TAUNTON'S

# Fine WoodWorking

Pullout: Bandsaw tune-up guide

August 2002
No. 157

## A classic Shaker wall clock


Which sharpening system is best?

Router-table tips

Arts & Crafts finish without fuming

Fine furniture from plywood

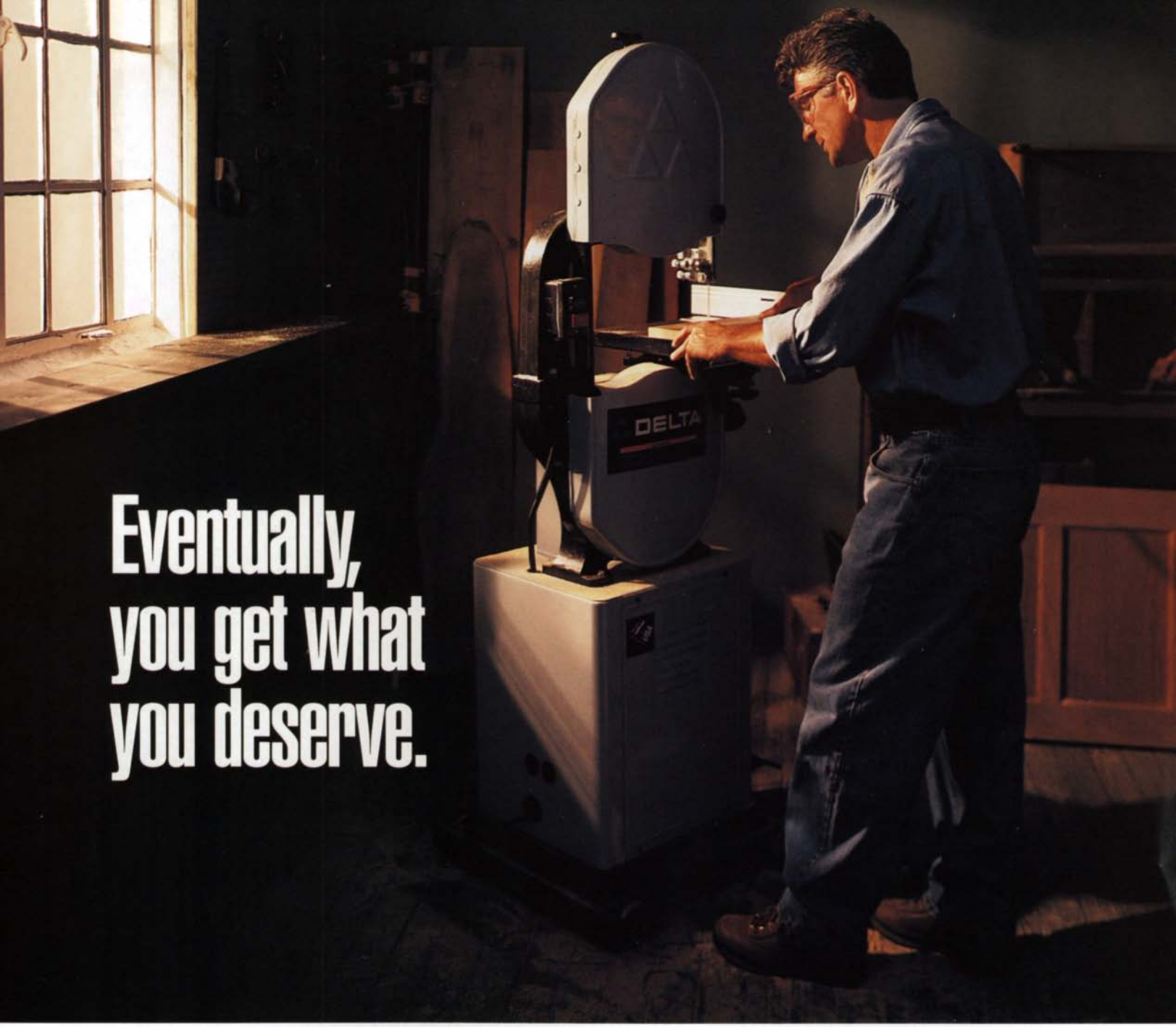
Tool test: Radial-arm saws

Build a traditional dovetailed drawer

$7.99/Canada $8.99

08

0 94115 56525 7




# Eventually, you get what you deserve.


## Get hundreds of dollars worth of free accessories with these Limited Edition Delta machines.

All the time, all the effort, all the talent. You put a lot into your woodworking. Which is why we've put together a deal you can get a lot out of. Right now, buy any one of 11 Delta machines – the same tools seasoned woodworkers have always relied on for uncompromising quality – and we'll give you a long list of accessories absolutely free. From mobile bases to cast-iron wings, table boards to carbide-tipped saw blades*. The way we see it, you've got it coming to you. For the name of your nearest dealer, call Delta Machinery at 800-438-2486 (U.S.) or 519-836-2840 (Canada). Or visit deltamachinery.com.

DELTA®

Delta is a proud sponsor of these PBS programs.

*Accessory packages vary by product.

READER SERVICE NO. 147

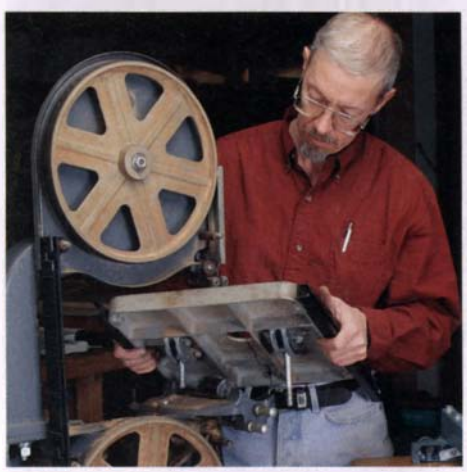
Fine WoodWorking®

# Departments



***On the Cover:***
*Contributing editor Chris Becksvoort makes a traditional Shaker wall clock out of cherry.*
*See p. 53*
*Photo: Michael Pekovich*

***Honing systems put to the test, p. 36***



***Bandsaw tune-up, p. 46***

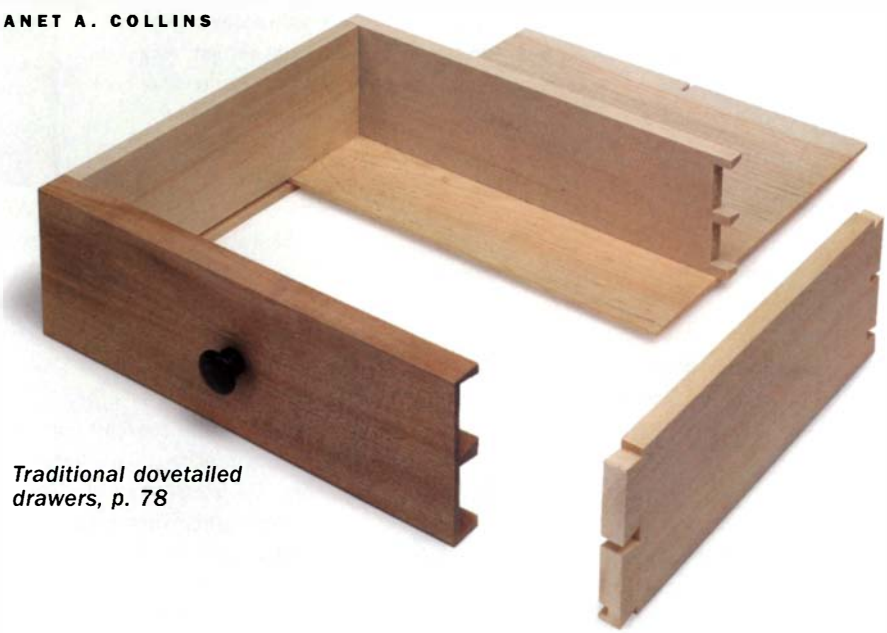
***Turned lid from contrasting woods, p. 100***

JULY/AUGUST 2002 NO.157

# Articles



*Arts and Crafts finish without fuming, p. 42*



*Traditional dovetailed drawers, p. 78*

# Contributors

**Janet A. Collins** ("Making Traditional Dovetailed Drawers") got her start in woodworking about 15 years ago, when she owned an old house. "I did everything to the house—including plumbing, electrical, insulating, replacing windows and doors and anything related to carpentry." When it came time to tackle the kitchen, Collins decided to build her own solid-wood cabinets. After successfully building the kitchen cabinets, she built other furniture for the house. "Shortly after that," said Collins, "I found North Bennet Street School, and the rest is history." Collins graduated from the school's full-time cabinet- and furniture-making program and is now the workshop program director there. When not working and teaching, she builds furniture on commission at her home and shop in Ryegate, Vt.

**Joseph Beals** ("Radial-arm Saws—One man's techniques for an indispensable machine") has been building custom cabinetry and architectural millwork for 20 years. He lives on the Massachusetts coast in a town appropriately named Marshfield, given that the area is the cranberry capital of the United States. For those who have never seen cranberries growing, they emerge from flooded bogs dotting the landscape like a giant, scarlet quilt. When he's not woodworking, Beals plays traditional Irish music on the fiddle with his son, with whom he also builds dry stone walls.

**Ron Layport** (Master Class) is returning as a *Fine Woodworking* author after an 11-year hiatus dating back to issue #89. Then he was a part-time furniture maker. Now he's an accomplished turner whose vessels have appeared in numerous exhibitions. He recently quit his day job of 40 years—as an art director in Pittsburgh, Pa.—to become a full-time woodworker. What changed was that his work was picked up by del Mano Gallery in Los Angeles. The turnings that caught del Mano's attention are very different from Layport's earlier platters and lidded vessels—each is a shallow bowl surrounded by the carved, stylized body of an animal. A few of these can be seen at www.delmano.com.

**Mark Edmundson** ("Fine Furniture from Plywood") is a custom furniture maker in Sandpoint, Idaho, although lately his attention has been on home building. When he purchased his rural mountain property nine years ago, he took out a book from the library that recommended building half of a house first and the rest later. It was his first woodworking project. He bought his first block plane and took out another book on how to sharpen it. Somewhere along the way he decided he wanted to work wood for a living and attended the furniture program at The College of the Redwoods in California. This year, with a growing family on his hands, he's finally getting to the other half of his house, incorporating the skills he has developed as a furniture maker.

**Pat Warner** ("Get the Most from Your Router Table") is a self-taught woodworker and furniture maker. Despite 30 years of practice, he said he is still learning from his mistakes. The router is his signature tool, and he has written some 70 articles and four books on the subject, including *The Router Book* (The Taunton Press, 2001), which has several chapters on the design, use and safety of router tables. When the router is off, Warner likes to listen to jazz in his workshop, and he is also a keen cyclist. You can contact him through his web site: www.patwarner.com.


Fine WoodWorking

PUBLISHER
**Timothy D. Schreiner**

EXECUTIVE EDITOR **Anatole Burkin**
ART DIRECTOR **Michael Pekovich**

MANAGING EDITOR **Matthew Teague**
SENIOR EDITOR **Asa Christiana**
ASSOCIATE EDITORS
**William Duckworth, Thomas G. Begnal, Timothy Sams, Mark Schofield**
SENIOR COPY/PRODUCTION EDITOR
**Thomas McKenna**
ASSOCIATE ART DIRECTOR **Kelly J. Dunton**
ASSISTANT ART DIRECTOR **Erika Marks**
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**
ADMINISTRATIVE ASSISTANT
**Mary Lou von der Lancken**
MARKETING MANAGER **Karen Lutjen**

CIRCULATION MANAGER **Christine Rosato**

ADVERTISING MANAGER
**David Gray**
SENIOR NATIONAL ACCOUNTS MANAGERS
**Linda Abbett, Carol Marks**
NATIONAL ACCOUNTS MANAGER
**John Dyckman**

**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. U.S. distribution by Curtis Circulation Company, 730 River Road, New Milford, NJ 07646-3048 and Eastern News Distributors, Inc., One Media Way, 12406 Route 250, Milan, OH 44846-9705.

**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) 283-7252, ext. 423**
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) 283-7252, ext. 829**
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: **(800) 283-7252, ext. 329**

**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.

# Letters

**Have we published your tip?—**We're working on a plan to use all of our Methods of Work tips of the last 27 years on a CD-ROM and on the Web. Consequently, we're trying to track down everyone who has contributed a tip so that we can give you a $15 Taunton gift certificate as a token of our appreciation (actually, one gift certificate for each tip, with a limit of five). If we've published your tip, please contact us via mail (The Taunton Press, Attn. Archive Project, 63 S. Main St., P.O. Box 5506, Newtown, CT 06470), e-mail (archiveproject@ taunton.com) or phone (800-477-8727).

**Brushed off—**The article "Choosing and Using Brushes" by David Sorg (*FWW* #156, pp. 38-43) presented one paintbrush manufacturer, Purdy, as the only source for fine-quality tools and ignored not only Wooster but other American manufacturers.

Mr. Sorg suggests Tynex and Chinex are the only brands of synthetic brush filament to consider worthy of purchase. It's important to remember these are trademarks of the DuPont Co. and that other filament manufacturers offer equally fine products. By promoting these brands, the article, in effect, rendered half the industry undesirable.

Additionally, DuPont offers credits to manufacturers who use their filaments and promote their brands on packaging and advertising. While Wooster uses filament from DuPont, as well as other manufacturers, we have chosen to retain our independence and not promote the brands of any supplier of any raw material we use.

Sorg, besides seeming to be a fine craftsman, is also in the business of selling videos. On his web site, there is a link to the Purdy Corp. Sorg is entitled to have any links he likes on his web site, but shouldn't a publication such as yours present a more objective face? The article did not hint that any other brush manufacturer existed. Would you have left Delta or Powermatic out of an article about choosing tablesaws?

*—Bob Ricksecker, The Wooster Brush Co., Wooster, Ohio*

**EDITOR REPLIES:** We did not intend to imply that other brands of brushes are undesirable. All finishers and woodworkers have preferences when it comes to tools. *Fine Woodworking* does not shy away from letting our authors share that information with our readers.

**Questions and views on 10-in. combination blades—**I take issue with one omission in Tom Begnal's article "10-in. Combination Tablesaw Blades" (*FWW* #155, pp. 32-37). I have spoken with several other woodworkers who share my frustration with the Forrest sawblades. Not only are they expensive in the first place, but they cannot be sharpened by anyone but Forrest. I have had three other sharpening shops attempt to achieve what they achieve at the Forrest sharpening center, only to fail. Fair warning to all—the real investment in a Forrest blade comes in the sharpening.

*—Doug Christensen, Salt Lake City, Utah*

In Tom Begnal's article, the sidebar ("Why tablesaw blades get dull," p. 33)

## Fine WoodWorking

*.... around the country*

### If we're in your neck of the woods, come by and see us

**July 7-15:** *Fine Woodworking* will sponsor, judge and present the Best in Show award at the Del Mar Design in Wood exhibition near San Diego. Last year's show featured more than 300 entries.

**Aug. 11-13:** Associate editor Tom Begnal, who edits our Tools & Materials department, will be keeping an eye out for new tools at the National Hardware Show at McCormick Place Complex in Chicago.

**Aug. 22-25:** A large part of the *Fine Woodworking* staff, as well as a number of authors, will be in our booth at the International Woodworking Fair (IWF), the biggest woodworking exhibition of the year, at the Georgia World Congress Center and Georgia Dome in Atlanta.


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** |
| *Finance Director* | **Timothy Rahr** |
| *Publisher, Magazines* | **Jon Miller** |
| *Publisher, Magazines* | **Sarah Roman** |
| *Publisher, Books* | **James Childs** |
| *Editorial Director* | **Marc Vassallo** |
| *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** |
| *Associate Ad Sales Director* | **Jeff Dwight** |

TAUNTON TRADE COMPANY
*President,* **Jan Roman**

TAUNTON DIRECT
*Circulation Director,* **Ned Bixler**

TAUNTON NEW MEDIA
*Director,* **Suzanne Roman**

THE TAUNTON STAFF

**Books:** *Marketing:* Allison Hollett, Brandi Gabriele. *Editorial:* Maria Taylor, Robyn Aitken, Helen Albert, Peter Chapman, Carol Kasper, Carolyn Mandarano, Suzanne Noel, Jennifer Peters, Stephanie Ramp, Amy Reilly, Jennifer Renjilian, Timothy Snyder, Michael Urban, Marilyn Zelinski. *Art:* Paula Schlosser, Joanne Bisson, Nancy Boudreau, Wendi Mijal, Lynne Phillips, Carol Singer, Rosalind Wanke. *Manufacturing:* Thomas Greco, Michael Gyulay.

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

**Distribution:** Paul Seipold, Aaron Lund, Sergio Colon, Leanne Dion, Deborah Greene, Linnea Ingram, Frederick Monnes, Raymond Passaro, Elsie Rodriguez, Alice Saxton, Rocco Toce.

**Finance/Accounting:** *Finance:* Andrea Henchcliffe, David Wasserman, Kathy Worth. *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, Carole Ando, Bonnie Beardsley, Katherine Clarke, Frances Denninger, Alfred Dreher, Monica Duhancik, Summerlily Gajdosik, Margaret Hicock, Barbara Lowe, Eileen McNulty, Patricia Parks, Deana Parker, Patricia Pineau, Marylou Thompson. *Data Entry:* Anne Champlin, Madelaine Frengs, Debra Sennefelder, Andrea Shorrock, Betty Stepney.

**Human Resources:** Linda Ballerini, Christine Lincoln, Dawn Ussery.

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

**Marketing:** Renu Aldrich.

**Operations:** Lori Runco, Jeannette Pascal, Dorothy Simpson, Ward Willis. *T Room:* Michael Louchen, Geraldine Benno, Anna Pendergast, Norma-Jean Taylor. *Maintenance:* Susan Nerich, Alvin Jack, Lincoln Peters.

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

**Taunton Creative and Editorial:** Robert Goodfellow, Sarah Opdahl, Pamela Winn. *Photography:* Scott Phillips. *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. *Editorial:* Steven Aitken.

**Taunton Direct:** Nancy Clark, Deborah Johnston, David Pond, Christine Rosato, Eileen Sheehan, Jeanne Todaro.

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

**Taunton Trade Company:** Susan Shaw, *Director;* John Bacigalupi, Trina Bayles, Paul McGahren, Eve Pison, Elizabeth Quintiliano, Maureen Remitz. *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 web site 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 web site 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.**

compares a carbide tooth to high-speed steel. As far as I know, there is no ordinary wood sawblade that is made with this material. I have a couple of metalworking blades that are high-speed steel, but only 2 in. dia. and about twenty-thousandths of an inch thick. They would be impossible to sharpen with the file that is the usual sharpening tool for the ordinary steel sawblade. Since HSS is brittle, teeth cannot be set either. HSS is used for jointer blades and is suitable for such use. I have not heard of using brazed in HSS teeth, although it should be possible. *–Jim Little, Rockville, Md.*

Congratulations! You've done it again. *FWW* #155 is another outstanding issue. However, I have one question about Tom Begnal's article: Why on p. 37 (in the blade-comparison table) does Begnal state, "When price is factored in, Everlast enjoys some added appeal in that it sells for about 40% less than the Forrest blade," with Forrest selling at $119 and Everlast at $70? The chart rates Everlast and U.S. Saw (Oldham) both "Excellent" and "Very good." But the U.S. Saw is only $60, a $10 better buy than the Everlast.

*–Bruce H. Burnham, Richmond, Mass.*

**TOM BEGNAL REPLIES:** Sorry for the confusion. A last-minute price change by U.S. Saw was reflected in the chart, but not in the text. At $60, the blade from U.S. Saw is about 50% less than the Forrest.

**Further backsaw discourse—**I found Philip C. Lowe's article "Backsaw Workshop" (*FWW* #156, pp. 62-65) very helpful. It clearly explained both the function and use of rip and crosscut teeth. I do have a few comments, though.

Yet another cause of problem cuts is a bent blade. When sighting down the blade edge, check for both set and straightness. A slight modification of the bench hook may be helpful. Leave the right end of the bench hook's upper cross chock about 1¼ in. shy of the right edge of the bench hook board. When through-crosscutting, I locate the sawkerf above the board's projection. At the completion of the cut, the saw slightly scores the board. The saw cannot fall to the bench. This avoids damaging the saw's forward teeth and the workbench itself.

To saw a tenon shoulder, I was taught to first accurately score the shoulder line with a square and a knife, and then chisel a shallow triangular cross-sectioned trench outside of and up against the scored line. The backsaw blade is then laid in the trench. The teeth never touch the surface of the stock, and the trench readily guides the blade.

The scoring and chiseling were easy. My sawkerfs were exactly where I wanted them and at the desired angle to the long axis of the stock.

I was told that this was a technique for beginners. Having botched my share of tenon shoulders and trashed carefully prepared stock, I am embarrassed to say that I take the time and still prepare the trench for the crucial shoulder cut.

*–John Alexander, Baltimore, Md.*

**A finish that is even fun—**In response to Lon Schleining's article "An Easy, Durable Finish" (*FWW* #154, pp. 46-49), I would like to say, Fantastic!

I was looking for a durable finish that had a hand-oiled look to bring out the clarity of the birch kitchen cabinets I was building, and this was the perfect finish. It's very easy to apply and fun, I might add. I'm sure I'll have tennis/buffing elbow by the time I'm done finishing the entire kitchen, but it will be worth it.

*–Ian Corbin, Minneapolis, Minn.*

**Suggestions for respirator safety—**As a person who actively tries to make the world safer, I sincerely appreciate the degree of emphasis that *Fine Woodworking* places on woodworker safety issues. To that end, the April Finish Line (*FWW* #155, pp. 117-118) by Jeff Jewitt was a good reminder of the importance of protecting yourself from respiratory hazards.

However, a couple of noteworthy corrections to the article may help reinforce proper safety techniques. Jewitt correctly points out that prefilters are important elements of most respirators designed for spray applications. The photo on p. 117 accompanying the article, though, shows the inappropriate use of a respirator without the prefilters. The application shown requires the prefilters to adequately capture the fine mist particles; the cartridges alone will not achieve this.

Additionally, the fit check shown on p. 118 of the article is being performed without the cartridges on the mask. For best results, the cartridges should be attached and the fit check performed immediately before each use.

All in all, Jewitt's comments were right on the mark. Keep up the fine work that you are doing on educating woodworkers on safety issues!

*–John F. Quinn, Marketing Manager, MSA Safety Works*

**Keep on grooving—**I've subscribed for many years, although there was a lull in the early '90s. I would like to compliment the editorial staff on putting together an outstanding magazine. It seems like you're hitting the sweet spot with a great mixture of very useful articles. I've particularly enjoyed the articles on finishing. You could do those in every issue as far as I'm concerned, as it is an area of woodworking that seems the most arcane to me. Congratulations on a job well done.

*–Pete Brinkley, Missoula, Mont.*

**Safety concerns—**As an English amateur woodworker, I subscribe to only two magazines: One is British, and the other is



***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.

# IMAGINE . . .

# A DOVETAIL JIG WITH NOTHING TO ADJUST

Hard to believe? A flying pig may be a myth, but the new AKEDA dovetail jig is a reality.

Why so amazing? It's the world's first variable layout dovetail jig that's completely free of complicated set ups, offsets and adjustments!

You can go from through dovetails to half blind dovetails, switch between pins and tails, change work piece thickness, cut rabbeted drawer fronts, and vary pin angle all without adjustment to the jig. So you'll be finishing your project while others are still thinking about it!

But there's much more to the remarkable new AKEDA Model DC–16 dovetail jig. See it for yourself at AKEDA dealers worldwide.

Available in the US late Summer 2002, exclusively from:

WOODCRAFT®

Dept. 02WW08PA
P.O. Box 1686
Parkersburg, WV 26102
Call toll free 1 800 225 1153
www.woodcraft.com

AKEDA™
WWW.AKEDAJIGS.COM

**AKEDA Jigs Incorporated**
280 – 319 West Pender Street
Vancouver, BC, Canada V6B 1T4
Toll free 1 877 387 6544

READER SERVICE NO. 206

*Fine Woodworking*. That is a measure of my opinion of *FWW*.

I was particularly pleased to read Michael Dunbar's Rules of Thumb on safety (*FWW* #154, pp. 86, 88). Excellent, well-thought-out advice of a sort rarely seen in woodworking magazines on this side of the Atlantic.

It is hard, then, to overstate my incredulity on turning to p. 104 of the same issue and seeing the Greek key molding being cut on a tablesaw in Steve Latta's Master Class. One slip or a moment's distraction and all or part of the digit, which in the photograph is only an inch or so from the unguarded sawblade, could very easily be missing. U.S. readers may be interested to know that the practice illustrated would be illegal in the workplace in the U.K., although what the amateur does in the privacy of his or her own workshop is another matter. I do hope *FWW* readers, not to mention Latta's pupils, will adopt safer practices.

Even more to the point, how does the editorial team at *FWW* reconcile the publication of a photograph like this with its stated policy on safety?

Hints and tips are one thing, but surely publication in a Master Class article must imply some measure of endorsement.

*–Jim Hooker, Chichester, West Sussex, England*

**EDITOR REPLIES:** The editors and Steve Latta agree that we should have observed more caution. Use a hold-down device and keep your fingers far away from the blade.

**Getting a charge out of PVC pipes—** After designing and using PVC dust systems for nearly 20 years, I've developed some strategies for dealing with the stuff after some shocking R&D. PVC may be a good insulator but, as the humidity in the shop air drops in the winter, it also makes a great capacitor capable of storing (and discharging) a static charge of thousands of volts.

Once, when I was walking past the 6-in. trunk line to our planer, a foot-long bolt of lightning found its path to ground right on top of my head. It traveled out my right hand to the jointer I was leaning against. Had it traveled through my heart and out my feet, the scenario could have been much different. On another occasion I was reaching for a blast gate and got knocked 5 ft. back onto the floor. My hand was white and cold. It took three hours for the circulation to restore itself.

Based on these experiences, the conclusion I've reached is: Ground the pipe to everything you can! Simply wrap a long spiral of bare No. 14 copper wire around your pipes, connecting branch lines to trunks with wire nuts. For a cleaner and more professional look, you can use 2-in.-wide adhesive-backed aluminum tape on the pipe and crimped terminal ends and stranded wire jumpers over the fittings and blast gates. Ground to either the frame of the machinery or to the ground lug in the switch. Also, run a wire to your breaker-panel grounding bus and a metallic cold-water pipe for insurance. Make sure it's a cold-water

# Superior European Machines

Free Video

## The Knapp

There is simply no other combination machine on the planet, built to such a high level of quality.

Each machine is custom tailored to meet your demands. The Knapp has a sliding table with virtually no deflection; Cured cast-iron work surfaces throughout; Dovetail raising and lowering mechanisms; Self cleaning threads; Separate jointer and tablesaw fence. It's built more like a metal working machine.

Free Video



NEW: NX-31

Free Video

Here's the ultimate five-in-one value combination machine. This compact, workhorse has the five main tools needed to create masterpieces. The NX-31 gives you:

- 12" jointer to prepare your lumber
- 12" planer to dimension your lumber
- 3 HP shaper
- 3 HP, cast-iron mortiser
- 12" table saw with a 50" sliding table panel saw
- 10-second change-over time
- 3 separate motors 3 HP each

## Laguna TS

During the last decade Laguna Tools has become the benchmark for band saw innovations. Let us demonstrate to you how we are also taking the table saw to new levels. Call today to receive your free video presentation of the unique features on our new affordable table saw. Our appreciation and knowledge of North American woodworking, combined with European heritage make our designs and innovations unparalleled.

**LAGUNA TOOLS**

*Fine European Woodworking Machinery*

**800-234-1976**

www.lagunatools.com

E-mail: mail@lagunatools.com

17101 Murphy Ave. • Irvine, CA 92614 • (949) 474-1200

READER SERVICE NO. 217

pipe and not your gas line! High volumes of air sucked through the PVC produce the static charge on the outside of the pipe. On a dry day you can see sawdust literally jump onto the pipe and dance around.

Any ferrous metal swept into the system shouldn't cause a spark until it hits the steel impeller on your blower. A magnetic bar epoxied to the entrance of your floor sweep will catch most of the steel fasteners (except for stainless). Aluminum and brass sucked up may ding your impeller blades, but they won't cause a spark. As the author Rod Cole, "PVC Pipe Dangers Debunked" (*FWW* #153, pp. 48-49), stated, emptying the dust bin or bags at the end of the day is not only good insurance, it's good housekeeping.

*–Philip Armstrong, Vilas, N.C.*

**The best tip?—**The Methods of Work award winner "Flared chisel for dovetail sockets" (*FWW* #155, p. 14) is like reinventing the wheel. The chisel reinvented is a Bachi Nomi. Per the description in the Japan Woodworker catalog, "Bachi Nomi are the original shape of Japanese chisels, first made many centuries ago ... They are also superb for cutting dovetails."

I humbly offer as a suggestion to Methods of Work that readers simply purchase this chisel—perhaps from Japan Woodworker—thereby saving work and the destruction of a chisel that was designed for other uses. Certainly, my suggestion is worth as much, or more, than someone claiming the Bachi Nomi as an original design.

*–Faustin Baron, Schenectady, N.Y.*

**EDITOR REPLIES:** Methods of Work tips routinely feature shopmade devices that can be purchased ready-made. We appreciate the ingenuity of all creative woodworkers, whether they invent the wheel or simply figure out another way to manufacture it.

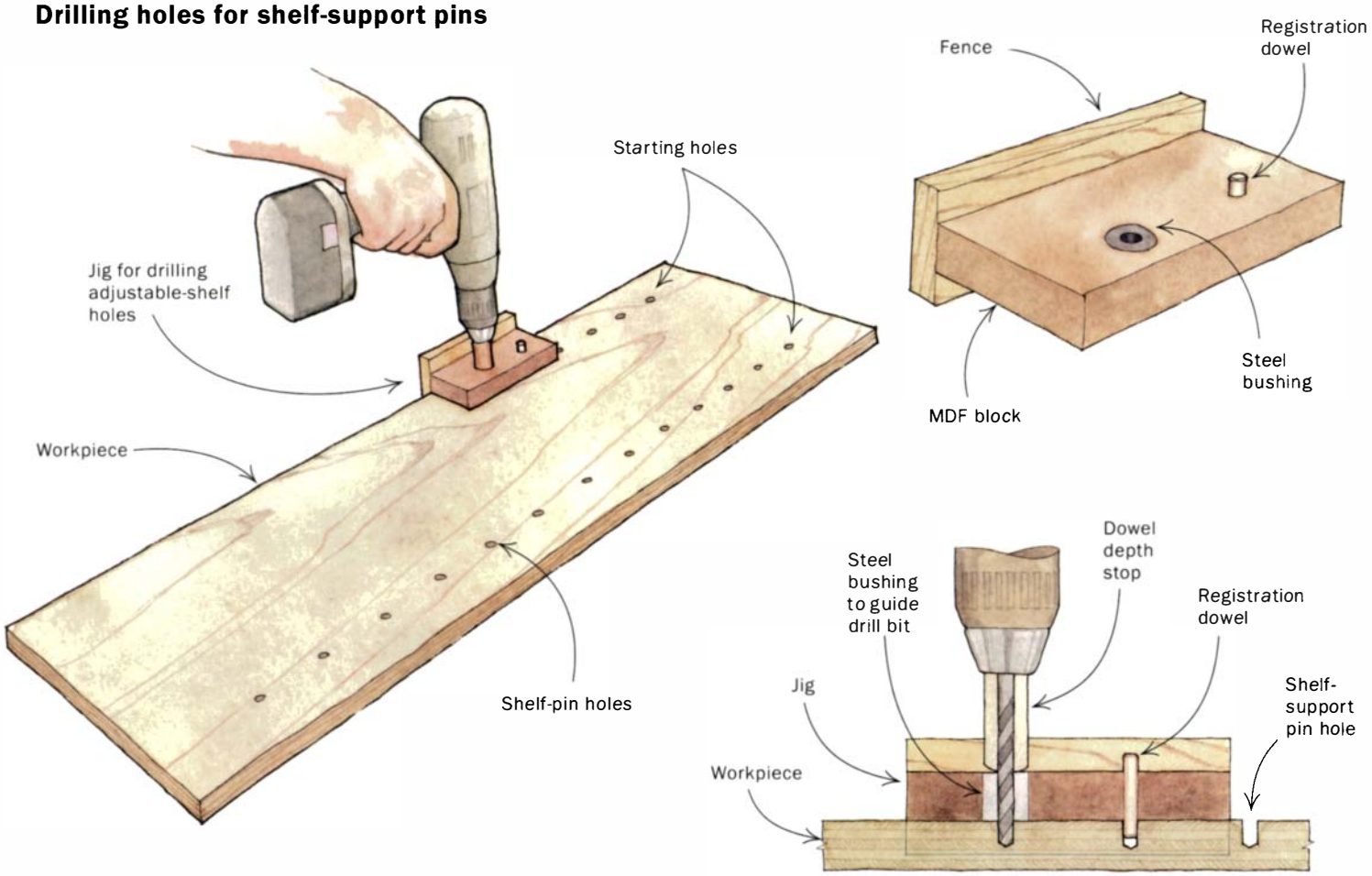
**Correction—**A Q&A response (*FWW* #155, pp. 94, 96, "Boiling vs. steam-bending") erroneously stated that boiling wood will remove the lignin that holds the cell walls together. Lignin, a complex molecule contained within multiple layers of cell walls, does lose some of its properties during boiling, but it will not completely leach out of the wood fibers. Hence, boiled wood is indeed more brittle than wood that is steam bent.

**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*

EDITED AND DRAWN BY JIM RICHEY

## Drilling holes for shelf-support pins




Most jigs for drilling holes for shelf pins are awkward to use and bulky to store. By contrast, this simple homemade jig is small, accurate, easy to use and built to last.

To make this jig, start with a scrap block of ¾-in.-thick medium-density fiberboard (MDF) and screw a hardwood fence to one edge. Measure in from the fence and install a registration dowel sized to fit your shelf-pin hole. Both the fence and the registration dowel should extend past the surface on both sides of the block: This allows the jig to be flipped over and used along both edges of the workpiece.

Now measure a distance down from the registration pin and drill the guide hole. The distance from the registration pin to the guide hole will set the spacing of the shelf-pin holes. I prefer a spacing of 2 in. If the jig is to be used just once, you can use the guide hole as is. However, if you want a jig you can use over and over, install a steel bushing for the guide hole.

To use the jig, install a depth stop on the drill bit. For this use a ¾-in.-dia. dowel drilled along its axis and then cut to length so that only the correct amount of drill bit protrudes. Measure down from the top of the workpiece and drill two starting holes, one on each edge. Place the jig's registration pin in the first hole and, while holding or clamping the fence against the edge of the workpiece, drill the second hole. Repeat this sequence while walking the jig down the workpiece until you have drilled all of the shelf-pin holes along one edge. Flip over the jig and repeat the process along the other edge.

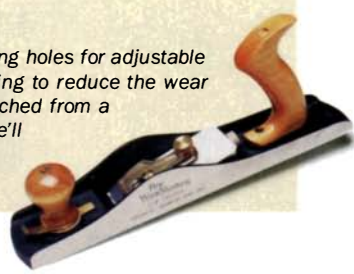
*—Andrew Fairbank, Hammondville, NSW, Australia*

## Improved tablesaw splitter

Many woodworkers never attach the splitter that comes with their new tablesaw because it is cumbersome and inconvenient to use and has to be removed for some operations, such as cutting

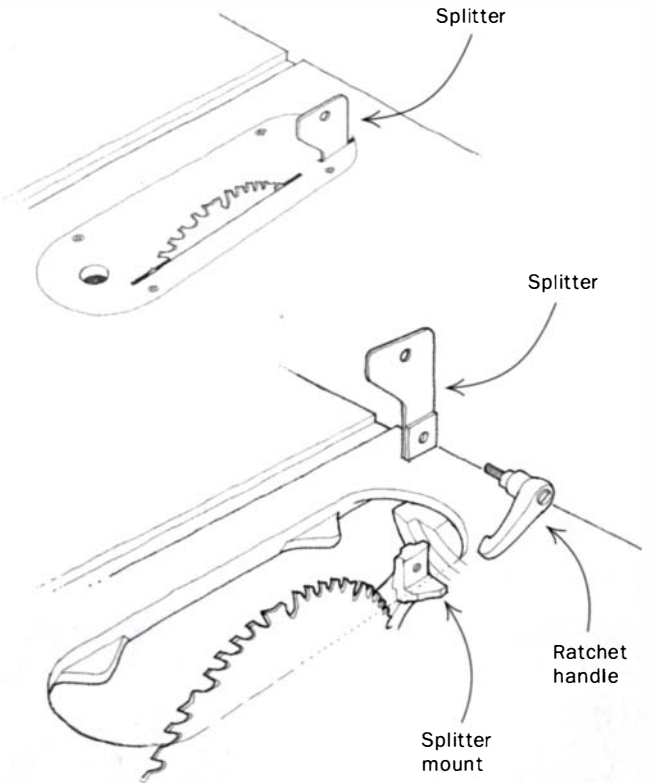
### A reward for the best tip

*Andrew Fairbank sent us his design for a jig that increases the accuracy and relieves the tedium of drilling holes for adjustable shelves. Fairbank's jig is a cut above the run-of-the-mill wood version because he added a steel bushing to reduce the wear that eventually causes the drill bit to wander off center. Fairbank, a resident of Australia, recently switched from a career in engineering to become a teacher. 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.*



dadoes. After experiencing kickback on a friend's saw that had no splitter, I was determined to work out a convenient solution for the splitter on my own saw (General). With the design shown below, the splitter can be left in place even when using a crosscut sled. And because it uses the same arbor mount as the factory-supplied splitter, it tilts for a miter cut. Not all splitters work that way.

To make the splitter, cut the basic shape shown from 3/32-in.-thick aluminum stock. This thickness will leave 1/64 in. of clearance




on each side of a standard sawblade kerf. You can modify the shape as you wish, but mine sits 2½ in. above the table.

The best part of this design is the way the splitter attaches to the mount. Replace the old splitter attachment bolt with an adjustable ratchet-type of handle that has the same size threads. These ratchet handles are available for just a few bucks from Reid Tool Supply (800-253-0421) and other sources. The handle will clear the blade and will make it easier to remove and install the splitter.

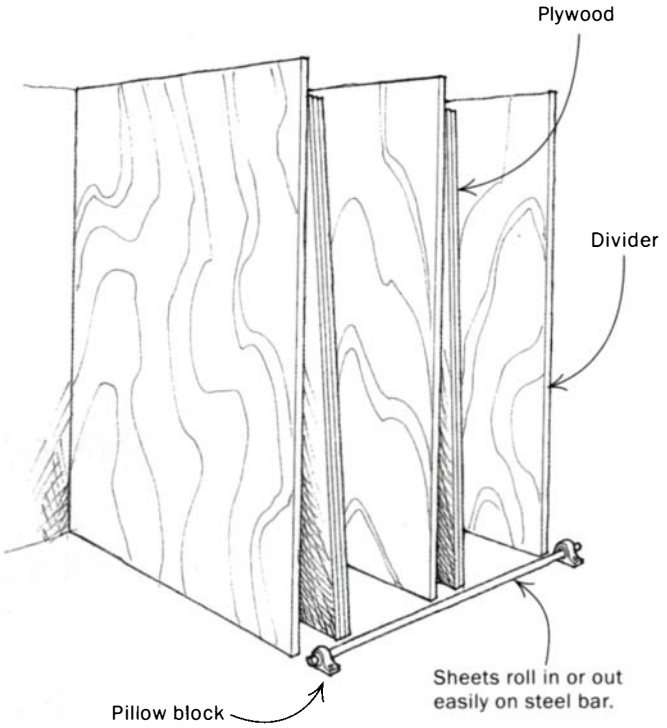
*—Bud Ruby, Oakland, Calif.*

**Quick tip:** To keep the workpiece from slipping on your tablesaw's miter-gauge fence, add self-stick antiskid floor tape to the front of the fence. The tape is sold at most building centers.

*—Steve Fix, Atlanta, Ga.*

## Efficient plywood storage

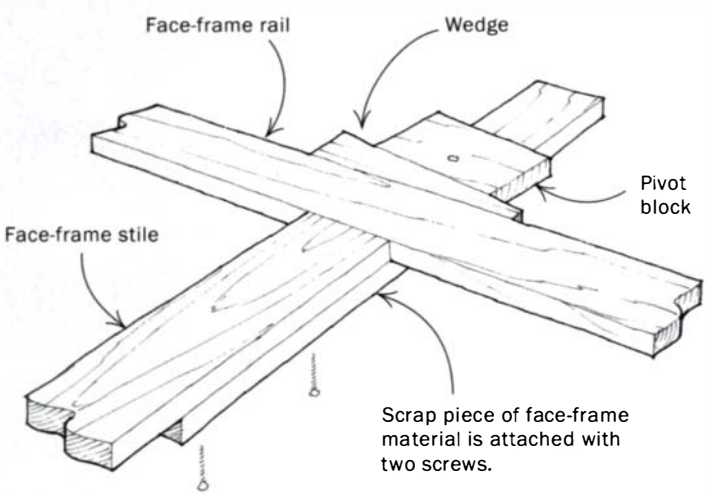
Store plywood vertically if you are short on space. An added benefit is that you can access every piece. Build several dividers into the rack to separate the different kinds of plywood. Put pillow blocks with a 1-in.-dia. steel bar in front of the rack, and the sheets




will roll in and out easily. Write the name of the face veneer on the front edge of each piece with a marker to make it easy to know what you have.

*—Blaise Gaston, Earlysville, Va.*

## Clamping face frames with wedges



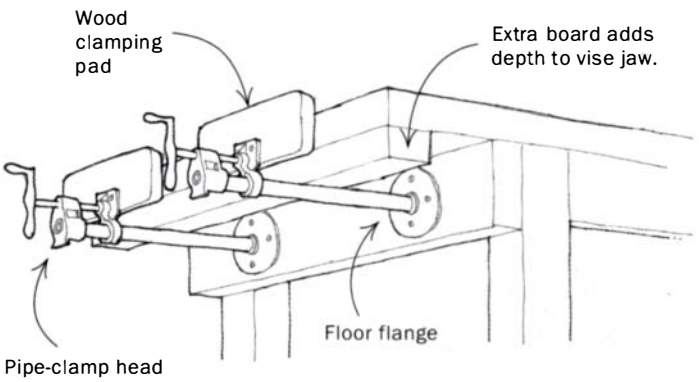

I've always relied on pipe clamps for gluing up face frames. But recently I had to fabricate a large face frame that required more and longer clamps than I own. I solved the problem with a shop-built wedge-clamping assembly at each glue joint. The wedge-clamp design shown above is made entirely with drywall screws and scrap face-frame cutoffs.

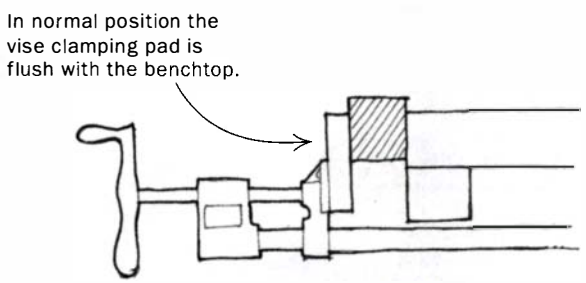
First, I screwed a scrap piece to the back of the stile so that it extends 6 in. or so past the rail. Then I screwed a pivot block onto this extension with a single screw. This allows the block to pivot to fit the wedge's angle. When the face frame has been assembled, I

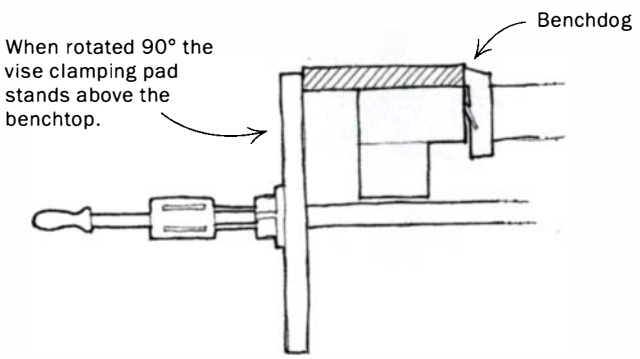
drive a wedge home with a mallet to apply sufficient pressure to get a tight joint. *—James Bascom, Bel Air, Md.*

**Quick tip:** Arm & Hammer washing soda—the laundry product available at supermarkets—makes a great sawblade pitch cleaner. Cut the bottom couple of inches from a plastic 5-gal. bucket and use it as a dish. Add warm water and a couple tablespoons of the washing soda and let the blade soak for a few minutes. Swipe the blade with a small plastic brush, and you'll have a sparkling clean blade at a tiny cost. *—Bob Barone, North Conway, N.H.*

## Bar-clamp end vise



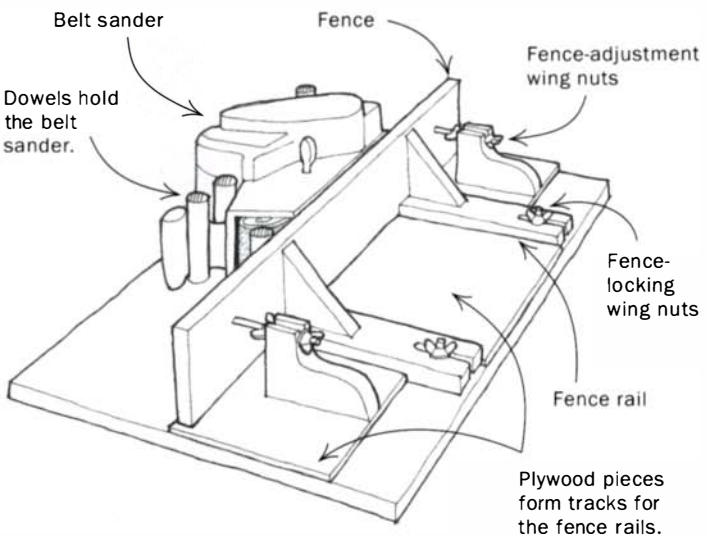



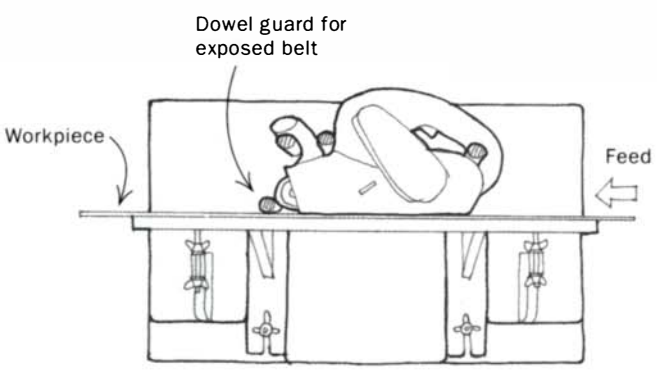

Here's how to add an inexpensive and versatile tail vise to your workbench that can be easily removed when you need to save space. Mount two ¾-in.-dia. pipe flanges solidly to the undercarriage of the bench. Make two pipe-clamp heads (I used Jorgensen style No. 50) on short sections of pipe and screw the pipes into the flanges to make the vise. On my bench I added some thickness to the top to create a deeper clamping jaw. I also screwed hardwood clamping pads to each clamp head. The clamping pads are sized so that they are normally flush with the top of the bench; but when rotated 90°, the pads extend ⅝ in. above the top of the bench. This allows the vise to hold, in conjunction with benchdogs, large panels flat on the benchtop for routing.

