31-Day Holiday Giveaway

Win Tommy Mac's Toolbox!

Popular Woodworking Magazine

December 2012 ■ #201

Dovetailed Chest
Build a Classic Case for Your Treasured Tools

Geometric Tabletop
Make a Pinwheel Pattern Using Shop-Sawn Veneers

12 Tips for Better Woodworking
Top Techniques for Shop Success

Hand-tool Stool
Simple, Useful & Traditional

Hollows & Rounds
These Planes Make Any Profile Possible

fw media
US $5.99
12
0 74470 01355 6
Display until January 7, 2013

popularwoodworking.com

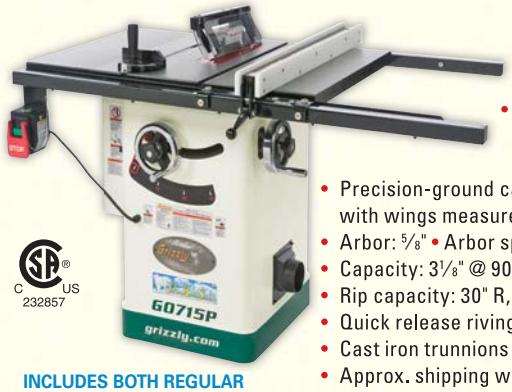
Grizzly Industrial®

PURVEYORS OF FINE MACHINERY®, SINCE 1983!

- OVER 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 ALL 3 LOCATIONS • MOST ORDERS SHIP THE SAME DAY

10" HYBRID TABLE SAW

BEAUTIFUL WHITE COLOR!



- Motor: 2 HP, 110V/220V, single-phase
- Precision-ground cast iron table with wings measures: 27" x 40"
- Arbor: 5/8" • Arbor speed: 3850 RPM
- Capacity: 3 1/8" @ 90°, 2 3/16" @ 45°
- Rip capacity: 30" R, 12" L
- Quick release riving knife
- Cast iron trunnions
- Approx. shipping weight: 404 lbs.

CSA C US 232857

INCLUDES BOTH REGULAR & DADO BLADE INSERTS

G0715P ~~$795.00~~ **SALE $725.00** $99 shipping

10" CABINET TABLE SAW with Riving Knife & Extension Rails

- Motor: 3 HP, 220V, single-phase • Precision-ground cast iron table
- Table size with extension: 27" x 74 3/4" • Arbor: 5/8" • Arbor speed: 4300 RPM
- Max. depth of cut: 3 1/8" @ 90°, 2 3/16" @ 45° • Max. rip capacity: 50" • Max. dado width: 13/16" • Approx. shipping weight: 572 lbs.

CSA C US 232857

FREE 10" CARBIDE-TIPPED BLADE

See our website for Reviews & Awards grizzly.com

Wood Magazine Top Value Approved 2009

G0691 ~~$1425.00~~ **SALE $1395.00** $150 shipping

10" LEFT-TILTING CONTRACTOR-STYLE TABLE SAW with Riving Knife

- Motor: 1 1/2 HP, 110V/220V, single-phase
- Precision-ground cast iron table with wings
- Table size: 25 1/4" x 40" • Arbor: 5/8" • Arbor speed: 4000 RPM • Capacity: 3 1/8" @ 90°, 2 1/4" @ 45°
- Rip capacity: 30" R, 12" L • Approx. shipping weight: 221 lbs.

MADE IN TAIWAN

New!

FREE 10" CARBIDE-TIPPED BLADE

MADE IN ISO 9001 FACTORY!

$99 shipping

G0732 ~~$795.00~~ **SALE $650.00**

10" LEFT-TILTING TABLE SAWS w/Riving Knife & Cast Iron Router Table

- Motor: 3 HP or 5 HP, 240V, single-phase
- Precision-ground cast iron table size with wings: 27" x 48" • Arbor: 5/8" • Cutting capacity: 25 5/8" R, 8" L
- Max. depth of cut: 3" @ 90°, 2 1/8" @ 45°
- Approx. shipping weight: 546 lbs.

See our website for Reviews & Awards grizzly.com

MADE IN TAIWAN

FREE 10" CARBIDE-TIPPED BLADE

$150 shipping

CSA C US 177335

G1023RLW 3 HP ~~$1250.00~~ **SALE $1225.00**

G1023RLWX 5 HP ~~$1350.00~~ **SALE $1295.00**

10" CABINET TABLE SAW with Riving Knife

- Motor: 3 HP, 220V, single-phase
- Precision-ground cast iron table
- Table size with extension: 27" x 40"
- Arbor: 5/8" • Arbor speed: 4300 RPM
- Max. depth of cut: 3 1/8" @ 90°, 2 3/16" @ 45°
- Max. rip capacity: 29 1/2"
- Max. dado width: 13/16"
- Approx. shipping weight: 542 lbs.

3 HP LEESON® MOTOR!

FREE 10" CARBIDE-TIPPED BLADE

CSA C US 232857

G0690 ~~$1325.00~~ **SALE $1295.00** $150 shipping

ULTIMATE 14" BANDSAW

- Motor: 1 HP, 110V/220V, single-phase, TEFC
- Precision-ground cast iron table size: 14" sq.
- Table tilt: 15° L, 45° R
- Cutting capacity/throat: 13 1/2"
- Max. cutting height: 6"
- Blade size: 92 1/2"–93 1/2" L (1/8"–3/4" W)
- Blade speeds: 1500 & 3200 FPM
- Approx. shipping weight: 196 lbs.

CSA C US 252923

See our website for Reviews & Awards grizzly.com

MADE IN TAIWAN

MADE IN ISO 9001 FACTORY!

G0555P ~~$495.00~~ **SALE $475.00** $79 shipping

19" HEAVY-DUTY BANDSAW

MADE IN TAIWAN

- Motor: 3 HP, 220V, single-phase, TEFC, 60 Hz
- Precision-ground cast iron table size: 26 3/4" x 19"
- Table tilt: 5° L, 45° R
- Cutting capacity/throat: 18 1/4"
- Max. cutting height: 12"
- Blade size: 143" L (1/8"–1 1/4" W)
- Blade speeds: 1700 & 3500 FPM
- Approx. shipping weight: 480 lbs.

CSA C US 252923

EXTREME SERIES

MADE IN ISO 9001 FACTORY!

DELUXE RE-SAW FENCE INCLUDED

$99 shipping

G0514X2 ~~$1495.00~~ **SALE $1395.00**

17" HEAVY-DUTY BANDSAWS

INCLUDES DELUXE EXTRUDED ALUMINUM FENCE, MITER GAUGE & 1/2" BLADE

- Motor: 2 HP, 110V/220V, single-phase, TEFC • Precision-ground cast iron table size: 17" sq.
- Table tilt: 10° L, 45° R
- Cutting capacity/throat: 16 1/4"
- Max. cutting height: 12 1/8"
- Blade size: 131 1/2" L (1/8"–1" W)
- Blade speeds: 1700 & 3500 FPM
- Quick release blade tension lever • Approx. shipping weight: 342 lbs.

MADE IN TAIWAN

See our website for Reviews & Awards grizzly.com

$99 shipping

G0513P ~~$895.00~~ **SALE $850.00**

ALSO AVAILABLE **G0513** HEAVY-DUTY 17" BANDSAW (GREEN & TAN) ~~$950.00~~ **SALE $850.00**

PRICING CODE 12P0P
MENTION THIS CODE WHEN PLACING YOUR ORDER
15171

FOLLOW US ON

1-800-523-4777

3 GREAT SHOWROOMS!
BELLINGHAM, WA • MUNCY, PA • SPRINGFIELD, MO

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

FULL YEAR WARRANTY GRIZZLY Power Tools Machinery

CARD #57 or go to PWFREEINFO.COM

FREE BROKERAGE RATES ON MACHINERY ORDERS TO CANADA!
PLEASE VISIT GRIZZLY.COM® FOR DETAILS

INCREDIBLE HOLIDAY SALE
NOV. 1st - DEC. 31st

FREE CATALOG
712 PAGES
A HUGE SELECTION OF HIGH QUALITY MACHINES & TOOLS

12" JOINTER/PLANER COMBINATION MACHINES

NEW END-MOUNTED FENCE

MADE IN TAIWAN

WOOD HOT NEW TOOLS 2006

- Motor: 5 HP, 220V, single-phase
- Jointer table size: 14" x 59½"
- Cutterhead dia.: 3⅛"
- Cutterhead 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"
- Planer table size: 12¼" x 23⅛"
- Approx. shipping weight: 734 lbs.

CARBIDE INSERT SPIRAL CUTTERHEAD!

TOP VALUE AWARD

Reviews & Awards

$150 shipping

G0634XP ~~$2195.00~~ SALE $2150.00

ALSO AVAILABLE

G0633 3 KNIFE JOINTER/PLANER ~~$1995.00~~ SALE $1950.00

G0634Z SPIRAL CUTTERHEAD MODEL ~~$2450.00~~ SALE $2395.00

CYCLONE DUST COLLECTOR

MADE IN TAIWAN

- Motor: 1½ HP, 110V/220V, single-phase, TEFC, 3450 RPM
- Air suction capacity: 775 CFM
- Static pressure at rated CFM: 1.08"
- Intake port: 6" with included 5" optional port
- Impeller: 13½"
- Height: 65½"
- Built-in remote control switch
- Approx. shipping weight: 210 lbs.

PLEATED FILTER IS PROTECTED BY A STEEL CAGE

ONLY 65½" TALL!

FULLY MOBILE WITH BUILT-IN CASTERS

BEAUTIFUL WHITE COLOR!

G0703P ONLY $725.00 $79 shipping

8" JOINTERS

- Motor: 3 HP, 220V, single-phase, TEFC
- Precision-ground cast iron table size: 9" x 72½"
- Max. depth of cut: ⅛"
- Max. rabbeting depth: ½"
- Cutterhead dia.: 3"
- Cutterhead speed: 5000 RPM
- Cuts per minute: 20,000
- Approx. shipping weight: 500 lbs.

FREE SAFETY PUSH BLOCKS

$150 shipping

BUILT-IN MOBILE BASE

CHOOSE EITHER 4 HSS KNIVES OR SPIRAL CUTTERHEAD MODEL

4 KNIFE CUTTERHEAD

G0656P ~~$795.00~~ SALE $715.50

SPIRAL CUTTERHEAD

G0656PX ~~$1195.00~~ SALE $1075.50

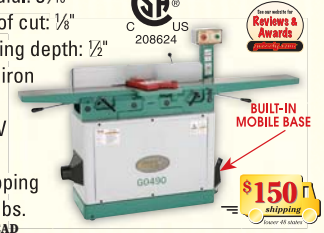
8" X 76" JOINTERS

- Motor: 3 HP, 240V, single-phase, TEFC, 3450 RPM
- Precision-ground cast iron table size: 8" x 76⅜"
- Infeed table size: 8" x 43⅜"
- Cutterhead knives (G0490): 4 HSS, 8" x ¾" x ⅛"
- Cutterhead speed: 5350 RPM
- Cutterhead dia.: 3⅜16"
- Max. depth of cut: ⅛"
- Max. rabbeting depth: ½"
- Deluxe cast iron fence size: 36" L x 1¼" W x 5" H
- Approx. shipping weight: 597 lbs.

FREE SAFETY PUSH BLOCKS

CSA C US 208624

Reviews & Awards



BUILT-IN MOBILE BASE

$150 shipping

4 KNIFE CUTTERHEAD

G0490 ~~$945.00~~ SALE $850.50

SPIRAL CUTTERHEAD

G0490X ~~$1250.00~~ SALE $1125.00

10" DRUM SANDER

- Motor: 1½ HP, 110V, single-phase
- Conveyor motor: 1/10 HP
- Drum speed: 2300 FPM
- Drum size: 5⅛" x 10"
- Max. sanding width: 10"
- Max. workpiece height: 3"
- Min. workpiece height: ¼"
- Variable feed speeds: 1–10 FPM
- 4" dust port
- Approx. shipping weight: 220 lbs.

WHEELS & STOWABLE TRANSPORT HANDLES FOR MOBILITY

$79 shipping

G0716 ~~$415.00~~ SALE $375.00

15" PLANERS

- Motor: 3 HP, 220V, single-phase
- Precision-ground cast iron table size: 15" x 20"
- Min. stock thickness: 3/16"
- Min. stock length: 8"
- Max. cutting depth: ⅛"
- Feed rate: 16 FPM & 30 FPM
- Cutterhead speed: 5000 RPM
- Approx. shipping weight: 660 lbs.

CHOOSE EITHER 3 KNIFE OR SPIRAL CUTTERHEAD MODEL

BUILT-IN MOBILE BASE

$150 shipping

3 KNIFE CUTTERHEAD

G0453P ~~$1050.00~~ SALE $945.00

SPIRAL CUTTERHEAD

G0453PX ~~$1650.00~~ SALE $1485.00

20" PLANERS

Z SERIES

- Motor: 5 HP, 240V, single-phase
- Precision-ground cast iron table size: 20" x 25¾" (20" x 55½" w/ extension)
- Max. cutting height: 8"
- Max. cutting depth: ⅛"
- Feed rate: 16 & 20 FPM
- Cutterhead dia.: 3⅛"
- Cutterhead knives: 4 HSS (G0454)
- Cutterhead speed: 5000 RPM
- Approx. shipping weight: 920 lbs.

2 SPEEDS!

CSA C US 208624

BUILT-IN MOBILE BASE

$179 shipping

4 KNIFE CUTTERHEAD

G0454 ~~$1575.00~~ SALE $1417.50

SPIRAL CUTTERHEAD

G0454Z ~~$2495.00~~ SALE $2245.50

1 HP WALL MOUNT DUST COLLECTOR

MADE IN TAIWAN

- Motor: 1 HP, 110V/220V,single-phase
- Amps: 14/7 • Intake size: 4"
- Bag size (dia. x depth): 13½" x 24"
- Balanced steel, radial fin impeller
- Air suction capacity: 450 CFM
- Max. static pressure: 7.2"
- Approx. shipping weight: 51 lbs.

SPECIAL WALL MOUNT DESIGN!

EASY MOUNTING WALL BRACKET & LOCKING THUMB SCREW SECURES DUST COLLECTOR IN PLACE!

G0710 ~~$174.95~~ SALE $159.95

VISA MasterCard AMERICAN EXPRESS DISCOVER NOVUS

grizzly.com®

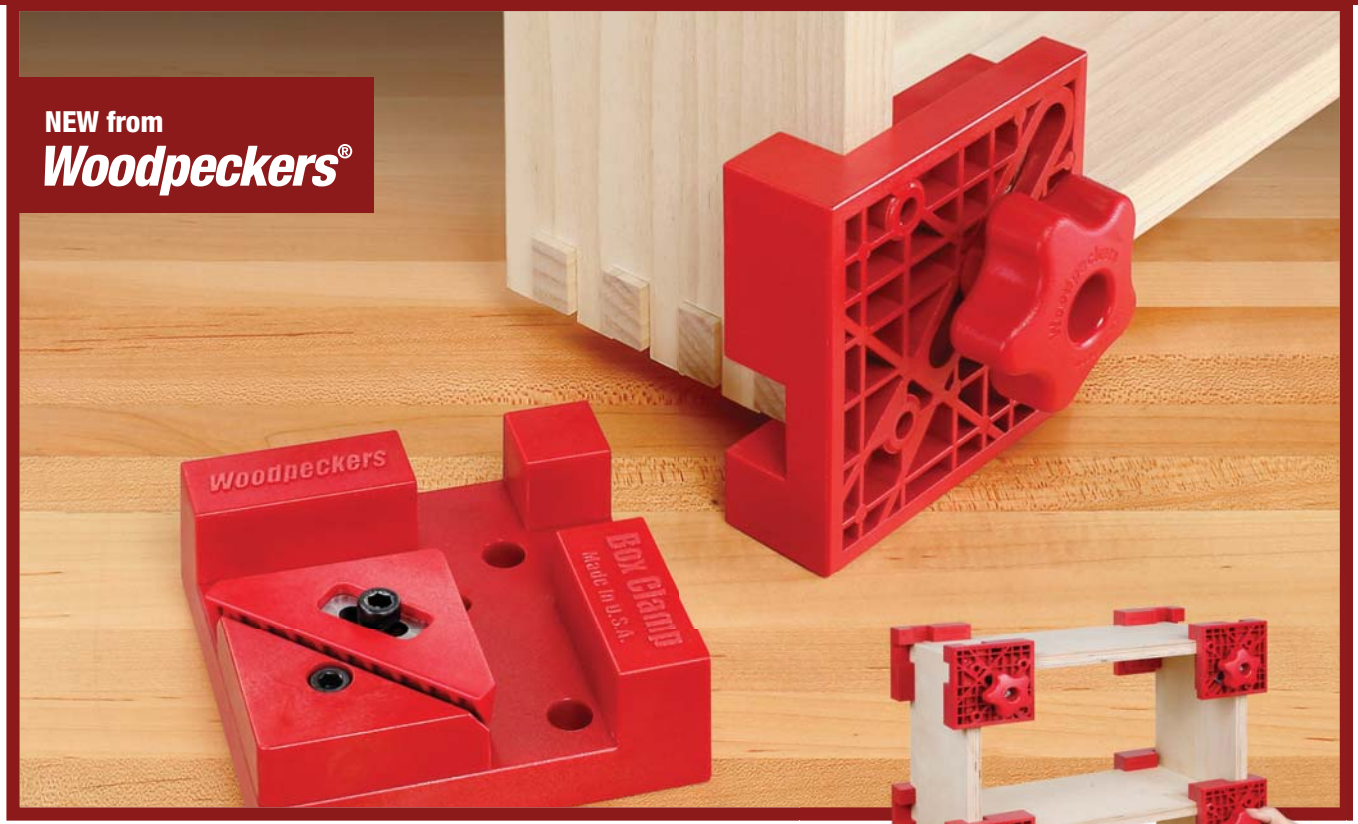
OVER 12,000 PRODUCTS ONLINE!

GRIZZLY GIFT CERTIFICATES TAKE THE GUESSWORK OUT OF GIVING!

PayPal BillMeLater

Square Up Your Projects

Faster Than Ever



The New Woodpeckers Box Clamp™ is just the ticket for your cabinet and box making projects. This simple tool eliminates the hassle of cumbersome bar clamps and eliminates the need to continuously make adjustments to square the corners.

Imagine being able to dry-fit all parts at the same time without any clamps to interfere with the assembly process. You'll know right from the start if your project is square and be able to confirm part placement and dimensions.

Even better, you can to do all that without a second set of hands. Once your project is glued and clamped, you can easily install pocket screws from the inside or any other fasteners from the outside. Both parts will be square and secure from unwanted movement.

Woodpeckers Box Clamps are designed for most 90 degree joints including pocket hole joints, lap joints, dado as well as T-joints. Virtually any joint found in common cabinetry.

The new Box Clamp™ is also perfect for box joints, half-blind and through dovetail joints. Whether the corner is flush or has material extending from the surface, the clearance is there to ensure a square corner.

When you need square corners, you can't beat the Woodpeckers Box Clamp™.

Made in U.S.A. **On sale for only $36^{99} a pair.**

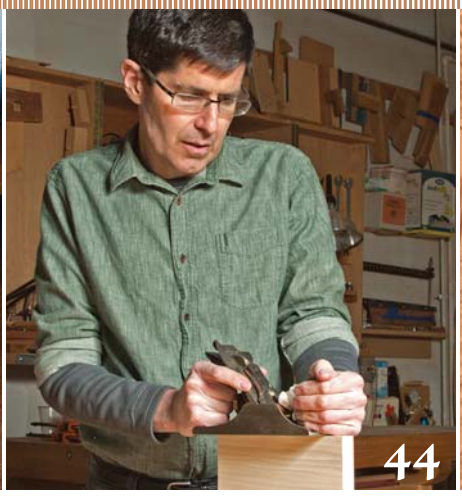
See our full line of American made woodworking tools at ***woodpeck.com*** *and your local dealer.*

11050 Industrial First Ave. • North Royalton, Ohio 44133 • (800) 752-0725

CARD #52 or go to PWFREEINFO.COM

CONTENTS

DECEMBER 2012



FEATURES

COVER PHOTO BY JOE CIARCIA/SYMPHONY PHOTOGRAPHY; STOOL PHOTO BY CHRISTOPHER SCHWARZ;
PARQUETRY PHOTO BY HEATHER TROSDAHL; BODY MECHANICS PHOTO BY JEFF MILLER; HOLLOWS & ROUNDS PHOTO BY AL PARRISH

Popular Woodworking Magazine

31 Days of Christmas Sweepstakes

To celebrate the season, *Popular Woodworking Magazine* and its sponsors are giving away a prize a day throughout December. To earn your chance, you must enter separately for each day's prize. All entrants will qualify for the Grand Prize: a custom-made toolbox by Tommy MacDonald, host of the PBS TV series *"Rough Cut: Woodworking with Tommy Mac,"* filled with hand tools from Woodcraft.

More than $9,000 in Prizes with a Winner Every Day!

Enter Every Day in December!

1 BOSCH

Colt™ Router Plunge Base Kit

www.boschtools.com

2 RIKON POWER TOOLS

Variable-Speed Mini Lathe

www.rikontools.com

3 FORREST

10" Woodworker II Saw Blade

www.forrestblades.com

4 BESSEY Simply better.

K-Body REVO Clamps, Set of KP Blocks

www.besseytools.com

5 HORIZON WOOD PRODUCTS

20 BF of matched-flitched cherry

www.horizonevolutions.com

6 Titebond PROFESSIONAL WOOD GLUES

1 gal Titebond Original Glue

www.titebond.com

7 Earlex

Spray Station Gemini

www.earlex.com

8 EASY WOOD TOOLS MADE IN AMERICA

Set of 3 Mid-size Turning Tools

www.easywoodtools.com

9 Kreg

Master System K4MS Pocket Hole Jig

www.kregtool.com

10 MIRKA

CEROS 550 CV Random-Orbit Sander

www.mirka-usa.com

11 GENERAL INTERNATIONAL

10" Left-tilt 2-HP Table Saw

www.general.ca

12 Woodpeckers®

V2 Precision Router Lift

www.woodpeck.com

13 BOSCH

23 Gauge Pin Nailer

www.boschtools.com

14 Blue Spruce Toolworks

Hand tools for your finest work

½" Dovetail Paring Chisel

www.bluesprucetoolworks.com

15 BESSEY Simply better. General Purpose Clamp Kit

www.besseytools.com

16 DMT

10" DuoSharp® Bench Stone w/ Base

www.dmtsharp.com

17 Wood Vise Screw Premium Kit

LAKE ERIE TOOLWORKS Traditional Tools for Today's Woodworker

www.lakeerietoolworks.com

18 MASTERPIECE WOOD FINISH

3-part Oil/wax Finishing System

www.masterpiecewoodfinish.com

19 PROFESSIONAL Titebond WOOD GLUES

1 gal Titebond III

www.titebond.com

20 The Finishing Store.com

$200 Savings Coupon

www.thefinishingstore.com

21 HAMILTON 2005 TONITOWN, AR

Traditional Marking Gauge

www.hamiltontools.com

22 LEIH Leigh Router Joinery Jigs

R9 Dovetail Jig

www.leighjigs.com

23 BLOKKZ

Universal Clamping Blocks

www.blokkz.com

24 30 Clamps: BTB30 Kit BESSEY Simply better.

www.besseytools.com

25 JET

10" ProShop Table Saw w/ 52" Rip Capacity

www.jettools.com

26 Lee Valley

Set of 5 Veritas Bench Chisels

www.leevalley.com

27 KNEW CONCEPTS

Woodworkers Fret Saw

www.knewconcepts.com

28 DMT

Set of Three 8" Dia-Sharp® Bench Stones

www.dmtsharp.com

29 HOCK www.HOCKTOOLS.com

Spokeshave Kit

www.hocktools.com

30 MultiMaster Start Q Sander

www.feinus.com

31 WOODCRAFT

GRAND PRIZE

Custom Toolbox by Tommy Mac filled with Hand Tools from Woodcraft

www.woodcraft.com

Enter every day at popularwoodworking.com/31days

Popular Woodworking Magazine and its sponsors will award one prize each day in the month of December. The prize pictured on the calendar date is the prize offered for that day. To register for a chance to win each prize, you must enter on the day it is offered. You may enter as many of the daily contests as you like; limit one entry per day. All entrants from the first 30 days of the contest will be eligible for the Grand Prize, which is a custom-made toolbox by Tommy MacDonald filled with tools from Woodcraft. Visit popularwoodworking.com/31days for a full list of rules and restrictions.

