Tool test: Combo blades, p. 44

TAUNTON'S Fine WoodWorking

April 2018 No. 267

Box joints made easy • Why you need a shooting board
Great finishes from hardware-store ingredients • Arts and Crafts rocker

Wide chisel works wonders, p. 24

Grizzly Industrial®

35 YEARS
1983 – 2018

PURVEYORS OF FINE MACHINERY®, SINCE 1983!

- ALMOST A MILLION SQUARE FEET PACKED TO THE RAFTERS WITH MACHINERY & TOOLS
- 2 OVERSEAS QUALITY CONTROL OFFICES STAFFED WITH QUALIFIED GRIZZLY ENGINEERS
- HUGE PARTS FACILITY WITH OVER 1 MILLION PARTS IN STOCK AT ALL TIMES
- TRAINED SERVICE TECHNICIANS AT BOTH LOCATIONS • MOST ORDERS SHIP THE SAME DAY

17" HEAVY-DUTY BANDSAW
35TH ANNIVERSARY EDITION

New!

Extruded-Aluminum Fence with Scale and Magnified Cursor Included

- Motor: 2 HP, 110V/220V, single-phase, TEFC, prewired 220V, 1725 RPM
- Amps: 20A at 110V, 10A at 220V
- Precision-ground cast iron table size: 17" x 17" x 1½"
- Table tilt: 45° R, 10° L
- Floor-to-table height: 37½"
- Cutting capacity/throat: 16¼"
- Blade length: 131½" (⅛" to 1" wide)
- Approx. shipping weight: 342 lbs.

MADE IN AN ISO 9001 FACTORY

G0513ANV ONLY $995.00 + $115 shipping

19" HEAVY-DUTY BANDSAWS

- Motor: 3 HP, 220V, single-phase, 1725 RPM, 12A (G0514X2)
- Motor: 3 HP, 220V/440V*, 3-phase, 1725 RPM, 10A/5A (G0514X3)
- Precision-ground cast-iron table size: 26¾" W x 19" D x 1½" H
- Cutting capacity/throat: 18¼"
- Max. cutting height: 12"
- Blade size: 143" L (⅛"–1¼" wide)
- Blade speeds: 1700 & 3500 FPM
- Approx. shipping weight: 480 lbs. (G0514X2), 456 lbs. (G0514X3)

EXTREME SERIES

MADE IN AN ISO 9001 FACTORY

SINGLE-PHASE WITH FOOT BRAKE
G0514X2 ONLY $1795.00 + $115 shipping

3-PHASE WITH FOOT BRAKE
G0514X3 ONLY $1695.00 + $115 shipping

G0514X2 SHOWN

10" CABINET TABLE SAW
WITH LONG RAILS & RIVING KNIFE

Reviews & Awards

- Motor: 3 HP, 220V, single-phase, 12.8A
- Precision-ground cast iron table with extension measures: 27" x 74¾"
- Floor-to-table height: 34"
- Arbor: ⅝"
- Arbor speed: 4300 RPM
- Max. dado width: 13/16"
- Capacity @ 90°: 3⅛", @ 45°: 2⅜"
- Max. rip capacity: 50"
- Approx. shipping weight: 557 lbs.

MADE IN AN ISO 9001 FACTORY

G0691 ONLY $1895.00 + $169 shipping

20" PLANERS

- Motor: 5 HP, 240V, single-phase, 19A
- Max. cutting width: 20" • Max. cutting depth: ⅛"
- Min. stock length: 8"
- Feed rate: 16 FPM & 20 FPM
- Cutterhead dia.: 3⅛"
- Cutterhead: (4) HSS knives, 20" x 1" x ⅛" (G0454); (98) carbide inserts (G0454Z)
- Cutterhead speed: 4800 RPM
- Table size: 20" x 25¾" (20" x 55½" w/ extension)
- Overall size: 39½" W x 55½" L x 45⅞" H
- Approx. shipping weight: 920 lbs. (G0454), 932 lbs. (G0454Z)

4-KNIFE CUTTERHEAD
G0454 ONLY $1645.00

SPIRAL CUTTERHEAD
G0454Z ONLY $2395.00 + $199 shipping

G0454 SHOWN

BUILT-IN MOBILE BASE!

12"x84" HEAVY-DUTY PARALLELOGRAM JOINTER
WITH SPIRAL CUTTERHEAD

Available February 2018

New!

- Motor: 5 HP, 230V, single-phase, 19A, 3450 RPM
- Cast-iron table size: 12¾" x 84"
- Fence size: 5⅝" x 47"
- Floor-to-table height: 32⅛"
- Max. depth of cut: ⅛"
- Cutterhead diameter: 3⅛"
- Cutterhead speed: 4950 RPM
- Number of carbide inserts: 96
- Carbide insert size: 15 x 15 x 2.5mm
- Bevel jointing: 0–45° L/R
- Power transfer: V-belt drive
- Overall size: 84" W x 39" D x 47" H
- Approx. shipping weight: 1278 lbs.

FREE PAIR OF SAFETY PUSH BLOCKS

G0834 ONLY $2750.00 + $299 shipping

12" JOINTER/PLANER COMBINATION MACHINE
WITH SPIRAL CUTTERHEAD

Shop Series

- Motor: 5 HP, 220V, single-phase, 25A
- Cutterhead dia.: 3⅛", Speed: 5034 RPM
- Max. jointer depth of cut: ⅛"
- Max. width of cut: 12"
- Planer feed rate: 22 FPM
- Max. planer depth of cut: ⅛"
- Max. planer cutting height: 8"
- Approx. shipping weights: 750 lbs.

FREE PAIR OF SAFETY PUSH BLOCKS

Reviews & Awards

G0634Z ONLY $2950.00 + $169 shipping

INDUSTRIAL OSCILLATING EDGE SANDER

- Motor: 3 HP, 220V, single-phase
- Sanding belt oscillates ¼"
- 8" vertical table height adjustment
- Table tilt: 45°
- Table size: 11¾" x 47¾"
- Platen size: 47½" x 9½"
- Base size: 42" x 24½"
- Footprint: 42" x 24½"
- Sanding belt size: 9" x 138½"
- Belt speed: 4120 FPM
- Table height: 33" to 41"
- Table tilt: 0°–45°
- End table dimensions: 18" x 13"
- End table travel: 8"
- Approx. shipping weight: 873 lbs.

G9984 ONLY $3295.00 + $199 shipping

3 HP SHAPER

- Motor: 3 HP, 240V, single-phase, with reversing switch, 12A
- Table with extension wing attached: 30½" x 28¼"
- Floor to table height: 34"
- Spindle travel: 3"
- Spindle size: ½", ¾", 1"
- Table spindle openings: 1½", 3", 4", 7"
- Maximum cutter height: 2½"
- Spindle speeds: 7,000 and 10,000 RPM
- Overall size: 30½" L x 30" W x 39½" H
- Footprint: 20" L x 21" W
- Approx. shipping weight: 392 lbs.

G1026 ONLY $1295.00 + $115 shipping

*To maintain machine warranty, 440V operation requires additional conversion time and a $250 fee. Please contact technical service for complete information before ordering.

PRICING CODE 18FINE
MENTION THIS CODE WHEN PLACING YOUR ORDER
19393

1-800-523-4777 **grizzly.com®**

VIEW VIDEOS AT grizzly.com

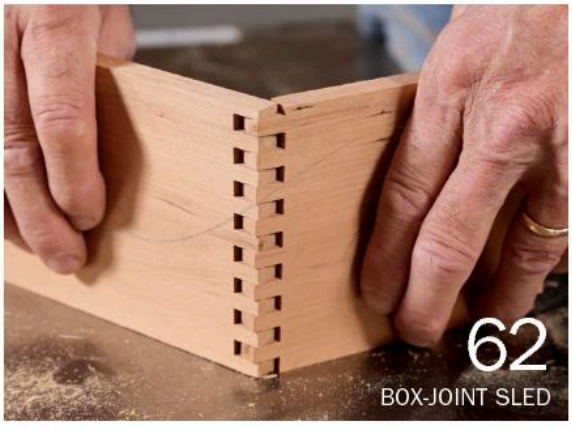
TECHNICAL SERVICE: 570-546-9663 • FAX: 800-438-5901

2 GREAT SHOWROOMS!
BELLINGHAM, WA • SPRINGFIELD, MO

BUY NOW, PAY LATER with Affirm
Choose your monthly payments at checkout

Fine WoodWorking®

MARCH/APRIL 2018 ■ ISSUE 267



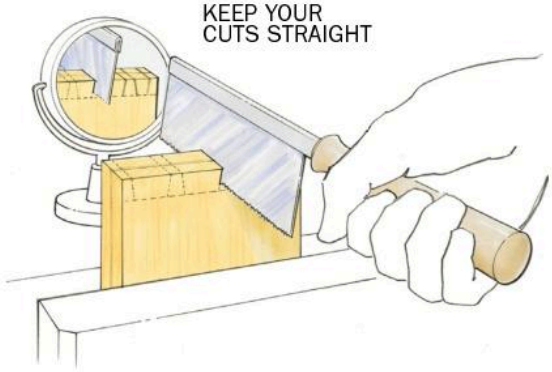
features

Cover photo: Michael Pekovich

in every issue

77
GALLERY:
MARQUETRY TABLE

16
KEEP YOUR
CUTS STRAIGHT



SMALL WORK,
BIG CHISEL 24

22 21-GAUGE
NAILER

80
DRAMATIC INLAY
USING EPOXY

The Taunton Press
Inspiration for hands-on living®

Bend the sanding rules.

This abrasive takes on any shape to make detail and flat sanding easy. And the unique film backing resists punctures, tears and creases. It'll change the way you think about sanding.

3M
PRO GRADE PRECISION™
Ultra Flexible Sanding Sheets and Rolls

on the web

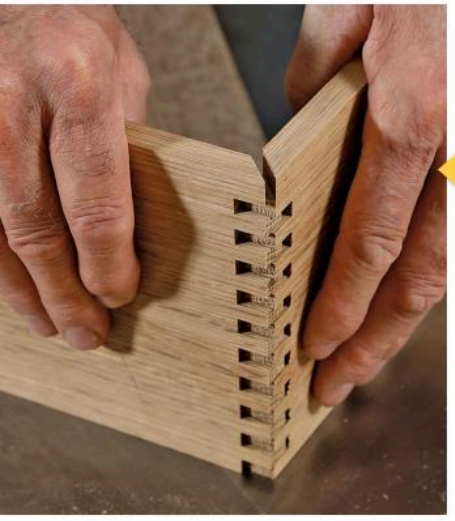
THIS MONTH ON FineWoodworking.com

Visit FineWoodworking.com/267 for online extras, available February 7. And don't miss the collection of free content on our website, including tool reviews, an extensive project gallery, and must-read blogs.

VIDEO

Shooting board master

Timothy Rousseau (p. 48) demonstrates the shooting board he uses most, with tips on how to maximize its potential.



VIDEO

Modern-day blade sharpening

Follow along as a sawblade goes through the sharpening process at Quinn Saw in St. Louis.

The next level

On p. 62, Doug Stowe shows you his no-frills approach to finger joints. In this online article, he explains how he makes mitered finger joints for a cleaner look on some of his boxes.

Is it worth it?

We break down the cost of sharpening blades and bits and make it easy to decide whether you should resharpen a cutting tool or just replace it.

Free eLetter

Get free plans, videos, and articles by signing up for our FREE eLetter at FineWoodworking.com/newsletter.

Members get special benefits

Subscribe to FineWoodworking.com to gain exclusive access to more than 1,000 project and technique videos. You'll also get more than 40 years of magazine archives at your fingertips, including 1,400-plus articles and project plans.

VIDEO WORKSHOP

Woodworker's guide to upholstery

Making a comfortable cushion is well within the skillset of any woodworker. In this video series, upholsterer Michael Mascelli shows the simple steps to making an upholstered seat cushion. You'll learn how to:

- Assemble a set of basic tools for upholstery
- Create a spring foundation for support
- Build up a base of foam layers for shape and comfort
- Top it off with leather or vinyl

Fine WoodWorking

Editorial Director	Thomas McKenna
Creative Director	Michael Pekovich
Deputy Editor	Jonathan Binzen
Deputy Art Director	John Tetreault
Special Projects Editor	Matthew Kenney
Associate Editor	Anissa Kapsales
Associate Editor/ Social Media	Barry NM Dima
Managing Editor/ Production	Elizabeth Healy
Administrative Assistant	Betsy Engel
Contributing Editors	Christian Becksvoort Garrett Hack Roland Johnson Steve Latta Michael Fortune Chris Gochnour

FineWoodworking.com

Web Producer	Ben Strano
Manager, Video Studio	Jeff Roos
Video Director	Colin Russell
Executive Editor, Books	Peter Chapman

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

Subscription Rates: U.S., $34.95 for one year, $59.95 for two years, $83.95 for three years. Canada, $36.95 for one year, $63.95 for two years, $89.95 for three years (GST included, payable in U.S. funds). Outside the U.S./Canada: $48 for one year, $84 for two years, $120 for three years (payable in U.S. funds). Single copy U.S., $8.99. Single copy Canada, $9.99.

Postmaster: Send all UAA to CFS. (See DMM 707.4.12.5); NON-POSTAL AND MILITARY FACILITIES: Send address corrections to *Fine Woodworking*, PO Box 37610, Boone, IA, 50037-0610.

Canada Post: Return undeliverable Canadian addresses to *Fine Woodworking*, c/o Worldwide Mailers, Inc., 2835 Kew Drive, Windsor, ON N8T 3B7.

Printed in the USA

Please Recycle This Magazine
Remove Inserts or Samples Before Recycling

NEW

RIKON

Jointers

For superior, smooth finished surfaces!

RIKON's jointers feature helical cutterheads with carbide 4-sided insert cutters. The cutting action of the helical design with multiple cutting edges is exceptionally smooth and efficient.

6" HELICAL JOINTER (20-106H)

- 1 HP Motor
- Motor Speed (No Load) 3,450 RPM
- 28 Carbide Insert Cutterhead with 5,500 RPM Cutterhead Speed
- 4 Cutterhead Insert Rows
- Adjustable 35" x 4-7/8" Fence
- Large 46-1/2" x 7-1/2" Table
- Carbide Insert Size 14 x 14 x 2 mm

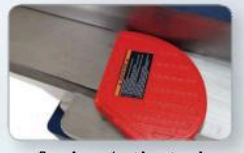
8" HELICAL JOINTER (20-108H)

- 2 HP Motor
- Motor Speed (No Load) 3,450 RPM
- 40 Carbide Insert Cutterhead with 5,500 RPM Cutterhead Speed
- 4 Cutterhead Insert Rows
- Adjustable 35" x 4-7/8" Fence
- Large 73-1/2" x 9-3/8" Table
- Carbide Insert Size 14 x 14 x 2 mm

Features


Helical Cutterheads


Large Tables & Adjusting Fences


Spring Activated Blade Guards

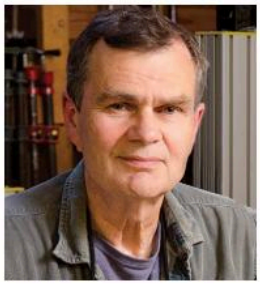

Easy to Read Depth of Cut Scales

Call today for more information **877-884-5167**
or visit **www.rikontools.com** for a dealer near you!

5 YEAR WARRANTY

contributors

Tim Puro ("Four Great Finishes with Hardware Store Supplies") runs Monroe Furniture Restoration in Bloomington, Ind. Unsatisfied with his career as a bank trust officer, Puro turned his furniture hobby into a profession. Like many hobbyists, he was often asked to repair broken or damaged furniture. The repairs usually went fine, but the finishing was a mystery. That led to a furniture touch-up class with teacher Mitch Kohanek, and a new career for Puro. "There are a lot of woodworkers out there but not so many people involved in the craft of furniture repair and finishing," he says, "It looked like an opportunity to carve out a niche in the furniture business." Today Puro employs two assistants at his thriving business, taking on everything from onsite repairs to regluing a parade of broken chairs. He teaches at the nearby Marc Adams School for five to six weeks each year, and also at woodworking clubs.



Curtis Erpelding (Designer's Notebook: "Distilled Rococo") has been making custom furniture in the Seattle area since 1975 and writing for us since 1980. His contributions to the magazine have included articles on making slip joints with a radial-arm saw (*FWW* #32); inventive joinery for knock-down furniture (#45); building fine furniture with Douglas fir (#94); and setting up shop (#131). Like the man himself, his shop is bursting with ingenious solutions to woodworking challenges. In the same issue with the article on his shop, his elevating workbench was on the back cover.

After completing a furniture-making apprenticeship in 1990, **Christopher Moore** (Master Class: "Create dramatic inlays with epoxy") earned a master's degree in sculpture. In 2011, he and his wife created Noble Goods to showcase the more practical side of his lifelong explorations incorporating wood, resin, and mixed materials into his work. Now he manages a cooperative shop in Brooklyn, N.Y., which he shares with a small group of thoughtful makers. His inspirations are patterns—those found in nature, and those designed by humans.

As a boy growing up in Florida, **Matt Kenney** (Handwork: "Get a big chisel for little work") made tree forts and skateboard ramps. About 20 years ago, as a graduate student in South Carolina, he began to make furniture. His love for the craft brought him to Connecticut and to *Fine Woodworking* nearly 10 years ago. His job as an editor has expanded to include co-host of the Shop Talk Live podcast, and maker of decorative boxes and small cabinets. His first book, *52 Boxes in 52 Weeks* (The Taunton Press) goes on sale in May 2018.

We are a reader-written magazine. To learn how to propose an article, go to FineWoodworking.com/submissions.

Fine WoodWorking

Publisher	Renee Jordan
Director, Advertising Sales & Marketing	Alex Robertson 203-304-3590 arobertson@taunton.com
Director of Digital Advertising Operations	John Maher
Senior Advertising Sales Assistant	Diana Edwards
Sales & Marketing Assistant	Tricia Muzzio 203-304-3415 tmuzzio@taunton.com
Marketing Manager	Matthew Ulland
Member BPA Worldwide	BPA WORLDWIDE
Single Copy Sales	MEDIAWORKS 360

The Taunton Press
Inspiration for hands-on living®
Independent publishers since 1975
Founders, Paul & Jan Roman

President & CEO	Dan McCarthy
CFO	Mark Fernberg
CTO	Brian Magnotta
SVP, Consumer Marketing	Paula Backer
VP, Controller	Robert Caldaroni
VP, Human Resources	Carol Marotti
SVP, Home & Construction	Renee Jordan
SVP, Fine Cooking	John Boland

Publishers of magazines, books, videos, and online
Fine Woodworking · Fine Homebuilding
Threads · Fine Gardening · Fine Cooking
taunton.com

veritas®
Combination Plane

Designed with the discerning woodworker in mind

Originally created to replace stacks of wooden-bodied molding and joinery planes, combination planes are defined by their flexibility. Invaluable for restoration work, a combination plane remains an ideal choice for times when you need to make a short run of custom molding.

The Veritas Combination Plane is the result of four years of research and development. It is precisely machined, easy to adjust and holds settings securely – all features that, together with the improved blade technology, also make it fully reliable in use. It represents our continuing commitment to designing and manufacturing exquisite woodworking hand tools that do not limit the expression of the person that is wielding it. Like all Veritas products, our combination plane is designed with the discerning woodworker in mind; it is built to the highest standards, comfortable to handle, and made in Canada.

We have prepared a 16-page brochure that provides detailed information about the Veritas® Combination Plane. You can view it online or add a copy to your next order.

1-800-683-8170
leevalley.com

Configure the plane for left- or right-hand use or to accommodate grain direction.

Accessories
Two Baltic birch plywood boxes are available separately: one provides a place to keep the fully assembled combination plane; the other, holds blades side by side in two 6" long rows.

Our combination plane will accept the right-hand (and unhanded) blades available with the Veritas Small Plow Plane, as well as the blades used with the Stanley #45 and most of those used with the Stanley #55. We also offer an all-new assortment of blades to create a variety of decorative profiles.

Box for combination plane

Blade box

Combination plane blades

letters

From the Editor

Potassium dichromate doesn't belong in a home shop

In our last issue, we published a Finish Line on using potassium dichromate to age wood. Since that issue arrived on newsstands and in homes, I've received more than a dozen letters and emails warning of the extreme hazards of using the compound in a woodshop. It's not uncommon for us to get feedback about new techniques, projects, or finishes. But I've never gotten so much correspondence with such urgency and dire warnings. And as much as I tried to temper my response, telling myself—"This is a traditional technique still used by some. The stuff is OK if you follow safe measures"—I cannot ignore the credentials and emphatic concern of the letter writers.

Nor should you.

Potassium dichromate, what we referred to as "potash" in the article, is extremely dangerous, and regrettably we did not do a thorough enough job of explaining the hazards of using and disposing of the compound. After getting through the wave of emails about potassium dichromate, I did some research on my own. I read multiple lab studies, perused material safety data sheets from various chemical companies, and checked out what the Centers for Disease Control had to offer. What I found out was scary, and it confirmed the warnings conveyed by our readers.

Handling potassium dichromate requires a full respirator and full eye protection (splash goggles) and protective clothing and gloves. You also need to be in a well-ventilated area (most data-sheet info recommends the use of a ventilation hood).

Potassium dichromate is a known human carcinogen and research shows connections to a range of other serious health issues. Disposal of the compound also is an issue. It's highly toxic to the environment. Potassium dichromate should not be directly exposed to combustible elements, such as sawdust, because of a risk of explosion; as an oxidizer, it also may help to spread fire in the shop. There's lots of ammunition against this compound. But don't believe the woodworking editor. Research it yourself, and read the excerpts from concerned readers, many of whom also happen to be chemists.

It is my belief that the hazards of potassium dichromate far outweigh its benefits in a home shop, and I can't with good conscience recommend the product to other woodworkers.

I apologize for this situation. We should have done a better job.

Stay safe in the shop.

—Tom McKenna, editorial director

Readers weigh in heavily on "potash"

I was rather disappointed to read the Finish Line in *FWW* #266, "Instant aging with potassium dichromate."

Wood that has been exposed to chromate solution should not be burned as that will spread the chrome (VI) in the smoke, and any liquids should not be put down the drain as it is very toxic to aquatic organisms. I believe the article is incorrect for stating that once dry it is no longer considered hazardous. Any wood treated with dichromate is almost certainly going to leach chrome (VI).

While some basic precautions are given in the article, I don't think they go far enough. Users who do not take proper precautions run the risk of blindness if the solution gets in the eyes, erosion of the nasal membranes if the dust is inhaled, and lung cancer from the dust. Contact with the solution can cause skin ulcers. Contact with the treated uncoated wood can cause contact dermatitis.

Usually the precautions on a material safety data sheet (MSDS) are taken lightly by the general public. In this case they should not be.

I would also note that in my 30 years as a chemist I have never heard of potassium dichromate being called potash. Potash is generally a carbonate and is used as fertilizer. Potassium dichromate is a poison.

— BILL HOFFMAN, Palatine, Ill.

I have a PhD in chemistry and was shocked at the recent article where *Fine Woodworking* encouraged amateur woodworkers to use a known carcinogen in a home workshop environment.

Aqueous dichromate will raise the grain and will require sanding either before the first coat of finish or after the first coat of finish. The last picture in your article shows the author hand-sanding the holly inlay with no gloves and making fine dust. This final sanding will generate toxic dust that will contaminate the shop and clothing. The

Fine WoodWorking

To contact us:
Fine Woodworking
The Taunton Press
63 South Main St.
PO Box 5506
Newtown, CT 06470-5506

Send an email:
fw@taunton.com

Visit:
finewoodworking.com

To submit an article proposal:
Write to *Fine Woodworking*
at the address above or
Call: 800-309-8955
Fax: 203-270-6753
Email: fw@taunton.com

To subscribe or place an order:
Visit finewoodworking.com/fworder
or call: 866-452-5141
9am-9pm ET Mon-Fri; 9am-7pm ET Sat

To find out about *Fine Woodworking* products:
Visit finewoodworking.com/products

To get help with online member services:
Visit finewoodworking.com/customerservice

To find answers to frequently asked questions:
Visit finewoodworking.com/FAQs

To contact *Fine Woodworking* customer service:
Email us at customerservice@finewoodworking.com

To speak directly to a customer service professional:
Call 866-452-5141 9am-9pm ET Mon-Fri;
9am-7pm ET Sat

To sell *Fine Woodworking* in your store:
Call us toll-free at 866-452-5179, or
email us at tradecs@taunton.com

To advertise in *Fine Woodworking*:
Call 800-309-8954, or
email us at fwads@taunton.com

Mailing list:
We make a portion of our mailing list available to reputable firms. If you would prefer that we not include your name, please visit:
finewoodworking.com/privacy
or call: 866-452-5141 9am-9pm ET Mon-Fri;
9am-7pm ET Sat

For employment information:
Visit careers.taunton.com

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.

dust can easily be transported into the living quarters and will be an ongoing source of toxic waste.