I also purchased two additional clamp heads (Jorgensen style No. 56). These sliding heads, when combined with various lengths of pipe, make the vise more versatile by increasing the size range of workpieces it can hold. *—Mike Billick, Sylmar, Calif.*

**Quick tip:** To remove small router burn marks on shaped profiles, take the router bit out of the chuck, hold the bit in a gloved hand and delicately scrape off the burn mark. This avoids dulling the crisp features of the routed edge, as you would using sandpaper. *—Matthew C. Jackson, Rapid City, S.D.*

## Thicknesser for thin stock




**TOP VIEW**

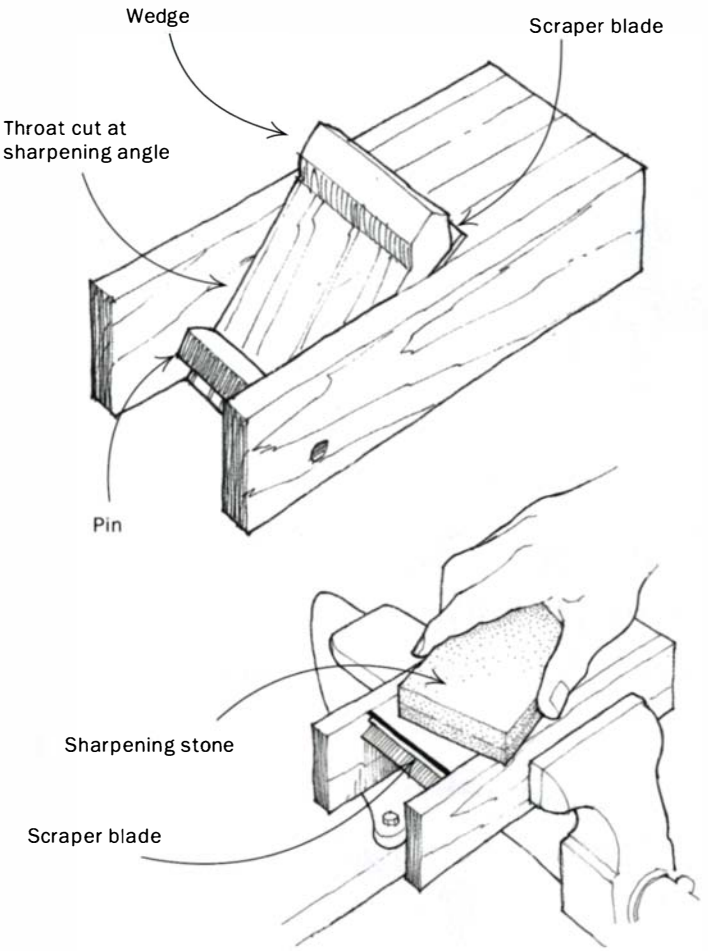
My interest in making oval Shaker boxes required a method to sand resawn strips of wood to a consistent thickness of 1/16 in. I then steam these strips and bend them around my molds.

To make the thicknesser shown above, I mounted a belt sander on its side in a wooden base and secured it by placing three ¾-in.-dia. dowels at key locations in the handles. I then added an ad-

justable fence to control the thickness. Two horizontal carriage bolts and four wing nuts provide fence adjustment. When I have set the fence location, I lock it in position with two other wing nuts. I have also made provision for attaching the hose of a shop vacuum on the outfeed side to collect dust. And, for safety's sake, I placed a ¾-in.-dia. dowel at the front of the sander to prevent my fingers from getting caught between the belt and the fence.

*—Floyd Williams, Idyllwild, Calif.*

## Sharpening jig for scraper blades

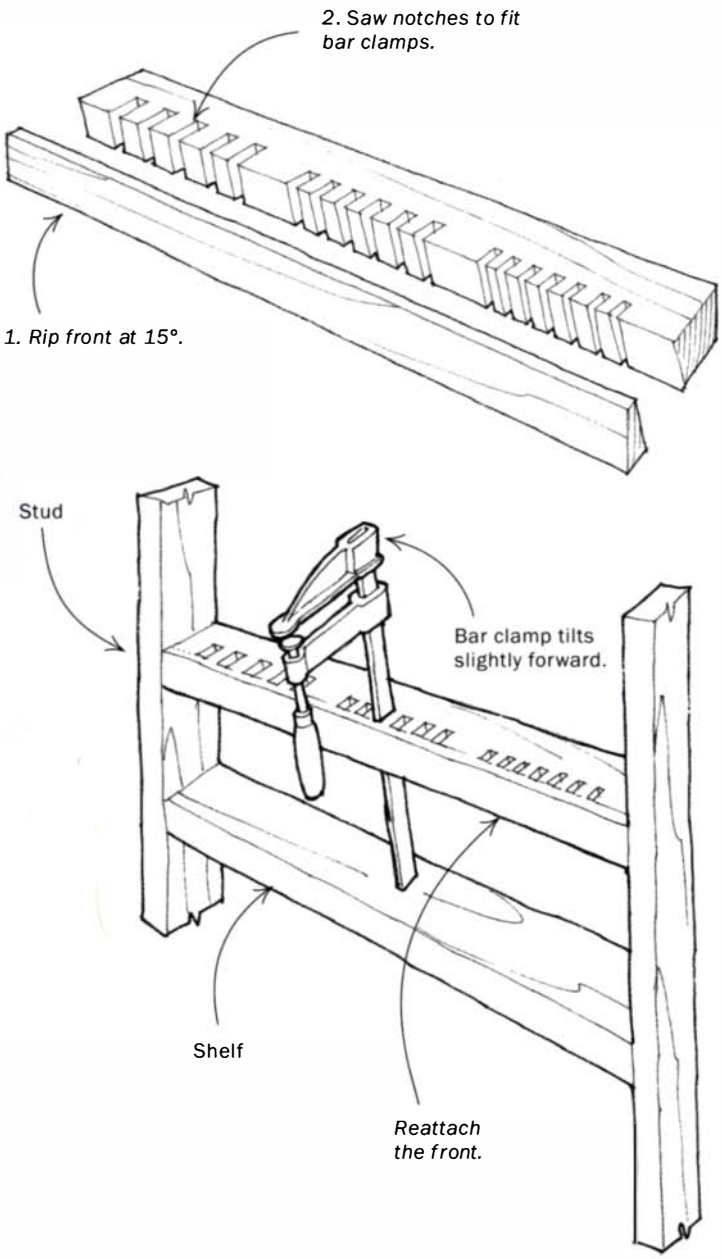



Blades for scraper planes are wide, thin and difficult to grind to the correct angle consistently by hand. So I built two jigs like the one in the sketch, one for my 60° Lie-Nielsen scraper and another for my 45° Stanley scraper. The jigs are just like the back half of a Krenov-style plane. To make the jig, first laminate the middle section with a few pieces of white pine and cut it to the appropriate sharpening angle. Then add the maple sides and pin and make a maple wedge. The construction shouldn't take a lot of time, perhaps an hour or two.

To use the jig, wedge the scraper blade into it so that the cutting edge is just proud of the bottom. Turn the jig upside down on the bench and tap with a piece of soft pine until the blade is flush with the bottom of the jig. Now clamp the jig in the vise and grind away. Start with a fine silicon-carbide stone flat on the jig, then move to a hard black Arkansas stone. To finish, take the blade out of the jig and gently grind off any wire edge that may have formed.

*—Charlie Chambers, Annandale, Va.*

## Bar-clamp storage rack

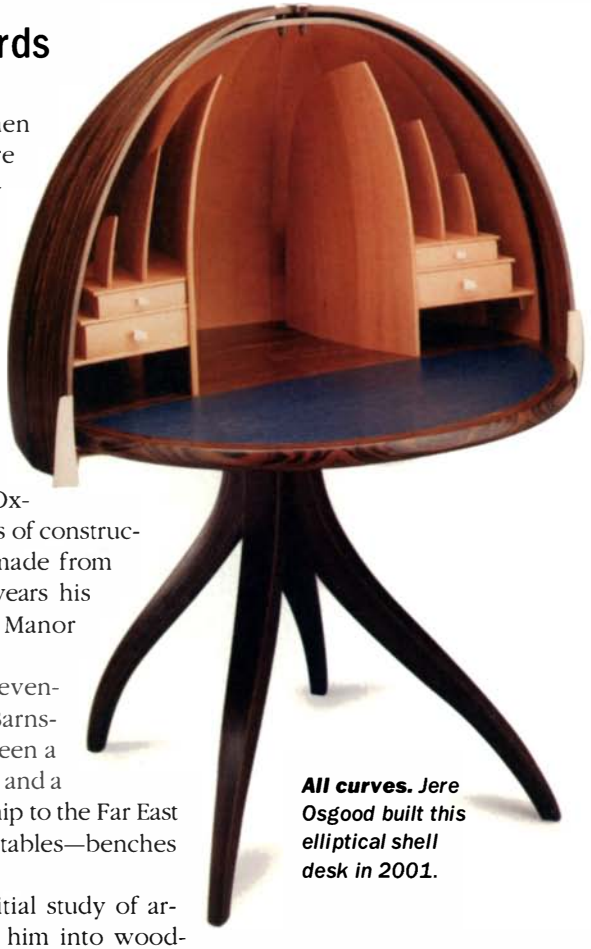



When I built my workshop, I came up with this easily made rack to store bar clamps. It fits neatly between the wall studs and works well. The clamps are stored efficiently, yet each is readily available for use. I made the rack by ripping off the front edge from a piece of framing lumber at an angle of 15°. Then I cut slots at different depths, widths and spacing to accommodate my selection of clamps, with some extra slots for future purchases, of course (one can never have enough clamps). After that, I glued back on the front, mounted the rack between the studs and installed a shelf below the rack to complete the job.

*—Nick Rowe, Greenlane, New Zealand*

# Notes & Comment

## Furniture Society awards



**All curves.** *Jere Osgood built this elliptical shell desk in 2001.*

Three outstanding artists/craftsmen were to be honored by The Furniture Society at the society's annual conference in June. Two Britons, John Makepeace and Alan Peters, along with American Jere Osgood, were to be recognized for their lifetime achievement in the field of studio-furniture art.

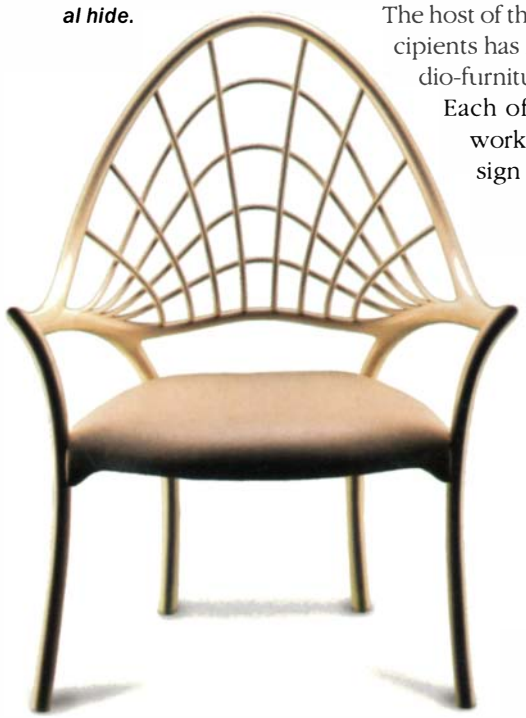
Makepeace first saw fine furniture being made at the age of 11 and later chose to be trained as a cabinetmaker rather than attend Oxford. He has pioneered new methods of construction and the concept of furniture made from sustainable forests. For nearly 25 years his woodworking school at Parnham Manor educated a generation of designers.

Peters began his career with a seven-year apprenticeship with Edward Barnsley. Unlike Makepeace, Peters has been a frequent user of tropical hardwoods, and a Winston Churchill traveling fellowship to the Far East inspired him to make several bowl tables—benches with hand-carved depressions.

Osgood's initial study of architecture led him into woodworking and furniture making. Favoring flowing designs full of curves, he developed new lamination processes for furniture. This experimentation was rewarded by two grants from the National Endowment for the Arts.

The host of the event, Michael Monroe, said, "Each of the recipients has fundamentally shaped the direction of the studio-furniture movement as a maker, teacher and author. Each offers a compelling example of the craftsman working with integrity to the highest standard of design and construction, earning a living at his craft."

*—Mark Schofield, assistant editor*



**Millennium chair.** *John Makepeace designed this chair made from laminated English holly. The upholstery is natural hide.*

**Furniture fan.** *Alan Peters built this fan table in 1989 from Indian ebony and sycamore.*

## Wood webs

**www.craftemergency.org**

The occupation of craftsman is financially perilous at the best of times, so even a small setback can have disastrous implications.

Ian Gale, from Madison, Wis., has been a cabinetmaker for 26 years, specializing in marquetry, inlay and veneer work. In 1999 he fell from a 6-ft. ladder and broke his arm in three places, putting him out of work for three months. Like many craftsmen, he lacked a financial cushion to tide him over.

A friend put him in touch with the Craft Emergency Relief Fund. Based in Vermont, the fund exists for just such occasions, making grants and no- and low-interest loans up to $8,000 to bonafide full-time craftsmen. Although the recipients are few, averaging around 25 each year, the impact is enormous. As Gale put it, "I broke my arm, but the fund saved my neck."

The web site has further information for both potential benefactors and beneficiaries.

**www.hsebooks.co.uk/index2.html**

Ivan Hall, from Devon in England, draws our attention to an experiment that the United Kingdom's Health and Safety Executive did using dust extractors of the type often found in small workshops. When you visit the web site, go to the search window, type in "woodworking" and click on the search button. When the list of reports appears, scroll to the second to last, titled *Dust explosions from unenclosed sock filters*. Click on the title to view the report, including pictures of fan-assisted 15-ft. flames coming out of various dust collectors. The comforting news is that rapid airflow makes the dust hard to ignite, but you may want to consider locating your dust collector away from your tools and having a carbon-dioxide fire extinguisher handy.

*—M.S.*



Photos, this page: Courtesy of The Furniture Society; p. 26: Kevin Snyder

## High school woodshop unplugged

***Hand-cranked bandsaw.*** *Woodshop teacher Rocky Steirs converted a bandsaw from electric-powered to hand-powered to comply with school liability restraints.*

Many school woodshop instructors would have given up in disgust, but when the Boulder, Colo., school district banned power tools, Rocky Steirs took it as a challenge. Using his background as a silversmith and his research on Colonial-era metalworking, he adapted many of the power tools to hand operation and built others from scratch (right).

An example of the former is the 14-in. bandsaw (left) where one student now turns a handcrank while the other does the cutting. Steirs comments that this setup has two advantages: Two pairs of eyes are watching the cut, and the person cranking seems instinctively to protect the person cutting and can stop the blade instantly. Although the hand-powered bandsaw is slower than an electric model, the students have used it to resaw 5-in.-thick stock. As the motto of the New Vista High School shop says, "You don't need power tools to build character." —*M.S.*

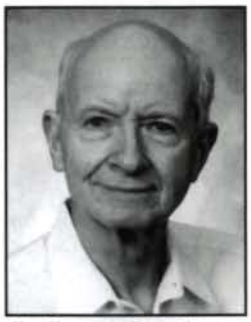
***Back to the future.*** *Two students operate a treadle lathe built by Steirs using his knowledge of Colonial-era metalworking.*

MADE IN THE USA

# Forrest Saw Blades

America's Best Since 1946!

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



Jim Forrest, President

"When we established Forrest Manufacturing over 55 years ago, we committed our company to providing the very best products and services possible.

"Since then, demanding craftsmen have come to rely on us for the finest quality blades and dados. They also count on us for the best in-factory sharpening available anywhere.

"Forrest saw blades eliminate or reduce splintering, scratching, and tearouts. We make them of high corrosion-resistant C-4 carbide to provide the longest possible life between sharpenings. We also hand-straighten them for perfect flatness and an astonishing +/- .001" runout that gives you peak performance. And Forrest blades feature exceptional perimeter concentricity and super fine tooth grind to ensure the highest quality edges.

"Our exclusive guarantee is another reason to have complete confidence in the products we offer! **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.** There's never any risk to you. You have my word on it!"

Jim Forrest

### Woodworker II

| *ALL PURPOSE – table saws and portable circular saws.* | | Sale Price | 10% Off First Blade | 15% Off Second Blade |
|---|---|---|---|---|
| 12" x 40T x 1" | | ~~$120~~ | $116 | $110 |
| **10" x 40T** | **(1/8" or 3/32" K)** | ~~$119~~ | $107 | $101 |
| 10" x 30T | (1/8" or 3/32" K) | ~~$ 00~~ | $ 89 | $ 84 |
| 8 1/4" x 40T | (3/32" K)* | ~~$ 00~~ | $ 89 | $ 84 |
| 8" x 40T | (3/32" K) | ~~$ 00~~ | $ 89 | $ 84 |
| 7 1/4" x 30T | (3/32" K) | ~~$ 00~~ | $ 62 | $ 59 |
| 5 3/8"x40Tx10mm | (5/64" K)** | ~~$ 00~~ | $ 80 | $ 76 |

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

**The 10"x40T earned the Editor's Choice for the best performance regardless of price.** *American Woodworker April 1998, pp 68-69.*

*For Sears & Makita **For DeWalt Cordless Portables

### New! Customized Woodworker II

| *For the advanced table saw operator. Ideal for joinery and special uses!* | | Sale Price | 10% Off First Blade | 15% Off Second Blade |
|---|---|---|---|---|
| 10" x 40T (1/8" K) | *#1 grind for square cut box joints.* | ~~$130~~ | $117 | $111 |
| 10" x 40T (1/8" K) | *#6 grind for near flat bottom, easy feed.* | ~~$130~~ | $117 | $111 |
| 10" x 40T (1/8" K) | *Dovetail joint grind. Specify angle & left or right points. See Fine WW12/01.* | ~~$130~~ | $117 | $111 |
| 10" x 40T (5/64" K) | *Ultra thin kerf for precision work. Use stiffener plate.* | ~~$130~~ | $125 | $118 |
| 10" x 20T (1/8" K) | *Fast feed rip for thick hardwood without burning, but finish is not smooth like WWII.* | ~~$ 94~~ | $ 85 | $ 80 |

### 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.*

| | Sale Price | 10% Off First Set | 15% Off Second Set |
|---|---|---|---|
| 6" set | ~~$260~~ | $242 | $229 |
| 8" set | ~~$289~~ | $260 | $245 |
| 10" set | ~~$349~~ | $314 | $297 |
| 12" set | ~~$449~~ | $404 | $382 |

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!

### Chop Master

| *Specially designed for sliding compound miter, miter-chop, and radial saws.* | | Sale Price | 10% Off First Blade | 15% Off Second Blade |
|---|---|---|---|---|
| 7 1/2" x 60T x 5/8" | *Makita Cordless Slide* | ~~$105~~ | $ 95 | $ 89 |
| 8 1/2" x 60T x 5/8" | *Hitachi, DeWalt, Ryobi. Freud TR125* | ~~$119~~ | $107 | $101 |
| 10" x 80T x 5/8" | *Delta, Bosch, Hitachi, Makita, Ryobi, AEG & all* | ~~$139~~ | $125 | $118 |
| 12" x 80T x 1" | *Delta, Hitachi, Makita, B&D, Sears & all* | ~~$149~~ | $134 | $127 |
| 15" x 100T x 1" | *Makita, Ryobi* | ~~$199~~ | $179 | $169 |

NEW!

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

### Duraline HI A/T

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

| | | Sale Price | 10% Off First Blade | 15% Off Second Blade |
|---|---|---|---|---|
| 10" x 80T | (1/8" or 3/32" K) | ~~$159~~ | $143 | $135 |
| 12" x 80T x 1" | (1/8" K) | ~~$181~~ | $163 | $154 |

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

### Woodworker I

| *Designed for radial arm or tablesaws–fine crosscut.* | Sale Price | 10% Off First Blade | 15% Off Second Blade |
|---|---|---|---|
| 7 1/4", 8", 8 1/4" x 60T | ~~$109~~ | $ 98 | $ 93 |
| 10" x 60T | ~~$129~~ | $116 | $110 |
| 12" x 60T | ~~$139~~ | $125 | $118 |

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

All prices in U.S. funds

## Two Easy Ways to Order

***Call toll-free***

**1-800-733-7111** OR

***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

AMERICAN EXPRESS · MasterCard · VISA · DISCOVER

See our blade demos at IWF Atlanta Booth #6872

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

FREE SHIPPING– All Orders Over $275 Other orders, please add: Saw blade – $7 • Dado – $9 • Stiffener – $3

### $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.)

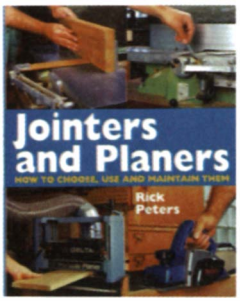
*3 coupons at $5 each, use 1 coupon per blade.

FORREST

**Forrest Manufacturing Company**
**457 River Road**
**Clifton, NJ 07014**



READER SERVICE NO. 139




## An education in surfacing lumber

**Jointers and Planers** *by Rick Peters. Sterling Publishing, New York; 2001. $14.95 paperback; 128 pp.*

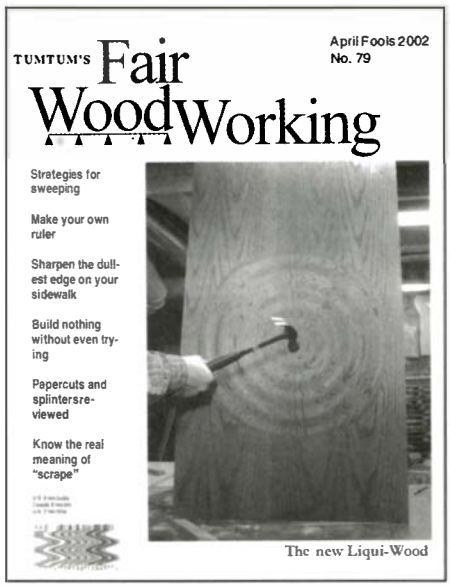
As a beginning woodworker fortunate enough to be surrounded by a staff of mostly expert woodworkers, I can garner any machine instruction I require simply by walking into the nearest cubicle. However, having learned my way around the bandsaw, the tablesaw and the router by way of shameless mooching, I began to fear I might be pushing my luck.

Rick Peters' book seemed a smart alternative to bothering yet one more colleague for instruction. It's a comprehensive guide to the two tools needed to achieve square, flat stock. Peters walks you through the initial purchase to their use and repair, as well as suggestions for shopmade accessories that will enhance the machines. His advice is not limited to the beginner. To highlight the versatility of the planer and the jointer, Peters includes a chapter on advanced operations for both machines, including how to rabbet on the jointer and cut moldings on the planer.

Personally, these are skills that can wait; I'll be happy just to impress my colleagues with my perfectly square lumber.

*–Erika Marks, assistant art director*

## Fair enough


TUMTUM'S Fair WoodWorking

April Fools 2002
No. 79

Strategies for sweeping

Make your own ruler

Sharpen the dullest edge on your sidewalk

Build nothing without even trying

Papercuts and splintersreviewed

Know the real meaning of "scrape"

The new Liqui-Wood

It's a sure sign that you've reached a certain stature when folks start making fun of you. The cover of a newsletter we received in April looked awfully familiar. Inside, Methods of Work, edited and drawn by Rich Jimey, showed shopmade bandages using masking tape, while a reader shared his discovery in a hardware store of "nells," pointy metal things for joining wood.

The lead article was titled "Ball and Claw Foot Pedicure," with useful tips on trimming the claws with pliers, resetting the cuticles and finally applying your favorite nail polish.

We often bemoan the lack of humor in this hobby, so a big thanks to the Minnesota Woodworkers Guild and, in particular, to Willis Bowman. We'll keep a lookout for tips from Olie and Lena.

*–The staff of FWW*

# Tools & Materials

## Delta's new 16-in. lathe has a steel bed


***A new look from Delta.*** *Model 46-745 has a steel bed that, according to Delta, offers torsional stiffness 20 times greater than cast iron.*

Introduced just last summer, Delta's 46-745 lathe is not only a new model, but it is also a machine with a new look. Instead of a traditional cast-iron bed, the 46-745 has a bed made from steel—not a block of solid steel, mind you, but heavy sheet steel that has been folded and welded to create a sturdy beam.

Made in Tupelo, Miss., the lathe features a 16-in. swing over the bed (11½ in. over the base of the tool rest) and 42 in. between centers. It was delivered in a single box. But don't take that to mean it's a light tool. Indeed, the box weighed about 400 lbs., with 100 of them belonging to the bed.

Like the bed of the lathe, the two legs are made from folded sheet steel. As an option, the legs can be filled with dry sand to provide added weight and stability to the lathe, a feature that can come in handy when turning large workpieces. For even more stability, you can extend the length of the feet by slipping a length of 4x4 lumber through each one. Then, screw the 4x4s to the feet. And, if necessary, the 4x4s can be bolted to the floor. However, I didn't need any of those stabilizing options while using the lathe.

I tested the lathe for several months. Also, several members of the Southern Woodturner's Guild in Memphis, Tenn., stopped by to give the tool a workout. All told, the lathe turned about 250 pieces, ranging from bottle stoppers to a 22-in.-dia. platter to a piece of pine that weighed some 55 lbs. So I was able to get a good sense of what this machine can do.

Model 46-745 has a 1½-hp, 120-volt, variable-speed reversible motor (made by Baldor) that mounts to a cast-iron headstock. The

## Shop Test | Miniature raised-panel bits

***Downsized bits.*** *Both CMT (left) and Jesada (right) offer router-bit sets that include small panel-raising and stile-and-rail cutters, ideal for smallish frame-and-panel construction.*

**Two companies, CMT and Jesada Tools, have recently introduced sets of small, raised-panel router bits with matching stile-and-rail cutters. These sets are a real breakthrough for boxmakers and others who need to make small raised panels and appropriately scaled stiles and rails.**

**While both sets rely on the ogee for the basic shape of the cutters, the CMT set (part No. 800.518) has a more gradual, elongated ogee than the Jesada set (part No. 600-820), which has a tighter ogee with a pronounced fillet. The CMT panel-raiser also produces a wider shoulder and has a back cutter to allow the use of thicker stock.**

**I really appreciate the back cutter on the CMT raised-panel bit. It creates a panel that is flush on the inside of the stiles and rails of a frame, along with a nice reveal around the back side.**

**Jesada claims that its bits work with stock ranging in thickness from ⅜ in. to ¾ in., while CMT says its bits work on thicknesses of 7/16 in. to 1 1/16 in. The CMT panel-raiser works on a panel that is as small as 2¾ in. square, while the Jesada works on a 2-in.-square panel.**



Photos, except where noted: Erika Marks; this page (top): courtesy of Delta Machinery; facing page (top): Tom Begnal

motor offers three speed ranges (0 to 1,100 rpm, 0 to 2,200 rpm and 0 to 3,200 rpm), and to change from one range to another is simply a matter of repositioning a single drive belt.

The headstock slides the full length of the bed, which allows outboard turning when you use a floor-standing tool rest or an accessory from Delta.

A touch pad mounted above the motor houses the controls for on/off, reverse and speed. Some of my fellow guild members questioned the location of the controls. Although convenient, they're in a zone that sees lots of chips and dust. But in the few months I tested the lathe, that wasn't a problem, even though I purposely avoided blowing out or vacuuming the controls.

The lathe has a #2 Morse taper and 1¼ in.-8 spindle threads. An adapter, available from Delta as an option, allowed me to use all of my earlier lathe accessories with 1 in.-8 threads.

The locking levers on the headstock, tailstock and tool rest are large and conveniently located. And they use a push rather than pull action, which I find easier. Also, large, square locking pads offer lots of bearing surface. As a result, the headstock, tailstock and tool rest remained firmly anchored in place, even while turning a 55-lb. chunk of pine.

If the motor becomes overloaded, say when a cutting tool catches a turning, the 46-745 has a safety feature that automatically turns off the lathe. That way there's less chance for the tool to fly out of your hands. Resetting the power is quick and easy.

The live center in the tailstock leaves something to be desired—it overheated and eventually locked up. And the knockout bar is too light. But these are minor concerns when compared to the overall performance of the machine. At an average street price of $1,800, this lathe is an excellent value. For more information, contact Delta (800-438-2486; www.deltamachinery.com).

*—Bill Ramsey*

**Both sets did an admirable job. I did, however, have trouble with the Jesada; to get the stile and rail to match up, I had to move the shims around and add an extra shim to the end profile cutter. A second set I looked at worked better. The CMT set produced parts that fit perfectly without any fussing with the bits.**

**Because all of these bits are used to cut mostly small workpieces on a router table, it's important to pay special attention to safety. Before starting, I made several push sticks and hold-downs specifically for holding small panels and short stiles and rails. Also, to provide maximum support for small workpieces, I adjusted the opening in the router-table fence so that it would be as narrow as possible.**

**The CMT set sell for $160; the Jesada sells for $116. For more information, contact CMT (888-228-9268; www.cmtusa.com) or Jesada (800-531-5559; www.jesada.com).**

***—Roland Johnson***

## Dial caliper reads in fractions

***Dial a fraction.*** *Prefer to work in fractions rather than in decimals? This caliper lets you read fractions right from the dial.*

A dial caliper is a handy tool to have. It allows precision measurements of outside, inside and depth dimensions, up to a full 6 in. And the dial is easier to read than vernier calipers.

I find calipers especially helpful when measuring the thickness of a board, particularly when thickness-sanding thin stock. I also use it regularly to measure mortise depths and the diameters of round tenons.

However, because most calipers are made for machinists, the tool reads in decimals. But woodworkers use fractions almost exclusively, so dealing with decimals becomes a nuisance.

Recently, I was more than happy to get my hands on a dial caliper that reads in fractions of an inch. Actually, the tool has two scales—a large outer scale in fractions and an inner scale in decimals.

The fractional scale is calibrated in 1/64-in. increments, accurate enough for most of my work. But when I need to get fussier, it's easy to place the pointer between the lines, effectively providing a reading of 1/128 in.

Although this stainless-steel tool doesn't have the overall quality of an expensive machinist's caliper, it's more than suitable when I'm measuring wood. Indeed, when checked against gauge blocks, it was dead on. The tool is also nicely finished. And the parts slide smoothly.

The fractional caliper is available from Highland Hardware (800-241-6748; www.highlandhardware.com); order part No. 06.50.08. It sells for about $37. *—R.J.*

## Titebond polyurethane hot-glue system

***Hot glue is hot stuff.*** *Titebond's quick-setting system is handy for gluing small, hard-to-clamp parts, such as moldings and miters.*

The last time I tried using a conventional hot-glue gun on wood, I swore I'd never do it again. The bond was pretty weak, and common wood stain softened the glue. A new polyurethane hot glue, however, shows promise.

The HiPURformer Advanced Bonding System is the result of a partnership between Franklin, the people who make Titebond glue, and the German tool manufacturer Steinel. Hot polyurethane adhesives have been around for a few years, but it took a new generation of compact applicators to make them practical for the small shop.

A support stand serves as the heat source for the gun. Once heated, the gun stays hot for about 15 minutes of cordless operation before needing to be reheated. It takes about 20 minutes to heat the adhesive from cold.

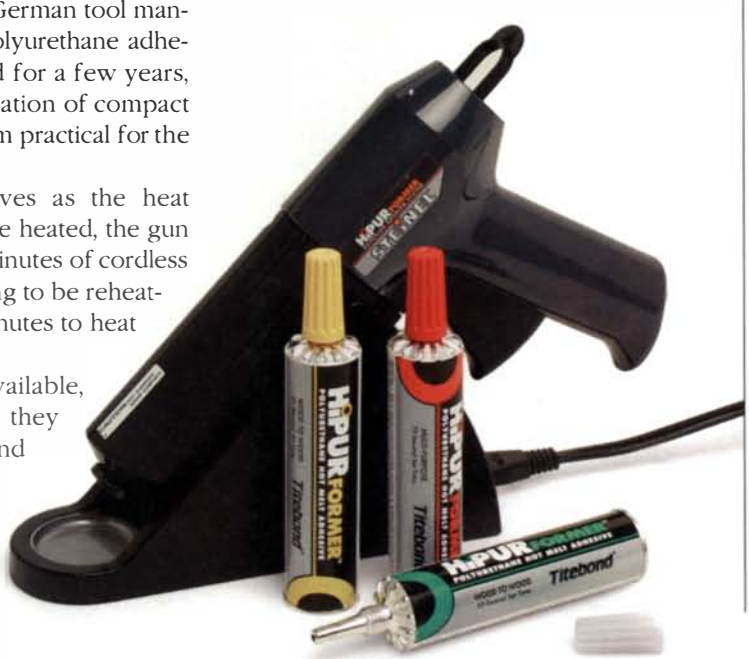
Three glues are available, identified by the time they take to set. The 30-second glue is for normal woodworking, and it's a great substitute for plain wood glue. I especially like it for difficult-to-clamp situations, such as when making mitered crown moldings. Imagine being able to hold the pieces together for 30 seconds and then moving on to the next step, without all that overnight clamping to slow you down. The 60-second formula is a little thicker and has some gap-filling ability—good for joints that may be less than perfect. The 75-second glue is for non-woods like metal, plastic and glass. All formulas are waterproof.

I've used this gun a lot around the shop to make quick repairs and connect a joint. As for strength, Franklin claims the hot glue is about half the strength of regular Titebond glue. To find out if that's strong enough, I did 12 double tests on side-grain red oak, plus a few more on miters and end grain. Failures were about as expected: The hot glue failed before the regular Titebond, and joints with a gap failed before those with no gap.

But, most significantly, on every side-grain test, the glue was strong enough to tear out some wood. And failure was directly related to glue coverage.

According to Franklin, a 1-in.-long glue bead is sufficient for a 4-sq.-in. clamped joint. The kit, which includes three glue cartridges, sells for about $100. Extra cartridges cost $8 each. For further information, contact Franklin International (800-347-4583; www.titebond.com).

*—Gary Williams*




## Woodworker's mat helps heat cold feet

Cold feet are about the only condition that can drive me out of my unheated, Maine-based shop during the winter. Replacing my wool socks with a heating mat, therefore, sounded like a good idea. So I was more than happy to try the industrial-sized Footwarmer by Indus-Tool of Chicago.

First, I wanted to know how quickly the mat could heat up. On several mornings when the shop temperature was around 20°F, I plugged in the mat, put a thermometer on it and timed the warm-up. It consistently went from 20° to just under 50° in half an hour, and up to nearly 70° in one hour. After that, temperature fluctuations hung mostly in the upper 60s, probably cooled a bit by my movements over the mat.

The mat did indeed keep my feet warm. At first, I kept my heavy wool socks on, with my usual sneakers or steel-toed boots over them. With either sneakers or boots, I stayed equally warm, which is surprising because steel-toed boots are almost always colder than a pair of heavy-duty sneakers. With heavy cotton socks, I did feel a little cold in the boots but not in the sneakers.

I only wish the mat was available in a larger size. At my 12-ft.-long workbench, a 16-in. by 36-in. mat just isn't long enough. Two or three of them in a row would be a less than perfect solution because all of the cords would surely get in the way.

The Footwarmer uses about as much electricity as a 120-watt lightbulb. At a cost of about $75, it would be a useful, inexpensive addition to a small, unheated shop. For additional information, contact Indus-Tool (312-226-2473; www.indus-tool.com). *—Ken Textor*



Photos, this page (top left): Gary Williams; top right: Tom Begnal

## Japanese Z-Saws

***One handle fits all.*** *Z-Saws from Japan have replaceable blades and harder teeth.*

Western-style saws cut on the push stroke. Japanese saws, on the other hand, cut when pulled.

Generally, when ripping thick stock by hand, I use a Western-style saw because, on the down stroke, the weight of the saw helps feed the teeth into the wood.

But when crosscutting or cutting dovetails or tenons, I think a Japanese saw has some distinct advantages. On the pull stroke, the blade is in tension and can't buckle unexpectedly. Plus the blade can be made from relatively thin steel. The result is a narrow kerf and less waste.

At one time, Japanese saws were hard to come by in the United States. Now, however, they're available in most woodworking retail stores and catalogs. Among all of the current choices, I've come to favor a set sold under the Z-Saw name.

Z-Saws have several features I like. The blades are interchangeable, so you need only one handle. And it takes just seconds to change a blade.

But I especially like the tooth hardness of the blades—slightly over 68 Rockwell C—making them harder than most files. Of course, that means there's no practical way to sharpen these saws. But that drawback is more than offset by longer cutting life. And because Z-Saw blades are mass-produced, they're relatively inexpensive. Besides, for most of us, cutting wood is a lot more enjoyable than sharpening steel.

I use the general-purpose blades for ripping and crosscutting stock. But for cutting joints such as dovetails and tenons, the lighter, fine-tooth blades work best. However, the fine-tooth blades need stiffening along the back, so they do best mounted in a handle with a built-in spine.

Prices run about $17 for a large rip blade; $14 for a thin-kerf blade. A long handle costs around $17. Contact Tashiro Hardware (206-328-7641; www.tashirohardware.com). *—Simon Watts*

## Bosch 3¼-hp plunge router adapts to table

This newest router from Bosch, model 1619EVS, has a smooth, 3¼-hp, variable-speed (8,000 rpm to 21,000 rpm) 15-amp motor with a soft-start feature. Weighing in at just under 14 lbs., it's hefty but not unmanageable. A one-wrench bit-changing system is a handy feature, and an attachment for dust collection is included.

The plastic subbase has a generous 2-in.-dia. opening. Remove the subbase, and the opening becomes 3¾ in., a plus for anyone using extralarge bits.

Runout measured 0.004 in., compared with an average of just under 0.003 in. in tests of nine plunge routers during the last year at *Fine Woodworking*. The 1619EVS had a noise level of 95 decibels, a bit higher than our average. It scored an excellent rating in our vibration test.

In the area of ergonomics, though, the 1619EVS really shines. For my average-sized hands, the grips and various levers are both convenient and comfortable.

Generally, a plunge router is fussy to use in a router table because it has a spring mechanism designed to plunge the bit down into a workpiece, not up into one. When the router is upside down, you're always fighting the springs. But this router solves that problem. The springs can be disengaged by flipping a lever and pushing a button. Then the coarse and fine adjustment knobs control the bit depth. And reengaging the springs is just as easy.

I like this tool a lot, whether handheld or table-mounted. And I like it even more as a dual-purpose machine. The Bosch 1619EVS costs $315 on average. For more information, contact Bosch (877-267-2499; www.boschtools.com). *—Michael Standish*


***A simple conversion.*** *Bosch's new router allows you to disengage the plunge-spring mechanism, making it readily adaptable to the router table.*

*Bill Ramsey lives in Belden, Miss., and is a founding member of the American Association of Woodturners; Roland Johnson builds furniture in Sauk Rapids, Minn.; Gary Williams is a woodworker and technical writer living in Lakeside, Calif.; Ken Textor has his woodworking shop in Arrowsic Island, Maine; Simon Watts is a furniture maker in San Francisco; Michael Standish works wood in West Roxbury, Mass.*



Photo, this page (bottom): Tom Begnal

# Sharp and Sharper

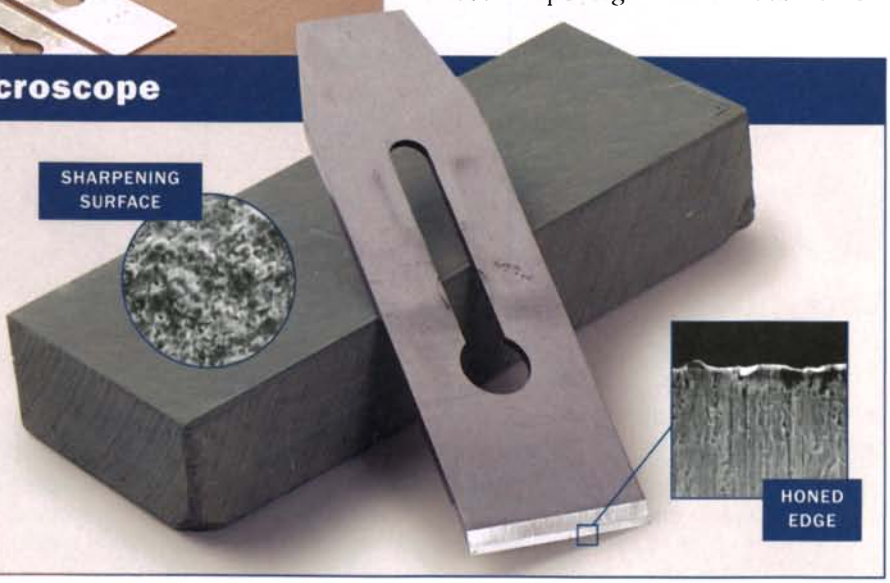
## Nine honing systems are put to the test

BY AIMÉ ONTARIO FRASER

Learning to be a better woodworker means learning to be a better sharpener. That's a simplification, of course, but sharpening is so fundamental to fine woodworking that the two are bound together like a double-wedged through-mortise and tenon glued with epoxy. And just as woodworkers have strong opinions on how to cut, wedge and glue that joint, they have strong opinions about sharpening. Ask six woodworkers

### Under the microscope

Abrasives vary widely, with various designations for grade or grit, but 700x photos put the systems on a level playing field, matching them up in terms of results. Each blade was honed on the successive series of grits recommended for each system, finishing on the finest grit available.






Photos, except where noted: Michael Pekovich; facing page (bottom): Asa Christiana


## THREE POPULAR SYSTEMS

**The grit size of each abrasive is apparent in the microphotographs, as is the scratch pattern on the honed edge. In the handplaning test, the roughest edges gave adequate results, but the finest edges performed superbly.**

### ARKANSAS STONE

Finest grit: Translucent

Source: Woodcraft (800-225-1153)

Price: $159 ($273 for set of four grits)

Use: With light honing oil; flatten occasionally on coarse diamond stone or sandpaper

### DIAMOND STONE

Finest grit: Extrafine

Source: Woodworking catalogs

Price: $85 for combination stone

Use: Mist with water

### WET-OR-DRY SANDPAPER ON GLASS

Finest grit: 2,000

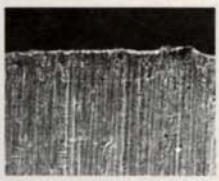
Source: Auto-parts stores

Price: $1 per sheet

Use: Attach to glass with spray adhesive; mist with water

**SHOP TEST** SCORING THE SYSTEMS

**Fraser rated the honing systems in three ways. Ease of honing took into account how quickly the abrasive cut and how easy it was to use. Ease of planing was based on planing three woods: quartersawn hard maple, tiger maple and end-grain cherry. Last, she evaluated the surfaces produced on those woods.**

| | | | |
|---|---|---|---|
| MICROPHOTO OF PLANE IRON |  |  |  |
| ABRASIVE | Arkansas stone | Diamond stone | Wet-or-dry sandpaper |
| EASE OF HONING | Good | Excellent | Very good |
| EASE OF PLANING | Fair | Good | Good |
| WOOD SURFACE | Good | Good | Good |
| COMMENTS | Abrasive cut slowly; a great deal of pressure was required to plane tiger maple and end grain; left heavy scratches on end grain | Left very good surface on straight grain but slight tearout on tiger maple and small scratches on end grain | Left surface good enough for light sanding on straight grain but tearout on tiger maple; good value |

about the best way to sharpen, and you'll get at least 10 different answers.

Those varied answers never sat well with me, and I wanted to know what worked best and why. So I undertook an evaluation of the most common methods of sharpening woodworking tools. For this test I focused on plane irons—because it's easy to control conditions and evaluate results when planing—knowing that the bottom-line results would be the same for chisels, spokeshaves and other edge tools.

After spending a few months immersed in the subtle art and science of sharpening, I can see why each method has its proponents. Every method I tested produced adequate results—consistent plane shavings and flat surfaces. But some methods are better than others, yielding a superior finish when handplaning, with less effort.

To do these tests, I flattened, polished and honed the plane irons on each abrasive system. I tested diamond stones, Arkansas stones, wet-or-dry sandpaper, ceramic stones, various waterstones, microhoning compound on a leather strop, the Tormek system and diamond paste on various substrates. Then I looked at the blade edges and the abrasives at 700x magnification. I also used the blades in the shop for

Microphotographs: Mark Floyd, Forensic Analytical Labs

## WATERSTONES

**Not all waterstones are created equal. The quarried and synthetic Japanese stones vary widely in price but less so in results. Unlike other waterstones, the Norton does not need to be soaked in water and is softer.**

### QUARRIED JAPANESE WATERSTONE

Finest grit: 8,000 (stone is called Awase Toishi, Grade 7)

Source: Japan Woodworker (800-537-7820)

Price: $225 ($279 with medium natural stone, called Aoto, and Nagura stone)

Use: Soak in water, then rub with Nagura stone before use; flatten occasionally with diamond stone or sandpaper

### SYNTHETIC JAPANESE WATERSTONE

Finest grit: 8,000

Source: Various woodworking catalogs (brand name is Samurai)

Price: $77 ($135 for set of four grits)

Use: Soak for at least 10 minutes before using; flatten occasionally on sandpaper or diamond stone

### NORTON WATERSTONE

Finest grit: 8,000

Source: Garrett Wade (800-221-2942)

Price: $98 ($193.60 for set of three grits)

Use: Mist with water; flatten frequently on diamond stone or sandpaper

***A Nagura stone is recommended for the quarried waterstone.*** *Rub the soft, chalky Nagura on the waterstone to condition it for final honing.*

| | | | |
|---|---|---|---|
| MICROPHOTO OF PLANE IRON |  |  |  |
| ABRASIVE | Quarried Japanese waterstone | Synthetic Japanese waterstone | Norton waterstone |
| EASE OF HONING | Excellent | Excellent | Excellent |
| EASE OF PLANING | Excellent | Good | Excellent |
| WOOD SURFACE | Very good | Very good | Excellent |
| COMMENTS | Planing was easy; left smooth surfaces except just a few stripes raised slightly on tiger maple | Planing was difficult at times; left some roughness on tiger maple | Very easy to use; plane iron left a mirror-smooth surface on all three woods, with no tearout on tiger maple |

daily work and in controlled tests. When it was over, I knew sharp—both in theory and in practice. I could see it in a microphotograph, hear it as I worked the irons on the stones and feel it through the plane on tiger maple.