Registration starts at 12:01 AM on December 1, 2012, and ends at midnight on December 31, 2012.

800-472-6950

LaVergne, TN

WOODLINE

Great Carbide Bits
Great Prices

What can we help you make today?

We carry the full line of Franmar products. We have what you need to get the job done right without harming yourself or the environment.

FRANMAR Chemical
Solutions From Soybeans!

For creating forms, arcs and curves, the CMT flexible template is easy, safe and accurate. 39", 47" & 78" lengths available starting at $61.99.

New *CMT ITK Plus*™

CMT has introduced a new line of thin-kerf saw blades which reduces material waste and demand on the saw, while delivering reliable, industrial-quality performance cut after cut.

Need some new ideas for holiday gifts? Our bowl & tray bits and more than 60 styles of templates for only $16.95 each can provide the inspiration you need. It's always more special when you make it yourself.

It's easy!
We can show you how.

A 16" or 19" UltraMag Fence™ makes a great gift.
Prices start at $79.95.

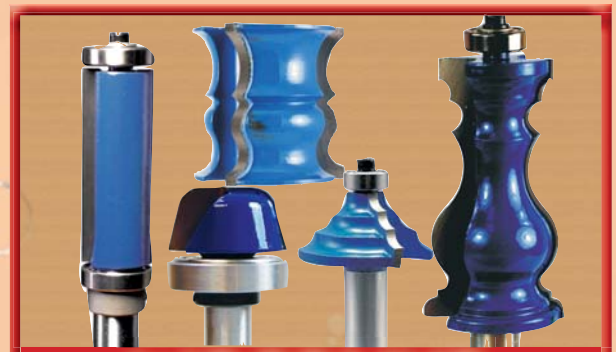
For sales promotions and upcoming events
Like us on Facebook

Woodline.com - your complete source for

CMT ORANGE TOOLS™

Where the Contractor, Woodworker and Cabinetmaker Meet

at 25% off list prices.



WOODLINE
Quality Carbide Router Bits, Shaper Cutters & More

800-472-6950

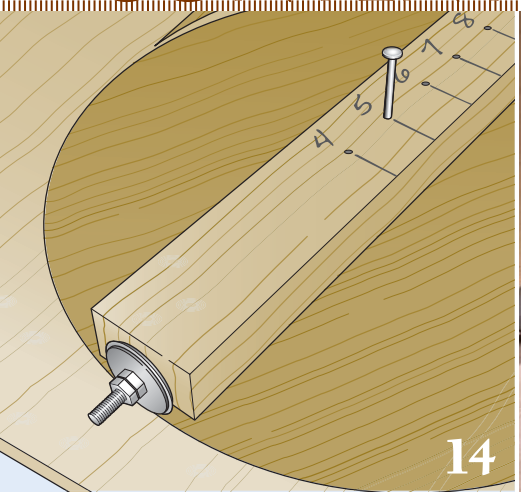
WOODLINE.COM

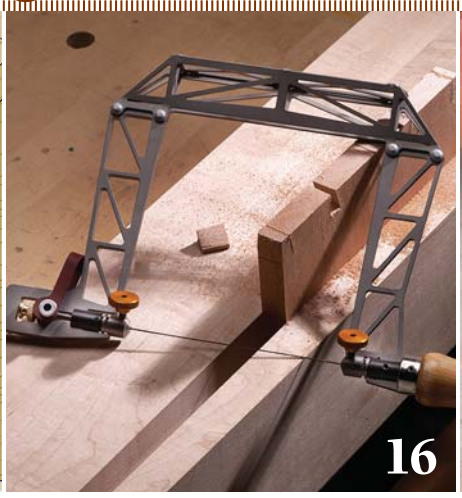
Request or view our catalog online.

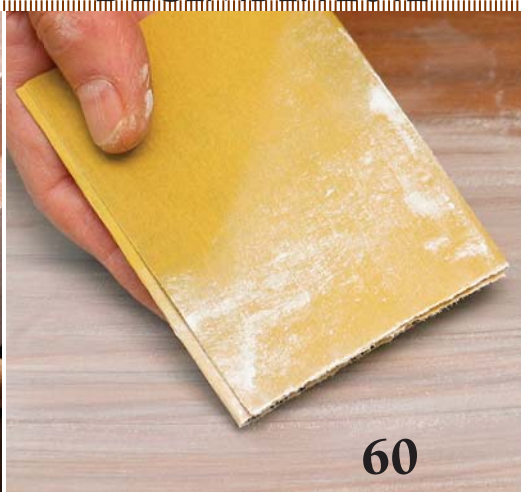
CARD #50 or go to PWFREEINFO.COM

CONTENTS

DECEMBER 2012







REGULARS

POPULAR WOODWORKING MAGAZINE

Number 201, December 2012. *Popular Woodworking Magazine* (ISSN 0884-8823,USPS 752-250) is published 7 times a year, February, April, June, August, October, November and December, which may include an occasional special, combined or expanded issue that may count as two issues, by F+W Media, Inc. Editorial and advertising offices are located at 8469 Blue Ash Road, Suite #100, Cincinnati, OH 45236. Unsolicited manuscripts, photographs and artwork should include ample postage on a self-addressed, stamped envelope (SASE); otherwise they will not be returned. Subscription rates: A year's subscription (7 issues) is $24.95; outside of the U.S. add $7/year • Canada Publications Mail Agreement No. 40025316. Canadian return address: 2835 Kew Drive, Windsor, ON N8T 3B7 •

Periodicals postage paid at Cincinnati, Ohio, and additional mailing offices. Postmaster: Send all address changes to *Popular Woodworking Magazine*, P.O. Box 420235, Palm Coast, FL 32142-0235 Canada GST Reg. # R122594716 • Produced and printed in the U.S.A.

ILLUSTRATION BY MARY JANE FAVORITE; COPING SAW & BOOKSHELF/WINE RACK PHOTOS BY AL PARRISH; FINISHING PHOTO BY BOB FLEXNER

Good Enough is Sometimes Best

On the way to supper a few weeks ago we walked past the local hardware store (yes, a few still exist) and at the wide plate-glass window my son, Locke, stopped and stood with his mouth agape. Behind the glass was a kid's set of "Real Tools." Small, but real. There was a hard hat, a steel hammer, a tape measure, a chalk box, chalk and a square. There were also safety glasses, a tool belt and a pair of suspenders (evidently, we should all be wearing those).

When my parents came into town to help celebrate Locke's third birthday, we'd already bought the flying car and everything else a child could want, so I was having a hard time justifying (to my wife) running down to the hardware store and picking up the tool set. Luckily, my parents asked what he might like.

It was the end of a busy week, but Friday after work my father and I stole away to the shop. We were scheduled to light the candles on the cake in an hour, but if I could find a little stock already milled, we might manage a small toolbox to hold Locke's new set of tools.

There are a hundred ways to build a toolbox, but our method was dictated by the clock. We found a few scraps of poplar already milled. We decided the toolbox should be exactly half the length of the longest board and as tall as the shortest of two other scraps. We cut simple angles on the end pieces and rabbeted the sides to accept the full thickness of the ends. The four sides of the box were grooved to house the bottom and the bottom was rabbeted to fit.

We laid on a little glue, countersunk a few screws to hold everything together and then plugged the holes with short lengths of a dowel. We debated the merits of using a fat dowel for the handle but settled on cutting an arch in a piece of flat stock, which we then doweled in place.

There are no dovetails, hidden Chinese joints, figured lumber or exotic veneers. It's just a little toolbox, for little tools. Because while it's good to push yourself, sometimes simple is good enough.

In my living room acting as a plant stand is a small bench that may well be the first piece of furniture my father and I built together when I was a kid. It's a butt-jointed three-board stool, held together with yellow glue (you can still spot the squeeze-out) and a handful of finish nails. How something so poorly built is still rock-solid is beyond me, yet there it sits.

I hope the same will be true for this little toolbox. Perhaps it's because it was made for my son, or because I built it with my father, but this simple little toolbox, built in about 45 minutes, might be one of my favorite pieces.

In the age of Xboxes and PlayStations, iPods and iPads and iEverything else, it's nice to have made something, however simple, that, with luck, my son will still have years from now. Even screws and inelegant dowels trump plastic. Especially now that my 3-year-old has a real steel hammer. **PWM**

Matthew Teague

PHOTO BY THE AUTHOR

POPULAR WOODWORKING MAGAZINE

DECEMBER 2012, VOL. 32, NO. 201
popularwoodworking.com
EDITORIAL OFFICES 513-531-2690

SUBSCRIPTION SERVICES:
Subscription inquiries, orders and address changes can be made at popularwoodworking.com (click on "Customer Service"). Or by mail: *Popular Woodworking Magazine*, P.O. Box 420235, Palm Coast, FL 32142-0235. Or call 386-246-3369. Include your address with all inquiries. Allow 6 to 8 weeks for delivery.

NEWSSTAND DISTRIBUTION:
Curtis Circulation Co., 730 River Road, New Milford, NJ 07646. PHONE: 201-634-7400. FAX: 201-634-7499.

BACK ISSUES are available. Call 800-258-0929 for pricing or visit popularwoodworking.com. Send check or money order to: *Popular Woodworking Magazine* Back Issues, F+W Media Products, 700 E. State St., Iola, WI 54990. Please specify publication, month and year.

Quadrant Stays

I am building a campaign chest and I am having difficulty in the placement of the quadrant stays. I have the stay located as low as possible, but the channel would be pretty wide and I would have to get or fashion a longer piece of brass for the bridge/stop.

Can you provide some insight on placement?

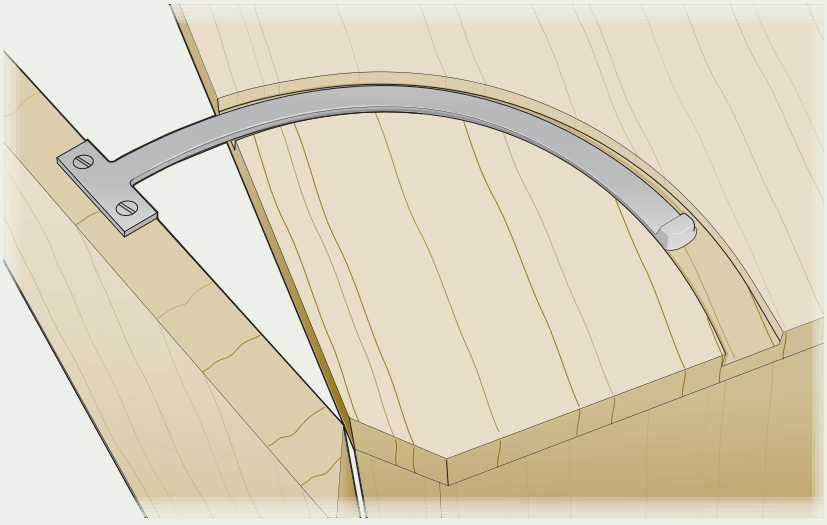
John Schoonover
Radcliff, Kentucky

John,
The quadrant stays do not operate in a perfect arc – or perhaps they do but the pivot point is shifted somehow.

In any case, the channel needs to be wider than the brass hardware. To get the correct width of channel, I traced the shape of the stay at several points (probably 10 or 12 points) between "open" and "closed." This created a true picture of the width of channel that I needed to make.

If you are going to make a pattern for a router equipped with a flush-trim bit, you can make all these tracings on a sheet of paper taped to the drawer side. Then you can remove the paper and use it to make your pattern.

Christopher Schwarz, contributing editor



What Gouge for Texturing?

I plan on making Matthew Teague's box from "4 Boxes, 4 Ways" (August 2012, issue #198). I have made some similar boxes but have never tried my hand at using a gouge for texturing. What size gouge was used? And could you recommend a maker?

Ike Weatherholtz,
Falling Waters, West Virginia

Ike,
The gouge pictured in the magazine is a 5mm No. 3 sweep; a different size will give you just a slightly different look. Woodcraft.com has drawings of profiles beside the photos of their gouges; those will give you some idea of how the end profile will look using each.

For this application, I'd consider gouges less than about 5/16" wide and see what look suits your tastes. My gouges are Pfeil, but I'm no expert on available brands. I also have an old set of carving tools with a few gouges in it from Millers Falls, which I love. As long as I can sharpen it, I'll use it.

Matthew Teague, editor

Full-blind Dovetails

I read the article in the August issue (#198) about campaign furniture and it's fascinating; it's something I've never tried and would like to. But on page 26, Christopher Schwarz explains full-blind dovetails and I'm confused.

Normally, with either a through- or a half-blind dovetail, the tail angle holds the pinned piece against its force; that is, you assemble a drawer by pushing the sides into the front, so pulling on the front gives you the actual wood connection as a holding force.

With this full-blind dovetail it appears to me that both the tails and pins are cut at 90° and assembly is just pushing the top down onto the sides. I'm seeing this joint being held together by a lot of end-grain glue surface and no mechanical lock.

What am I missing?

Matt Waln
via e-mail

Matt,
The full-blind dovetail works exactly like a through-dovetail or a half-blind dovetail joint. The only difference among the three joints is what part of the joint the viewer can see. In the case of the campaign chest, the tails are on the top and bottoms of the chest. The pins are on the ends. All the joints are sloped 14°, which provides the mechanical interlock.

If this is still not making sense, perhaps this will help: Picture a typical through-dovetail joint. Now imagine adding a thick layer of veneer covering the pin board – you've just created a half-blind dovetail joint. Now imagine adding a second layer of thick veneer that covers the tail board – you've just created a full-blind dovetail joint.

In all three joints, the mechanics are the same. The only difference is what part is visible.

Christopher Schwarz, contributing editor

Knife Lines are Your Friends

I plan on cutting stretchers and tenons by hand for a table project on which I'm working, but I'm not sure how to go about it. I can lay out the tenons with

CONTINUED ON PAGE 12

ILLUSTRATION BY MARY JANE FAVORITE

Choose your Elite bench with free storage cabinet!

ELITE 2500
$1,960
Length 99″

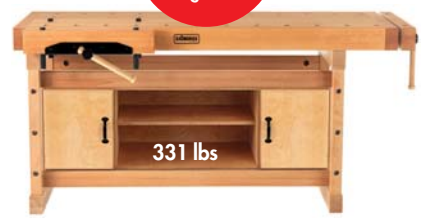
ELITE 2500 Workbench + free Cabinet SM08. Worth $ 500.

For both left and right handed use.

Rock solid and packed with features

- Designed and built by Swedish craftsmen
- European beech top and trestle.
- Top 3 1/4″ thickness with 4 1/4″ skirt
- Massive 29″ full width vises
- Double row of 1″ round steel bench dogs working from both vises
- 10 years warranty

ELITE 2000
$1,860
Length 76″



ELITE 2000 Workbench + free Cabinet SM08. Worth $ 500

ELITE 1500
$1,760
Length 59″

ELITE 1500 Workbench + free Cabinet SM07. Worth $ 400

OPTIONAL ACCESSORIES

QSH Quick Action HoldFast
Works in any dog hole in top and trestle.

My business has me conducting seminars and workshops on hand tool use in locations across Canada, the US and the UK. I have worked on too many benches to remember, though there were a few I would like to forget! Good hand work requires a good bench, the two are inseparable. When I arrive at a location and find a big Sjoberg, it all but guarantees a successful event. I am so adamant about the benches that I will only return to lead a "hands on" event if the facility has proper benches for each student. I have guided several workshops in to purchasing the Sjobergs Elite series 1500, 2000, 2500 and I recommend these to anyone starting out in woodworking. They are solid, flat and heavy!

Rob Cosman
"Your Hand Tool Coach" www.robcosman.com

SJÖBERGS
workbenches – made in sweden

Visit www.sjobergs.se for video and full details of range and specifications

WOODCRAFT®

For A Free Catalog Or To Find Your Local Woodcraft Store, Visit woodcraft.com Or Call 800-225-1153.

CARD #49 or go to PWFREEINFO.COM

CONTINUED FROM PAGE 10

a marking gauge, saw close to the line and trim to the line with a shoulder plane. But in order for the table to be square, opposite stretchers need to be exactly the same length. Can I use the same procedure and saw close, then sneak up to the line with my shooting board? Will this make them identical in length – or is there a better way to match the lengths of two boards?

With a table saw and a crosscut sled this is easy to do, but I would like to dedicate my table saw to long rips (what I think table saws do best). This issue of matching boards in length is compounded when making boxes or frames.

I guess I'm asking if there is some technique to get the same precision with hand tools that you get with power tools when it come to repeatability of length of cut?

Paul Korman
via e-mail

Paul,

If you're using mortise-and-tenon joints, the critical length is the distance between the shoulders. There isn't any reason to fuss with getting the overall lengths perfect, because a bit of a gap at the bottom of the mortise won't hurt anything. I intentionally leave a small gap to make room for glue and bits of junk and to ensure that the shoulders are tight.

Your try square and marking knife are your allies in this. Clamp the parts together and mark the length between the shoulders at the same time with your knife. Practice sawing so you can get a square shoulder right next to the line. If you're off a bit, trim back to the knife line with your shoulder plane or a chisel, but don't go beyond the lines.

The first few might take a while and make you nervous, but with a little practice this is a reliable and time-tested method.

Robert W. Lang, executive editor

Nut Block Attachment for a Wooden Leg Vise

I am building a Roubo bench out of Southern yellow pine and am ready to install the nut block of a Big Wood Vise (bigwoodvise.com) in the front leg.

My question is how to hold the nut block in the leg? In Christopher Schwarz's book "Workbenches," he mentions attaching it with 3" screws. How has that worked out over the years?

Tom Erbaugh
via e-mail

Tom,

Christopher's 2005 Roubo (the one that appears in "Workbenches") uses a metal screw. The metal collar for it is screwed on to the back of the leg, with the threaded hole centered on the hole through the leg. He is still using that same vise hardware on that bench (although he's since removed the crochet on the left front), and to the best of my knowledge, he has no complaints with it after almost seven years of daily use.

However, you're installing the same wooden screw that I have on my "Gluebo" (the "LVL Workbench" that was featured in the November 2009 issue, #179), and the attachment method is a bit different. After drilling the clearance hole for the screw through the leg, align the hole in the block with the hole in the leg, then scribe (or pencil) a line across the top and bottom edge of the nut block. Now waste away the material between those lines to create a mortise that's half the depth of the leg's thickness. Set the nut block in the completed mortise, then secure it in place with four countersunk screws – one at each corner. **PWM**

Megan Fitzpatrick, executive editor

ONLINE EXTRAS

Letters & Comments

At popularwoodworking.com/letters you'll find reader questions and comments, as well as our editors' responses.

We want to hear from you.

Popular Woodworking Magazine welcomes comments from readers. Published correspondence may be edited for length or style. All published letters become the property of *Popular Woodworking Magazine*.

Send your questions and comments via e-mail to popwood@fwmedia.com, or by mail to 8469 Blue Ash Road, Suite 100, Cincinnati, OH 45236.

PHOTO BY AL PARRISH

Highly Recommended

The Veritas molded-spine dovetail saws don't look like traditional tools, but they work every bit as well – and at a lower price – as saws offered by other manufacturers ($68, leevalley.com).

Available with 14 teeth per inch (tpi) for stock thicker than 1/2" and 20 tpi for thin stock, the carbon-steel blade is 9 1/4" long, .020" thick with a 1 9/16" depth of cut.

These bubinga-handled saws are an excellent choice for beginners and non-beginners alike, if you don't mind the non-traditional look.

— Robert W. Lang

POPULAR WOODWORKING MAGAZINE

Customer Service

How can I contact customer service with questions regarding my subscription, including a lost or damaged issue?
Visit popularwoodworking.com/customerservice. Or write to Popular Woodworking Magazine, *P.O. Box 421751, Palm Coast, FL 32142-1751. Or, if you prefer the telephone, call 1-877-860-9140 (U.S. & Canada), 386-246-3369 (International) and a customer service representative will be happy to help you.*

When does my subscription expire?
The date of your subscription expiration appears on your magazine mailing label, above your name. The date indicates the last issue in your subscription.

Can I get back issues of *Popular Woodworking* and *Woodworking Magazine*?
Back issues are available while supplies last. Visit popularwoodworking.com/backissues. Or if you know the exact month and year of the issue you want, call our customer service department toll-free at 855-840-5118 to order.

What if I want more information about the projects and tools I read about in *Popular Woodworking Magazine*?
For all editorial questions, please write to Popular Woodworking Magazine, *8469 Blue Ash Road, Suite 100, Cincinnati, OH 45236. Or e-mail popwood@fwmedia.com.*

Does *Popular Woodworking Magazine* offer group discounts?
Group discounts are available by special arrangement with the publisher. For more details, send an e-mail to Debbie Paolello at debbie.paolello@fwmedia.com or call 513-531-2690 x11296.

Our Privacy Promise to You

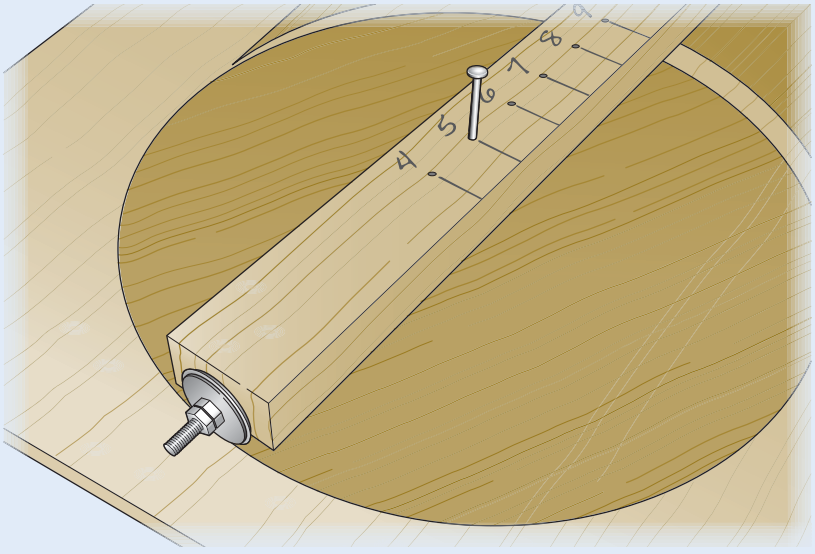
We make portions of our customer list available to carefully screened companies that offer products and services we believe you may enjoy. If you do not want to receive offers and/or information, please let us know by contacting us at:
List Manager, F+W Media, Inc.
10151 Carver Road, Suite 200
Blue Ash, OH 45242

Safety Note

Safety is your responsibility. Manufacturers place safety devices on their equipment for a reason. In many photos you see in *Popular Woodworking Magazine*, these have been removed to provide clarity. In some cases we'll use an awkward body position so you can better see what's being demonstrated. Don't copy us. Think about each procedure you're going to perform beforehand.

THE WINNER:

Shop-made Circle-cutting Tool



I often need to cut an arc or circle for a template or gasket. In the past, my results using a compass and scissors were far from the smooth shape I hoped for. Recently, I needed to cut a precise, smooth circular arc in a sheet of veneer, and I realized my old methods were inadequate. In addition to the arc looking ragged and uneven, the thin veneer would break when I attempted to cut it. I needed a better method.

