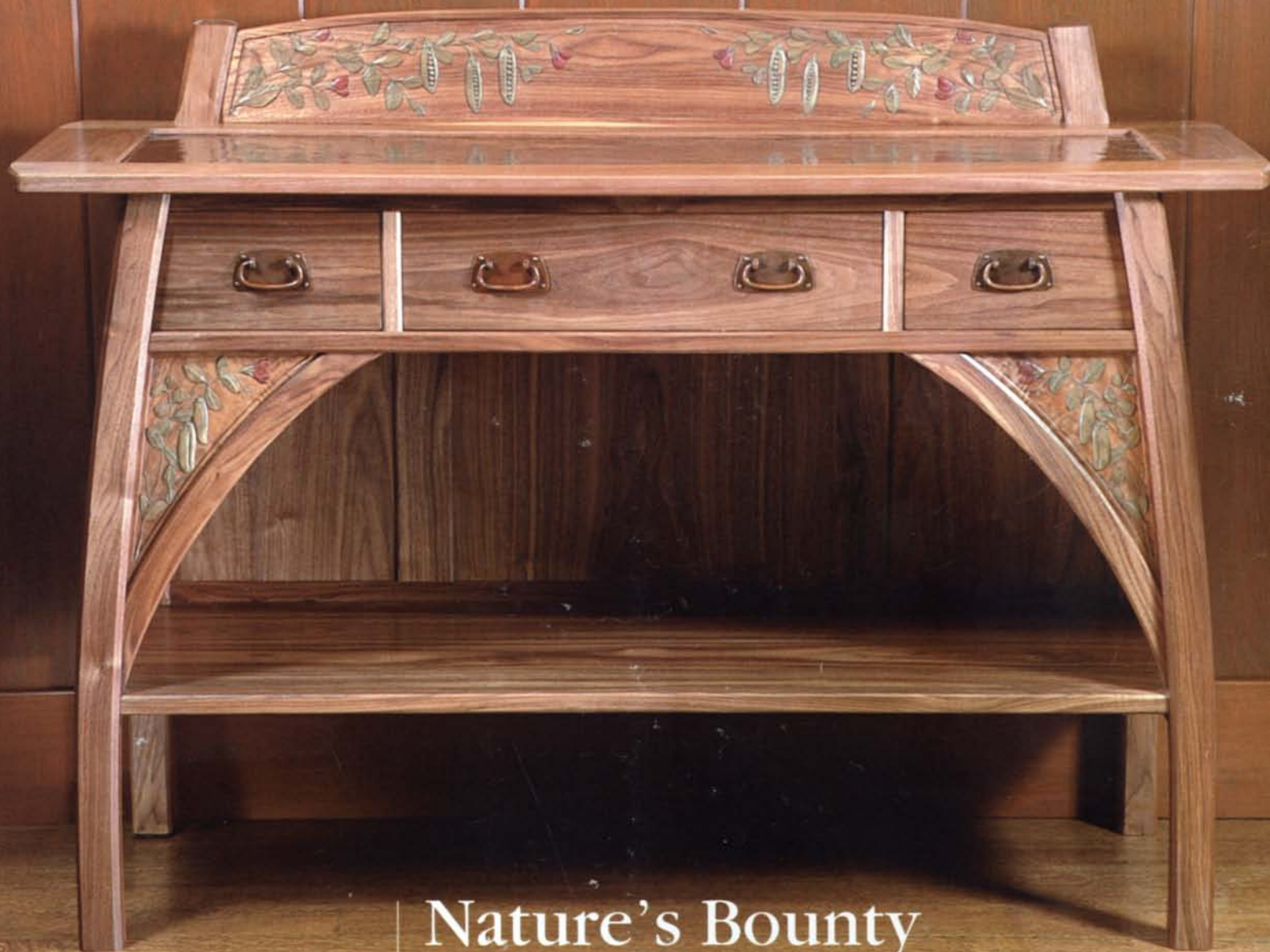
He's finished

The ultimate European Combination machine.

*Call for a free video
800.234.1976*

LAGUNA TOOLS
Innovation, Imagination and Invention at work

www.lagunatools.com
17101 Murphy Ave. Irvine, CA 92614
READER SERVICE NO. 75



Nature's Bounty

For Debey Zito, woodworking comes out of her respect for nature. "You buy a piece from me, and yes, a tree was cut down. But every day that it's used, for a couple of hundred years, that's a tree that doesn't get cut down," she said. With a naturalistic form, this black walnut server is one of many pieces that Zito and wood carver Terry Schmitt (right in photo) have collaborated on. Steeped in English Arts and Crafts and Art Nouveau traditions, Zito accentuated the leg-to-rail intersections with Gothic arches.

Zito's rise in the woodworking community wasn't easy. "I must have called every cabinet shop in Los Angeles, and the owners just laughed at me, asking if I was applying for my husband." Eventually, she found part-time work at a cabinet shop, and in 1981 she branched out on her own. Today, Zito makes a special effort to teach and offer apprenticeships to women.