### What makes a good edge

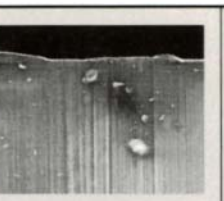
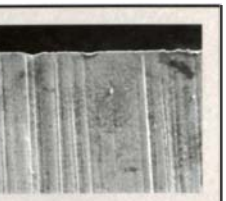
To understand why some edges cut better than others, you need to understand the edge. The edge of a plane iron is the intersection of two surfaces: the back of the iron and the bevel. When the back is flat and smooth, it presents a straight line to intersect with the bevel. Likewise, a bevel honed on a flat stone presents a straight line. When these two lines intersect, the edge is flat and smooth.

At the other extreme, a back with a hollow at the edge and grinder marks from manufacturing presents a curved and jagged line. A bevel honed on a coarse stone does likewise. The intersection of these two poor surfaces is doubly serrated, with random peaks and valleys that break and tear the wood rather than slice it cleanly. Also, the peaks break off inconsistently, and within a few inches of planing the iron becomes even more jagged and dull. This breakage on a microscopic level is the reason why the plane irons sharpened on some abrasives left obvious scratches by the time they got to the end-grain test.

Woodworkers generally hone their chisels and planes with a bevel angle around 30°. The angle isn't critical, but it must be maintained during honing. Any wobbling rounds the bevel and means each subsequent grit of abrasive may not be reaching

## BUFFING COMPOUND AND TORMEK SYSTEM

**The leather strop with microhoning compound is intended to be a final honing step only, so Fraser first honed that blade on the diamond stones. The Tormek, on the other hand, markets itself as a complete sharpening system, recommending taking a blade directly from its wet grinding wheel to its leather wheel charged with buffing compound, a jump in grits that may explain its rougher results.**

| | | |
|---|---|---|
| MICROPHOTO OF PLANE IRON |  |  |
| ABRASIVE | Buffing compound on leather strop | Tormek system |
| EASE OF HONING | Excellent | Good |
| EASE OF PLANING | Very good | Good |
| WOOD SURFACE | Very good | Good |
| COMMENTS | Left glassy finish on straight and end grain but tearout on tiger maple | Good on straight grain; hard to plane tiger maple; screeched on end grain; blade edge was rolled over slightly in microphotographs |

**BUFFING COMPOUND ON LEATHER STROP**

Finest grit: Green, microfine

Source: Woodcraft (800-225-1153)

Price: $20 (plus $22 for bench strop)

Use: Rub compound on split-leather strop before honing

the very tip. After 25 years of boatbuilding and furniture making, I can get decent results with freehand honing, but for the best edge I use a honing guide.

It takes more effort to push a plane with a dull iron. The iron wants to skip over the wood, and it takes a great deal of downward pressure to cut a continuous shaving. And even with that pressure, the cut is rough with significant tearout.

A sharp plane iron lasts longer and slices wood cleanly, producing beautiful, even shavings with almost no downward pressure after the first few inches. It will leave a glassy smooth surface in all but the most difficult woods. A sharp chisel or gouge will pare a finer, more accurate shaving and give you more control in end grain.

### For consistency, I tested identical plane irons, prepped the same way

To put all of the sharpening methods on an equal footing, I started with a couple of dozen identical, unused Lie-Nielsen plane irons, made of standard carbon steel. I had the backs ground flat at a machine shop, then lapped them all by hand using materials and methods common to woodworkers, not machinists: I polished each iron for about 40 minutes on a series of soft steel lapping plates charged with 9-, 6-, 3- and ½-micron diamond paste (the smaller the number, the finer the grit). By the way, a micron is one millionth of a meter.


**TORMEK GRINDING AND BUFFING WHEELS**

Finest grit: 6,000

Source: Various catalogs

Price: $412 for system (with grinding stone)

Use: For initial grind use grading stone to roughen wheel and then to condition wheel to a finer surface; use honing guide with both grinding and buffing wheels

To evaluate each sharpening system, I purchased sets of the various grits. The grades and grits of each system don't compare perfectly. I treated each system on its own terms, following the recommendations of the manufacturer, finishing on the finest grit available.

I used a FastTrak Honing Guide to hold all of the irons at a consistent 30° angle to the stone. (For more on honing routines and systems, see p. 41.) Last, I cleaned and oiled each iron and put it in a cardboard sheath to protect the edge in transport.

### One set of irons went to a lab, the other to the shop

I honed two irons with each system. One set went to Forensic Analytical Labs in Hayward, Calif., to be photographed through a scanning electron microscope, which provides clear images at greater magnification than an optical microscope could provide. I used the other set of irons in my daily work, getting real-world experience with


## DIAMOND PASTE

**As with buffing compound, this is a final honing step only. Woodworkers advocate a number of substrates for diamond paste, so Fraser photographed and tested blades sharpened with paste on MDF, hard maple and a steel plate marketed for this purpose. Maple was the winner, with the steel plate producing the roughest results. MDF was hardest to use.**

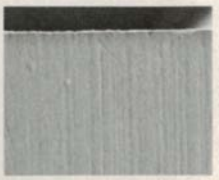
### DIAMOND PASTE ON HARD MAPLE

Finest grit: 0.5 micron

Source: Beta Diamond Products (800-975-9009)

Price: $30 (sold only as a set of various grits)

Use: Maple must be flat; use only one grit per wood block; isolate blocks and grits in plastic bags

| | |
|---|---|
| MICROPHOTO OF PLANE IRON |  |
| ABRASIVE | **Diamond paste on hard maple** |
| EASE OF HONING | Very good |
| EASE OF PLANING | Excellent |
| WOOD SURFACE | Excellent |
| COMMENTS | Smoothest edge in microphotographs; left the glassiest surface on wood with the least effort but was fussy to use; great final step after any other abrasive |

## Using diamond paste


***A dab will do.*** *Apply the light mineral oil lubricant (above) and lay down diamond paste on only a small area of the substrate (right). Spread it out with your fingertip.*


***Polish to a mirror surface.*** *Diamond paste is a great final step, no matter what honing system you favor.*

the ins and outs of each method. When the first set came back from the lab, I touched up each edge and then ran some controlled planing tests. The first was to plane quartersawn, straight-grained hard maple. I used a digital caliper on the shavings to set the cutting depth at 0.0015 in. Next, I planed a board of tiger maple, taking care not to skew the plane. Then I moved on to some end-grain cherry.

I ran the series of tests twice on each blade, checking my results and sometimes comparing two irons one after another to clarify subtle differences.

### How the honing systems stack up

Though it's not the most sensational story ever, the truth is that for general woodworking—where you use planes and chisels for jointing edges for glue-ups, leveling and aligning subassemblies and paring and fitting joints in even-grained woods—every sharpening method is adequate if applied correctly. You'll get good results, especially if you're used to sanding your work before finishing it. If you're not getting perfect shavings with any of these abrasives, look at your sharpening technique (see the top story on the facing page).

For general work, as described above, wet-or-dry sandpaper on glass is the best value. It's fast, easy and inexpensive, at least in the short term. Diamond stones also produce a good edge just as quickly, though they are more costly. On the other hand, one set should last most of your woodworking life. A side benefit is that both sandpaper and diamond stones can be used to flatten other stones.

While the Tormek grinding and honing system left rougher results than some others, many woodworkers use the wet, slow-speed grinding wheel, with its many handy jigs, as a first step before switching to other honing systems.

For those who sharpen planes and chisels a lot or work with dense or highly fig-

## A honing routine for razor-sharp results




**1. The first step in honing any blade is flattening and polishing the back. Start with a coarse but dead-flat abrasive. This crucial step can take up to an hour, but it is a one-time investment. Then work through the grits, making sure each abrasive surface is flat. Finish by polishing the back on the finest abrasive you have. Shoot for a mirror finish.**

**2. To hone the bevel, secure the blade at 30° in a honing jig. Start on a stone that's two or three grits below your finest. When you feel a burr along the full length of the back, you've spent enough time on the coarse stone. From this point, it's merely a matter of polishing. In general, this takes less than a minute per stone.**

**3. Finally, hone the back of the blade on the finest grit to remove all traces of the burr.**

### Watch it on the web

**To see a video of the author using a honing jig and diamond paste, go to www.finewoodworking.com.**

ured wood, waterstones are the best bet. Blades sharpened on waterstones cut figured wood very well, and the stones are easy to use. Waterstones cut quickly and easily because the abrasive surface breaks away rapidly, continually exposing new abrasive. The downside is that waterstones need to be flattened often.

The Norton waterstones got the highest rating in these tests. They produce an edge that leaves a glassy surface under a handplane, with a minimum of effort. Although the quality of surface they produced was just slightly less than that produced by the diamond paste, waterstones are easier to use. There's no oil to attract and hold contaminants, as there is with diamond paste, and you just keep them in a bucket of water, always ready to go.

Synthetic Japanese waterstones, the most economical waterstone, did quite well in the tests—no tearout in tiger maple, just a bit of roughness. The costlier quarried stone, prepared in the traditional way by rubbing it with a Nagura stone before final honing, gave slightly better planing results than the synthetic one. However, my informal tests suggested that synthetic stones also perform better when prepped this way. And because a Nagura stone is inexpensive, it's a good way to upgrade.

When you need the very finest edge—such as when flattening a tabletop or working difficult woods—add diamond paste on maple as a final honing step. You will get a glassy-smooth wood surface that has no need for sanding. For the ultimate hand finish, pick up a handful of shavings and burnish the newly planed wood. Rub on oil and wax, and the wood will glow. You may need more than one grit of diamond paste, depending on the stone you finish with. For instance, 2,000-grit sandpaper is comparable to about 6-micron paste; step through the grits of diamond paste from 3 to 1 to ½ micron for the best finish. After an 8,000-grit waterstone (about 3 microns), go from 1- to ½-micron paste for best results.

By studying the photographs and the charts, you'll understand what goes on in sharpening. And you'll learn what you need to do to get from where you are to where you want to be. Bottom line—you'll be a better woodworker. □

*Aimé Ontario Fraser is a woodworking teacher and writer in Westport, Conn.*


### MY IDEAL HONING SYSTEM

**In my shop, I use Norton waterstones (center) for most sharpening. In demanding situations, I go through the trouble of getting out the diamond paste and maple (right) to polish both sides of the edge to a mirror finish. I also use diamond stones (left) to keep my waterstones flat and to rapidly flatten the backs of new plane irons and chisels.**

Photo, this page (top left): Asa Christiana

# Safe and Simple Arts and Crafts Finish

## Pigment stains and dyes reproduce a fumed finish without the ammonia

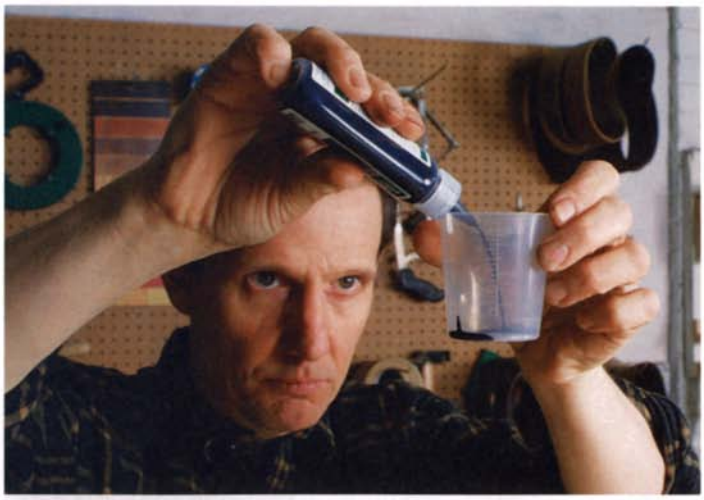
BY JEFF JEWITT

The Arts and Crafts furniture that became the rage in this country in the early 20th century was a reaction against the ornate and excessive style of Victorian designs. Several companies, such as Roycroft, Limbert and Stickley, all produced this style of furniture. Gustav Stickley is considered by many as the leader and originator of this style of furniture in America, and he had a particular fondness for quartersawn white oak. He worked tirelessly to perfect the finishing process, even after his company folded, and he clearly favored results that emphasize the subtle character of the oak with a low-luster, "in-the-wood" type of finish.

Stickley and others used a method of coloring oak in which the wood was exposed to ammonia fumes in an airtight chamber. The method effectively colored the hard, glassy surface of the ray-fleck patterns as well as the rest of the wood, establishing an even tone throughout the furniture. Fuming isn't that hard to do, but there are drawbacks, not the least of which is that ammonia is a dangerous chemical. Ammo-

## STEP ONE A DYE STAIN MIMICS FUMING

***Prep work before the color goes on.*** *When using a water-based dye stain, it's best to raise the grain with a coat of clean, distilled water. After that dries, lightly sand the raised grain on all of the wood that will be stained.*



***A light dye stains it all—even the ray flecks.*** *This washcoat of a light brown dye brings the color of different woods closer together, imparting an even tone to all. Work fast when applying dye stain. Flood it on and wipe it off quickly. The small pieces get dunked into the dye and wiped immediately.*

nia produces color by reacting with tannic acid in the wood. The color can vary widely in boards from different trees, and the lighter sapwood (often difficult to spot on white oak) will not react to the ammonia. Also, the strength of the ammonia, the length of exposure and the amount of tannic acid in the wood are all variables that make the process difficult to control.

Ammonia produces a cool brown tone—color that is devoid of orange or red. Stickley and other manufacturers sometimes corrected this initial fumed color by using warmer tones of dyes or pigment stains. Reading about those finishing practices, it occurred to me to try another approach—to eliminate the fuming process altogether. And I have found that I can finish white oak to look as though it were fumed. I get great results using only water-based dye stain, store-bought oil-based pigment stain and a clear topcoat such as lacquer or shellac. I prefer this method to fuming because it's less toxic and dangerous, and it gives me more control over the final color.

When finishing quartersawn oak, proper selection of wood for grain, texture and color is of the utmost importance. After lightly planing the rough stock, choose boards to make up panels very carefully. To get a better read on the grain patterns, you can wet the wood with distilled water. (Regular tap water can contain dissolved

Photos: William Duckworth

## STEP TWO A PIGMENT STAIN POPS THE RAYS

*A darker pigment stain adds color by filling the pores. Oil-based pigment stains contain particles that lodge in the open grain and stay behind as color after the excess stain has been wiped clean. Jewitt uses oil-soaked rags and brushes to apply this stain and wipes it clean in two stages.*

Quartersawn white oak doesn't blotch, and the open grain and glassy ray fleck provide either subtle or rich contrasts, depending on the type of colorant used. Dye stains add color to the ray flecks; pigment stains don't. Water-soluble dyes are a terrific way to imitate the effect of fuming. You can usually nail the exact color you want by starting with some basic brown colors on scraps and tweaking them with primary dye colors. This initial dye can range anywhere from a light tan to a dark reddish brown. The only way to tell if the color is right is to experiment on scraps and carry the finish all the way to the end.

To reach the color you want, use a systematic approach for mixing the dyes. Start with the manufacturer's suggested mix of dye to solvent (such as 1 oz. dye to 1 qt. water), what I call the master mix, and apply the dye to a piece of scrap. The color of the wood when it's wet is pretty much the color it will be after a clear finish has been applied. If the dye is the right shade but too dark, take one part of the master mix and add one more part of water. Then try that on a piece and see if you're closer. If it's still too dark, continue to dilute it. When the approximate shade and intensity are

iron salts that react with the tannin to produce gray stains that will discolor the final finish.) After gluing up panels, sand them all to 100 or 120 grit and then do the shaping and joinery. After dry-fitting, sand all of the parts up to 180 grit and raise the grain with distilled water. When the wood has dried, hand-sand the raised grain with 180-grit paper and remove all of the dust from the pores with a brush, a vacuum or a blast of compressed air.

With most Arts and Crafts or Mission furniture, you can do most of the coloring and initial sealing before the final assembly. It's a great technique if you have mostly flat components like those on the dictionary stand shown on these pages. The keyed through-tenons on this piece hold this project together, so it was a cinch to prefinish. On pieces that you must glue together, mask off all of the glue surfaces and plug open mortises with scraps of wood.

right, use master stock solutions of primary colors (made from the manufacturer's suggested ratios) to tweak the dye color to what you want. If the color is almost there but not red enough, put 1 oz. of the master mix in a new container and then add ¼ oz. of red at a time until the color is right. If the color is too red, do the same with green. Orange, yellow and black can be used in the same way, but I usually get what I'm after by tweaking brown with either red or green. When tweaking colors, keep a record of the amount of new color you use for each sample.

When you have the color you want, mix the amount of stain you'll need for the job. Figure a quantity of 1 qt. of dye for every 100 sq. ft. of material. This amount works for stain applied by hand, but figure more for the additional waste if you intend to spray it on. You can apply dye stain by just about any method—sponge, rag, brush or spray. Whichever you use, apply the dye liberally to the entire surface you're working on and blot up the excess quickly. When it's dry, lightly scuff the surface with a gray synthetic abrasive pad to bring down any raised grain. Don't use sandpaper because it will cut through the dyed surface and remove the color.

You can stop adding color at this dyed stage if all you want is a subtle surface color and less pronounced grain, and move straight to a clear topcoat finish. But I prefer to take it another step for the added effects you can get with a pigment stain.

An oil-based pigment stain applied over a dye stain is a good way to highlight the grain and "pop" the ray fleck because the pigments fill in the crevices of the open grain without adding color to the harder, smooth surface of the ray flecks. Dark pigment stains applied over lighter dye stains are particularly effective when using this technique. Choose a pigment stain that contains Gilsonite, the trademarked name for asphaltum, which is essentially tar. You can find Gilsonite in many wood-tone stains such as McCloskey's stock maple and walnut colors and Watco's dark and light walnut colors.

After the stain has dried, you can add a topcoat to it, which will darken the color slightly and add some depth to the piece. To check whether the stain is dry enough for a topcoat, wipe the stained surface with a clean white cloth. If any stain comes off, wait longer. When no more stain comes off, you can safely apply just about any topcoat—lacquer, shellac or varnish—with the exception of water-based finishes.

Most Arts and Crafts or Mission furniture looks better with a fairly thin topcoat, and a satin or matte sheen is preferable to gloss. Rub out any glossy sheen with 0000 steel wool. When the finish is dry, the piece can be waxed, but use a dark-colored wax for furniture that is stained a dark color. □

***How you apply it doesn't matter, but what it looks like does matter.*** *Whether sprayed, brushed or padded on with a rag, you can make an Arts and Crafts finish work by using almost any clear film finish, as long as you steer away from glossy sheens. A dead flat, or at most a satin sheen, will work best.*

*Jeff Jewitt writes frequently about finishing topics for* Fine Woodworking.

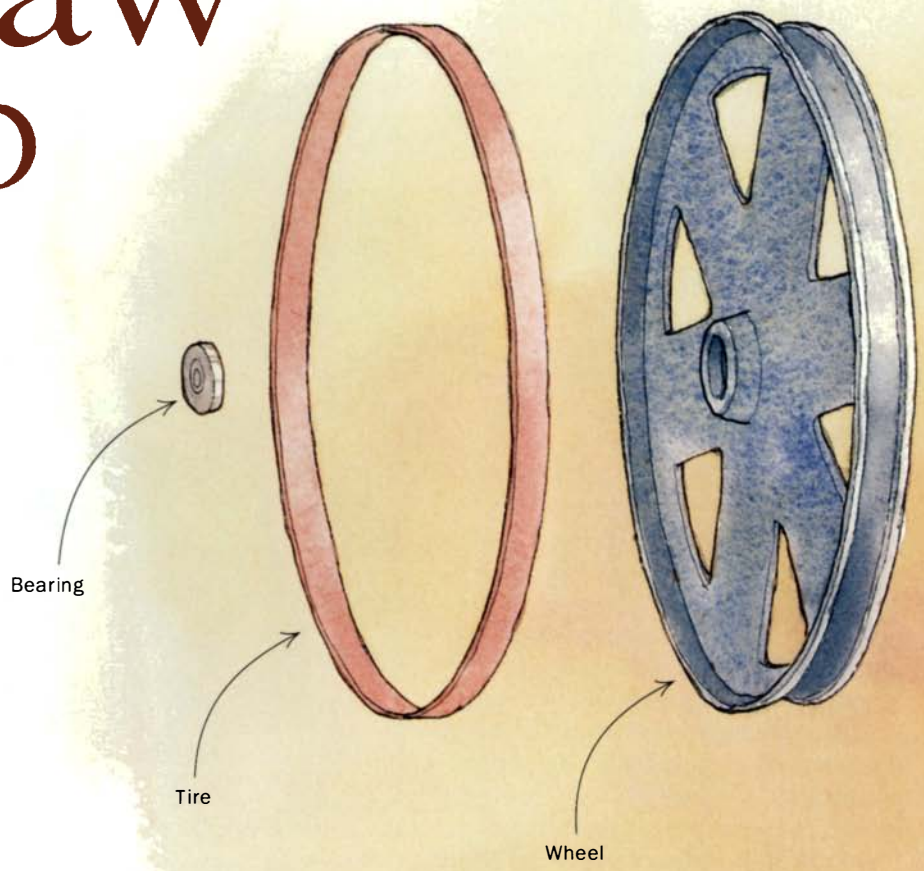
## Vary the look with different stains

**Different stain combinations will significantly alter the look of a piece of furniture. These samples were prepared with three colors of dye stain (TransTint). The first two were then colored with a coat of walnut pigment stain (McCloskey); the third was colored with a coat of jet-black mahogany pigment stain (Bartley).**

# Bandsaw Tune-up

## In just a few steps you can make an old bandsaw run like new

BY JOHN WHITE




A poorly tuned bandsaw will cause nothing but frustration. But the tune-up process is straightforward, takes only a few hours and is certainly worth the trouble. The procedure of making a bandsaw behave consists of two basic steps: tuning up the machine and then adjusting it for the blade being used and the work being done.

In this article, I've broken down the tune-up process into its main components, allowing you to go through the whole machine step by step. During tune-up, the machine's wheels, drive pulleys and table are brought into alignment, and the guide assemblies are cleaned and lubricated. Also, the machine's tires, drive belts, guide components and bearings are checked and, if necessary, replaced. Once a bandsaw has been tuned up properly, setting it up for the blade and work at hand is quick and simple. If you run into problems in the future, use the chart at right to help troubleshoot the machine. □

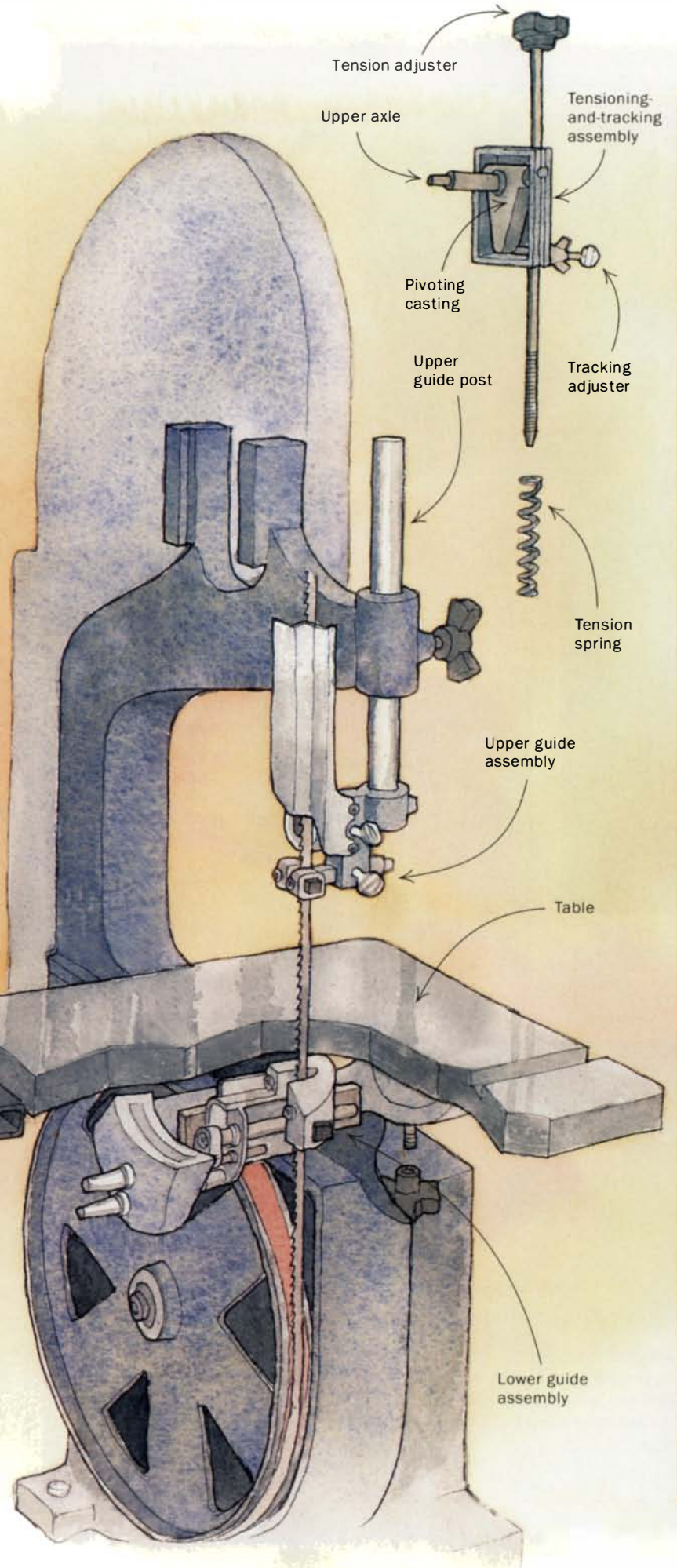
*John White is the shop manager for* Fine Woodworking.

### Troubleshooting Guide

| SYMPTOM | POSSIBLE CAUSE | | SEE |
|---|---|---|---|
| Vibration at high speed | • Pulleys on motor are worn or bent<br>• Drive belt is stiff or worn | • Wheel-bearing failure<br>• Thrust-bearing failure | Wheels, Blade guides |
| Vibration at low speed | • Wheels are bent or misaligned<br>• Dust buildup on tires<br>• Tires are cracked or worn | • Tire is lifting off wheel<br>• Blade is cracked or kinked or has a bad weld | Wheels, Tires |
| Blade doesn't stay centered on wheels | • Tires are grooved, hardened or worn<br>• Wheel-bearing failure | • Wheels are misaligned<br>• Tracking mechanism is slipping or bent | Tension, Wheels, Tires |
| Blade doesn't cut straight | • Blade is dull<br>• Fence is not aligned for drift | • Worn guide blocks<br>• Low blade tension<br>• Poorly adjusted guides | Tension, Blade guides |
| Cut is barrel-shaped | • Blade is dull or too narrow<br>• Feed rate is too fast | • Low blade tension<br>• Poorly adjusted guides | Tension, Blade guides |



Drawings: Jim Richey




## TENSION

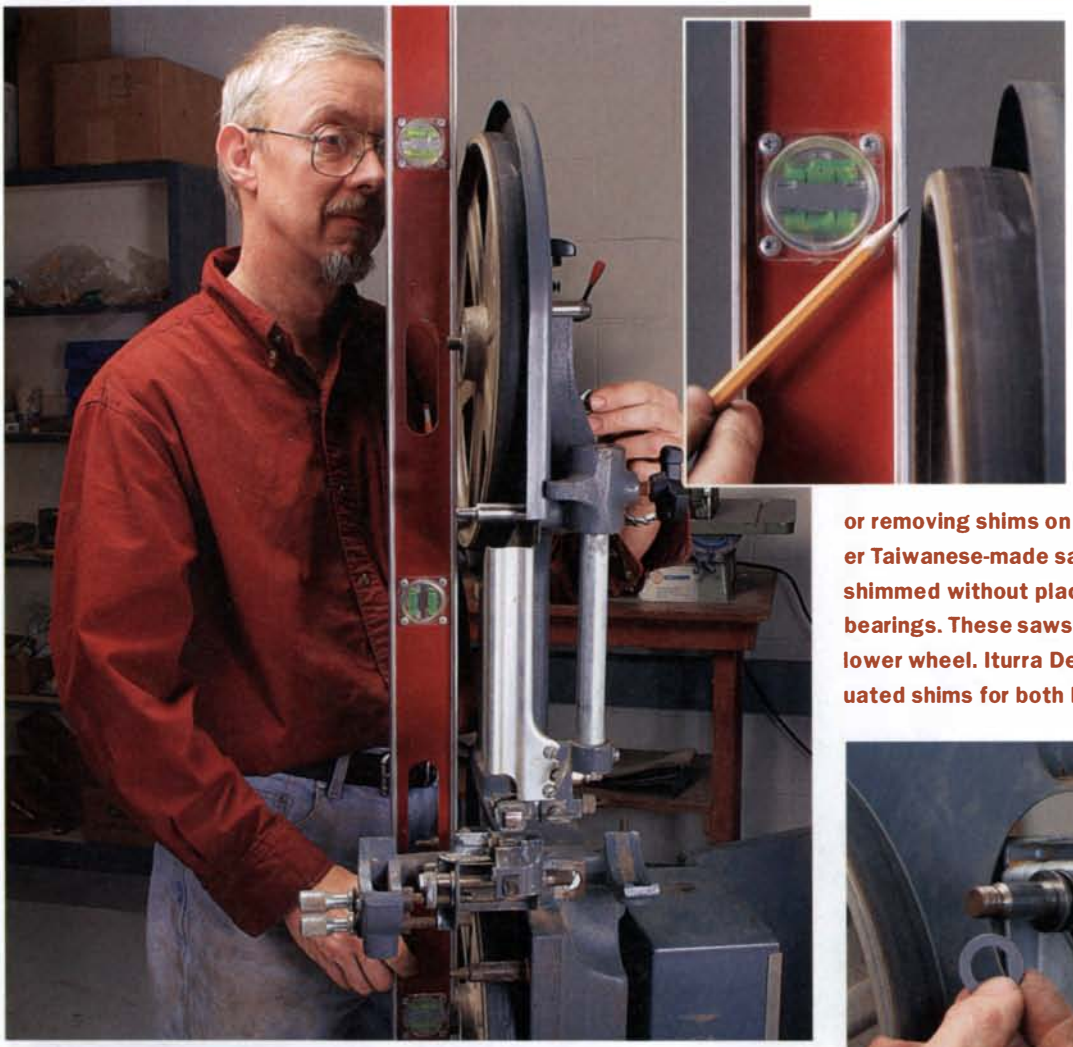
The tensioning-and-tracking assembly controls the position of the upper wheel. Remove the upper wheel and cover to get at the assembly. Inspect the pivoting casting that supports the axle for cracks or bends from overtensioning. A cracked or bent casting should be replaced. If the axle is loose, which is common, don't worry—it will tighten up when tension is applied. Use light oil to lubricate the pivot pin.

After a few years of use, the slides on both sides of the square main casting will probably have a step worn into them—use a file to smooth down the worn faces and the sharp edges left on the top of the grooves in the casting. Use a stick lubricant on the slides before sliding the assembly back into the frame.

The original tensioning spring on a 14-in. bandsaw is almost always crushed, making it impossible to tension the blade properly. The spring can be replaced with a heavy-duty version from Iturra Designs (888-722-7078) without having to remove the upper wheel and blade cover (see the photo above and *FWW* #147, p. 83).

The last step in servicing the top end of the saw is to remove the tension and tracking bolts—clean the threads with a wire brush and round off the ends with a file. Use a stick lubricant on the bolts before you reinstall them.

***Remove cover and clean up tensioner.*** *With the cover removed (above), it is easy to access the tensioner. Once the tensioner is removed, check to be sure the axle isn't bent, and then file the slides on both sides smooth.*



**Check the alignment.** *Begin by placing a long straightedge (White uses a 4-ft. level) across both wheels. Then adjust the tracking mechanism to bring the upper wheel parallel to the straightedge.*

Having the upper wheel aligned directly above the lower wheel allows the bandsaw blade to track better and puts less stress on the saw and the blade. On a 14-in. bandsaw, checking the alignment is easy. Remove the table and lay a long straightedge across the faces of both wheels. If the wheels are out of alignment, you'll see a gap between the straightedge and one wheel. On a Delta saw, the wheel alignment is adjusted by adding or removing shims on the upper axle. On Jet and most other Taiwanese-made saws, the upper wheel can't be shimmed without placing excess pressure on the wheel bearings. These saws are aligned by shimming behind the lower wheel. Iturra Designs sells inexpensive sets of graduated shims for both Delta and imported bandsaws.

***Shim out the upper wheel.*** *If the rims of both wheels aren't touching the straightedge, use shims to bring them into alignment. On Delta saws you can shim the upper wheel; for Taiwanese-made saws, shim the lower wheel.*

## Checking and replacing wheel bearings

To test the wheel bearings, remove the saw's blade and rotate the wheel through several revolutions with the tip of a finger against one of the spokes. You may feel a slight drag, but the motion should be smooth and silent. Even small amounts of roughness or a grinding sound indicate a contaminated bearing. If there is only a small amount of catching, the saw is still usable, but new bearings should be installed soon. If there is continuous roughness or grinding noises, the saw shouldn't be used until new bearings have been installed.

***Out with the old, in with the new.*** *A bandsaw wheel has two bearings: Even if only one is failing, they should both be replaced. The wheel bearings must be tapped out with a hammer and punch (left). When installing a new bearing, gently tap it into place using a soft hammer against the outer race (right).*



Photos: Erika Marks

## TIRES

Tires are simply oversized rubber bands. But they should be checked regularly, because the rubber becomes worn, cracked or hardened and can cause tracking problems and vibration. A tire should have an obvious crown and be smooth and free of grooves. Press your thumbnail into the tire; it should press in easily, and the surface should spring back. A lack of springback is a sign that the tire has hardened and needs to be replaced. To remove a tire, use a screwdriver to lift it over the rim. If the old tire was glued on, clean off the adhesive using acetone. The new tire should snap into a groove in the rim of the wheel (see the photos below).

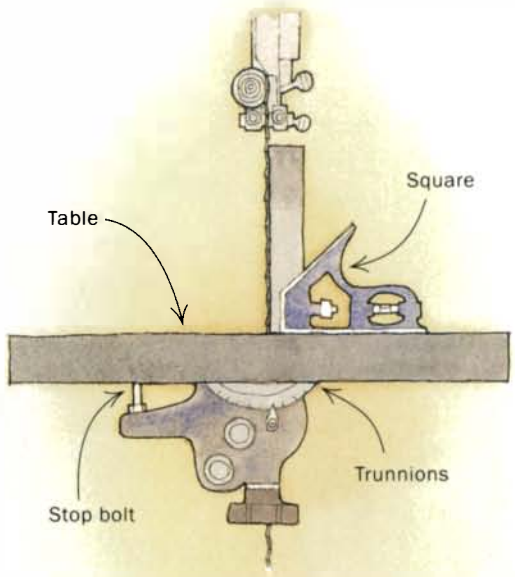
***Installing a tire.*** *Stretch the tire over the wheel (top). To even out the tension on the tire, slide a screwdriver between the wheel and tire, then rotate the wheel while holding the screwdriver in one spot (bottom).*

## TABLE

To get square cuts on a bandsaw, the table must be aligned square to both the sides and back of the blade. To align the table, first back off the blade guides and then adjust the blade to full tension and proper tracking. Place a square on the side of the blade and adjust the stop bolt (see the middle photo at left) to square up the table. Once the table has been adjusted, zero out the pointer on the table-tilt scale. To square the table to the back of the blade, loosen the table bolts from underneath, remove the table and place shims between the trunnions and the table casting. This process may take a little trial and error, but you only have to do it once, and it is definitely worth the time.

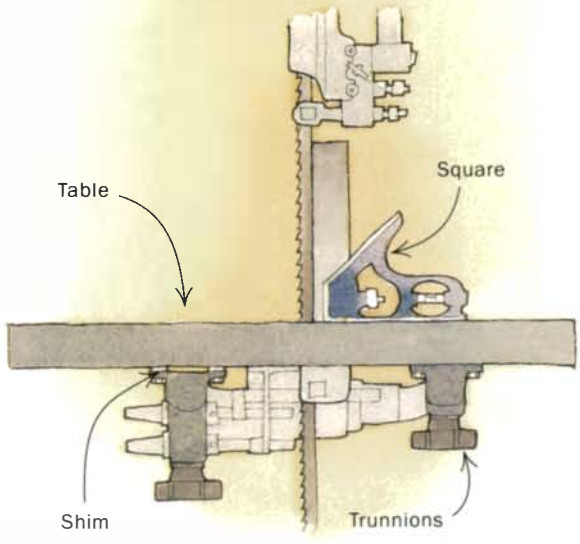
### ALIGNING FRONT TO BACK

***Square the tabletop to the side of the blade.*** *Tip the table and adjust the stop bolt mounted on the trunnion support casting.*

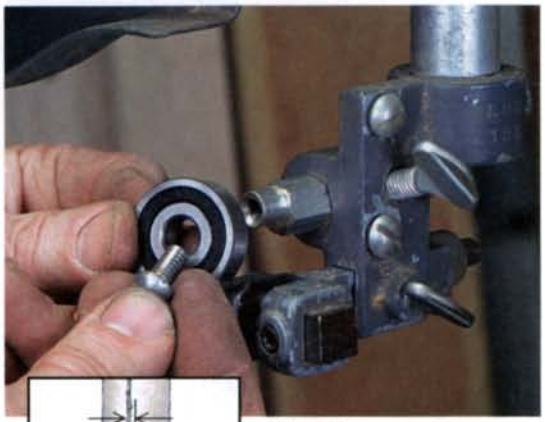


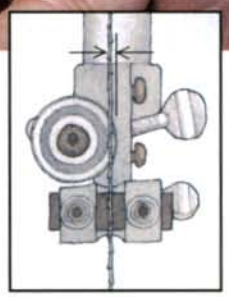

### ALIGNING SIDE TO SIDE

***There's only one way to square the table to the back of the blade.*** *You need to insert shims between the table and the trunnions until the blade and the table are aligned. While you have the top off, be sure to clean up and lubricate the trunnions.*



# BLADE GUIDES



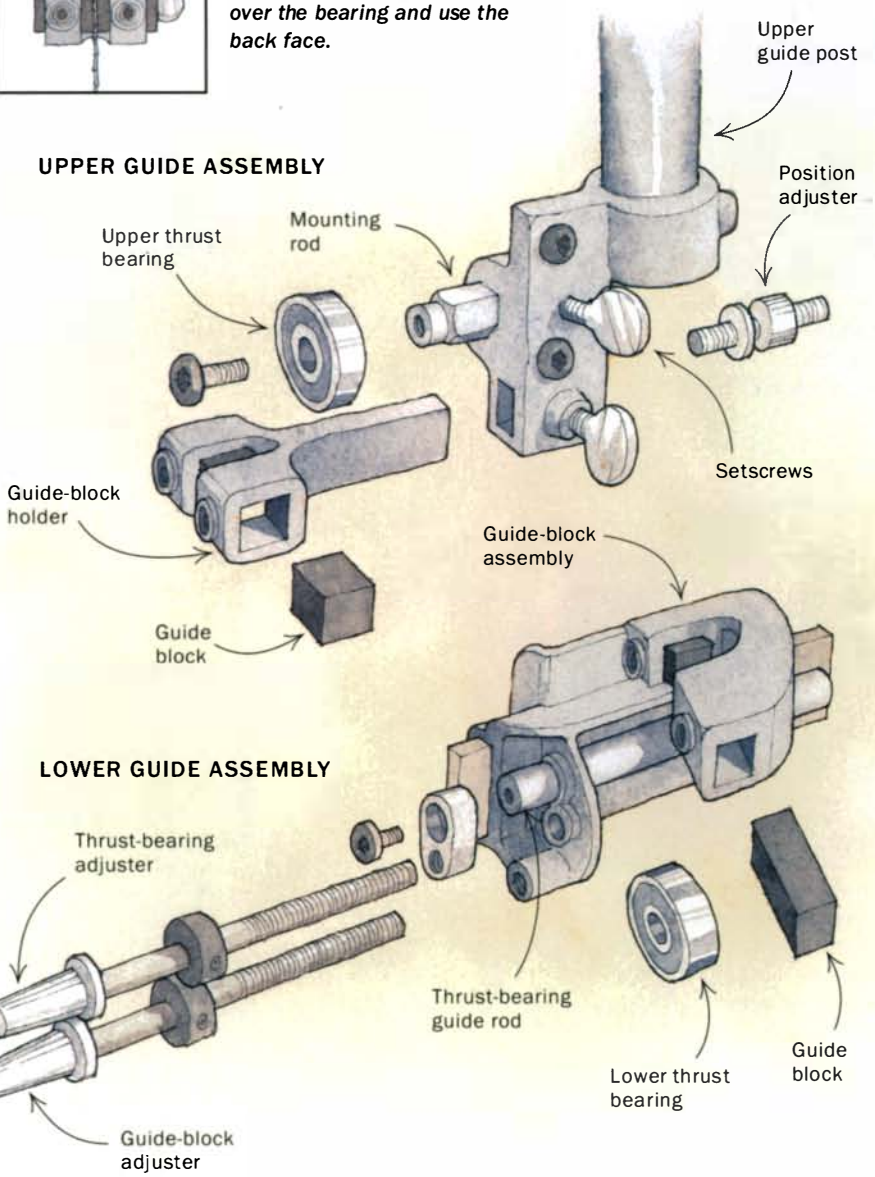


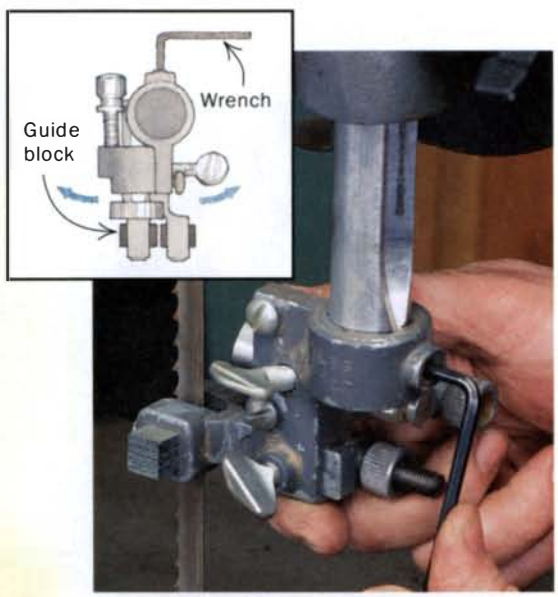
***Align the upper thrust bearing.*** *The blade should ride along only the outer edge of the bearing. If one face is scarred from use, flip over the bearing and use the back face.*

**The guide assemblies on a 14-in. saw are mechanically simple but have a number of parts that can wear out or jam up. Start by replacing any thrust bearing that is noisy or won't rotate freely. Then remove the bearing support and guide-block holders, file off any paint and burrs and inspect all parts for cracks or worn threads. Remove all of the setscrews and round off their ends with a file—the smoothed ends will hold better. Remove the knob that locks the guide post and shape the tip of its threaded end to match the groove in the guide post. Clean and lubricate the threads and the other parts of the guides as you reassemble them.**

**The guide blocks should be smooth, flat and square. Clamp the blocks in the holder with their faces touching; there should be no gaps between the blocks.**

**The lower guide assembly on the Delta 14-in. bandsaw is more complex than the upper guide assembly, but the same logic applies to tune-up. The lower guide assembly on a Taiwanese-made saw is tuned up the same way as the upper guide assembly.**



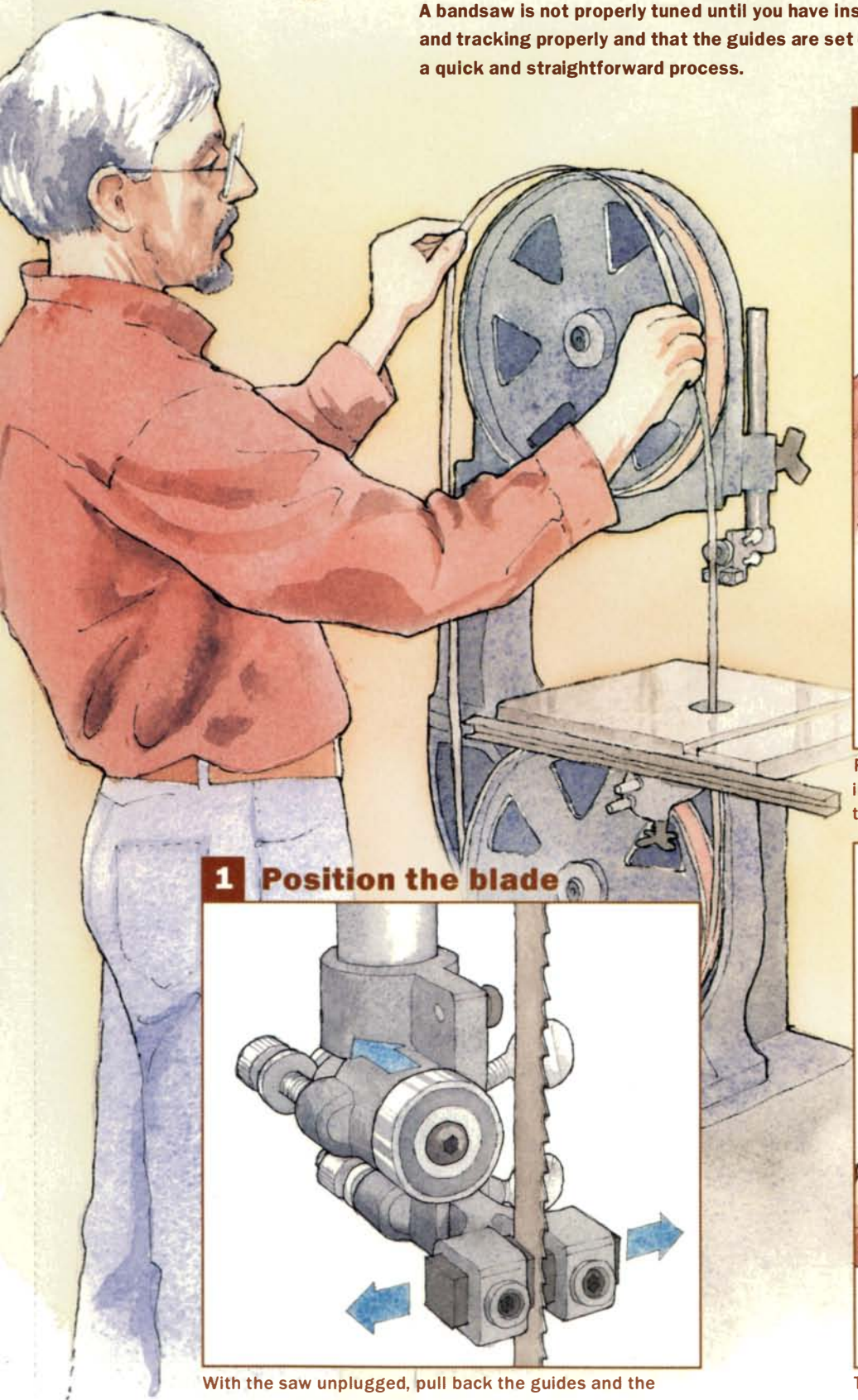




***Align the guide assembly with the blade.*** *Loosen the Allen screw on the upper guide assembly and adjust the assembly until the faces of the guide blocks are parallel to the blade.*

***Replace the lower thrust bearing.*** *Remove the nut on the end of the guide rod and slide off the tube to free up the bearing. Clean up everything and, if necessary, slide a new bearing into place.*

# Installing a bandsaw blade

**A bandsaw is not properly tuned until you have installed the blade and made sure it is tensioned and tracking properly and that the guides are set correctly. Following the steps here makes this a quick and straightforward process.**

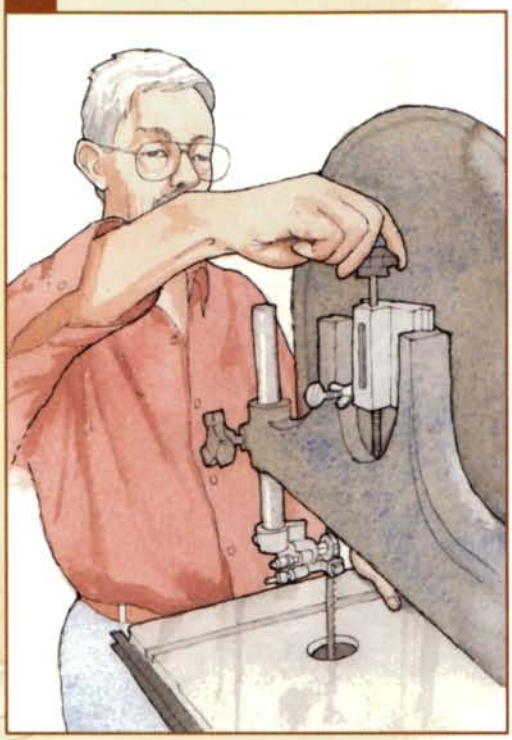


## 1 Position the blade



With the saw unplugged, pull back the guides and the thrust bearings and place the new blade on the wheels. Raise the upper guide assembly to clear the stock you'll be cutting by ¾ in. to ½ in.