Without a dedicated workspace, air control, and dedicated clothing, there is no reasonable way to handle this material safely. The proper precautions are not possible in a home shop or hobby shop environment.

—E. PHILLIP SMITH, Blountville, Tenn.

I read the article advocating the use of potassium dichromate as a stain with a sense of rising panic. Potassium dichromate is a strong—repeat STRONG—oxidizing agent that will react with finely divided organic material. In a woodshop, we have lots of chips and sawdust that certainly qualifies as finely divided organic material. Potassium dichromate can ignite a fire and can support a fire. Additionally, it is toxic, and with lengthy exposure can cause cancer. I've worked with the stuff professionally, and it will never enter my shop.

—DAVID MORLEY, Calgary, Alta., Canada

As a retired chemist, I have serious safety concerns about using potassium dichromate. Potassium dichromate is a hexavalent chrome compound that is highly toxic. The use, handling, and disposal is federally regulated. Potassium dichromate is hazardous regardless of whether it is dry or in solution. Even though some of the chrome will be reduced to trivalent, some hexavalent will remain. Major information on potassium dichromate can be found by looking up the safety data sheet; this can be found on the websites of chemical suppliers such as Fisher Scientific.

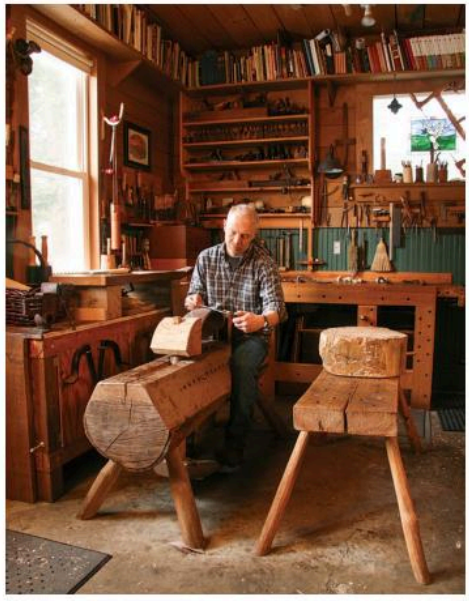
—WILLIAM SCHEVEY, Honesdale, Pa.

Unplugged workshop spurs memories

I read with pleasure David Fisher's description of his unplugged workshop (*Tools & Shops*, Winter 2018). Among his tools are a chopping stump, equipped for holdfasts, and a drawknife. It took me back to the small shed shop of my grandfather-in-law, a wooden clog maker, or sabotier, in the east of France. One end of a drawknife tool was attached by a stout eye bolt to the stump in the middle of his shop, which made for very fast removal even across the grain. Seems a tool like that could be of use in making the beautiful shaped bowls of the author.

Out of curiosity I asked Pépère how long it took to make a pair of shoes. He said that during the hard times if he spent more than 20 minutes his family would go hungry.

—BILL ROSE, Champaign, Ill.



Heating and cooling your shop

I enjoyed the article on mini-splits for the shop. I represented one of the top brands for 14 years and would not be without them in my home. They are fabulous technology and indeed are very efficient.

The advice to "hire a pro" is correct. You may be able to do it yourself, but if you make a mistake and things go sideways, you are well and truly up a creek. Excellent dust collection is important with these units. The filters on these units must be cleaned, but it's equally important to clean the evaporator coils regularly to ensure years of service.

—JACK FREDERICK, Nevada City, Calif.

Appreciates safety article

Cutting off a finger sounds about as fun as playing dodgeball with wooden mallets. Now I love my hands and I love woodworking, but tablesaws have the greatest potential for dismemberment and injury of any tool.

I know the dangers of using a tablesaw because I was one of those rookies who got hit in the crotch by kickback! Here at Zac Brown Customs in Georgia, we (me especially) love *Fine Woodworking* as a source of ongoing professional development and enjoyed the "Safe Ripping on the Tablesaw" article by Bob Van Dyke in *FWW* #266. As a refresher we actually got our whole team to review the article on tablesaw safety.

I'm relatively green to woodworking (having only practiced for the last three years); however, my supervisor Mark has operated his own custom furniture/cabinet business for 35-plus years. Wonderfully for us, he still retains all his fingers and toes.

Keep the safety coming, *Fine Woodworking*. We look forward to the miter saw next.

—PETE WALKER, Peachtree City, Ga.

Correction

Due to an editing error, we inaccurately described the hose requirements for Oneida's Universal Dust-Free Router Hood (Tools & Materials, *FWW* #266) in the last paragraph of the review. The text should say: The Universal Dust-Free Router Hood fits standard 1½-in.-dia. hoses, as well as Festool's 36-mm-dia. hoses. Oneida also sells a 6-ft. accessory hose that fits both the Router Hood and a standard 2¼-in.-dia. dust port.

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 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, find another way. We want you to enjoy the craft, so please keep safety foremost in your mind.

Hammer®
Quality that convinces

Austrian Engineering.
Power for any Need.

C3-31 comfort

Combination Machine

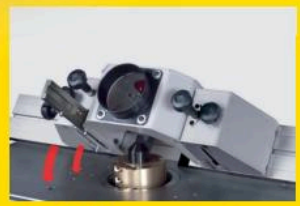
A powerful package of performance and precision in a compact unit

jointing, planing, shaping, routing, sawing ... All in one!

Silent-POWER® Cutterhead

MF shaper system
Change from shaper to router in seconds

Scoring unit
Tear free cuts



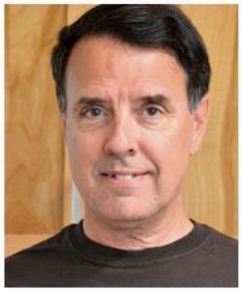
Multifine adjustment
Memory function

FELDER GROUP USA
Trusted woodworking solutions since 1956
sales-us@felder-group.com
www.feldergroupusa.com

Ask about our package deal.
Extras including: router shaft, shaper tools, blades, mobility kit and more!
Toll free 866-792-5288

workshop tips

Best Tip

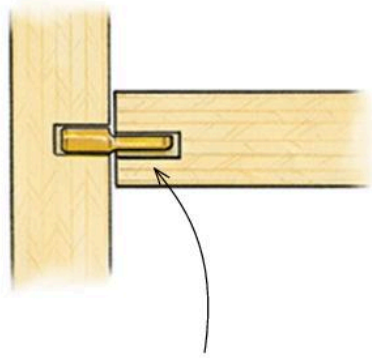


Joe Carretto worked for 20 years in the U.S. Air Force as a space flight engineer, building and flying rockets and satellites, and helping NASA launch and assemble the International Space Station. That meant moving his woodworking shop with him around the country. When he retired and set up a permanent shop, a plumbing leak forced him to build the cabinets twice. Along the way he thought of this winning tip.

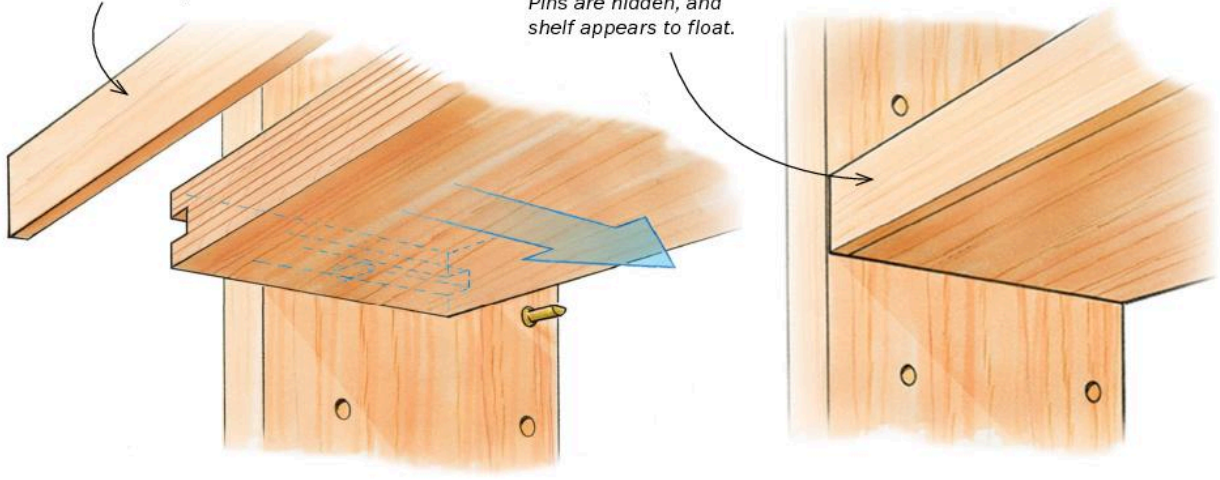
Hide adjustable shelf pins in a secret slot

Like many people, I use those little spoon-shaped pins to create adjustable shelves in cabinetry. They do the job but leave the shelf feeling wobbly, and I don't like seeing the pin tips underneath. So now I cut a slot on the side edges of the shelf (before adding a solid-wood strip to the front edge), so the little pins can slide into the slots. Not only does that make the shelf more secure, but it also makes it impossible for the pins to drop out, and it hides them, giving the finished shelf a floating look. If you are worried about shelf strength, you can cheat the slots downward a bit, below the centerline.

—JOE CARRETTO, Corsicana, Texas



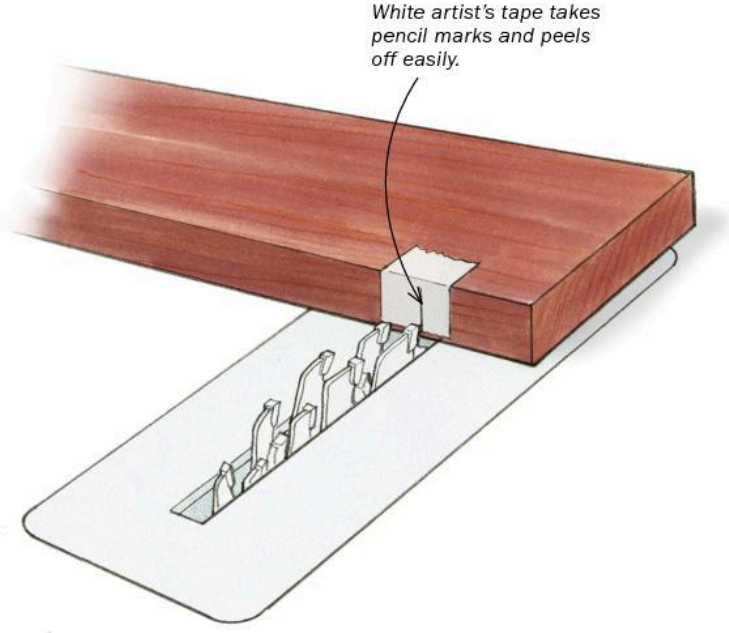
Slot the ends of shelves to fit tips of adjustable shelf pins.



Use white tape to mark on difficult woods

To make precise, clearly visible marks on dark or coarse-grained woods, I lay down a piece of white artist's tape first, and mark on that. It's a low-tack tape, similar to blue tape, so it comes off easily, and it takes pencil marks and erases nicely. You can find it at most art-supply stores.

—DENNY SPECTOR, Redding, Calif.



A Reward for the Best Tip

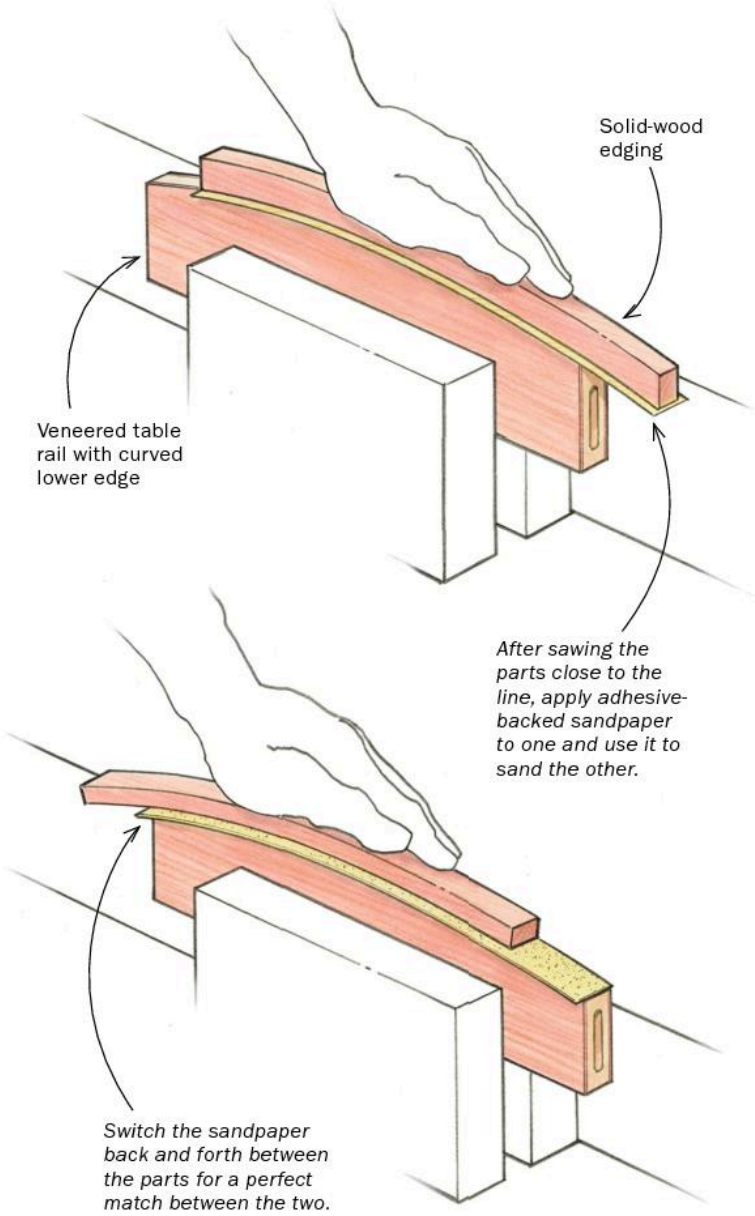
Send your original tips to fwtips@taunton.com. We pay $100 for a published tip with illustration; $50 for one without. The prize for this issue's best tip was a block plane from Veritas.

Drawings: Dan Thornton

Curved edges smooth each other

I use veneered panels in my work, often with curves, and I have a simple method for shaping the edging to fit the panel precisely. Start by bandsawing both parts as close to the curved line as possible, and then use adhesive-backed sandpaper applied to one part to sand the other. Now switch the sandpaper to the opposite piece and continue sanding. Repeat, moving the sandpaper back and forth between pieces, and the curves will gradually get closer and more identical. This works only on uniform curves with a single radius—not complex curves with changing radii—but it's quick and easy.

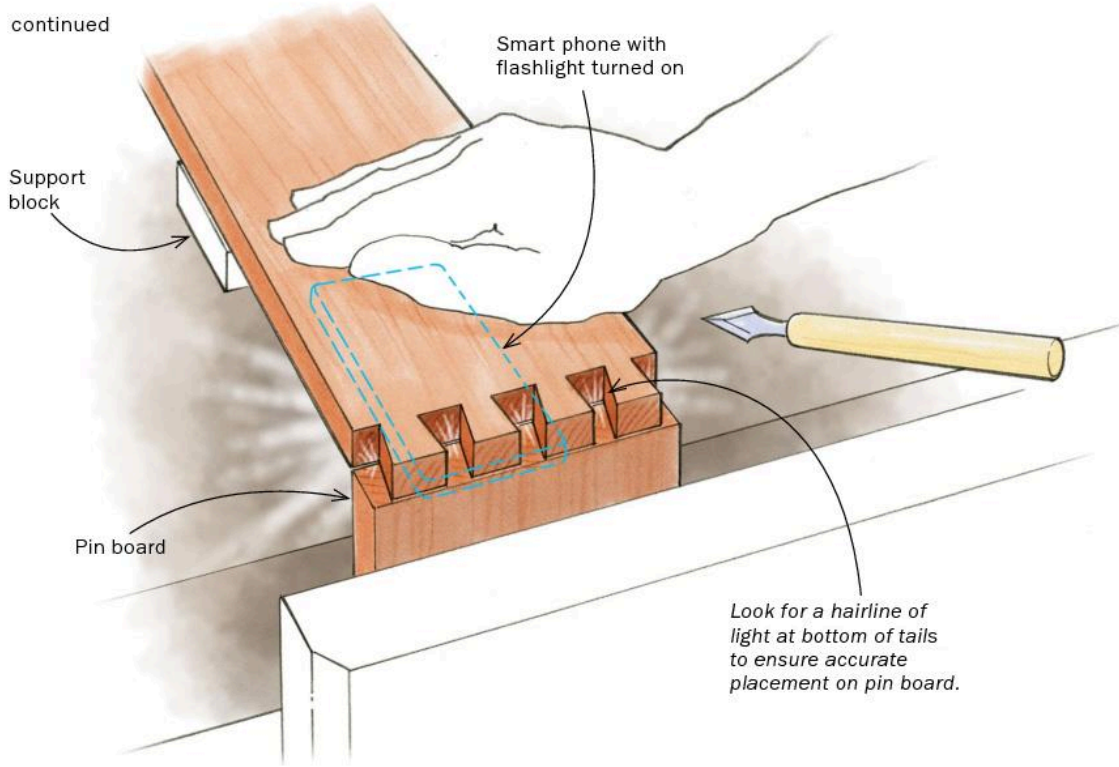
—CRAIG THIBODEAU, San Diego, Calif.



Smart-phone flashlight guides dovetail transfer

I cut tails first when dovetailing, and I find it tricky to align the tail board precisely over the pin board when transferring the layout from one to the other. So I started using the flashlight on my smart phone to ensure even placement. I lay the phone flat on the bench behind the pin board, where it can shine straight up. Then I place the tail board on top as usual, and simply look for an even amount of light at the bottom of the tail sockets. I get perfect alignment every time.

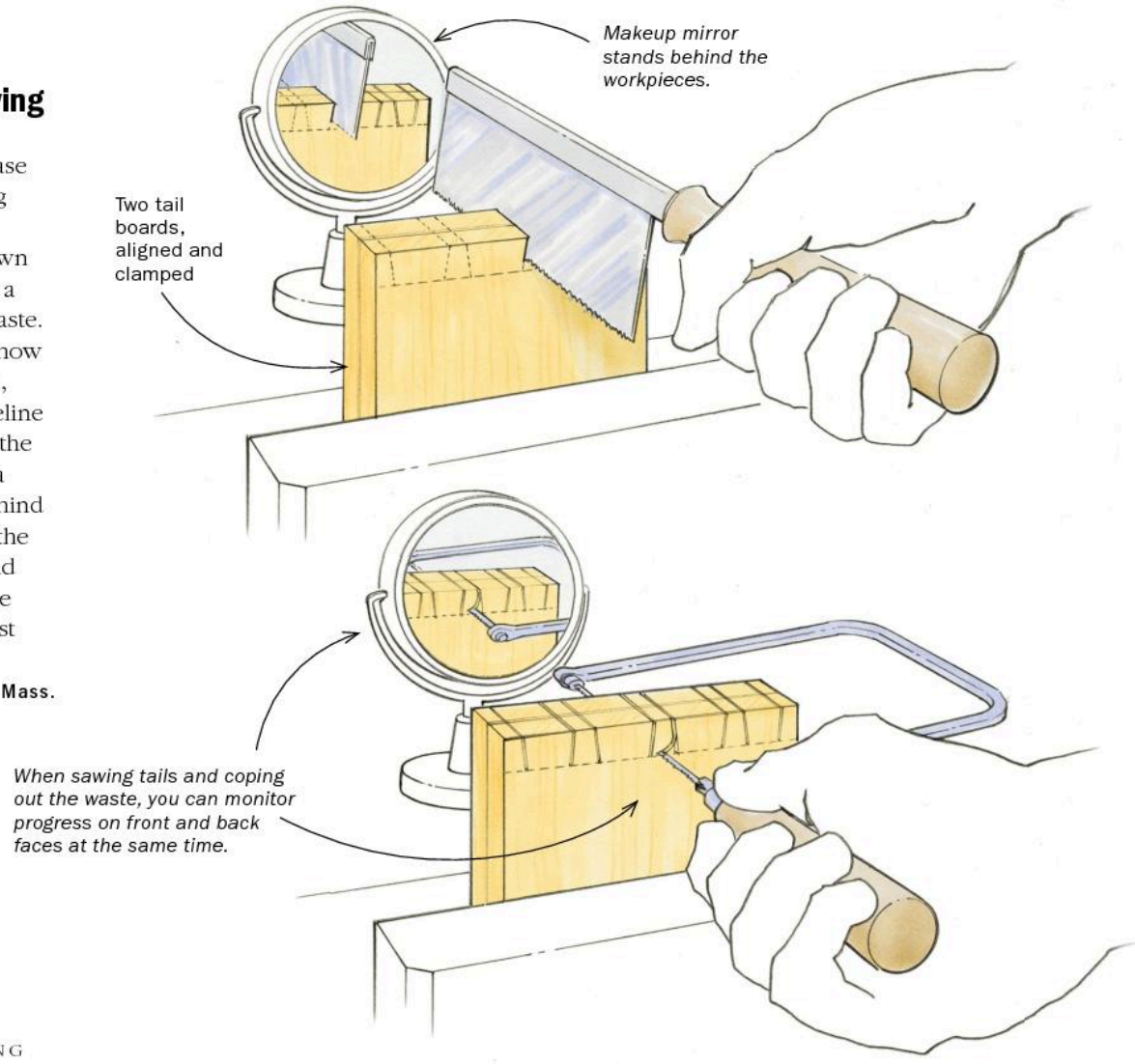
—OSCAR VILLAREAL, Orange, Calif.

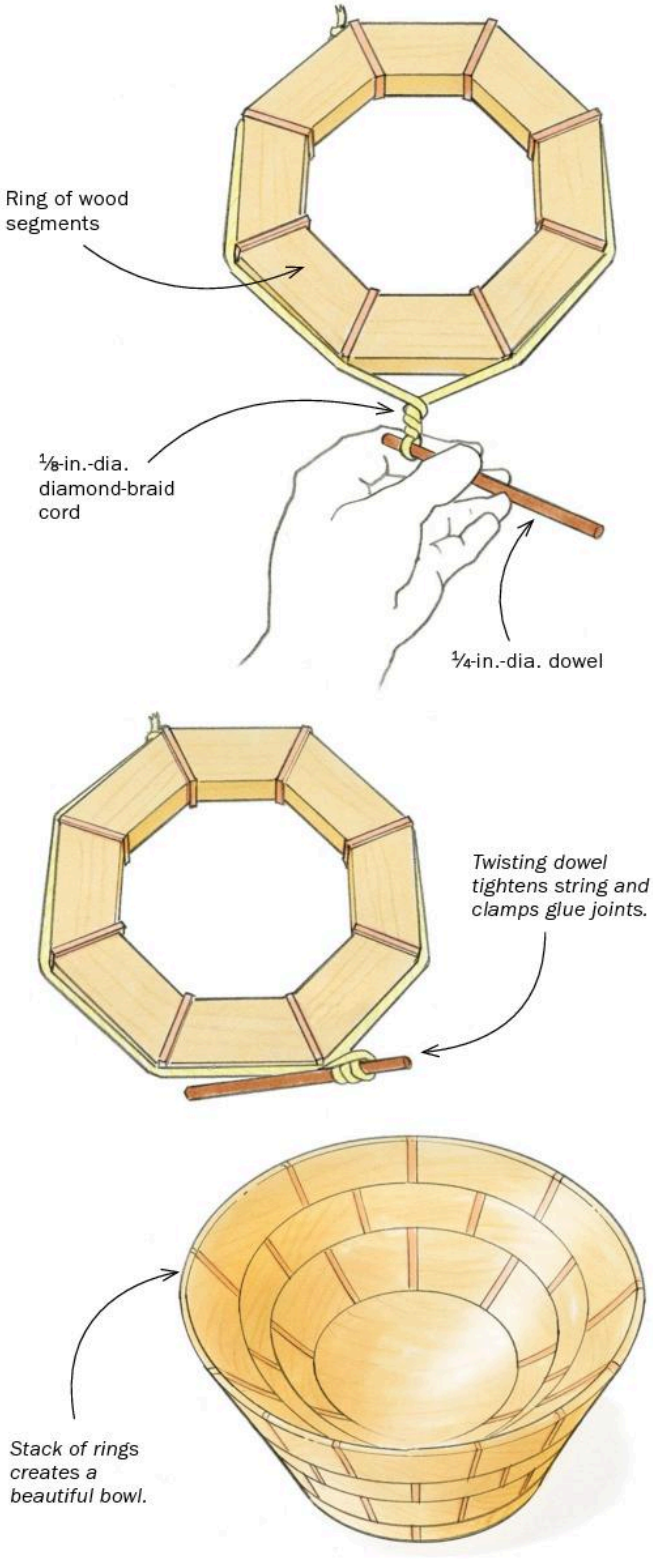


Makeup mirror keeps dovetail saw from straying

When I cut dovetails, I increase my efficiency by gang-cutting them, clamping two boards back to back while I saw down the sides of the tails and use a coping saw to remove the waste. This means that one of the show faces is facing away from me, and I have sawn past its baseline occasionally, especially with the coping saw. So now I place a bathroom makeup mirror behind the boards so I can monitor the saw on both boards, front and back. Since I started using the small mirror, I haven't cut past any baselines.