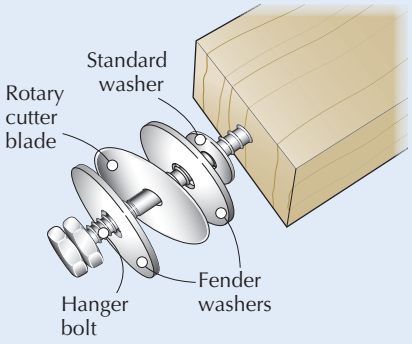
I came up with a circle-cutting tool that uses a rotary blade similar to the blade used in some office paper trimmers.

The rotary cutter blade is 28mm (1.10") in diameter with a 5mm (3/16") mounting hole. A set of two blades is available at office supply and fabric stores, or online under "paper trimmer blades." The blade is attached to the end of a 1x2 board using a 3/16" x 2" hanger bolt, with two 3/16" x 1" fender washers supporting the blade, (one on each side) and a standard 3/16" washer between the board and the first fender washer. Two 3/16" nuts hold everything snugly, but allow the blade to rotate. I drilled holes in the board at 1" increments and used a nail through the holes, driven into 3/4" plywood underneath, as a pivot point. The blade extends below the 1x2 board about 3/16".

With this circle cutter, it is best to make several light cuts.

When the tool is not in use, I wrap a piece of duct tape around the blade to protect it. It works great.

Bill Wells
Olympia, Washington



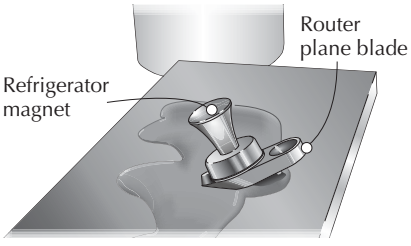
A Magnet Helps When Sharpening Small Blades

For sharpening small blades such as the ones used in router planes, spokeshaves etc., I use a refrigerator magnet (such as the one offered by Lee Valley) and a DMT Dia-Sharp plate.

The small magnet has enough power to grab hold of a small blade and when used with a "steel" DMT sharpening plate, the magnet grips the plate as well as the blade. The magnet provides enough strength to hold a blade on the bevel side, which saves your fingers from those annoying cramps.

I use an old-fashioned ketchup bottle filled with water and a little car wash soap as a lubricant for the steel sharpening plate.

Peter Saale
Pasadena, California



Plow Your Way to Small Pegs

If the idea of making small square pegs with a table saw makes you cringe, here is a way to make perfectly square pegs with a plow plane.

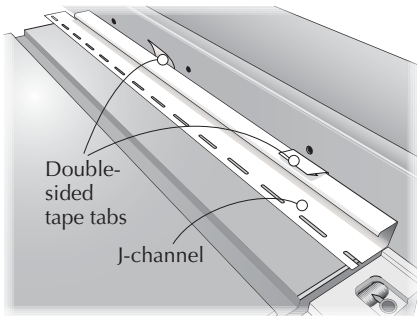
Start with a squared-up board. Then, adjust the plane's fence and depth stop to match the size of peg you require. Using a thinner blade in your plow plane will waste less wood.

Start plowing a groove on the face of the board until you reach the depth stop. Then, plow a second groove on the edge of the board, adjacent to the first groove. Keep firm pressure on the plane's fence at all times.

When you reach the bottom of the second groove, the square peg snaps free.

Kari Hultman
Lemoyne, Pennsylvania

ILLUSTRATIONS BY MARY JANE FAVORITE



Cutting Thin Sheet Stock

Cutting thin sheets of plastic laminate or other thin stock on the table saw presents a safety problem if the material slips under the narrow space between the table and the bottom of the rip fence.

The solution to this problem is to block that gap. The method I find useful is to temporarily attach to the fence a leftover piece of vinyl J-channel (used around windows when installing vinyl siding). I secure the J-channel to my rip fence with a few short pieces of double-sided tape.

I leave some of the paper backer on the tape to use as grips to help remove the tape when I'm done with the J-channel. To make the grip, I peel off the backing on one side of the tape then adhere the tape to the side of the channel that will be attached to the fence. Then, I remove the backing on the other side of the tape and relocate it (the backing) to both sides of the tape above the J-channel to make a non-sticky grip.

Note: If you don't have a piece of J-channel, you can buy a 10' length for about $5 at a home-improvement store.

John Cusimano
Lansdale, Pennsylvania

Wooden Plow Plane Fence

I added a wider auxiliary wooden fence to my plow plane fence and improved my precision for making square cuts. But instead of a flat rectangular fence, my fence is rabbeted on the outside bottom edge, which allows me to put my fingers there for better control of the tool. The rabbeted space also keeps my fingers from touching the workpiece thereby avoiding both splinters or possible finger burns.

Charles Mak
Calgary, Alberta

Improved Keyhole Slot Layout

I believe I have a more accurate yet simple solution to the problem of mounting items with keyhole slots than was shown in Tricks of the Trade in the June 2012 issue (#197).

Lay down a piece of paper larger than the dimensions of the object to be mounted. Next, place the hardware keyholes down on the paper and trace the outline. When done, cut out the shapes you traced.

Turn the hardware over (keyhole slots up) and place the outline over it aligning all the edges. While holding the paper in place, gently rub the keyhole areas with the side, not the point, of a soft pencil lead. With a little practice you will magically produce a highly detailed copy of the keyholes and a template to work with.

If the outline of the item is symmetrical to the keyholes, simply place the template on the mounting surface location and drill your screw holes through the template. Remember that the screws will be in the "key" – not the "hole" – position when mounted.

If the object is asymmetrical to the keyholes, simply punch holes through the template where you want the screws and turn the template over before placing it on the mounting surface. Use the holes as your drill guide.

The item will be mounted exactly where you want it using only pencil, paper and scissors – no measuring required. PWM

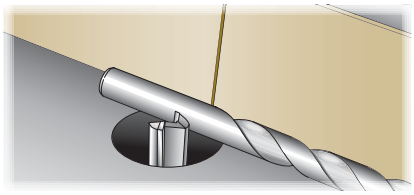
Chet Wolgamot
Lawrenceburg, Indiana

Drill Bit as Set-up Block

Need a quick and precise way to set the fence on your router table, mortiser, drill press, table saw or band saw but don't have those fancy set-up blocks? Yes, you do – your drill bits.

Just choose the appropriate-size bit and use it as a spacer to set the fence. It also works for setting a precise distance on components of your projects.

Rob Cairns
Nevada City, California



ONLINE EXTRAS

For links to all online extras, go to:

- **popularwoodworking.com/dec12**

TRICKS ONLINE: *We post tricks from the past and film videos of some Tricks of the Trade in use in our shop. They're available online, free. Visit popularwoodworking.com/tricks to read and watch.*

Our products are available online at:

- **ShopWoodworking.com**

Cash and prizes for your tricks and tips!

Each issue we publish woodworking tips from our readers. Next issue's winner receives a $250 gift certificate from Lee Valley Tools, good for any item in the catalog or on the web site (leevalley.com). (The tools pictured below are for illustration only, and are not part of the prize.)

Runners-up each receive a check for $50 to $100. When submitting a trick, include your mailing address and phone number. All accepted entries become the property of *Popular Woodworking Magazine*. Send your trick by e-mail to popwoodtricks@fwmedia.com, or mail it to Tricks of the Trade, *Popular Woodworking Magazine*, 8469 Blue Ash Road, Suite 100, Cincinnati, OH 45236.

Knew Concepts Titanium Fretsaw

The truss system of the spine looks curious, but it works gangbusters.

The crazy design of this titanium 5" woodworker's fretsaw from Knew Concepts is, I think it's fair to say, the first thing you notice. But use it and you'll quickly come to appreciate that the structure helps to make it lightweight and rigid, and the clever tensioning mechanism snugs up the blade tight – and keeps it there.

This frame is a redesign of the company's earlier titanium woodworker's fretsaw, the frame of which was a continuous piece of 1/8"-thick titanium (the same design as the aluminum woodworker's fretsaw currently available). But in an effort that was initially meant to reduce materials waste and take advantage of more readily available 1/16"-thick titanium, designer Lee Marshall came up with a riveted truss system for the saw's spine that's even more rigid than the original (he calls it a "birdcage saw," in honor of the Birdcage Maserati). The spine is riveted to 1/8"-thick titanium arms.

Also worthy of note is the blade-clamping and tensioning mechanism. On most fretsaws, the blade is pinched between two plates at either end. When a saw is properly tensioned, those plates need to hold the blade tightly; they typically don't (and it is quite frustrating when the blade comes loose in the middle of a cut).

All Knew Concepts saws have a small plunger and anvil mechanism that grabs tight on the blade with little effort; get the blade positioned correctly in the blade slot, then turn the orange knobs to lock it securely.

And the tensioning mechanism is just as simple to use; it works more like the tension-release lever on a band saw than the typical thumbscrew arrangement. Set it just short of perfect by turning the knurled brass screw, then a cam clamp effects the final tension. Flip it against the saw's arm, and you have a tight blade that will "ping" nicely if you pluck it. When the saw isn't in use, release the tension to extend the blade's life.

Another clever feature is that the blade-clamping mechanism can swivel left or right and lock in detents, from 0° to 45° (though 90° would be nice) – quite handy when removing dovetail waste in the middle of a board that's wider than the saw's armature. And while the saw I tested was a pre-production model and didn't include this feature, Marshall tells me he's added indexing positions to keep the swivel in place when tension is released. Is that a big deal? Not really, but it does mean the saw will stay in the same orientation you last left it, so there's less fiddling.

At $225, the Knew Concepts titanium saw is certainly an investment in your work – but it is also the best fretsaw I've used. The company also offers a fine aluminum version (with a continuous frame) for $95.

— Megan Fitzpatrick

CONTINUED ON PAGE 18

Looks like a bridge. *The truss system for the spine of this saw looks and acts like a bridge – it can handle incredible stress.*

Cam action. *The blade is tensioned by setting the brass screw appropriately, then flipping the cam lever. Once the screw is set, it's quick and easy to flip from tensioned to not.*

Knew Concepts Fretsaw

Knew Concetps ▪ knewconcepts.com or 831-234-4652

Street price ▪ $225

▪ **VIDEO** *See the company's titanium and aluminum fretsaws in action.*

Prices correct at time of publication.

PHOTOS BY AL PARRISH

CONTINUED FROM PAGE 16

Makita PJ7000 Biscuit Joiner

The biscuit or plate joiner category of the hand-held power tool world has been pretty sleepy over the past few years. But Makita has introduced a new model that, while not revolutionary, adds some nice, user-friendly features.

The PJ7000 packs plenty of power in its 5.6-amp motor, yet the motor has a relatively small circumference making it comfortable to grip, even for smaller hands. The top handle is comfortable as well. Combined, these holding features provide solid control and less user fatigue. And at just 5.5 pounds, it's relatively lightweight – about 20 percent less than most competitor models.

PJ7000 Plate Joiner

Makita ▪ makitausa.com

Street price ▪ from $179

▪ ARTICLE *Read "A New Manual for Biscuit Joiners" on our web site.*

Prices correct at time of publication.

The fence system for this biscuit joiner consists of two parts: the fence itself and a removable angle guide. The angle guide moves up and down on a rack-and-pinion gear system to make height adjustments for various thicknesses of material. The fence pivots in a fixed position to make angle cut adjustments. Three detents are built in for 0°, 45° and 90° angles. With the fence in the usual 90° position, the 4" slot-cutting blade is centered for material approximately 3/4" thick (20mm). When using both the fence and the fence with the angle guide, setup was quick and accurate with easy-to-read scales.

The tool also comes with a set plate that snaps on to the fence to cut a slot centered on 1/2"-thick material.

Like other plate joiners, an easily adjusted, on-board depth stop makes the switch between #0, #10 and #20 biscuits a snap. There are three additional settings, Max (20mm), D (14.7mm) and S (13mm) for use with other Lamello fasteners and hinges.

At $179, the price, combined with the nice features, makes it a good buy.

—Steve Shanesy

Bosch 23-gauge Pin Nailer

Whenever I use a 23-gauge pneumatic pin nailer, I feel like I'm cheating. It is a fast, easy and reliable way to attach moulding or other parts without much need to disguise the evidence. The slim fasteners leave tiny holes behind that are nearly invisible. This new gun from Bosch has several features in a well-designed tool that make it a great choice at a reasonable price.

Bosch has devoted its efforts recently to tools that are lighter and more powerful than previous versions. The FNS138-23 has 10 percent more power than the previous model, allowing for deeper sinking of fasteners, or operation with lower air pressure.

Bosch FNS138-23 Pin Nailer

Bosch Tools ▪ boschtools.com or 877-267-2499

Suggested retail price ▪ $159

▪ ARTICLES *Visit our web site to read more tool tests from our editors.*

Prices correct at time of publication.

It also is the first pin nailer to feature a dry fire lock-out. If you're out of ammo, the tool won't shoot. This prevents possible damage to the workpiece or the gun's internal parts and eliminates the embarrassment of dropping a piece of trim after thinking you've nailed it down.

An internal air filter keeps any debris or contamination from the compressed air system out of the internal parts, and the muffled exhaust air exits out the back of the gun. There is a window on the side of the magazine so you can see when you're running low. Fasteners up to 1 3/8" long are automatically positioned in the easy -to-load magazine.

The tool has a comfortable over-molded grip, is light in weight and nicely balanced with a narrow nose piece and a recessed magazine. You can see where the fastener will go and easily place it in a tight corner or other hard-to-reach location. For putting small mouldings on furniture or attaching household trim, this is a nice tool – and you aren't really cheating. **PWM**

— Robert W. Lang

Look Beneath the Surface

Find valuable design lessons (and templates) in furniture 'bones.'

The average Jill might look at the little chest of drawers shown on this page and say, "What a nice furniture piece; it's perfect for a nightstand. What kind of wood is that?"

The average Joe might reply, "It's tiger maple, and has some interesting post-and-rail joinery."

The somewhat more historically versed Fred might say, "It's a dowry chest circa 1830, crafted in the style known as Empire. Note the large drawer on top and decorative split turnings on each side post."

All three would be right, but their views are much different than what a furniture designer sees. A designer sees by visualizing a space and observing the relationships of shape, contrast, transitions, light, shadow and texture – which is very different from how most folks look at the world. It's human nature to look at the surface, not taking the time to look deeper. By doing so, we often miss many valuable lessons and shortchange ourselves on a rich source of ideas and inspiration.

Miniature chest. *This small chest of drawers is a reproduction of a small period dowry chest. But in the basic form, there are many design lessons to explore that apply to any style.*

Look at the Bones

Furniture in this Empire style never inspired a large, devoted following, and even today it's sandwiched in the shadows between the iconic furniture from the 18th century and the craftsman styles that ushered in the 20th. But our job as artisan designers is to look below the surface and try to see the bones at the heart of a design.

This actually requires pulling away from several common mindsets that can hinder us. One is the tendency to idealize furniture from the past and view it as something in a glass case, not to be changed or improved upon. At the other extreme is the mindset focused on discovering something new and untried, always striving to push the boundaries. Both these views have their place in our furniture-building tradition. Artisans have always looked to masterful work as standards to be appreciated and studied, and conversely the desire to seek out new expressions is a natural outgrowth of the creative mindset.

Yet both camps can miss the mark in how our woodworking tradition has always kept itself alive and fresh. One tends to freeze the tradition, while the other often ignores work from the past in search of new horizons. The important questions are not, "Has this been done before?" or "How does this rate against some standard of perfection?" Instead, they are, "What is the creative potential in this object? Is there something hidden in the bones of this design?"

Imagine the Form

Try to imagine the bare-bones form of the chest above. It starts by just imagining the space. In the Western tradition, designers envision space as a solid, even if that space is a room full of air. This might seem odd at first, but if you can imagine a room or a furniture piece as a three-dimensional cuboid, you've taken a big leap forward.

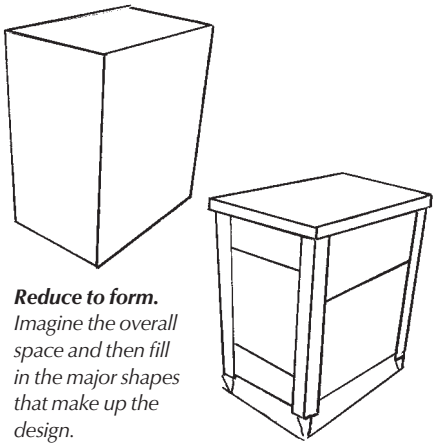
I explained in my June 2012 column (issue #197) how period designers used simple circles, squares and rectangles as building blocks. This has great potential because we can easily envision a simple square or rectangle. And, it's not much of a leap to go from imagining a two-dimensional square to a three-dimensional cube.

Let's take a moment and imagine the

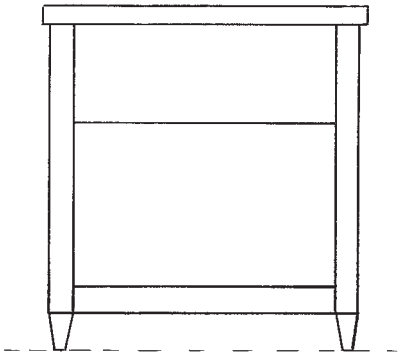
CONTINUED ON PAGE 22

PHOTOS & ILLUSTRATIONS BY THE AUTHOR, EXCEPT PUBLIC DOMAIN "EGG HEAD" IMAGE

CONTINUED FROM PAGE 20



Reduce to form. *Imagine the overall space and then fill in the major shapes that make up the design.*



Experiment. *When you see into the bones of a design, it becomes a blank palette to experiment with your own ideas.*

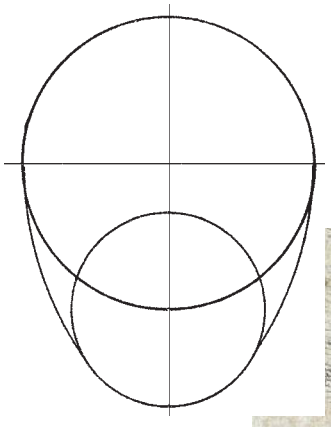
space that this chest embodies (above). The first view is just the governing space while the second shows the major shapes and transitions (borders) that make up the composition. Note that we are looking beneath the curly maple, decorative turnings and scrollwork on the bottom rail. Those details are only skin deep. Looking again just at the façade, what's left is a simple form – basically a rectangle framed by the posts, top and floor.

In this case I left the border that marks the top drawer, the most prominent feature on this form. With all that detail removed, can you imagine some different possibilities? Could the lower space be left open instead of filled with drawers, or could you imagine a door or a pair of doors? Instead of the decorative split turnings on the legs, can you imagine other possibilities? Perhaps some carvings or inlay? Or just left plain with simple chamfers? Just for a creative exercise, sketch out this simple form and see how many possibilities you can extract from this basic skeleton.

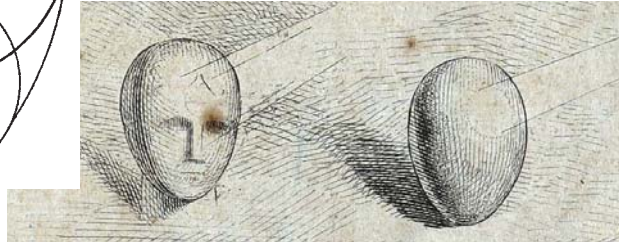
Look Around Your World

Apply this concept to your everyday surroundings by breaking down the commonplace into simple forms to unveil endless possibilities to inspire and inform. Take a simple egg form (below, left). It's hard to get more basic; it's just a pair of major and minor circles connected with some curved lines.

You can create an infinite number of possibilities by varying the size and spacing of the major and minor circles (nature already does this). Yet look at the potential of this simple form: Is it an egg? Or is it a human face (below)? Or is it a vase (right)? That's just scratching the surface on seeing the creative potential in the bones beneath the surface, yet it can open up a whole new world.



Circles. *Even an egg shape is made up of simple circles.*



Egg head. *But the simple egg shape is pregnant with possibilities!*

Application

If you're in the camp that reveres masterful work, whether period or contemporary, push yourself to sketch out the bare bones of the work you most admire. If it's made before 1830 it's likely the form is organized around simple whole-number ratios. Even with contemporary work, such as pieces by Sam Maloof or James Krenov, it's a great way to visualize what it was that made these designs stand out. While you are at it, take those simple bones and experiment with your own creative ideas. **PWM**

George is the author of two design DVDs (Lie-Nielsen Toolworks) and co-author with Jim Tolpin of the forthcoming book "By Hand & By Eye" (Lost Art Press).

Underlying form. *Is our egg shape hidden beneath the surface on this stone vase?*

ONLINE EXTRAS

For links to all these online extras, go to:

- **popularwoodworking.com/dec12**

BLOG: *Read more from George R. Walker on his Design Matters blog.*

IN OUR STORE: *George R. Walker's DVDs.*

Our products are available online at:

- **ShopWoodworking.com**

About This Column

Design Matters

Design Matters dives into the basics of proportions, forms, contrast and composition to give you the skill to tackle furniture design challenges with confidence.

TOMMY MAC'S TOOLBOX

BY THOMAS J. MACDONALD

Combine power and hand tools to improve your joinery skills.

Building a toolbox much like this one was a real turning point in my woodworking career. It was 1999 and I had begun classes at Boston's North Bennet Street School's Cabinet and Furniture Making program. At the time, I was a pretty good carpenter and could build plywood cabinets using power tools, but I was pretty inexperienced when it came to crafting fine furniture. Designing and building a toolbox was one of our first project assignments at school.

The experience was for me way more than a project; it was my introduction to hand tools and more advanced joinery. Years later, I realize just how much this project influenced my woodworking. While building it, I was learning the harmony of using both power and hand tools.

Heirloom toolbox. *This handsome chest will be a pleasure to use and be treasured for generations to come – plus it's a great introduction to blending hand and power tools in the shop.*

ALL PHOTOS BY JOE CIARCIA; ILLUSTRATIONS BY ROBERT W. LANG FROM ELI CLEVELAND'S MODEL

Now, it's one of my favorite projects – and it's featured in season three of my PBS television show, "Rough Cut – Woodworking with Tommy Mac."

If you're new to woodworking, or haven't learned basic hand-tool skills, this project could have a similar influence on you. Don't worry about the joints being a perfect fit. It's a shop project after all.

Mill Your Lumber in Stages

I prepare stock in a couple sessions at least a day apart. This is meant to minimize wood movement while also allowing for it. As a rule of thumb, avoid taking more than 1/4" of wood off of the thickness of a board in one milling. I call the first session "rough mill" because I cut the parts out of the rough board leaving about 1" over in length, 1/2" over in width and 1/8" over in thickness.

First, flatten one face on the jointer. Check the grain direction of the wood and watch for tear-out. Take off about 1/16" with each pass until the face is flat. Next, straighten one edge with the jointed face against the fence. Make sure the fence is 90° to the bed of the jointer.

When the jointer work is done, move to the planer and make the opposite face parallel (to avoid tear-out, whichever end trailed over the jointer should lead over the planer). Run each part through the planer with the jointed face down. Mill the boards to the sizes in the cutlist plus the overage described above.

Stack the parts with stickers between and align them vertically so each board is supported by the one below it. Leave the boards overnight then repeat the milling process to bring the boards to final dimensions. Note that some parts, such as the case divider fronts, must be fitted to the box rather than cut to dimensions now. After the second milling, remove any mill marks by skimming all surfaces with a hand-plane. Take light cuts to avoid changing the thickness or taking it out of square.

Spring Joints for Glue-ups

The wider outside case parts should be glued up from narrower boards; a full-width board may cup over time.

Spring joint. *A slight concave shape planed onto mating surfaces of an edge joint allows you to clamp up with a single clamp across the center of the panel glue-up. Aim for a center that's recessed about 1/64".*

Pin spacing. *To get dovetail pins spaced equally, walk the compass across the work and make adjustments until the spacing is just right.*

Before edge-gluing, clamp each mating pair of boards face to face and hand-plane the edges to "spring" the joint. Take a short pass along the middle of the edges, then another along more of the length and a final pass along the full length. The boards' jointed edges should touch at both ends with a tiny gap in the middle, about 1/64".