## 2 Tension and track

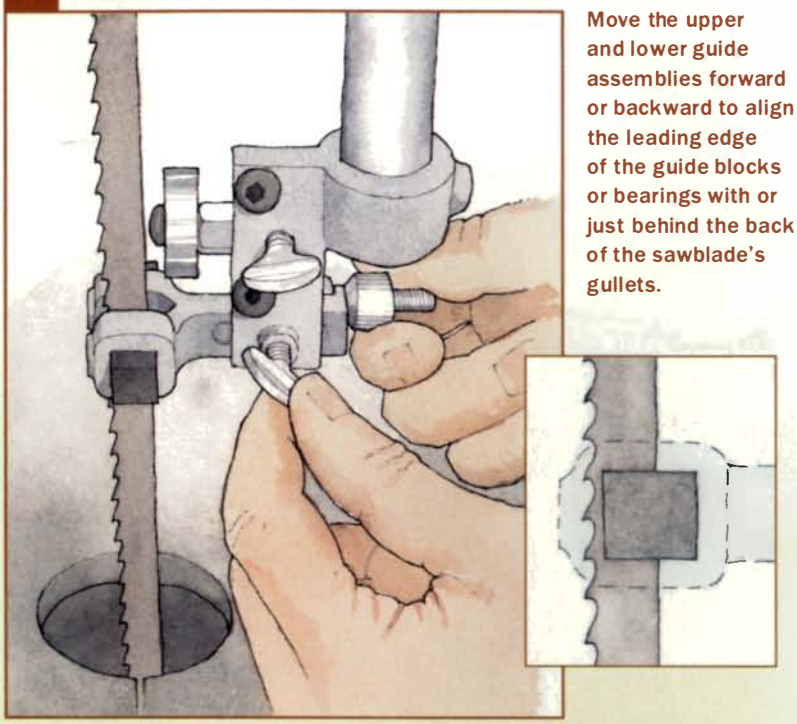


Rotate the upper wheel by hand while alternately increasing the tension and adjusting the tracking to keep the blade centered on the upper wheel.

Turning the tracking adjustment in adjusts the blade toward the back of the wheel.

# Installing a bandsaw blade (continued)

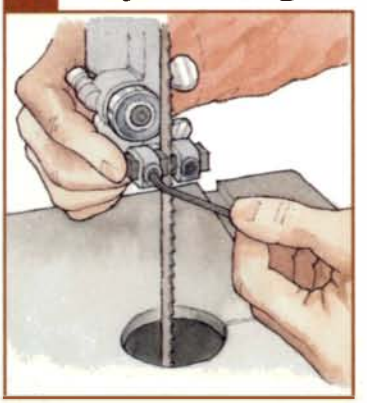
## 3 Adjust the guide assemblies



Move the upper and lower guide assemblies forward or backward to align the leading edge of the guide blocks or bearings with or just behind the back of the sawblade's gullets.

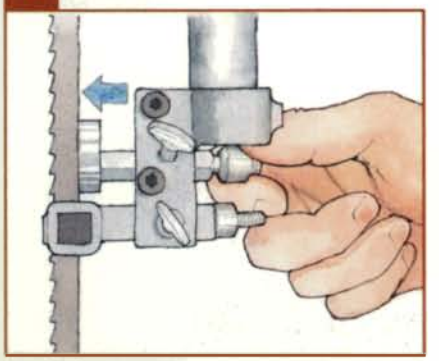


## 4 Adjust the guide blocks

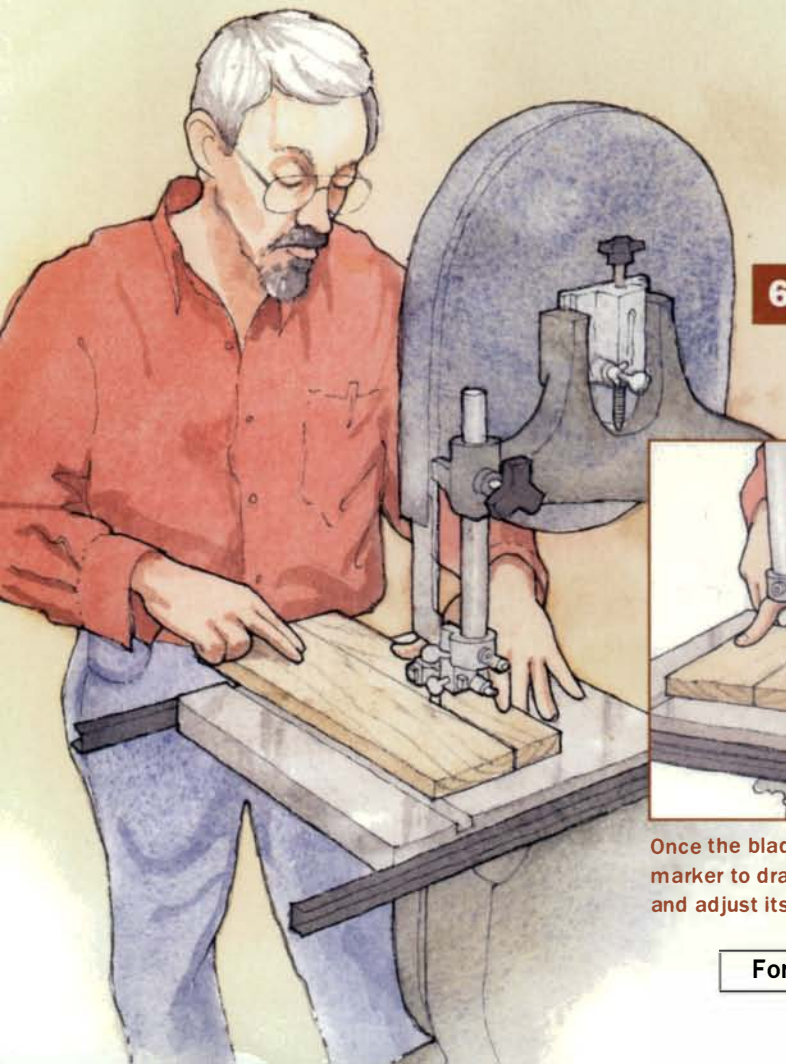


Move one of the guide blocks or bearings in each assembly so that it just touches the side of the blade. Lock it in place. Double-check that the block or bearing doesn't reach beyond the back of the blade's gullets. Bring the second block of each assembly against the blade. A soft block can be locked in place touching the blade. Hard blocks or ball-bearing guides should be spaced away from the blade with a single piece of paper. Rotate the blade by hand to check that a bad weld or kink in the blade won't cause problems.

## 5 Position the thrust bearing

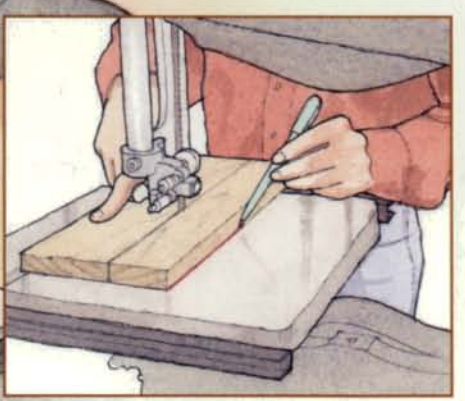


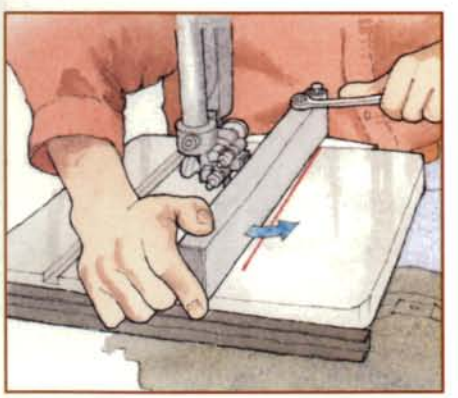
Bring the upper and lower thrust bearings forward to just barely touch the back of the blade. Rotate the blade by hand to make sure everything turns smoothly.



## 6 Align the fence for drift

Begin by drawing a straight line parallel to the edge of a test board. Rip the board freehand, adjusting your feed angle until the blade naturally follows the line.





Once the blade is following the line, hold the stock in place and turn off the saw. Use a marker to draw a line on the tabletop along the edge of the stock. Reinstall the fence and adjust its angle parallel with the mark on the table.

For more bandsaw tips, go to www.finewoodworking.com

# Building a Shaker Wall Clock

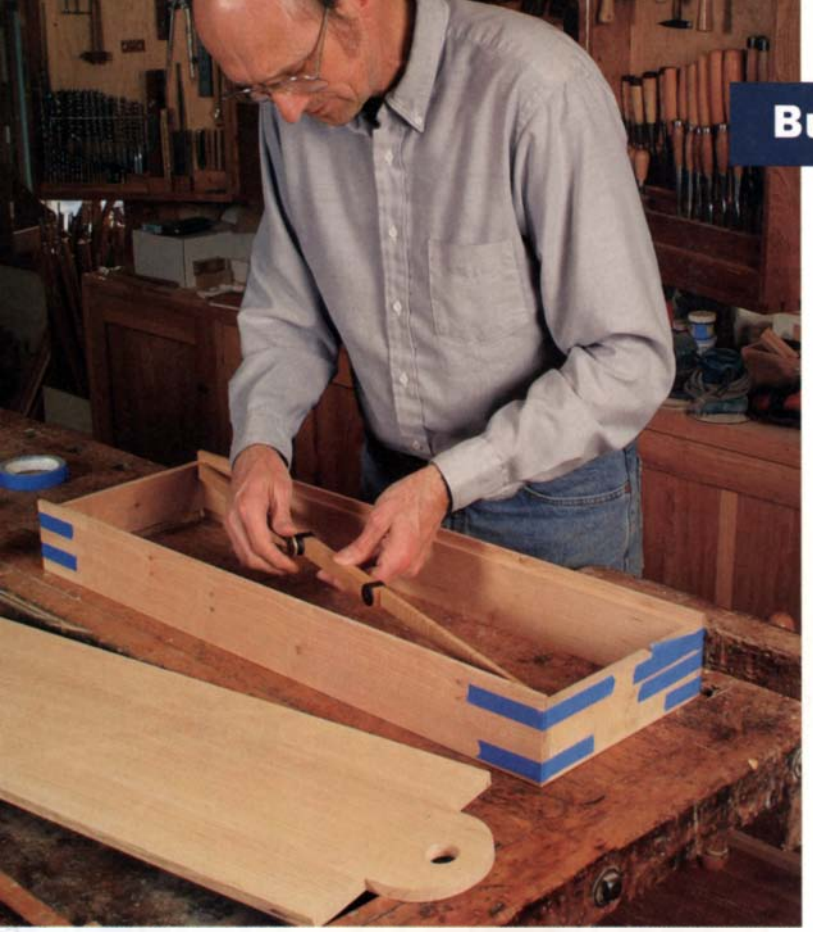
## Choose your movement first, then build the clock around it

BY CHRIS BECKSVOORT

Isaac Newton Youngs, a Shaker brother who lived in the Sabbathday Lake community in New Gloucester, Maine, built only 14 of these clocks, yet they still stand out as a hallmark of Shaker style. Some clocks were built with a glass door below, and a few were made with glass set into the side panels. My favorite is still housed at Sabbathday Lake and looks closer to the one I build. But you couldn't say that mine is an exact reproduction of the 1840 versions. Furniture reproduction is a slippery phrase. Though I'm known as a Shaker furniture maker, only twice in my career have I been asked to build historically accurate Shaker reproductions, meaning that all wood, hardware, dimensions, joinery techniques, tooling and finishes must match the original.

I have no qualms with historical accuracy, except when it comes to techniques that may have worked in the past but are not suitable today. Wood movement is one of those areas. The Shakers did not have to deal with forced hot-air heat. We do. Shaker clock makers built their cases to fit their mechanisms. We must build our cases to fit mechanisms that are commercially available today. To me, that seems perfectly aligned with Shaker ideals.

For starters, the original clock was constructed predominantly of white pine. I chose cherry for its color, hardness and grain. Because cherry moves more than white pine does, I had to make a few dimensional adjustments to allow for wood movement of the



**Quick clamps for temporary strength.** *The false top and false bottom are simply butt-joined and glued to the sides. The actual top and bottom will reinforce this joint. Before the glue sets, check to make sure the case is level and square.*

***Long-grain plugs are hardly seen.*** *The top is screwed straight into the sides, then plugged and trimmed flush.*

***Allow the back to move.*** *The back is screwed only near the center. The edges are then nailed into place, allowing for seasonal movement.*

## Build the case

back panel. Second, I decided to use a top-of-the-line mechanical movement, which required a small amount of additional interior space. Consequently, my overall case is a little deeper, and the back is a bit thinner. So much for historical accuracy.

The construction of both the original and my version is as simple as the spare design. I will offer several options—in construction techniques, dimensional changes and types of mechanisms—to suit the type of clock you want to build. Accurate dimensions for the original clocks (the glass door, not the panel-door version) can be found in John Kassay's *The Book of Shaker Furniture* (University of Massachusetts Press, 1980) or (for the clock with glass panels in the sides) in Enjer Handberg's *Shaker Furniture and Woodenware* (Berkshire Traveller Press, 1991). The version I built appears in my book, *The Shaker Legacy* (The Taunton Press, 1998).

### Make the case to fit the clock parts

I never start construction on a clock until I have the movement, dial and hands. Having these at the ready makes it much easier to fit the dial and allow proper clearance between the shaft, the hands and the glass, as well as the clock movement and the case back. I hate surprises.

Once you have the clock parts, you can cut the sides of the case to size. Then cut ⅜-in. by ½-in. rabbets to accept the back. The front of each side receives a stopped rabbet to accept the face. You could simply make the clock an inch wider and avoid cutting rabbets in the front, but—for reasons more aesthetic than historical—I prefer to keep proportions closer to the original.

Next, cut the top and bottom pieces and mold them with a quarter-round router bit. The back of the top is notched out ½ in. by 4½ in. to allow for the hanger on the back of the case.

On the original, the top and bottom were merely nailed onto the sides. I use long, thin screws and plugs. Another alternative is dowels. I once had a student who attempted to use sliding dovetails, only to discover that they lasted from 12 until noon. With only 5/16 in. of overhang on the sides and part of that cut away by the rabbet, the remaining end grain is extremely fragile.

I prefer to use a false bottom and top, which not only make glue-up easier but also act as a doorstop in front and create rabbets to house the back. Glue the false top and bottom to the sides using butt joints. Once the glue dries, center the actual top and bottom on the case and screw them into the sides.

The clock back simply butts up against the false top and bottom and is screwed into place from behind. However, this is where wood movement comes into play. The back is about 9½ in. wide, which means that a piece of flatsawn cherry will move about 5/32 in. (from 6% moisture content in winter to 13% moisture content in summer). If you can locate or glue up a quartersawn back, the amount of movement is cut in half, to 5/64 in. So, if you're building in the summer, when the back has reached a moisture content of near 12% or 13%, the back can be fitted tightly. In the winter, when the moisture content of the back is closer to 6%, a gap of just under 3/64 in. is required on each side. Also, leave a small gap where the half-round hanger protrudes through the top.

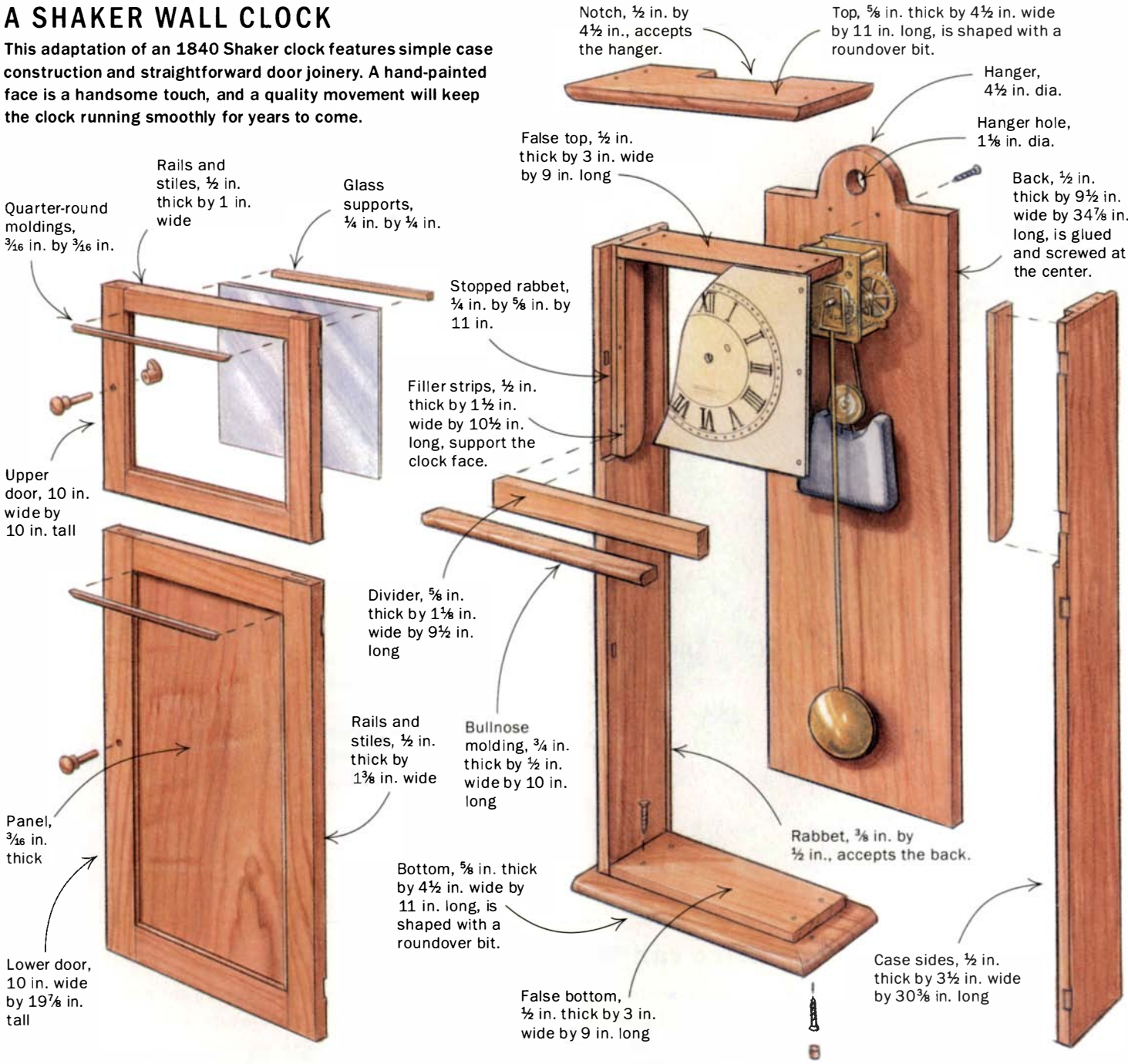
Another change I make is to increase the size of the hanger hole,



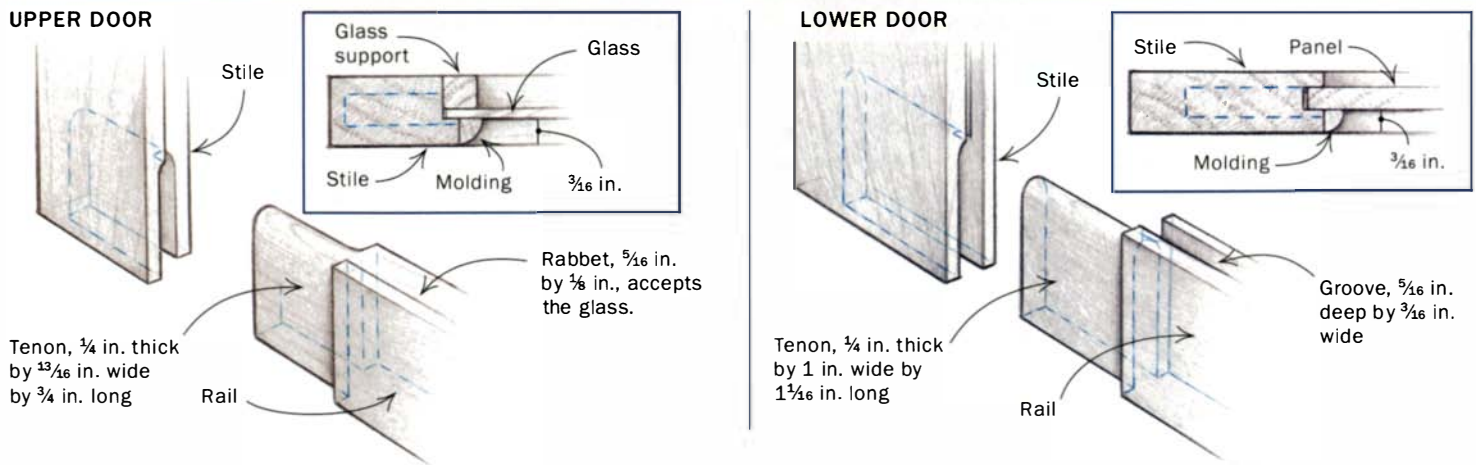
Photos: Erika Marks

# A SHAKER WALL CLOCK

**This adaptation of an 1840 Shaker clock features simple case construction and straightforward door joinery. A hand-painted face is a handsome touch, and a quality movement will keep the clock running smoothly for years to come.**

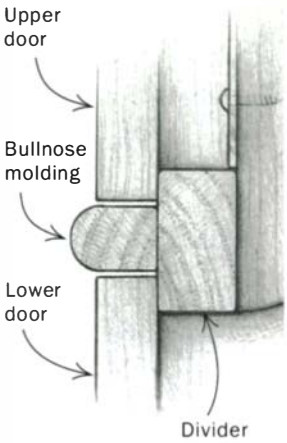



## DOOR-JOINERY DETAILS




Drawings: Bob La Pointe

***Horizontal divider catches the doors.*** *The horizontal divider is sized to act as a doorstop for both doors. It is set into the stopped rabbet that holds the clock face.*




***Bullnose molding separates top and bottom doors.*** *Shape the profile using a roundover bit, then cut it to fit flush with the sides.*

## Fit the door divider

from ½ in. to 1⅛ in., to allow the clock to be hung on a Shaker peg. The back is merely nailed into place, with a dab of glue in the center to ensure that wood movement is equal in both directions.

Next, let in the two-piece molded divider between the top and bottom doors. A horizontal divider, which also acts as a doorstop, is set into the rabbet flush with the face, and then a bullnose molding is glued over it.

At this point it pays to plan ahead. Measure the depth of the movement to check that you have proper clearance for both the shaft and the glass of the door. Mechanical movements are either attached directly to the back—as I've done—or sit on a shelf. Quartz movements, being much shallower, are usually attached to the dial. If you use a spacer, the movement can also be attached to the case back. Planning ahead allows you to position the dial so that the hand shaft is close to the glass but does not touch it. Once you've established the location of the dial, glue two vertical filler strips to the inside of the case. Thick metal dials like the one I used can be screwed to these strips directly, while thin metal or paper dials should be adhered to ¼-in.-thick plywood backings.

### Simple joinery for the doors

The doors are relatively straightforward, mortised and tenoned at each corner. Cut haunched mortise-and-tenon joints on center, and make sure to offset the glass and panel grooves to allow room for the thumbnail profile along the fronts. The frames are ½ in. thick, and the bottom panel is only 3⁄16 in. thick. The 3⁄16-in. quarter-round moldings are added after the panel is in place. On the top door, add the quarter-round moldings to hold the glass on the outside, and add 3⁄16-in. glass supports, nailed from the inside, to hold the back of the glass.

From looking at the original, I can't tell how the doors are kept

## A movement for every price range

**By far the least expensive movement is the battery-powered quartz movement. It is also the most accurate and the least fussy and bothersome. Change the battery once a year, and that's it. These movements are also the smallest and easiest to mount. The cost is anywhere from $5 to $30, and you can get a pendulum to boot. Sounds perfect, doesn't it?**

**The fact is, I can spot their fake pendulums a mile away. They have a weird little groan and oscillate too slowly. Still, if money is a concern, they're worth considering. Quartz movements are available in craft catalogs and also from Woodcraft Supply (800-225-1153; www.woodcraft.com), Murray Clock Craft (800-268-3181; www.murrayclock.com) and Merritt's Clock Supply (800-345-4101; www.merritts.com).**

**In my opinion, mechanical movements are much more in keeping with period clocks. Most require a little extra work to install and to get the pendulum adjusted to the correct time. Plus, they need to be wound every week. Most are face-mounted, which requires the face to be backed by ¼-in.-thick plywood. The lower-end mechanical movements run from about $35.**

**The price for a spring-driven, time-only (silent) movement is about $40 ($110 for a unit with a 20-in. pendulum). You can also spend more and get chimes or a bell strike. The downside to these movements is that they have a life expectancy of roughly five years if oiled yearly. The brass plates are thin and soft, and after a few years of use, will wear out. They can be repaired but will require the services of a clock maker to install bushings.**

**Inexpensive mechanical movements can be ordered from the same suppliers listed previously.**

**I am quite fussy, and I would not expect my customers to pur-**

## Construct the doors

**Don't risk surprises.** *Before applying glue, carefully dry-fit the doors and see that they fit the case.*

***Quarter-round molding trims out the door.*** *The molding is shaped on the router, then mitered to fit the door. Becksvoort simply glues the molding to the rails and the stiles.*

***Securing the glass.*** *After setting the glass into the rabbet, small glass supports are nailed into place.*

closed. Nor does Kassay give any clue. When in doubt, I take historical liberties, using something that is period appropriate and might have been used. I usually turn my knobs with extended shafts and attach a small oval spinner (*FWW* #155, pp. 46-47). I chisel out a small mortise for the spinner on the inside of both the upper and lower cases. This method is unobtrusive, and it works.

As far as I know, nobody makes hands to match the originals. When in doubt, select the simplest design possible, such as moon or spade hands. If you are handy with sheet metal, you can cut your own. If you decide to get the expensive mechanical movement, you can have custom hands made to specifications.

As far as a finish goes, I am partial to Tried & True Varnish Oil (*FWW* #152, pp. 74-75). It leaves a silky, penetrating finish that I prefer. More accurate for this clock would be a shellac finish, which was used on the original.

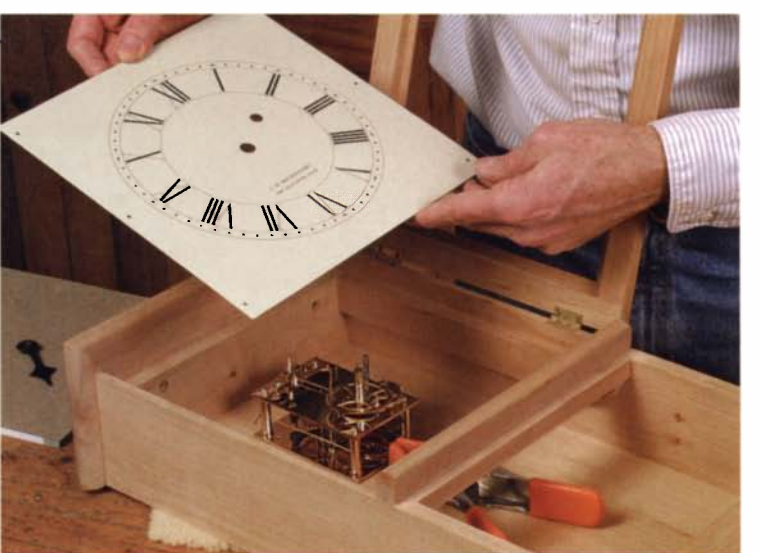
When hanging the clock from a peg board, carve a ½-in. flat spot at the top of the peg where it meets the hanger, leaving a slight ridge, to keep the clock from sliding forward on the peg. If the peg board is ¾ in. thick, use a ¾-in. spacer behind and near the bottom of the clock. A toggle bolt or similar anchor will attach the spacer to drywall or plaster if there is no stud nearby. Once the clock is perfectly plumb and running smoothly, drill a hole through the back into the spacer and anchor the clock with a screw. This keeps it from shifting during winding or an accidental bump. □

*Chris Becksvoort is a contributing editor.*

**chase a high-priced clock that took 40 hours to make, only to have to replace bushings after two years. A quality case demands a quality movement. I wanted a time-only, weight-driven movement made of thick, hardened brass plates. To me, this high-quality movement comes closest to what the original Shaker movements must have been like. I don't mind the extra time it takes to install the movement or the extra time required to adjust the pendulum to get it to keep perfect time. The weekly winding with the crank key becomes a Sunday night ritual.**

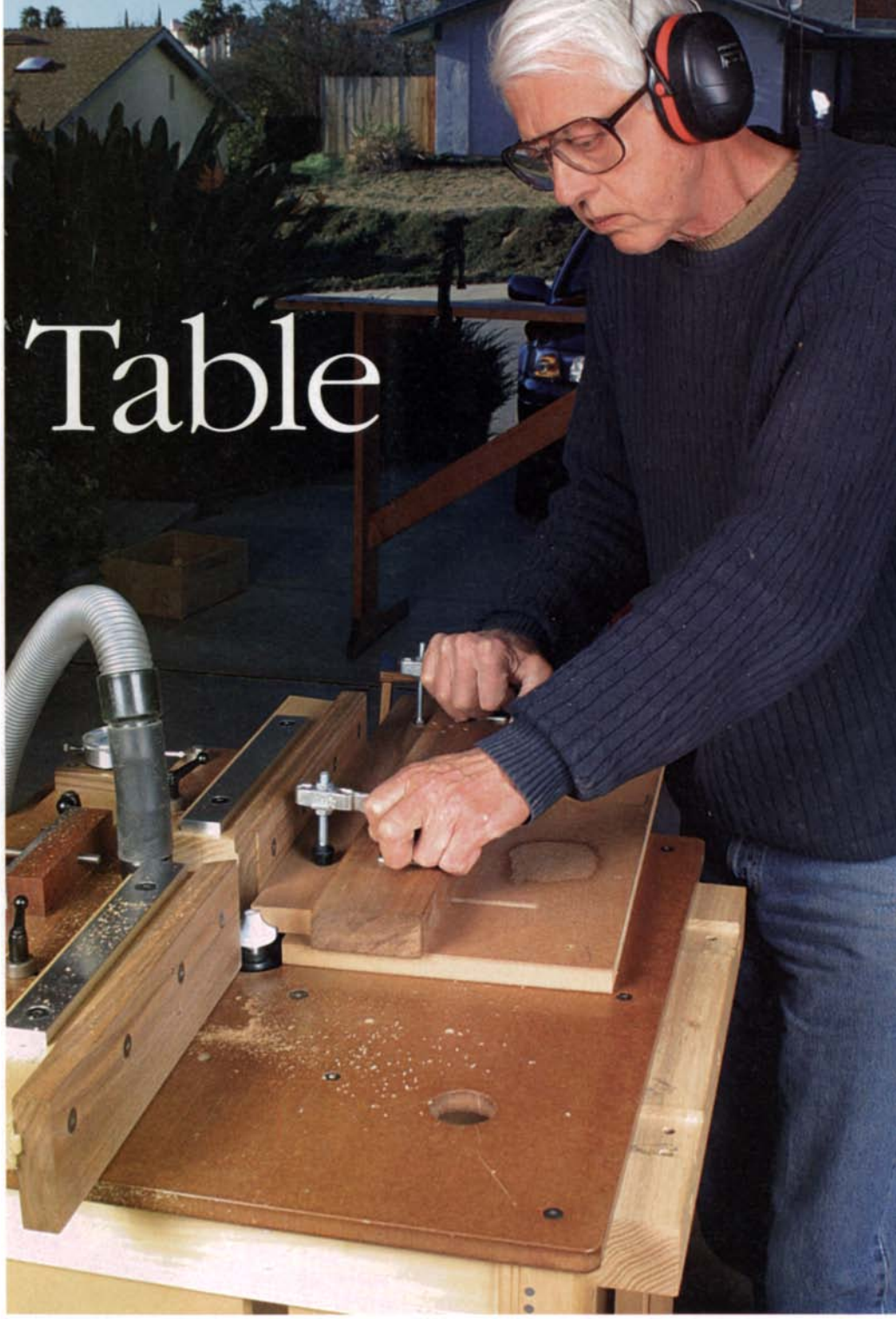
**The banjo movement is available from Merritt's Clock Supply with weight, pendulum and winder for $225. Individually made wall-clock movements are available for $300. Add another $50 for custom-cut hands, and $25 for unpainted, heavy steel dial blanks direct from David Lindow, clock maker (527 Gravity Road, Lake Ariel, PA 18436; 570-937-3301).**

**Custom dials and dial painting are available from The Dial House (3971 Buchanan Hwy., Dallas, GA 30132; 770-943-5370).**



***Align the movement with the face.*** *With the movement roughly centered inside the clock, lay the face in place and make adjustments until the hands are properly centered. Use an awl to make screw holes through the movement.*

# Get the Most from Your Router Table



Make controlled cuts using special jigs that hold the work and keep hands away from cutters

BY PAT WARNER

Judging from the growing ranks of ready-made router tables and the numerous articles in magazines on how to build one, the router table has become a must-have tool for woodworkers. Unfortunately, instruction in the correct use of this tool has been all but ignored. I can tell from the e-mails I receive that too many woodworkers are using risky methods to obtain disappointing results.

Most routing can be done safely and accurately on the router table if certain guidelines are followed. Here I'll cover three keys to success and talk about bits. I'll also discuss which routers are okay for use in a table and how to determine the correct feed rate. And I'll give a few tips on getting smooth cuts every time, even with special cuts or bits.

### Three keys to successful routing

If you decide to build your own router table, you are welcome to make it as sophisticated as the one John White built (*FWW* #153, pp. 55-61). However, the table does not have to be that complex. All that is required for maximum control of the workpiece and highest quality of cut are a flat table that's at a comfortable working height and a good fence.

If the work is not at a comfortable height, any form of routing will be a struggle. Even for shorter woodworkers, the standard bench height (34 in. to 36 in.) is too low for routing. You can't see the work, and if you try, you'll fold yourself in half. What level feels comfortable varies considerably even among those of the same height. A good way to discover what feels right for you is to use a drill-press table as your experimental height platform. Hold a workpiece as if you were routing it, and adjust the table to see what height feels comfortable.

Whether a router tabletop has been "windowed" for an insert or not, it must be flat and uninterrupted. If the workpiece bumps into any minor changes of height between



Photos: Mark Schofield

the router insert and the tabletop, these imperfections will be transferred to the workpiece. The top must also be as square to the spindle as practical.

The fence must be straight, flat and square to the top. Adjustability would be nice, but if it ain't flat and straight, the depths of cut will vary, and there may be some risk to the user.

### A bit about cutters

Router bits come in many diameters, lengths and shapes. Some are easy to use, and some, in my opinion, require extra vigilance on the part of the operator. A bit must be sharp to cut cleanly. No matter how skillful you may be, you cannot get good cuts from a dead bit.

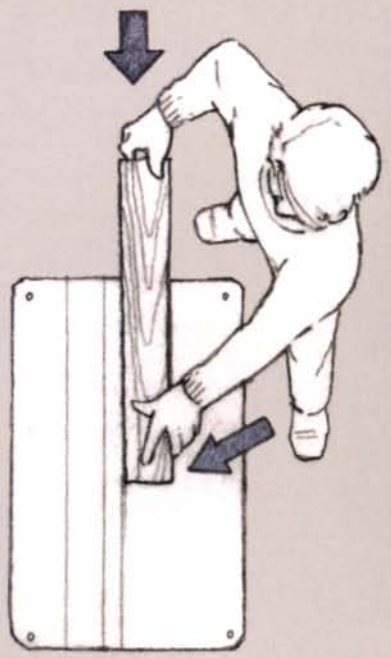
Certain cutters—because of their size and shape—require special skills and jigs to achieve good results. I think most woodworkers are unaware of this. Not surprisingly, manufacturers of router bits advertise a bit's application, not its difficulty in use. For instance, cutters that are over 2¼ in. dia. are adapted from other cutters designed specifically for the shaper spindle. Manufacturers present these cutters to the amateur as being like any other tool bit in their inventory. But they are not. The bits require special methods for controlling the workpiece, slower speeds and advanced operator skill.

Moreover, there is no way these bits can cut their profiles in one pass; often three or four are required. A consequence of taking multiple swipes is that the bits dull pretty quickly. You can expect a good cutter to have a half-life of 200 ft. to 300 ft., if the bit is treated with respect. I wouldn't say to rule out large cutters entirely; they are going to be popular no matter what I say. Instead, I recommend using them with extreme caution: Take light cuts, practice, be sure the workpiece is secured firmly and use special fences or guards to keep your hands away from the bit.

### Horsepower vs. human power

It is fairly easy to push wood across a router table, so you may tend to feed stock too quickly. To compensate for this, I recommend using as large a router as possible in a table—ideally a 2½-hp to 3-hp model. A large router not only provides pure muscle, but it also evens out any balance problems with a bit, and the "flywheel" action keeps the cutter moving uniformly. That

## TABLE-ROUTING TECHNIQUE



**STANCE**

*Standing to the right-hand side of the router table allows you to feed a longer board with fewer hand movements.*

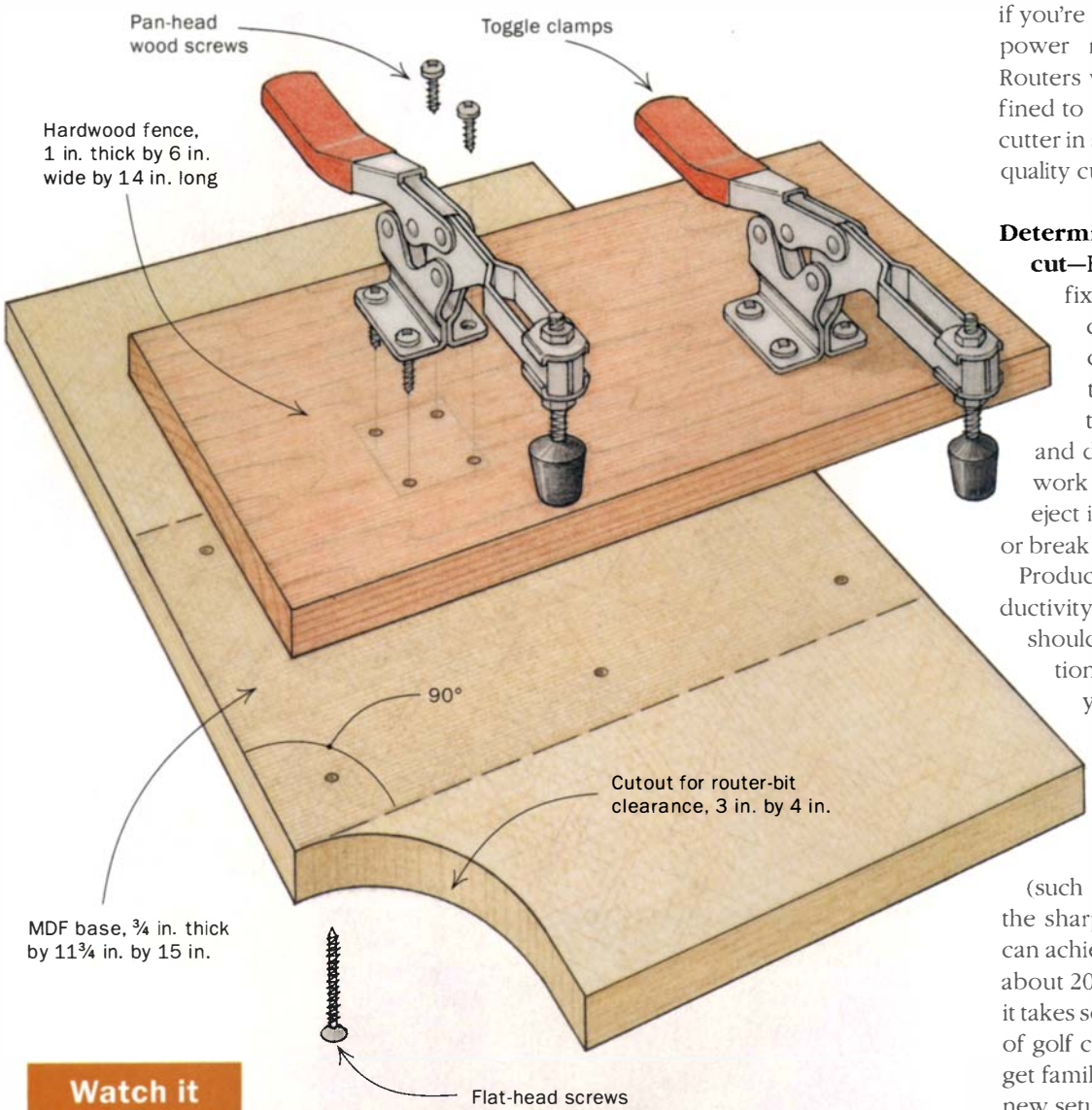
**HAND POSITION**

*The left hand guides the stock as the right hand pushes. Let the workpiece slip through the fingers of the left hand. Maintain steady forward momentum with the right hand.*

Drawing, this page: Erika Marks

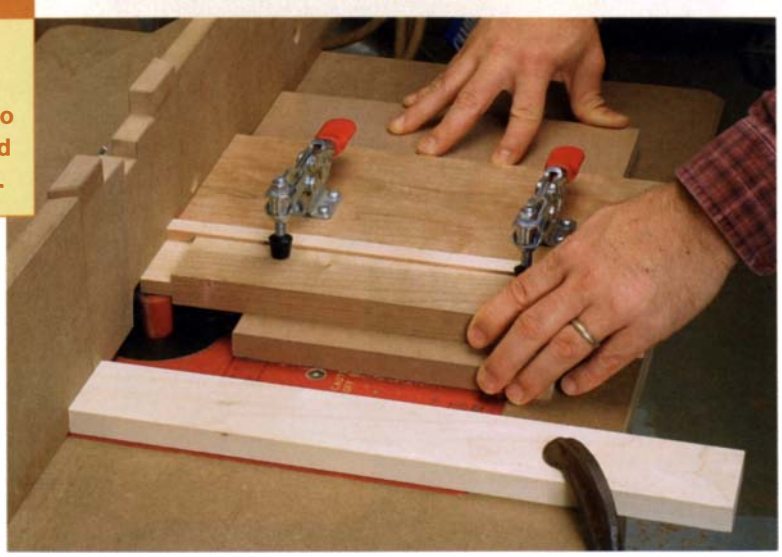
## END-GRAIN SLED

**This jig is used when cutting the ends of a workpiece on the router table. Examples include cutting tenons and the profile on the end of a rail using matched rail-and-stile bits.**




**Watch it on the web**

To see the author's jigs in action, go to www.finewoodworking.com.



***Cutting tenons.*** *This rail and a backing block are secured against the sled by two toggle clamps. A stop block prevents cutting into the jig.*

said, a 1½-hp router with a sharp cutter will work for short runs and light cuts (the equivalent of a ⅜-in. by ⅜-in. cut). However, if it's working more than 30 minutes or if you're making larger cuts, a small-horsepower router may tend to overheat. Routers with 1 hp or less should be confined to bits with ¼-in.-dia. shanks. A big cutter in a small router is a recipe for poor-quality cuts.

**Determine the feed rate for every cut**—Feed rate on the router table is not fixed and must be learned for each combination of router, workpiece, cutter design and sharpness, and the depth of cut. If the feed rate is too slow, you can burn the work and destroy the cutter. If you feed the work faster than the cutter can cut and eject its chip, you may chatter the work or break the bit.

Production shops aim for maximum productivity with minimum adversity, and you should too. Even the fanciest of production shops relies on the test cut. Once you are set up, test the process. Start with a feed rate that's almost slow enough to burn the stock and increase the speed to the point of tearout. Although many factors affect the feed rate (such as the hardness of the wood and the sharpness of the bit), in general you can achieve a quality cut at a steady rate of about 20 ft. per minute. Remember, just as it takes some time getting used to a new set of golf clubs, it will take some practice to get familiar with the correct feed rate for a new setup.

### Tips for smooth cutting

There's more to achieving good results on a router table than just the equipment and the feed rate. You need well-prepared stock, secure hold-downs when necessary and good working habits. With practice, the following guidelines will ensure consistent, satisfactory results with your table-mounted router.