—DANNY SPATZ, Newton, Mass.





Make a tourniquet to clamp segmented rings

Rather than purchasing a number of band clamps or big hose clamps for assembling segmented rings for the bowls I turn, I use ⅛-in.-dia. cord, twisted tight with a ¼-in. dowel. I use a diamond-braid cord with a 40-lb. working load, available at home centers. The cord and dowels are cheap, so I can clamp an entire series of rings at once.

—AL WEINZAPFEL, Evansville, Ind.

Planer by Grizzly
Model: G0832
$355

MACHINES

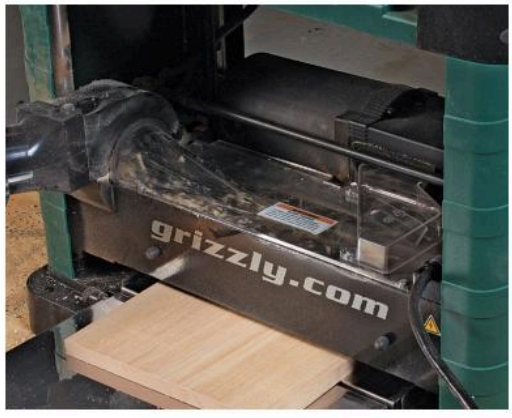
Benchtop planer with built-in dust collection

GRIZZLY'S NEW G0832 PLANER is a solid performer—and its price is hard to beat. This 13-in. model's three cutters left very smooth surfaces on the several wood species I tested. The minor machine marks that were left behind were easily removed with sandpaper or a handplane. Plus, the disposable blades, which are indexed for simpler changes, are reversible, doubling their lifespan. Two other helpful features are a depth-of-cut indicator and an adjustable depth stop.

The good results I got did require some strategy, though. While snipe was nearly nonexistent in most wood types with the depth of cut locked, I got a significant amount on the first and last 1½ in. if it wasn't locked. And although the recommended maximum cutting depth is ⅛ in., I found passes of 1/16 in. were much better; for wide boards 1/32 in. was best. Also, I had trouble getting an even cut on the wide board I started with. I ended up removing the cutterhead gibs to file and sand the rough castings so the blades were held more evenly.

This planer comes with built-in dust collection. A blower motor helps direct planer chips out of the 2½-in. dust port and into the included collection bag. This setup collected the vast majority of the dust chips, and only some blew back toward the front of the machine.

—Kelly J. Dunton is a furniture maker in Terryville, Conn.



Thar' it blows. *The built-in dust blower did a great job directing chips up the clear chute (right) and to the included collection bag (above).*

Easy repeatability. *The machine's adjustable depth stop lets you lock in stock-thickness settings from ⅛ in. to 1¼ in.*

Photos: John Tetreault

YOUR WOODWORKING EXPERTS

QUICKSCREWS INTERNATIONAL CORPORATION 19 87

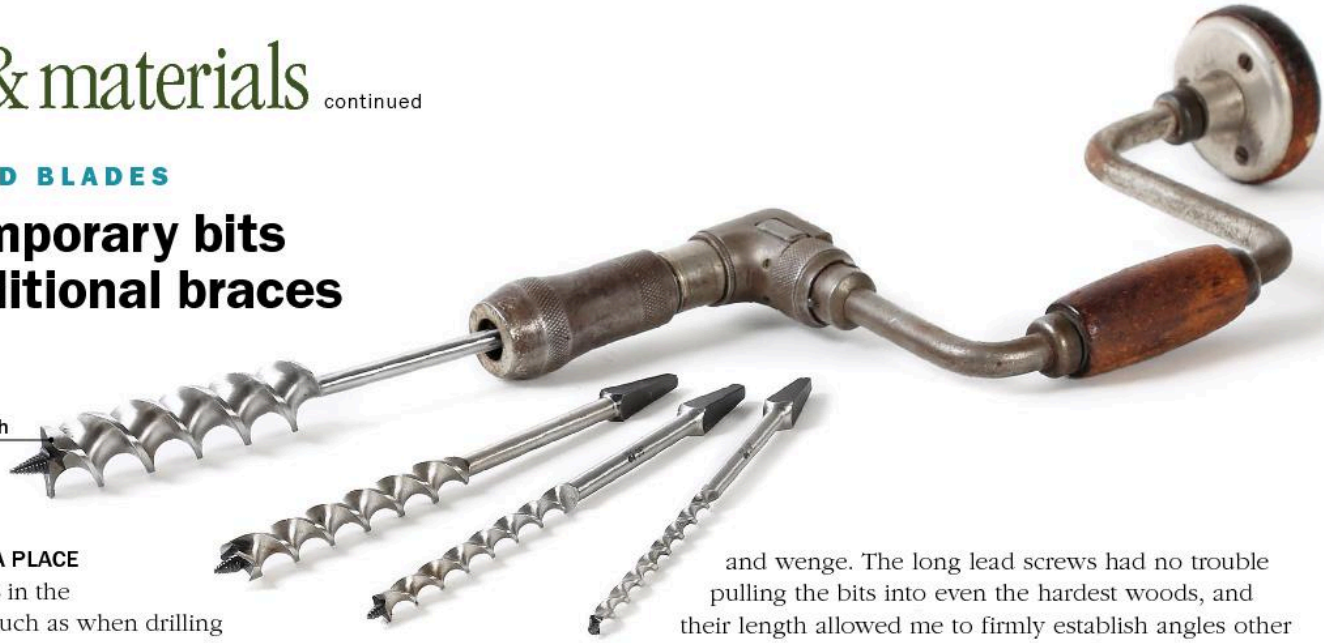
VIEW THE ENTIRE GUIDE ONLINE

WWW.QUICKSCREWS.COM/FASTENER-GUIDE

800.743.6916

■ BITS AND BLADES

Contemporary bits for traditional braces



Jennings Pattern auger bits by Fisch
$33 to $45

THERE IS STILL A PLACE FOR BRACE BITS in the modern shop, such as when drilling angled holes in chairmaking. But searching through the rusty offerings in antique shops to find auger bits suitable for fine furniture making is a real challenge. Enter Fisch's square taper shank augers designed for two-jaw braces, offered as part of a partnership with Tools for Working Wood.

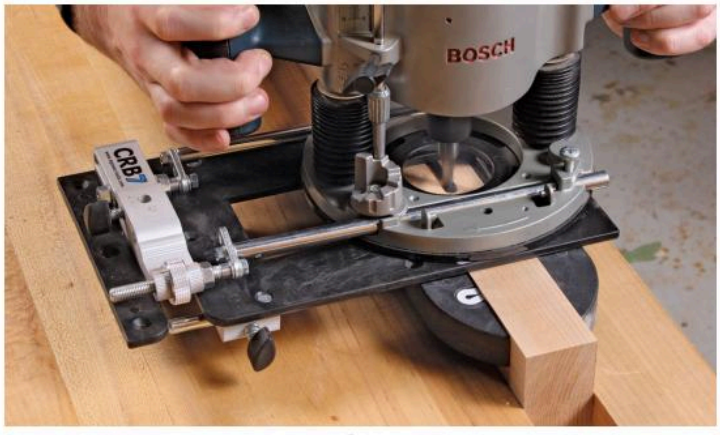
These bits come sharp and ready to use in sizes from ¼ in. up to 1 in. They have a fine lead screw that is designed for use in hardwoods, but I tested them in a variety of woods: white and yellow pine, white oak, maple, mahogany, walnut, and wenge. The long lead screws had no trouble pulling the bits into even the hardest woods, and their length allowed me to firmly establish angles other than 90° before the spurs contacted the surface—not always the case with other auger bits.

The spurs themselves created very clean entry holes, though there was occasionally some minor tearout in the pines. The cutting lips and spirals created and spat out shavings with great efficiency, helping the bits pull themselves through the stock, meaning there was far less need to clear chips than usual.

—Bill Pavlak is a journeyman cabinetmaker in the Anthony Hay Cabinet Shop at Colonial Williamsburg.

■ ACCESSORIES

MPower offers adjustable guide for its router base



Router guide by M Power
Model: CRB7MHLF
Guide and base: $180
Guide alone: $70

HANDHELD ROUTERS ARE USEFUL IN ANY SHOP, even those with router tables. My professional shop has eight loaded with common bits and ready to go. But routing accurate mortises or channels with a single fence can be challenging. This is where MPower's CRB7MHLF shines. It's an attachment for the company's CRB7 router base (Tools & Materials: "Router base does the work of many jigs," *FWW* #241).

The attachment's heart is its two jaws. One is fixed to the base using screws supplied in the kit. The second is movable, and thanks to locking knobs and a large microadjust wheel, setup is fast and accurate. The guide was particularly easy to set up for a groove by just resting the fixed jaw on the workpiece and sliding the adjustable jaw into place, much like a clamp. The CRB7 base has a built-in adjustment mechanism that lets you position the router bit once the CRB7MHLF guide is in place.

The guide helps cut mortises for hinges and locks accurately and safely, especially when you use stop blocks. The jaws have threaded inserts on each face to allow for a larger auxiliary fence, increasing safety and accuracy. It can also help you rout the faces of panels up to 7 in. wide, so it's useful for fluting.

—Greg Pilotti runs a custom furniture-making shop in Parkesburg, Pa.

■ POWER TOOLS

Nailer leaves mini holes

Brad nailer by Grex
Model: H850LX
$268

THE GREX H850LX 21-GAUGE NAILER combines some of the best features of a 23-gauge pinner and an 18-gauge brad nailer. Technically, it's a brad nailer since the nails have heads, but they're mini compared with those on an 18-gauge nail, so they leave really tiny holes, closer to a 23-gauge.

It can handle nails from ⅜ in. to 2 in. long, similar to an 18-gauge nailer, so you can use it instead of an 18-gauge in a lot of situations and save time on filling holes and final touch-up. It's perfect for nailing outside miters on crown, base, and picture moldings, as well as attaching that type of trim to cabinetry. However, I'd still rely on an 18-gauge when attaching trim to drywall.

The nailer fires like a typical 18-gauge by depressing the safety tip, but has almost zero recoil, like a 23-gauge. The H850LX is solidly built with an all-aluminum housing, so at 3.6 lb. it's rather heavy. There's a nifty removable edge guide that slides and locks onto the base of the tool, with a ruler on one side. This is helpful when nailing, say, 2-in. face frames to a ¾-in. cabinet part, especially when the offsets vary. The nailer also includes several features that are fairly standard now on higher-end guns: removable no-mar rubber tip, auto-lockout mechanism to prevent firing blanks, a reversible belt hook, and a swiveling air coupler.

The H850LX 21-gauge won't supplant my 18-gauge nailer, but it could make my 23-gauge pinner obsolete.

—Tony O'Malley is a furniture and cabinet maker in Emmaus, Pa.

■ MATERIALS

Innovative inlay material takes color

Inlay material by Easy Inlay
$13 to $20

EASY INLAY HAS INTRODUCED TWO TYPES of inlay material, crushed mother-of-pearl and crystal calcite. The mother-of-pearl comes in flake and fine grades, and the crystal calcite in coarse and fine. Regardless of the grade, the materials work well as inlay, take finish well, and are a good way to add color to projects, especially since both can be dyed. This ability is no surprise with the crystal calcite, but you can't alter the color of traditional mother-of-pearl, which makes the Easy Inlay product special. I tinted some with TransTint and shellac, per the instructions, and ended up with colors that were quite bright. You can also combine the two materials to create patterns with varying color and shimmer.

I found the coarse crystal calcite pretty chunky. And between the two mother-of-pearl grades, the fine had a more even shimmer and, when used with smaller details, required less secondary filling with cyanoacrylate glue, a necessary practice with inlay to fill voids after the first gluing. Regardless of the material or grade, though, I found at least one extra gluing necessary. To my eye, the flake mother-of-pearl lacked some of the subtle shimmer I typically get from other mother-of-pearl materials: I suspect this is due to the higher volume of glue required to hold the small particles together in the inlay groove.

—Craig Thibodeau is an inlay specialist in San Diego.

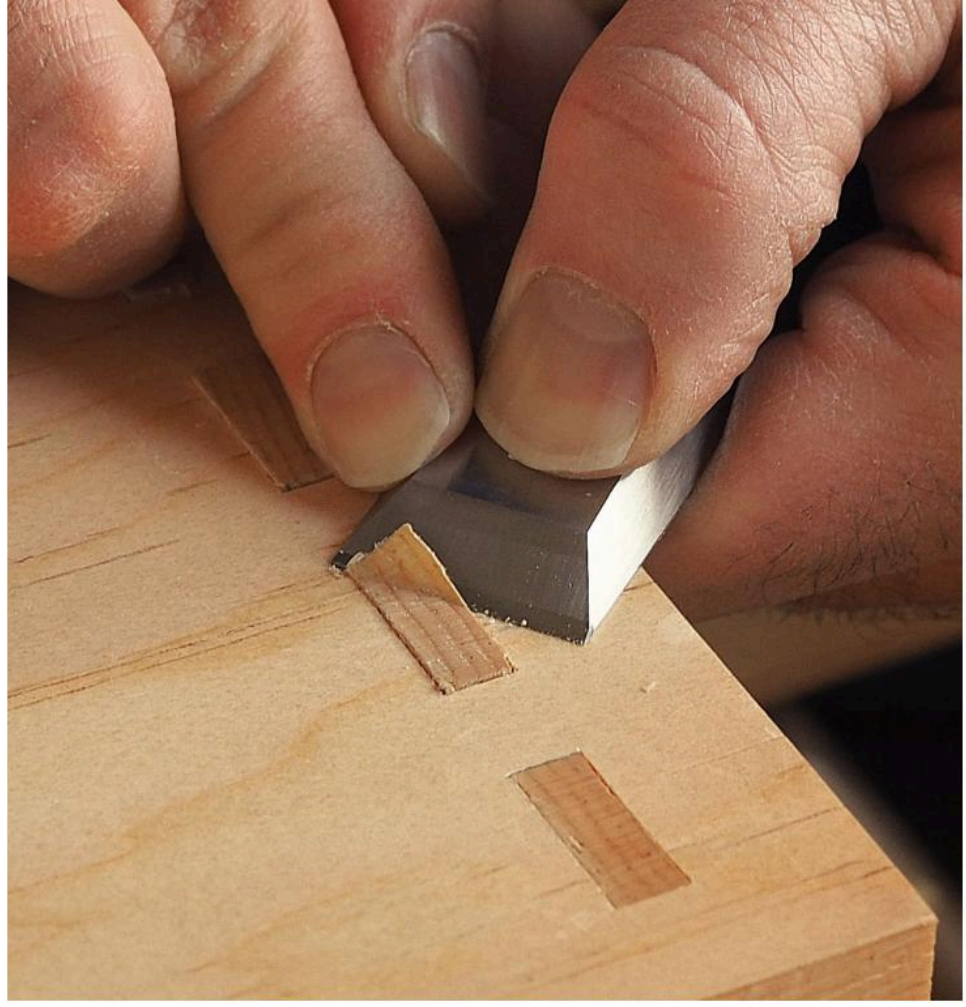
Get a big chisel for little work

A 1-IN. CHISEL IS A GREAT CHOICE FOR PARING AND CUTTING SMALL-SCALE JOINERY

BY MATT KENNEY

I have a 1-in.-wide chisel that I could not work without, because it helps me achieve the level of precision demanded by the small, delicate boxes and cabinets that I make. The chisel takes and holds a very keen edge and leaves a great surface behind. It has a nice, well-balanced heft. It's wide enough to hold comfortably by the blade, near the bevel, which gives me far greater control over the chisel than holding it by the handle. More important than these individual qualities is that taken together, they form a tool that just works. I never have to struggle against any shortcomings. I can work more intuitively, and as a result, more efficiently and accurately. It's a joy to use.

Photos: Michael Pekovich



Perfect pare. *When you need to trim flush a peg or through-tenon (right), there's no better tool than a wide chisel. Place the back of the blade on the surface to remove the last bit of wood. This guarantees the peg or tenon will be perfectly flush, and you won't cut into the surrounding area. A wide chisel also provides great precision for paring the shoulders of a tail board (bottom right). Use the gouge lines to guide a narrow cut, then use that surface as a guide for the next one. Repeat across the shoulder.*

I use the chisel almost exclusively for paring. Sometimes this means using a jig to create a 45° miter on the side of a small box or bit of molding. At other times I use it to cut angles on the ends of the delicate pieces that make up a kumiko pattern. It's also a great tool for flush trimming, and for paring the outside shoulders on tail boards when cutting dovetail joinery. One thing I never do is whack it with a mallet. Sure, it could be used to chop out waste from a dovetail or mortise, but for me it's a refined tool, reserved for precision work.

Use it to cut and clean joints

My 1-in.-wide chisel is heavy, but this is a benefit, not a problem. Because the majority of the weight is in the blade, the chisel is easy to balance when held by the blade with both hands. The handle doesn't droop, so it's easy to keep the blade pressed firmly down on the reference face of a miter or kumiko jig, or when paring a part flush.

However, weight isn't the only reason this chisel is great for paring. Its width makes it more stable than narrower chisels. As a result, this is an excellent tool for paring one part flush to another. Place the chisel flat on the reference surface, press it down with your off hand, and then push the chisel into the part you are trimming flush. This works best when there is very little material left to pare. If there's 1/16 in. or more above the surface, then pare just a bit at a time. I do this by pressing the chisel down and then rotating the blade into the cut. You can accurately remove between 1/16-in.- and 1/8-in.-wide swaths of waste with this technique.

NEW PRESENTERS • NEW CLASSES

Fine WoodWorking 2018 LIVE

Step into the pages of *Fine Woodworking* with small-group master classes, engaging presentations, and hands-on demonstrations.

Take your craft to the next level

and enjoy a weekend of camaraderie with woodworkers who share your passion. Fine Woodworking LIVE 2018 features a full line-up of new classes plus new presenters joining our returning experts. Don't wait – last year's event sold out!


Peter Follansbee


Teri Masaschi


Mike Pekovich


Tim Rousseau


Marc Spagnuolo

Join us at Southbridge Hotel & Conference Center

Southbridge, Massachusetts • April 20-22, 2018

Presented by RIKON

Register at FineWoodworkingLive.com

Cut small miters. *Kenney makes very small boxes. Some have sides just 3/16 in. thick, and 1½ in. wide and long. That's too small to miter with a tablesaw, but a wide chisel and an accurate jig allow him to cut the miter very quickly. The smooth surface left by the chisel results in a joint so tight it disappears.*

Quick kumiko. *The tiny pieces that fit together to create patterns inside a kumiko frame must have dead-accurate angles cut on their ends. A sharp, wide chisel can cut these angles very quickly and accurately. The key is to keep the chisel's back flat on the paring guide for the final pass.*

Holding the chisel by the blade gives me excellent control. I wrap my right hand around the blade, putting my thumb on top, just behind the bevel, and bracing my fingers, which are under the blade, against the jig or workpiece. I then use my thumb to push the chisel into the cut. If my left hand isn't acting like a hold-down on the workpiece, I use it to press the blade down. In addition to the precision I can achieve with this paring technique, the grip, with my hand stopped against the jig or workpiece, prevents the chisel from shooting off out of control and perhaps cutting my other hand or damaging the jig or workpiece.

As much as I like to use this chisel with the blade in my hand, it's not always practical. Paring the half-pin shoulders on a tail board, for example, would be difficult with it held that way. However, I still want as much control as possible over the cut, so I use my left hand to hold the blade just behind the bevel. It's pinched between my thumb on top and my other fingers beneath. Again, my fingers are pressed against the workpiece. I wrap my right hand around the handle to guide the cut and push the blade into the waste. This two-handed grasp allows me to precisely control where the chisel cuts and how thick the shavings are. □

Special projects editor Matt Kenney is the author of 52 Boxes in 52 Weeks, which will be on sale in May *(The Taunton Press, 2018).*

Rococo distilled

BY CURTIS ERPELDING

Simply put, French Rococo is fancy stuff. By the early 1700s it was seen in all forms of artistic expression in France, including painting, sculpture, and interior design. Rococo furniture, grand and highly decorative, often incorporated asymmetry, curves, and gold finishes. To modern eyes Rococo design can seem luridly overdecorated—plastered with gilding, flamboyant carving, and all kinds of competing squiggly forms. However, beneath all the eye candy often hides a sophisticated and stunningly beautiful form. Lines curve continuously and when a line does break, its continuation is often a reversal, concave to convex, like a musical counterpoint. Line, proportion, and overall form create harmony.

This version of a Rococo slant-front desk is clearly not an exact reproduction. Rather, it's an attempt to modernize and personalize what appeals to me, both in terms of design and technique.

As far as the design goes, I pared down the bells and whistles of an original Rococo desk, limiting the flair to two elements, the parquetry pattern and the tamboured front. While this desk is still ornate, it is

Photos: Curtis Erpelding

The basic form. *Erpelding stayed true to the form of a Rococo desk, making a relatively small piece characterized by refined shapes and details. However, he replaced the solid slant front that dropped down into the writing surface with a tamboured cover (above). A writing surface slides out when the tambour is open (p. 30).*

Restricted embellishment. *Rather than decorate every surface, Erpelding focused on the parquetry and the tamboured front. The lattice pattern uses quartered kingwood and figured kingwood. At the edges, quartered figure cut at a diagonal frames the lattice and flows down the legs.*

A nod to the period. *Erpelding used kingwood and satinwood for their color and contrast but also as a salute to the period of inspiration, the 18th century. When the lid is open, it reveals a complex interior with hidden compartments.*

understated in comparison with the originals.

There's a certain irony in the idea of using digital technology to build a piece of furniture that is steeped in old-world inspiration and takes a form that may become extinct given the use of laptops, tablets, and smart phones. But use digital technology I did, and lots of it.

CAD (computer aided drawing) and CAM (computer aided machining—in this case a CNC router) influenced nearly all aspects of the design and build.

In the past I have often built full-scale mockups. A mockup works great for establishing scale and proportions and nothing beats it in giving a sense of the volume that a piece will occupy. However, because of the difficulty of mocking up complex curved surfaces, and because of the speed with which options can be explored and changes made, I decided to rely exclusively on 3-D CAD drawings and renderings.

One place where CAD was integral was designing and laying out the parquetry patterns. Software enabled me to take the curved 3-D surfaces of the desk I had drawn and unwrap them onto a two-dimensional plane. I could then create the parquetry design on a flat surface knowing that it would fit perfectly when folded back over the 3-D contour. □

Curtis Erpelding makes furniture in Port Orchard, Wash.

Craftsman Rocker

Classic style meets comfort in this sturdy oak rocking chair

BY MICHAEL PEKOVICH

Photo, this page: Michael Pekovich

Designing a chair can be a tough thing to get right, especially a rocking chair. So I used an old Stickley-style flea-market find that's been parked in front of my woodstove for a number of years as a starting point. Its wide, low stance and deep cushion make it the most comfortable rocker I've sat in. My goal was to clean up some of the lines and proportions of the original, but make sure to keep all of its comfort intact.

The construction of the chair is straightforward, but there are curves and angled joinery that add a little challenge. Fortunately I found a way to simplify both tasks.