Glue up the boards starting with a single clamp in the middle. Add more clamps if necessary. After the glue has dried, clean up any excess and trim the parts to final width and length.

Through-dovetails

Start by laying out the pins on the ends of the case side boards. Set a marking gauge to the thickness of the case parts and mark around the faces and edges at both ends of each board. Then, lay out the pins on the ends of a side board. Start by measuring and marking 3/16" from each edge. Then use a compass or dividers to make seven equal divisions between the 3/16" marks you just made (above). Start on one line and walk the dividers along to the other line. When they land directly on the line, the space is evenly divided. The points where the dividers hit are the center points of the pins. Transfer the divider marks to the outside face. Measure 3/16" on either side of the marks and, from that point, draw the dovetail angle across the end grain to the inside face. Square the lines down the inside and outside faces to the marking-gauge line.

Now you can cut the pins. Carefully saw on the waste side of each pencil line, then use a coping saw to cut out the bulk of the waste. Use a chisel to chop to the marking gauge line. Chop halfway in, then flip the board and come in from the opposite face to finish the waste removal. Check the surfaces with a square and pare each cheek and shoulder until they are true.

When the pins are finished, scribe the tails. Stand each end of the pin board on its corresponding tail board. Align the inside face of the pins with the marking gauge line on the inside face of the top or bottom board. Trace the pins using a sharp pencil.

Square the tail lines across the ends of the boards then cut carefully on the waste side of all of the lines. Saw out

Stop that rabbet. *Set up stop-blocks on your router table's fence to register the front and back as you mill the rabbets in the back inside edges of the case sides.*

Ready, set, assemble. *When all the case joinery, including dovetails, dados and rabbets, is completed, the toolbox is ready for glue-up.*

Custom caul. *To make sure the dovetail joints seat completely, make a clamping caul that applies pressure on only the tails.*

the bulk of the waste and chop to the marking-gauge lines. Lightly test-fit each corner and mark where the joints are too tight to close. Use a chisel to pare the tails to fit. Do not adjust the pins.

Dados & Rabbets

First lay out the dados for the case dividers on the inside faces of the sides. The top one starts 2 3/8" from the top edge; the second dado is 4 7/8" from the top; the third is 8 1/4" from the top. The dados are all 1/2" wide x 1/8" deep and are cut across the entire face.

To cut the dados mount a 1/2" dado stack on the table saw to cut 1/8" deep. Make sure to cut the dados on the inside faces. Run the top edge of each side against the fence on all of the cuts. Once all of the dados are cut, use a router plane to clean up the dado bottoms.

Now lay out and cut the 3/8" x 3/8" rabbets on the back inside corner of the case sides, top and bottom. The rabbets in the top and bottom run the full length of the edge. The rabbets on the sides stop 3/8" from each end.

Cut the rabbets at the router table. Set a straight bit to cut 3/8" from the tabletop and the fence. Run both the top and bottom all the way through. Now set up to make the stopped cuts. With the router off, mark the front and back edges of the bit on the fence. Clamp front and back stops on the fence so that the bit will not cut past either end of the layout lines.

To make the cuts, set the back corner of the side against the rear stop and slowly move the piece toward the fence and into the cutter. Once it is against the fence, push the piece to the front stop then slowly swing the back of the piece away from the cutter.

Glue up the Case

Notch your clamping cauls around the pins so they press only on the tails. Glue and clamp the bottom corners first. Once the glue starts to set, remove the clamps and glue the top corners, checking for square. Now leave the clamps on until the glue has fully cured.

Make the Case Dividers

Frames divide the case and act as drawer supports. The outside corners of the frames are joined with bridle or slip joints. The two upper dividers have a middle rail with stub tenons.

Begin by cutting the slots in the long stiles. The slots are 1/4" thick x 1 3/4" long, and go through the full width of the front and back frame parts, centered in the thickness of the parts. Put a 1/4"-thick dado stack on your table saw set to cut 1 3/4" high. Cut the slots with the parts on end using a backer board, such as tenoning jig, to support the piece. When done, cut grooves for the stub tenons in the front and back pieces. Without moving the fence, lower the dado stack to 1/4" and cut grooves on the inside edges of the top two frames.

Now cut and fit the frame tenons using your dado stack and table saw. Run the stock flat on the saw table guided with the miter gauge. The dado stack should be set to cut just 1/8" high. Cut the top face of the tenons first, then fit the joint by trimming the bottom face. For the top two center rails, cut the tenons at the same time as the rest. After all of the joints are fit, trim the tenons on the center runners to 1/4" long.

With the frame joinery complete, glue up the frames and fit them to the case. Make sure the frames are square. If necessary, clamp the slip joints closed so the joints don't flare out. Once the glue dries, flush the top surfaces at the joints with a handplane. Fit the frames to the dados in the case sides by planing the bottom surfaces.

When the frames are done, glue on the cherry divider faces. Mill them just thicker than the frames. Glue on the faces, allowing additional length on each end for the dovetails. Once the glue dries, handplane them flush to the frames. Lay out the length of the dovetails on the case sides. Now slide each frame into place and mark the dovetail length and the bottom of the dovetail dado on the face piece. When done, cut each end of the cherry faces to length.

Drawer Divider Front

I use a "ramp block" that helps me make the dovetails for the drawer divider front. To make it, mill a piece of scrap to 3/4" thick x 4" wide (and make sure it's a scrap that allows you to work a safe distance from the blade). On the edge,

"In theory there is no difference between theory and practice. In practice there is."

Lawrence Peter "Yogi" Berra, (1925-)
Baseball player and manager

mark 1/2" from one face. Tilt the table saw blade to 10° and set the fence just over 5/8" from the bottom of the blade. With the scrap on edge, rip the angle into the piece. Skim off any saw marks with a handplane.

Clamp the ramp block and divider as shown below. The block should be perpendicular to the face piece and tight against its end. Chop down on the dado mark and remove chips until the chisel rides flat on the ramp block. Repeat this on the top and bottom of both ends of all of the dividers.

When done, fit the dividers to the case. Slide each divider in place then use a sharp pencil to trace the dovetails onto the front edges of the case. Remove the dividers, square the lines down the inside face and mark the 3/4" depth of the sockets. Saw, chop and pare the sockets until the dividers fit snugly.

Partition & Guides

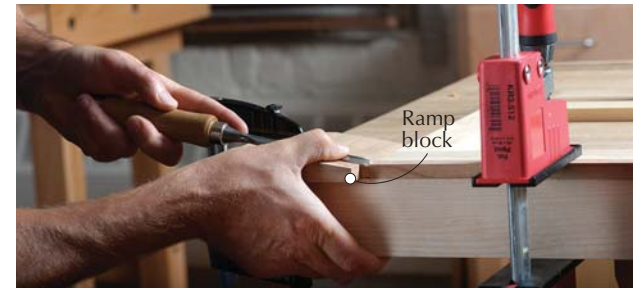
Mark the length of the dovetails and dados on the case top and second frame. The tails are 5/16" from the inside edges of the top and frame. The dados are 1/8" deep x 1/2" wide, and centered in the case. Use a square, knife and chisel to clear out the 3/4"-long dados. Make sure the partition fits tightly in the dados. If not, either widen the dados or handplane the partition to fit. Once the partition fits, clamp the top divider to the second with the shoulders aligned on the ends, and scribe the dado across the face of the top divider. Cut the 1/2"-deep x 3/4"-wide notch in the top divider and fit it to the partition.

Now cut the partitions to length. First, dry-fit the frames in the case and measure the length of the partition. Dovetail the ends using the ramp block that you used for the dividers. Mark the 1/4" dovetail length on the ends of the partitions. Set in the shoulders on the back and remove about 1/8" of the back of the tails. Use these notches to test the partition in the dados. Once the shoulders fit, cut the tails with the ramp block as before.

Tommy Mac's Toolbox

NO.	ITEM	DIMENSIONS (INCHES) T	W	L	MATERIAL	COMMENTS
CASE						
❑ 2	Top & bottom	5/8	14 1/2	28	Cherry	
❑ 2	Sides	5/8	14 1/2	13 1/4	Cherry	
❑ 3	Divider fronts	1/2	1 3/4	27	Cherry	
❑ 3	Divider backs	1/2	1 3/4	27	Secondary	
❑ 6	Divider sides	1/2	1 3/4	13 3/8	Secondary	
❑ 2	Center runners	1/2	1 3/4	13 3/8	Secondary	Trim to fit
❑ 3	Divider faces	1/2	3/4	27 5/8	Cherry	Leave long
❑ 1	Vertical partition	1/2	3/4	5	Cherry	Leave long
❑ 2	Center drawer guides	1/2	1/2	13	Secondary	
❑ 4	Backs	3/8	4	27 1/2	Secondary	Shiplap
DRAWERS						
❑ 2	Fronts (upper)	3/4	1 3/4	13 1/8	Cherry	
❑ 4	Sides (upper)	3/8	1 3/4	13 1/2	Secondary	
❑ 2	Backs (upper)	3/8	1 1/4	13 1/8	Secondary	
❑ 2	Fronts (narrow mid.)	3/4	2	13 1/8	Cherry	
❑ 4	Sides (narrow mid.)	3/8	2	13 1/2	Secondary	
❑ 2	Backs (narrow mid.)	3/8	1 1/2	13 1/8	Secondary	
❑ 1	Front (wide mid.)	3/4	2 7/8	26 3/4	Cherry	
❑ 2	Sides (wide mid.)	3/8	2 7/8	13 1/2	Secondary	
❑ 1	Back (wide mid.)	3/8	2 3/8	26 3/4	Secondary	
❑ 1	Front (lower)	3/4	3 7/8	26 3/4	Cherry	
❑ 2	Sides (lower)	3/8	3 7/8	13 1/2	Secondary	
❑ 1	Back (lower)	3/8	3 3/8	26 3/4	Secondary	
❑ 4	Narrow bottoms	3/8	14 5/8	12 3/4	Secondary	
❑ 2	Wide bottoms	3/8	14 5/8	26 3/8	Secondary	
❑ 12	Drawer stops	1/8	1/2	5/8	Secondary	

Frame-up. *The case is divided using frames with slip joints at the ends and stub tenons where needed for a center divider. These frames support the drawers and fit in dados.*



Guided chisel. *As an aid to cutting the dovetails on the divider fronts, use a shop-made "ramp block" to guide the chisel and help achieve consistent sizes and angles.*

Fit the partition to the case. With the dividers in place, slide the partition into the dados and scribe the tails on the case and second divider. Mark the 5/8" depth of the tails as well. Remove the partition and divider to cut and fit the sockets. When done, glue in the dividers and partition. Start by sliding the dividers in almost completely then apply glue to the front 2" and the dovetail. With the dividers in place, glue in the partition. Glue the center drawer runners on the top two dividers directly behind the partition. Use a square to make sure they are flush to the width of the partition and square to the front of the case.

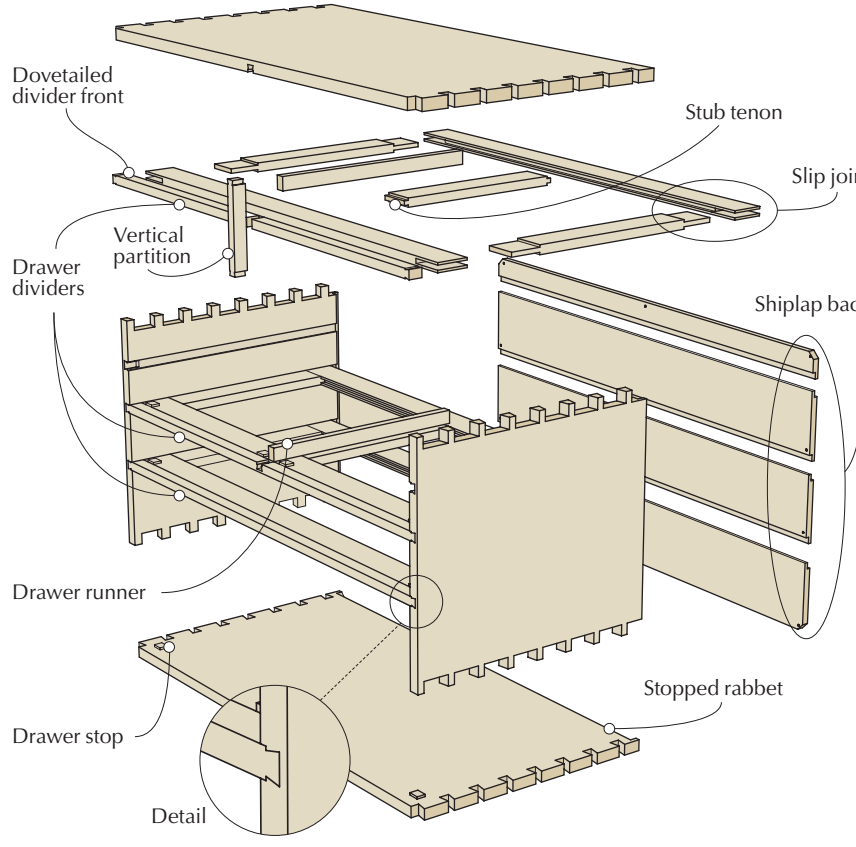
Make the Drawers

On the inside face of each drawer part cut a 1/4"-wide x 3/16"-deep groove 1/4" up from the bottom edge. Once the grooves are cut, rip the backs to width, cutting them flush to the top of the groove. Next, dovetail the drawers. Lay out the half pins on the drawer fronts. Set a marking gauge to 9/16" and, from the inside face, mark the end grain on both ends of each drawer front.

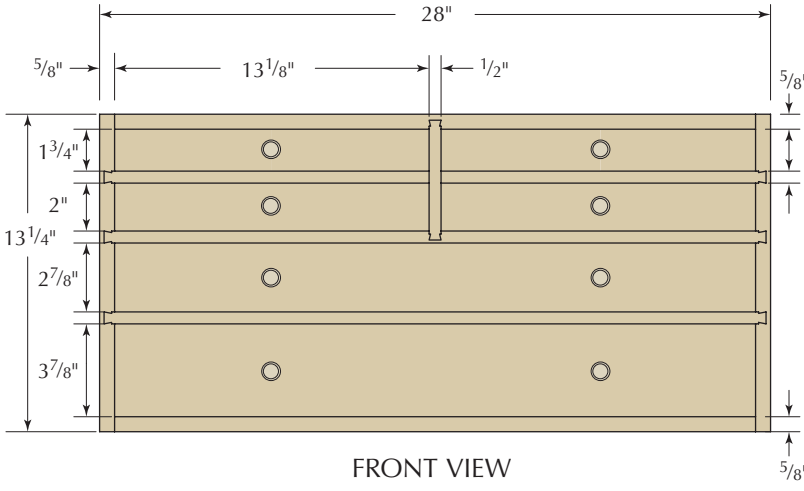
Use the same setting to mark around the front of the drawer sides. Reset the marking gauge to the 3/8" thickness of the drawer sides and mark the inside

Dovetail socket. *The socket for the case dovetail is located at the end of a shallow dado that houses the drawer divider.*

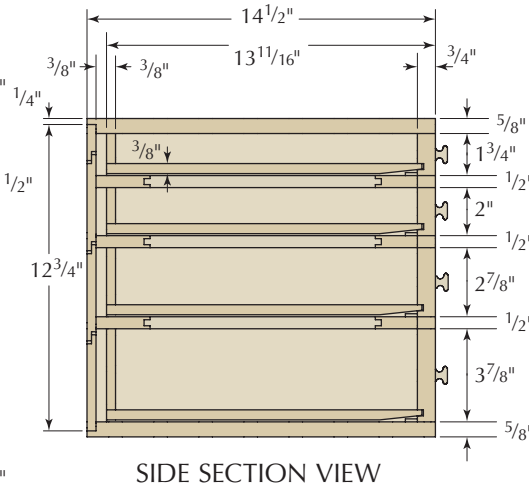
Upper drawers divided. *A vertical partition divides the case for the four narrower upper drawers. It is dovetailed like the divider fronts at the ends, and it is let into the middle of the top drawer divider with a simple notch.*



EXPLODED VIEW



FRONT VIEW



SIDE SECTION VIEW

REGISTER TO WIN TOMMY'S TOOL BOX & MORE

Tommy MacDonald has generously donated his toolbox (which is featured on season three of "Rough Cut") as part of the grand prize for a series of daily random drawings sponsored by *Popular Woodworking Magazine*. The daily drawings are called "The 31 Days of Christmas" and will run during December 2012. In addition to the toolbox, the grand-prize winner will also receive sets of bench planes, chisels and several measuring and marking tools from Woodcraft. Other great tools and materials from leading manufacturers will be given away each day leading up to the grand-prize drawing on Dec. 31.

To be eligible for the daily drawings, participants must enter each day of the month. All entries in the daily drawings are automatically entered in the grand-prize drawing. Some of the daily prizes include table saws from General International and JET, a mini-lathe from Rikon, a set of bench chisels from Veritas, Bessey clamps, a Blue Spruce Toolworks dovetail chisel, a Mirka Ceros sanding system, a Woodpeckers router table lift plus 22 other daily prizes.

To learn more about the prizes and to enter for a chance to win, go to popularwoodworking.com/31days. — Steve Shanesy

face on both ends of each front. With the same setting, also mark around the back of each side and around both ends of each drawer back. Lay out a 1/4" half pin on the top and bottom of the drawer front and back. Also mark a 3/8"-wide pin in the center. Mark the dovetail angle on the end grain and square the lines down the inside faces.

On the drawer fronts, saw at an angle taking care not to cut through either marking gauge line, then chop out the waste, working down to the lap line on the fronts. Pare the pins until the cheeks are flat and perpendicular to the ends. Mark, cut and fit the tails just as you did on the case.

Glue up the drawers making sure they are square. Clean off all of the glue and flush all of the surfaces with a handplane. Make sure the drawers sit flat on a flat surface. Test the drawer in its opening. Plane the top edges of the sides until the drawers move easily in their pockets.

Glue the Drawer Stops

With the drawers fit, align the drawer fronts flush with the case and dividers. Apply a small amount of glue to each stop. Reach through the back of the case and position the stops on the tops of the dividers. Make sure the stop is tight to the back of the drawer front. Once the glue sets, test the drawer and trim the stop if necessary.

Cut the bottoms to fit in the grooves. Set the table saw to 6° with a zero-clearance insert and a featherboard in front of the blade. Set the fence to just under 1/4" from the blade. Bevel both sides and the front of the bottom. Adjust the fence until the bottom just starts to slide into the drawer. Cut all of the bottoms and fine-tune the fit with a plane. When the bottoms fit, trim them flush to the back of the drawer. Cut a 1/2"-long x 1/8"-wide notch in the center of the back edge of each drawer bottom. Insert a screw through the notch into the drawer back to pinch and hold the bottom in place.

Shiplap the Back

Rip the backboards to 4" wide. On one edge of each cut a 3/16"-deep x 3/8"-wide rabbet. On two of the boards, cut the same rabbet on the opposite face of the opposite edge. Fit a single-rabbet board on the bottom of the case in the back rabbet and screw it along the bottom edge. Lay the double-rabbet boards in next so the rabbets overlap, leaving a 1/8" reveal in each joint. Screw these boards in at the ends, near where they overlap the board below. Trim the unrabbeted end of the final board until it fits in place with the same 1/8" reveal and screw it in place.

Sand & Finish

Make sure all the glue has been cleaned off of the surfaces. Address any tear-out, dents or gouges before you start to sand. Then thoroughly sand beginning with #120-grit paper and progress through finer grits stopping at #180 or #220 grit. Then ease all the sharp edges. Apply the finish you prefer following the manufacturer's instructions. When it's dry, install drawer pulls of your choice (mine are iron; 3/4" for the top drawers, 1 1/8" for the bottom drawers).

When your toolbox is completed you will have learned many of the essential woodworking skills. And if you're like me, your joinery tolerances will have tightened up a lot just learning the ins and outs of dovetailing. **PWM**

Tommy is the creator and star of the WGBH PBS television program "Rough Cut – Woodworking with Tommy Mac."

ONLINE EXTRAS

For links to all online extras, go to:

- **popularwoodworking.com/dec12**

ENTER THE DRAWINGS: *Register your name to win daily prizes in the "31 Days of Christmas" sweepstakes.*

WEB SITE: *Visit the author's web site for more information about "Rough Cut – Woodworking with Tommy Mac."*

WEB SITE: *Visit the WGBH web site to watch past episodes of "Rough Cut" and see the schedule for upcoming shows.*

IN OUR STORE: *"Mastering Hand Tools," a two-DVD set by Christopher Schwarz.*

Our products are available online at:

- **ShopWoodworking.com**

The Case for Hollows & Rounds

BY MATT BICKFORD

A few simple planes open the doors to a multitude of mouldings.

Ins & outs. *Most moulding profiles are a combination of convex and concave arcs. With a few planes to make these arcs, nearly any profile is possible.*

PHOTOS OF NEW PLANES BY AL PARRISH; ADDITIONAL PHOTOS BY THE AUTHOR; ILLUSTRATIONS BY ROBERT W. LANG FROM THE AUTHOR'S SKETCHUP MODELS

I am not a woodworker who uses only hand tools. I use machinery when it is efficient and when it won't dictate the look of my final product. I use planes to flatten boards wider than my 6" jointer. I dimension lumber by hand when it will not fit through my 12" planer. I cut my dovetails with a handsaw. When I became tired of applying the same moulded edges to my projects of various sizes I started to research my options.

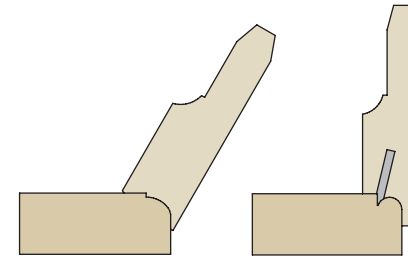
Several years ago I became aware of moulding planes. You have seen these during your meanderings through flea markets and auction houses. These planes can be hundreds of years old, thus, when you use them, you will be creating profiles that are appropriate to period work and do not contradict period style. These planes do not make coves and astragals that are the interpreted design of a present-day machine shop, the corporate choice of what the masses may like or the design insanity of squeezing a 3 1/2" crown ogee into 3/4"-thick material.

I bought several dedicated moulding planes (also called complex moulders) over the course of a couple years. I bought a couple of side-bead planes to, well, make beads. I bought a reverse-ogee plane because I liked that profile for a chest. I got a crown moulder because I thought it was neat.

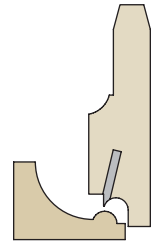
Like router bits, these dedicated planes make uniform profiles and can be, depending on size, very quick and extremely efficient. With a dedicated moulding plane, a 3/16" lip around a drawer front is executed in the span of minutes. A 1/4" bead along an edge is never more than a few moments away from completion.

The integral fences and depth stops that allow these planes to create a uniform profile also preclude them from making the same profile in a different location relative to a board's edges. With both methods – routers and dedicated moulding planes – a complex profile can be built up using several pieces, but the tool dictates the process and product.

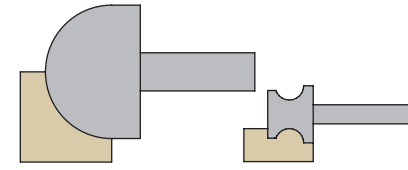
One-trick ponies. *Moulding planes with complex profiles are limited to cutting only the one profile for which they're designed.*



Quick work. *Though limited to cutting but one profile, a complex moulder will execute that one shape quickly.*



Complex limitations. *The fence and depth stop on this side-bead plane means you're limited to cutting only at the edge of a board.*



Router bits. *Like a dedicated moulding plane, router bits are pretty much limited to executing only the profile they were made to cut.*

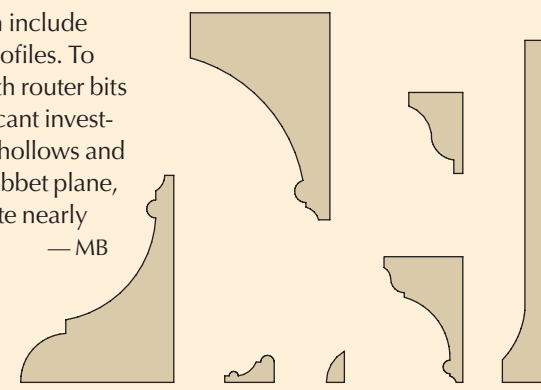
Unlike routers, dedicated moulding planes often need a significant amount of work to make them function. This work, which is often executed blindly by a person new to the tool who chooses to buy the most complex, makes the plane seem even more limiting and daunting. Even more depressing: When you find that dedicated moulder to create the profile that you like, you find the tool has been sold.