**Begin with good stock preparation**—Material preparation cannot be overlooked in any aspect of woodworking. But routing, due to its methods of registering the work to the cutter, is more sensitive to misshapen work than most tools are. A stick with a crook, cup or bow is not to be trust-



Drawings, except where noted: Vince Babak

***Cutting profiles.*** *Warner uses this long-grain sled when routing profiles on long, narrow boards. The toggle clamps are safer and more effective than using fingers to guide the work this close to a cutter.*

## LONG-GRAIN SLED

**This jig is used for running the long side of a workpiece past the cutter. The sled can help cut the long edges of rails and stiles using one cutter from a matched set. It can also aid in cutting decorative profiles and moldings.**




ed. One that is poorly jointed or not uniform in thickness will be a surprise during each operation, and the resulting cut will be a disappointment. Improperly prepared stock is also a safety issue: Warped stock cannot be cut accurately and may be hard to push past the bit, increasing the chance of injury.

**Get a grip on your work, and stop chattering**—Like a group of mischievous lads, a router can get where no other tool can. You can enter the edge, the end or the face of nearly any stick. The cut can be blind, half blind, through or cut to any fractional depth.

A router bit can't be expected to behave without adversity under all of these conditions. A cutter can chatter the walls and floors of its pathway. It can tear out as it encounters wavy grain. It can burn in cherry and spoil the entry and exit of cross-grain cuts such as dadoes. A bit can break, bend, burn, vibrate, scream, lose its carbide or go dull in seconds if it's abused.

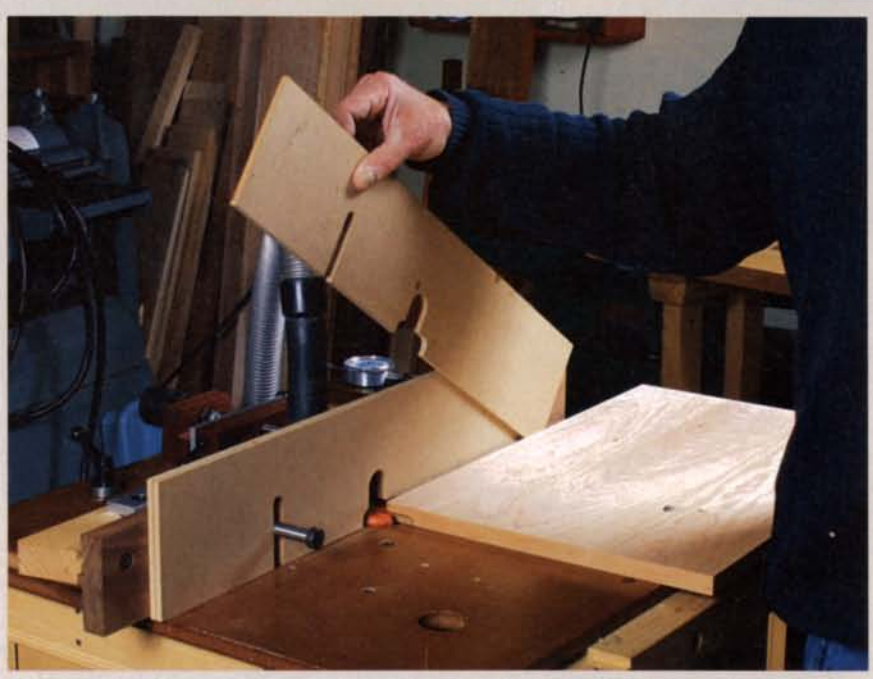
To combat these problems, it is the accepted practice to use hold-downs, featherboards and other contrivances to manage difficult cuts on the router table. I don't. In my view, if the operation is a risky one, it requires a proper jig to control the workpiece safely and achieve a quality cut.

Over the years I've developed numerous jigs for use with a router, but two simple ones will aid many of your cuts on the router table. The first is an end-grain sled (see the photo and drawing on the facing page) used when cutting the end of a workpiece, particularly a narrow one. The work is secured with toggle clamps, and a backup piece of scrap can be placed between the workpiece and the jig's fence to prevent breakout.

The second jig is a long-grain sled (see the photo and drawings above) used when routing the face of long, narrow stock, where control by fingertips alone would be an accident waiting to happen. Stock

## USE SPACERS FOR STEPPED CUTS

***Set the cutter for the desired depth.*** *Stack ¼-in.-thick MDF spacers underneath the workpiece, and remove one after each cut. A metal rod secures the spacers while the length of the cut is determined by a stop block over the fence.*



***Small bites with large bits.*** *Large cutters last longer and yield a cleaner cut when the cut is made in small stages. Four ¼-in.-thick pieces of MDF are placed against the fence and secured over a metal rod.*

that is rigidly held, not resonated with a featherboard, will be chatter-free.

**Think about how you're working—**The ergonomics of table routing is also important. I see many woodworkers stand in front of the table and feed the work hand over hand in a series of jerky movements. For a smooth cut you need one long, flowing movement, and this can only come if you stand at the front corner of the router table on the infeed side. Use your right hand to provide the forward momentum while the left hand directs the workpiece down and against the fence.

**Take light passes—**If a new cutter is making a mess of the workpiece, you're probably trying to take off too much wood at once. The solution is to take lighter cuts, adjusting the depth of cut until the quality is acceptable. The starting point may cause the bit to cut far less than the profile itself, but it has to be your starting point or you'll kill the cutter or mutilate the workpiece. You can adust the depth of cut by lowering the cutter, by shimming the workpiece or by making adjustments to the fence.

There are three ways to adjust the depth of the cut without adjusting the cutter. The first method is to use spacers under the workpiece. A second way is to use spacers against the fence. Spacers allow you to cut the profile in increments, easing the strain on the equipment and giving a cleaner cut (see the photos at left).

The third way can be used with any type of fence (see the photos and drawing on the facing page): First establish the location of the fence during the final depth of cut using a sample with the finished profile. Clamp a registration block at this point, and then move the fence forward so that only a small part of the cutter is revealed. Make the first cut. After the first cut, gradually move back the fence, taking incremental cuts until the fence is resting against the registration block. Now you're ready for the final cut.

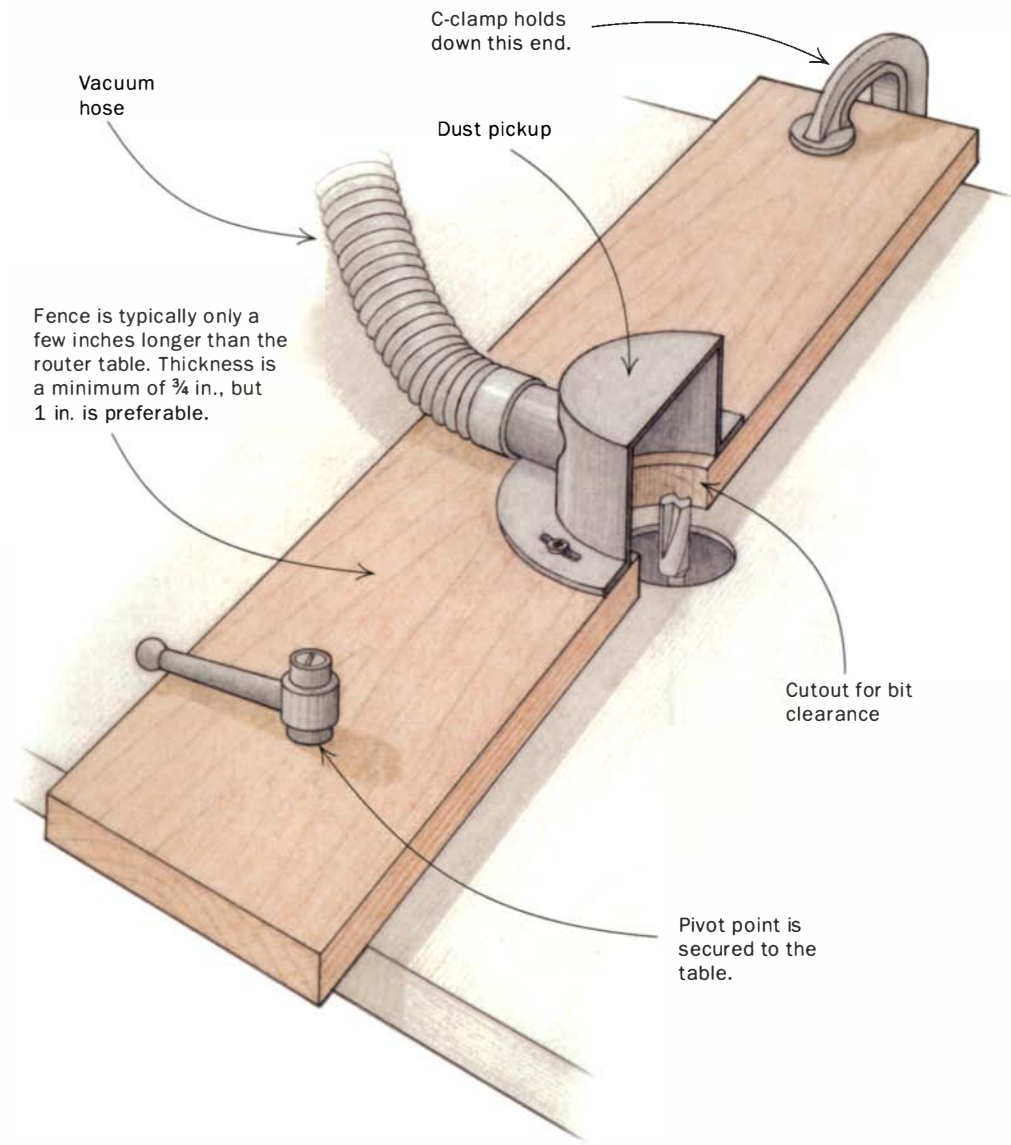
### Strategies for special cuts and bits

There are several cutting strategies that will render the cut safe and of maximum quality. For example, skinny moldings can be harvested off wide stock, broad rabbets on narrow stock can be "tunneled" first and then ripped, and large cuts can be done in two or more stages. Special strategies are

***Fence and cutter setup.*** *Using a sample with the desired final profile, establish the correct height of the cutter and the final position of the fence (top). Mark this location by clamping a registration block to the table (center). Make stepped cuts by moving the fence back in stages (bottom). The final cut will be with the fence against the registration block.*

## A SIMPLE, EFFECTIVE FENCE

**You can get by with a piece of MDF or jointed hardwood as long as it is straight. A pivot point at one end makes fine adjustment easier. The other end is secured with a C-clamp.**




also required for trapped cuts, dovetail cuts and climb cuts.

**Trapped cut**—When the cutter is trapped in the work, such as when profiling a stile, it can lift the work and spoil the profile. For cuts like this, stock must be well-prepared (flat and straight) and under firm control using a long-grain sled.

**Dovetails**—For a smooth cut, a dovetail bit usually requires its path to be preplowed with a straight bit. This strategy also prevents the bit from breaking.

Instead of gradually raising the straight-cut bit, which can be backbreaking if you don't have a router lift, you can vary the height of the workpiece via stackable spacers. Take multiple passes, removing the spacers—I use ¼-in.-thick medium-density fiberboard (MDF)—one at a time. When the workpiece is resting on the surface of the router table, you're ready to make the final cut, with the bit having to establish only the finished profile.

**Climb cutting**—These cuts should only be made by those with experience on the router table. The purpose of feeding the wood in the same direction as the turning cutter is to get a very smooth cut with no tearout. If the operator loses control, the workpiece is propelled off the table and can pull the operator's hands into the router bit. Take only very small cuts, and make sure that both the workpiece and the fence are perfectly straight.

### When to go with a handheld router

I stated earlier that the majority of cuts are best performed on the router table, but there are some cuts that are either safer or better when done with a handheld router. These include cuts on long boards, particularly the ends, profiles on the edges of large tabletops, inside cuts and cuts best made with a plunge router. To table-rout for these cuttings is to ask for trouble. □

*Pat Warner is a furniture maker, writer and teacher. He lives in Escondido, Calif.*

# Fine Furniture from

## Custom thicknesses, matched grain and seams, and solid-wood details beat the plywood-box look

BY MARK EDMUNDSON

One look at a stack of hardwood plywood and you know why there are fewer and fewer nice planks in a unit of lumber. The best logs are scooped up by veneer mills, ending up in kitchen cabinets and mass-produced entertainment centers. Wanting to rescue these attractive panels, I had to find a way to turn them into pieces my clients would accept as custom furniture. The freestanding cabinet featured here incorporates many of the techniques I've developed for overcoming the inherent drawbacks of using plywood.

By laminating ¼-in.-thick panels around a core of medium-density fiberboard (MDF), I create custom panels that are thicker than the standard ¾ in. This technique also allows me to contrast the exterior wood with a different interior species—in the cabinet shown here I used cherry and maple. I also locate the veneer seams carefully to create a solid-wood effect. The solid legs, corner posts and door frames add to the furniture feel. Other custom touches include the raised-panel treatment on the plywood door panels and the mitered edge-banding on the top and bottom. The top also has a raised lip, or "pencil roll," applied at the back edge. An attractive drawer box, custom door pulls and nice hinges complete the piece.

### Plywood can overcome its deficiencies

While plywood presents a number of problems to the custom furniture maker, it also offers the solutions. The hardwood plywood at a lumber dealer is probably "A-1," which refers to a grading system. On the A side you'll find very impressive veneers, all book-matched and ready for sanding. But the other side (the "1" side) is usually uninspiring, consisting of veneers with sap and from different logs or flitches. Even if you put this side on the inside of a cabinet, it still detracts from the overall quality and appeal.

At some point I came up with the idea of sandwiching ¼-in.-thick A-1 on both sides of an MDF core. The idea allows me to get rid of the inconsistent side and gives me the freedom to choose an alternative wood for the interior of a cabinet, something I usually do when I cut my own veneers. Also, the center core can be whatev-

***Some of the finest logs end up as plywood veneers.*** *Most hardwood plywood dealers sell attractive sheet goods in a variety of common species, featuring rotary-sliced, book-matched and quarter-sliced veneers.*

### Selecting sheet goods

**Woodworkers can choose from a wide selection of hardwood plywood. Whatever you want is likely to be available somewhere, especially if you live in a city. And if your dealer doesn't have it in stock, the dealer can order it from a supplier. Most places carry a pretty good selection of ¼-in.-thick hardwood plywood (another reason to use my sandwich system rather than ¾-in.-thick plywood). If you're forced to order something sight unseen, try to be as specific as you can about your needs. Most places will let you decline something if it's not up to your expectations.**

**You'll most likely have to make decisions about veneer slice, core type, face grade and back grade. I put the highest value on the veneer slice, which is the manner in which the veneer has been cut. The best choices for the exterior are either a plain-sliced or quarter-sliced veneer. Both of these are cut in a straight line, duplicating the figure of sawn lumber. Rotary slicing involves centering the log in a lathe and turning it against a broad cutting knife. The grain pattern does not match that typically found in solid wood.**

**For a hardwood plywood core, I prefer MDF because there's no chance of a void being telegraphed onto the surface veneers. The face grade will most likely be A if you've chosen plain- or quarter-sliced veneer. It's also helpful to know that veneer-**

***continued on p. 66***



Photos, except where noted: Asa Christiana; this page and facing page (top): Michael Pekovich

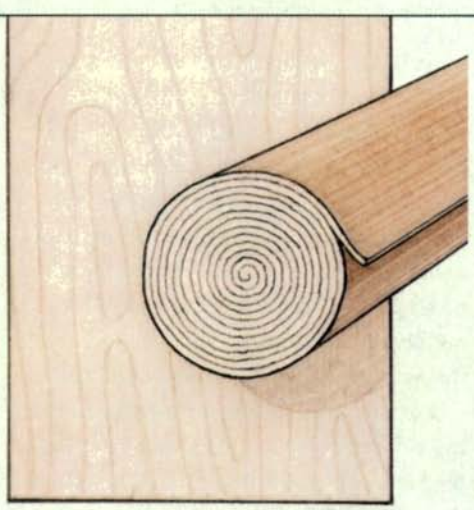
# Plywood

er thickness I want, further distancing a piece from the plywood-box look. Last, plywood is much easier to laminate onto a substrate than thin veneer is.

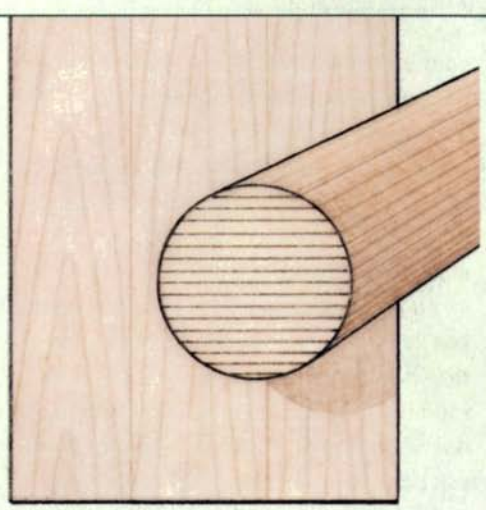
Avoiding the ¾-in. edge thickness is important on the top and bottom as well as on the sides of a cabinet like this. I like the top to be at least 1 in. thick. An even thicker bottom gives a piece a sturdy and substantial feel. In this case I wanted to use applied feet, so the thicker bottom allowed more purchase for the joinery. The core MDF is ½ in. or thicker, and I often glue up the core from thinner MDF plies. For the bottom of this cabinet, I used one ⅜-in.-thick ply and one ¼-in.-thick ply to achieve a ⅝-in.-thick core, an overall thickness of 1⅛ in.

Treat the plywood veneers as you would solid wood. Use to your advantage the grain orientation, the position of veneer seams, the book-matches and the runs of veneers from the same flitch. For this cabinet I was able to line up the veneer seams on the sides and top so that the grain appears to run up one side, across the top and down the other side.

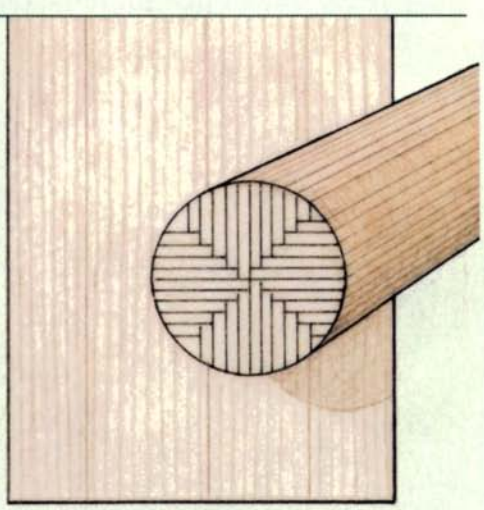
Also essential to the furniture look are the corner posts—in this case 1 in. square. Make the side panels ⅞ in. thick, leaving a ⅛-in. shadow line on the outside and a flush surface on the inside. However, using solid posts with plywood panels creates a potential problem on the inside of the cabinet. Because the post is wider than the panel, a portion of it will be visible from inside, interrupting the smooth look of the maple interior. To correct this I made the back post 1 in. wide but only ¼ in. thick and glued it into a shallow rabbet. The edge-banding on the back edge of the side panel completed this faux post (see the detail drawing on p. 70), allow-



***Rotary-sliced veneer plywood looks the least like solid lumber.*** *The veneer is peeled off the perimeter of the log, producing a wavy pattern that doesn't exist in solid wood.*



***Plain-sliced veneer plywood is a better choice.*** *The veneer is sliced as plainsawn lumber would be, giving the appearance of solid wood. It is often book-matched at its seams.*

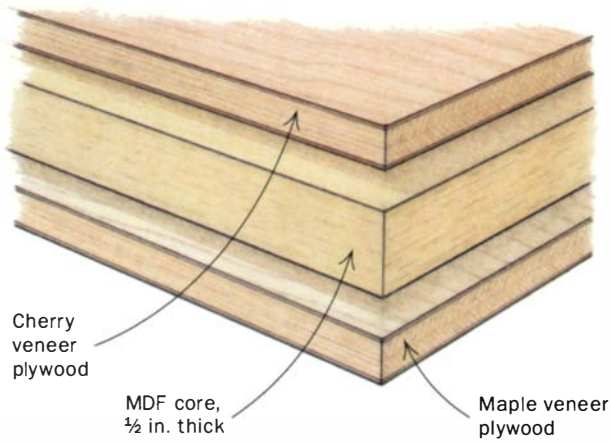


***Quarter-sliced veneer looks like quartersawn lumber.*** *Both are sliced parallel to the growth rings. Quartersawn oak plywood with book-matched ray flecks has added appeal.*

Drawings: Vince Babak

## CREATE CUSTOM PANELS

Build up thicknesses by gluing ¼-in.-thick plywood sheets onto an MDF core. This technique puts the best faces of each sheet on display, allows the use of different species inside and outside the cabinet and creates thicknesses greater than the standard ¾ in. This sandwich combines cherry and maple plywoods in a 1-in.-thick panel for the top of the cabinet.




***Spread glue evenly.*** *Make a spreader by notching a thin piece of wood or plastic, which will regulate the amount of adhesive left behind. Only one surface needs glue. The pieces of blue tape keep everything in place during clamping.*

***Clamping cauls apply even pressure.*** *Edmundson's setup includes 4x4 timbers on the bottom of the sandwich and 2x3 cauls on top, which are sprung (tapered) about 1/16 in. on each end. He adds two sheets of melamine-coated particleboard above and below to help distribute the pressure. A couple of 2x4s below the setup create clearance for the clamp heads.*

## Selecting sheet goods (continued)

***MDF- vs. veneer-core plywood.*** *Veneer core tends to run a little undersized, while MDF core is usually right on.*

**core plywood tends to run a little under its stated size, usually by a light 1/32 in., while MDF core is usually dead-on.**

**i make it a point to talk with a knowledgeable sales clerk and view everything the yard has to offer. You may find a few nice alternatives or surprises.**

**As you leaf through a stack of plywood, you'll notice that the sheets come in runs, that is, there will be several sheets with veneers from the same log, or flitch. This run might be two or five sheets long. if you ask politely, most places will let you go through the stack to find a run that suits your needs. if you're looking at plain-sliced veneer, it is likely that the veneers will be quite wide. A quarter-sliced stack will most likely consist of narrower veneers. When considering which type of figure suits your piece, consider also where the veneer joints will end up. This means you need to know your panel dimensions before you head out to the lumber dealer. A best-case scenario for a top panel might be a face-grain panel, where two book-matched veneers are wide enough to cover the entire top, with the seam dead-center.**

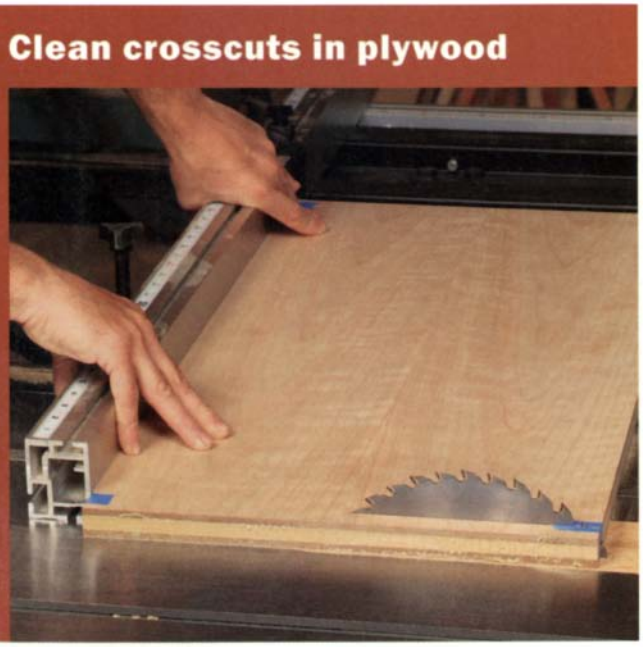
**For the piece in this article, i used the top dimension as a rough guide because the sides were to be a bit narrower (due to the width of the corner post). i was able to line up the book-matched seam on the sides and the top. A second choice would have been to cover the top and the sides in**

ing me to dado the back panel directly into the side panel for a seamless interior.

### First, make the sandwiches

If your shop is big enough, lay out the sheets so that you can view them all at once. Examine each one and circle with a pencil anything that looks like a defect. Pay special attention to the ends, where the veneer seams are usually the worst. I try to avoid using the last few inches of a sheet. Measure the veneer widths and record any large changes that might fool you later. Determine whether the veneers run parallel to the edges. Most likely they won't, so plan on cutting them parallel before you crosscut.

The next step is to cut the face sheets and the cores. Because you'll be cutting oversized, there's no need to worry about tearout. I typically leave more on the length than on the width because crosscutting small amounts produces the worst tearout.



**Clean crosscuts in plywood**

*Ripping cuts tend to be clean, but crosscuts are prone to tearout. Raise the blade well above the sheet and put the most important face up. Then wrap blue tape across the bottom and around the ends.*

After you've made your oversized cuts in the sheet goods and cores, they are ready to be glued up. It's not as critical a procedure as it would be with thin veneers; the thickness of the plywood adds stiffness to the glue-up. I use a vacuum bag for clamping the plies, but I've had excellent results with clamps and sprung, or tapered, cauls, too (facing page). Yellow glue is fine as the adhesive.

After the carcase panels have been glued up, cut the sides to size. Wait to trim the top and bottom panels until you've glued the sides to the corner posts and have taken a final measurement.

### How to avoid tearout while cutting plywood

Even if your sawblade is sharp, it's difficult to saw commercial plywood without tearout. When veneer is sliced at the mill, it comes off the blade in a curve. This produces many tiny little splits on one side but leaves the other side smooth. If the veneers are book-matched, every other piece will be reversed and have the checks. These checked areas are especially prone to flaking and tearout on the tablesaw, especially when crosscutting.

Obviously, you want the important side of the panel facing up. However, you'll still find that the checked portions of book-matched veneers can flake off on the top. Raising the blade well above the work minimizes this but greatly increases tearout on the underside. Another problem spot is the end of a crosscut. If the cut isn't backed up, it can blow out. My solution to both problems is to run a strip of blue painter's tape where the kerf will be. Tape both under and on top of the plywood. After the cut, carefully peel away the tape from the sheet at a 90° angle. Of course, whenever

**four veneers (two book-matches). When neither of these is possible, I try to find a veneer that will cover the sides with one book-match and hope that a suitable cut will present itself for the top.**

**Plywood veneers may not be totally consistent in width. It's usually a small variation but something to watch out for nonetheless. In deciding how many sheets I need, I play it safe. An extra sheet gives me more options when it comes to laying out the cuts.**

**Hardwood plywood is one of the more expensive items at the lumberyard, and most places try to take good care of it, but dings and scratches are still possible. Commercial veneer is paper thin and easy to sand through. A good rule of thumb is if there is a scratch in it now, there will be a scratch in it forever. So I choose pieces carefully and then accept minor dings as character traits. When I have found what I need, I ask for some of the 4x8 sheets of cardboard used for shipping to protect the material for the ride home and when storing it at my shop.**

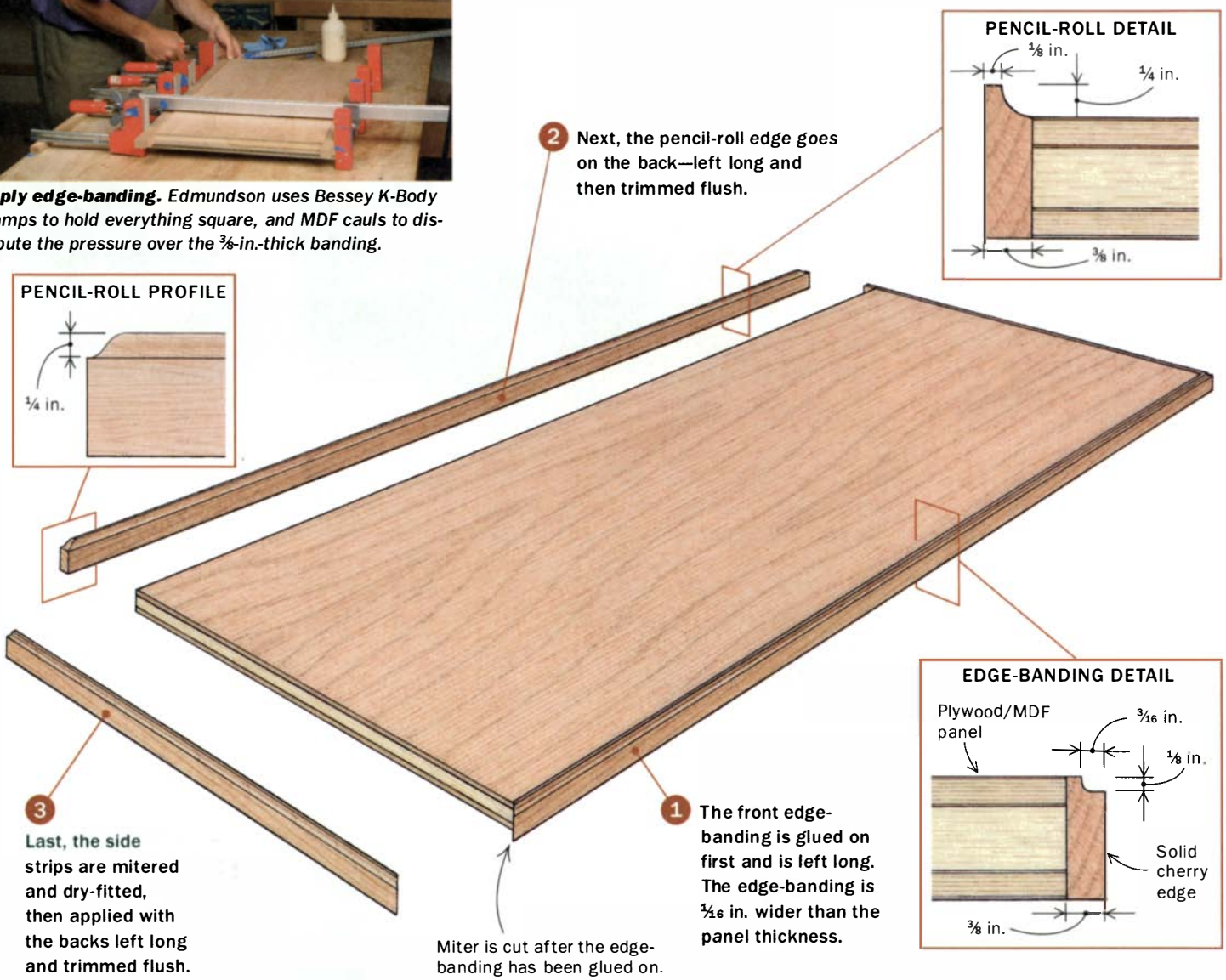
**When picking out the interior stock, I'm not as particular. I like to use a light wood like maple. At all of the yards in my area, ¼-in.-thick maple is available only in rotary-sliced veneer, which means there will be no seams to worry about. Also, I take whichever core is available because small voids won't be noticed on the inside.**

***Cutting a plywood sheet.*** *A second sheet of plywood (top) makes a serviceable edge guide for rough-cutting large sheets.*

## CASE TOP: A LESSON IN EDGE-BANDING

The edge-bandings on the top and bottom are mitered at their front edges for a better-looking corner. But they're not mitered at the back edges, which makes it much easier to apply the side edge-bandings.

***Apply edge-banding.*** *Edmundson uses Bessey K-Body clamps to hold everything square, and MDF cauls to distribute the pressure over the ⅜-in.-thick banding.*




***Plane and scrape the edge-banding flush.*** *Don't go too far with the block plane before switching to a scraper. Use pencil squiggles to avoid the plywood.*

***Miter the front edge-banding after it has been applied.*** *This sounds counterintuitive, but it's easier to glue a long strip on this large panel when you don't have to line up precut miters perfectly. Lay out the cuts, saw close to the line (left), then clamp on a guide block for the final paring (right). Miter the side edge-banding to fit.*

***Detail the pencil roll.*** *The side edge-bandings are butted against the pencil roll at the back. Edmundson carves a gentle S-curve on the ends of the roll lip.*

possible, make crosscuts first and ripping cuts second to get rid of any blowout at the back edge. It's worth practicing these cutting tips on scrap.

### Thin edge-banding won't be noticed

Using the finished sides as a guide, measure and cut the top and bottom panels. After they have been cut to final size, apply the edge-banding. I don't like banding thicker than ⅜ in.; after that it stands out too much, at least to my eye. I leave it about 1/16 in. wider than the panel thickness and trim it flush after glue-up.

Attaching mitered edge-banding, especially on long pieces, takes practice and a little luck (see the drawings and photos on the facing page). It's difficult to line up the mitered ends exactly with the corners of the panel. To increase your chances of success, leave the edge-banding long and cut the miters after glue-up. Mark the 45° miter with a pencil and cut slightly proud of the line with a pull saw. Next, use a try square to place a chopping block at the miter angle. You'll get better results from thinner paring cuts, so reposition the block a few times as you approach the line. Practice this technique on the bottom first, where small mistakes will be less obvious.

Before gluing on the side pieces, apply the banding at the back edges of the panels. On the top, apply a pencil roll. This oversized banding features a small cove that protrudes above the top to stop things from rolling off the back. The edge of the cove is flush with the top.

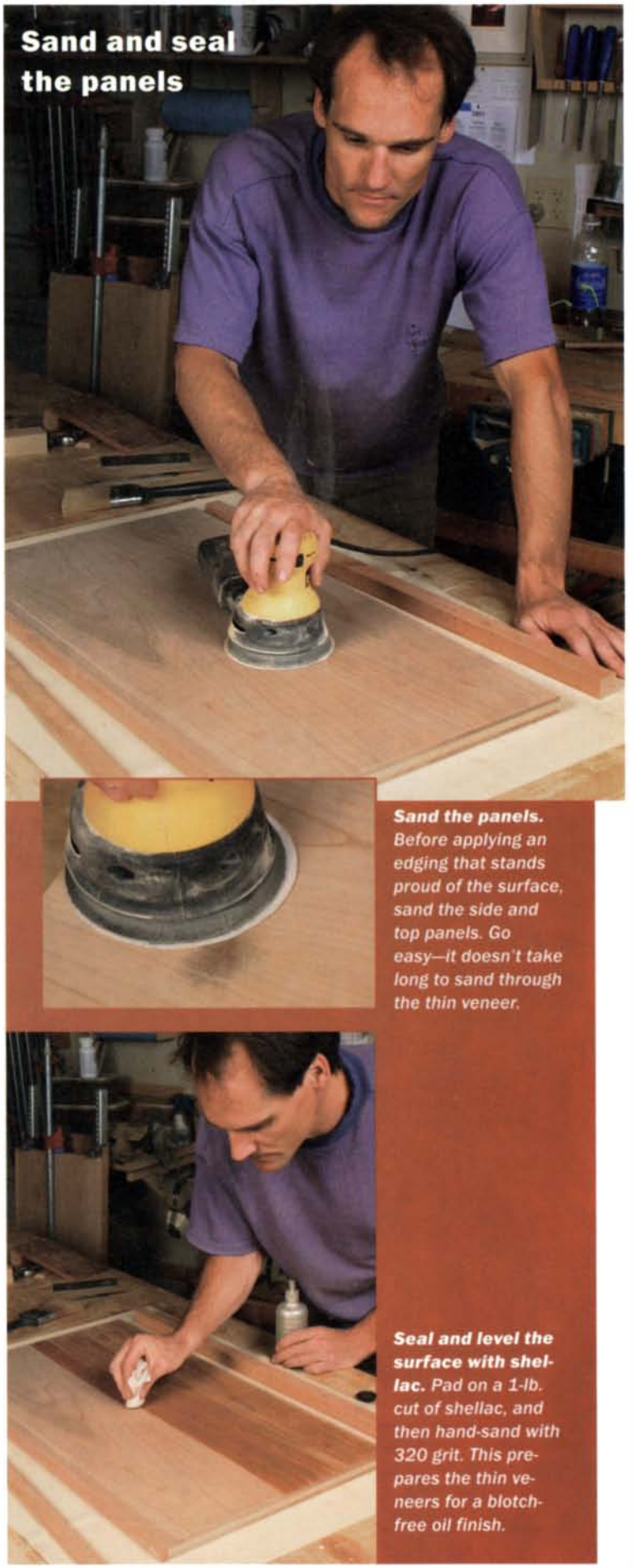
Mill the cove on thicker stock, then rip away the thin strip. Glue it on long just like the front edge. The closer you can get the cove flush to the top, the less work you'll have to do afterward. Use a wet rag to clean up glue squeeze-out; you want to minimize aggressive sanding on the plywood. There is no miter on the pencil roll, so run it long, then cut it flush with the panel edge after the glue has dried. Last, glue on the side strips. These are mitered in front but left long in back and trimmed flush afterward.

**Plane and scrape the edge-banding flush—**To trim edge-banding flush with the plywood surface, start with a handplane and scraper and finish up with the sander. (Flush-trimming router bits may do a fine job, but I'm a little leery of them.) Caution is the key to success. Don't get too close with the handplane, and be very careful with the sander. Use pencil squiggles along the edge to keep track of how much wood you're removing.

The pencil roll is harder to clean up without going through the thin veneer on the panel. If the glue-up went well, you won't have much to do. A profile sanding block or a curved scraper is a good thing to have. Again, use hash marks to keep track of where you're removing wood and where you're not.

### Sand and seal flat surfaces

Before attaching the corner posts, sand and seal the sides. The veneers will be pretty smooth right off the shelf. I usually start with 180 grit on my random-orbit sander, being careful to keep my hand moving continuously over the piece. There will be no warning before you've sanded too much in one spot. Before you know it, you will see the glueline, and the panel will be ruined. If there is a scratch you think you can lessen, do so very lightly. Cabinet scrapers can be helpful, too, but never make more than a few passes. Do a test on that piece you practiced your crosscuts on to show

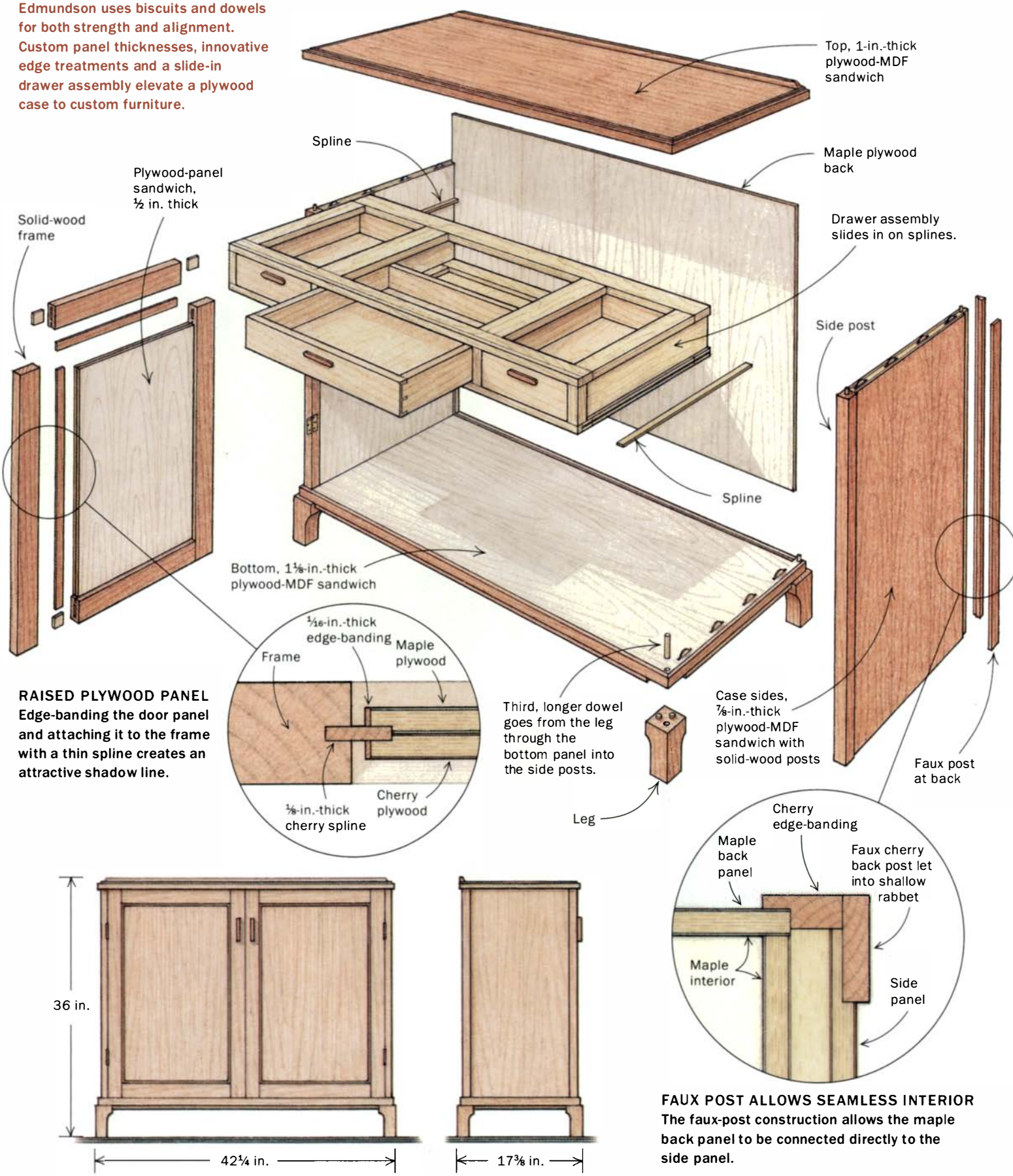



**Sand the panels.** *Before applying an edging that stands proud of the surface, sand the side and top panels. Go easy—it doesn't take long to sand through the thin veneer.*

**Seal and level the surface with shellac.** *Pad on a 1-lb. cut of shellac, and then hand-sand with 320 grit. This prepares the thin veneers for a blotch-free oil finish.*

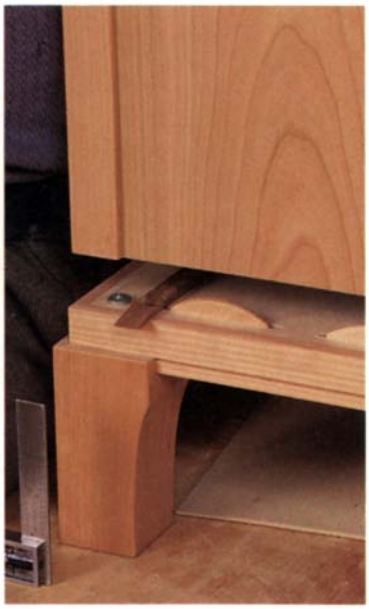
# ASSEMBLY STRATEGIES FOR PLYWOOD FURNITURE

**Edmundson uses biscuits and dowels for both strength and alignment. Custom panel thicknesses, innovative edge treatments and a slide-in drawer assembly elevate a plywood case to custom furniture.**




**RAISED PLYWOOD PANEL**
**Edge-banding the door panel and attaching it to the frame with a thin spline creates an attractive shadow line.**

**FAUX POST ALLOWS SEAMLESS INTERIOR**
**The faux-post construction allows the maple back panel to be connected directly to the side panel.**



***Dowel centers ensure matching holes.*** *Attach the legs to the bottom panel with two short dowels. Then drill a third hole through the bottom panel into the leg to accept a longer dowel that will extend up into the case side.*

***Attach the top.*** *Like the bottom, the top is located and attached with biscuits and dowels. The biscuits locate the panels side to side, and the dowels lock in the front-to-back alignment.*

yourself just how easy it is to burn through the veneer. After you've finished with 180 grit, be careful wiping off the dust. The small checks in the veneer tend to catch cloth fibers. I prefer to use a shop brush or vacuum to clean off the piece. Next, use 220 grit, clean off the dust and then pad on a 1-lb. cut of shellac to fill the veneer. Last, sand with 320 grit using a sanding block. The shellac remains in the tiny checks and leaves a level surface.

## Assembly of plywood furniture is straightforward

Glue the front posts to the side panels using a simple butt joint, then apply the faux posts at the back edges and set the panels aside to work on the base.

The legs go on next. They fit into shallow recesses in the bottom panel, positioned for a ¼-in. reveal. Dowels are necessary to strengthen these applied feet. Use dowel locators to position two shallow pegs in the corners of the foot. Later, a third, longer dowel will be inserted from above, extending through the corners of the bottom panel and deep into the legs.

Cut stopped grooves in the top and bottom panels to accept the thin back panel. After dry-fitting the case sides to the bottom, use the groove in the bottom to line up the corresponding groove in the sides for a seamless fit.

The sides are attached to the bottom and top with biscuits and a dowel at each corner. I like a ⅛-in. reveal between the corner posts and the edges of the top and bottom. The biscuits strengthen the joint and align the pieces side to side. The dowels align the panels from front to back. As I said earlier, the dowels in the bottom corners are longer and extend down through the bottom panel and into the feet.

After assembling the case, you can add a drawer box to the interior, as I did, and adjustable shelves.

## Dress up the doors with visible splines

Next, build and hang the doors. The door panels are glued up without an extra MDF core, so they end up ½ in. thick. To create a raised-panel variation, cut the glued panels approximately ⅜ in. smaller than the panel opening in the door. Glue on a 1/16-in.-thick solid edge, then cut a ⅛-in. slot into the panel and the door members. The panel is held in place by visible splines, creating a nice shadow line.

## Finish with Sam Maloof's recipe

After sanding and sealing the rest of the piece, apply the finish. I used Sam Maloof's 1:1:1 finish, made up of one part satin polyurethane, one part linseed oil and one part tung oil. For the doors, I used mortised-in butt hinges and handmade handles. For adjustable shelves, I prefer brass pins with milled brass sleeves.

It's a shame not to utilize the wonderful veneers that end up on sheet goods. While the terms "commercial plywood" and "fine furniture" form an uncomfortable union for some purists, a little innovation yields a piece that truly feels custom. The key is using the strengths of commercial plywood to overcome its weaknesses. □

*Mark Edmundson is a furniture maker in northern Idaho.*

# Radial-Arm Saws

Although the heyday of these machines may be past, there still may be a place for one in your shop

BY WILLIAM DUCKWORTH


Mention the radial-arm saw to any online woodworking discussion in cyberspace or to a real-time gathering of woodworkers, and you're bound to stir up trouble. Some woodworkers argue that this tool is a dinosaur—extinct—and has no place in the shop. Others still sing its praises in no uncertain terms. My intent is not to stoke any flames (hold the letters, please), but I will declare this: The radial-arm saw is not the best all-purpose cutting machine. The tablesaw has usurped that role. But if your budget allows both, you won't regret having the use of both machines.

There can be no doubt that the advent of sliding compound-miter saws, added to the safety concerns of radial-arm saws and the barrage of liability lawsuits manufacturers have had to defend, have all bitten into the market share of radial-arm saws sold. As an example, *Fine Woodworking* last published a review of radial-arm saws about 15 years ago. Three of the machines made and reviewed then are no longer available.