Start with the legs

The front legs are straight, but the rear legs take a bit of a turn. It's important to get their shape right for the rest of the project to go easily. Start by making templates for the legs. I used ¼-in. MDF. Draw the joinery on the templates to allow them to also serve as story sticks.

Trace out the rear leg profile on the stock and rough-saw the shape on the bandsaw. To clean up the lower front face of the legs at the exact angle, I made a jig for the tablesaw. The back faces are not as critical, so I just cut close to the line on the bandsaw and cleaned up with a block plane, scraping the inside corner where the block plane couldn't reach. With the legs shaped, cut the mortises. If you use a hollow-chisel mortiser, place a wedge under the rear leg to keep the front face horizontal when cutting the side rail mortises. For the mortises on the inside face, be sure to register the front of the leg against the fence.

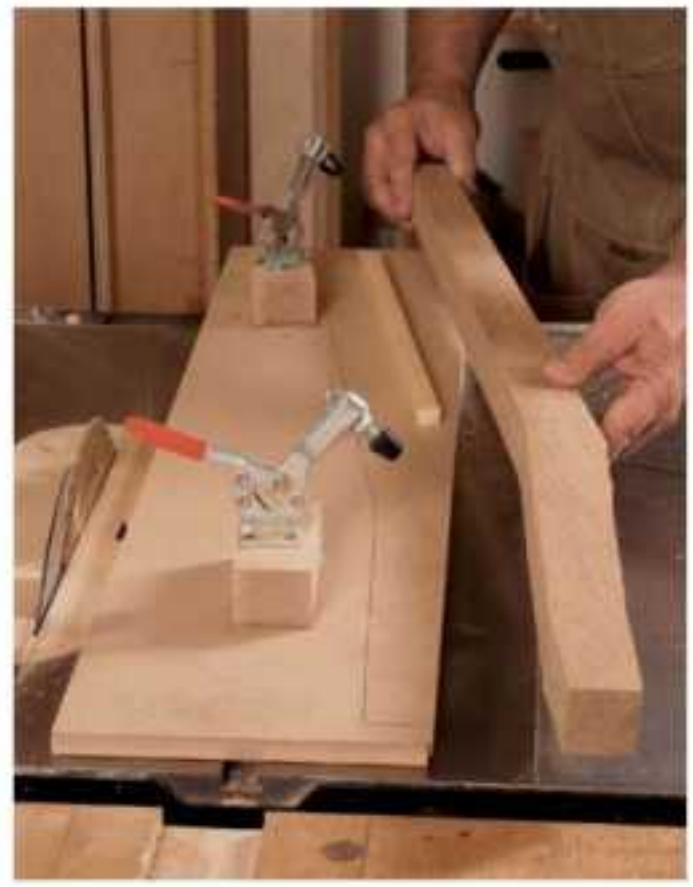
In addition to mortises for the seat rails, the front legs get a tenon at the top for the armrest. The outside faces are grooved for the corbels that support the armrests.

Wedge simplifies angled tenons

Angled joinery can be a headache, but if you make a wedge equal to the angle of the side rails, you can use it to cut all of the angled tenons without tilting a blade or

SHAPE THE REAR LEGS

Templates guide the way. *Pekovich begins by making templates of the front and rear legs including the joinery locations. To trace out the rear leg profile, he registers the top front of the leg against the jointed edge of the blank, and bandsaws out the rough shape.*



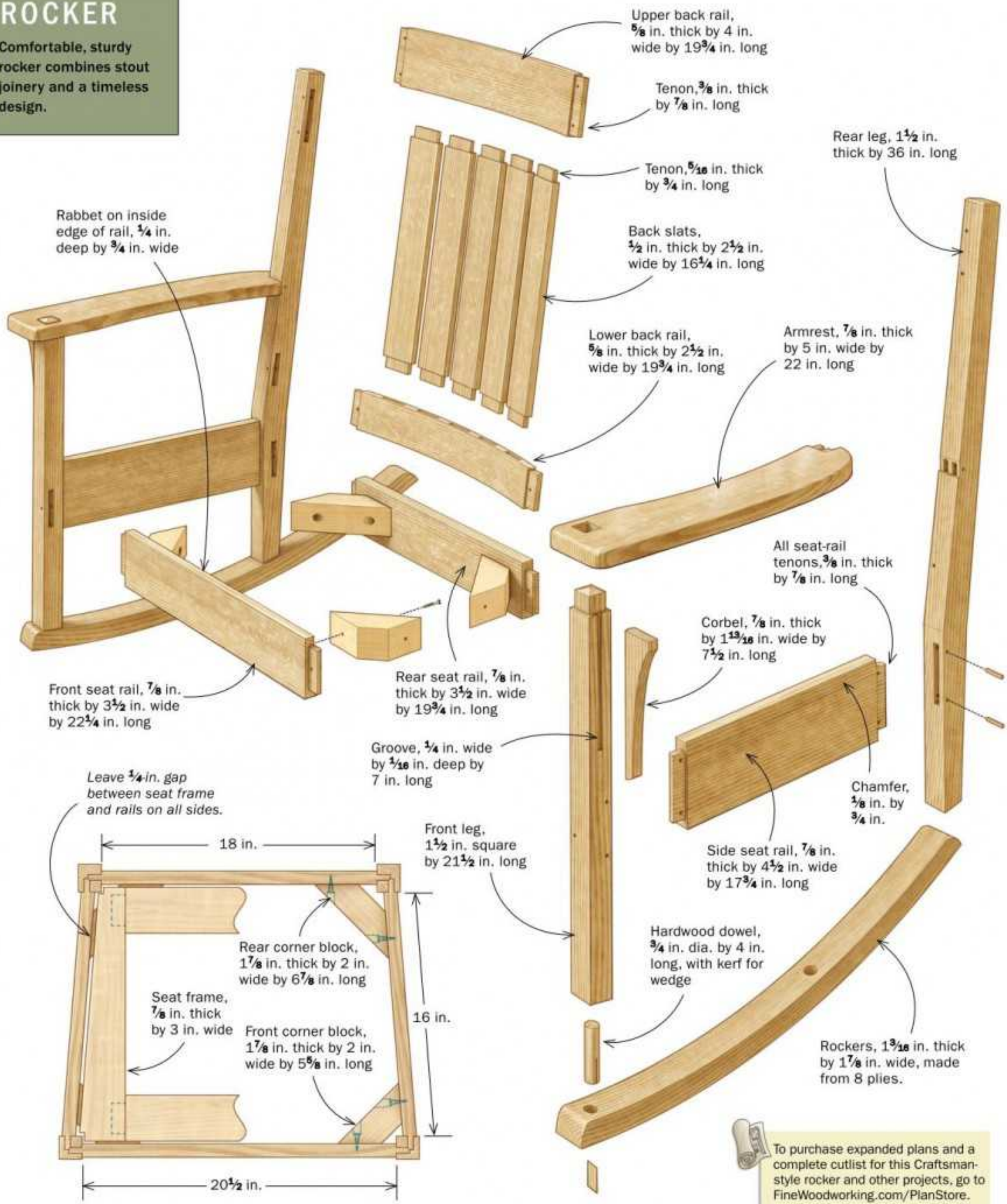
Finish the front profile. *To clean up the lower front face of the leg, Pekovich uses a tablesaw jig. The jointed upper front face of the leg rides against the jig's angled fence. The back of the leg is cleaned up with a block plane and scraper.*

Register off the front face when mortising. *This will ensure that the chair comes together square. A wedge cut to match the taper of the leg helps to clamp the leg in place.*

Photos, except where noted: Rachel Barclay

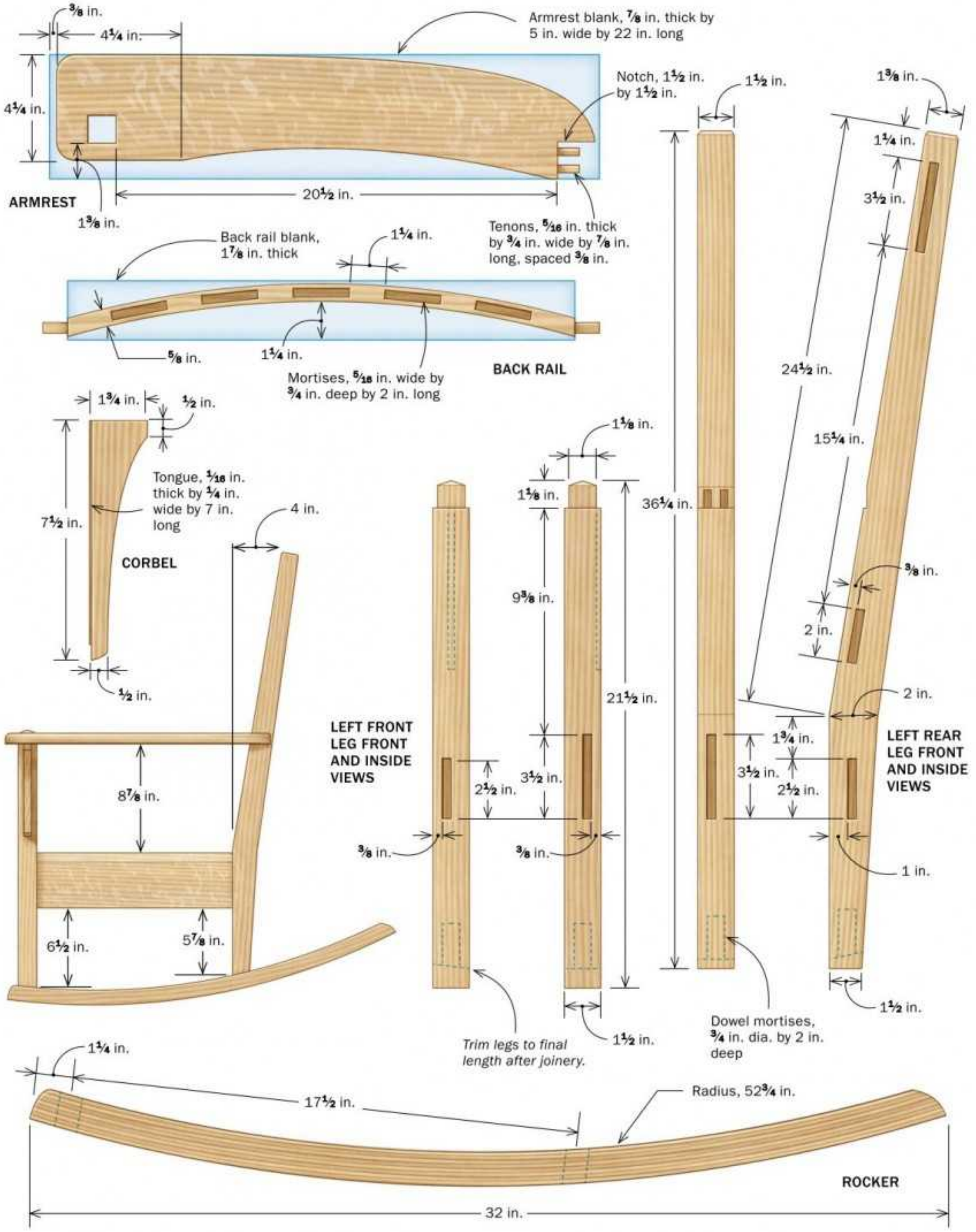
A CLASSIC ROCKER

Comfortable, sturdy rocker combines stout joinery and a timeless design.



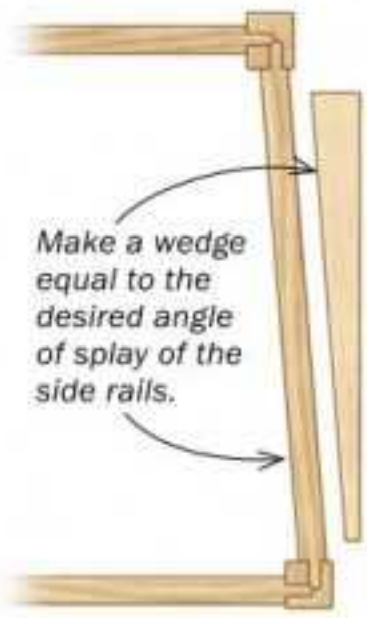
To purchase expanded plans and a complete cutlist for this Craftsman-style rocker and other projects, go to FineWoodworking.com/PlanStore.

Drawings: John Hartman


3/8 in.
4 1/4 in.
Armrest blank, 7/8 in. thick by 5 in. wide by 22 in. long
4 1/4 in.
Notch, 1 1/2 in. by 1 1/2 in.
1 1/2 in.
1 3/8 in.
ARMREST
20 1/2 in.
1 3/8 in.
Tenons, 5/16 in. thick by 3/4 in. wide by 7/8 in. long, spaced 3/8 in.
Back rail blank, 1 7/8 in. thick
1 1/4 in.
5/8 in.
1 1/4 in.
Mortises, 5/16 in. wide by 3/4 in. deep by 2 in. long
BACK RAIL
1 3/4 in.
1/2 in.
Tongue, 1/16 in. thick by 1/4 in. wide by 7 in. long
7 1/2 in.
CORBEL
4 in.
1/2 in.
8 7/8 in.
6 1/2 in.
5 7/8 in.
1 1/8 in.
1 1/8 in.
36 1/4 in.
9 3/8 in.
21 1/2 in.
LEFT FRONT LEG FRONT AND INSIDE VIEWS
2 1/2 in.
3 1/2 in.
3/8 in.
3/8 in.
1 1/2 in.
1 3/8 in.
1 1/4 in.
3 1/2 in.
24 1/2 in.
15 1/4 in.
3/8 in.
2 in.
2 in.
1 3/4 in.
3 1/2 in.
2 1/2 in.
LEFT REAR LEG FRONT AND INSIDE VIEWS
1 in.
1 1/2 in.
Dowel mortises, 3/4 in. dia. by 2 in. deep
Trim legs to final length after joinery.
1 1/4 in.
17 1/2 in.
Radius, 52 3/4 in.
ROCKER
32 in.

A WEDGE FOR ANGLED TENONS

A wedge that equals the splay angle of the side rails helps cut the side seat rails to length and cut the angled tenons on the ends.



Cut the side rails to length. *Screw the wedge to the crosscut sled (above) to trim the side rails to length at the proper angle. Cut one end, then add a hook stop to cut the rail to final length (right).*

Combine the wedge with a spacer to cut the angled tenons. *To cut the first cheek, clamp the rail against the wedge in a tenoning jig. Pekovich uses a ¼-in.-wide box-joint blade set to cut the cheek and shoulder in one pass (left). Then he adds a spacer next to the wedge to cut the second cheek (above). The spacer should be the thickness of the desired tenon plus the kerf of the blade.*

angling a miter gauge. Start by cutting the side rails to length with the wedge screwed to the crosscut sled so that the rail ends are angled to match the splay angle. Then combine the wedge with a tenoning jig to cut the tenon cheeks. Add a spacer block to cut the second cheek. The width of the spacer should equal the width of the mortise plus the sawblade kerf. Finish up by cutting the tenon to width with a handsaw and chiseling the end shoulders.

Back rails start as thick blocks

Before moving on to the rest of the joinery, you'll need to make the back rails and the rear seat rail. All three parts are the same length, as are the tenons. This ensures that the back assembly comes together square without gaps at any joint. The only difference is that the upper and lower back rails, because they'll be cut to a curve, start out as thicker blocks. Cut the tenons in all of the parts before sawing the back rails to their curved profile.

If you're careful at the bandsaw, the curves should clean up easily with a spokeshave and scraper. Complete the back rails by mortising them for the back slats. I screwed a set of curved jaws to my mortiser fence to make the job easier. Dry-fit the back rails to the legs to determine the slat length and tenon the slats to fit.

The last task is to cut the front seat rail to length and tenon

Cut the tenons before the curves. *The same blade and spacer used for the seat rail tenons are used for the back rails as well.*

Saw and smooth the curves. *A steady hand and sharp blade at the bandsaw should leave just a little waste to clean up. Pekovich uses a spokeshave followed by a card scraper to quickly smooth away the bandsaw marks.*

Dry-fit and measure for the front rail. *It's common for the angle of the side rail tenons to differ slightly from the plan. If that happens, it will throw off the length of the front rail. To account for any variation, wait until the rest of the chair parts are cut and dry-assembled before measuring and cutting the front rail to length.*

Mortise the back rails for the slats. *If you have a mortiser with a sliding table, a pair of curved clamping cauls makes the job easier. Draw a centerline at each mortise location on the back rail and align it to a centerline on the cauls. Then shift the table left and right.*

ADD THE ARMRESTS

With double tenons at the back and a through-mortise and tenon at the front, the armrests add extra insurance against racking.

Dry-fit to locate the notch in the rear leg. *To simplify the double-tenon joinery at the back of the armrest, Pekovich first cuts a notch in the leg that's perpendicular to the armrest. Rest a straightedge on the shoulder of the tenon on the front leg and mark the bottom of the notch on the rear leg.*

the ends. It's best to save this for last so that you can dry-fit the back assembly, side rails, and front legs to measure for the front rail length. If there was any error in your wedge angle, you can adjust the length of the front rail so that all the joints come together without gaps at the shoulders.

Add the armrests

The armrests attach to the rear legs with a double tenon. The leg is angled where they meet, so the first step is to rout a notch in the leg perpendicular to the armrest. This lets you cut the tenons with square shoulders. To locate the notch, dry-fit the chair and rest a straightedge on the tenon shoulder, then mark where it intersects the rear leg. I used a simple routing jig and pattern bit to cut the notch. The key is to add a wedge to the bottom of the jig to rout the notch at the correct angle. Next, cut the mortises at the notch location and cut the double tenons using a crosscut sled at the tablesaw. The tenons are shouldered on the top edges only. Clamp a piece of MDF along the baseline and use a bearing-guided straight bit to rout the shoulders.

The next task is to locate the mortise on the armrest for the front leg tenon. Clamp a straightedge to the inside face of the rear leg and measure the distance between the straightedge and the inside cheek of the tenon. Then measure between the notch

Notch the rear legs. *The routing jig has a cutout equal to the thickness of the armrest. A wedge attached to the bottom creates a flat that is parallel to the front leg. The jig is clamped to the leg and a bearing-guided straight bit is used to rout the notch.*

Mortise the rear legs for the armrests. *Place a wedge under the rear leg so that the flat of the notch is perpendicular to the bit. Cut the bottom end of the mortises flush with the bottom of the notch. The top ends are inset from the top of the flat to allow for a shoulder.*

Tenon the armrests. *After laying out the tenon spacing on the armrests, cut them at the tablesaw using a crosscut sled. Define the tenon walls first, then slide the armrest over to remove the waste.*

Shoulder the tops of the tenons. *Use a bearing-guided straight bit to cut the shoulders. To guide the cut, notch the corner of a piece of MDF and clamp it along the baseline of the tenons. The side of the notch prevents you from inadvertently routing into the armrest.*

Measure off of the rear leg to locate the armrest mortise.

Pinpoint the mortise for the front leg tenon. *To locate the mortise side to side, clamp a straightedge to the inside face of the rear leg and measure between it and the inside cheek of the tenon. Then measure between the notch in the rear leg and the rear cheek of the tenon to locate the mortise front to back.*

Drill and chop the mortise. *At the drill press, remove most of the waste. Then chop to the scribe lines working halfway through from each face.*

in the leg and the rear cheek of the tenon. This will give you the location of those two mortise walls on the armrest. Use a marking gauge to lay out the mortise on both faces of the armrests. After drilling and chopping the mortises, cut the armrests to their final profile.

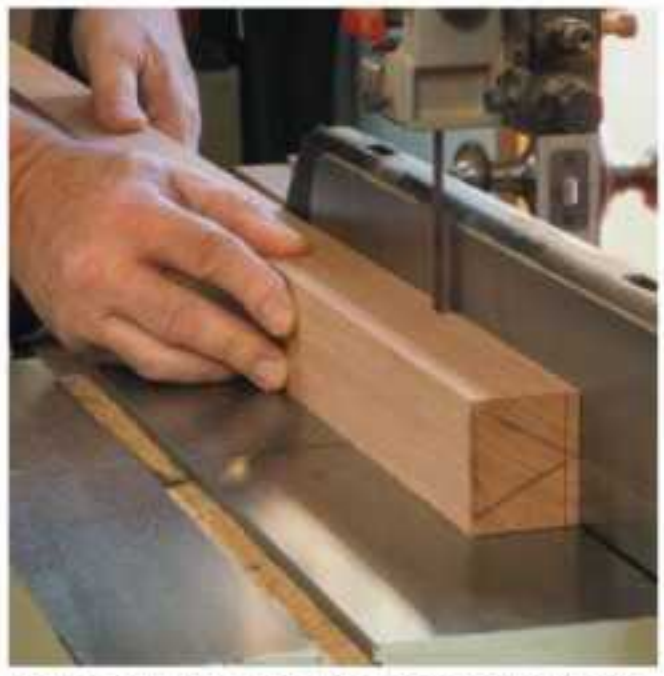
Get rocking

The last task is to outfit the chair with the rockers. Rather than sawing them from solid stock like the back rails, I created the curves with a bent-lamination technique. Start with thick stock a few inches over length and rip it into strips roughly 3/16 in. thick, jointing the face between cuts. Make a triangle on the stock before you start; this

Shape the armrests. *Cut out the profile at the bandsaw, then shape the edges with a block plane and files. The front of the armrest can be rounded slightly for comfort. Grip it and let your hand tell you how you need to shape it.*

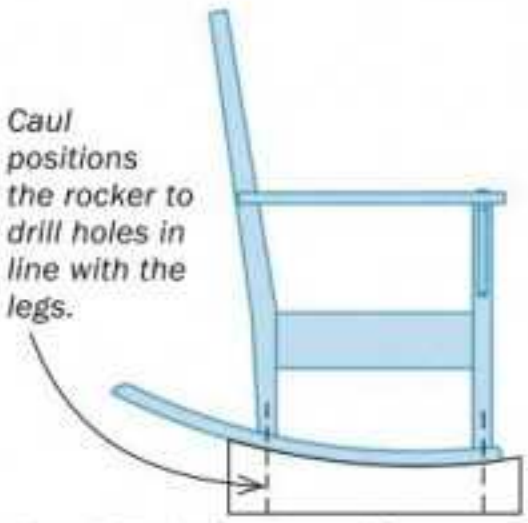
ROCKERS

Using bent laminations creates a stronger rocker than cutting it from solid stock.