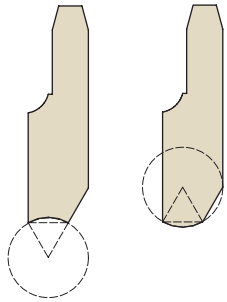
A new profile, new plane and new tooling will be needed for each shape, regardless of complexity. Mimicking the size of a larger profile is possible by building up smaller shapes you already possess, but it's still a compromise that may never join, finish or look right.

There are, however, options that are cheap and bountiful, and easy to tune, use and maintain. And they allow you, the user, to never make compromises. Once you've purchased and tuned the tools, you'll never be at the mercy of

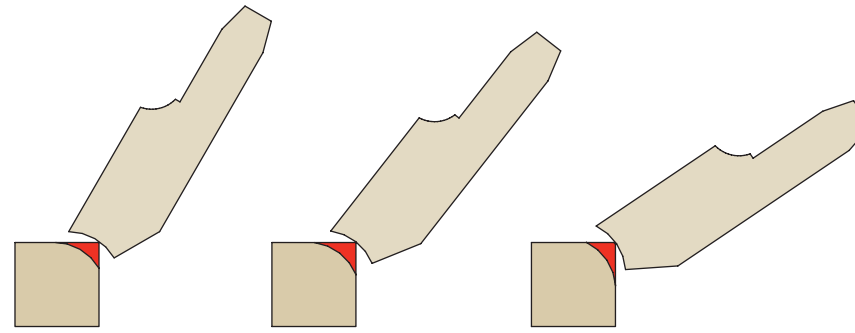
MINIMAL TOOLS, MULTIPLE PROFILES

A tall case clock can include seven (or more) profiles. To make these profiles with router bits would require a significant investment in tooling. A few hollows and rounds, along with a rabbet plane, will enable you to create nearly any imaginable profile. — MB

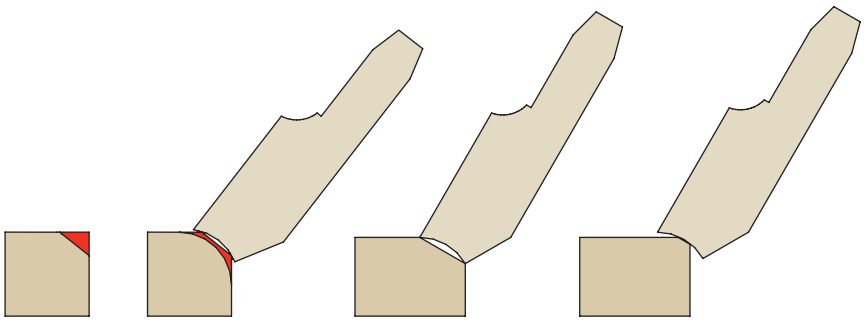




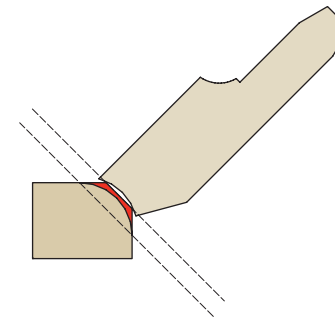
Basic geometry. *On hollows and rounds, the width of a plane's sole is equal to the 60° radius of the circle segment it creates.*



Staying straight. *With only one point to ride along, it can be difficult to keep a hollow from rotating as you move through the cut, resulting in a profile that varies along its length.*



Hollow on chamfer. *A uniform chamfer (of about two-thirds the width of the hollow's sole; left and left center) provides two points for the plane to ride along; this helps the user get a good cut. However, a chamfer that's either too wide (right center) or too narrow (right) will provide only a single reference point for the sole.*



Two points. *The chamfer acts as a fence to locate the plane in the cut. Your first passes will produce two shavings – one at each contact point. As the cut progresses, those shavings get wider. When they meet, you're done.*

dedicated moulding plane profiles or router-bit manufacturers again.

Hollows & Rounds

When I started with moulding planes I quickly became aware of hollows and rounds, and that these planes can do nearly everything. Most moulding profiles are a combination of convex or concave circle segments with a few flat segments, called fillets, mixed in. These are the same terms by which hollows and rounds should be viewed: as a portion of something much larger.

Hollow and round planes create an arc of a circle of specific radius, not a specific profile. These planes have neither fences nor depth stops, which means that there is no face upon which either needs to be referenced. These planes' soles are only one-sixth of a circle, 60°, but a larger portion of a circle can be created by tool manipulation.

Regardless of whether you want to cut a bullnose that is nearly half of a circle on the edge of a board, or an ovolo that's nearly 90° set back from the board's edge and is part of a larger complex profile, the tool is the same.

Having a series of planes that creates a graduation of radii allows you to make nearly any profile that you can find in furniture or in architecture. These tools allow you to make the profile as it was so often made in period work – out of one solid piece of wood.

Chamfers Control Hollows

The first time you hold a hollow plane, it may not be apparent how to use it to create a uniform profile. A hollow has a concave sole, so it creates a convex shape. If you start on a square corner of a workpiece and work to completion, you will find that consistency can be difficult.

Get a rabbet plane, shoulder plane, block plane or chisel, and use it to cut a chamfer of about two-thirds the width of the plane's sole, approximately uniform in width and angle along the length of the workpiece. (Minor variations will be overcome by the length of the hollow moulding plane.)

Your hollow plane will ride on the two edges of that chamfer as you make the initial passes, and you will quickly see a uniform profile develop along the length of your stock.

When you are ready to tackle a specific profile, start with a chamfer that approximates the angle of the profile you intend to create (again, two-thirds of the width of the plane's sole). Change the angle of the chamfer on your next practice piece to see how that affects the profile.

This chamfer serves three purposes.

First, by giving the plane two points upon which to sit instead of just one, you have made a fence of sorts to help steer the hollow. When the plane makes its initial passes, it will create two shavings (one from

each point on the chamfer) that will each increase in width with subsequent passes.

Eventually, the second purpose of the chamfer will be recognized as these two shavings become one – you have a method to gauge progress and/or depth.

Third, you will have removed the bulk of the waste material with a straight plane blade that is easier to maintain, leaving only a small amount of work and wear for the concave cutting edge of the hollow plane's blade.

By adding a chamfer or two prior to executing profiles, the number of profiles that can be created increases dramatically (more on that later).

Rabbets Control Rounds

Like a single hollow, a single round plane creates one specific arc, but it is concave. Again, imagine starting this round plane on a square corner.

Adding a chamfer for the round to ride will certainly remove a significant amount of material. A uniform chamfer will also give you a gauge for progress as you watch the uniform facet disappear with each pass. But a chamfer won't help you steer the round plane.

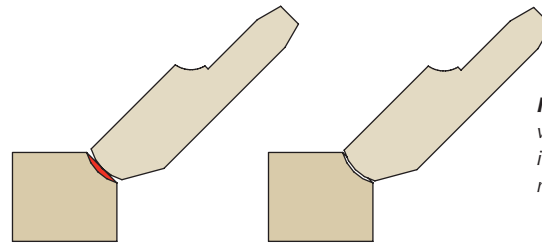
Instead, cut a rabbet to create two arrises for the plane to sit upon. This means that, so long as the rabbet is uniform and the round is sitting upon both points, it will be steered.

Start with a square rabbet. Then make a rabbet that is deeper and narrow, and compare the results after planing. Now cut a shallow, wide rabbet for the round to ride along. As with the chamfers for the hollows, the two edges of the rabbet on which the round registers should be about two-thirds the width of the plane's sole.

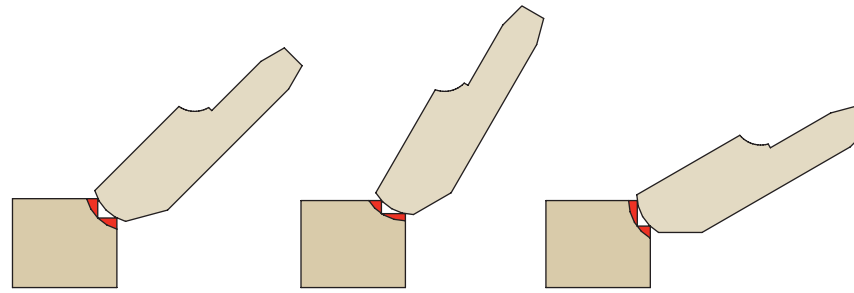
Like the chamfer, this rabbet, also serves three purposes.

First, you steer the plane by giving it a chute in which to ride.

Second, you will be able to gauge your depth of progress by making certain that the two shavings being ejected at either side of the blade are of equal width along the length of the cut. These two shavings will soon become one, which,



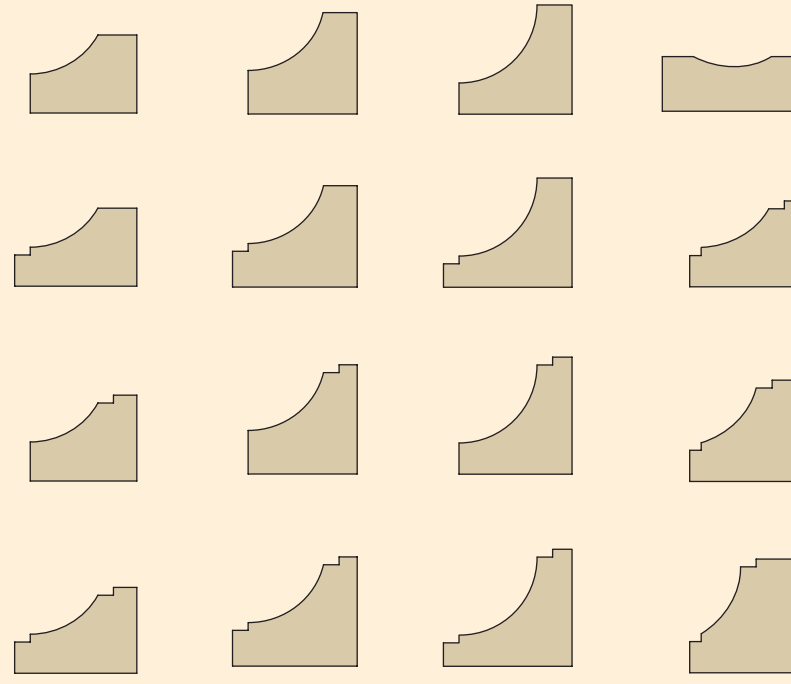
Round on chamfer. *While a chamfer will quickly remove waste material, it won't provide help in steering a round plane.*



Round on rabbet. *A rabbet creates two arrises for a round plane to ride (left). Adjusting the width and depth of the rabbet changes the angle at which the plane is presented, and thus changes the resulting profile (center and right).*

ONE ARC, ENDLESS VARIATIONS

Here are drawings of 16 cove mouldings, each of which illustrates a shape cut by a round plane of a single radius. Adding a rabbet or two in different locations to guide the plane, and varying the angle of that rabbet (and thus the path of the plane), allows you to create a variety of profiles with a single tool. Smaller or larger segments of a circle will create a variety of looks from an identical radius. — MB



if the rabbet is uniform, will occur along the entire length of the final pass. (Take abbreviated passes in specific problem areas if necessary, then make a final pass along the length to ensure you've a clean and continuous cut.)

And third, the bulk of the waste material is removed with an easier-to-maintain tool.

A World of Profiles

Possession of one of these two planes, either a hollow or round in any size, allows the user to make many moulding profiles (see "One Arc, Endless Variations" on page 33). The more you use these planes the more you will learn to manipulate them as well.

I envision users starting with a single profile that is one-sixth of a circle with a radius that is equal to the plane sole's width. Soon, by learning how to rotate the tool in subsequent passes, the user can progress into profiles that are one-quarter of a circle or larger.

And with a single pair of planes (one hollow and one matching round), the number of profiles you have the ability to create substantially increases. With a matched pair, you can combine convex and concave shapes to place coves next to ovolos in whatever order you want on a single piece of stock. You can make ogees and reverse ogees by changing the dimensions of your rabbet or rabbets, and practice making smooth transition points from hollow to round cuts.

The two points upon which each plane sits (the edges of chamfers for hollows and the arrises of a rabbet for rounds) approximates the angle of the profile each creates. Only the location of the chamfers and rabbets has changed relative to the original corner of the stock when it was square.

Where to Begin?

A small to mid-sized antique pair of matched hollow and round planes is a good place to start (think Nos. 4, 6, 8 or 10 according to the numbering system listed in the chart on the next page). Sharpening and tuning one pair of planes is the best way to learn what needs to be done (Larry Williams has an excellent DVD on "Sharpening Profiled Hand Tools," available from Lie-Nielsen). If you purchase several pairs of antique tools before learning how to tune them up and use them, you could find it overwhelming and counterproductive.

So while one pair of hollows and rounds is a good place to start, all your profile possibilities will be derivatives of the same or similar radii. But with practice, you will learn to manipulate and steer the tools, and will be able to make a No. 6 hollow mimic the shape of a No. 5, or use a No. 6 round to create a slightly larger cove.

Beyond the Basics

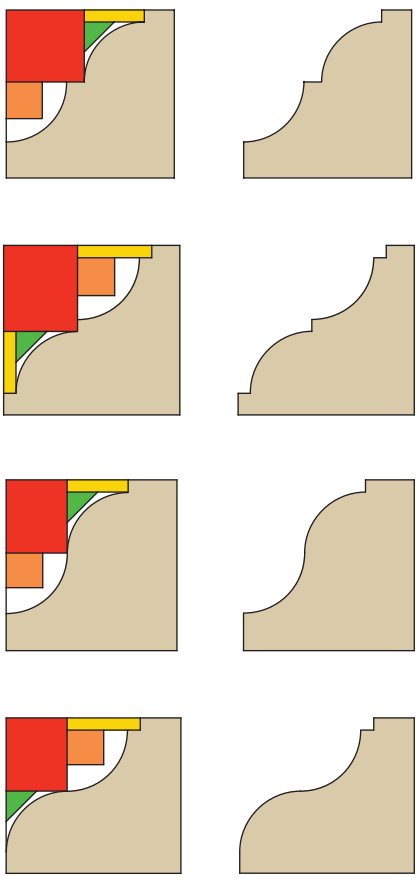
Two pairs of hollows and rounds, along with a way to quickly, accurately and efficiently make rabbets, is the next logical step. By adding only a second pair of hollows and rounds to your tool chest, you'll be able to take advantage of the versatility that these planes allow and encourage.

With a second pair, you can make the same profiles in two different sizes. You can also mix and match the convex shapes of one with the concave shapes of another. With two pairs, you can create profiles that are more representative of what we see throughout the centuries.

Having two pairs also allow you to make elliptical or ovular shapes, or make a base moulding that complements a support, which in turn complements a table's edge.

Imagine the options that will be open to you by adding a third pair. Depending upon the scope of your work, you may never need more than those six moulding planes.

But with a half set of planes (nine pairs incrementally increasing from a $\frac{1}{8}$" radius up to $1\frac{1}{2}$"), the options are staggering. With a half set, you're almost



Multiple rabbets. *In the left column, the red, orange and yellow designate rabbets; the green designates a chamfer. These cuts guide the planes to create the profiles in the right column.*

Locked-in design. *Router bit profiles limit design possibilities and often are not appropriate to a period design.*

Sensible sequence. *Hollows and rounds allow you to produce well-proportioned complex mouldings with a few simple tools.*

Two pair & a rabbet. *With just five planes, you have a huge array of moulding possibilities.*

Numbers of Hollows & Rounds

NO.	IRON WIDTH	RADIUS (INCHES)
1	1/16	1/16
2	1/8	1/8
3	3/16	3/16
4	1/4	1/4
5	5/16	5/16
6	3/8	3/8
7	7/16	7/16
8	1/2	1/2
9	9/16	9/16
10	5/8	5/8
11	11/16	11/16
12	3/4	3/4
13	7/8	7/8
14	1	1
15	1 1/8	1 1/8
16	1 1/4	1 1/4
17	1 3/8	1 3/8
18	1 1/2	1 1/2

A half set of planes would consist of even or odd numbers only.

certain to have all the tooling you could ever need for any moulding profile.

Parts of a Whole

The advantages of these planes are commonly viewed through their lack – fences or depth stops. This is what increases exponentially the number of moulding profiles they allow you to create.

Hollows and rounds are pieces of a larger puzzle. They encourage you to put your hand to your work and compare it to the backdrop of furniture history. They encourage pure copies for those of us who try to replicate, and promote creativity for those who want to create something new – without being tied to manufacturers' products.

These tools will not enable you to make crown moulding for your living room in less than an hour. You will not be inspired to make new baseboards with a quirked ogee for your entire first floor. You will, however, consider ripping out that mantel with machine marks to replace it with a better one.

Hollows and rounds will not speed up tenfold the pace at which you work. They will, however, increase the rate at which you progress in your craft. A set of these tools will allow you to look at a tall case clock and consider just one thing: "Am I ready yet?" You will no longer need to consider the investment in, or be hindered by, the prospect of new tooling when you choose your next project. You'll have the tools. You have the skill. You just need somebody to paint the clock face. **PWM**

Lift the limits. *With a half set of hollows and rounds in your arsenal, you may never need to buy another tool to make any moulding you want.*

Matt is the maker of M.S. Bickford planes, and the author of "Mouldings in Practice" (Lost Art Press), a new book that delves deep into the use of these tools.

ONLINE EXTRAS

For links to all online extras, go to:

- **popularwoodworking.com/dec12**

BLOG: *Read the author's blog, "Musings From Big Pink."*

IN OUR STORE: *Buy the author's new book "Mouldings in Practice" (Lost Art Press).*

WEB SITE: *Visit the author's web site and learn about the moulding planes he makes.*

TO BUY: *"Moldings in Practice" Matt Bickford's new DVD from Lie-Nielsen Toolworks.*

Our products are available online at:

- **ShopWoodworking.com**

Moravian Stool

BY CHRISTOPHER SCHWARZ

This traditional, lightweight stool is an excellent first step toward chairmaking.

One highlight of a visit to historic Old Salem in North Carolina is the beautiful Moravian furniture and woodwork in the village's buildings. My favorite piece in the town is a small stool that shows up in many of the buildings. It's a tough little guy – the costumed interpreters sit, kneel, stand or even saw on reproductions of this stool every day.

This form is also common in rural Europe, especially in eastern Bavaria, which is close to the origin of the Moravians in the Czech Republic. In Europe, it's also common to see this stool with a back – sometimes carved – which turns it into a chair.

But the best part of the stool is that it requires about $10 in wood and two days in the shop to build – and it has a lot of fun operations: tapered octagons, sliding dovetails, compound leg splays and wedged through-tenons. And by building this stool, you'll be about halfway home to being able to build a Windsor or Welsh chair.

This particular stool is based on originals owned by Old Salem that are made from poplar. The stools are remarkably lightweight – less than 4 lbs. Like many original stools, the top of many Old Salem stools have split because of their cross-grain construction. Despite the split, the stools remain rock-solid thanks to sliding dovetail battens under the seat. I like to think of the split as just another kind of necessary wood movement.

Here's how the stool goes together: The thin top is pierced by two sliding-dovetail sockets. Two battens fit into those sockets. The legs pierce both the battens and the stool's top, and they are wedged in place through the top. This is the cross-grain joint that will make the top split in time.

The best place to begin construction is with the legs.

Geometry 101

The legs are tapered octagons. They are 1 5/8" square at the top and 1" square at the foot. The top of the leg has an 1 3/8"-diameter x 1 1/2"-long round tenon. To make the legs, first mark the 1 5/8" octagon on the top of the leg and the 1" octagon at the foot. See "Octagons Made Easy" at right.

With your octagons drawn, saw each leg into a tapered square – 1 5/8" at the top and 1" at the foot. I cut these tapers on the band saw, though I've also done it with a jack plane.

With the legs tapered, you can connect the corners of your two octagons with a pencil and a straightedge. Then it's just a matter of planing the four corners down to your pencil lines, which creates an octagon.

Now turn the tenons on the top of each leg. The tenons are 1 3/8" in diameter and 1 1/2" long. This is a quick operation with a parting tool. Measure your tenons with dial calipers to ensure they are exactly 1 3/8" or just slightly less. If they are even slightly fat, they won't go in.

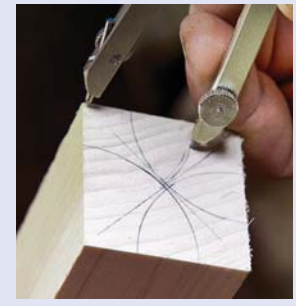
Big Sliding Dovetails

Many beginners are intimated by sliding dovetails because they are hard to fit, especially when made by machine. It

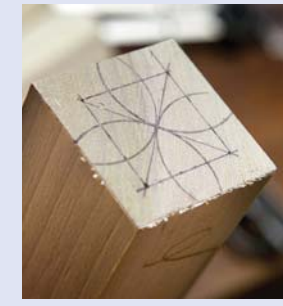
OCTAGONS MADE EASY

Making a proper octagon is a mystery for many beginning woodworkers, but it is easy. All you need is a compass, a center point and four corners of a square.

1. Set the compass to the distance between one corner and the center point of the square you wish to make into an octagon.
2. Place the point of the compass at one corner and strike an arc across the square.
3. Repeat this process at the other three corners of your square.
4. The resulting pattern looks a bit like a flower. The eight points where the arcs intersect the square are the points of your octagon. Plane down to those lines and you have a well-proportioned octagon. —CS



One compass setting. *To make an octagon, set your compass for the distance between the center point of your square and one corner.*



Smaller octagon. *For the small octagon at the foot, mark the square you want to turn into an octagon, reset your compass and repeat the process.*

A diamond in the square. *Here you can see the arcs of the octagon and how they create the facets of your octagon.*

Tenon the legs. *Turn a 1 1/2" long by 1 3/8"-diameter tenon on the top of each leg after you've finished planing the octagons.*

PHOTOS BY THE AUTHOR; ILLUSTRATION BY ROBERT W. LANG FROM THE AUTHOR'S MODEL

CUT THE DOVETAIL SLOT

Saw perfect walls. *The 16° guide is made from scrap and is clamped to the underside of the stool's top. An 8-point crosscut handsaw was used to make these four kerfs.*

Faster than you think. *A chisel can remove waste much faster than a router plane. Just keep an eye on the grain so it doesn't split below the final depth of the socket.*

Flat & finished. *Router planes excel at making housed joints perfectly flat. You could do this work with a chisel, but it would be a fussy process.*

seems to take a lot of hammering to get the joint seated without gaps.

When you make them by hand, you can build in a little forgiveness that makes them both easy to assemble and tight. The trick? A shoulder plane. But I'm getting ahead of myself. First we have to cut the long and wide socket on the underside of the stool's top.

Fetch your sliding bevel and set it to 16° off of 90° (or 106°). Lock it. Tight. That is the only angle you need for the entire project – even the compound splay of the legs.

The 16° is the angle of the walls of the sliding dovetail. Lay out the locations of the battens so they are 2 1/8" from the ends of the top. The dovetail socket is 3/8" deep, 2 1/2" wide at the bottom and has 16° splayed walls. Lay out the sockets on the underside and edges of the top.