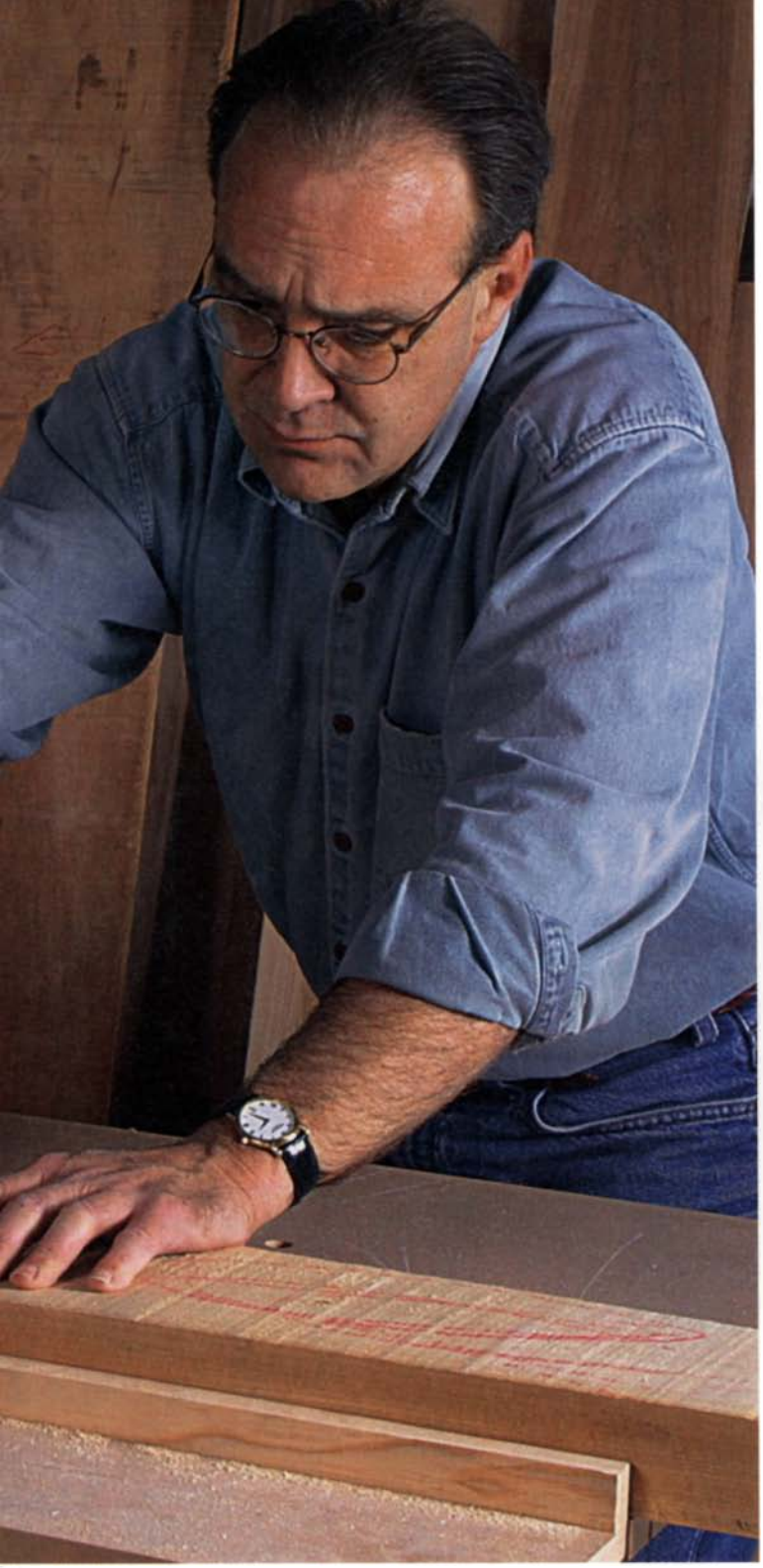
Even though the number of manufacturers making radial-arm saws has decreased, those that remain offer the buyer a wide range of choices. I assembled and tested five machines made by four different manufacturers. Both Delta and the Original Saw Co. offer many larger, more expensive machines. But I chose what I thought would be a fairly representative assortment that readers might be interested in. Three of the machines take a 10-in. blade; the other two take a 12-in. blade.

### These are a bunch of apples and oranges

When *Fine Woodworking* publishes tool reviews, we're sometimes criticized for not concluding for the readers precisely which



Photos, except where noted: William Duckworth; this page: Michael Pekovich



tool they should buy. But for most woodworkers, spending money on tools is very much a budget-driven decision. So the best (and usually the most expensive) model is not an option for everyone. The radial-arm saws I looked at are good examples. With a range in price from $629 to $2,878, it's simply unfair and unrealistic to expect that machines at the top and bottom end of that assortment are going to be even remotely similar in the quality with which they were built and the shop performance you can expect from them over a lifetime.

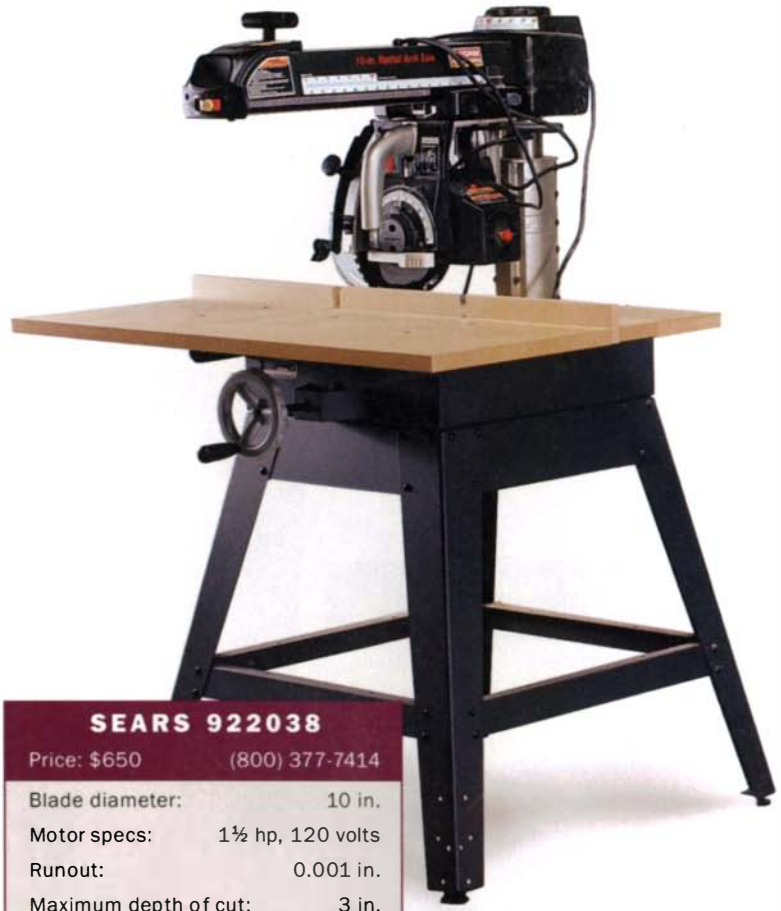
All of the saws arrived at the *Fine Woodworking* shop via com-


| RIDGID RS1000 | |
|---|---|
| Price: $629 | (800) 474-3443 |
| Blade diameter: | 10 in. |
| Motor specs: | 1½ hp, 120 volts |
| Runout: | 0.0005 in. |
| Maximum depth of cut: | 3 in. |
| Maximum width of cut: | 15½ in. |
| Weight: | 150 lbs. |

**The Ridgid saw, made by the Emerson Electric Co., was the only one that came with a videotape that gives a good overview of putting together and using the machine. Ridgid gets high marks for a clearly worded and printed owner's manual that lays out a step-by-step instruction of assembling the saw and making the myriad adjustments necessary to get it in working order. The instructions more often than not spelled out the *why* as well as the *how* to make a given adjustment.**

**This saw cut through 8/4 lumber and ¾-in.-thick plywood easily and cleanly with the carbide-tipped blade supplied with the machine. The uniquely designed clear plastic blade guard is activated by a lever attached to the handle on the motor carriage (right), and it takes some getting used to. If you don't pull on the lever, the front of the guard will bind on the back of the fence when you try to pull the saw forward. After I made some crosscuts 90° to the fence, switched the setting to cut some miters and then returned the saw to the original 90° setting, it was cutting about 1/16 in. out of square on an 11-in. width. The automatic brake took an average of five seconds to stop the blade.**


***This blade guard needs a lift.*** *The pointed plow on the front of the blade guard must be manually lifted up and over the fence to advance the saw forward into the cut.*



**SEARS 922038**

Price: $650 (800) 377-7414

| | |
|---|---|
| Blade diameter: | 10 in. |
| Motor specs: | 1½ hp, 120 volts |
| Runout: | 0.001 in. |
| Maximum depth of cut: | 3 in. |
| Maximum width of cut: | 15½ in. |
| Weight: | 204 lbs. |


***It may be safer, but it's also slower.*** *Called a "control cut device" by the manufacturer, this feature is unique to the Sears saw. It consists of a steel cable connected to the carriage (above), and it controls the forward movement of the saw. The device is activated by a trigger switch (right), and the choice of three speeds is controlled by a thumb dial.*

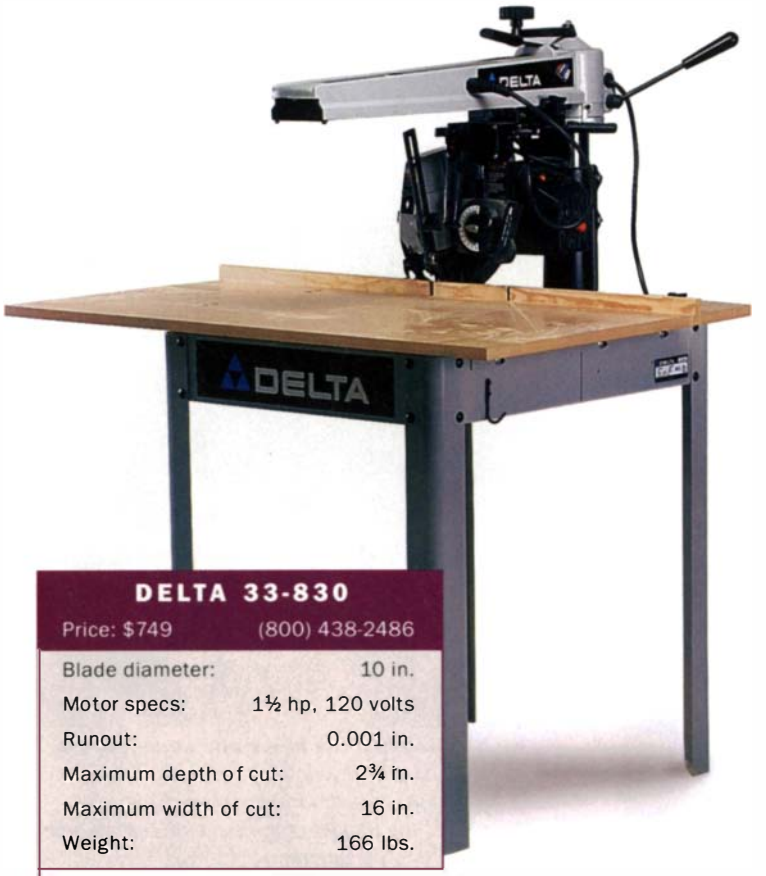
**The Sears saw, made by Ryobi Technologies in Mauldin, S.C., is similar in design to that of the Ridgid saw (p. 73), with one notable exception called the "control cut device" (see the photos above). The saw comes with a comprehensive owner's manual, clearly written and illustrated. I ran into trouble at one point trying to remove the blade guard that had been installed at the factory. i called the consumer help line listed and got immediate and competent help to solve the problem.**

**The Sears saw had no trouble chewing through solid lumber and plywood with the stock carbide-tipped blade. The blade guard is a substantial combination of metal and plastic, and you have to loosen and remove it in stages to change the blade, which can be a less-than-smooth operation. The automatic brake was quick to stop the spinning blade (four seconds) after power was cut off.**

**The control cut device on this saw is certainly unique and worth mentioning here. The device consists of a steel cable controlled by a separate motor (with its own plug) that limits the forward travel of the saw and keeps a steady tension on the yoke assembly. Whereas you turn the sawblade on and off with a switch at the front of the overhead arm, the control cut device is switched by a trigger on the yoke handle. Speed of travel is regulated with a thumb dial also located on the top of the yoke handle. The dial offers three settings from 6 ft. to 35 ft. per minute. Clearly this device was installed as a safety feature to eliminate the risk of a sawblade jumping toward the operator. However, i've never had any trouble keeping a firm control over radial-arm saw crosscuts, and i found this device too restrictive.**

mon carrier sturdily packaged and containing all of the hardware and most of the tools required for assembly. Shipping damage to one of the crates did not result in any harm done to the machine. I assembled each of these machines, one at a time, following to the letter the manufacturer's owner's manual. I took pains in the initial setup to level the tabletops, square up fences and blades, adjust the stop settings and tweak the bearings for a tight and smooth operation. Before putting the machines to work, I used a dial caliper to check all of the arbors for runout. And then I put them through their paces, making crosscuts and miters in 8/4 lumber and ¾-in.-thick plywood, changing the settings and then moving the machines back into place to see how well they returned to their original square settings. Because radial-arm saws are not the best tools for making rip cuts, I didn't test these machines for their ripping abilities.

Runout on all of the motors was remarkably small. Using a dial indicator, I got readings that ranged from a perfect 0.0000 in. to only 0.001 in. But with all of the moving parts and the adjustments that a radial-arm saw requires, runout may be the least of your concerns. These saws live up to their (well-deserved) reputation of be-




## DELTA 33-830

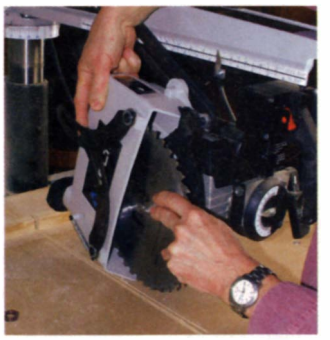
Price: $749 (800) 438-2486

| | |
|---|---|
| Blade diameter: | 10 in. |
| Motor specs: | 1½ hp, 120 volts |
| Runout: | 0.001 in. |
| Maximum depth of cut: | 2¾ in. |
| Maximum width of cut: | 16 in. |
| Weight: | 166 lbs. |

**Of the 17 models of radial-arm saws that Delta Machinery offers, this is the only 10-in. version. This saw is priced to compete with the Ridgid and Sears models, and the construction is of a similar quality, though the cast-iron arm and the heavy-duty sheet steel base make this machine feel more solid. It is fitted with the same motor (made by the Emerson Electric Co.) found on both the Ridgid and Sears saws, and it can be rewired from 120 volts to 240 volts.**

**This saw cut through 8/4 lumber and ¾-in.-thick plywood easily, but I noticed some marked tearout on the crosscuts through the face veneer of the plywood. Tweaking the bearing settings on the arm improved the quality of cut.**

**Changing the blade can be a difficult process. The heavy-duty, all-metal blade guard must be mounted on the motor but not fully fastened in place. As with the blade guards on most of the machines I looked at, what you gain in safety you lose in facility, which, I suppose, is a small price to pay. Rather than being mounted out on the front of the arm, the switch is on the top of the yoke carriage, which makes it hard to see, depending on where you're standing. The automatic brake took an average of eight seconds to bring the blade to a full stop.**



***Hopefully, you won't have to do this often.*** *Changing sawblades can be an ordeal because you must partially remove the guard to access the arbor nut.*

## DELTA 33-891

Price: $1,865 (800) 438-2486

| | |
|---|---|
| Blade diameter: | 12 in. |
| Motor specs: | 2 hp, 230 volts |
| Runout: | 0.001 in. |
| Maximum depth of cut: | 3¾ in. |
| Maximum width of cut: | 14⅜ in. |
| Weight: | 300 lbs. |

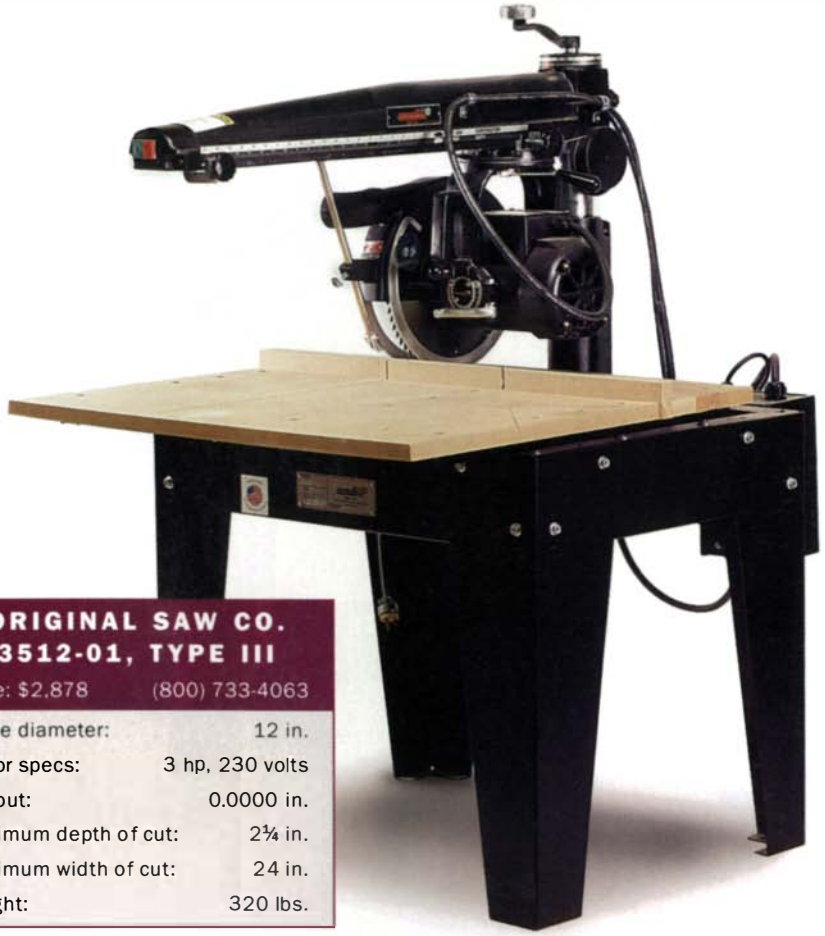
**The steel combination blade that comes with this saw is nothing to write home about (no carbide here), but the machine itself is tuned to perform with accuracy. Switching back and forth from 90° square crosscuts to 45° miters using the built-in indexed settings, all of the cuts were consistently true.**

**Instead of pivoting from the top of the column, all the way at the back, as other saws do, this machine pivots on a turret located about halfway out on the length of the arm. According to the Delta literature, one benefit of this design is that the saw pivots 360°, which probably makes it easier to set up the saw for unusual and steeply angled cuts. I suspect another big benefit is that there's less stress on the overhead arm because less weight is cantilevered away from the column, which translates into less trouble with the adjustments on the machine.**

**For safety, a keyed lock is mounted at the top of the arm, near the switch. The mechanical brake took 15 seconds to bring the blade to a full stop.**

***A unique design.*** *With a centered pivot point, the weight of the saw is counterbalanced, reducing stress at the column. The indexed 90° and 45° settings on this Delta saw were extremely accurate.*

Photo, this page (bottom right): Michael Pekovich



**ORIGINAL SAW CO. 3512-01, TYPE III**

Price: $2,878 (800) 733-4063

| | |
|---|---|
| Blade diameter: | 12 in. |
| Motor specs: | 3 hp, 230 volts |
| Runout: | 0.0000 in. |
| Maximum depth of cut: | 2¼ in. |
| Maximum width of cut: | 24 in. |
| Weight: | 320 lbs. |

***Two handles find the angle and keep it there.*** *The lower handle keys into a notched collar, providing factory-set adjustments for square cuts and 45° miters. The handle at the top tightens the overhead arm onto the column.*

**If you have the money and need a radial-arm saw, you can't buy a better-built machine in this size. The Original Saw Co. in Britt, Iowa, offers this 12-in. saw as the only size in its class—what they call "contractor duty." Looking at this machine up close, with its cast-iron and cast-aluminum construction on a heavy steel frame, it's hard to believe that you can upgrade to "heavy-duty" and "super-duty" series for 14-in. to 20-in. blade sizes with crosscut capacities of up to 52 In.**

**Except for hard wiring the magnetic starter and installing the blade guard, this machine was ready to go right out of the crate. As the owner's manual says, this machine "was thoroughly tested, inspected, and accurately adjusted before leaving the factory." And what a great job they did. All of the adjustments were spot on target: the factory settings for 90° and 45° cuts in relation to the fence were dead-on, the blade was square to the table, the tabletop was level and parallel with the yoke travel on the overhead arm, and movement of the roller bearings on the arm tracks was smooth.**

**The first crosscuts were perfectly square, and the 45° miter cuts proved equally accurate. No matter how many times I moved the arm back and forth, once I locked it in place, the saw cut perfectly square every time. Beefy handles at the column adjust and tighten the arm on the column and keep it there. There's a simply designed, small, adjustable clamp stop for the overhead track to limit the distance of the outward travel from the column—a nice little safety feature that's easy to use. A spring-loaded steel cable returns the carriage assembly to the column when you release your grip on the saw. The loosely mounted aluminum blade guards don't entirely cover the blade, but they would certainly provide a shield from any errant lateral movement of hands that get too close. The automatic brake stopped the blade about seven seconds after switching off the power.**

ing finicky—some more so than others—and most require fastidious care to get them up and running, and diligent monitoring to keep them cutting square and true. All of them came to us with similar tabletop designs, in which a piece of lumber (some warped) or medium-density fiberboard (MDF) serves as the fence, and you can move it around to different locations in conjunction with other loose tabletop pieces. Adjustable fences make sense if you need to switch from a crosscut to a rip cut, but if you don't intend to use the radial-arm saw for ripping, a better solution might be to replace the factory setup with a more permanent fence—flat and straight and firmly secured to the tabletop.

What appear on pp. 73-76 are summaries of each machine, listed in order of price, starting with the least expensive. Each summary lists other common facts for comparison, such as blade diameter, motor specs, maximum depth of cut, as well as the maximum width of cut when the saw is set up square to the fence. I've also listed the weight of each assembled machine because I believe that you'll often find a correlation between how much a machine weighs and how well it performs. □

*William Duckworth, associate editor, gave away an old 12-in. DeWalt radial-arm saw when he moved his shop several years ago, and he still regrets it.*

# One man's techniques for an indispensable machine

BY JOSEPH BEALS

A radial-arm saw and a tablesaw will do more or less the same things, but the tablesaw is by far the better general-purpose tool. Having said that, why bother with a radial-arm saw at all? Here's why I wouldn't be without one.

### THE RADIAL-ARM SAW IS THE PREMIER CUTOFF TOOL

By fastening a stop block against the fence, I can index the stock and cut any number of pieces accurately and safely, including wide or long boards that would be awkward to move on a tablesaw. Simple and compound miters are also easier and safer to accomplish for the same reason. And because the fence is sacrificial, I can move it or install a new one when it's needed to show a clean sawkerf for accurate indexing. Also, I can make a fence of any length, given sufficient shop space.

### THE RADIAL-ARM SAW IS A BETTER TOOL FOR CUTTING DADOES

Because the location for the dado cut is clearly visible from above and can be indexed either against the kerf in the wood fence or from a stop block on either end of the workpiece, it's easier to make repetitive dado cuts with a radial-arm saw, risking little chance of a clumsy mistake. And once the setup is completed, angled dadoes are just as convenient to make as straight dadoes. I can quickly make multiple passes for getting a precise fit on really wide dadoes or simply removing a lot of waste for tasks such as making tenons.

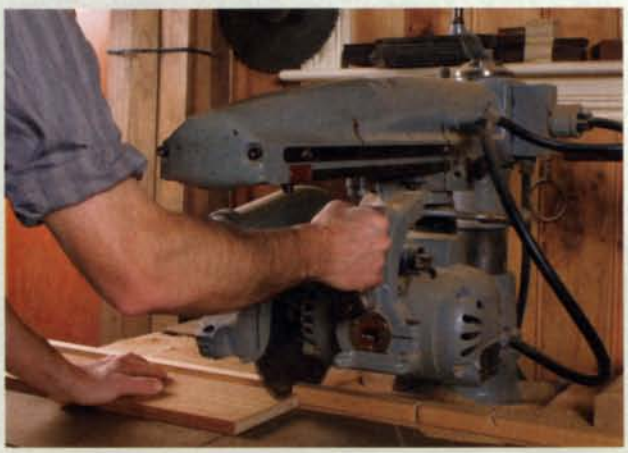
### IN DEFENSE OF THE TOOL

Radial-arm saws have an only partially deserved reputation for making sloppy cuts. It is true that these machines must be adjusted carefully, but after that, the quality of the saw will determine its potential for tight, accurate performance.

My radial-arm saw is an old DeWalt GP, which takes a 12-in. blade on a 1-in. arbor. Except for the motor housing and the lower head unit, the entire saw is cast iron. Although the saw is heavy and rigid, it adjusts and operates far more easily than most of the lighter-duty models now sold. These advantages may be a good argument for buying used industrial equipment if you can handle the weight and do your own maintenance. One source for used but reconditioned DeWalt machines is Wolfe Machinery (800-345-6659; www.wolfemachinery.com), or you can often find bargain deals in the classified ads of your local newspaper. □

*Joseph Beals is a cabinetmaker and architectural millworker in Marshfield, Mass.*

## THREE TASKS BEST SUITED FOR A RADIAL-ARM SAW

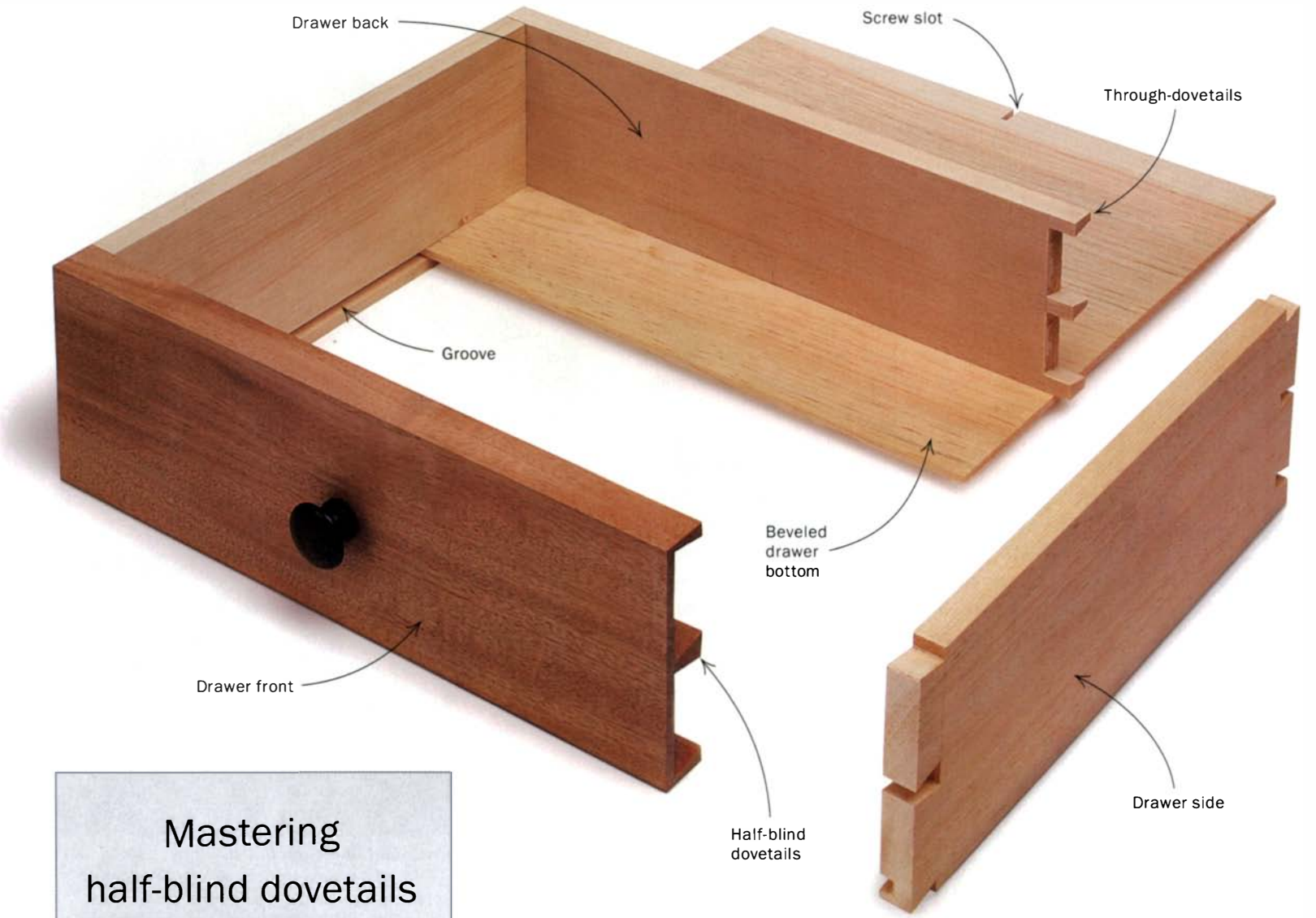


***No equal for crosscuts.*** *It's easier to make accurate crosscuts with a radial-arm saw than with a tablesaw because the stock stays put: You're not sliding a long, heavy board on a small table surface.*


***Making dadoes, straight and angled.*** *While most dadoes are cut 90° to the edge of a workpiece (above left), some must be cut on an angle. Beals uses an angled scrap of plywood as a jig (above right) to position a window frame for a beveled dado. The jig increases accuracy and saves setup time.*

***Cutting tenons.*** *For cutting tenons that must all be the same length and thickness, a scrap of wood clamped to the fence will size all of the cuts identically.*

# Making Traditional Dovetailed Drawers




Mastering half-blind dovetails is the key to building reliable drawers

BY JANET A. COLLINS

The dovetailed drawer has long been the hallmark of quality, handcrafted furniture. And for good reason: A dovetailed drawer is both beautiful to look at and strong enough to last 200 years. But dovetailing a drawer is not the daunting task you might think—all it requires is a little know-how and practice. No matter what size drawer you're building or what piece of furniture it's going in, the techniques are the same. If you can build a drawer for a simple Shaker table, you can build a dozen of them for an 18th-century highboy.

The key to building a drawer is learning to cut dovetails. A traditional dovetailed drawer combines both half-blind and through-dovetails. Because you want to see dovetails only on the drawer sides, use half-blind dovetails at the front of the drawer. Through-dovetails are used to connect the back to the sides. In this article I'll



Photos: Kelly J. Dunton

walk you through cutting half-blind and through-dovetails, especially as they concern building drawers. I'll focus mainly on cutting half-blind dovetails, because once you learn to cut those, through-dovetails become a piece of cake.

I recently taught a workshop on cutting half-blind and through-dovetails. At the end of the three-day class, students not only knew how to lay out and cut these two joints, but they also knew how to build a traditional dovetailed drawer. The first order of business is to tune up your tools: two chisels, a dovetail saw and a marking gauge. Using properly tuned tools makes your woodworking life much easier.

As you're working, remember to cut pins on the drawer front and back, and tails on the drawer sides. Dovetails go together and come apart only one way, and this orientation works with the movement of the drawer being opened—you won't loosen the joint as you open and close the drawer.

## Build drawers to fit the case

Before you start building drawers, your table or case piece should be constructed and glued up, and the drawer parts should be milled to finish thickness. Drawer fronts should be ¾ in. to ⅞ in. thick; sides and back should be ⅜ in. to ½ in. thick.

Now cut drawer parts to length and width based on the opening in the case piece or table. For a flush drawer, rip the fronts and sides approximately 1/64 in. smaller than the height of the opening. To accommodate the bottom, cut the drawer back ½ in. narrower than the sides. Now mark the lengths directly off the case piece and crosscut them to size at the tablesaw. The length of the sides should be approximately ½ in. shorter than the depth of the drawer opening in the case.

Now you need to decide which will be the inside and outside faces of each drawer part. If you place the heart side of the board facing out, the drawer parts will cup toward the inside. The mechanics of the joint will help control this cupping. However, aesthetics rule—especially on the drawer front. If the bark side is more attractive, place that side out and mark the board accordingly.

With all of the pieces marked, cut grooves along the lower edge of the front and sides. The ¼-in.-wide by ¼-in.-deep grooves should be ¼ in. up from the bottom on the inside of the drawer front and sides. This can be done with a dado set on the tablesaw or on the router table. Once the grooves have been cut, you're ready to start marking the parts.

The shoulder lines of the dovetails are based on the thickness of each part, which changes slightly in final preparation. Be sure to plane, scrape or sand (to 220 grit) the drawer parts before laying out and cutting any dovetails. Once you've removed the machine mill marks, organize and label all drawer parts. Mark the inside face and adjacent drawer bottom edge of the front, sides and backs. Mock up or explode the box and mark adjacent corners to be dovetailed. You will be checking for this orientation and reference marks as you lay out and cut the dovetails.

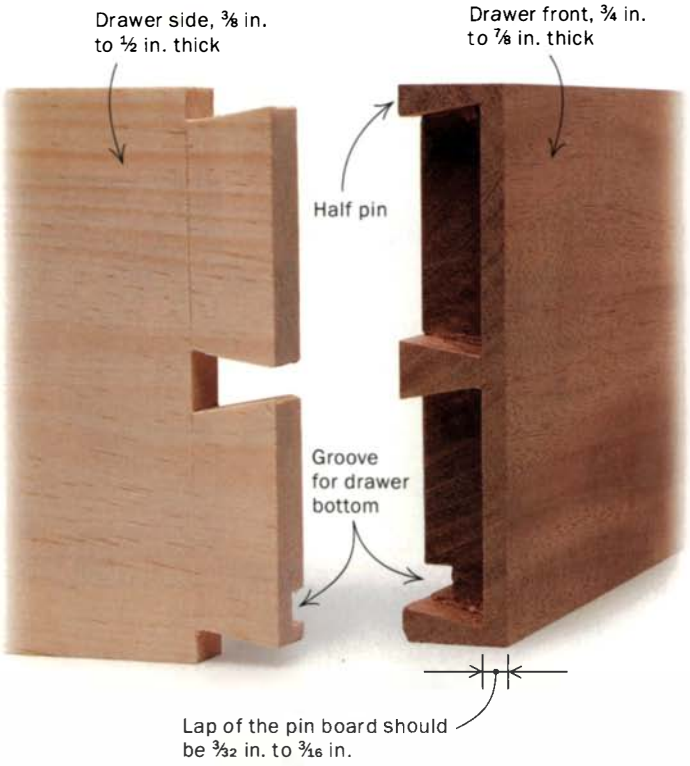
## Cut the pins first

Because half-blind dovetails are slightly more difficult to cut than through-dove-

### FIT THE DRAWER TO THE OPENING

***Measure the drawer parts straight off the case. Cut the sides about 1/64 in. shy of the height of the drawer opening (left). Trim the drawer front for an even reveal at the top, bottom and sides (below).***

## HALF-BLIND DOVETAILS JOIN THE FRONT TO THE SIDES




### 1 LAY OUT AND CUT THE PINS

***Lay out the depth of the tails.*** *Mark the lap where the drawer side joins the drawer front. Leave between 3/32 in. and 3/16 in. so that the tails are hidden when the drawer is closed.*

***Mark the pins.*** *Set the bevel gauge (see the box below left), then begin marking pins. The first and last are half pins; any others are equally spaced between them.*

### SETTING THE BEVEL-GAUGE ANGLE

*1. Draw tick marks 6 in. and 8 in. from the end of the board. Next, mark a point 1 in. from the edge. Connect these points to create angles with ratios of 1:6 and 1:8.*




*2. Set the bevel gauge against the board and adjust to the desired angle.*

tails, I'll focus on cutting the half-blind dovetails at the front of the drawer, because they are slightly more challenging. But the same principles apply. There is much debate over whether to cut the pins or the tails first, but I always cut the pins first. I find it is easier to square up the surfaces of the pins and use them to scribe the tails, rather than the other way around.

Shoulder lines are the first layout marks placed on each piece and reflect the thickness of the piece being dovetailed into it. Set a marking gauge to the exact thickness of the sides and scribe a shoulder line on all four edges of each end of the back. If the sides are the same thickness as the back, scribe the ends of the sides with the same gauge setting. If the sides are not the same thickness as the back, reset the gauge and scribe the shoulder lines to the thickness of the drawer back. By setting the gauge to the exact thickness of the pieces and cutting accurately, you eliminate a fair amount of handplaning and sanding.

The lap of the pin board (drawer front) should be 3/32 in. to 3/16 in. A lap thinner than that can be weak and may break when you chop between pins. Remember to use the inside face of the drawer as your reference face. If the drawer front is ¾ in. thick, set the marking gauge to 9/16 in., leaving a 3/16-in. lap. Set the marking gauge to scribe a line in the end of the board. Be sure to leave 3/32 in. to 3/16 in. as the lap. Scribe the ends of the drawer front as well as all sides of the ends of the tail boards. Change the marking gauge to match the thickness of the tail board and scribe this line only on the inside face of the pin board.

Place the pin board in the vise with the inside surface facing you. Doing it this way consistently helps ensure that you orient the pins correctly over and over again. To help students orient the pins correctly, I tell them to remember "fat side or wide side, inside." Mark the angle of the pin on the end grain with the widest part of the dovetail on the inside of the drawer. To save yourself work later when you're chopping out the tails, make sure your pins are only as narrow as the thinnest chisel you own.

For both through- and half-blind dovetails, both edges of the pin board should have what are called half pins. These half pins can be up to the same width as the full

***Continue the lines around the corner.*** *Use a square to mark out the pins to a shoulder line that represents the thickness of the drawer side. Mark areas to be removed with an X.*

***Follow the lines.*** *To cut out the area between the pins, use a fine dovetail saw (15 tpi or more) and cut to both lines.*

***Chop out the pins.*** *Begin by chopping down just inside the shoulder line, then chip away the stock with horizontal blows. Pare to the shoulder line and clean up the sides.*

## 2 SCRIBE AND CUT THE TAILS

pins but have the angle on only one side. The half pins help keep the edges of the tail board from cupping. Space the pins by measuring and dividing the board evenly. The way I do it is quick and simple. I use the width of my index and middle fingers to mark the space between the centers of the pins. These marks are made on the inside edge. Then I mark 3/16 in. to each side of the center mark for each pin to end up with pins that are 3/8 in. wide (fat side).

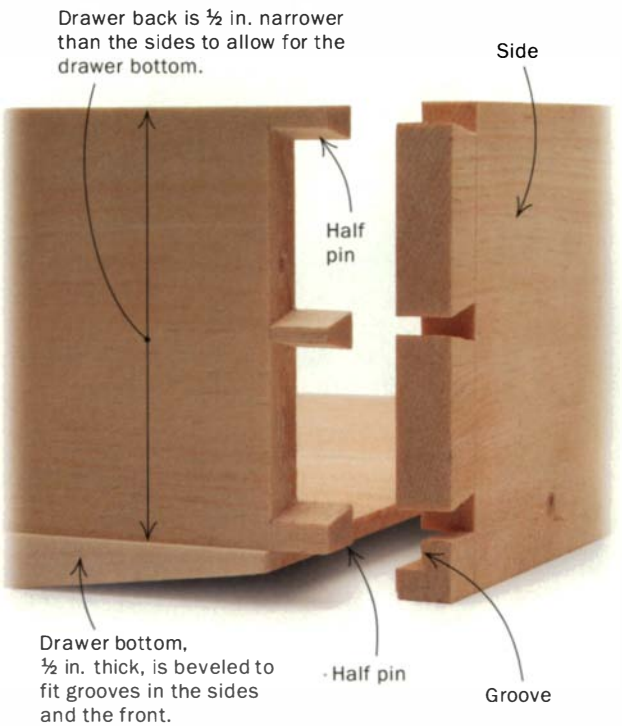
Use a bevel gauge to draw the angle on the end grain for each pin. The angle should be approximately a 1:6 to 1:8 ratio. Use a square to connect the line and continue it down the shoulder line. The angle line and this square line are the only two lines you need to cut the pins (or tails).

Mark the area to be removed with an X and use a fine dovetail saw (15 tpi or more) to cut to the line. Saw the pins, making sure not to cut into the lap or the inside of the drawer. Chop out the cheeks of the pins that cannot be cut with the saw. Clamp the pin board inside face up to the workbench. Start away from the shoulder line and alternate chisel blows between horizontal and vertical. Do not undercut the lap or shoulder too much. Place the board back in the vise and pare the cheeks. Use the back of

***Mark out the tails.*** *With the drawer side flat on the bench, clamp the drawer front at a right angle. With the end of the side flush to the end of the lap, mark the tails using a sharp pencil.*

***Saw away what you can.*** *The edges of the sides can be cut close to the line. Pare away what little is left using a sharp chisel, and chop out the area between the tails just as you chopped out the waste between the pins.*

## THROUGH-DOVETAILS JOIN THE BACK TO THE SIDES




***There's no need to angle the saw.*** *When cutting the pins for through-dovetails, you can cut all the way to the shoulder line.*



***Through-dovetails go all the way through.*** *To mark out the tails, clamp the back at a right angle to the side. Because the tails go completely through, make sure the back and side are flush.*

the chisel to follow both the angled line and square line to bring the entire cheek of the pin into square. Use a combination square to check that the pin edges and shoulders are square.

**Scribe tails from pins, then cut away the waste—**The tails are scribed off the pins only after you are satisfied that all of the pins are square. Place the tail board inside face-up on the bench. Clamp the pin board 90° to the face of the tail board, just as if the drawer were going together. Line up the inside face of the pin board directly on the inside edge of the tail-board shoulder line. Scribe the tails using a sharp, hard-lead drafting pencil, which leaves a thin, definite line to cut to.

Place the tail board in the vise with the inside facing you. Draw a square line across the end grain from the end of each angled line. Remember that the angle of the pins appears on the end grain and that the angle of the tails appears on the face of the board. Mark the waste with an X and cut to the pencil line, not into it. If you cut beyond the pencil line you will have a gap. Chop out the waste as you did for the pins, but stop at half depth and flip over the board. Repeat the process on the other side and check to see that everything is square. At this point, your dovetails should start to fit together. If they are a little snug, pare only the tails. Once you have squared the pins, they should not be touched again.

### Cut the through-dovetails

Through-dovetails join the drawer sides to the back. Lay out the pins using the same technique described for the half-blind dovetails, but you don't have to leave room for the lap. Once the pins have been cut, chop out the waste halfway through the pin board's thickness, leaving some material to support the end. Then pare to the shoulder line. Flip over the piece, continue to chop out waste and then pare to the shoulder line. Place the piece back in the vise and pare the cheeks square. This area can be slightly undercut in the center. Tails are marked and cut exactly the same as they are on the half-blind dovetails.

### Glue up the drawer and slide the bottom in place

Now, when you assemble the dovetails, you have four pieces of wood that are starting to resemble a drawer. At this point, you

## GLUING AND CLAMPING

***Glue blocks fit the tails.*** *Use clamping blocks made of the same species as the drawer sides (or a softer wood). Be sure to remove any material that might crush the pins. Taping the blocks in place helps ease assembly.*


***Check for square.*** *Once the clamps are in place, check the diagonals to see whether the drawer is square.*

can glue up the drawer, making sure that it is kept square while you clamp it.

A traditional dovetailed drawer uses a solid-wood bottom. The grain of the drawer bottom runs side to side, allowing it to expand and contract from front to back. Edge-glue enough ⅜-in.-thick stock to equal the drawer depth. Cut these panels 1/16 in. smaller than the dimension of the drawer and the bottom of the grooves. Bevel the bottom of the drawer with either a handplane or a machine. I typically use the tablesaw to cut this bevel and handplane the bottom to fit. The bottom should slide easily but not be so loose that it rattles. Finally, cut a slot (⅛-in.-wide sawblade kerf) in the back edge of the bottom to screw the bottom to the drawer back. The slot should be long enough to allow the bottom to expand and contract freely.

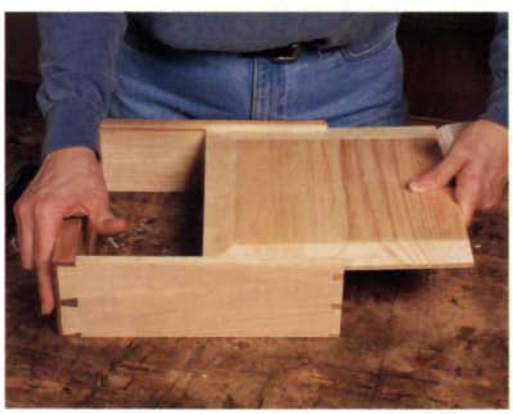
For the final drawer fitting, lightly plane the sides to fit the case. If the drawer needs to have some height shaved off, take it off the top of the drawer, leaving your flat (reference) edge alone on the drawer bottom.

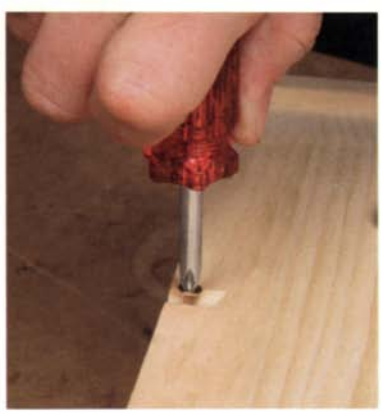
I usually finish the inside of the drawers and the case itself with shellac. Oil finish inside a case takes longer to cure, usually smells for a long time and can become gummy and tacky over time. □

*Janet A. Collins runs the Workshop Program at North Bennet Street School in Boston.*

***Raised-panel drawer bottom.*** *Once the drawer bottom has been sized and beveled at the tablesaw, handplane the bevels to fit.*

## INSTALLING THE DRAWER BOTTOM





***Slide the bottom in place.*** *Beveled sides of the bottom should fit smoothly into the drawer grooves. A single screw at the back—and no glue—is all that is needed to hold the bottom in place and allow for seasonal movement.*

# 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.**

**Roger St. Denis** Ripon, Que., Canada

St. Denis was commissioned to reproduce this Art Deco dresser (16 in. deep by 22 in. wide by 36 in. tall) from a photo of the original, made in 1913 by French furniture maker Paul Iribe. Taking approximately 275 hours to complete, the dresser is made of cherry, maple and birch and features sides that are carved with both concave and convex surfaces. The piece is finished with acrylic paint and lacquer.

**Ethan Hutchinson** Denver, Colo.

This cherry bench (20 in. deep by 38 in. wide by 33 in. tall) took approximately 40 hours to complete and features contrasting ebony plugs. "My strongest influences are my grandfather, who built Queen Anne furniture, and Sam Maloof," said Hutchinson. The bench is finished with a mixture of linseed oil, varnish and thinner.