Saw the plies. *Joint the face of the blank between each cut. Remove the sawmarks from the second face at the planer or with a handplane.*

A bending form creates the curves. *Pekovich layered MDF to create a clamping form and drilled holes for clamps. To keep the plies aligned, he wraps the bundle with stretch wrap after gluing and then wraps each end of the bundle to the form. Begin clamping from the center and use a flexible caul to distribute the clamping pressure.*



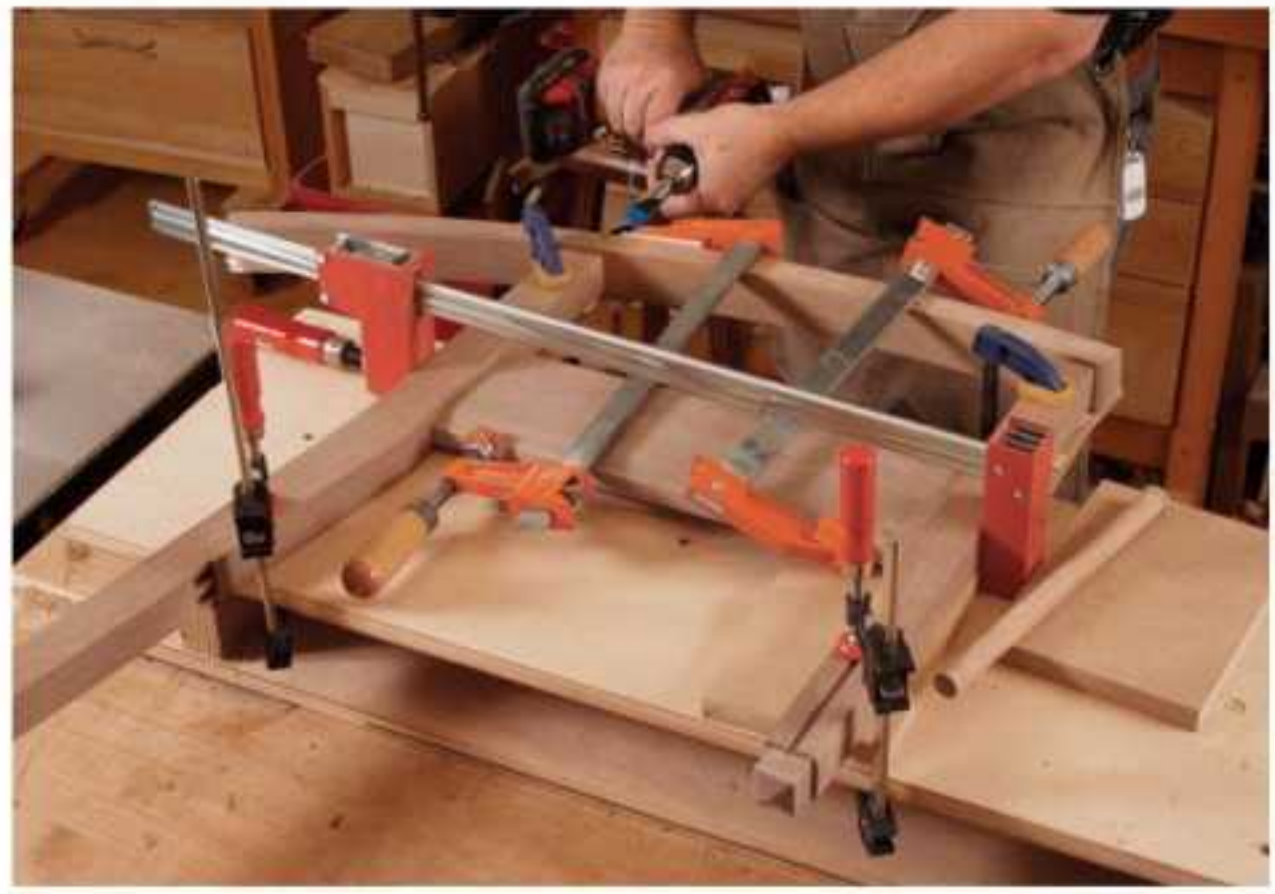
Pre-drill the rockers. *After cleaning up the rockers, trim them to length and drill through-holes for the dowels. Make a curved caul to support the rocker and use a Forstner bit to drill holes at the leg locations.*

will help you keep track of the order of the strips for a more seamless glue-up later.

Make a bending form from layers of MDF with holes drilled at clamp locations and the ends notched for clamping as well. Finally, screw cleats to the bottom of the form to raise it off the benchtop for easier clamping and cover it with packing tape. I used Unibond 800 glue for the lamination because it has a rigid glueline and won't creep over time. When the glue is dry, run one edge of the lamination over the jointer and then head to the planer to clean up the opposite edge.

There are a few options for attaching rockers, but I went with dowels, which are

Trim the legs and drill for dowels. *Set the rocker in place and scribe the curve onto the legs. After trimming them, use a block plane or file to fine-tune the fit. Then clamp the rocker in place as a drilling guide and use a brad-point bit to drill the legs.*



ASSEMBLE THE CHAIR SIDES FIRST

VIDEO WORKSHOP

Upholsterer Michael Mascelli shows how to make a cushion for this rocker in a members-only video at FineWoodworking.com/267.

Glue the side assemblies. *Kerf one end of the dowels for a wedge and epoxy them into the legs. Fit the armrest onto the front leg tenon, then bring the side assembly together. Finally glue on the rocker, driving a wedge into the kerf to lock it securely. Trim the dowel flush once the glue is dry.*

essentially slip tenons. Dry-fit the legs to the side rails and hold the rocker in place to mark the curve on the leg bottoms. Bandsaw the shape and then fair each curve to match the rocker using a block plane or file. Drill the rockers for the dowels using a concave caul at the drill press. Then use the rocker as a drilling template for the legs. I turned oak dowels, but you can buy hardwood dowel stock if you wish. Slot the upper portion for wedging later and glue them into the legs with epoxy.

Finish before assembly

This is the perfect project for pre-finishing because nothing needs to be flushed after glue-up. I fumed the white oak rocker overnight using janitorial-strength ammonia, and followed up with a wiping varnish and brown wax. (For more on fuming, see Finish Line: "Fumed finish: authentic Arts and Crafts," *FWW* #186, p. 116.)

Start by gluing the slats to the back rails; then glue up the side assemblies. Add the rockers, gluing and wedging them in place. Finally, bring the entire assembly together. Screw corner blocks inside the seat rails to add strength and give the cushion a place to rest. I chose to let an upholsterer handle the cushion, but I provided a seat frame with ¼-in. clearance around each edge and a notch at each leg post. □

Michael Pekovich is a furniture maker, instructor, and FWW's creative director.

Bring it all together. *Start by gluing the back slats to the back rails, then glue up the side assemblies. Once those dry, glue everything together. When the final glue-up has cured, add screw blocks inside the seat rails at each corner to strengthen the joints and provide a platform for the cushion.*

TOOL TEST

Combination Blades

BY KELLY J. DUNTON

Yes, one blade really can make clean rips and crosscuts

In a perfect shop, you'd switch between rip and crosscut tablesaw blades so that you were always using one optimized for the cut being made. Of course, there are no perfect shops, and many woodworkers prefer to keep one blade in the saw for both types of cuts. This is why combination blades are so popular, and because of their popularity there are nearly a gazillion available at home centers, hardware and woodworking stores, and online. It's also why the editors at *Fine Woodworking* asked me to test them and determine which ones make the smoothest cuts.

To make sense of the overstuffed field—and so that I wouldn't spend all year in the shop testing sawblades—we decided to narrow the test to 40-tooth combination blades with ⅛-in. (standard) kerfs, because 40 teeth strike a balance between ripping and crosscutting. Nine blades met these criteria. I used them to make crosscuts and rips in pine, cherry, and plywood to determine how smoothly and cleanly they cut. I also ripped 8/4 hard maple to discover how they managed challenging ripcuts.

In the end, the Freud Premier Fusion blade produced the best cut quality for both rips and crosscuts, but it did not rip thick, hard maple quickly. If you're looking for a faster ripcut and don't mind minor imperfections in the cut, then go with the Forrest Woodworker II or Ridge Carbide TS2000.

Kelly J. Dunton is a professional furniture maker in Terryville, Conn.

Photos, except where noted: Matt Kenney; blade photos: John Tetreault

GREAT FOR CROSSCUTS

With 40 teeth and a tooth grind designed to sever wood fibers, combination blades should leave a smooth surface on end grain.

Clean crosscuts. *Because inferior crosscuts require extra work to clean up, Dunton tested the blades' ability to crosscut without chipping out grain or creating whiskers on the bottom of the cut.*

Least scoring wins. *You want a clean surface on the end grain. The Infinity Super General left a surface that was smooth to the touch (left). The SawStop Titanium Series scored the end grain, creating arcing ridges. (above.)*

GOOD FOR RIPS

Cutting with the grain is more challenging for a combination blade, but the ones that rip best leave almost imperceptible machine marks. A single light pass with a handplane should remove them.

Smooth cuts with the grain. *The surface left by a ripcut with the Forrest Woodworker II had minor imperfections (left), but the Amana Prestige left visible machine marks (above).*

Combination sawblades

WHAT MATTERS MORE: SMOOTHNESS OR SPEED?

Because of their geometry, teeth ground to cut cleanly and smoothly do not rip quickly. So, when picking a combination blade, you must decide what you prefer: super-clean cuts or faster ripping. The Freud Premier Fusion left excellent surfaces. It's the Best Overall in that regard. At just $88, it's also the Best Value. The Forrest Woodworker II and Ridge Carbide TS2000 have teeth that rip more quickly, and they are Best Overall blades for ripcuts. The tradeoff for that speed, however, is a cut that's not quite as smooth or clean.

AMANA
PRESTIGE PR1040

CMT
285.040.10

DELTA
25-7657

SAWSTOP
TITANIUM SERIES

TENRYU
GM-25540

BLADE	PRICE	CROSSCUT QUALITY		
		Pine	Cherry	Plywood
Amana Prestige PR1040	$62	Good	Very good	Good
CMT 285.040.10	$59	Good	Very good	Very good
Delta 25-7657	$22	Good	Fair	Fair
BEST OVERALL Forrest Woodworker II	$150	Very good	Excellent	Very good
BEST OVERALL BEST VALUE Freud Premier Fusion P410	$88	Excellent	Excellent	Excellent
Infinity Super General	$100	Excellent	Excellent	Very good
BEST OVERALL Ridge Carbide TS2000	$105	Very good	Excellent	Good
SawStop Titanium Series	$66	Fair	Fair	Fair
Tenryu GM-25540	$95	Very good	Excellent	Good

Online Extra

For info on sawblade sharpening, go to **FineWoodworking.com/267.**

FORREST
WOODWORKER II

FREUD
PREMIER FUSION P410

INFINITY
SUPER GENERAL

RIDGE
CARBIDE TS2000

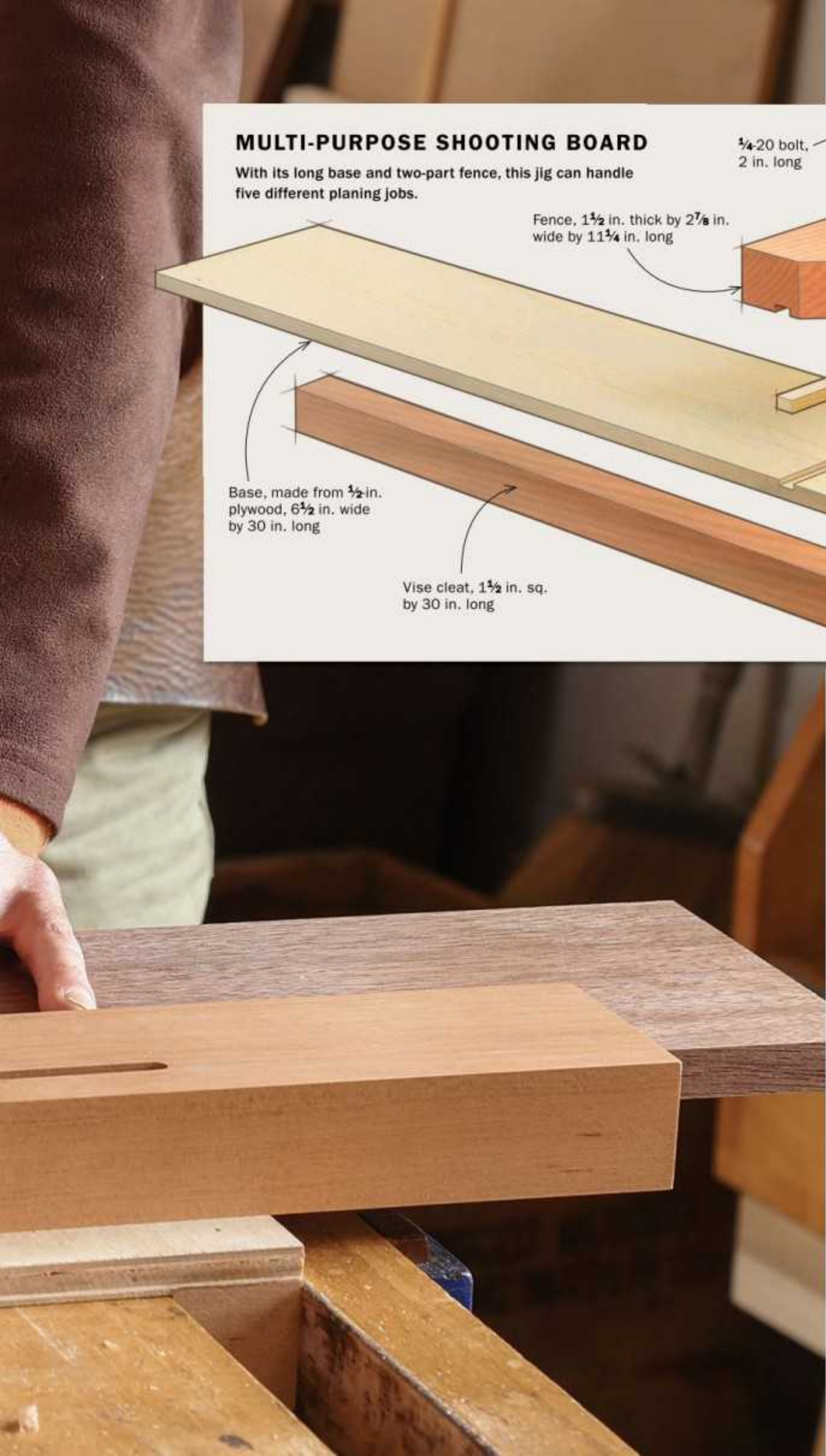
RIP QUALITY		RIP SPEED	NOTES
Pine	Cherry	8/4 Maple	
Fair	Good	Good	Rip speeds were average. Crosscuts produced chipout on the bottom edge in cherry and pine. There was considerable blade scoring in soft- and hardwood ripcuts.
Good	Good	Good	Rip speeds were average. Plywood and hardwood crosscuts were clean, but there was scoring in the pine crosscuts. Ripcuts scored the edge in both cherry and pine.
Good	Good	Excellent	Rip speeds were very fast, but there was considerable chipout in cherry and plywood crosscuts, and some scoring on all ripcuts.
Very good	Excellent	Very good	Crosscuts and rips in pine and cherry were smooth and clean, with some chipout on the bottom edge of plywood crosscuts, and light scoring in pine after rips. Rip speed was above average.
Excellent	Excellent	Good	This blade made the smoothest and cleanest rips and crosscuts, and left just a tiny bit of fuzz on the bottom of plywood crosscuts. This quality, however, comes at the cost of somewhat slower rip speed.
Good	Very good	Good	Crosscuts in pine and cherry were great, but there was some fuzziness and chipout on the bottom of plywood crosscuts. Rip speed was average, with some scoring in pine, but very little in cherry.
Very good	Excellent	Very good	This blade produced very clean crosscuts in pine and cherry with some fuzziness on the bottom of plywood crosscuts. It ripped quickly and left a clean surface, although there was light scoring in softwood rips.
Good	Good	Excellent	This blade made the second fastest ripcuts, but with some scoring on the cut. There was some chipout when crosscutting pine and cherry, and considerably more chipout when crosscutting plywood.
Good	Good	Excellent	This blade made the fastest ripcuts, but there was scoring on the cuts. Crosscuts in hardwood were great, and in softwood nearly as good, but there was chipout and fuzziness on the bottom of plywood crosscuts.

A Shooting Board that Handles Five Jobs

Simple, versatile design excels for trimming end, edge, and face grain

BY TIMOTHY ROUSSEAU

Photos: Matt Kenney; drawings: Dan Thornton



As an instructor at the Center for Furniture Craftsmanship, I have seen many different shooting boards through the years. After using them at the school, I often made versions of the best ones for my own shop. They really started to pile up, which bugged me, because I am by nature a distiller, constantly evaluating my tools, machines, jigs, and techniques to find the cleanest and simplest solutions.

The shooting board shown here retired most of the others. Made from one piece of plywood and three pieces of solid wood, it is simple but amazingly versatile, as it can be used for five different planing jobs.

Like most shooting boards, it's good for trimming end grain and miters. But it also works great for shooting the edge of a board and serves as a planing stop, too, handling

MAKE THE BASE

Plywood is a better choice than MDF, because it's more durable. Make sure to use a piece that's dead flat.

Glue for the rabbet. *The rabbet's short shoulder is tall enough to register the cleat parallel to the edge of the base, while the glue creates a strong bond that prevents the cleat from shifting in use.*

Pop in some brads. *They hold the cleat in place as the glue dries.*

Cut a dado for the stop. *It's doesn't need to be deep—3/16 in. works great. Locate it 2 in. or so from the end.*

both thin and thick parts. I'll show you how to make it, and demonstrate how I use it for all five tasks.

Simple to make

The base of the shooting board is made from ½-in. plywood. Beneath it is a hardwood cleat that runs the length of the base and fits your bench vise. On top is a two-part fence: A low, narrow stop is screwed into a dado and a tall, wide fence fits over the stop.

Start with the base. Cut a shallow rabbet in the bottom of the base along one edge. This will register the cleat and ensure that it's parallel to the base. Spread glue in the rabbet, clamp the cleat in place, and then drive in some brad nails.

After letting the glue dry, take the base to the tablesaw and cut a shallow dado at one end for the low stop. (Leave the blade height set for now. You'll use it again.) For a right-hander like

Insert a T-nut from below. *After drilling a counterbore and a through-hole, hammer in the nut from the bottom.*

Put the stop in the dado. *Start wide and plane it down so that it just fits, then screw it down in the middle.*

ADD THE FENCE

Used to trim both square end grain and miters, the fence is quick to reposition and easy to keep true.

Groove the fence to fit the stop. *Set the rip fence to cut a groove down the middle of the fence. The blade's height should be the same as it was for the dado in the base.*

Check for square. *The fence is normally a bit out of square at this point. Look for high spots and mark them with pencil.*

Miter the back corner. *After cutting a slot for the bolt, clip the back corner of the fence at 45°.*

True the fence. *Plane just the high spots at first and then take a full-length shaving.*

me, the dado should be at the left end of the base. If you and your bench are lefties, put it at the right end. Next, drill the counterbore and through-hole for the T-nut. This nut receives a bolt that helps hold the tall fence in place. Knock the T-nut into the hole. Fit the low stop into the dado and then screw it into place.

The fence, made from hardwood, now gets grooved on the bottom to fit over the low stop in the base. Cut the groove with the same setup used to cut the dado in the base. Then cut a slot parallel to the back edge of the fence for the bolt that threads into the T-nut. I cut the slot with my horizontal mortiser, but a handheld router and edge guide are just as effective.

Next, use the bandsaw to cut off the back corner of the fence at 45°. The angle doesn't need to be perfect, because you'll true it when you use the shooting board for miters.

Fit the fence onto the low stop and lock it down. Then check it for square, marking the high spots with a pencil. Take the fence off the base, and plane down those high spots. Reattach the fence and check for square again. Repeat until the fence is perfectly square to the base's edge.

That's it. The shooting board is ready for work.

Simple to use

Paired with a sharp No. 6 bench plane, this shooting board can do so much: trim end grain and miters, shoot edge grain, and plane face grain on boards that are thin or thick, wide or narrow. Whatever the task, the cleat on the bottom should be clamped in a vise.

The most common use for a shooting board is cleaning up and trimming end grain. For this, the tall fence should be

5 ways to use the jig

What's better than a set of accurate and easy-to-make shooting boards? A single one that handles five planing jobs with no fuss.

1 CLEAN UP END GRAIN

Cleaning up end grain is a shooting board's basic function. Press the workpiece against the fence with just a bit overhanging the base. Take a pass, slide the workpiece out again. Take another pass. Repeat until the end is clean and square.

90° SETUP

Zero-clearance fence. *Set the fence just a hair over the base's edge. Rousseau does this with the bolt snug, tapping the fence's other end with a mallet (above). Then plane the fence flush to the base's edge (right). This prevents tearout on the back edge of the workpiece.*

locked in place with the bolt. I always set the fence so that it overhangs the edge of the base just a fuzz. I then use my plane to shoot it flush to the edge of the base, creating a zero-clearance fence that prevents tearout when you trim end grain.

Another way to use the shooting board is for shooting edge grain. There's nothing tricky about it. With the fence set to 90°, place the board's end grain against the fence, with the edge hanging over the base's edge. Plane the edge. You'll get it straight and square in no time.

The shooting board can also be used to plane face grain. For thin boards, I take off the fence and plane against the low stop. For face-planing wide boards, I slide the jig to the left so about half its length hangs off the end of the bench and then clamp it in the vise. This gives me more space along the front edge of the

With the end grain against the fence, you can also shoot long grain. Rousseau clamps the workpiece to the base to help stabilize it. Because breakout isn't a concern, the part can overhang the edge and fence.

After removing the fence, you can use the low stop for planing boards as thin as 3/16 in. thick. The base provides a stable, flat planing platform.

To face-plane wide boards, slide at least half the base off the bench and then clamp it in the vise. Set the workpiece against the end of the base and plane. Because the base is low, you won't clip it with the plane at the end of a stroke.

5 TRIM MITERS

When shooting miters, there's always a danger that the plane will pull the workpiece forward as it cuts. The solution is to take smooth, easy passes. Thin shavings are better than heavy ones, too, because it takes less force to make them.

bench. Butt the board against the base and plane it.

Finally, with a quick adjustment, the jig excels at trimming miters. You remove the bolt, flip the fence over, and set it at 45° to the edge of the base with a combination square, making sure the back corner of the fence is against the low stop and the 45° face is overhanging a bit so you can plane it flush for zero clearance. Then clamp it down. I prefer this over a dedicated fence always set to 45°, because there's no guarantee a dedicated fence will remain at 45° through the seasons. With this jig, I can always quickly set it dead perfect.□

Timothy Rousseau, of Appleton, Maine, is a professional furniture maker and instructor at the Center for Furniture Craftsmanship in Rockport, Maine. See him at Fine Woodworking Live 2018 (finewoodworkinglive.com).

Online Extra

For a closer look at Rousseau's shooting board, watch the video at **FineWoodworking.com/267.**

45° SETUP

Not slippery when wet. *Before using the fence for miters, Rousseau spreads water on the bottom, which makes the fence and base grip each other a bit so the fence won't slip as you clamp it.*

Clamp the fence. *Set its angle with a combination square. Be sure the fence's back corner is in contact with the low stop. This will keep the fence from shifting backward under the force of planing.*

Four Great Finishes with Hardware-Store Supplies

Add warmth, depth, and age using commonplace products and foolproof techniques

BY TIMOTHY PURO

Adding color to wood can have a big payoff, but many woodworkers hesitate to try an unfamiliar finish on a project that took hours to complete. Also, the supplies can be pricey. A lot of professional stains, dyes, and glazes are available only online, in amounts too large and prices too high to experiment with. My approach is low risk and low cost. I teach my students how to execute foolproof finishes using products available from hardware stores, home centers, and paint stores—often in small cans.

I combine the products in a multi-step approach that sandwiches layers of color between layers of finish and gives a deep, varied effect that one-step dyes and stains can't match. I use the products in ways not described on the back of the can: thinning stain to mute its effect, applying a very thin sealcoat for the same purpose, or fully sealing the wood and using an oil-based stain as a glaze over the top. And most importantly, I always make sample boards to dial in the exact look I want.

The four finishes presented here beautify common furniture woods, warming the color, popping the grain, and adding subtle age in ways that clear finishes just can't.

Tim Puro is a professional finisher in Bloomington, Ind.

Warm up walnut

If you can find 19th-century walnut furniture that still has its original finish, you'll see a red/brown color with orange undertones that looks almost like mahogany. Today's kiln-dried walnut is steamed, which makes the white sapwood darker and more usable but gives the brown heartwood a silvery-gray cast. If you want the warm color of old walnut, I have a finish that will get it for you. It puts no color in the wood—it's all in the finish.

Tone with shellac—This finish starts with two coats of Zinsser Bulls Eye amber shellac. I thin it by about 30% with denatured alcohol to create a 2-lb. cut, which makes it much easier to brush. Before pouring the shellac out of the can, give it a good stir to mix up the wax that's in this product.

Sand the wood up to 180 grit, then start brushing on the shellac. You should be able to brush on both coats within 30 minutes. Allow the two coats to cure for three to four hours and then lightly sand to level the surface, using 320- or 400-grit stearated paper such as Norton ProSand.

Off-the-shelf supplies. *First the amber tone of Zinsser Bulls Eye shellac warms the walnut, then Zinsser SealCoat creates a magnifying layer. Finally, cedar-colored wiping stain is applied as a glaze to give the walnut an antique hue.*

1. TONE WITH AMBER SHELLAC

If you like the look after this step, you can stop here and just apply a topcoat.

Thin it for better brushing. *Bulls Eye amber shellac is too thick out of the can, so thin it with one-third denatured alcohol.*

Apply two coats. *The best brushes for shellac have Taklon fibers in them, like this artist's wash brush. It lays down thin coats that dry quickly, letting you apply two within 30 minutes. Wait three or four hours for these coats to cure, and sand with 320- or 400-grit paper to knock down the wood whiskers and brush marks.*

Photos, except where noted: Asa Christiana; sample boards: Michael Pekovich

2. GLAZE WITH CEDAR STAIN

Oil-based stains can act as great glazes and give you plenty of working time.