Now you need to saw the angled walls of the sockets. With short sliding dovetails (for drawer blades, for example) I'll just kerf them freehand. But because these sockets are 11 1/2" long, I make a guide for my handsaw.

The guide is just a piece of 2"-square scrap that has one edge sawn or planed to 16°. I clamp the scrap to the underside of the bottom and saw the walls by pressing the sawplate against the guide while stroking forward and back.

Remove the majority of the waste with a chisel and mallet. Then finish the bottom of the sockets to their final depth of 3/8" using a router plane.

Shape the Battens to Fit

The battens have the complementary shape cut into them. Unlike the sockets, there is very little material to remove to make the male section of the joint – just little slivers on the edges.

The dovetail is 3/8" thick and has 16° bevels. Lay out the 3/8" thickness on the two edges and two ends of the batten. Then use your sliding bevel to scribe the 16° angle. The angle should touch the corner of the batten and your 3/8" scribe line. Then you just have to remove the material in the two right triangles created by your pencil.

There are lots of ways to do this, but the most straightforward is to remove the majority of the waste with a shoulder plane (or a rabbet plane) and tease the waste out of the corner with a fine handsaw or chisel.

Plane down to your layout lines and clean up the joint for a test-fit. Decide which way the joint will go together

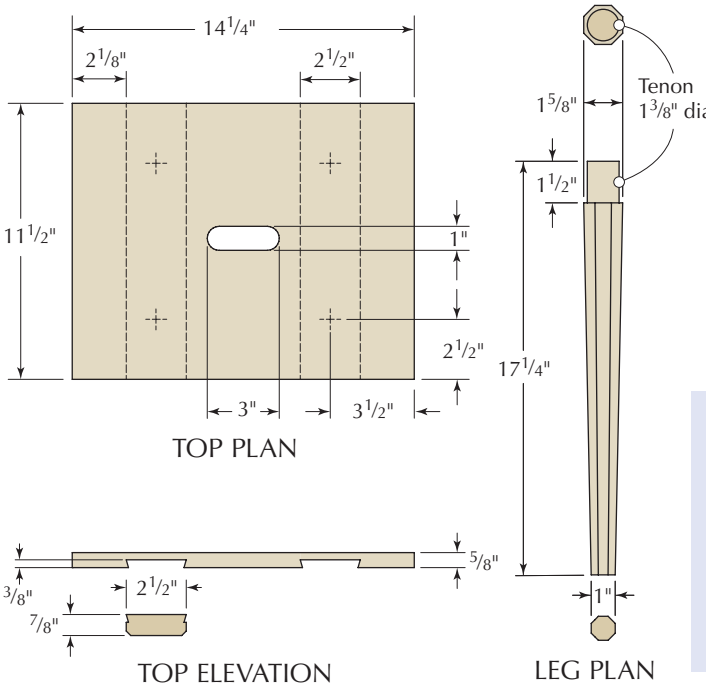
PLANE THE BATTENS

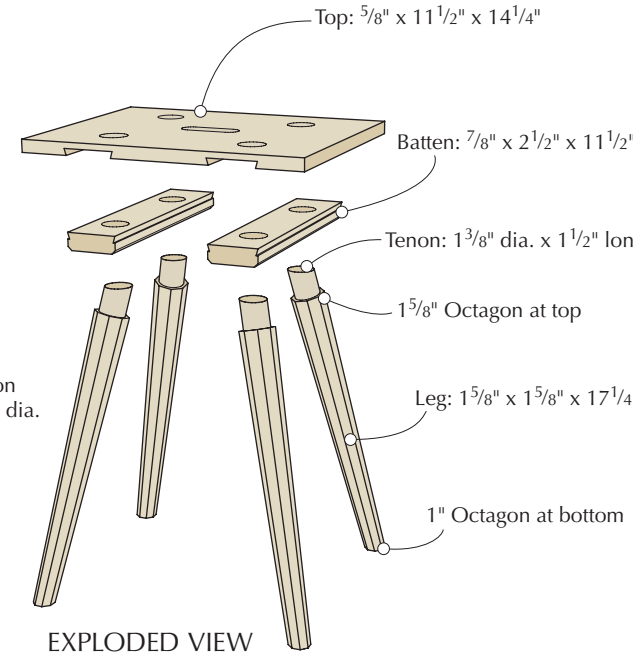
Little triangles; big strength. *Here's the little triangular section that creates the dovetail, which was cut with a shoulder plane. The waste in the corner can be removed using a saw or chisel.*

Plane the middle. *There is so much friction in assembling a sliding dovetail that it's best to hollow out the middle of the joint with a few "stopped shavings" along the joint's bevel.*

"The past is a foreign country; they do things differently there."

—L. P. Hartley (1895-1972), British novelist & short story writer





Moravian Stool

NO.	ITEM	DIMENSIONS (INCHES) T	W	L	MATERIAL
❑ 1	Top	5/8	11 1/2	14 1/4	Poplar
❑ 2	Battens	7/8	2 1/2	11 1/2	Poplar
❑ 4	Legs	1 5/8	1 5/8	*17 1/4	Poplar

* Level legs to floor after assembly

and compare the ends of the batten to the sockets in your top. When both ends of a batten will fit in their socket, the temptation is to hammer it home. Resist.

Instead, return to your bench vise and clamp your batten in place. Mark the sliding dovetail about 1 1/2" from both ends of the batten. Then make stopped shavings between those two pencil marks until the plane stops cutting. Repeat this process on the other 16° walls.

These stopped shavings hollow out the middle of the sliding dovetail, which makes fitting the joint much easier.

Now use a mallet to drive the battens in place. No glue. You should be able to get the batten to slide in place with the same sort of force you would use for chopping dovetail waste. If you are whaling on the batten and denting it, your joint is too tight. Remove the batten and plane a little more off.

Once the battens are fit, plane a 3/16"x 3/16" chamfer on their long edges to reduce the physical and visual weight of the stool.

Legging Up

By far the most stressful part of the project is "legging up" – where you bore the compound-angle holes through the battens and seat. Luckily, there are some chairmaking tricks that make this process a snap.

The first trick is to ignore the fact that the legs are inserted at a compound angle – called rake and splay. Instead, lay out the leg angle from the center of an "X" drawn between the locations of the four leg mortises. By working out from the center point of the seat, you can drill the holes at a single angle. The resulting hole produces a compound angle, but by working from the center point, you only have to worry about one angle, which is what we call the "resultant angle" in chairmaking.

And here's the best part: For this stool, the resultant angle is 16° – the same angle setting as the sliding dovetail.

First step: Lay out the center point of the four leg mortises on the underside of the assembled seat. The center point of each leg hole is 2 1/2" from the long edges and 3 1/2" from the ends. Draw a big "X" on the underside that connects these four points – yes, it's a pain to draw because of the battens.

Now you have a choice: Chuck up a 1 3/8" Forstner in your brace or cordless drill and eyeball the angle using a sliding bevel placed on the "X." This is how I usually do it with chairs.

Or take the chicken road and do it on the drill press. Here, I demonstrate the chicken method. Make a small platform that bevels the seat at 16° on your drill press's table. Clamp the platform to the drill press. Chuck a 1 3/8" Forstner in your drill press. Line up the long line of your "X" with the shank of your bit and the post of your drill press. That will ensure the hole is at the true "resultant angle." Drill through the seat

and take it slow so you don't splinter the seat when the bit breaks through.

Rotate the seat and repeat the process for the three other holes.

Brief Detours Before Assembly

These stools have a handle in the middle that makes them easy to carry around. This handhold is 1" x 3" and runs parallel to the grain. Bore it out using a brace and bit or a drill press and finish the shape with rasps.

Another thing you need to do before assembly is to make some 1⅜"-wide wedges to drive into the tenons on the legs. I use wedges that have a 6° included angle and are about 1¼" long. Make them from hardwood – I usually use oak – and make them by splitting or sawing. (I've provided a short video on the magazine's web site that shows how I do this on a band saw.)

If your tenons fit tightly in the mortises, you will need to saw kerfs in the tenons so the wedges will go in. If your tenons are loose, you can split the tenon with a chisel after driving the legs home.

Last detail: Chamfer the rim of your tenons with a rasp. This will help prevent your seat from splintering when you whack the legs in place.

Traditional Glue

I use hide glue for most things, but especially chairs and stools. Any household article that will take abuse and might require repair is an excellent candidate for hide glue because it is reversible and easily repaired.

Brush the glue on the mortise and the tenon and drive the legs home. If you sawed a kerf in the tenon, align the kerf so it is perpendicular to the grain of the stool's top. If you don't do this, the wedge will split the seat.

Drive the wedges home. Stop tapping them when they stop moving deeper into the tenon. Wait for the glue to dry, then saw the tenons flush to the seat.

Cut the feet so they sit flat on the floor – the magazine has a story on its web site that explains how to do this. Then break all the sharp edges on the stool with sandpaper.

Many of these stools were painted. I applied three coats of General Finish's "Tuscan Red" milk paint, sanding between coats with a #320-grit sanding sponge.

With the stool's construction complete, you only have to wait for nature to take its course. One night while you are lying in bed you'll hear a sharp crack or pop – it's the sound of your stool's seat splitting and becoming historically accurate. **PWM**

Christopher Schwarz is the editor of Lost Art Press (lostartpress.com) and the author of a forthcoming book titled "The Furniture of Necessity."

INSTALL THE LEGS

Quick & flawless. *The platform raises the seat to the 16° resultant angle. The pencil lines ensure that the angle is in relation to the centerpoint of the seat.*

Set for life? *Wedging the tenons will keep them tight even after the glue fails. To prevent splitting, the kerf in the tenon is perpendicular to the grain of the seat.*

Friendly for the fingers. *The 1" x 3" grip for the stool is a little tight for most adult hands, but it looks right. You might consider making it a little bigger if you have big mitts.*

ONLINE EXTRAS

For links to all online extras, go to:

- **popularwoodworking.com/dec12**

WEB: *Visit Old Salem's web site and plan a visit there to see the town and the Museum of Early Southern Decorative Arts.*

VIDEO: *See how the author lays out an octagon on a leg.*

BLOG: *Learn how to level the feet of a chair or stool.*

VIDEO: *See how to cut perfect wedges on the band saw.*

TO BUY: *"Furniture in the Southern Style," by Robert W. Lang and Glen D. Huey.*

IN OUR STORE: *"The Anarchist's Tool Chest," by Christopher Schwarz.*

Our products are available online at:

- **ShopWoodworking.com**

PROFILED Inlays

BY RUTAGER WEST

Decorative banding within moulding adds a distinctive detail.

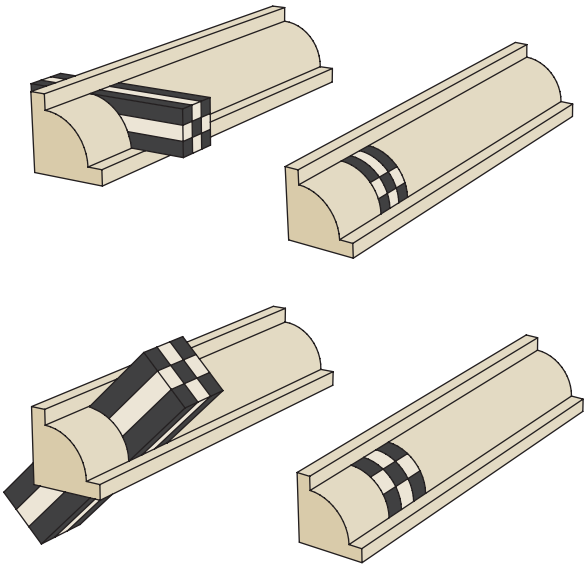
For my very first veneer project, I decided to make a curved-top jewelry box. I knew I would need to use solid wood on the edges to protect the fragile veneer and I also wanted to embellish the box with some geometric inlay bands. At the same time I was drawing up some inlay ideas, I was staring at a new moulding plane that was on my bench. A light bulb went off in my head and I thought, "why not make my edgebanding from my inlay blank?"

The process seemed easy enough: Cut a rabbet in the corner and fill it with a thick slice from my inlay packet then run the profile with my new plane or a router bit. Well, I did a bit more thinking and realized that many if not most profile bits and planes cut at 45° degrees, so just placing the banding in the rabbet at 90° and cutting a profile that slants at 45° would skew the inlay detail – it would be longer on the side.

I determined that in order to work, the inlay would have to be presented at 45° too. Easier said than done. After several attempts (all successful – some difficult and others wasteful), I have settled on the following method: Rip a board at 45° and insert the inlay strip in the cut.

In this example, I'm starting out with a holly and ebony checkerboard inlay packet no thicker than the middle section of a 3/16"-radius corner bead profile my plane or router bit could cut. I wanted the rest of the profile to be filled in with holly, so the board I ripped at 45° was holly.

Because both holly and ebony are expensive and sometimes hard to find, I wanted to conserve my stock. I did

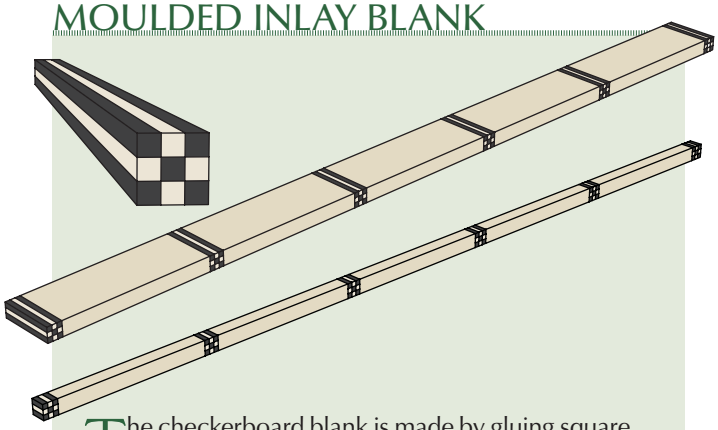


Orientation. *If the inlay banding is placed at a right angle to the edge moulding, the pattern would be skewed when the moulding is cut (top). Tilting the banding to a 45° angle eliminates that distortion (above).*

Appearance. *When the edge is profiled, either with a moulding plane or a router, the checkerboard pattern appears within the edge of the bead.*

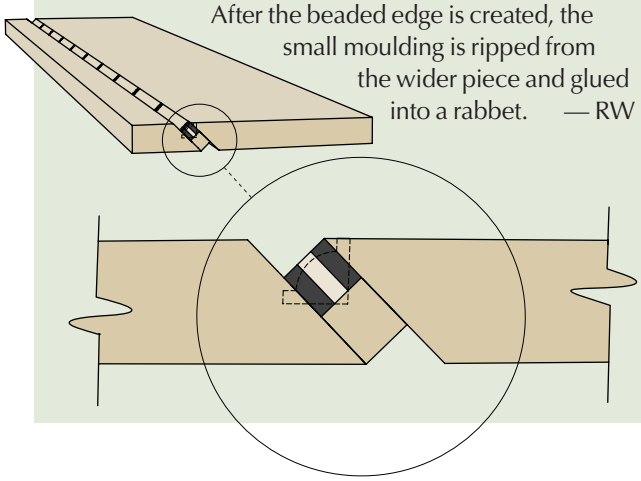
PHOTOS BY THE AUTHOR, ILLUSTRATIONS BY ROBERT W. LANG

MOULDED INLAY BLANK



The checkerboard blank is made by gluing square strips of contrasting wood into a long block. This block is cut into short lengths that are then glued between blocks of light-colored wood. When the glue has thoroughly dried, square lengths are ripped at the band saw.

To form the tilted edge inlay, these squares are glued between the angled edges of other pieces of wood. The extra width of all these pieces provides a margin of safety for forming the small moulding. After the beaded edge is created, the small moulding is ripped from the wider piece and glued into a rabbet. — RW



CUT, ANGLED & REASSEMBLED

1 ***Good insurance.*** *Rather than work with small pieces close to sharp blades, the inlay is glued between wide pieces of scrap material.*

4 ***Tight squeeze.*** *Cauls above and below the joint prevent the bevels from sliding apart as clamps are tightened.*

so by attaching scrap stock to the edge of the inlay packet and the edge of the holly. Edge-gluing the scrap to the holly also adds a safety margin for the rip by moving the work away from the tilted table saw blade, which makes the offcut safer to handle. Adding the scrap to the inlay maximizes the yield of the packet since you need a large width to fill the rip cut but only really need about a 1/4" of the inlay for the profile.

The next step is to glue the inlay into the 45° rip cut. I like to use a white glue that dries with a clear glue line, such as Elmer's. You'll need to clamp the boards together both edge to edge and top to bottom to stop the boards from just ramping off each other.

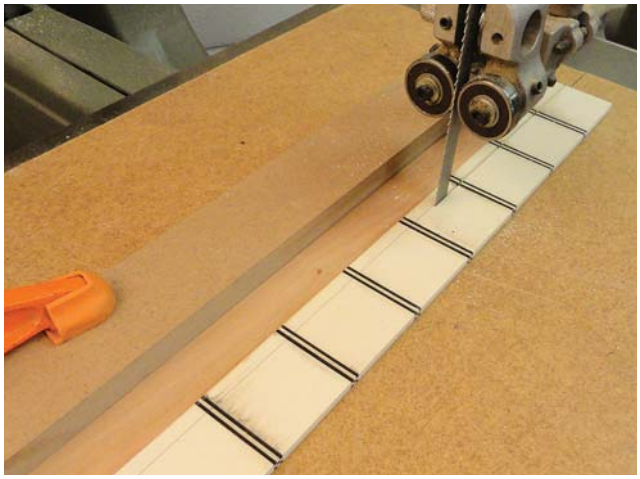
My method is to use several clamps for the edge and then sandwich them with two pieces of melamine board (so the glue doesn't stick,) with Bow-clamp cauls. I tighten the cauls about 75 percent and then start alternating edge clamps and cauls until the boards are flat and the glue starts squeezing out. I leave the clamps on overnight.

After the glue dries and the clamps are removed, I rip off the edge side at 90° even with the edge of the inlay then plane the profile with a Bridge City HP-6 handplane. The profile can also be cut with a hand-held router or on a router table.

The last step is to cut the inlay free from the board at the table saw leaving a 1/16" step of holly, making the total width 5/16". The profiled inlay can now be glued into a 5/16" rabbet – or make the rabbet 1/16" wider and add two 1/32" stripes of contrasting wood for a more dramatic look.

Profiled inlays are a great way to add a decorative touch to your next project. They can be used in a rabbet on the edge or can be put into a V-groove most anywhere in the field of your project. You can use lots of different profiles and wood species to make your next box, picture frame or piece of furniture really stand out. **PWM**

Rutager is largely a self-taught woodworker. He lives in St. Paul, Minn.

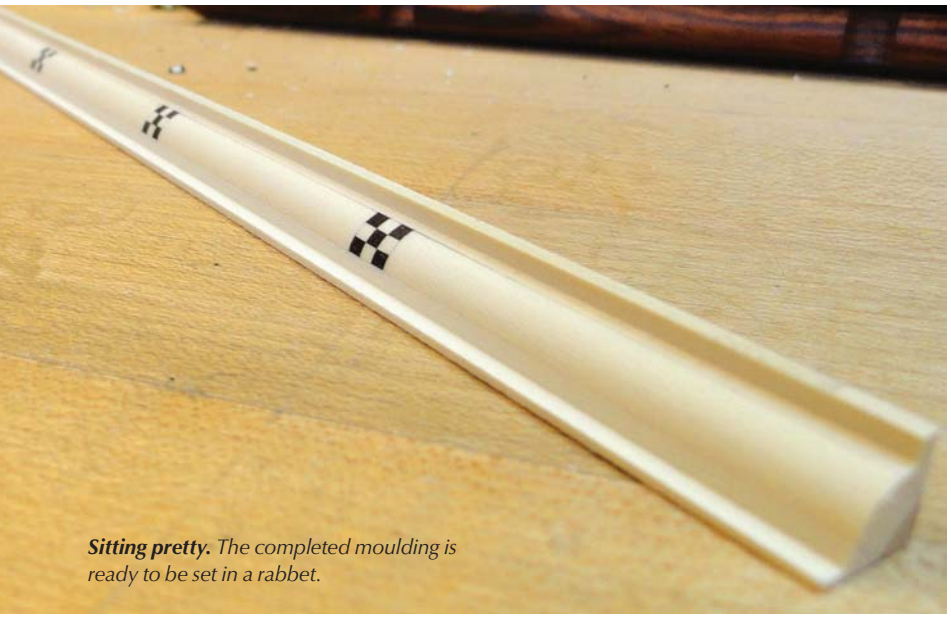


2 ***Conservative approach***. *The checkerboard inlay blank is glued to a thin scrap and ripped to make the most of the inlay blank.*

3 ***Margin of safety***. *Scrap is glued to the blank to conserve material and keep the tilted blade away from the fence.*

5 ***Orientation.*** *With the clamps removed, the blank is ready to be turned into moulding.*

6 ***Router ready.*** *The edge is trimmed at a right angle and the blank is ready to be profiled.*



Sitting pretty. *The completed moulding is ready to be set in a rabbet.*

ONLINE EXTRAS

For links to all online extras, go to:

- **popularwoodworking.com/dec12**

WOOD: *Buy ebony and holly blanks to make your own inlay banding.*

ARTICLE: *Learn how to make diamond-shaped inlay banding from Rob Millard in an article from our October 2011 issue.*

ARTICLE: *Read a review from our April 2008 issue of the Bridge City moulding plane used by the author in this article.*

IN OUR STORE: *"Woodworker's Guide to Veneering and Inlay," a 168-page book by Jonathan Benson.*

IN OUR STORE: *"Creating Veneer, Marquetry & Inlay" DVD, a compilation of nine videos from master craftsmen.*

Our products are available online at:

- **ShopWoodworking.com**

BODY MECHANICS

BY JEFF MILLER

Get better woodworking results with these 12 tips.

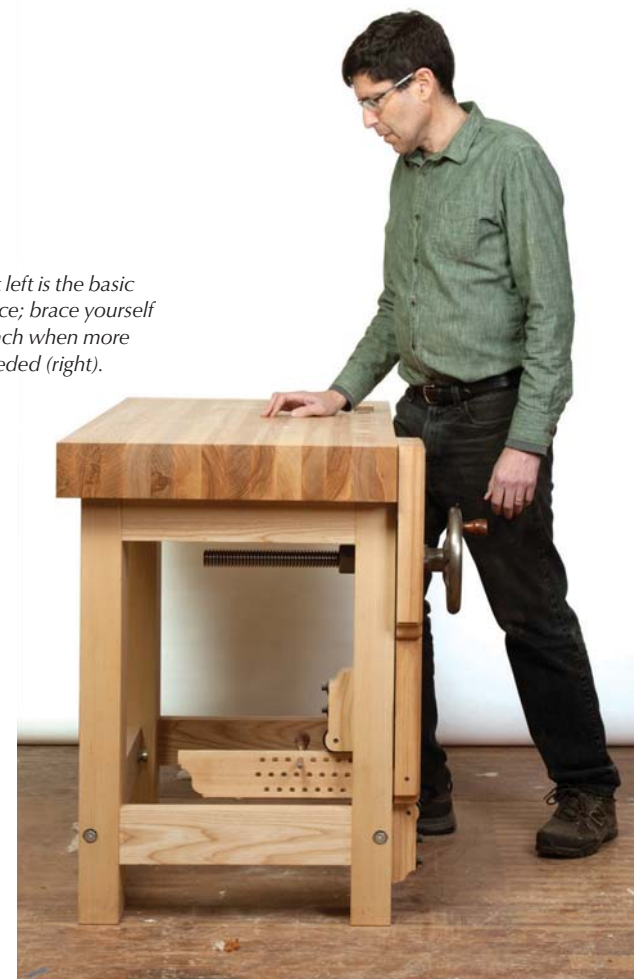
I've been teaching now for more than 15 years. And in that time I've thought a lot about why students are or are not able to do certain things. Problems arise only rarely as a result of a student not having good information about how something should be done. Most know the steps involved. Many are familiar with multiple methods of cutting dovetails or mortise-and-tenon joints. The problems are almost always more fundamental in nature.