**Robert Holland**
Newport News, Va.

Holland built this balloon clock (5¼ in. deep by 10½ in. wide by 21 in. tall) from plans in David Bryant's *Wooden Clock Cases* (Stackpole Books, 1995). This style of clock was popular in England in the late 1700s. Holland's version is made of solid mahogany, with mahogany and satinwood veneers, and features an eight-day, bell-strike mechanical movement. The finish is lacquer.

**Michael Seward** ▶
New Park, Pa.

Seward built this dining-room sideboard (20 in. deep by 72 in. wide by 42 in. tall) out of curly cherry. The piece features flat frame-and-panel doors and curved drawer fronts that are proud of the plane of the flanking doors. It is finished with a stain mixture of cherry and red mahogany aniline dyes and hand-rubbed oil.

**Michael Mau** Neenah, Wis. ▲

Mau wanted to design and build a drawing table for his wife, an illustrator, that would appear more feminine than the traditional drafting table. This drawing table (36 in. deep by 49 in. wide by 39 in. tall) is what he came up with. Taking approximately 300 hours to complete, the table is made of maple, cherry and birch and is finished with tung oil and urethane.

**Craig Arnold** Pearland, Texas ▼

Arnold, an electrical engineer by profession, made this oxbow chest of drawers (22½ in. deep by 40 in. wide by 33½ in. tall) after seeing similar versions on Israel Sack Inc.'s web site and in Jeffrey P. Greene's *American Furniture of the 18th Century* (The Taunton Press, 1996). The chest is made of Honduras mahogany, with a secondary wood of poplar, and is finished with an alcohol dye stain and sprayed polyurethane. Photo by Donnie Harris

**Carter Sio** Newtown, Pa.

Sio, a woodworker and teacher at George School in Newtown, Pa., built this cherry music-storage cabinet (17 in. deep by 19 in. wide by 52 in. tall) for a client who wanted a place to store her music books. Keeping with the Stickley motif of the client's home, Sio constructed the sides and back of the cabinet with small floating panels with a floating spline between each panel. He also gave the piece a musical feel by using turned rosewood viola pegs for drawer handles. The cabinet is finished with a tung oil, varnish and thinner mixture.

**Peter H. Wallace**
Kutztown, Pa.

This Windsor writing armchair with candlestand is a reproduction of a New England piece from Rhode Island or Connecticut. Taking approximately 60 hours to complete, the chair (23 in. deep by 36 in. wide by 48 in. tall) is constructed of tiger maple and has a shellac finish.

**Chris Gochnour**
Salt Lake City, Utah

This oval desk (42 in. deep by 72 in. wide by 31 in. tall) is made of curly maple, linden and Japanese pagoda and is finished with aniline dyes, oil pigments and lacquer. To build the desk, Gochnour used trees from the grounds of the Utah State Capitol that were downed after a tornado screamed though Salt Lake City in 1999. The desk resides in the governor's office as part of the permanent collection of the Utah State Capitol.

**Peter Presnell** Kneeland, Calif.

Commissioned by a couple in Napa, Calif., this sideboard (18 in. deep by 72 in. wide by 35 in. tall) serves as a companion piece to a dining table and chairs that Presnell made for the same clients several years before. Made of solid cherry, the piece features black maple and claro walnut drawer pulls and has a hand-rubbed oil and varnish finish.

**Joe and Laura Wilding**
Highlands Ranch, Colo.

This husband-and-wife woodworking team designed and built this cradle for their first child, who was born Dec. 2, 2001. Constructed of walnut inherited from Laura's grandfather, the cradle (30 in. deep by 32 in. wide by 32 in. tall) took approximately 80 hours to complete. It has a Danish oil finish.

**William F. Tucker Jr.**
Charlotte, N.C.

Tucker made this Queen Anne corner cupboard following plans from Franklin H. Gottshall's *Reproducing Antique Furniture* (Crown, 1971). The cabinet (25 in. deep by 40 in. wide by 84 in. tall) is made of walnut with poplar as a secondary wood. The finish is stain and urethane.

### Tips for photographing your furniture

1. *Clean and dust the furniture.*
2. *The furniture will appear more three-dimensional if it is lit so that each plane has a different brightness. Take care, however, to avoid excessively bright highlights or dark shadows.*
3. *To be sure the photos will be free of distortion, avoid the use of wide-angle lenses, and photograph with the camera positioned even with the center of the furniture both vertically and horizontally.*
4. *Use 35mm color print (negative) film of moderate speed (ISO 200-400). If you're using a digital camera, shoot at the highest resolution and place the image on a CD.*
5. *Photograph the furniture from several angles. Include some head-on shots, as well as some shots that show both the front and side of a piece.*
6. *Keep the background simple. A cluttered or otherwise distracting background may draw the viewer's attention away from the subject.*

# Rules of Thumb

BY ROLAND JOHNSON

## Take an inspection kit when buying lumber

Years ago when it was time to head for the lumber dealer to buy wood for a project, I thought I was well prepared with my tape measure and my pickup truck. I sorted through the piles of roughsawn lumber, avoiding warped boards and obvious flaws, and tried to get sizes appropriate for my project. Buying a little extra for good measure, I loaded up and headed home.

Inevitably as I surfaced the wood, however, I found unwanted surprises. I uncovered odd colors, differing grain patterns and a general lack of continuity from board to board. Often it meant a trip back to the lumber dealer to buy more wood. Turns out I really wasn't prepared, and it cost me time and money.

I have since developed a lumber-buying kit that goes a long way toward eliminating unwelcome surprises. My basic kit includes the following essentials: tape measure, pad and pencil, calculator, moisture meter (and its correction table), low-angle block plane (tuned up and super sharp), flashlight (high powered with a focused lens), gloves, a lumber crayon and a cut list (if the lumber is for a specific project).


***Equipped for success.*** *You'll make better decisions at the lumber dealer if you bring a few key items: tape measure, pad, pencil, calculator, moisture meter, block plane, flashlight, gloves and lumber crayon.*

### Your eyes are still your best tool

Check each board for warp. A twisted board is probably the least useful. Unless you want short, narrow pieces or are starting with stock significantly thicker than the finished dimension, it is hard to eliminate twist. Cup can be eliminated by ripping the board into narrow pieces, jointing the edges square and gluing them back together into a flat board. Crook can be overcome by cutting a board into shorter, straight pieces. A tape measure and a good cut list will tell you if you can use the cuttings from a warped board.

***A flashlight is indispensable.*** *It will help you peer into piles in shadowy warehouses and help you determine color and grain.*

### Plane lumber to check color and grain

One of the more critical aspects of building a nice piece of furniture or cabinetry is to have all of the lumber be of a similar color and grain configuration. Buying flitchsawn lumber is one way to guarantee consistency, but lumber mills in my area simply saw up logs, stack the piles and don't pay attention to keeping boards from one log together. As the piles are stacked and restacked during drying and grading, the boards get mixed around even further. And once the lumber gets to the dealer, it is shuffled again by employees and customers. It becomes a rare instance where you can find two boards from the same log.

Complicating things is the fact that I usually buy roughsawn lumber. Roughsawn is cheaper, and the extra thickness allows me more leeway for straightening out defects. However, the rough surface makes it hard to see grain and color.

The key to evaluating color and grain at the lumberyard is the end grain. The growth rings tell you a lot about face grain. If the growth rings are wide, the grain will be exaggerated. Tight growth rings have fine grain—the old-growth look. End grain also tells you whether a board is flatsawn, rift-sawn or quartersawn. Matching color, growth-ring width and orientation of the grain takes you a long way toward finding compatible boards.

A sharp block plane makes it easy to shave the end grain cleanly, and a flashlight provides the necessary light in a dark ware-



Photos, except where noted: Michael Pekovich; this page (top): Kelly J. Dunton

***Plane end grain to preview a board.*** *Most lumber dealers won't mind if you take a few passes on the end of a board to uncover its color and grain.*

house to see color and grain. However, be sure you get the okay from the dealer before you start planing his boards.

Planing the face of the board is also a good way to reveal color and grain, but most lumber dealers would blanch at the sight of someone planing a spot on the face of a board. If you can't get a good idea from the end grain, perhaps the dealer would permit a light shave of the face at the end of the board. Always ask first.

## Check moisture content of all boards

Measuring the moisture content of each board as you select it for grain and color will tell you if the board is a keeper. Be sure to have the meter's correction table with you so that you can convert the reading to the moisture content of that particular species.

A good rule of thumb is don't buy anything with a moisture content over 15%. Anything wetter than that might look fine at the lumberyard but may warp later when it dries. Also, if you put it into a piece of furniture at that moisture content, it will probably split near the joints as it comes down to 6% to 8% in the house.

I recently built some 8-ft. tapered columns that measured 12 in. at the base. Each column was wrapped with a base molding, with the grain of the molding running perpendicular to the column. The boards on the column could have shrunk a bit without obvious problems, but if they had expanded, they would have broken the miter joints of the base molding. I was fortunate to find boards for the columns with a moisture content of 12%. This higher moisture content ensured that the boards would shrink rather than expand as they acclimated indoors. I made sure the lumber was around 8% for the base moldings and the rest of the project, which included a curved staircase handrail and newel posts.

***Check out the moisture content of each board.*** *Before buying, make sure each board's moisture content is under 15%—anything over that is a potential problem.*

## Calculator and cut list save time and money

Once you have determined that a board is acceptable, measure its width and length and write it on your pad. If you are trying to fill a cut list, mark on the list what pieces this board could represent. Use the lumber crayon to mark on the board which pieces could be cut from it; this will save a lot of time when you start sorting and surfacing the lumber back in the shop.

I use the calculator to figure the board footage and keep a tally of how much I have in my pile and how much money I am spending. It is very easy to buy way more lumber than you need or can afford. Having extra wood in the shop is always a good thing, but you can have too much of a good thing.

## Gloves and a case complete the kit

Wearing gloves while you are sorting and stacking is more of a convenience than a necessity. Rough lumber is indeed rough, and I try to make the task as pleasurable as possible. Also, time spent removing slivers would be better spent sorting and grading. Leather gloves resist splinters better than cotton ones do.

When you are finished pulling your boards, leave the yard's lumber stack neat. Carelessly stacked lumber is hard to pick through and can create warps where there were none. I'm sure your lumber dealer will appreciate your consideration, and maybe the next person will be neat, too.

I keep my lumber-buying kit in a small case that's easy to transport and doubles as a writing desk for calculating my lumber pile.

A few tools and a little preparation will ensure that your lumber dollar is well spent. □

***Keep track of your stack.*** *Bring along a cut list and check off the parts of your project as you account for them. Also, use a calculator to tally up the bottom line in board feet and dollars as you go.*

# Q&A

## Sharpening the nicker of a rabbet plane

***It seems that all woodworking magazines have numerous articles on sharpening handplane blades. However, I don't believe that I have ever seen anything on how to sharpen the tiny nicker on a rabbet plane, such as the Record No. 778 or the Millers Falls No. 85. What is the proper procedure for this?***

***—Bob Hughes, Walker, Mich.***

**Mike Dunbar replies:** That little nicker is an important part of a rabbet plane because it scores the wood fibers ahead of the blade. When planing cross-grain, it ensures a cleaner cut. It is a good idea to sharpen it as part of tuning a new plane. Because it does get dull with use, maintaining it is also important.

The nicker on the 85 or 778 is a small disc with three radiating spurs. These spurs do the scoring and require periodic sharpening. By the way, the "missing" spur allows the user to position the nicker so that it will not score, if the job requires.

To remove the nicker, raise the depth stop out of the way and withdraw the small screw that holds the nicker in place. Both the nicker and screw are so small that they can be easily lost, so work on a clean surface. Straight from the manufacturer, only one of the spurs on the plane is ready to use. When it becomes so worn from sharpening (many years from now) that it no longer does its job, you need to file an edge on another spur and turn it into position.

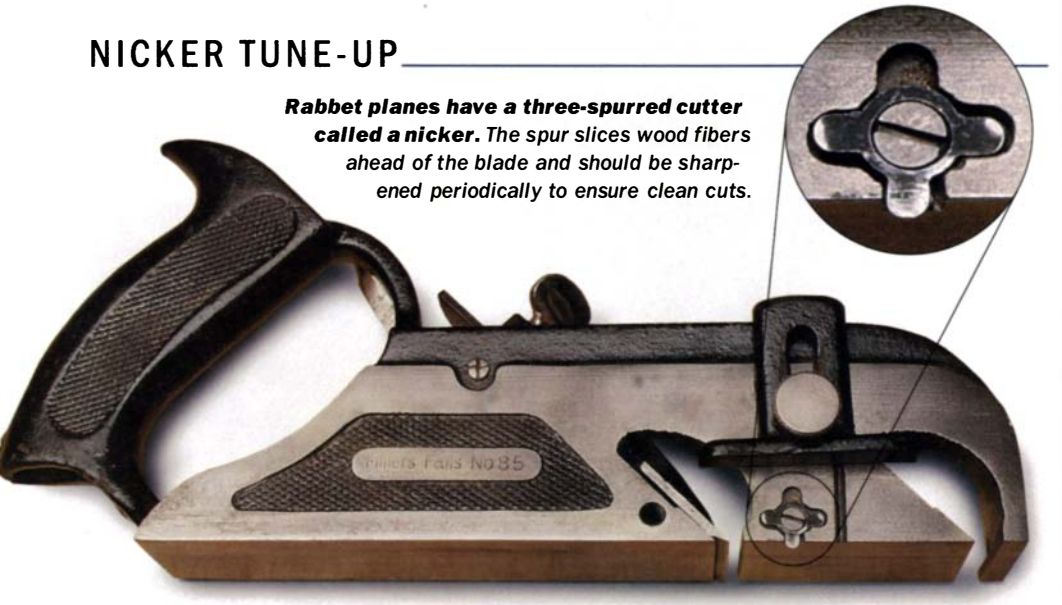
Sharpening a spur is pretty straightforward, but the disc is small and hard to hold. Begin by honing the flat, outside surface on a smooth stone—red India grit or finer. I prefer 220-grit sandpaper adhered to a plate of aluminum. Hold down the nicker with your finger and slide it back and forth until the spur is shiny.

Holding the nicker between your fingers or with a small pair of pliers, hone the spur's rounded back surface. The spur is curved, like your fingernail, so hone it as you would a turning gouge, arcing the cutting edge along the stone or sandpaper. Examine the rounded surface in good light to be sure that you have honed all the way out to the cutting edge.

That should do it. With the nicker in your fingers, try running the spur cross-grain on a board. If it is sharp, it should score a clean line.

[Mike Dunbar is a contributing editor.]

## NICKER TUNE-UP




***Rabbet planes have a three-spurred cutter called a nicker.*** *The spur slices wood fibers ahead of the blade and should be sharpened periodically to ensure clean cuts.*

***File a thumbnail.*** *If the nicker edge is worn, refile it into a thumbnail shape.*

***Hone until it's sharp.*** *Using a sweeping motion with your hand, hone the nicker on a fine-grit stone or 220-grit sandpaper.*

## Scroll cutting on the bandsaw

***I've been trying to use my 18-in. bandsaw to scroll-cut a sloping, contoured wavy line along kiln-dried ash pieces that are 1 in. thick by 3 in. wide by 4 in. long. I've tried using a 24-pitch, 1/16-in.-wide blade and have been cutting at low, medium and high speeds, but I'm getting a rough finish that requires sanding. Am I expecting too much of this blade on ash of this thickness?***

***—Peter Byrne, Inverness, Scotland***

**John White replies:** I can make a few suggestions that may help you get a smoother contour cut on 1-in.-thick ash, but it may not be possible to get a cut that doesn't require some cleaning up.

First of all, the saw must be tuned up (see pp. 46-52), the wheels must be in line, and the tires, belts and bearings must be in good condition.

Next, try a different blade. The blade you're using has teeth that are too fine and are likely clogging in the ash, which will cause the blade to wander. A ¼-in.-wide blade with 10 tpi to 12 tpi would be more appropriate. A ¼-in.-wide blade will cut a ⅜-in. radius curve, which should be adequate. For a smooth cut, get a regular-tooth profile that has a 0° rake. A blade with variable-tooth spacing will give even a smoother cut. Buy a quality blade, and if



Photos: Timothy Sams

# ORDER 1-800-328-0457 MAIL ORDER HOURS M-F 7:00-5:30 C.S.T. SAT 8:00-1:00

## DELTA MACHINERY

| Model | Description | Sale |
|---|---|---|
| 22-580 | NEW 13" Planer - 2 speed | 449 |
| 40-570 | 16" Scroll Saw | 225 |
| 36-255 | 12" Compound Miter Saw | 309 |
| 11-985 | 10" Drill Press | 125 |
| 50-868 | 3-speed Air Cleaner | 299 |
| 23-710 | Sharpening Center | 158 |
| 11-990 | 12" Bench Drill Press | 199 |
| 22-560 | 12-1/2" Planer with extra knives | 299 |
| 22-565 | 22-560 Planer with stand | 319 |
| 14-650 | Hollow Chisel Mortiser with chisels and bits | 239 |
| 17-900 | 16-1/2" Floor Drill Press | 349 |
| 17-965 | 16-1/2" Floor Drill Press - var. spd | 395 |
| 17-924 | Mortise Chisel Kit | 69 |
| 31-780 | Oscillating Spindle Sander with *FREE* 31-781 spindle set | 199 |
| 36-444 | 10" Contractors Table Saw | 599 |
| 31-250 | 18" Drum Sander | 789 |
| 31-252 | 18" Drum Sander with extension shaft, pneumatic drum & dust tray | 849 |
| 28-278 | 14" Band Saw 3/4 HP | 595 |
| 37-190 | 6" Deluxe Jointer | 449 |
| 37-195 | 6" Professional Jointer | 549 |
| 50-850 | 1-1/2 HP Dust Collector | 295 |
| 34-184 | Tenoning Jig | 105 |
| 22-680 | 15" Planer | 1199 |
| 46-715 | NEW 14" Wood Lathe | 649 |
| 36-426 | 10" *Limited Edition* Contractors Table Saw w/ 30" unifence, cast iron wing, table board & carbide blade | 849 |
| 28-299 | 14" *Limited Edition* Band Saw - 1 HP w/ mobile base and rip fence | 849 |
| 33-830 | 10" Radial Arm Saw | 749 |

## DELTA INDUSTRIAL MACHINERY

| | | |
|---|---|---|
| 36-841 | 10" 3 HP *Limited Edition* Unisaw with 52" Unifence, table boards, mobile base and carbide blade | 1699 |
| 36-843 | 10" 3 HP *Limited Edition* Unisaw with 50" Biesemeyer fence, table boards, mobile base and carbide blade | 1699 |
| 36-844 | 10" 3 HP *Limited Edition* Left Tilt Unisaw with 50" Biesemeyer fence, table board, mobile base and carbide blade | 1699 |
| 36-845 | 10" 5 HP *Limited Edition* Left Tilt Unisaw with 50" Biesemeyer fence, table board and 3 carbide blades | 1999 |
| 43-437 | 3 HP *Limited Edition* Wood Shaper with mobile base and router spindle assembly | 1599 |
| 32-325 | Line Boring Machine | 1029 |
| 37-350A | 8" Jointer - DJ20 | 1449 |
| 36-850 | Stock Feeder, 1/4 HP | 479 |
| 36-851 | Stock Feeder, 1 HP | 749 |

**We can special order *any* industrial machine.**

## MILWAUKEE TOOLS

| | | |
|---|---|---|
| 0512-21 | 14.4 volt Cordless Drill Kit with 1.7 Ah batteries | 165 |
| 0516-22 | 14.4 volt Cordless Drill Kit with 2.4 Ah batteries | 189 |
| 6537-22 | Super Sawzall | 169 |
| 6521-21 | Super Sawzall w/ orbital | 185 |
| 0201-20 | 3/8" Drill 0-2500 rpm | 109 |
| 0234-6 | 1/2" Drill 4.5A mag 0-850 rpm | 135 |
| 0235-6 | 1/2" Drill w/keyless chuck | 145 |
| 0244-1 | 1/2" Drill 4.5A mag 0-600 rpm | 148 |
| 0233-20 | 3/8" Drill 5.5 amp | 89 |
| 0301-20 | 1/2" Drill 8.0 amp | 159 |
| 0375-6 | 3/8" close quarter Drill | 159 |
| 6176-20 | 14" Chop Saw | 169 |
| 6546-6 | Screwdriver 200 & 400 rpm | 89 |
| 6547-22 | 6546-6 Kit with 2 batteries | 118 |
| 6390-21 | 7-1/4" Circular Saw w/ case | 139 |
| 5371-6 | 1/2" v/spd Hammer Drill Kit | 189 |
| 6490-6 | 10" Miter Saw | 269 |

### *NEW MILWAUKEE ROUTERS*

| | | |
|---|---|---|
| 5615-20 | 1-3/4 HP, 2-handle | 159 |
| 5615-21 | 1-3/4 HP, 2-handle with case | 169 |
| 5619-20 | 1-3/4 HP, D-handle | 169 |

## FREUD CARBIDE TIPPED SAW BLADES
### 5/8" Bore - Industrial Grade

| Model | Description | Teeth | Sale |
|---|---|---|---|
| LU82M010 | Cut-off 10" | 60 | 32 |
| LU84M011 | Combination 10" | 50 | 45 |
| LU85R010 | Super Cut-off 10" | 80 | 69 |
| LU85R012 | Super Cut-off 12" | 96 | 99 |
| LM72M010 | Ripping 10" | 24 | 39 |
| LU87R010 | Thin Kerf 10" | 24 | 49 |
| LU88R010 | Thin Kerf 10" | 60 | 55 |
| LU98R010 | Ultimate 10" | 80 | 79 |
| LU91M008 | Cmpnd Mtre 8-1/2" | 48 | 40 |
| LU91M010 | Compnd Mtre 10" | 60 | 54 |
| SD308 | 8" Carbide Dado | | 125 |
| SD506 | 6" Carbide Super Dado | | 159 |
| SD508 | 8" Carbide Super Dado | | 175 |

## MAKITA TOOLS

| Model | Description | Sale |
|---|---|---|
| 5090DW | 9.6 volt 3-3/8" Saw Kit | 139 |
| DA391D | 9.6 volt 3/8 angle Drill | 85 |
| DA391DW | 9.6 volt 3/8" angle Drill Kit | 139 |
| 6095DWE | 9.6 volt 3/8" Drill Kit w/ 2 batt. | 125 |
| 6095DWLE2 | 6095DWE with flashlight | 135 |
| 632007-4 | 9.6 volt Battery | 35 |
| 632002-4 | 7.2 volt Battery | 32 |
| 6343DWAE | 18 volt 1/2" Drill Kit | 259 |

### CORDLESS DRILLS WITH NICKEL-METAL HYDRIDE BATTERIES

| | | |
|---|---|---|
| 6213DWBE | 12 volt 3/8" Drill Kit | 159 |
| 6233DWBE | 14.4 volt 3/8" Drill Kit | 199 |
| 9902 | 3"x21" Belt Sander w/bag | 179 |
| 9924DB | 3"x24" Belt Sander w/bag | 179 |
| N1900B | 3-1/4" Planer with case | 142 |
| 1912B | 4-3/8" Planer | 219 |
| N9514B | 4" Disc Grinder 4.6 amp | 65 |
| DA3000R | 3/8" Angle Drill | 189 |
| 5007NBK | 7-1/4" Circ Saw w/ case | 125 |
| LS1011N | 10" Slide Compound Saw | 449 |
| 3612C | 3 HP Plunge Router | 259 |
| LS1013 | 10" Dual Compound Slide Miter Saw | 529 |
| BO5010 | 5" Random Orbit Sander | 69 |
| LS1220 | 12" Compound Miter Saw | 335 |
| 9227C | 7/9" Polisher | 195 |
| 2703 | 10" Table Saw | 325 |
| LS1212 | 12" Cmpnd Slide Miter Saw | 699 |
| 5057KB | 7-1/4" Saw for Hardi board | 279 |
| 2012NB | 12" Planer | 489 |
| RF1101 | 2-1/4 HP var. speed Router | 209 |
| RD1101 | Above Router w/ "D" handle | 219 |
| RF1101KIT | RF1101 with fixed base and plunge base | 289 |

## SENCO AIR NAILERS

| | | |
|---|---|---|
| SFN30 | Finishing Nailer w/ case 1" to 2" | 199 |
| SLP20 | Pinner w/ case 5/8" to 1-5/8" | 149 |
| SKS | Stapler 5/8" to 1-1/2" | 269 |
| SN700XL | "FramePro" - Full 2" to 3-1/2" | 399 |
| 601 | "FramePro" - Clip 2" to 3-1/2" | 279 |
| SFN40 | Finish Nailer 1-1/4" to 2-1/2" | 259 |

## CST/BERGER LEVELS

| Model | Description | Sale |
|---|---|---|
| 54-135K | 20x Level Package | 229 |
| LM500PKG | Rotary Laser Level Pkg | 899 |
| 57-LM10I | Wizard Interior Rotary Laser Level Package | 215 |
| 57-LM10E | Wizard Exterior Rotary Laser Level Package | 419 |
| 58-GIZ-3PKG | Gizmo 3 Laser Level Pkg | 369 |
| LC635LP | LaserCross Rotary Level | 129 |
| 11-635K | Laser Plumb Bob w/ case | 82 |

## JORGENSEN ADJUSTABLE HANDSCREWS

| Item# | Jaw Length | Opening Capacity | Sale | Box of 6 |
|---|---|---|---|---|
| #0 | 8" | 4-1/2" | 13.95 | 75.30 |
| #1 | 10" | 6" | 16.95 | 91.50 |
| #2 | 12" | 8-1/2" | 18.50 | 99.95 |
| #3 | 14" | 10" | 22.50 | 121.50 |

## PONY CLAMP FIXTURES

| Model | Description | Sale | Lots of 12 |
|---|---|---|---|
| 50 | 3/4" Black Pipe | 9.99 | 109.00 |
| 52 | 1/2" Black Pipe | 8.99 | 97.00 |

## JORGENSEN STYLE 37 CLAMPS 2-1/2" Throat

| Item# | Jaw Length | Sale | Box of 6 |
|---|---|---|---|
| 3712 | 12" | 8.99 | 48.75 |
| 3718 | 18" | 9.99 | 53.95 |
| 3724 | 24" | 10.99 | 59.50 |
| 3730 | 30" | 11.99 | 64.95 |
| 3736 | 36" | 12.99 | 70.50 |

## PANASONIC CORDLESS

| | | |
|---|---|---|
| EY6535NQKW | NEW 15.6V Multi Drill | 289 |
| EY6431NQKW | 1/2" 15.6V Drill Kit with two 3.0 Ah Ni-MH batteries, 45 minute charger, & case | 205 |
| EY6407NQKW | 1/2" 12V Drill Kit with two 3.0 Ah Ni-MH batteries, 45 minute charger, & case | 189 |
| EY6406FQKW | 3/8" 12V Drill Kit with two 2.0 Ah Ni-Cd batteries, 30 minute charger, & case | 159 |
| EYC133 | 5-3/8" 15.6V Wood Cutting Saw and Drill Kit | 379 |
| EY3790B | 12 Volt Lantern | 19.95 |
| EY3793B | 15.6 Volt Lantern | 19.95 |

## BIESEMEYER FENCES

| | | |
|---|---|---|
| B-50 | 50" Commercial Saw | 335 |
| T-SQUARE 52 | 52" Homeshop | 285 |
| T-SQUARE 40 | 40" Homeshop | 275 |
| T-SQUARE 28 | 28" Homeshop | 265 |

## HITACHI TOOLS

| | | |
|---|---|---|
| C8FB2 | 8-1/2" Slide Compound Saw | 459 |
| C10FS | 10" Slide Compound Saw | 519 |
| C15FB | 15" Mitre Saw | 599 |
| EC12 | 2 HP, 4 gallon Compressor | 249 |
| NR83A | Framing Nailer - Full Head | 359 |

## STABILA LEVELS

| | | |
|---|---|---|
| 25010 | 10" die cast Torpedo Level | 19.95 |
| 24620 | 16" Professional Level | 15 |
| 24640 | 24" Level w/ hand holes | 48.95 |
| 24670 | 48" Level w/ hand holes | 62 |
| 24816 | Level package: 24670 and 24620 | 69 |
| 03100 | Compact Laser Level w/ prism | 279 |
| 24632 | "Jambor Set" designed for setting door jambs. Includes 78" level and 32" level | 129 |
| 37632 | Same as above but magnetic | 159 |

**2002 TOOL CATALOG AVAILABLE**
Call Toll-Free 1-800-328-0457 In Minn. Call (651)224-4859
FAX: (651)224-8263 • www.7cornershdwe.com
CHECK • MONEY ORDER • VISA • MASTERCARD • DISCOVER
**SEVEN CORNERS ACE HDWE., Inc.**
216 West 7th St. • St. Paul, MN 55102 • Est. 1933

**We are one of the last mail order companies to provide *FREE FREIGHT*!**

**We now stock Delta Industrial Machinery, Powermatic Machines, and Performax Sanders.**

**TOOLS ON SALE™**
AMERICA'S LOWEST PRICED TOOLS
FREE FREIGHT TO THE
48 CONTINENTAL STATES ON EVERY ITEM
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

## DEWALT TOOLS

| Model | Description | Sale |
|---|---|---|
| DW124K | 1/2" right angle Drill | 339 |
| DW321K | Top Handle Jigsaw Kit | 155 |
| DW364 | 7-1/4" Circ. Saw w/ brake | 155 |
| DW364K | DW364 Saw with case | 168 |
| DW378G | 7-1/4" Framer's Saw | 159 |
| DW610 | 1-1/2 HP 2-handle Router | 152 |
| DW411K | 1/4 sheet Palm Sander w/ case | 58 |
| DW682K | Biscuit Joiner with case | 169 |
| DW705S | 12" Cmpnd Mitre Saw with carbide blade, dust bag, & extension | 299 |
| DW621 | 2 HP Plunge Router | 199 |
| DW621K | DW621 Router with edge guide and case | 234 |
| DW680K | 3-1/4" heavy duty Planer | 159 |
| DW276 | Drywall Gun, 0-2500, 6.5 amp | 99 |
| DW703 | 10" Miter Saw | 229 |
| DW706 | 12" Double Bevel Compound Miter Saw | 419 |
| DW920K-2 | 7.2V Split Screwdriver | 105 |

### *"NEXT GENERATION"* CORDLESS DRILLS

| | | |
|---|---|---|
| DW980K-2 | 12 volt 1/2" variable speed with two batteries and case | 169 |
| DW983K-2 | 14.4 volt 1/2" variable speed with two batteries and case | 199 |
| DW987K-2 | 18 volt 1/2" variable speed with two batteries and case | 269 |
| DW988K-2 | 18V 1/2" Drill/Hammer Drill Kit | 289 |

## BENCH TOP TOOLS

| | | |
|---|---|---|
| DW708 | 12" Slide Mitre Saw | 599 |
| DW788 | 20" Scroll Saw | 449 |
| DW733 | 12" Planer with extra blades | 399 |
| DW744 | 10" Portable Table Saw | 499 |

## PNEUMATICS & COMPRESSORS

| | | |
|---|---|---|
| D51845 | Full Round Head Framing Nailer | 329 |
| D51275K | 15 gauge Finish Nailer | 249 |
| D51256K | 16 gauge Finish Nailer | 199 |
| D51238K | 18 gauge Brad Nailer | 144 |
| D55155 | 2 HP, 4 gallon Compressor | 349 |
| D55153 | 4 HP, 4 gallon Twin Stack Comp. | 319 |

## POWERMATIC MACHINES

| Model | Description | Sale |
|---|---|---|
| 1660760 | 3 HP Model 66 Table Saw | 2099 |
| 1660791 | 5 HP Model 66 Table Saw | 2199 |
| 1791263 | 719A Chisel Mortiser w/ bit set | 799 |
| 1791279 | 6" Model 54A Long-bed Jointer | 749 |
| 1791227GK | 10" Contractors Saw w/ 30" fence, table board and blade | 899 |

## DAVID WHITE INSTRUMENTS

| | | |
|---|---|---|
| LP6-20XLA | Sight Level Package - 20x | 285 |
| LT8-300P | Level Transit - 26x | 679 |
| 4810-3 | ML600 Visible Beam Laser | 859 |
| 4700-2 | Auto 900 Visible Beam Laser | 1139 |
| ALP8-22 | 22x Auto Level w/ tripod & rod | 295 |
| ALP8-26 | 26x Auto Level w/ tripod & rod | 309 |
| ALP8-28 | 28x Auto Level w/ tripod & rod | 349 |

## BOSCH

**1587AVSC**
Top Handle "CLIC" Jig Saw Kit
with case and 9 Progressor blades
**Super Sale 155**

| Model | Description | Sale |
|---|---|---|
| 1584VS | Barrel "CLIC" Jig Saw | 155 |
| Bosch Metal Case for above Jig Saws | | 24 |
| Bosch 30 blade assortment for Jig Saws | | 29.99 |
| 1619EVS | 3-1/2 HP variable speed Plunge Router | 319 |
| 1274DVS | 3"x21" var. speed Belt Sander | 159 |
| 1278VSK | 1-1/2"x12" Belt Sander | 129 |
| 1275DVS | 3"x24" var. speed Belt Sander | 215 |
| 1276DVS | 4"x24" v/s Belt Sander | 225 |
| 1194AVSRK | 1/2" var. speed Drill w/ case | 159 |
| 3107DVS | 5" Random Orbit Sander | 99 |
| 3725DVS | 5" Random Orbit Sander | 145 |
| 3727DVS | 6" Random Orbit Sander | 149 |
| 3915 | 10" Slide Compound Saw | 479 |
| 3912 | 12" Compound Mitre Saw | 309 |
| 11224VSR | 7/8" SDS Rotary Drill | 229 |
| 1347AK | 4-1/2" Grinder with case | 92 |
| 1613AEVS | 2 HP Plunge Router | 199 |
| 1617 | 1-3/4 HP Router - 2 handle | 159 |
| 1617EVS | 2 HP Router with variable speed, 2 handle | 184 |
| 1618 | 1-3/4 HP Router "D" handle | 179 |
| 1618EVS | 1618 router w/ variable speed | 205 |
| 4000 | 10" Table Saw | 495 |
| 1677M | NEW 7-1/4" Worm Drive Saw | 199 |
| 3960K-CC | 24 volt Drill Kit | 299 |
| 3960CFK | 24 volt Drill & Circular Saw Kit with coupon for FREE Recipro Saw | 499 |

### *NEW ROUTER & PLUNGE BASE KITS*

| | | |
|---|---|---|
| 1617PK | 2 HP Router Kit | 229 |
| 1617EVSPK | 2 HP variable speed Router Kit | 249 |

## JDS AIRTECH AIR CLEANERS

| Model | Description | Sale |
|---|---|---|
| 750 | 1/4 HP, 200 CFM - 750 CFM | 259 |
| 8-12 | 1/3 HP, 800 & 1200 CFM | 489 |

## PERFORMAX

| | | |
|---|---|---|
| 16-32 Plus | Drum Sander with stand, casters, and paper | 799 |

## JET TOOLS

| | | |
|---|---|---|
| JJ6CSX | 6" Jointer - closed stand and extra knives | 499 |
| JJ8CS | 8" Jointer - closed stand | 1299 |
| JWBS14OS | 14" Band Saw 3/4 HP - open stand | 529 |
| JWBS14CSK | 14" Band Saw 1 HP - closed stand with rip fence and miter gauge | 599 |
| JWTS10CW2PF | 10" Contractor Table Saw with 30" Exacta fence 1-1/2 HP & cast iron wings | 899 |
| JTAS10X501 | 10" Tilting Arbor 3 HP Table Saw with 50" Exacta fence, table, and legs | 1499 |
| JDP17MF | 16-1/2" Drill Press 3/4 HP - 16 speed with bits and mortise attachment | 399 |
| DC-650 | Dust Collector, 1 HP, 650 CFM | 225 |
| DC1100 | 1-1/2 HP, 1100 CFM Dust Collector w/ accessory kit | 299 |
| AFS-1000B | Air Cleaner, 770 CFM | 239 |

## PORTER CABLE

| | | |
|---|---|---|
| BN200V | 12 NEW 12V Cordless Brad Nailer | 269 |
| 9740 | NEW "Tiger Claw" Recipro Saw | 279 |
| 9290 | NEW 19V Cordless Router | 289 |
| 3812 | 10" Portable Table Saw | 399 |
| 9444VS | Var/spd Profile Sander Kit | 128 |
| 690 | 1-1/2 HP Router 8 amp | 155 |
| 6931 | Plunge Router Base | 89 |
| 693PK | 690 and 6931 plus case | 199 |
| 691 | 1-1/2 HP Router D-handle | 179 |
| 698 | Heavy Duty Shaper Table | 149 |
| 352VS | 3"x21" v/s Belt Sander with bag | 189 |
| 360 | 3"x24" Belt Sander with bag | 239 |
| 360VS | 360 Sander w/ variable speed | 249 |
| 362 | 4"x24" Belt Sander with bag | 239 |
| 362VS | 362 Sander w/ variable speed | 255 |
| 9125 | 3-1/4" Planer Kit with case | 155 |
| 505 | 1/2 sheet Pad Sander | 165 |
| 330 | Speed Block Sander 1/4 sheet | 85 |
| 557 | Plate Jointer with tilt fence | 209 |
| 5563 | Face frame plates for 557 | 7.99 |
| 5554 | 1000 assorted biscuits | 29 |
| 7529 | 2 HP variable speed Plunge Router | 225 |
| 97529 | 7529 router with guide, dust collection, and case | 249 |
| 7519 | 3-1/4 HP Router 2 Handle | 319 |
| 7518 | 3-1/4 HP 5 speed Router | 349 |
| 7539 | 3-1/4 HP v/sp Plunge Router | 349 |
| 7310 | 5.6 amp Laminate Trimmer | 115 |
| 97311 | Laminate Trimmer Kit with underscribe base | 235 |
| 7335 | 5" Random Orbit Sander | 119 |
| 97355 | 7335 w/ case & dust pick-up | 149 |
| 7336 | 6" Random Orbit Sander | 125 |
| 97366 | 7336 with case & dust pick-up | 158 |
| 332 | Palm Grip Random Orbit Sander | 68 |
| 333 | 332 sander with dust bag | 69.95 |
| 333VS | Random Orbit Sander - variable speed | 88 |
| 334 | 333 Sander with PSA pad | 69.95 |
| 310 | Production Laminate Trimmer | 159 |
| 347K | 7-1/4" "Framers" Circular Saw with plastic case | 129 |
| 743K | 7-1/4" "Framers" Circular Saw with case - left hand version | 129 |
| 9737 | Tiger Recipro Saw | 159 |
| 9543 | Top Handle Jig Saw | 165 |

## PORTER CABLE PNEUMATIC NAILERS

| | | |
|---|---|---|
| BN125A | Brad Nailer -18 gauge, 5/8" to 1-1/4" | 89 |
| BN200A | Brad Nailer -18 ga. 3/4" to 2" | 109 |
| FN250A | Finish Nailer -16 ga. 3/4" to 2-1/2" | 169 |
| DA250A | Nailer -15 ga. 1-1/4" to 2-1/2" | 205 |
| FC350 | Framing Nailer - clipped head | 239 |
| FR350 | Framing Nailer - round head | 239 |
| RN175 | Roofing Coil Nailer | 275 |
| PIN100 | NEW Pin Nailer 23 gauge | 139 |
| PN650 | NEW Palm Nailer Kit | 129 |

## PORTER CABLE COMPRESSORS

| | |
|---|---|
| CPF23400S | 3 HP, 4 gal. Side Stack 269 |
| CPFAC2600P | 2 HP, 6 gal. Pancake 199 |

## PORTER CABLE CORDLESS TOOLS

| | | |
|---|---|---|
| 9866 | 12 volt Drill Kit | 144 |
| 9876 | 14.4 volt Drill Kit | 165 |
| 9884 | 19.2 volt Drill Kit | 209 |
| 9884CS | 19.2V Drill / Saw combo Kit | 369 |

**FREE FREIGHT • FREE FREIGHT • FREE FREIGHT • FREE FREIGHT**

READER SERVICE NO. 173

you are going to use the blade often, get one of the longer-lasting types, such as a bimetal blade.

Tension the blade to 15,000 psi and closely fit the blade guides. If you have a choice on your saw, use guide blocks on the side of the blade instead of bearings. At certain tensions a blade can develop harmonic vibrations that will cause a rougher cut. For the smoothest cut, install the blade, then make test cuts with slightly higher or lower blade tensions. Variable-tooth blades are designed to reduce harmonics.

Run the blade at a high speed—3,000 ft. per minute or more, if possible.

Use a moderate feed pressure. A regular-tooth blade shouldn't be pushed too hard; it doesn't cut as fast as a hook-tooth blade.

Also, pay attention to your cutting technique and keep steady pressure on the workpiece while sweeping through the curves in one smooth motion. Letting up on the feed pressure in the middle of a cut will cause the blade to flutter momentarily, which may cause a rough spot on the workpiece.

[John White is the shop manager for *Fine Woodworking*.]

## Food-safe finish for the inside of a bowl

***What's the best finish (one that's safe for food) for the inside of a turned bowl?***

***—Jamie Miller, New York, NY***

**Richard Raffan replies:** The finish you apply to your bowl depends somewhat on the bowl's intended use and the surface you prefer. Personally, I don't like high-gloss finishes, partly because they eventually break down and are difficult to refurbish, but also because I like my bowls to be used.

I employ a very quick and easy oil and beeswax finish. The finish also provides a good base for regular refurbishing with just about any furniture polish. With constant use and little or no oiling, wood will develop a wonderfully soft patina. With regular polishing, any wood will soon gain a deep antique glow. The secret to tactile surfaces is frequent use and attention.

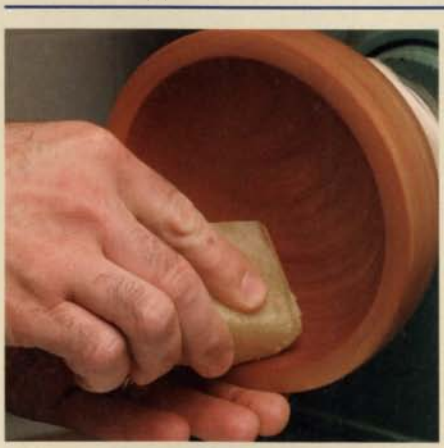
I finish the bowl while it's spinning on the lathe, first slopping on a generous

### A SIMPLE TWO-STEP FINISH FOR BOWLS

**STEP 1: Wipe on mineral oil**


*Use a generous amount of mineral oil. With the bowl spinning, burnish the oil into the bowl using a cloth. Use moderate pressure and caution so as not to get the rag wrapped into the lathe. The bowl will take on a satin finish.*

**STEP 2: Apply beeswax and then burnish**



*Hold the block of beeswax firmly against the wood and apply a thin, even layer inside the bowl. With the same rag you used for the mineral oil, press firmly into the bowl until you see a shine. Save this rag for the next time you need to burnish a bowl.*



Drawing (p. 98): Bobbi Angell

dose of mineral oil. Then I hold a lump of pure beeswax firmly against the wood to build up a thin layer of wax inside the bowl. Then I press the oil-soaked cloth firmly against the spinning bowl to burnish it. Any surplus remains in the cloth. (The cloth can become so impregnated with oil and wax that on dense woods you can dispense with the oil and wax and just apply the cloth.)

The finishing technique should work on bark if you have cut and sanded it. If the bark is rough, just oil it with boiled linseed oil, wipe off the surplus, then buff the surface by hand when it's dry, which is usually after 24 hours.

[Richard Raffan is the author of *Turning Wood* (The Taunton Press, 2000).]

## Pecan as a furniture wood

***I have a huge pecan tree lying in my backyard. It was felled recently to make room for a new septic system. Is pecan suitable for use in furniture? And, if so, is quartersawing or plainsawing the way to go? Last, can any wood be salvaged from the thicker branches?***

***—Donald R. Joyner, Farmville, N.C.***

**Jon Arno replies:** Although pecan is one of the softest species in the hickory genus (*Carya*), it is still an exceptionally strong and elastic wood. Regardless of how you cut it, it will display most of the same annoying drawbacks typical of all hickories. These include very high shrinkage and poor decay resistance, making it difficult to air-dry without some degrade due to warping, checking and bluestain. Even once it is thoroughly seasoned, pecan remains unpredictable in that it is prone to distortion caused by changes in humidity.

To some degree, pecan's stability can be improved by having the log quartersawn so that the annual rings on the end grain are perpendicular to the face of the boards. This will minimize cupping, and the lumber will be superior in applications where strength and utility are the key objectives. However, from a cabinetmaking perspective, these benefits are offset by some significant negatives. Quartersawing will seriously compromise the width of the boards and also the beauty of the wood's figure. In the case of pecan, this is no small sacrifice, considering the fact that plainsawn pecan and other hickories have a subtly beautiful, semi-ring-porous figure.

The truth is that working with pecan just takes a certain amount of masochism. To capture this wood's special charm, you simply have to endure its cantankerous attributes. It is a torturously tough, knuckle-whitening wood to work with. Also, to expose its most attractive figure, there is little choice but to plainsaw the boards and then deal with the wood's notorious instability after the fact through careful selection of the joinery methods used in the design of the piece. In other words: Make sure wide panels have plenty of room to float in their frames, cut mortise-and-tenon joints so that they are a bit on the sloppy side, rather than rubber-hammer snug at the time of assembly,

READER SERVICE NO. 25



READER SERVICE NO. 20



READER SERVICE NO. 70



READER SERVICE NO. 44



READER SERVICE NO. 160

then pin them to achieve the necessary rigidity. Pecan is exceptionally difficult to restrain, and the strategy is to let it move in ways that won't disrupt the structural integrity of the piece.

On the other hand, if you are willing to put out the extra effort to accommodate its uncompromising nature, pecan offers many rewards. It makes exceptionally durable furniture that ages with dignity.

***Good for more than pies.*** *Pecan is durable and subtle, and its instability can be overcome through smart design.*

Pecan,
*Carya illinoeosis*

Antique pieces, with their natural luster and light cinnamon patina, seem to whisper wealth and grace. Also, pecan is a uniquely American timber with a time-honored role in our history. It was the wood of choice among the 17th- and 18th-century French cabinetmakers who settled in Louisiana and subsequently enriched our American cabinetmaking tradition with their so-called French provincial furniture designs.

One final tip in regard to trying to salvage a few boards out of the branches of that pecan tree: Don't press your luck. Branches tend to be loaded with extremely unstable wood tissue called reaction wood. In a species like pecan, where even the normal wood tissue is notoriously lacking in stability, converting the branches into a little firewood is certainly the more prudent approach and not in the least bit wasteful.