Seal then glaze. *Apply a couple more coats of shellac to build up the film thickness. You don't need any more amber tone, so use SealCoat shellac, which is blond-colored and ready to brush right out of the can. Sand lightly with 320- or 400-grit paper and then wipe on the cedar stain with a rag, in the direction of the grain, arranging it to suit your eye.*

The amber-colored shellac will give the walnut a much warmer tone. Now apply two or three coats of Zinsser SealCoat shellac with a brush or spray gun, or spray lacquer from an aerosol can or a gun to build the film thickness a bit. If you like the look, you can stop here. By the way, lacquer (and, obviously, more shellac) will stick to a waxy shellac like Bulls Eye amber just fine, but polyurethanes and water-based finishes are a bad idea.

Warm glaze—For an even warmer red-brown color, more like the tone of air-dried walnut, I add a glaze. Old Masters Wiping Wood Stain is a full-bodied stain with lots of pigment, which creates intense color when applied to raw wood but a much more subtle look when used as a glaze. In this case I chose the cedar color, which has a burnt-umber hue. This oil-based product dries slowly, giving you plenty of working time.

Wipe on a thin coat with a rag. I often use those thick paper-towel rags sold at home centers. Glaze can be arranged with the rag as you apply it, or with a dry brush right after. To keep it simple I used only the rag this time, working in the direction of the grain until I got the color shift I was looking for. If it looks like you have painted the surface, you've applied too much. If there isn't much of a color shift, you haven't applied enough. Properly dispose of the oily rag (spread it out in a safe, flat area to dry) and allow the glaze to dry at least 12 hours.

Topcoat—To seal in the glaze and add depth to the overall finish, apply two or three more coats of Zinsser SealCoat, waiting several hours between coats and leveling at least every other one with 320- or 400-grit sandpaper. Then rub out the final coat and add a dark wax.

3. FINISH WITH DARK WAX

After applying a few more coats of SealCoat shellac, sanding lightly between coats, create a satiny sheen using steel wool and wax.

Steel wool and wax. *Kiwi shoe polish contains hard waxes that rub out well. The brown version does not add a lot of color, but dries dark in areas where you don't remove all of it. Apply the wax with 0000 steel wool. Then buff to a nice shine. Leave a bit of wax in the nooks and crannies to add some age.*

Add richness to mahogany

When we have a chance to finish very old mahogany in our shop, it usually needs just a few coats of shellac to look spectacular. Twentieth-century varieties and African substitutes like sipo don't have the same yellow and orange undertones and rich red-brown color of the Santo Domingo and Cuban mahoganies available before 1900. To create the look of old mahogany on new wood, I use a multi-step process.

Reddish-yellow dye—You might already have a reddish-yellow dye in your collection of stains. Minwax golden oak and Minwax Puritan pine are oil-based dyes with pigment added. If you let the can rest for a few days and don't shake or stir it, you can pour off the liquid on the top, which will be all dye. I used Minwax Puritan pine. If the look is too red for your taste, try the golden oak, which is more greenish-yellow. You can get both in half-pint cans.

Sand the mahogany to 180 grit, then apply the oil-based dye undiluted onto the raw wood with a brush or rag and allow it to cure for at least 12 hours.

Buy local. *Minwax golden oak or Puritan pine stain, two colors of Old Masters Wiping Stain, and Zinsser SealCoat shellac.*

1. TURN A STAIN INTO A DYE

You may already have the reddish- or greenish-yellow dye you need in your shop. If not, buy a small can at the hardware store.

Leave the pigment behind. *Before shaking or stirring the can, Puro poured off the dye on top, leaving the settled pigment behind.*

Straight onto the wood. *Apply the oil-based dye with a brush or rag, and let it cure for at least 12 hours.*

Spit coat—To keep the upcoming coat of stain from being absorbed too deeply in the wood, dilute SealCoat shellac by 50% with denatured alcohol and apply one thin coat with a rag. Allow it to dry for 30 to 60 minutes. The dye and shellac will raise whiskers in the wood and make it feel rough. Burnish it using a wadded brown-paper bag, scrubbing the surface until it feels smooth.

Cedar stain—Next, stain the wood using Old Masters Wiping Wood Stain in the cedar color. Give it a good stir so the pigment is dispersed, and apply it with a rag or foam brush. Immediately wipe off the excess and allow the stain to dry for at least 12 hours. The medium red-brown hue might look a bit saturated now, but it will be subdued by the final layer of color.

Two shellac topcoats—Now brush on two to three coats of Zinsser SealCoat shellac, full strength. Allow the first coat to dry for 30 minutes and scuff it with a brown-paper bag, brush on a second coat, and wait another 30 minutes. You should see a noticeable sheen or gloss. If you don't, apply a third coat. Allow it to cure for three to four hours, and then sand lightly with 320- or 400-grit sandpaper wrapped around a block to level the surface.

2. SUBTLE WAY TO USE STAIN

A full-pigmented red-brown stain goes next; the previous dye and a spit-coat of shellac will dull its effect.

Spit-coat before staining. *Dilute SealCoat shellac by 50% and then wipe it onto the dyed surface with a rag. After it dries, rub the surface with a wadded brown-paper bag to knock down the raised whiskers without cutting through the color.*

Subtle stain. *The red-brown of Old Masters cedar will warm up the wood and add more depth. Wipe it on with a rag or paper towel, wipe off the excess, and let it dry 12 more hours.*

Try a brown glaze—If you like the look you have, you can stop here and apply the final topcoats of shellac or lacquer. But I love the added depth and non-uniformity that comes from multiple layers of color. I use Old Masters Wiping Wood Stain as a glaze again, this time in the provincial color, a Van-Dyke brown hue.

Use a rag to apply the glaze just as you would apply stain, but then remove the excess with a dry, 2-in.-wide, high-quality, white china-bristle paintbrush. As the dry brush starts to get loaded with glaze, work out the excess onto a paper towel. Arrange the glaze evenly on the surface. Don't worry if you leave a few brush marks. If they go with the grain, they will disappear. The goal is a translucent layer of color. Clean the brush with mineral spirits and allow the glaze to dry for at least 12 hours before topcoating.

Finish up with more shellac—After the glaze dries, don't sand or rub it. Apply at least two more coats of the blond Zinsser SealCoat, then level the surface with 320- or 400-grit sandpaper, apply one thin final coat, and rub it out.

Your mahogany sample should have a deep, rich look that can't be duplicated with a single application of dye or stain.

3. SEAL, GLAZE, AND TOPCOAT

To subdue the intense red-brown and make the look richer and more complex, try a glazing technique, arranging stain on a film of shellac.

Seal the surface and build a sheen. *Glazing only works over a fully sealed surface, so apply two more coats of full-strength SealCoat, rubbing with a paper bag between them and sanding lightly afterward to level the surface for glazing.*

How to apply a glaze. *Apply Old Masters Wiping Stain liberally with a rag (above) or brush, and then use a dry brush to arrange it on the surface and remove the excess (left). Wipe the dry brush on a paper towel as you go to unload it.*

Pop the figure in maple

Most finishing articles and finishing books recommend dying figured maple to accentuate the figure. Dyes can do a fine job, but it's easy to overdo the effect, with the dye soaking deeply into the end-grain stripes and creating too much contrast. By starting with SealCoat shellac and following with my trick of using stain as a glaze, you get a more subtle effect that is easy to control.

Seal—Sand to 220 grit, then apply at least three coats of SealCoat. After letting those coats dry for three or four hours, scuff the surface with 320- or 400-grit sandpaper and apply two or three more coats, letting each one dry at least two hours before sanding. If the shellac gums up your sandpaper, you haven't waited long enough. Keep going until you see a gloss or sheen.

Glaze—Wipe on Old Masters Wiping Stain in cedar, removing the excess with a dry brush as before. Arrange the glaze on the surface and create a translucent layer of color. Allow the glaze to dry for at least 12 hours before adding the topcoat.

Topcoat—Don't sand or rub the glaze; apply at least two more coats of SealCoat to lock in the color, magnify it, and add depth. Sand between coats and rub out the final one.

Simple supplies. *All you need are blond, dewaxed shellac, followed by Old Masters stain used as a glaze.*

1. SEAL AND BUILD DEPTH

Three to five coats of SealCoat shellac create a smooth, sealed surface for glazing.

Brush on light coats. *Use SealCoat right out of the can, brushing it on with a Taklon brush. Let the first three coats dry at least two hours before scuffing the surface with 320- or 400-grit paper. Add more coats, letting each dry thoroughly, until you begin to build a sheen.*

2. USE STAIN AS A GLAZE

The oil-based stain makes a forgiving glaze, giving you plenty of time to work or even wipe it all off and start again.

Wipe it on and brush it off. *Don't be afraid to apply a heavy coat. Then remove the excess with a dry brush, lightly brushing with the grain (below). Unload the brush on a paper towel as you go.*

Add age to cherry

It's not difficult to get the aged look of cherry furniture without waiting years for the wood to darken. It starts with stain, thinned with mineral spirits, applied directly to the wood.

Sand the cherry to 220 grit, and then apply a thinned coat of Old Masters Wiping Stain in cedar with a rag or foam brush. Wipe it off immediately, removing all the excess, and let it dry overnight.

Seal and glaze—Now brush on at least two coats of SealCoat shellac, leveling each coat as you go, as with the earlier finishes. You might need a third or fourth coat to create the smooth sheen you need for applying the glaze. Allow the full shellac layer to cure for three to four hours, then sand it lightly to level the surface.

As with the other finishes, a glaze adds depth, and in this case, tones down the redness of the stain. Use Old Masters Wiping Stain in the dark walnut tone, which has a greenish-brown, raw-umber hue, moving the finish toward a more medium red/brown.

Wipe on the glaze with a rag and remove the excess with a dry brush as before. Allow the glaze to dry for at least 12 hours before topcoating with SealCoat or lacquer as you did for the other finishes.

Fine finish. *Puro combines the warm reddish cedar stain with the dark walnut version, which has a greenish tone that brings the cherry back toward brownish-red.*

1. START WITH A THINNED STAIN

Another way to control the effect of pigmented stain is to thin it.

Dilute by 50%. *Stir the can well, pour out some of the oil-based cedar stain, and add an equal part of mineral spirits. Apply the thinned stain directly to the wood with a rag, wipe off the excess, and let it dry for 12 hours.*

2. SEAL AND GLAZE

Use SealCoat to form a smooth barrier, and then apply stain as a glaze over the top.

Shellac before the stain. *Brush on a few coats of SealCoat at full strength, sanding between coats. Let the final coat dry for four hours. Then wipe on a liberal coat of the dark walnut stain, and use a dry brush to remove the excess.*

Simple Box-Joint Sled

The strength and style of finger joints come easy with this straightforward sled

BY DOUG STOWE

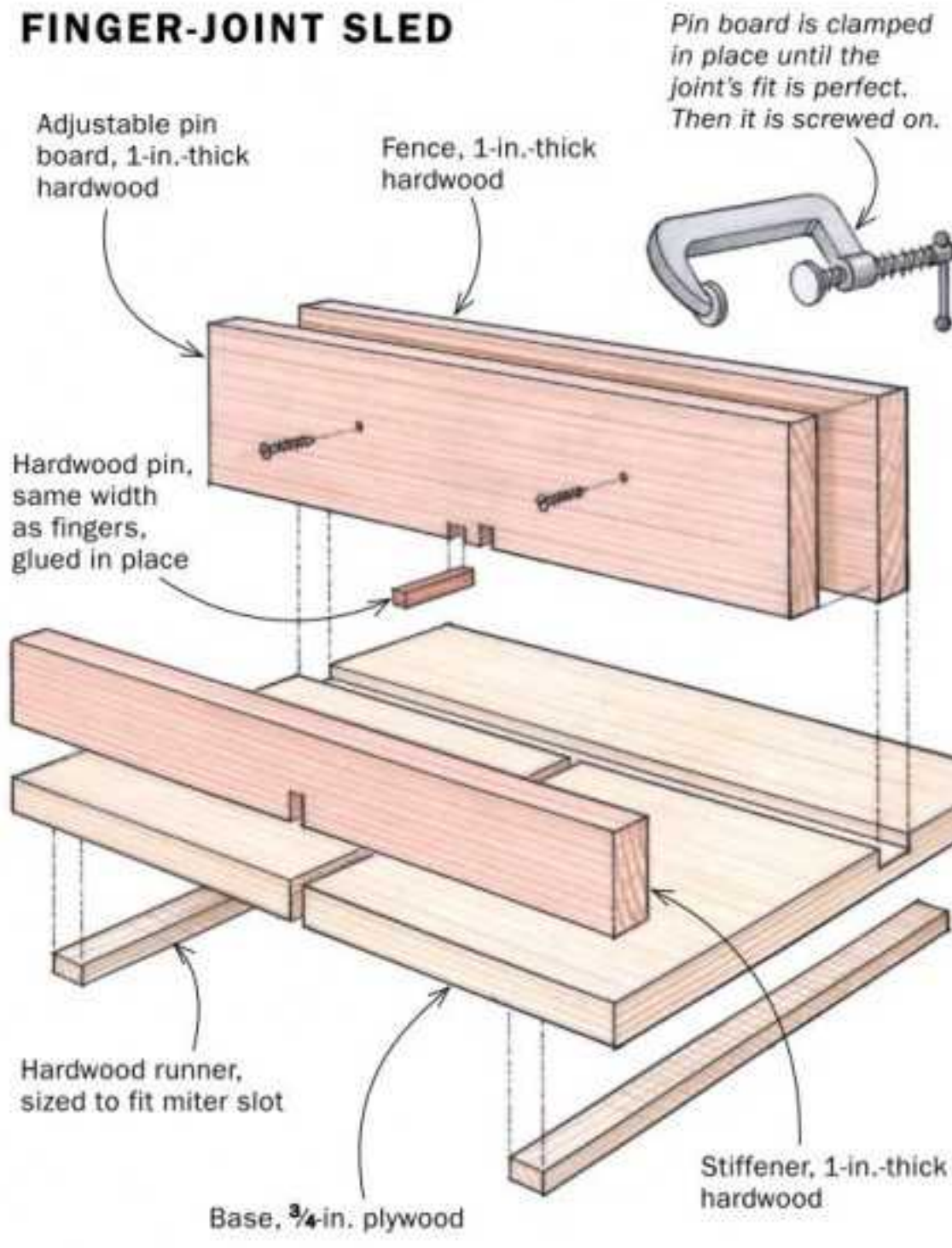
Finger joints, also called box joints, are incredibly strong thanks to all their long-grain glue surface interlocking finger by finger. But these joints have distinct advantages beyond strength. Once you have a jig set up, they are quite quick to make. And the pattern of end grain vs. side grain at the corners creates a pleasing visual rhythm. The joint also can be scaled up, as in some Greene and Greene pieces. Luckily, finger joints offer all this while being very easy to cut.

Soup up a crosscut sled

While you can make finger joints using a jig clamped to the miter gauge of your tablesaw, a dedicated sled is the better choice.

Photos: Barry NM Dima

FINGER-JOINT SLED



Because it has two runners instead of the gauge's one, it provides a more stable and reliable platform.

A standard combination blade will work, but if using a single blade, I prefer rip blades because of their flat top, which leaves a cleaner joint than a combo blade's alternate top bevel. Similarly, for fingers wider than a standard sawblade's ⅛-in. kerf, you can use a regular dado stack, but I like box-joint blade sets, which come with a pair of blades that leave a flat-topped kerf in two fixed widths. Alternatively, you can send a typical dado stack to a saw sharpener to have the teeth ground flat on top.

Start by building a small crosscut sled, making sure the fence is square to the blade. Clamp a board to its fence and cut a kerf in

Drawings: Vince Babak

MAKE THE JIG

First cut. *With the adjustable pin board clamped to the fence of a crosscut sled, saw a kerf through it. Stowe fits scrapwood stops into his miter slots to limit the jig's travel so he doesn't expose too much of the blade at the end of the cut.*

it. Remove the board and fit a hardwood pin into the kerf. A tight fit is best. Glue the pin in place.

Before you clamp the pin board back into place against the fence, grab an offcut from the pin stock. Because the pin's width matches the kerf—and the fingers—this will help you zero in on the joint spacing. Push the offcut against the side of the sawblade, and slide the pin board over until the pin abuts the offcut. Clamp the pin board here.

Dial in the fit

I advise making a run of fingers on two scrap boards to dial in the spacing and make sure the final fit is consistently tight. Align one corner of a board against the pin

TIP

SPECIALTY BLADE FOR BOX JOINTS

For finger joints wider than the standard ⅛-in. kerf, you can use a specialty box-joint blade set. These cut a flat-topped kerf and work by stacking two blades, either inside to inside or outside to outside, for a pair of fixed widths.

Fit the pin. *Remove the pin board and fit a hardwood pin into the kerf. You want a friction fit. Glue the pin to keep it stable.*

Offcut approximates spacing. *While you'll fine-tune the fit later, placing an offcut from the pin stock between the pin and blade will get you pretty close.*

Clamps for now. *For your test cuts, the pin board should be clamped to the sled's fence, allowing you to hold things temporarily in position as you home in on a perfect fit for the fingers.*

and make the first cut. Then fit that first notch over the pin to make the second cut. Continue walking the fingers over until you've finished that edge. Repeat these steps on a second board.

Aim for a friction fit. It's good to have a bit of room for glue, but avoid visible gaps. If you need to tighten the joint, loosen the clamps and tap the pin board so the pin moves away from the blade; to loosen the fit, tap the pin board in the opposite direction. When the joint is just right, screw the pin board in place. As long as you're making boxes with the same joint spacing and using the same blade (or combination of blades), you won't need to readjust the jig.

Making boxes

Compared with making two test boards, building a four-sided box with finger joints requires only a few extra, albeit important,

HOW TO GET THE FIT JUST RIGHT

Form some fingers. *Cut fingers on two pieces of scrap stock. Straddle the pin securely. Clear any dust that collects, since it can throw off your accuracy.*

steps. First, set the sawblade's height a little higher than the thickness of the stock so the fingers can be sanded flush later. Push the workpiece against the pin to create a full finger with the first cut. Then cut fingers across the rest of the board. The next part's crucial: To cut the fingers on the other end, flip the stock over end for end. If you don't, the joints will not align. Do this for a pair of parts, either the front and back or the two sides.

Whichever pair you tackle second, you'll approach differently, making the first cuts while using an already-cut piece as a spacer. For this, take a just-cut piece and place the first finger between the pin and blade. Slide an uncut piece up to it and make the first cut. This offsets the mating fingers, allowing the two boards to interlock. To keep track of which parts need to start with a spacer, I cut the initial notches for all four ends that require the spacer, then remove the spacer and form the rest of the fingers.

I prefer to cut the fingers while the stock is slightly overwidth, and trim to width only after I know exactly where the final finger falls. This lets me deal with any error that may creep in. For instance, when making a box with ¼-in. fingers, one would expect the dimensions to fall at some exact ¼-in. increment, but they often do not. If the ¼-in. finger fits best in a slot that's an extra 1/64 in. wide, over the course of 5 in., that would add slightly more than 1/16 in.

You shouldn't have to force the parts together. To open up the joint, slide the pin toward the blade.

Since this joint relies on glue, avoid visible gaps. The fingers are too loose if you pick up two joined pieces and one falls off. To close the gaps, slide the pin away from the blade.

A perfect fit is when the parts slide together without being forced or hammered.

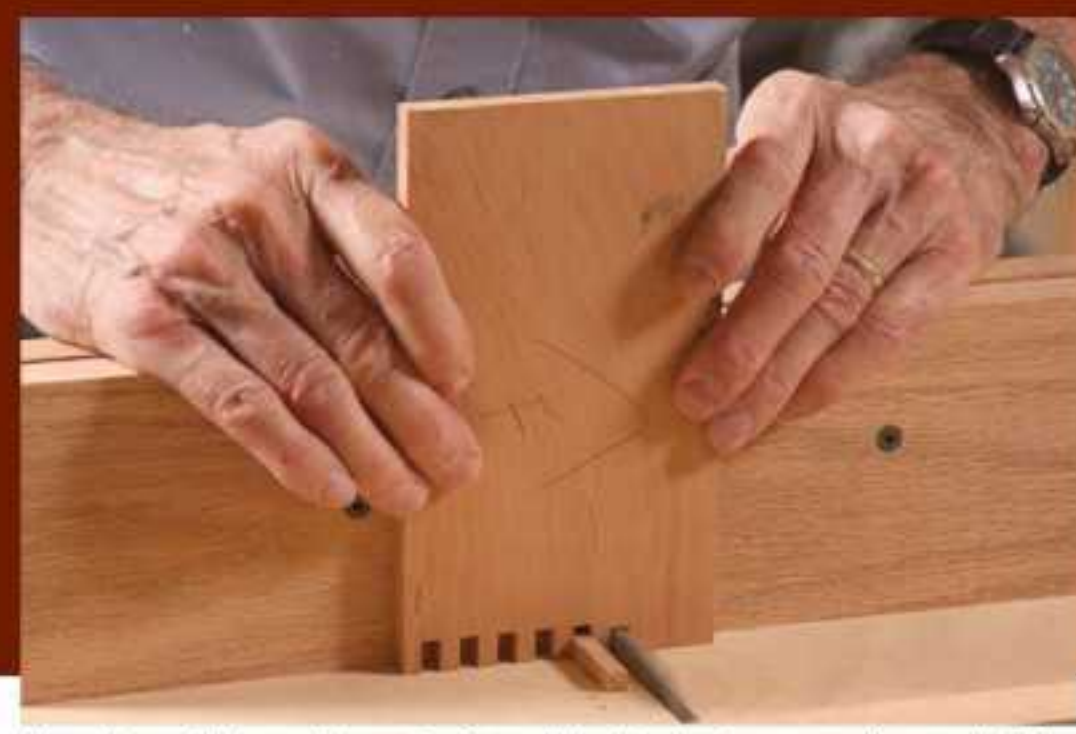
USING THE SLED

Screws set the fence. *When you've established the perfect fit, screw the pin board in place. This jig will now work with any box you make using this blade.*

Offcut sets the blade height. *Raise the blade about 1/64 in. above the stock to create a cleanup allowance. The fingers can be sanded flush to the box sides following assembly.*

FIRST SET

First finger. *Align one corner of a board against the pin and make the first cut.*



The pin registers the cuts. *Complete the kerfs across the end of the board. Stowe starts with the front and back boards.*

SECOND SET

Second set needs a spacer. *For the first cuts on the second pair of boards, use an already-cut piece as a spacer. Put its first kerf over the pin, and slide an end up to it. Stowe cuts the first notches on each end of both boards, before removing the spacer.*

Finish the fingers. *Remove the spacer and complete the remaining cuts.*

Groove for the bottom. *To prepare for a bottom panel, Stowe routs ⅛ in. above the lower edge. Two parts get a stopped groove, two get a through-groove.*

Trim the excess. *Stowe cuts the fingers in stock that is a little wide and rips it to width later. This lets him clean up any cumulative error, like the thin finger on the right, that may have crept in.*

Glue the fingers. *Apply a drop of glue to the edges where the parts slide together. The glue will spread as the fingers interlock.*

For all your cuts, make sure the parts are nested carefully over the pin. If the stock isn't placed accurately and held down throughout the cut, the box sides won't come together correctly.

To install a bottom, I use a router table and a ⅛-in. bit to run a groove. I generally locate the groove ⅛ in. from the lower edge when using ⅛-in. Baltic-birch plywood for the bottom. Two of the parts will have a finger at the bottom edge, and they get stopped grooves; the other two parts get through-grooves.

One great thing about a box with well-cut finger joints is that clamps are often unnecessary. But keep some handy just in case a corner needs persuasion. If it does, be sure to clamp close to the joints and not at the middle of the box, where the pressure will flex and distort the sides. □

Doug Stowe, based in Eureka Springs, Ark., is a box maker and woodworking instructor.

Online Extra

Expand your design options with mitered finger joints. Learn how to make them at **FineWoodworking.com/267.**

Wrap up. *Assemble the sides around the bottom. If the parts are cut well, clamps may not be needed. Friction is often enough to hold the pieces. Check for square before letting the glue set.*

Brass Stretcher Brightens

Photo, this page: Michael Robbins

a Bench

Strong, classic form with a metallic twist

BY MICHAEL ROBBINS

This bench came into being in two stages. It existed as a top and four legs for a year or so, moved from here to there around the shop, all the while unfinished and collecting dust. I knew the bench needed something. With its knife-edge seat and splayed turned legs, it had the classic proportions and simplicity of a Shaker bench, but it lacked a voice of originality.