If you're having trouble with your dovetails, or even your band sawing, here are a dozen fundamental things to think about that may help.

Stand up Straight? Actually, No

Woodworking is one example where standing up straight is actually a bad idea. Why? Standing up straight puts you in a position that is less balanced, less stable and less versatile than what you need for effective woodworking.

That doesn't mean you should slouch. It's just that good posture for woodworking is more like that for many sports. Woodworking is not really an athletic endeavor – although it can certainly have its moments. But when you're trying to do almost anything physical, learning how to use your body better will definitely pay off. Not surprisingly, many of the



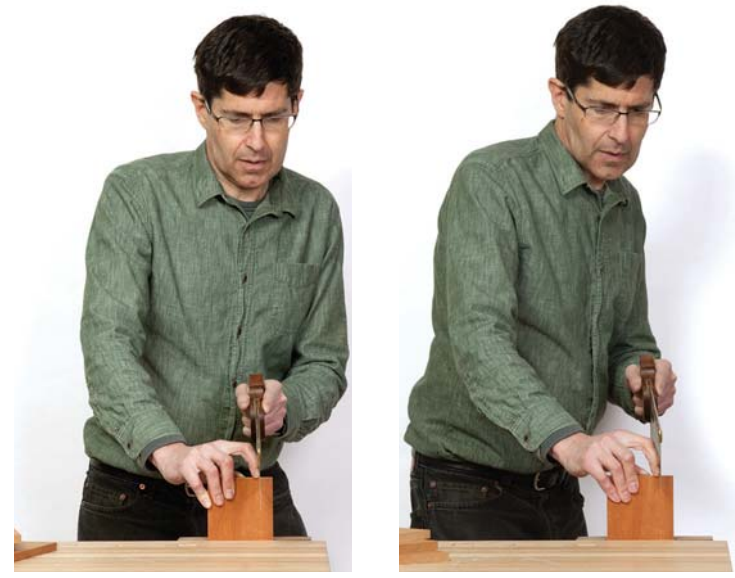
Stable stance. *At left is the basic woodworking stance; brace yourself against your bench when more stability is needed (right).*

basic principles from a variety of sports apply just as much to woodworking.

What's the better stance? Stand with your feet shoulder width apart, one foot pointing forward and the other pointing off somewhere between 45° and 90°. Your knees should be slightly bent, with your hips pushed gently forward. Many woodworkers will also lean against either the workbench or a machine for additional stability.

What's better about this stance? It provides you a balanced, stable platform for all of your work. And when you've got that stability and balance, almost any woodworking task will be easier to control, whether it be planing, sawing, chiseling or even using one of your stationary machines. You'll be able to extend your reach farther without losing your balance, and be able to use your strength and weight to greater advantage.

This certainly isn't the only body position for woodworking, but it's a really effective one.



Alignment counts. *Put your body in front of the saw (left) and you force your wrist and shoulder to move out of alignment with the tool in order to make a straight cut. Instead, align with the saw the parts of your body that are in motion.*

Body Alignment

Lining up your body properly will also help you to do the work more accurately and efficiently. The key to this is proper alignment.

For example, mis-alignment of your arms means you have to rely on multiple coordinated movements to control what you're doing. It's both less accurate and less powerful to add in this unnecessary or wasted movement. It's not impossible to work this way, but it's easier to just eliminate the extraneous movement.

When sawing, you should have your wrist and forearm lined up precisely with the back of the saw. This way, a simple, pivoting movement from your shoulder and some flexing at the elbow will move the saw in a straight line. If your wrist is flexed (your forearm doesn't line up with the saw) and you're standing in front of the board, your shoulder will have to twist and pivot, and your wrist has to bend and straighten (along with the elbow movement) to move the saw. This will be much harder (although not impossible) to control.

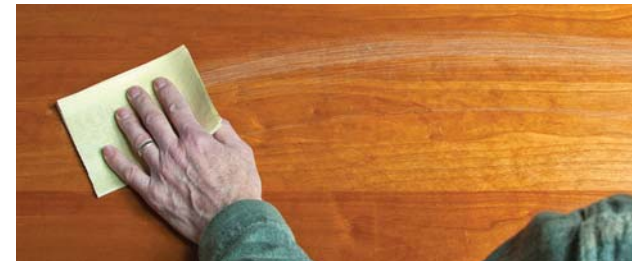
In addition to increasing your accuracy, aligning your body properly also means you'll be putting less stress on the joints and fatiguing muscles less as well. You lessen the chance of a repetitive-stress injury.

Take Advantage of How Your Body Works

You also need to pay attention to the way your body naturally wants to move (also known as body mechanics). Take advantage of these natural tendencies and you'll do better work. Work against them, and you'll expend extra effort to overcome what your body naturally wants to do. For example, pulling a marking gauge toward you as you scribe a line takes advantage of the natural pivoting of your arm from the shoulder, and tends to tighten the gauge's fence against the work as you pull. If you push the marking gauge, your arm wants to pivot away from the work. The same pivoting action affects your sanding. The natural tendency when sanding from side to side is to sand in arcs. It's easier to sand straight with strokes that go out from and back toward your body.

Put Yourself (& the Wood) in the Right Place

Setting your body up in a good position is more than just stance and alignment, however. You need to be in a good position to do the work. You also need to be able to see what needs to be seen. Getting these things right can be as simple as working at a good workbench. But that doesn't take care of the problem if you fail to think about where you need to be in relation to the work. Don't just put the workpiece on your bench a certain way because it's easy to put it there. Ask yourself if you'll be able to set up your body properly to do the work and to see important lines or relationships at the same time. You won't be able to work effectively if your body position or alignment are thrown off by a poor choice in locating your work. And you can't chop, pare or saw square if you can't see what square is. A good bench allows for flex-



Natural arc. *The natural pivoting motion of the shoulder leads to a curved sandpaper path if you sand from side to side. For straight strokes, reposition the work (or yourself) to sand out from and back toward your body.*

PHOTOS BY THE AUTHOR

The right working height. *A Moxon-style vise (this one is from Benchcrafted) can hold boards for dovetailing (and other work) at the perfect height.*

ibility in securing your work for just this reason.

When you finish one task and start to do something different, don't just leave the work where it was if that position is no longer effective. Think about the best position for what you're about to do. This may mean moving the work, or moving yourself.

I'm also a firm believer in raising or lowering the work as necessary, rather than simply hunching up your shoulders or bending over and straining your back. You're better off adjusting the work to suit the best body position instead of contorting yourself to accommodate the work.

Separate Force & Control

Most woodworking involves pushing or pulling either a tool or the wood in a controlled way. In most cases it helps to think about force behind the movement and the control over the tool or the wood as separate issues. One part of your body should be responsible for the push or pull (the force), and another for the precise control. So you may be controlling a chisel's position with your hands and arms and possibly your shoulders, and applying force with shoulders, your core or your legs. Or you'll subtly adjust the pressure on the front and back of a handplane with your hands and arms while pushing the plane forward with your lower body.

The same concept applies when you hold a board against the rip fence and down on the surface of the table saw with your left hand as you push the board through with your right hand. And also when you have to hold a tool at a constant angle for freehand sharpening.

Separation of force and control usually means you're working more efficiently as well. Your lower body muscles are also much stronger than your upper body ones. And relying on the stronger muscles to do the harder work makes sense.

In reality, some of the work inevitably gets done by your other hand or other part of the body. But thinking about the separation of chores this way will definitely help you to gain more control over your actions.

Balanced pressure. *You can plane a convex curve with a straight plane – you just have to learn to balance the pressure on the tool between your hands.*

Stay Contained

You have more power and more accuracy close to your body. So if you're looking to increase one or both of these, you need to keep things close – though not so close that you're cramping your ability to work (but it might be closer than you think). Most of the time, your elbows shouldn't stray too far from your torso. Even handplaning is best with your elbows close to your body – no more than a foot away from your hips most of the time.

Stop Working so Hard

Hard work and accurate work seldom go together.

I'm not talking about your work ethic here. Rather, I'm talking about the idea that if you're straining or pushing too hard or cutting too fast, you're creating a whole slew of accuracy problems. This is as true with machines, where you'll see vibration, chatter and torn-out fibers, as it is for hand tools.

And it's also true for your body. You need to get a feel for how hard to push or how fast you can cut before things break down. And then find ways to work within those limits.

This doesn't mean you can't work fast and hard up to the point where accuracy matters and then slow down to get it all exactly right. It means that pushing for hard and fast has consequences for the accuracy and cleanliness of your cuts.

Too fast? *If you cut too aggressively with a router, the results suffer. In the mortises above (which are sliced in half lengthwise), you can see chatter on the top. On the bottom is a mortise routed at an appropriate speed.*

Stay Relaxed

It's common to tense up when trying to learn a new way of doing something physical. Adding in the thought that you should relax is not always beneficial (although sometimes it helps). Instead, try to break down the task into smaller components and work on one simplified task until you can do it without tension. Then add in the next component. It's particularly helpful to commit to working on muscle memory separate from accuracy and detail. Don't stress about accuracy right away, either. It comes from a few things:

using your body correctly and without added movement or tension, an awareness of exactly where you need to cut and experimenting to see how you can best put these things together. Then it takes practice. Sometimes lots of practice.

Seek Out Feedback

It's really helpful to have someone else look at your work, especially if that person is more skilled than you are. You need to learn to see more in the work, and having someone else point things out to you is an invaluable start.

But feedback should come much earlier than at the end of the project.

Plane feedback. *Be sure to watch for the uneven removal of stock as evidence of planing out of square. You can see this on the top leg. The leg on the bottom is still square across.*

There's a very rich stream of feedback available to you as you work. Your hands, eyes, ears and even nose provide you with all kinds of useful information. You need to pay attention to this feedback for a couple of reasons. First, not noticing what you're doing as you do it, with all of the detail available, is like driving your car without paying attention to what you're doing. You don't wait until you're in the ditch to correct your steering; don't wait until your work is a mess before paying attention to your woodworking.

Second, the more you observe of the sights, sounds, feel and smell of woodworking as you go, the more you'll be able to correlate certain feels, sights and sounds with success. How does the plane feel in your hand when it works especially well? How does it sound? What does it look like when you plane perfectly? What about the sound of the jointer or planer when you're going against the grain as opposed to with the grain?

Make it a habit to pay attention to all of these things more and more, and your work will improve.

Learn at What to Look

It's not as simple as it sounds. A lot of the time, the temptation is to watch something that is completely irrelevant. At the table saw, that might mean watching the blade cut the wood. Sure, you need to be aware of where the blade is so you can keep your hands away, but watching the blade cut won't affect the quality of the cut. Watching to be sure that the board stays tight to the rip fence is far more important, and will have a direct impact on the cut quality. Likewise, watching the shavings coming out of a handplane is cool, but the edge of the board you're planing will tell you much more about what's going on (although the shavings can tell you if the blade is skewed in the plane, and you should check that each time you start planing). Choose to look at what's important.

Practice. *Planing a short board upright against a single bench dog is a good way to learn about balance and pressure when planing. Practice enough and your muscles will retain the knowledge.*

Learn to Accept Mistakes

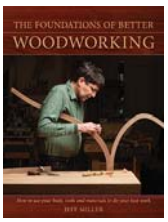
No one wants to make mistakes. But fear of making mistakes, or trying to avoid them by avoiding new challenges that might lead to mistakes, means you won't develop as quickly as a woodworker. Afraid you'll spoil good wood? Use cheaper stuff.

Learn How to Practice

You really can't skip practice. You need to get good enough at basic skills before you can add in or move on to additional, more challenging skills.

For example, if you're not already comfortable with your saw technique, then the simple fact that you're trying to saw to a line will mean you have to concentrate on that, and your saw technique will likely fall apart. You need to get good enough at the motions of sawing that you can do it without thinking. This means you've established certain neural pathways that are ready to work even if they aren't given much thought. This is sometimes called muscle memory. And the only way to get it is to practice.

It doesn't take a huge amount of time, but all the reading in the world won't do it. You can't learn to ride a bicycle by reading about it, and woodworking is pretty much the same. **PWM**



Jeff is author of the new book "The Foundations of Better Woodworking" (Popular Woodworking) in which he writes on how to use your body, tools and materials to do your best work. It's now available at shopwoodworking.com.

ONLINE EXTRAS

For links to all online extras, go to:

- popularwoodworking.com/dec12

BLOG: *Read Jeff Miller's blog.*

REVIEW: *Read Andy Brownell's review of "The Foundations of Better Woodworking."*

Our products are available online at:

- ShopWoodworking.com

Parquetry Tabletop

BY HEATHER TROSDAHL

Grain pattern inspires a new take on a pinwheel design.

I originally made this table during my first year at the College of the Redwoods Fine Woodworking Program. For our second project we are encouraged to incorporate shop-sawn veneers in some way. My plan was simple: I wanted to make a table out of a small but beautiful piece of red narra (an exotic from Southeast Asia). I knew it had to be a veneered top to get the most out of this unusual board, and I wanted it to be simple in design to allow the wood to speak for itself. I decided to resaw the board and find a pleasing layout by slipmatching my veneers.

Once I cut the veneers I realized I didn't like how this particular board looked when slipmatched. Bookmatching, or even flipping parts end to end, presented unwelcome chatoyance. No matter how I arranged the veneers and depending on the direction of the light they shifted from lighter to darker in color, highlighting the fact that I was joining separate pieces of wood to make the top.

To my eyes, neither option was going to do this board any justice. Then it dawned on me: I was approaching this project with a solid-wood mindset. Now that I was working with veneers I could put aside my concerns for wood movement, multiplying the possibilities. So why not take this opportunity to explore something new?

I turned to my wood for some guidance: "How can I use the chatoyance as part of the design?" The answer: parquetry – the joining of many pieces of wood to make a geometric pattern. But what pattern? This is where the possibilities are endless and can be somewhat overwhelming.

Luckily, I had a flame-like graphic at the end of my board and I thought it a shame to destroy its potential by slicing it in to smaller pieces. Instead, I cut a template window that framed this part of my board, which allowed me to notice a wedge shape that evoked a petal-like form, or a blade on a windmill rather than a symmetrical wedge suitable for a starburst. I liked this shape, so I used the window to search for other areas on the veneer that would work with this same shape. I found a total of three petals per veneer leaf.

From there, one question guided me through the next stage: "Can I use the chatoyance inherent in the wood to accentuate the already implied movement in, say, a pinwheel pattern?" And so it begins.

Shop-sawn Veneers

Using shop-sawn veneers for parquetry takes a lot of the worry out of the work. At 1/16" to 3/32" thick, shop-sawn veneers are not as delicate as commercial veneers, and shop-sawn veneers can be worked like solid wood. The extra thickness allows handplaning and profiled edges. If you are working with a larger board, you can combine veneer and solid wood from the same plank to keep the colors and textures consistent throughout the piece. (If you need resawing instruction, see "Successful Resawing" at popularwoodworking.com/dec12.)

Revisiting the tabletop design for this article, I decided to use black walnut, one of my favorite domestic woods. It has rich grain characteristics, is readily available and is relatively easy to work.

For this top I used one 1" x 8" x 48" board of black walnut with a combination of wild-grain graphics from the flat-sawn part of the board and straight grain from the quartersawn edges; both are necessary for the pattern. I resawed another small board consisting of mostly vertical grain for the underside of the tabletop. Note that you should saw the veneers for both sides of the table at the same time to make them the same thickness. It's important that the two

Saw your own. *Resawing your own veneer allows you to control the thickness and grain pattern to suit specific goals.*

PHOTOS BY THE AUTHOR

sides are balanced and that the bottom veneer is crossbanded (like plywood) to ensure maximum stability once the veneers are glued to the substrate.

Prepare the Substrate

For your substrate, you can use a flat piece of 3/4" plywood, cut into a 22" x 22" square. Clean up the rough plywood edges with fine sandpaper wrapped around a hard block.

However, because the plywood edge will never get completely smooth and I find plywood unpleasant to handplane, I add solid wood to the edges of the substrate. You can easily plane the solid edges smooth and square and guarantee a good glue surface for the edge banding.

Often I will use something inexpensive and easy to plane, such as poplar, but for this project I recommend using the same species of wood as your veneers; that provides extra security to guard against planing through when profiling the edges. If you choose this method, cut your plywood substrate square 3/8" smaller than your final tabletop dimensions: so, 21 5/8" x 21 5/8".

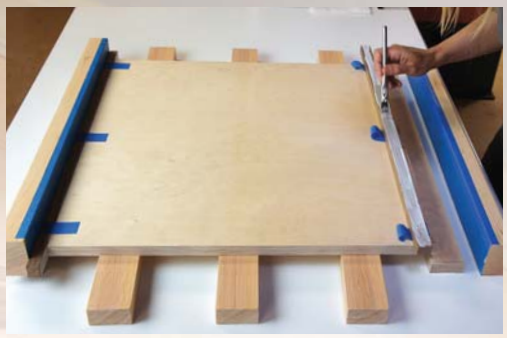
Cut four strips of walnut that are about 3/8" x 7/8" x 22 1/8", slightly larger than the dimensions of the substrate edge.

Prepare for clamping the edge banding. The screw pressure of your clamps should be centered in the middle of the stock. The use of cauls at least 3/4" thick between the banding and the clamps will protect the banding and better distribute clamp pressure.

Elevate your substrate on cauls (faced with tape to resist the glue), and place a caul under each end of the clamps. Brush glue on to both the plywood edge and the banding and rub the two back and forth to evenly spread the glue. Now position the edge banding and use some blue tape to hold it in place. Glue the banding on two opposing sides at the same time and then clamp it down.

After allowing the glue to dry, use a handsaw to cut off the extra lengths of the edge banding, then use a handplane to flush it to the substrate surface before moving on to the two remaining edges.

With all edges flush to the surface, use a handplane to square the edge-banded substrate.



Get set. *To attach your edge banding, elevate the substrate and position the clamps and cauls. Then spread glue on the plywood and walnut, rub the pieces together for even glue distribution, and tape and clamp the edge banding in place.*

Draw Your Pattern

Begin by laying out the only two lines which go from edge to edge uninterrupted.

1. Your first line divides the substrate in two parts, almost diagonally, but not corner to corner. Because of the pinwheel pattern, begin the line 5 3/8" to the right of the top left corner and connect it to a point 5 3/8" from the left side of the bottom right corner.

2. Draw the second line to divide it into four. Move clockwise to the next corner and measure out 5 3/8" to the right of the top right corner and connect the line to a point 5 3/8" from the left side of the bottom left corner.

3. Draw a line from each corner, connecting it to a point 1" from the center of the two main intersecting lines. Now we have our first petal for each corner. Label these petals with a letter for each corner preceded by the number 4 (4A, 4B, 4C, 4D, as shown in photo 2, below, right).

4. For the next petal, work clockwise, connecting a point on the edge, 3 3/8" to the right of the first petal to a point 7/8" at the bottom near center. Do this for each corner and label this petal with the appropriate letter preceded by the number 3.

5. For the last petal, move counterclockwise, connecting a point on the edge 4" to the left of the corner and connect it to a point 7/8" to the left of center. Do this for each corner and label these petals with the appropriate letter and the number 2.

6. The remaining triangles should be labeled with the appropriate letter and the number 1, as shown in photo 4 (bottom, right). Now the pattern is complete and we have the parts properly labeled for layout and assembly.

Locate the Shapes

Make "viewing windows" for each shape to frame locations in the veneer and help visualize the selection after it's cut (See "Make Template Windows" on page 51). In this case, I have interesting grain graphics at the end of my board. This is my favorite part, so I reserve it for the largest corner petal (#4) for each quadrant.

I use the remaining windows to find interesting flat-sawn graphics elsewhere in my stack of veneers, and reserve the vertical grain for the triangle shapes.

Keep in mind that you need enough material for each shape times four. Each shape can have a different grain pattern, but all four of any one shape should have a similar graphic, with grain running in the same direction, so try to take each shape from the same area of each of the four source veneers. (I was careful not to flip any veneers for the petal shapes so the chatoyant effect would be the same for each group of petals.)

Once you find your parts in your material, trace the inside of the templates with a dark pencil, leaving enough room around each piece for sawing.

If you plan to include waterfall edge banding as I did, set aside the offcuts from each shape. Label them to make it easier to match the grain once the parquetry veneer is complete.

To make sure you have enough material for the whole pattern, lay out all the parts on to your veneers before you start cutting.

To make the cuts I used a band saw with a fine blade and a zero-clearance table bed. The bed is simply a thin piece of plywood cut to the dimensions of the band saw table. Turn the saw on and feed the ply through the saw until the sheet covers the whole table. Use double-sided tape or clamps to keep the sheet in place. This zero-clearance bed should reduce any chip out on the bottom of the veneers – but to be safe I cut 1/16" beyond the inside edges and plane to fit as the pieces are assembled.

Also leave some extra material (between 1/4"-1/2") at the edges that will become the outside edges of your tabletop. This will give you extra mate-

> "Art is pattern informed by sensibility."
>
> —*Herbert Read (1892-1968), English poet and literature & critic*

PATTERN LAYOUT

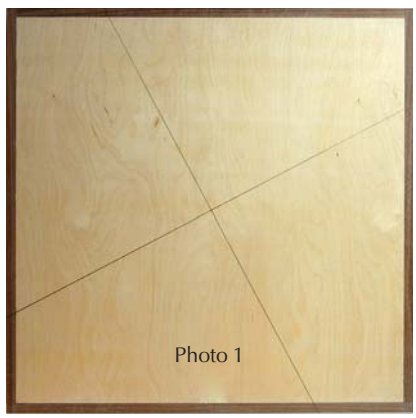


Photo 1

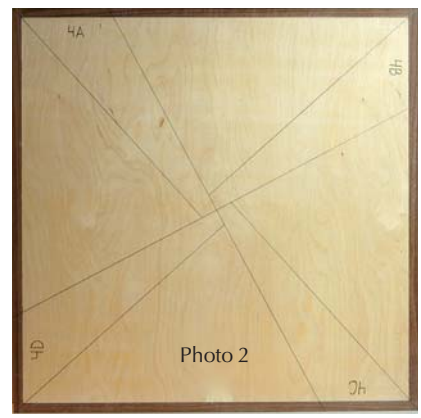


Photo 2

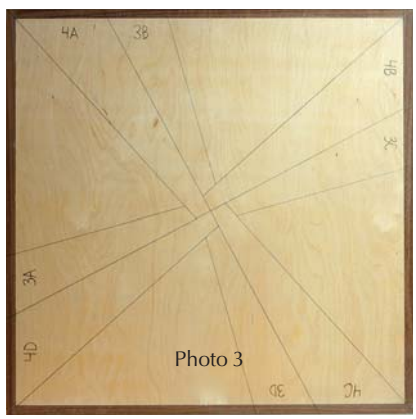


Photo 3

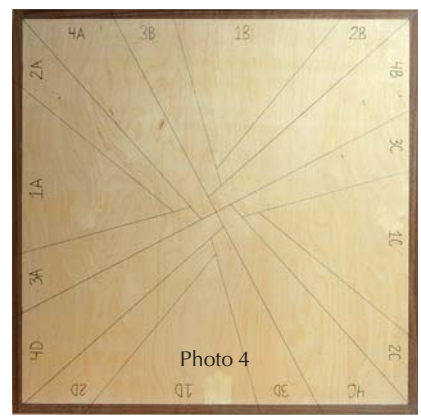
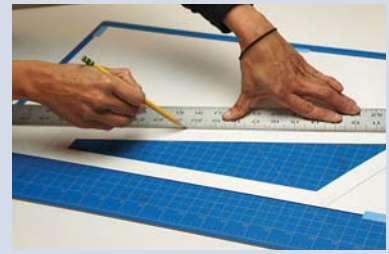


Photo 4

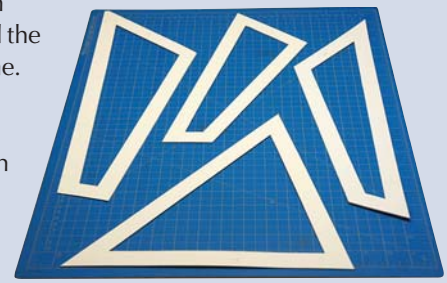
Draw the pattern. *The lines and labels in the images above are explained in steps one through six in the section above titled "Draw the Pattern."*

MAKE TEMPLATE WINDOWS



Because there are only four different shapes for the pinwheel pattern that are repeated at each corner, we only have to make four template windows to complete the pattern.