Like other hickories, pecan firewood packs a lot of Btu and is also one of the best for smoking meats.

[Jon Arno is a wood technologist in Troy, Mich.]

The International Woodworking Machinery & Furniture Supply Fair–USA®

IWF 2002

# New Technology • New Innovations • New Ideas

**Your Atlanta Advantage** | **A World of Opportunity In One Place**

## August 22-25, 2002

Georgia World Congress Center
Atlanta, Georgia USA

Come to IWF and learn how your operation can run more efficiently, produce better products, control costs, protect margins and increase profits. See live demonstrations of equipment and methods that can help you compete in today's market and make a difference to your bottom line.

IWF brings you face-to-face with the suppliers, manufacturers and experts that can show you what the world has to offer in new technology, products and services as they are introduced to the marketplace.

**See Fine WoodWorking in Booth BC405**

**Register Online at www.iwf2002.com**

**For more information:** e-mail info@iwfatlanta.com, fax a request to 770-246-0620, call 770-246-0608 or write to IWF 2002 , 6525 The Corners Parkway, Suite 115, Norcross, GA 30092 USA

IWF connection.com

**Preview IWF and find sources for thousands of products and services online at www.iwf2002.com with the new IWF Connection.**

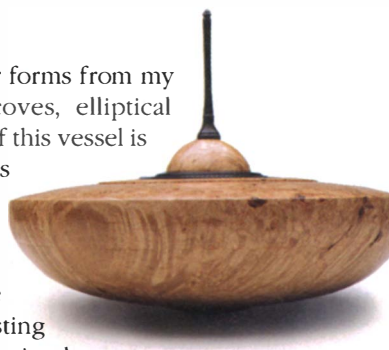
The International Woodworking Machinery & Furniture Supply Fair–USA® is owned and sponsored by: American Furniture Manufacturers Association, Wood Machinery Manufacturers of America and Woodworking Machinery Industry Association.

BY RON LAYPORT

# A turned lid from contrasting woods

For a dozen years or so, I built one-of-a-kind furniture, wrestling giant carcases and tabletops around my shop to the point of exhaustion. I loved the design-as-you-go approach and especially the process of cutting every joint by hand. I was turning down commissions because I was so busy.

Then I attended a workshop to learn to turn my own table legs. That weekend at the Ellsworth School of Woodturning in Quakertown, Pa., turned out to be a serendipitous miscalculation of monumental proportion. Unbeknownst to me at the time, David Ellsworth was the master of the thin-walled hollow vessel. I spent the weekend learning to turn a bowl and a hollow form, never quite getting to that table leg. I learned that an entire piece can be made, sanded and finished on the lathe—a far cry from case work. I have yet to build another piece of furniture, and I have never looked back.



## Design considerations

My lidded vessels borrow familiar forms from my furniture-making days: beads, coves, elliptical curves. In fact, the overall shape of this vessel is that of a finial. The joinery I use is also borrowed from furniture. If you've ever worked with mortise-and-tenon joinery, you already have an understanding of the banded construction. The contrasting laminations are simply a series of spigots (round tenons) fitted into turned mortises.

I consider pieces like this to be functional art, made to be used. The opening of this vessel is wide enough to allow easy access, and the bottom is a relatively flat french curve.

## Required tools and supplies

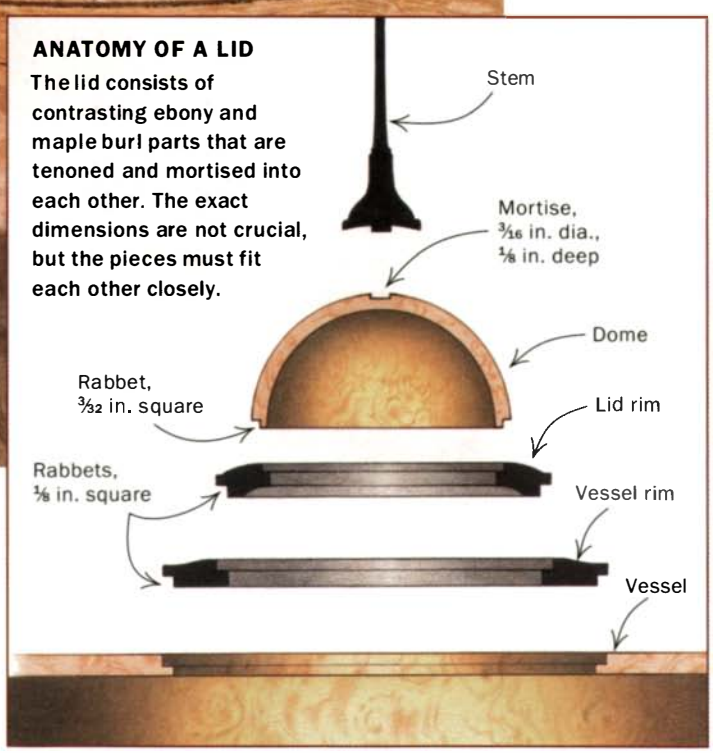
I used a deep-fluted bowl gouge to form the outside shape. I made the final smoothing cuts with a side-ground gouge that allowed me to lay it on its side bevel for a planing cut.

Though the focus of this article is not on turning hollow forms, hollow cutting is necessary to make this vessel. This subject was covered by Howard Lewin in *FWW* #154 ("Turn a Hollow Vessel," pp. 68-72). One of my favorite holding devices is the Oneway Stronghold chuck, which has jaws that expand and contract to clamp the inside or outside diameter of a workpiece. It is available from Craft Supplies USA (800-551-8876; www.craftusa.com).

For this piece, I used bigleaf maple burl and ebony. The burl was wet enough to rough out

**ANATOMY OF A LID**

**The lid consists of contrasting ebony and maple burl parts that are tenoned and mortised into each other. The exact dimensions are not crucial, but the pieces must fit each other closely.**




Drawing: Michael Gellatly

## FIT A RIM TO THE VESSEL

***While turning the moist burl, leave extra material at the opening.*** *After the hollow vessel has dried, true up the opening and cut out the small rabbet for the ebony rim.*

***Mount the ebony blank on a waste block.*** *Glue it at its center only (above left), so it can be parted away later. Turn a rabbeted edge to fit the vessel (above right). Both the outside and inside diameters here are critical. Use the vessel to check the fit (right).*

easily but dry enough to minimize distortion later. I got my burl from Mardena Blaney at Exotic Burl (541-396-2333) in Coquille, Ore. It was difficult to find ebony stock wide enough for the rims on this piece, but resawing, jointing and gluing up using cyanoacrylate glue and accelerator worked fine.

### Shape and hollow the vessel

Start by roughing the general shape between centers. This allows you to reposition the rough blank to avoid or include things like bark or color breaks. True up both ends using the gouge, then use a parting tool to turn a ⅜-in. spigot at what will be the foot of the vessel. Next, fit the spigot into a four-jaw chuck to bring the outside of the vessel to its final profile.

I added a flat, wide detail around the opening, to create lift and a visual link between the lid and the vessel so that the lid wouldn't appear isolated. Turn the outer edge of this detail to the finished depth, but leave the inner rim about 1/16 in. heavy in thickness after hollowing. You can go back and true it up after the piece has dried. There is sure to be some distortion on a piece this large and thin, and the opening must closely fit its ebony rim.

I usually put on a coat or two of finish before hollowing, to seal the wood and minimize distortion. Hollow the vessel to a uniform ¼-in. thickness. After hollowing, let the piece dry and settle for several days before truing up the opening. Use the tiniest shearing cuts possible to avoid a catch (and explosion), and clean up the distortion inside the opening with a miniature parting tool. Extreme care must be taken here—this is where I've lost most of these vessels. Lightly sand and refinish this area.

***When the fit is right, part away the rim.*** *Then turn a recess in the waste block to hold the rim in the reverse position.*

***The recess must fit the rabbeted edge.*** *Attach the rim to the block with double-faced carpet tape. Turn the top surface.*

### Turn both sides of the rim

Before making the ebony rim for the vessel, cut a ⅛-in. by ⅛-in. rabbet into the vessel's opening. I used a small shop-ground cutter. This rabbeted edge will receive the band of ebony.

Next, glue up a block of ebony for the rim and rough out the circle on the bandsaw. Glue the blank onto a waste block, which goes on a faceplate. If you glue on the ebony only at the center, the ring can be parted easily off the waste block. Turn the stock to about ½ in. thick and trim the outside to fit the rabbet. It must fit without being forced yet without any play. Next, cut a rabbet in the rim so that it will fit into the mouth of the vessel. I use trial-and-error fitting rather than

***Attach the rim to the vessel.*** *Put cyanoacrylate glue on the ebony rim and the accelerator on the vessel.*



Photos: Asa Christiana

## TURN THE LID PARTS

***First, turn another ebony rim.*** *Rabbet it on the bottom to fit the vessel's rim, and rabbet it on the top surface to fit the burl dome to follow. Then turn the decorative elements on the top surface. Leave the rim on its faceplate and waste block.*

***Turn the small burl dome.*** *While roughing the outside, leave a spigot to hold it for hollowing. After hollowing, turn a precise rabbet on the edge to fit the ebony rim. Mount the dome on the rim and turn a small mortise for the stem.*

calipers, removing a hair at a time until the pieces slide together.

When this is done, part off the rim and turn an exact recess for the rabbeted shoulder into the same waste block. This recess will hold the rim in the reverse position for turning its other face. To secure rings like this, I use six or eight strips of double-faced carpet tape. The carpet tape is stickier and more substantial that regular double-faced tape. Get an easy, slide-in fit, then add the tape strips, which will jam the workpiece in place.

Trim the center of the rim, then shape the outer surface into a shallow cove that will stand a hair proud of the vessel. Last, trim this inlay band with another rabbet to receive the lid. Sand and finish it, but don't install this fragile rim on the vessel yet, to avoid breaking it with the Stronghold jaws.

Flip the vessel onto the Stronghold chuck, using the jumbo jaws to hold it along the inside of the rim. With the tailstock and a cup center brought up lightly to minimize chatter, shape the bottom, continuing the french curve and using the foot treatment of your choice. I turned the spigot smaller and attached an ebony foot. Sand and finish the bottom. Now you can glue on the vessel's rim and foot.

### Turn and fit the lid to the vessel

To make the lid, start with a matching ebony rim to fit the rim on the vessel's opening, using the steps described previously. I don't always add this second ebony rim, but it's a nice touch, disguising the joint between the lid and the vessel. Once this rim fits the rabbet in the vessel's rim, part it away from the waste block. Flip it over, remount it and make the top surface slightly curved to add visual lift. Clean up the center and cut a 3⁄16-in.-deep rabbet to receive the domed, burl portion of the lid. Leave the rim in place on its waste block and faceplate.

The burl dome is just a small bowl. Mount it on a faceplate and turn the outside first, leaving a spigot on the bottom. Grab the spigot in a chuck and hollow the dome to 3⁄16 in. thick. Turn a rabbet on the outside edge to fit the recess on the inside of the lid's rim. Slightly undercut the shoulder for a tight fit.

Glue the dome onto the lid rim and part away the spigot. Cut a mortise for the stem and give the piece a coat of finish on all but the very top. Set the partially assembled lid aside (still on its waste block and faceplate) to await the stem.

### A stem tops off the finial form

Start the ebony stem with its base at the tailstock, and work toward the headstock, turning the thinnest areas last. At the base, create a shallow cup shape to match the curvature of the dome and leave a small spigot in the center to match the mortise. Turn as much of the stem as possible, then part it off near the headstock and glue it into the dome. Remount the entire lid and bring up the tailstock. Perfect the tip of the stem and part away the waste.

Add a final coat of finish to the vessel and the lid. I usually buff a high-end vessel like this, working through the compounds from tripoli to white diamond and ending with a coat of wax. □

***The ebony stem is a spindle turning.*** *First, turn the bottom of the stem at the tailstock end, working around the live center to turn a spigot and a concave face to fit the burl dome. Then part away the stem near the headstock, leaving enough waste to support a center. Mount it on the lid and finish the tip (above).*

See ad index on page **113** for reader service number.

# CLASSIFIED

**The Classified rate is $8 per word, 15 word min. Orders must be accompanied by payment, ads are non-commissionable. The WOOD AND 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, Ph. (800) 926-8776, ext. 310. Deadline for the September/October 2002 issue is June 25, 2002.**

## Business Opportunities

FOR SALE: BEAUTIFUL ARTIST'S HOME in Leadville, CO. Large wood shop, ceramics studio, 4 bedrooms, 2 baths, hot tub with 14,000 ft. views! 5-minute walk to historic downtown. $250,000. Call: (719) 486-8264.

## Help Wanted

CAREER OPPORTUNITY: CABINETMAKER. Established CT shoreline company has created a full-time position open to a talented and experienced artisan. Benefits include: Blue Cross/Blue Shield, tax deferred benefits, matching 401K, paid holidays and vacation. Shop has quality machinery, dust collection and finishing room. Present staff have 20-years each experience and minimum 10-years with the company. If you enjoy challenging work and are interested in creating one-of-a-kind projects, please inquire. (860) 663-3202 or email me at Drexel@drexelsfrye.com

CABINETMAKING TEACHER for Architectural Woodworking job training program. Shop experience, project management, shop drawing skills. (413) 527-6103. www.nesaw.com

BUSINESS MANAGER Wood Finishes. Southern California manufacturer of wood coatings seeks Business Manager for new Professional Sales Division. Products are sold to professional customers. Responsibilities include: (1) defining customer base, (2) developing marketing and business plans, (3) creating and managing sales and distribution organization. Must have degree in marketing and at least 5 yrs. experience in marketing and sales within wood finishing field. Must be able to take on P&L responsibilities, travel and willing to live in Orange County, CA area. Exciting, ground floor opportunity. Excellent compensation and benefits. Send resume to: Orr & Boss, Inc., Plymouth, MI, Attn: Ann Jividen, by fax to 734-453-4320, or e-mail: ajividen@orrandboss.com.

## Finishes

SPRAY-ON SUEDE. Line boxes in seconds. Free brochure (sample enclosed). DonJer Products, 13142 Murphy Rd., Winnebago, IL 61088. 800-336-6537. www.donjer.com

## Hardware

www.profhdwr.com Online Catalog; hinges, fasteners, sanding products, optivisors. Professional Hardware. Visa, MC, Discover.

## Hand Tools

ANTIQUE & USED TOOLS. Hundreds of quality handtools. Many Stanley + parts. At www.antique-used-tools.com Visa/MC. BOB KAUNE, 511 W. 11th, Port Angeles, WA 98362. (360) 452-2292.

# CLASSIFIED *(continued)*

FREE CARVING TOOL CATALOG: 1-888-901-8099 or (507) 332-9801. P.O. Box 611, Faribault, MN 55021. www.stubaidirect.com

VINTAGE PLANES & PARTS, buying and selling. Pete Niederberger, Box 887, Larkspur, CA 94977. (415) 924-8403 evenings. E-mail: pniederber@aol.com

ANCIENT & MODERN TOOLS. Woodworking, metal working and other. Users and collectors. www.pennyfarthingtools.co.uk

## Instruction

BENJAMIN HOBBS Furniture Making Classes. Queen Anne and Chippendale chairs, chests, beds, tables, more. Hertford, NC. (252) 426-7815. www.hobbsfurniture.com

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.

WOODTURNING INSTRUCTION: Russ Zimmerman's Punta Gorda, Florida workshop or yours. (941) 575-4337 or www.learntoturn.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.

WOODWORKER ACADEMY, comprehensive entry level workshops and precision improvement are our specialty. San Francisco area (510) 521-1623 or www.woodworkeracademy.com

HANDS-ON WORKSHOPS in beautiful Maine. Basic and Advanced. Twelve-week intensive. Center for Furniture Craftsmanship (207) 594-5611, www.woodschool.org

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

TRADITIONAL HIGH-END FURNITURE design, finishing, carving, inlays. No tuition. Year apprenticeship. East Texas. (903) 769-1017.

NEW ENGLAND SCHOOL of Architectural Woodworking. 35-week career training in architectural woodworking or 6-week summer intensive for the serious enthusiast. (413) 527-6103. (MA) www.nesaw.com

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

## Machinery New/Used

USED PORTABLE SAWMILLS! Buy/Sell. Call Sawmill Exchange 800-459-2148, (205) 661-9821. http://www.sawmillexchange.com

## Miscellaneous

LASER GUIDE for chop saws, drill presses, radial arm saws etc. $29.95. Free brochure: 800-456-4987.

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.

## Plans & Kits

FULL SIZE FURNITURE LAYOUTS Drawn by: Philip C. Lowe. Catalog $3. (978) 922-0615. 116 Water Street, Beverly, MA 01915. www.furnituremakingclasses.com

FULL-SIZE PLANS for building fine furniture. Catalog $3. Furniture Designs, Inc., CK-702, 1827 Elmdale Ave., Glenview, IL 60025. 1-800-657-7692. www.furnituredesigns.com

DISCOVER THESE, STARTLING, NEW DESIGNS for your outdoor furniture. You build it. You'll love it. BJBooks, 123 Willow Glen Drive, Kalispell, MT 59901. (406) 257-3046 bjbooks@bigsky.net www.bjsoutdoorfurniture.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.

BUILD OUR HEIRLOOM QUALITY wooden geared clock movement kit for your own grandfather clock case. Serenity from a simpler time. www.greyfoxwoodworks.com

## 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. Musicmaker's Kits, Dept. FW, PO Box 2117, Stillwater, MN 55082. (651) 439-9120. www.musikit.com

## Power Tools

LAMELLO BISCUIT JOINERS and Accessories/Parts/Repairs. Best prices-most knowledgeable. Call Hank 1-800-789-2323. Select Machinery, Inc. (NY)

STAPLERS AND NAILERS at www.nailzone.com. Senco, Paslode, DuoFast, other tools and fasteners. (800) 227-2044.

## Wood

CLEAR OLD GROWTH Douglas fir: 4X6, 4X8, 4X10 and 6X6. Also available 2X6 Alaskan yellow cedar clear. E-mail EasyCreek@att.net. Fax 541-344-1654, or 541-344-3275.

DOMESTIC EXOTIC AND FIGURED lumber to 48-in. wide. Whole log matched sets. Berkshire Products: (413) 229-7919. www.berkproducts.com

CHESTNUT SPECIALISTS INC. Original plank, resawn or dimensional chestnut, oak and pine reclaimed antique lumber. Kilns drying. (860) 283-4209.

ATTENTION VA/MD AREA WOODWORKERS. K/D quartersawn sycamore, red & white oak. Cherry, walnut, elm, apple, and other domestic hardwoods. Herbine Hardwoods, Leesburg, VA. (703) 771-3067.

DOUGLAS FIR (TIMBERS) old growth, to 26-in. Custom milling and delivery. John Timber Trails (724) 738-0654.

FIGURED CLARO WALNUT slabs, planks, blocks, dimensions suitable for small to very large projects. California Walnut Designs. 800-660-020. www.woodnut.com

SAWMILL DIRECT 100 species of exotics, turning, lumber, logs, slabs, musical instruments TROPICAL EXOTIC HARDWOODS: Toll Free (888) 434-3031. www.anexotichardwood.com. See our other ad in this issue for more information.

FLORIDA'S FINEST 50+ species, great quality inventory, sizes; personal selection/service. ALVA HARDWOODS, (941) 728-2484, 1-888-894-6229.

LONGLEAF (HEART) PINE LUMBER. Resawn from salvaged timbers. Lumber, flooring, stair-tread material and hardwood bow-staves. Lee Yelton: (706) 541-1039. (GA)

QUALITY NORTHERN APPALACHIAN hardwood. Custom milling. Free delivery. Bundled, surfaced. Satisfaction guaranteed. Niagara Lumber, 800-274-0397 (NY) www.niagaralumber.com

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.

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

EISENBRAND EXOTIC HARDWOODS. - Widest selection anywhere. Domestic/imported. Reasonable prices. Quality guaranteed. FREE brochure. Info-(310) 542-3576. Orders - 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

REDWOOD BURL, RARE EXOTIC burlwood. Direct from logger. Table and clock slabs, turning blocks, box-wood! Burl Country: (707) 725-3982. Fax 707- 725-3306. (CA)

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

CALIFORNIA'S FINEST BURLWOODS: Massive inventory, many varieties, all sizes, any use, direct, guaranteed. Established 30-years. Burl Tree, 800-785-BURL.

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

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.

FINEST RED TEXAS MESQUITE Curly/straight grain. Prices start at $6.50. 1-866-TEX-WOOD www.texaswoodworks.com

NEWTON WOODS has fine black walnut veneer and furniture grade lumber. Unique figure. Also; madrone, laurel, Red River gum burl and more. Phone (559) 277-8456 or go to www.walnutwoods.net

CUBAN MAHOGANY VENEER (Swietenia Mahogoni) widths to 26-in. flitch prices available. Frank: (707) 744-1530. (CA)

## WOOD AND TOOL EXCHANGE

**Limited to use by individuals only.**

### For Sale

*Fine Woodworking*, 1-155, plus index to first 100 issues. Excellent condition. $475 plus shipping. Call (919) 848-7973. (NC)

*Fine Woodworking* issues 93-155. $190. plus shipping. Call (703) 356-1221, (8 am-8 pm EST). (VA)

*Fine Woodworking*, 43-97, 99-154, plus 18, 25, 27, and index of 1-100. $375. Fine Homebuilding; 46-51, 53-61, 63-77, 79-98. $200. All plus shipping. (540) 885-5563. (VA)

BEACH STROKE SANDER: $1250. Onsrud inverted pin-router, prime: $2000. Ekstrom-Carlson pneumatic drum-sander with hood: $1250. (517) 451-8416. (MI)

*Fine Woodworking*, 1-80. Good to excellent condition. $375. plus shipping. Call (734) 483-4576. (MI)

*Fine Woodworking*, issues 1-156 in excellent condition, with indexes. $450. plus shipping. Walt Pregmon, No. Pocono, PA (570) 842-2561.

FIGURED BLACK WALNUT-approx. 600 bd. ft., 2-in to 3-in thick. 18-in. to 30-in. long: $2.85/ bd. ft. Selling all or none. Johnny: (719) 395-2345. (CO)

### Wanted

MBK Ellipse Master jig base and arm extensions. Call Scott, (303) 946-9048. E-mail emistudios@earthlink.net

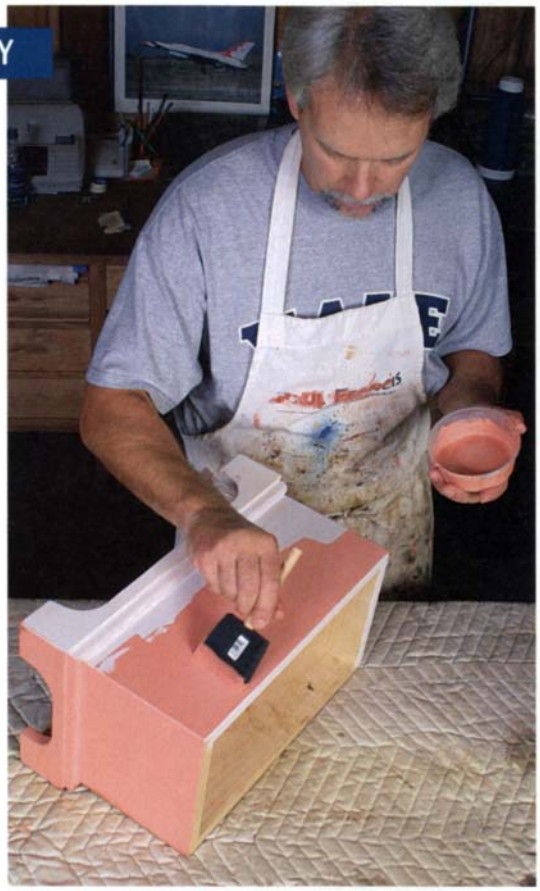
## INDEX TO ADVERTISERS

**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 #* |
|---|---|
| 202 | Accurate Technology, *p. 3* |
| 78 | Adams Wood Products, *p. 9* |
| 50 | Airware America, *p. 110* |
| 206 | Akeda Jigs, Inc., *p. 11* |
| 126 | Allred & Associates, Inc., *p. 95* |
| 88 | American Craft Council, *p. 110* |
| 47 | American Furniture Design, *p. 106* |
| 220 | Apollo Spray, *p. 7* |
| 17 | Ashman Technical, Ltd., *p. 98* |
| 196 | Australian School of Fine Furniture, *p. 98* |
| 132 | The Bartley Collection, Ltd., *p. 108* |
| 123 | Bauhaus Apprenticeship Institute, *p. 108* |
| 64 | The Beall Tool Co., *p. 108* |
| 107 | Belcher Veneer Co., *p. 106* |
| 150 | BenchDog, *p. 12* |
| 2 | Berea Hardwoods, *p. 21* |
| 3 | Berea Hardwoods, *p. 95* |
| 203 | Biesemeyer Mfg., *p. 29* |
| | BrandNew Industries, *p. 109* |
| 146 | Brookside Veneers Ltd., *p. 101* |
| | Cabinetparts.com, *p. 111* |
| 106 | CabParts, *p. 25* |
| | Center for Furniture Craftsmanship, *p. 7* |
| 94 | Certainly Wood, *p. 106* |
| 112 | The Chippendale School of Furniture, *p. 105* |
| 117 | Classic Designs by Matthew Burak, *p. 7* |
| 186 | Cocobolo, Inc., *p. 109* |
| 67 | Colonial Saw Company, *p. 98* |
| 138 | Columbia Forest Products, *p. 35* |
| 172 | Conover Workshops, *p. 109* |
| 75 | Cormark International, *p. 110* |
| 121 | Crown Plane, *p. 110* |
| | Cut List Plus, *p. 109* |
| 1 | The Cutting Edge, Inc., *p. 109* |
| 41 | Dakota County Technical College, *p. 91* |
| 72 | Dana Robes Wood Craftsmen, *p. 110* |
| 69 | Delmhorst Instrument Co., *p. 23* |
| 147 | Delta Machinery, *p. 2* |
| 211 | Denray Machine, *p. 21* |
| 134 | Diamond Machining Technology, *p. 15* |
| 12 | Diefenbach Benches, *p. 110* |
| | Diefenbacher Tools, *p. 109* |
| 109 | Dimestore Cowboys, *p. 111* |
| 84 | Dust Boy, Inc., *p. 108* |
| 216 | Eagle Tools/EuroShop, *p. 23* |
| 97 | Eagle Woodworking, *p. 110* |
| 178 | Eco Gate, Inc., *p. 3* |
| | Electrophysics, *p. 33* |
| 16 | Engraving Arts, *p. 106* |
| | Enviro-Safety Products, *p. 110* |
| 201 | Erhbooks.com, *p. 107* |
| 163 | Everlast Saw & Carbide Tools, *p. 3* |
| 190 | FatCow.com, *p. 95* |
| 80 | Fein Power Tools, *p. 117* |
| 167 | Felder USA, *p. 15* |
| 116 | Festool, *p. 25* |
| | *Fine Woodworking* Hat, *p. 105* |
| | *Fine Woodworking* Online, *p. 111* |
| 139 | Forrest Manufacturing, *p. 27* |
| 79 | Free Saw Blades.com, *p. 109* |
| 48 | Fuji Industrial Sprayers, *p. 23* |
| 125 | The Furniture Inst. of Mass., *p. 110* |
| | GRS Tools, *p. 3* |
| 174 | General Manufacturing Co., *p. 35* |
| 127 | Gilmer Wood Company, *p. 108* |
| 144 | Goby's Walnut Wood Products, *p. 106* |
| 32 | Good Hope Hardwoods, *p. 110* |
| 99 | Gorilla Glue, *p. 29* |
| 52 | Gougeon Brothers, *p. 106* |
| 51 | Groff & Groff Lumber, *p. 33* |
| | Guitar Making, *p. 108* |
| 38 | H. H. Perkins Company, *p. 101* |
| 157 | HB Tools, *p. 7* |
| 199 | Halder, Inc., *p. 106* |
| 166 | Hammer USA, *p. 103* |
| 35 | Harris Enterprise Corp., *p. 106* |
| 10 | Hartville Tool Company, *p. 91* |
| 93 | Hearne Hardwoods, Inc., *p. 101* |
| 118 | HerSaf/Safranek, *p. 15* |
| 158 | Hida Tool & Hardware, *p. 29* |
| 73 | Highland Hardware, *p. 26* |
| | Homestead Heritage Craft Center, *p. 106* |
| | IWF 2002, *p. 99* |
| 62 | Iturra Design, *p. 101* |
| 15 | J.B. Dawn, *p. 107* |
| 5 | The Japan Woodworker, *p. 103* |
| 198 | Johnny 2 Thumbs Salvage, *p. 107* |
| 155 | Jointech, *p. 19* |
| 29 | Katie Jig, *p. 103* |
| 24 | Kay Industries, Inc., *p. 98* |
| 53 | Keller & Company, *p. 33* |
| 188 | Kenco Safety Products, *p. 108* |
| 185 | Kreg Tool Company, *p. 101* |
| 11 | Kremer Pigments, *p. 109* |
| 183 | Kuffel Creek Press, *p. 25* |
| 217 | Laguna Tools, *p. 13* |
| 218 | Laguna Tools, *p. 33* |
| 162 | Launstein Hardwoods, *p. 12* |
| 95 | Legacy Woodworking, *p. 108* |
| | Leigh Industries, *p. 25* |
| | Leigh Industries, *p. 91* |
| 54 | LeNeave Machinery & Supply Co., *p. 105* |
| 113 | Librawood, *p. 111* |
| 133 | Lie-Nielsen Toolworks, *p. 95* |
| 77 | Lignomat Moisture Meters, *p. 21* |
| | Lionel Hastings & Company, *p. 17* |
| 214 | Logosol, *p. 17* |
| 82 | Luthiers Mercantile Intl., *p. 25* |
| 180 | Lynch Interactive, *p. 12* |
| 71 | M.L. Condon Lumber, *p. 89* |
| 131 | MEG Products, *p. 106* |
| 120 | Maine Chair Kit Co., *p. 109* |
| 119 | Mao Shan Machinery, *p. 101* |
| | Marc Blanchette Windsor Chairmaking, *p. 110* |
| 61 | Mass Bay Wood Products, *p. 110* |
| 83 | McFeely's Square Drive, *p. 21* |
| 130 | Microplane, *p. 89* |
| 215 | Micro-Rip 2000, *p. 109* |
| 102 | Mini Max USA, *p. 17* |
| 143 | Mini Max USA, *p. 89* |
| 148 | Misugi Designs, *p. 109* |
| | Molding Knives.com, *p. 3* |
| 177 | Mr. Sawdust, *p. 109* |
| | Museum of Woodworking Tools, *p. 106* |
| 28 | Noah's, *p. 111* |
| 33 | Northend Hardwoods, *p. 103* |
| 66 | Northland Forest Products, *p. 106* |
| 20 | Northwest Timber, *p. 97* |
| 92 | Northwest Woodworking Studio, *p. 108* |
| 141 | Norwood Sawmills, *p. 111* |
| 58 | Oakwood Veneer, *p. 111* |
| 101 | Omer Direct, *p. 15* |
| 140 | Oneida Air Systems, *p. 35* |
| 171 | The Original Saw Company, *p. 14* |
| | Originalfurnitureplans.com, *p. 109* |
| 7 | Packard WoodWorks, *p. 110* |
| 197 | Peck Tool, *p. 110* |
| 145 | Philadelphia Windsor Chair, *p. 107* |
| 43 | Plans Now , *p. 111* |
| 170 | Pootatuck Corp., *p. 107* |
| 114 | Productive Workspace, *p. 107* |
| 159 | Pygmy Boat, Inc., *p. 107* |
| 74 | Quick Wood Epoxy Sticks, *p. 107* |
| 34 | Rare Earth Hardwoods, *p. 106* |
| 27 | Red Hill Corporation, *p. 89* |
| 76 | Ridge Carbide Tool Co, *p. 110* |
| 57 | Robert Larson Company, *p. 110* |
| 26 | Roberts Plywood Co., *p. 103* |
| 31 | Rockingham Community College, *p. 111* |
| 161 | Rosewood Studio, *p. 33* |
| 181 | Rousseau Company, *p. 17* |
| 136 | Router Bits on the Web, *p. 26* |
| 187 | Routerbitsonline.com, *p. 108* |
| 169 | SR Woods/Craft Wood Veneer, *p. 110* |
| | The St. James Bay Tool Co., *p. 109* |
| 68 | Sandy Pond Hardwoods, *p. 111* |
| 154 | Sauer & Steiner Toolworks, *p. 107* |
| 60 | Sauers & Co. Processed Veneers, *p. 109* |
| 160 | Scherr's Cabinet & Doors, *p. 97* |
| 149 | Screw Products, Inc., *p. 107* |
| 46 | Sharp Tools USA, *p. 108* |
| 152 | Simp'l Products, Inc., *p. 12* |
| 200 | Society of American Period Furniture Makers, *p. 3* |
| 14 | Suffolk Machinery, *p. 9* |
| 87 | Super Shop by Smithy, *p. 26* |
| 129 | Talarico Hardwoods, *p. 108* |
| 23 | Target Enterprises, *p. 26* |
| 204 | Tech Mark Inc., *p. 23* |
| 18 | Tech-Wood Inc., *p. 108* |
| 70 | Tenryu America, Inc., *p. 97* |
| 103 | Thewindsorinstitute.com, *p. 109* |
| | Thomas Golding School, *p. 106* |
| 105 | TigerStop, *p. 107* |
| 207 | Titebond Adhesive, *p. 9* |
| 207 | Titebond Adhesive, *p. 17* |
| 207 | Titebond Adhesive, *p. 101* |
| 8 | The Tool Chest, *p. 107* |
| 184 | Toolcrib.Amazon.com, *p. 21* |
| 173 | Tools On Sale, *p. 93* |
| 100 | TracRac, Inc., *p. 28* |
| 176 | Tropical Exotic Hardwoods, *p. 111* |
| 25 | Turbinaire, *p. 97* |
| 213 | Tyler Tool Company, *p. 12* |
| 89 | Vac-U-Clamp, *p. 21* |
| 63 | Vacuum Laminating Technology, Inc., *p. 105* |
| 195 | Vacuum Pressing Systems, *p. 25* |
| 81 | Valley Custom Door, *p. 106* |
| 219 | Van Dyke Restorers, *p. 96* |
| 156 | Vari-Fence Systems, Inc., *p. 107* |
| 91 | Vintage Chair Kits, *p. 107* |
| 49 | Virutex.com, Inc., *p. 21* |
| 9 | W. Moore Profiles, *p. 103* |
| 40 | WGB Glass, *p. 17* |
| 21 | Waterlox Chemical & Coating, *p. 103* |
| 86 | West Penn Hardwoods, *p. 108* |
| 182 | Western Dovetail, *p. 107* |
| 98 | Whitechapel Ltd., *p. 89* |
| 122 | Wilke Machinery Co./ Bridgewood, *p. 19* |
| 142 | Williams & Hussey, *p. 26* |
| 179 | Wizard Detectors, *p. 19* |
| 59 | Wood River Veneer, *p. 108* |
| 115 | Woodcraft School of Fine Woodworking, *p. 107* |
| 189 | Woodcraft School of Fine Woodworking, *p. 9* |
| 153 | Woodcraft Supply, *p. 14* |
| | Woodfinder by Woodrose, *p. 107* |
| 37 | Woodjoy Tools, *p. 106* |
| 192 | Woodmaster Power Tools, *p. 7* |
| 193 | Woodmaster Power Tools, *p. 95* |
| 191 | Woodmaster Power Tools, *p. 96* |
| 96 | Wood-Mizer, *p. 89* |
| 110 | Wood-Ply Lumber Corp, *p. 108* |
| 212 | WoodRat, *p. 95* |
| 4 | Woodsmith Store, *p. 25* |
| 45 | Woodworker's Depot, *p. 91* |
| 65 | Woodworkers Discount Books, *p. 110* |
| 36 | Woodworker's Source, *p. 107* |
| 30 | Woodworker's Supply, *p. 89* |
| 42 | Woodworking Kits, *p. 109* |
| 44 | Worcester Center for Crafts, *p. 97* |
| 137 | World Timber Corp., *p. 106* |
| 19 | Yankee Hardwood Specialties, *p. 111* |
| 85 | Yestermorrow, *p. 103* |

# The art of faux graining



**MAHOGANY**

***Start at the ground.*** *The ground, or base, color (applied over a primer) should replicate the lightest color of the wood you are seeking to imitate. Use either oil or latex semigloss paint.*

BY PETER GEDRYS

Faux graining is a technique and an art that has been with us since ancient times. Originally confined to imitating fine or rare woods, the reasons to grain have widened: You may like country graining, with its rhythmic and whimsical patterns, or you may desire a tiger-maple look more intense than any board you could find. Whichever you prefer, there is a definite joy when someone, especially an expert, runs his hands and eyes over your work and questions, "That's not real wood?"

The fringe benefit of graining is that it teaches you the interaction of color and layering to create depth. These skills can then be utilized when staining and finishing your projects conventionally.

## Build your finish from the ground color up

As with any project, good preparation is the foundation for success. Whether you are using medium-density fiberboard (MDF), plywood or paint-grade lumber, the ground, or base, color can make or break a project.

The ground color should approximate the lightest visible color of the wood you are looking to imitate. It helps to have a finished piece of the wood you are imitating. For mahogany, if you like the old golden browns, the ground coat should be a fairly bright yellow or orange-yellow. If you prefer a reddish mahogany, the ground color should be rose or salmon. When in doubt, err on the lighter side with the ground coat: Later toning can always deepen it to the desired shade, while it is almost impossible to lighten it.

***The first coat of glaze.*** *Try to get an even coating, but don't worry about minor inconsistencies in color. Work on only one horizontal surface at a time to prevent runs.*

***Set the grain pattern.*** *The glaze can be removed with a number of different tools including a dry sponge brush, crumpled cheesecloth or, for smaller areas, an artist's brush.*

***Blur the lines.*** *Once the glaze has begun to set, go over the surface with a large bristle brush in both directions to soften any straight lines and to make the piece look more natural.*



Photos, except where noted: Mark Schofield

Begin by applying an oil- or water-based primer. After it dries, scuff-sand the surface with an abrasive pad. When applying the ground color, always use at least a semigloss paint. The higher sheen of this surface allows you to more easily manipulate your glaze. I prefer a good-quality oil-based paint, but latex paint works fine. You probably won't find a commercial paint in the exact color you are looking for, but you can use artist's colors to fine-tune the tone.

After it has dried, the ground color should be sanded lightly with 600- or 800-grit paper to remove any imperfections. If you have significant brush strokes, heavier sanding will be required to level them. Clean the surface, and you are ready to glaze.

## Apply the first coat of glaze

Loosely defined, a glaze is a translucent to semi-opaque layer of color. It can have an oil, water or even a beer-and-vinegar base. For this demonstration I used an oil-based glaze. Because of its extended drying time, the oil-based glaze is far more forgiving than a water-based glaze, allowing mistakes to be rectified easily before the glaze sets up.

### RECOMMENDED READING

*Graining: Ancient and Modern* by William Wall (Drake Publications, 1972)

*Professional Painted Finishes* by Ina Brosseau Marx (Watson-Guptill Publications, 1991)

*The Art of Faux* by Pierre Finkelstein (Watson-Guptill Publications, 1997)

Apply the glaze with an old brush, a disposable foam pad or a rag. The aim is to get good, even coverage, but remember this is not an exact science. Let the glaze set for a minute or so to allow some of the solvent to evaporate. This way, when you begin to remove and manipulate the glaze, the edges will remain more defined with less chance of the glaze running back together.

## Establish the grain pattern

Now the fun begins. The goal is to establish a grain pattern by selectively removing the glaze. Use a crumpled piece of cheesecloth for soft patterns; for hard definition use paper towels or an abrasive pad with notches cut into it. Lightly drag the material through the glaze to reveal the ground color until you see the grain starting to imitate your model.

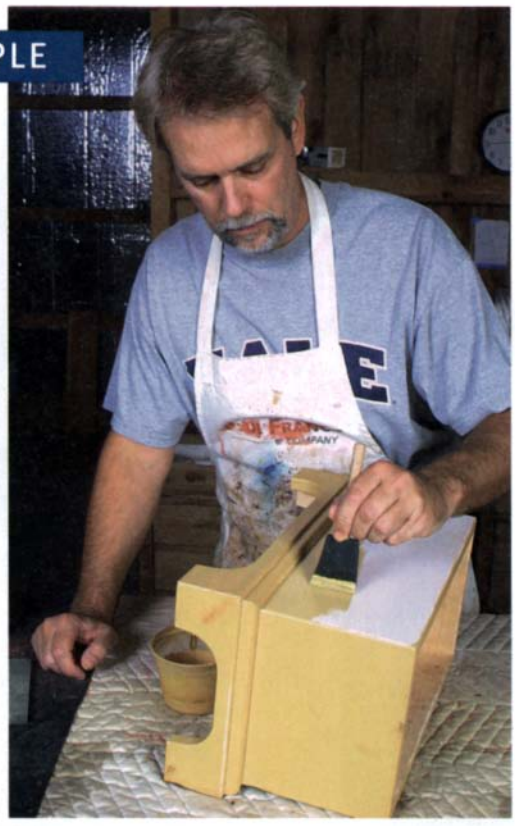
I have one fast rule: Do not make perfectly straight lines. After establishing the coarse grain structure, let your piece set for a few minutes. Then lightly pass a large bristle brush, known as a softener, first with the grain, then very lightly perpendicular to it. At

***Develop the pore structure.*** *Apply a second coat using the same glaze and start slapping the surface with a flogger. The greater the number of slaps, the tighter the grain structure will appear.*

***The toning layer adjusts the color.*** *You can alter the overall feel of your work by fine-tuning the color of the glaze. Adding rose-pink gives a warmer tone. To avoid masking the previous steps, apply the toning layer very thinly with a rag. Two thin coats look better than one thick one.*

Photo, this page (top): Kelly J. Dunton

## TIGER MAPLE



***A yellow tiger.*** *The ground color for the tiger maple was a buttercup yellow semigloss latex paint that was toned down by adding gouache artist's colors. These opaque colors change the tone of small batches of paint quickly.*

this point, your goal is not to remove glaze but to diffuse any straight lines. After the glaze dries, lightly apply a washcoat of shellac (1-lb. cut).

### Develop the pores with a good flogging

Using the same glaze, apply another even but thinner coat. Let the glaze set for a few minutes, then use a long-haired brush, called a flogger, in a light slapping motion, working from top to bottom. If the pores appear too large, repeat this step, occasionally wiping off the excess glaze from the brush. Some people achieve this look by lightly dragging fine steel wool, but I prefer the flogger.

Don't be afraid to experiment: Sometimes you come across a technique by accident, and this is what makes graining fun and interesting. Again, let the glaze dry and lightly apply a washcoat of shellac. This is not essential, but it provides much better control between each layer of glaze.

### Toning brings the whole work together

The third application of glaze is called the toning layer. At this point, you can further adjust the color. With mahogany you may liven it up with red or purple or subdue it with some Vandyke brown or black. Apply a thin layer and go over it lightly with a blending brush both with and perpendicular to the grain pattern. A thin veil of color is usually all that is needed to tie everything together and provide depth. Let it dry thoroughly and proceed with the finish coats.

***Give the tiger its stripes.*** *The basic stripe pattern is established with the end of the foam brush. Be inconsistent to avoid a regular pattern.*

***Remove more glaze.*** *A piece of cloth wrapped around a plastic pad or a credit card reveals more of the ground color, adding to the grain pattern.*

***Fine stripes.*** *Use a fan-shaped artist's brush to set the tiger figure in small areas.*

### The finished appearance

As when working with natural wood, the choice of finish will affect your overall look. Shellacs such as ruby, dewaxed orange or lemon add a glow and more depth. Lacquers, if you have the capabilities to spray, can be tinted and resemble the look of shellac but are more heat and water resistant. Varnish lends an amber or reddish-amber tone. Water-based finishes, because of their pale bluish cast, slightly cool the color.

Remember, practice is the key. Don't be afraid to alter steps or ad lib. After all, this is not rocket science. □

## Glazing recipes

Because colored glazes are often available only in gallons, I have developed formulas using clear glaze, which comes in quarts. To them I add Japan colors, very finely ground pigments in oil that dry quickly. Mix the Japan colors with a little glaze first to help them blend with the main batch of glaze.

**MEDIUM-BROWN MAHOGANY**

2 parts burnt umber

½ part black or asphaltum*

1 to 2 parts neutral oil-based glaze

½ to 1 part mineral spirits

**RED MAHOGANY**

2 parts burnt umber

½ part rose-pink

½ to 1 part black or Vandyke brown

1 to 2 parts neutral glaze

½ to 1 part mineral spirits

**TIGER MAPLE**

**Graining layer**

1½ to 2 parts medium-brown mahogany glaze

½ to 1 part yellow ochre

½ to 1 part mineral spirits

**Toning/pore structure layer**

Add ½ part thinner and ½ part raw umber

*Make sure any layer of glaze containing asphaltum is isolated with a washcoat of shellac; otherwise, applying a subsequent layer of glaze may reactivate the asphaltum and smudge it.

# More power. More capacity.

TurboIII Dust Extractor

## Introducing the NEW FEIN Turbo III Portable Vac.

**The perfect size for big jobs.** The new 9-77-25 makes dust-free sanding and wet/dry cleanup easy and practical. It features 14.5 gallon capacity, an automatic on-off switch and a three-second hose-cleaning delay.

**Powerful two-stage motor.** Features bypass cooling to prevent electrical damage and prolong the life of the motor. And with 10% more suction power than the Turbo II, it can run two 6" or one 8" Random Orbit Sander.

For more information and the name of a local dealer, call **1-800 441-9878** or visit us at **www.feinus.com.**

Visit us at IWF Booth #7013

Fein

Fein Power Tools, Inc. 1030 Alcon Street Pittsburgh, PA 15220

READER SERVICE NO. 80

# Bombé Bombshell

Randall O'Donnell, a period furniture maker in Bloomfield, Ind., made this bombé chest of drawers for an antiques collector. For O'Donnell, this piece represents the most difficult challenge he could think of; for his patron, it is a rare piece of history. Bombé furniture epitomizes the high craftsmanship and conspicuous consumption of Boston in the late 1700s. But not all bombé was created equal. Only 15 known pieces are serpentine across their fronts, creating a potbellied profile that curves in both directions. And only four of those pieces are, like this one, chests of drawers with the inside of the case and the drawer sides sculpted to match the exterior. Not surprisingly, none are available on the antiques market. The one discovered last sold for nearly $1 million at auction in 1995. O'Donnell hand-carved the sides and the drawer fronts from 4-in.-thick by 27-in.-wide slabs of mahogany, which could contain the entire curved profile for perfect grain continuity. The bead around the drawer pockets was not applied; instead, it was formed by relieving the case edges.

Photos: Michael Pekovich