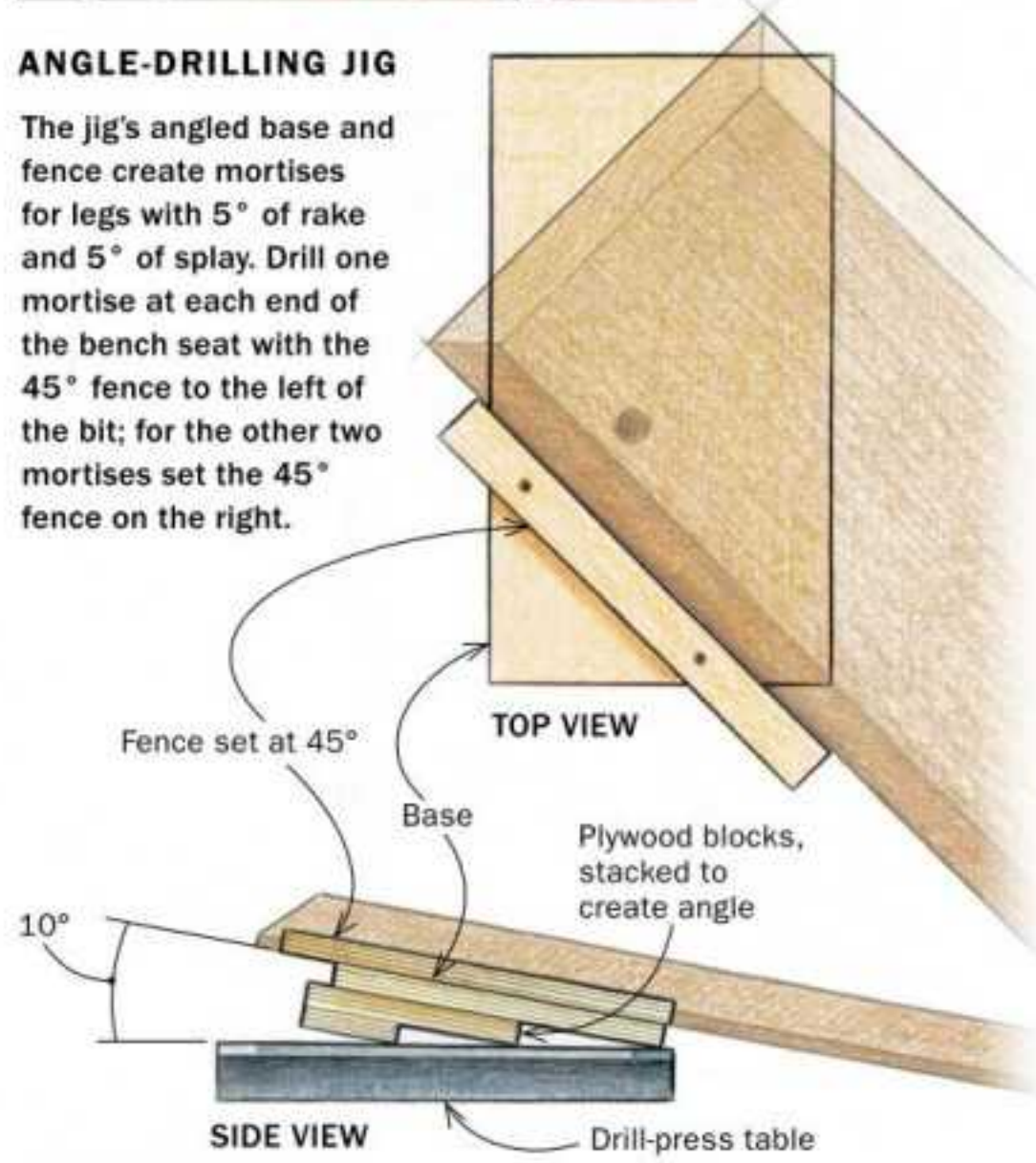
At the time I had recently built a chair with a steam-bent crest rail, and that curve seemed to bring the chair together in a way that seldom happens with squares and angles. So I began a quest for a curve that would tie the bench's form together. I had some flat bar steel leaning in the corner of the shop, and I began playing with that. After kinking a few pieces, I figured out how to bend the steel to a smooth arch, one with enough tension built in to provide structure while achieving the visual flow I'd been

Bevel the blank. *Robbins cuts the seat's wide underbevel on the tablesaw, leaving a narrow flat band above the bevel.*

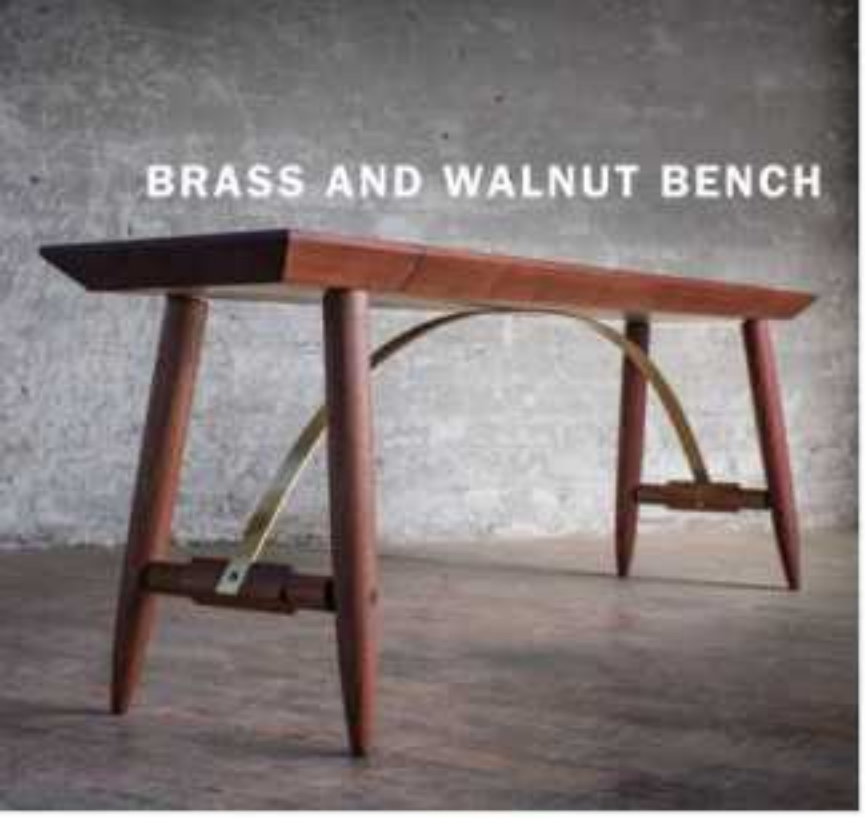
Jig directs the drilling. *To drill angled mortises for the legs, Robbins built a jig for the drill press. It is ramped at 10° and has a fence set at 45°.*

ANGLE-DRILLING JIG

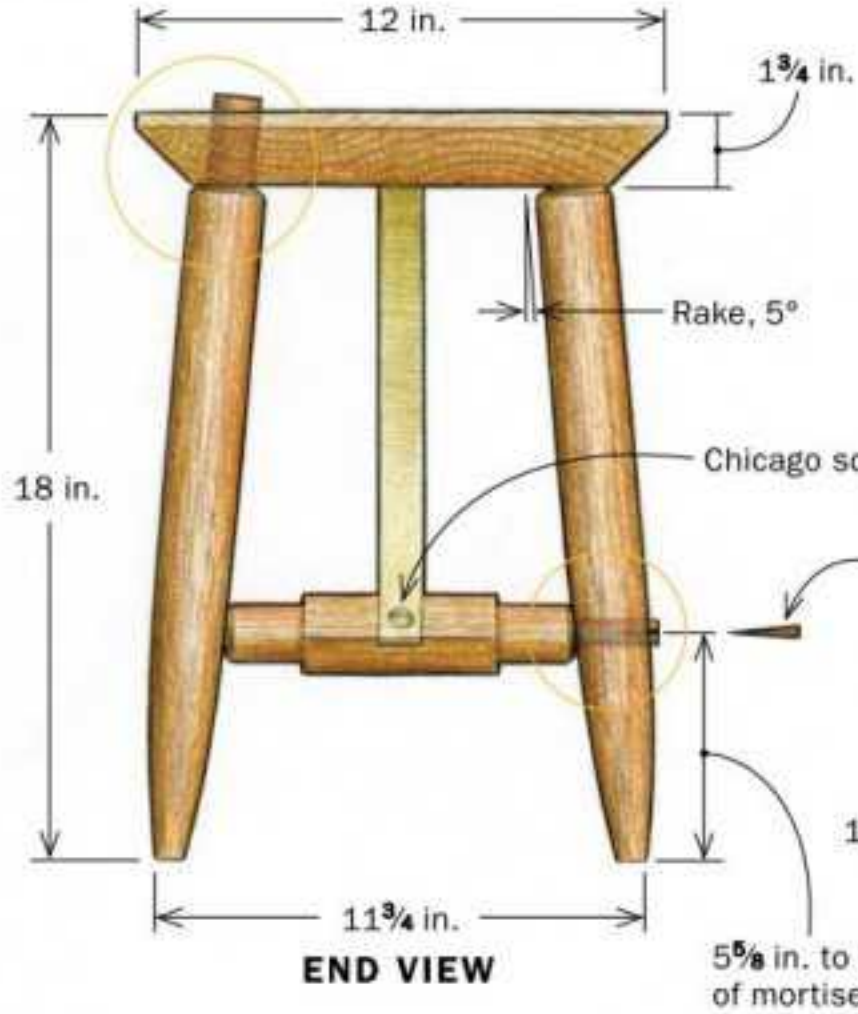
The jig's angled base and fence create mortises for legs with 5° of rake and 5° of splay. Drill one mortise at each end of the bench seat with the 45° fence to the left of the bit; for the other two mortises set the 45° fence on the right.



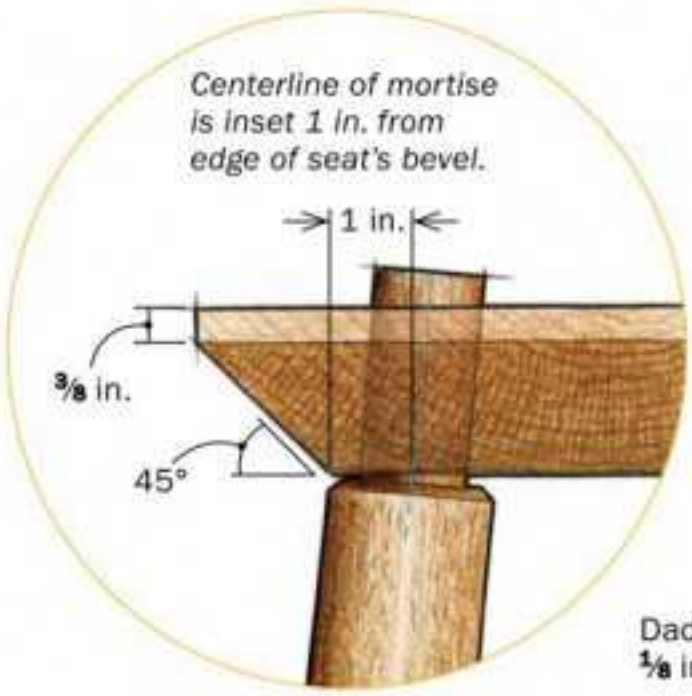
Finished at the bench. *After drilling nearly through at the drill press, Robbins finishes the mortises with a handheld drill. A backing block prevents blowout.*



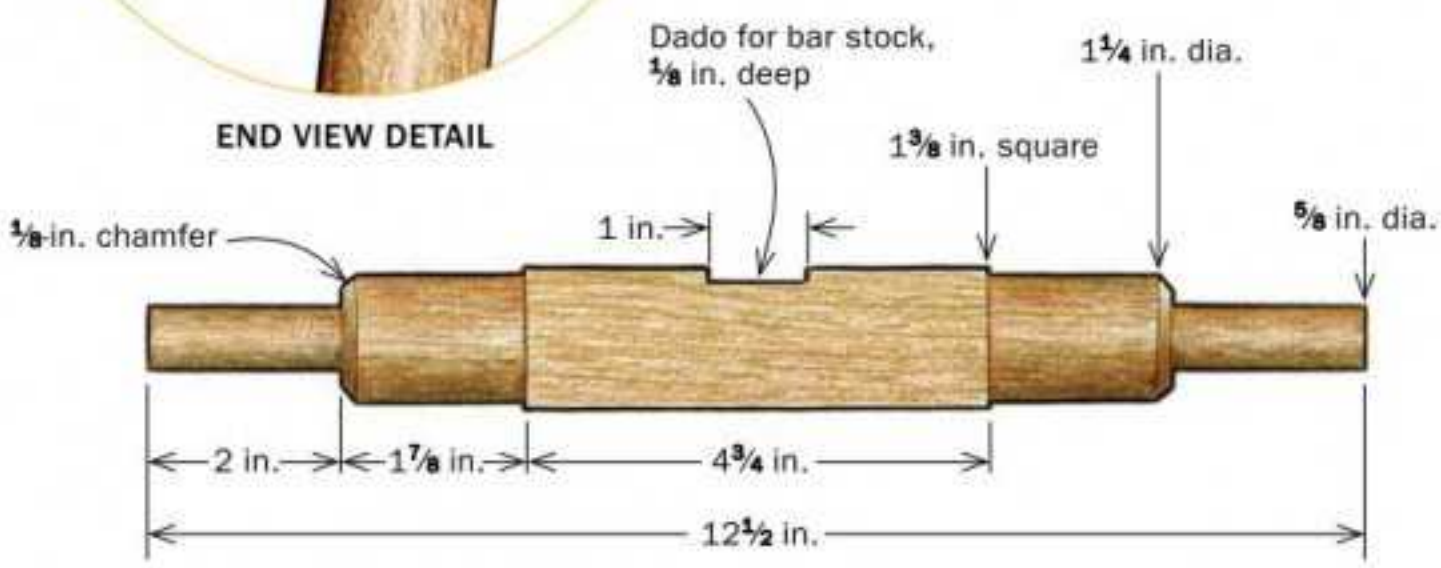
Turned legs and stretchers and a bowed bar of brass add the few key curves that elevate the design of this solid bench.



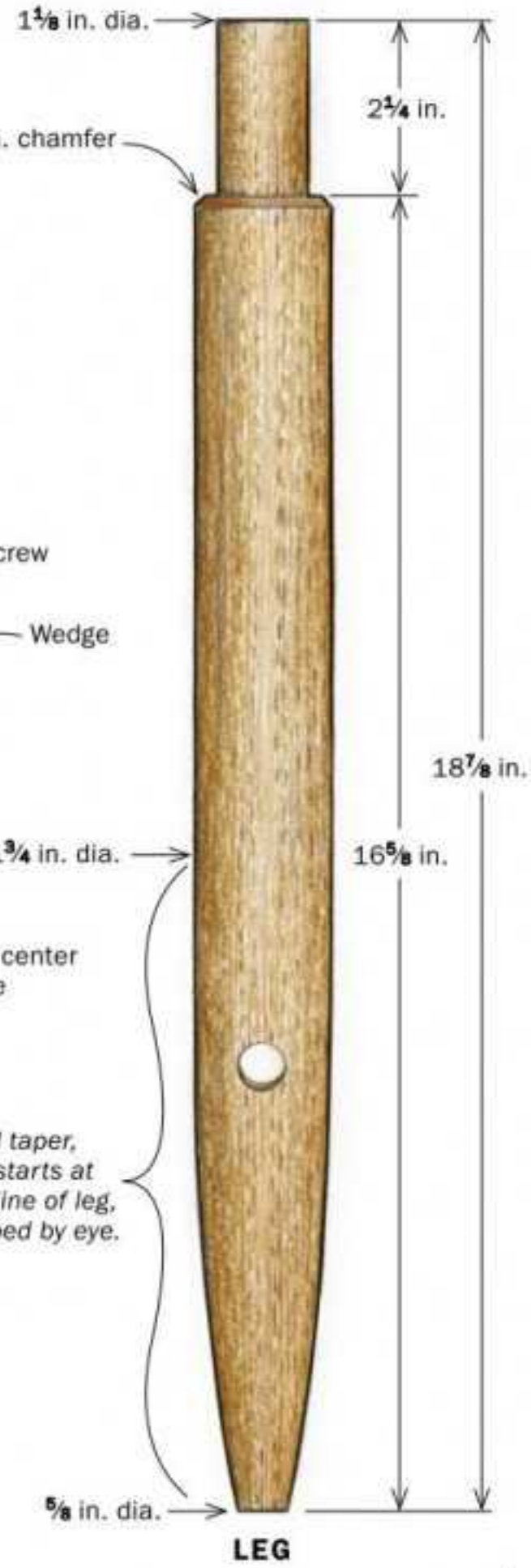
END VIEW



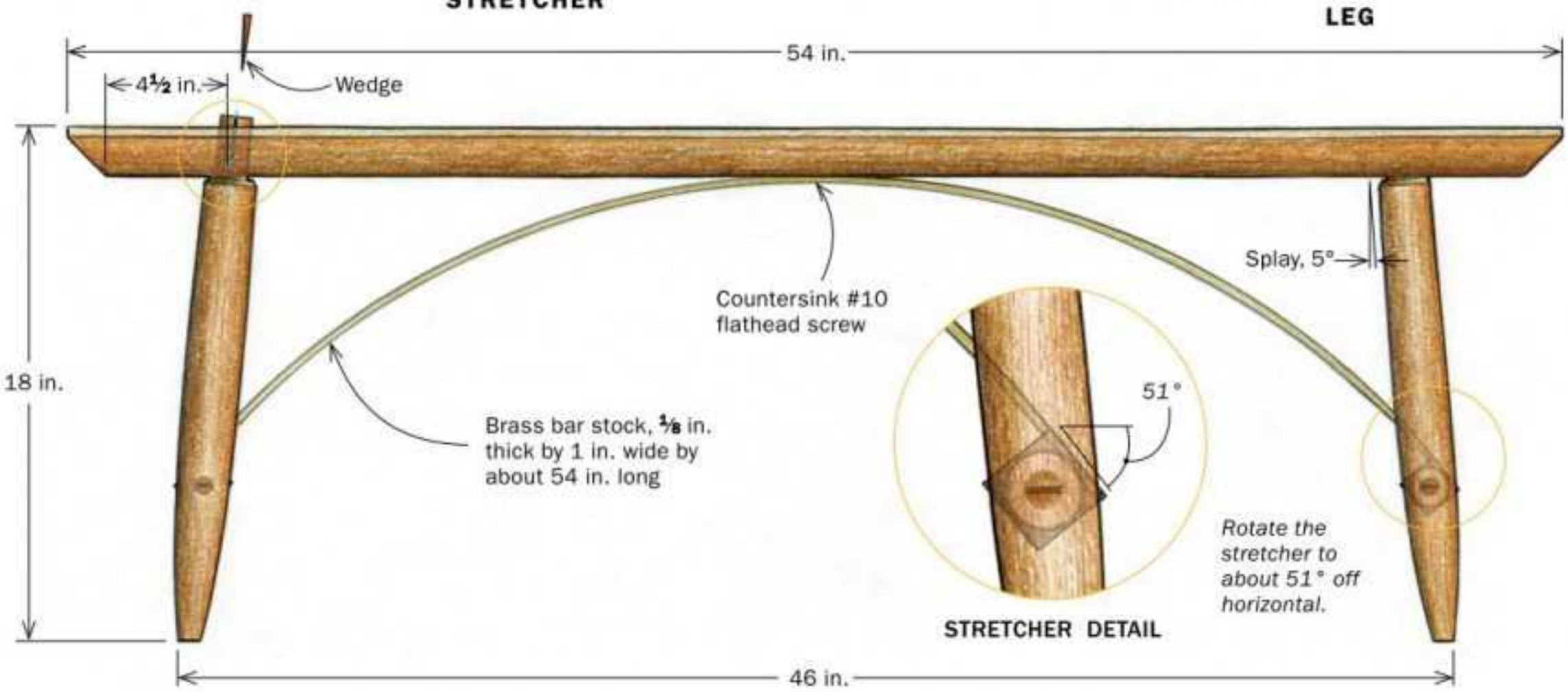
END VIEW DETAIL



STRETCHER



LEG



STRETCHER DETAIL

FRONT VIEW

Photos, except where noted: Jonathan Binzen; drawings: John Tetreault

Shape the legs

Turn the torpedoes. *After turning the leg blank to a cylinder, Robbins uses a skew chisel and wrench to size the tenon. Having turned the curved taper (right) by eye with a roughing gouge and a skew, he measures and marks for the stretcher mortise.*

Make way for the wedge. *At the bandsaw, with the leg clamped and cradled in a V-notched scrap for stability, Robbins kerfs the tenons to accept wedges.*

Drill for the stretchers. *To cut the angled mortises for the stretcher tenons, Robbins sets his drill-press table to 10°. With the leg resting in a V-notch cradle, he drills nearly all the way through.*

seeking to resolve the design. I've gone on to build several dozen benches of this design, and now I typically use brass for the arch.

Start at the seat

I begin the bench by gluing up the seat. I use 8/4 hardwood stock—walnut, in this case—and mill it down to 1¾ in. thick. After gluing it up, I cut the seat to size and then bevel all four edges at a 45° angle, leaving a ⅜-in.-wide flat at the top of the edge. Once the edges are shaped, I'm ready to drill holes to accept the legs.

I drill the holes so the legs will have both rake and splay angles of 5°. A shopmade angle jig that I clamp to the drill-press table makes cutting these holes straightforward. Using a 1⅛-in.-dia. Forstner bit and setting a depth stop, I drill the holes with the seat facedown. I drill to just shy of going through the seat. When I've drilled all four holes, I take the seat to the bench and use a hand drill to finish the holes. A backing block clamped in place prevents blowout when the bit comes through.

Calling in backup. *Robbins uses a hand drill to finish the through-mortises, preventing blowout with a coved backing block. To make the block, he drills a series of large holes in a scrap and rips it down the middle on the bandsaw.*

Make the stretchers

A notch for the brass. *Using a dado blade and a stop, Robbins cuts the centered dado for the brass bar in two passes.*

Dimensioning by dowel. *To get a precise shoulder-to-shoulder measurement for the stretcher blank, Robbins dry-fits the legs and marks a dowel rod threaded through the stretcher mortises.*

Turn the legs and drill the angled mortises

I mill the leg blanks a little over 1¾ in. square by 18⅞ in. long. This length includes 2¼-in.-long tenons that will protrude about ½ in. through the seat at assembly. I turn the legs to a taper and turn a tenon at the top. Then, to set the location of the mortises for the stretcher tenons, I measure from the foot and, with the lathe spinning, make a clean pencil line around the circumference of the leg. Next I use the bandsaw to cut kerfs in the tenons to accept wedges. Then it's off to the drill press. I set the drill-press table to a 10° angle and use a V-shaped cradle to hold the leg. I drill these mortises using a ⅝-in.-dia. Forstner bit.

I use the wedge kerf for orientation when drilling these stretcher mortises. I remove the blade from a combination square and tap it into the kerf, then place a magnetic torpedo level on the blade to find plumb. This ensures that the wedges will line up and create a clean detail when seen from the top. As with the seat, I drill the holes just short of through at the drill press, and then finish them at the bench with a handheld drill and a sacrificial backing block, this one with a radius to fit the leg.

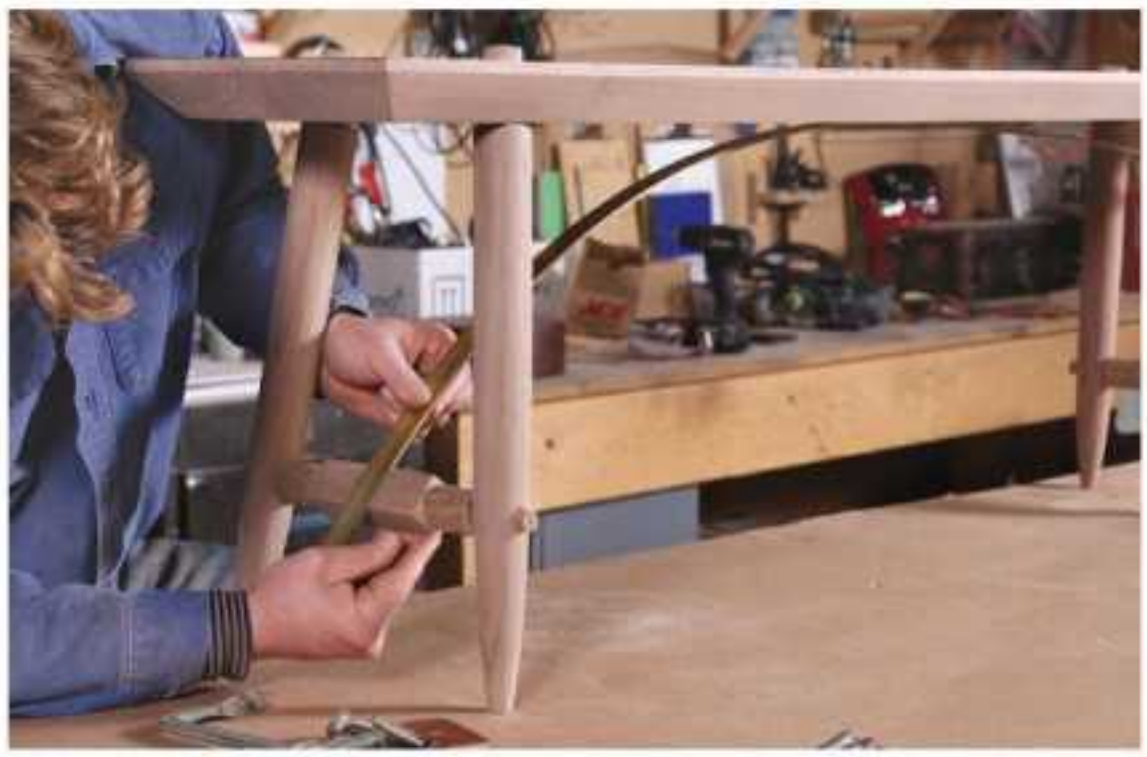
Lay out and turn the stretchers

To ascertain the length of the stretchers, I dry-fit the legs into the seat. I thread a length of dowel rod through the stretcher mortises

Tape trick. *Robbins wraps the blanks with blue tape to ensure he'll get a clean transition between the square and cylindrical sections of the stretcher when he turns them on the lathe.*

Bend the brass

Dry-assemble the bench to fit the brass. *With a vise clamped to his drill press, Robbins drills a hole with a twist bit at the centerpoint of the brass bar. He also cuts a countersink, then drives the screw by hand.*



Careful on the curve. *With the bar fixed at the middle, Robbins brings each end down gingerly to the stretcher (above), being sure the curves are symmetrical. He then clamps the ends in place and marks them for length (right). He notes the rotation angle of the stretcher using a digital gauge.*

and mark the distance between the legs, then add 4 in. to account for the two 2-in. tenons. After cutting the 1⅜-in.-square stretcher blanks to that length, I cut a dado across one side of each blank to accept the arched brass bar stock. I turn the stretchers next, using blue tape to ensure a clean transition from the square center section to the cylinders on either side.

Two-stage assembly

Once the stretchers are turned, I dry-assemble the bench and install the brass. For a 54-in. bench, I start with a 60 in. length of ⅛-in. by 1-in. C360 brass bar (from onlinemetals.com). At the centerpoint of the bar I mark, drill, and countersink for a #10 flat-head screw. I drive that screw with the bench upside down and the brass flat on the underside of the seat. Then I turn the bench right side up and slowly bring one end of the bar down to the

Bring the bench together

At glue-up, drive the legs home and synchronize the stretchers. *After fitting the legs to the stretchers, drive the legs into the seat. Robbins uses a digital angle gauge to be certain both stretchers are rotated to the correct position (right).*

Wedge work. *As soon as all the joints are home and the stretchers are properly rotated, Robbins knocks in the tenon wedges on the legs and stretchers.*

Flushing. *A flexible Japanese flush-cutting saw makes quick work of cutting off the tenons just proud of the surface. Robbins follows up with a chisel to flush them off cleanly.*

Last bit with brass

Quick cleaning. *Rubbing with a Scotch Brite metal finishing pad makes the brass gleam.*

Tighten the screws. *After driving the center screw (above), Robbins installs the knock-down fittings through the stretchers (below). Rubber gloves keep him from smudging the brass.*

dado in the stretcher. I exert some pressure inward toward the pinned center as I bend, which allows the brass to form a nice curve and creates some structural tension.

I move back and forth between the two stretchers, getting a feel for the natural curve of the brass, adjusting the rotation of the stretchers, and making sure the brass overhangs both ends equally. I'm shooting for a pleasing, symmetrical arch with a fair amount of tension. It takes practice to find a happy medium; if you're not careful you may go too far in one direction or the other and create a kink or a wonky angle.

Once I have this dialed in, I clamp the brass in place on the stretcher. I set a digital angle gauge on the top of the seat, zeroing it out. I then put the gauge on the flat of each stretcher and rotate the stretchers until their angles match. When they do, I mark the brass for length and mark the ends of the stretcher tenons for wedge kerfs. Then I disassemble the piece and cut the brass to length. At each end of the brass bar I drill a ¼-in.-dia. hole to accept knock-down fittings. I use brass-plated Chicago screws (chicagoscrews.com). I also cut kerfs for the stretcher wedges at this point, and then sand and polish all the parts.

Now I start the glue-up. I fit the stretcher tenons into the legs, then apply glue to the leg tenons and knock them home with a dead-blow mallet. I use the digital gauge again to set the rotation angle for the stretchers, and then drive wedges into the stretcher and leg tenons. Once the glue has cured, I trim the through-tenons and finish-sand the whole piece.

I usually apply an oil finish at this point. Then, last but not least, I dry-polish the brass to an even shine with metal-finishing Scotch Brite and screw it in place, giving the bench that nice visual flow I was seeking. □

Michael Robbins builds furniture in a former garment factory in Philmont, N.Y., and has a storefront showroom in nearby Germantown.

gallery

Inspiration for our readers, from our readers

ABE GOORSKEY
Floyd, Va.

"This is the first piece I designed as a solo furniture maker after leaving my previous job of 14 years at a custom furniture shop," says Goorskey, who cites contemporary Danish and Asian furniture as his inspiration. He made the stool, with its curved seat and tapered, curved legs, as a thank-you gift for the owners of the shop where he had worked for all those years, using wood they had given to him.

BLACK WALNUT, 12D X 17W X 30H

Photo: Richard Boyd

KAARE LOFTHEIM AND BILL PAVLAK
Colonial Williamsburg, Va.

Copied from an original made by William Buckland and William Bernard Sears in the 1760s, this table was built with period-appropriate hand tools in the Anthony Hay Cabinet Shop at Colonial Williamsburg. There was just one detail that differed from the original design. The original, Pavlak says, "has a marble top that has proven to be too heavy for the base, so we opted for a solid walnut top instead—sometimes learning from the past means not doing what they did."

BLACK WALNUT, 28D X 44⅞W X 34$^{3}/_{16}$H

TED BLACHLY
Warner, N.H.

This chest is similar in style to a tall cupboard Blachly designed in 2009. Back then, he wanted to explore what could happen to a simple piece "if it were given some sensuous shaping and an alluring stance." This chest explores that design idea in a horizontal form. The interior is finished with milk paint and shellac; the exterior with varnish.

WHITE PINE AND HORNBEAM,
18½D X 43W X 21H

Photo: Bill Truslow

BRUCE HART
Fort Bragg, Calif.

Hart built this cabinet-on-stand while in his first semester at the College of the Redwoods, now known as The Krenov School. The classic design is meant as an homage to James Krenov's approach to craftsmanship. Hart is in the class of 2017–2018.

IMBUIA, BLACK LIMBA, MAHOGANY, CAMPHOR, OAK, AND EBONY, 10D X 20W X 60H

Photo: Todd Sorenson

MATT RITTER
San Luis Obispo, Calif.

This dresser is based on one owned by Ritter's father, which had been in continuous use for more than a century. "My father passed away this year and to commemorate, I built a replica for my 13-year-old daughter." The style is more sleek, the joinery a bit more solid, but the piece does not forget its roots—it uses the old brass lock from the original dresser.

WALNUT AND MAPLE, 22D X 44W X 36H

Photo: Kyle Nessen

MARK BELLONBY
Mason Neck, Va.

The "pond life" theme of this end table was inspired by a trip Bellonby took to Japan and the many koi and carp he saw and photographed there. The marquetry incorporates a variety of shell inlay including mother of pearl and abalone in addition to wood veneers.

BLACK WALNUT AND VARIOUS WOODS, 20 DIA. X 24H

gallery continued

GLENN HEIMGARTNER
Charlottesville, Va.

Heimgartner designed this console table to serve two primary purposes. His clients wanted a focal piece in a prominent location in their great room entrance, and they also needed it to screen an HVAC vent in the room without compromising its function. The design was influenced by Art Deco details at the Virginia Museum of Fine Arts.

CHERRY AND MAHOGANY, 14D X 65½W X 40¼H

Photo: Michael Bailey

COSMO BARBARO
Edinboro, Pa.

The borders on this blanket chest are painted with black milk paint and texturized using a small V-shaped carving tool. The exterior is mahogany and the chest is lined with cedar to protect the textiles kept inside.

MAHOGANY AND CEDAR, 20D X 48W X 24H

BILL SEAY
Spring Mills, Pa.

The pillowlike forms of the drawer fronts and door panels on this desk were inspired by the Incan stonework found throughout Peru. Seay also designed the irregular shapes of the gallery drawers in the desk to resemble those famous Incan walls.

MAHOGANY, SPANISH CEDAR, AND EBONY, 29D X 49W X 30H

JACK O'KEEFE
Malvern, Pa.

O'Keefe made this Federal-style candle stand while he was a student at North Bennet Street School in Boston. "I saw a photo of a similar table with a contrasting light and dark veneer face made by a former student and I really liked it. I also thought it would be a really challenging veneer exercise, and it was."

15½D X 23¾W X 29H

Photo: Lance Patterson

ALEXANDER PEREL
Kiryat Motzkin, Israel

Perel makes furniture on his balcony using hand tools only, and is largely self-taught through YouTube, books, and magazines. He built this table for his wife. "I wanted the table to be on the dark side with the joinery as visible as possible, and it needed to be compact because of the small size of the room," he says. "When the table was done I stared an hour at it. It was so exciting to see it complete after so many hours."

WALNUT, 17¾D X 36W X 36H

KELLY PARKER
Parkville, Mo.

Asked to make a pyramid from wood, Parker added a few surprises. Built using a brick-laying technique, this pyramid box has two secret drawers and a secret compartment. The dovetailed drawers have sides made of cherry. If you turn the top of the pyramid, you'll find the secret cavity embellished with mother-of-pearl inlay. The V-grooves on the sides are meant to resemble the detailing seen on the ancient pyramids made with large blocks of stone.

REDWOOD BURL AND CHERRY, 11½D X 11½W X 10H

Create dramatic inlays with epoxy

ADD A BIT OF PIGMENT FOR A BOLD INLAY STATEMENT

BY CHRISTOPHER MOORE

In 2011, I started a furnishings company called Noble Goods with the help of my wife, Molly. We wanted to explore new materials and make functional objects for the home. I had just ended a six-year stint at a company specializing in cast resin furniture, interior architectural surfaces, and decor. The furniture and home goods we wanted to make were an opportunity to combine our passion for design and woodworking with the knowledge of pourable plastics I had gained on the job.

Resin is a wonderful inlay material. You can create delicate patterns without the worry of having to cut and fit matching, delicate inlay pieces. Instead, after drawing and cutting "mortises" for the resin, just pour the resin and watch as it fills the voids. You have an unlimited choice of colors, and the resin can be as translucent or opaque as you'd like. There really are no limits on the designs possible with resin inlay. It's also a lot of fun, even magical at times.

PREPARE FOR THE POUR

For the best-looking exposed edges, start with an oversize blank and rout the grooves out past the board's final shape. Moore does layout on the blank with a template and pencil.

Rout the grooves. *Because the epoxy is translucent, the grooves must be cut cleanly without burning, so use a sharp bit in the router.*

Build a dam. *Brush on a strip of furniture wax about ¼ in. from the groove, following the contour of the overall design but not dipping between close-set grooves (top). Next, lay down a bead of pure silicone caulk, like GE Type 1, in the middle of the wax. Blue tape, when pressed firmly to the wood, makes a good dam at the ends of grooves that run out the board's edge (bottom). Wait for the caulk to dry before pouring the epoxy.*

Photos, except where noted: Matt Kenney

STEADY FLOW FILLS THE GROOVES

The epoxy runs into every corner of the grooves, so let it find them on its own. A consistent pour speed is the way to go.

Mix the two parts. *Moore uses a digital scale, because mixing by weight is more accurate than mixing by volume.*

I have seen some dramatic failures with resin inlay, both my own and those of friends. Improper setup times, incomplete hardening, bubbles, shrinkage, colors gone wrong—all are potential pitfalls. But they can be avoided. I'll show you how to mix resin (I prefer epoxy) and add color to it, as well as demonstrate how to pour it cleanly and clean up after it has cured.

Inlay wood with epoxy

The three most common types of resin are polyurethane, polyester, and epoxy. All three require careful mixing or they will set too quickly, only partially, or not at all. They each have great benefits, but I've found that epoxy is best suited as inlay material in wood. It doesn't react dramatically with the moisture present in wood, it's durable, and when sanded properly it can be finished with a variety of topcoats, wax, and food-safe oils like mineral oil. Finished in one of these ways, epoxy is beautiful. It is also relatively odorless, and less dangerous during application than other types of resin.

I use an epoxy from Entropy (entropyresins.com) most often. I mix CLR general purpose laminating resin with the CLS hardener to create an epoxy with a slow pot life (20 to 60 minutes), good clarity, and that gives off little heat as it cures. If the grooves are more than ¼ in. deep, switch to a "casting" resin for a longer pot life. Don't use quick-set epoxies intended for repairs. They tend to have a short pot life, and put off a large amount of heat as they cure. This can lead to trapped air bubbles, yellowing, and even cracking.

There are three things to consider when choosing a wood for epoxy inlay: the wood's density, the size of its pores, and how thirsty its fibers are. Wood significantly softer than cured epoxy will sand more quickly than the epoxy, and you might end up with the inlay proud of the surrounding surface. Big pores, like

Tint and fill. *Using a toothpick or a small stick, add one drop of pigment at a time (top). Mix with a tongue depressor. After you've gotten the color right, pour the epoxy into a second cup (bottom). Don't scrape out the first cup; you want unmixed parts to stay behind in the original cup.*

Overfill the grooves. *Level the board first. Let the epoxy run through the grooves and rise above the surface (below). Most air bubbles will be found up in this excess, rather than down in the groove.*

INDEX TO ADVERTISERS

CLEAN UP AND CUT TO SHAPE

A pattern like this one should take just a few minutes to sand flush to the surface. Then it's on to shaping the workpiece.

Pull off the caulk. *Because it sits atop the wax, the caulk should come up easily without breaking apart.*

Sand it. *Epoxy is not as hard as you might think. Start with 80-grit paper and work up to 320 grit. Moore raises the grain after 220 grit, and then sands again with 220 before moving up to 320. Use good dust collection, and wear a dust mask.*

Rough out the shape. *Cut close to the layout lines drawn on the blank before the grooves were routed.*

Rout flush to the pattern. *A sharp bit creates very clean edges on the epoxy. Use double-sided tape to secure the pattern to the cutting board.*

RESIN ALL THE WAY THROUGH

By cutting deep grooves and planing off the bottom of the workpiece after the epoxy has cured, you can create objects like this box lid, with the resin pattern visible on both the top and bottom.

Deep grooves. *Start by cutting deep grooves in an overthick blank. For some patterns Moore works without a template. After drawing the design on the blank, he follows the lines freehand, moving slowly to control the router.*

Remove the waste. *After filling the grooves with epoxy and flushing it off, Moore runs the blank through his planer to remove the bottom (take light cuts), exposing the epoxy inlay on both the top and underside.*

those in red oak, can cause problems, too. The epoxy gets into them and it's very difficult to get out, which is a problem if the pores are on the surface alongside the inlay. Finally, epoxy can flow into the fibers surrounding the inlay areas via capillary action. Beneath the surface, this isn't a problem and actually makes for a stronger bond. But near and on the surface, it creates an unattractive halo of color.

What woods work well? Cherry, walnut, and maple have proven excellent for resin inlay, and they are the ones I use most often for cutting boards and cheese boards.

Resins can be tinted in a variety of ways, but I use Mixol pastes most often. The colors are intense, and come already suspended in a liquid medium that plays well with epoxy. Wet pigments are less likely to cause air bubbles in epoxy than dry pigments. There are 30 colors, and all but a few work well (avoid colors 6, 7, 10, and 18, because their color might change over time). □

Christopher Moore is a professional furniture maker in Brooklyn, N.Y.

Photo, this page (bottom left): Molly FitzSimons

CLASSIFIED

The Classified rate is $9.50 per word, 15 word min. Orders must be accompanied by payment, ads are non-commissionable. The WOOD & TOOL EXCHANGE is for private use by individuals only; the rate is $15/line, min. 3 lines. Contact: Ads@Taunton.com 866-5054687 Toll Free. Deadline for the May/June 2018 issue is February 9, 2018.

Business Opportunities

UNIQUE OPPORTUNITY – Specialized precision woodworking business for sale. Contact Rick Wheeler: rick@roselandpiano.com

Hand Tools

DIEFENBACHER TOOLS – Fine imported and domestic hand tools for woodworkers. www.diefenbacher.com (720) 502-6687 or ron@diefenbacher.com

USED AND ANTIQUE HAND TOOLS wholesale, retail, authentic parts also (415) 924-8403, pniederber@aol.com always buying.

Instruction

PENLAND SCHOOL OF CRAFTS, in the spectacular North Carolina mountains, offers one-, two-, and eight-week workshops in woodworking and other media. (828) 765-2559. www.penland.org

Wood

FIGURED CLARO WALNUT for architectural as well as musical instrument projects. (530) 268-0203. www.woodnut.com

QUALITY NORTHERN APPALACHIAN hardwood. Custom milling. Free delivery. Bundled, surfaced. Satisfaction guarantee. Niagara Lumber. 800-274-0397. www.niagaralumber.com

RARE WOODS - Ebony, boxwood, rosewood, satinwood, ivory wood, tulipwood + 120 others. (207) 364-1073. www.rarewoodsusa.com

LONGLEAF HEART PINE (antique). Flooring-lumber-millwork. Red cedar lumber & paneling. Lee Yelton: (706) 541-1039.

NORTH/CENTRAL VIRGINIA: Complete line of premium, kiln-dried hardwoods. Culpeper/Warrenton area. (540) 825-1006. cpjohnsonlumber.com

EISENBRAND EXOTIC HARDWOODS - Over 100 species. Highest quality. Volume discounts. Brochure. 800-258-2587. eisenbrandhardwoods.com

WOOD AND TOOL EXCHANGE

Limited to use by individuals only.

For Sale

Fine Woodworking issues 1 – present (in slipcases) $550.00 plus shipping. *Fine Homebuilding* issues 1 – present (in slipcases) $450.00 plus shipping. Buy both and get *Home Furniture* issues 1 – 14, also in slipcases. All are in excellent condition. crabbyhag@blackfoot.net (MT)

Fine Woodworking magazine: issues 1 – 233, $200.00 cash in Ohio. Ph: (330) 359-0154. Plus shipping.

Fine Woodworking issues 1 – 220 (13 missing). All in excellent condition. Asking $400 plus shipping. Call for particulars: (802) 985-2555. (VT)

Fine Woodworking 1– 266. Great condition. $400. plus shipping. lawsonwoodworking@hotmail.com Duane Lawson. (MO)

1300 CUTTER BITS: Molding knives of all designs and various thicknesses, some in boxes. Box of new short carbide planer blades. All from Grand Rapids furniture factory. $2600. plus shipping; must take all. PH: (989) 386-2692 after 7PM EST, will email photos. 80 yrs. old and retiring. (MI)

WOODWORKERS MART

Inheritance

BY MICHAEL CULLEN

A few years ago, while driving home to California from the East Coast, I decided on the spur of the moment to take a detour and head north to Pocatello, Idaho, where I was born and where three generations of Cullens lived before me. Essentially, I would be following the Oregon Trail, the very route my ancestors took by wagon and on foot when they arrived in Idaho in the 1850s.

This photograph, taken in Pocatello around 1912, shows my great-grandfather, James Cullen Sr., with two of his sons. In his mid-40s at the time, he was the father of nine children and an accomplished woodworker. His son James, my grandfather (at right in photo), followed him into woodworking, beginning an apprenticeship at age 16 in carpentry and cabinetmaking with the Northern Pacific Railroad in Idaho. He would go on to work for them for 49 years, building everything from train stations to trestle bridges, cabinetry to simple furniture.

During the long, dry, Idaho summers, my grandfather would build houses for extra money. He built a house for his own family in Pocatello, and as a child I was lucky enough to see him work at his bench in the basement. When I was 9, he showed me how to make a mount for the pair of deer antlers I had bought earlier that summer at Yellowstone. He began by tacking two brads, separated by a few inches, into the back of a rectangular piece of walnut. Then he fashioned a loop from a section of string. Without saying a word, he fitted the loop over the brads and drew it tight with a pencil; carefully, in a planetary motion, he traced out a perfect ellipse onto the walnut blank. For me, it was like witnessing magic, and at that moment, still unknown to both of us, I became a woodworker.

During my recent visit to Pocatello I stayed with a cousin whom I hadn't seen in a decade, and of course we talked all about the family. One morning he led me to a closet under the stairs and opened it to show me an amazing collection of our grandfather's tools. My cousin isn't a woodworker, but he clearly respected the tools—they were all carefully separated and placed on shelves, all their parts intact and without a speck of rust anywhere. He had rescued them from our grandfather's workshop after his death in 1987 and stored them safely for all these years. As we looked through the tools together, I described how each one worked and we traded stories back and forth about our grandfather.

Then my cousin spontaneously broke in and said, "You should have these tools—I know you will use them and care for them." I was floored, to say the least. I found it difficult to respond; I was astonished by his generosity and just never expected to have such a treasure come my way.

When I got home and unpacked the tools at my workshop I discovered that some of them were marked "JFC"—my grandfather's initials—while others carried a lone "C" on the casting. Further inspection revealed that all the tools with "C" were from the turn of the 20th century or before. These must originally have belonged to my great-grandfather and been handed down to his son in the 1920s. Now, nearly a century later, they were being handed down again, this time to his great-grandson.

These tools along with all the others I have collected over my career are now housed together in a chest I made long ago. It's impossible not to favor the tools of my ancestors, and to think as I use them about holding the same plane as they did, for the same purpose, and the same livelihood. And every so often I think perhaps it's time to buy a set of letter punches so I can add "MC" alongside their initials. Maybe, somewhere down the line, another maker will ask, "MC—I wonder where he fits in with C and JFC?" □

Michael Cullen has been making custom furniture in Petaluma, Calif., since 1990. Send your woodworking story to bench@taunton.com; we'll pay for any that we publish.

Photo: courtesy of Michael Cullen

ROUGH CUT
with Fine Woodworking

Get ready for ROUGH CUT,
now brought to you by *Fine Woodworking*

In partnership with WGBH Boston, the new season features new host Tom McLaughlin in his New Hampshire shop. It's a full season of new projects and skill-building techniques, coming this spring.

Check local listings for times on your public television station.

Rough Cut with Fine Woodworking is a production of WGBH Boston and distributed by American Public Television.

Manual Meets Digital

Owain Harris, who builds custom cabinets in Deerfield, N.H., was raised in a family of teachers and writers and he assumed early on he might follow them into academia. But after working as a frame and finish carpenter, he was drawn into cabinetmaking. "I'd always enjoyed puzzles and problem solving," he says, "and woodworking was the ultimate problem to solve." One puzzle with his recent sideboard was how to create the colorful inlay on top of its solid walnut case. The solution involved a combination of hand, machine, and digital technologies. To cut the circles and curving grooves for the inlay, Harris used his ShopBot CNC router to generate plywood templates, which he followed with a handheld router. To coax the holly stringing to its tightest curves, he used hot-pipe bending. And to make perfect disks of pressure-dyed veneer, he did layout with an architect's circle template, cut to the line with an X-Acto knife, and cleaned up with sandpaper. Making the scalloped and bowed doors and drawer fronts was another technical challenge; he answered it by using the ShopBot to carve a plywood substrate, a vacuum press to apply fumed eucalyptus veneer, and a long-armed shopmade inlay tool to create grooves for the holly stringing. Looking ahead, Harris says, "with so many tools, techniques, and strategies to figure out, I'm always excited to build the next piece." *—Jonathan Binzen*

Photos: Bill Truslow