Trace each of the four shapes onto tracing paper. Then take these shapes and lightly tape the corners to trace them with a straightedge onto white card stock. Leave yourself enough room to add a second line around the outside of each shape for the frame. Use an X-Acto knife to cut out the inside lines for each shape, then cut the outside line to release each shape from the sheet of card stock. — HT



rial and the wiggle room needed if you accidentally plane past your template line and need to slide the part inward to get some extra width.

The extra length is also a good place to hold the assembly down if you need to flatten it before it's glued to the substrate.

Start Underneath

To practice joining edges before you move on to the parquetry, start by piecing together the underside of your tabletop first. This is a fairly easy place to begin because the bottom is simply made up of four or five wider strips of straight-grain veneer. You will use the same techniques described below – shooting each edge of the veneer pieces then gluing one seam at a time – until you've reached your final dimensions (See "Shooting Perfect Edge Joints" on page 52 for additional information).

To glue up these veneers, first tape the seam together on one side, place the mating parts between two clamped cauls and tap in wedges to add extra clamping pressure to the seam. Then store it somewhere flat with a heavy piece of ply covering it until you're finished with the top (see pictures at the top of the next page).

Note: If you decide on simple edge banding, reserve four straight grain veneer strips slightly larger than your substrate edge in width and length.

Prepare Your Veneer Pieces

Start by making a simple veneer shooting board to hold the parts while you clean up the edges. The veneer is placed on a piece of ply large enough to fully support your veneers and faced on one side with sandpaper to help hold the veneer in place.

Place your first piece, part (1A) on the board with one edge protruding slightly beyond the edge of the shooting board. Use a jointer plane on its side, pushing it along the surface of the benchtop. (It's important your benchtop is flat, your plane side is square to the bottom of the plane and the blade is sharp and taking even shavings.)

To make sure your edges match up perfectly, you may want to mark which side is up when you plane the edge. Then flip and mark the mating part upside down and plane the joining edge. This way the parts will still

GRAIN SELECTION

Largest first. *First select the area from your veneer that will make up the largest portion of your pattern.*

Continuous pattern. *Locate the smaller pattern pieces contiguously on a wide band of straight grain.*

Careful sawing. *With a zero-clearance bed in place on your band-saw table, cut out your pattern pieces.*

Quick shooting board. *With a flat bench, a piece of plywood topped with adhesive-backed sandpaper and a jointer plane, you've an almost-instant shooting board.*

Lay out the bottom. *The underside is made up of wide strips of straight-grain veneer. Practice your glue lines on the simpler underside before tackling the top.*

Glue up the bottom. *The extra thickness of shop-sawn veneers allows for stronger clamping across a panel glue-up. Tap in wedges at the corners to snug things up tight.*

join together even if the edges aren't perfectly square.

Plane the edges of the first piece (1A) until they fit the space on your pattern, leaving only the top outer edge long by planing it just outside your first outer pencil line. Plane the edge of 2A that mates with 1A. The two edges should meet up perfectly.

Before you glue these pieces together make sure the seam looks good on the top and bottom. To do this, tape them together on one side with nylon-reinforced strapping tape or veneer tape.

Apply half of the tape to one piece, starting in the center, butt up the edges, pull the tape tight and secure to the mating piece. If you're using veneer tape you can place an additional piece lengthwise with the seam. Once they are taped together and the top edge looks good, flip it over to make sure the seam looks good on the bottom, too. If the seam is open, take it back to the shooting board and check to see that you're cutting square. If both sides look good then you're ready for a glue-up.

Time for Glue-up

Use a flat, laminated tabletop for gluing up veneers, and wax the surface to make clean up easier between glue-ups. You'll also need a glue bottle with a small opening so that you can place a small bead of glue along these narrow edges.

Cut some strips of tape in 3" or 4" lengths. Weighted bars or wooden cauls with a clear tape covering the surface serve to keep the veneer and glue joint flat.

Place your parts with the taped seam down on the table. Fold the piece open slightly and apply a thin bead of glue along the entire edge. Tape the top seam together the same way you taped the other side. Place a weighted bar or clamp a caul over the seam to ensure it stays flat. Repeat the same process to join 1B and 2B, 1C and 2C, and so on. By the time you glue up 1D and 2D the glue-up from the first batch will be ready to work.

Match the glued-up pieces to the pattern on your substrate, then plane the remaining edge of 1A that will mate with 3A. Be careful – this edge is now a combination of edge and end grain. Make sure your blade is sharp and it shouldn't be a problem. Plane the edge of A3 to your pencil line and join the two edges. Repeat the steps above for the same parts from each quadrant.

Clean up the remaining edge of 2A (also a combination of edge and end grain) to the pencil line and do the same with the mating edge of 4A. Repeat the steps above until you have four sections.

Clean up the remaining edges on the four parts to just outside the pencil line before moving to the next joint. Joint and glue the edge of 4A to the edge of 3B. Do the same for 4C and D3. Now you've two halves and you're almost done.

The bigger the piece gets, the more

SHOOTING PERFECT EDGE JOINTS

You must be careful not to rely on force to bring edge seams together, especially at the ends. If you force a gap together, you're going to see the seam open up in the future. If you are having trouble closing the gaps on the outer edges, it's likely because you're diving in and out of your cuts with the handplane as you shoot the edges of the veneer pieces.

To solve this, start out with the nose of your plane flat on the edge, apply pressure only to the front of the plane and pull the plane forward into the cut. Push your plane along the edge, shifting your pressure to the center and then shifting it again to the back of the plane toward the end of the edge, and lift off to complete the cut.

At first, practice this with slow, deliberate movements to get the feel for it. After shooting a couple of edges successfully, you'll develop the muscle memory to join these edges quickly and fluidly. — HT

you need to handle it with care. Joining the two halves is the trickiest joint yet, because you'll have grain going in every direction. Make sure your plane blade is nice and sharp and set to take fine shavings. Once the pattern is complete, there's only a little more clean-up before you glue the veneers to the substrate.

Apply Veneer to Substrate

Plane the outer edges even to the pencil line using a piece of 1/2" ply to fully support and elevate the veneer sheet. The top and bottom veneer sheets should be only slightly larger than the substrate, by about 1/16" on each side. Position the top and bottom and make some clear registration marks on the edges and top/bottom surfaces. Use a dark pencil or white wax pencil so the marks are easy to see during the glue-up.

Shop-made Veneer Press

My veneer press consists of two platens and two pieces of card stock. The platens are thick in order to disperse clamp pressure. Each platen is two 3/4" pieces of plywood glued together, with card stock on the pressing faces. The card stock will absorb small height variations in the veneer. (If you have too much height variation you may have to use a scraper or sanding block to level out the veneers before you put them in the press.)

Set up a few cauls on a tabletop or a pair of sawhorses and place five cambered battens on top of the cauls. Place the first platen followed by a sheet of card stock and then a piece of paper on top of that. Place your substrate bottom up and place your veneer sheet nearby. Because moisture from the glue on one side of the veneer can cause it to curl you should apply a liberal amount of glue to the substrate only.

Use an ink brayer (found at art supply stores) to distribute the glue quickly and evenly.

Using your registration marks, position the veneer sheet and lightly tape the veneer in two spots or carefully hold it in place as you flip it over to the top side.

Repeat these steps for the top veneer. Make sure the registration marks still line up on both the top and bottom veneers and use blue tape along the edges to secure the two pieces in place.

Place it, top up, on the paper-covered platen and add a piece of paper, then card stock, and a second platen to the top. Place your cambered cauls and start clamping from center out on each side. Check for even glue squeeze-out on all sides and adjust clamping pressure or add clamps as needed. Leave the glue-up overnight to dry.

After removing the tabletop from the press, use a handplane to flush the veneer edges. Clamp the top to the side of a bench and plane down the edges in the same way you did with the banding.

Here, the surface for your plane to ride on is much narrower so it's important to be aware of this and keep your hand pressure even and the plane bottom parallel across the edge to prevent the cuts from diving off at the edge or cutting into your edge banding. Your final plane stroke should take an even shaving, including the edge banding. Before moving on, check that your edges are square.

ASSEMBLE THE PATTERN

1. Glue. *After taping the seam on one side, fold the pieces open just enough to run a thin bead of glue down the edge.*

2. Tape. *After the glue is applied, apply pieces of tape across the seam and move on to the next edge joint while this one dries.*

3. Pattern matching. *After each glue-up, match the workpiece to the pattern on the substrate to determine where to plane the next pieces to fit.*

4. Quadrants. *Work on the overall pattern in quadrants, repeating the shoot then glue-up process until you have four workpieces.*

Waterfall Edge Banding

Now you're ready for edge banding. You may opt for straight-grain continuous banding (which is faster), but I think a waterfall edge is an important detail that adds dimension and another level of completeness to the finished piece.

To prepare for this stage you will need the veneer offcuts we set aside earlier, a sliding square or ruler, and a shooting board. Locate all four of the offcuts that mate up with the parts from one edge.

Registration. *Mark where your veneer glue-up meets the substrate, and make sure you can easily see the marks.*

Find a place on the scrap veneer that lines up the best with its mating part in the pattern and mark it with a cabinetmaker's triangle.

Shoot the end of scrap veneer before you cut it into a smaller piece. Draw a line to mark the width of the piece so it's slightly larger than the substrate edge. Locate each of the four pieces you need for one side and cut them out slightly oversized.

Use a square to draw lines to divide the edge into four parts (one each to match each top pattern piece in a section). Shoot the edge of the first piece of banding that will mate up with second piece to the first line, and leave the and leave the outer edges slightly proud of the substrate corner.

Use a brush to distribute the glue evenly to one section at a time, and tape the banding in place so it doesn't shift while clamping. Place the caul and clamp it down.

Allow 20 or 30 minutes for the glue to set and remove the clamps to add the second piece of veneer. Use a chisel or a plane blade to remove any glue squeeze-out from the first piece before fitting the second. Shoot both edges of the second piece until it lines up with its mating petal. Apply glue to the second section and place a piece of tape to hold the piece in place. Place a second piece of tape, lengthwise this time, and use it to pull the edge of the second piece tight against the first piece. Use a couple more pieces of tape to hold the piece in place on the substrate edge.

Use a square to check that the banding hasn't slipped while taping. Then place a caul over both edge pieces and clamp it up. Repeat these steps; gluing one piece at a time until one side is finished. Allow a couple hours of clamping time before working this new edge.

Meanwhile, you can search for your parts for the remaining edges. Once the glue has fully dried, flush up the ends of the banding to the substrate top before moving on to the next edge.

Use the same planing techniques as you did for flushing the edge banding, and be careful not to cut into the surface veneers. To avoid this you may leave these edges a plane stroke or two proud of the surface; you'll take it the rest of the way when you clean up the surface. Repeat these steps for the remaining edges.

PRESS THE VENEER

Press. *You can make a simple veneer press consisting of plywood platens faced with card stock, sitting atop cambered cauls.*

Roll on. *You need to distribute the glue quickly and evenly to your substrate and veneer. An ink brayer is ideal for this job.*

Apply pressure. *Cambered cauls atop and below your press allow for even pressure distribution across the glue-up. You should see even glue squeeze-out around all the edges.*

Prepare for Finish

To clean up the surfaces and prepare them for finish, start by using a scraper to remove any glue and veneer tape from the pattern seams. Because of the parquetry pattern, there is grain running in every direction, so I use a large, hard sanding block to flatten the top. Depending on the amount of flattening required, start with #180- or #220-grit paper and sand in a circular motion working in patterns across the surface and diagonally until the surface is flat.

To ensure circular scratches are eliminated, switch to a small, cork-padded block with #320-grit paper for the last round of circular sanding, then switch to #400 grit and carefully sand with the grain in each section.

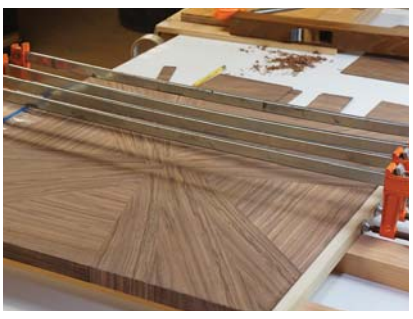
Because the design of this table is angular I decided to chamfer all my edges rather than cut a roundover.

WATERFALL EDGE BANDING

Pattern match. *Check your offcuts against the pattern on top to determine what matches up best with what.*

Add a little. *Shoot one edge of your offcut, then mark off that edge the width of the tabletop plus a tiny bit extra.*

Don't skimp on tape. *After applying glue, each piece of waterfall veneer must be taped securely in place so it doesn't shift during clamping.*



Apply pressure. *Use a caul across opposite edges to distribute the pressure. Work in sections and allow the glue to set before moving to the next section along an edge.*

Keep in mind the thickness of your veneer: There are only so many plane passes you can take before you hit the edge banding (or worse, plywood, if you elected not to edge the substrate).

While the walnut edge on the substrate does add some security when edge profiling, to be most effective, the waterfall pattern needs to flow over the edge uninterrupted; that can only be achieved if you keep the profile size within the thickness of your veneers.

To be on the safe side, cut the chamfers with a block plane rather than a router. That way, you can keep an eye on the veneer thickness and take only enough shavings to blend the edge and surface veneers seamlessly.

To help maintain a constant angle for your plane, cut a small block, about the size of a small block plane, with a flat on the bottom to ride along the tabletop and your desired chamfer angle on one side. Use it to guide your plane for an even chamfer along each edge. As always, make sure your plane is not diving in and out of your cuts; the block helps only to maintain a consistent angle. You may want to line the bottom with something soft (cork or felt) to keep it from scratching the top as you push it across the surface.

After chamfering, lightly file then burnish the corners (I like the two-sided file/burnisher from Glen-Drake Toolworks).

Guide block. *To maintain an even chamfer, cut a small block of wood with your desired chamfer angle and back the surface that rides on the tabletop with cork or felt.*

I prefer a matte finish for most of my projects, and protection is also a concern with a tabletop. For this top, I used several coats of Epifanes Rubbed Effect Finish (a quick-drying interior varnish) cut 50/50 with thinner to finish the top. With a very light hand, I sanded between coats with a some worn-out #600-grit sandpaper backed by a cork block. For the final coat, I applied Epifanes Wood Finish Matte Varnish to reduce the gloss.

After applying finish to my top, I was finally able to see the effect the chatoyance had on my pattern. It did add a level of depth and subtle motion that gives this piece an interactive quality: As the viewer walks around the table the color shifts enough to make the petals appear to be in motion. The result, I think, is a piece that embodies the spirit of a maker at play.

I didn't want to constrain this free-spirited pinwheel by simply planting it on the floor with four legs, bound by stretchers or aprons. To me, the only option was giving it a "lift" on a pedestal base. I took some cues from the top to create a similar pinwheel effect with the base. The result is a base that supports the pinwheel pattern, but does not distract from the main story. **PWM**

Heather is a graduate of the College of the Redwoods. Her work has won international awards and been featured in several galleries and magazines. The design shown here earned an Award of Excellence at the Sonoma County Wood Fair. Currently, Heather is building custom pieces and creating a small line of production furniture for Studio Proxima. She can be reached at heathertrosdahl@gmail.com.

ONLINE EXTRAS

For links to all online extras, go to:

- **popularwoodworking.com/dec12**

BLOG: *For more information on resawing your own veneer, see the author's "Tips for Successful Resawing" on the Editors' Blog.*

WEB SITE: *Epifanes finishes can be found at Jamestown Distributors.*

WEB SITE: *For the file/burnisher the author uses, visit Glen-Drake Toolworks.*

IN OUR STORE: *For more design inspiration, read Oscar P. Fitzgerald's "Studio Furniture of the Renwick Gallery."*

Our products are available online at:

- **ShopWoodworking.com**

Woodworker's Marketplace

Classified

Books

WE HAVE A WIDE VARIETY of woodworking books - from small projects, to home improvement, to enhancing your woodworking skills, and more! To see our full line of books, please visit our web site at ShopWoodworking.com!

Finishing Supplies & Equipment

BLOXYGEN SAVES LEFTOVER FINISHES - Inert Gas Preservation System. www.bloxygen.com or (888) 810-8311.

WOODFINISHSUPPLY.COM -- SHELLAC.NET Large Shellac Flake Selection - Brushes - Dyes BEHLEN Finishing Supplies - Stains - Aerosols RENAISSANCE Wax. 877-245-5611

Hand Tools

DI LEGNO WOODSHOP SUPPLY Quality woodworking hand tools at an affordable price. www.dlws.com or 1-412-331-1236.

WWW.JIMBODETOOLS.COM The Largest Antique Tool Website on Earth! Fine Antique Woodworking Tools of every kind. 845-505-8665.

Kits & Plans

FULL SIZE FURNITURE LAYOUTS Drawn by Philip C. Lowe. 978-922-0615. 116 Water St, Beverly, MA 01915. www.furnituremakingclasses.com

Schools/Instruction

JOHN C. CAMPBELL FOLK SCHOOL, Brasstown, NC. Courses for all skill levels. Weeklong and weekend classes year-round, taught by nationally known instructors. Friendly, supportive environment. Comfortable, on-campus housing. Delicious meals served three times a day. www.folkschool.org. 800/365-5724.

FRED WILBUR TEACHES DECORATIVE and architectural woodcarving using traditional methods. Please consult www.FrederickWilbur-woodcarver.com for schedule and information. Contact Fred at fcwilbur@verizon.net or write to P O Box 425, Lovingston, VA 22949.

PRIVATE CLASSES with woodworking author in the Great Smoky Mountains- All skill levels- www.GregoryPaolini.com (828) 627- 3948

THE ACANTHUS WORKSHOP, LLC Traditional woodworking education with lead instructor, Charles Bender, using conventional hand tools and modern machinery. Call 610-970-5862 or visit www.acanthus.com.

THE SCHOOL AT ANNAPOLIS WOODWORKS, Davidsonville, MD.Turning, Carving, Furniture Making, etc. Weeklong and Weekend classes for all skill levels.www.annapoliswoodworks.com 301-922-0649

Seat Weaving Supplies

CHAIR CANE & SPLINT, Shaker tape, fiber & natural rush. Complete line of basketweaving supplies. Royalwood Ltd., 517-WW Woodville Rd, Mansfield, OH 44907. 800-526-1630. www.royalwoodltd.com.

Classified rate is $6.00 per word, 15-word minimum. Order must be accompanied by payment; ads are non-commissionable. Send to: Popular Woodworking Magazine, 10151 Carver Road, Suite 200, Blue Ash, OH 45242 or Don Schroder, d.schroder@verizon.net. Phone: 610-821-4425, Fax: 610-821-7884.

Advertiser's Index

	PAGE#	CARD#	WEB ADDRESS
Acanthus Workshop	57	1	acanthus.com
Apprenticeshop, The	56	74	apprenticeshop.org
Beall Tool Company	56	2	bealltool.com
Bloxygen	57	3	bloxygen.com
Connecticut Valley School of Woodworking	56	64	schoolofwoodworking.com
Craftsman Plans	56	-	craftsmanplans.com
Craftsman Studio	56	5	craftsmanstudio.com
Di Legno Woodshop Supply	57	6	dlws.com
EBAC industrial Products	17	10	ebacusa.com
Epilog Laser	13	56	epiloglaser.com
Forrest Mfg.	21	13	forrestblades.com
Frederick Wilbur Woodcarver	57	15	frederickwilbur-woodcarver.com
Furniture Institute of Massachusetts	56, 57	16	furnituremakingclasses.com
Gorilla Glue	19	18	gorillaglue.com
Gregory Paolini Designs	57	19	gregorypaolini.com
Grex USA	13	20	grexusa.com
Grizzly Industrial	Cvr 2, 1	57	grizzly.com
GUDHO	9	89	gudho.com
Harbor Freight	63	76	harborfreight.com
Highland Woodworker, The	23	91	thehighlandwoodworker.com
Highland Woodworking	19	22	highlandwoodworking.com
Infinity Tools	21	23	infinitytools.com
JDL Company	56	88	jdltes.com
Jim Bode Tools	57	24	jimbodetools.com
John Campbell Folk School	57	25	folkschool.org

	PAGE#	CARD#	WEB ADDRESS
Keller & Company	56	26	kellerdovetail.com
Lake Erie Toolworks	56	70	lakeerietoolworks.com
Lee Valley	Cvr 4	28	leevalley.com
Leigh Industries	17, 19	-	leighjigs.com
Lie-Nielsen Toolworks	9	29	lie-nielsen.com
MLCS	61	81	mlcswoodworking.com
Old English	56	34	www.oefcc.com
Oneida Air Systems	9	35	oneida-air.com
Philadelphia Furniture Workshop	56	-	philadelphiafurnitureworkshop.com
Porter Cable	Cvr 3	84	portercable.com
RadarCarve	19	38	radarcarve.net
Royalwood Ltd.	57	no	royalwoodltd.com
School at Annapolis Woodworks	57	43	annapoliswoodworks.com
Shellac.net	57	90	shallac.net
Tools for Working Wood	23	45	toolsforworkingwood.com
Wall Lumber	23	47	walllumber.com
Whitechapel Ltd.	56	48	whitechapel-ltd.com
Woodcraft	11, 17	49	woodcraft.com
Woodfinder	56	-	woodfinder.com
Woodline	6	50	woodline.com
Woodpeckers	2	52	woodpeck.com
Woodworker's Source	56	53	woodworkerssource.com
Woodworker's Supply	19	54	woodworker.com

Bookshelf & Wine Rack

This simple modular shelf offers plenty of options for reconfiguration.

One symptom of my pervasive early 20s restlessness is that I regularly overhaul my apartment, completely rearranging the furniture and décor once a month or so. It's not so much that I can't settle on a suitable arrangement, but that suitability itself has a rather short shelf life. As such, I've become a huge fan of modular furniture design. Always eager to assume multiple roles, furniture of this kind wants to be rearranged just as much as I want to rearange it.

That's what inspired me to design my inaugural project for the magazine (with help from Robert W. Lang, executive editor). This bookshelf/wine rack will help solve a problem common to evenings spent beside the hearth – whether to drink or read – by gently encouraging both. The shelf can also be reoriented to sit in a standard position, and allows for expansion by building additional modules as you like.

At the home center, I picked up two 8' lengths of 1"x10" yellow pine. Because the boards are cut down to short lengths for the sides of the box modules, there's no need to fret if the lumber you find has a bit of a bow or twist (a problem common to big-box lumber); imperfections will be worked out during construction.

First, you need to cut the 12 box sides to size. To accommodate the rabbets used to join the sides, you'll need to cut six 14" lengths from one board and six 13" lengths from the other. I used a miter saw, but a circular saw will work just as well – provided you use a piece of scrap as a fence to guide it. Set aside the extra wood from the ends; this will provide the material needed for the mitered shelf in the middle unit.

Building the Modules

Now that you have the basic component pieces, it's time to start constructing the individual boxes. Each box is joined with rabbets that are glued together, and then nailed for reinforcement. Two rabbets are cut into each 14" length of board – one at each end, and on the same side of course. Cut these using a router with a ¾" bit set for ¼" deep.

To set up this cut, I first marked the width of the rabbet from the end of the board, and then aligned the router to the line. I marked the edge of the router base, drew a line and clamped down a piece of scrap that acts as a fence. Mark this same distance – from the end of the board to the fence – on the rest of your boards. I used a combination square to be positive the rabbets were reproduced identically.

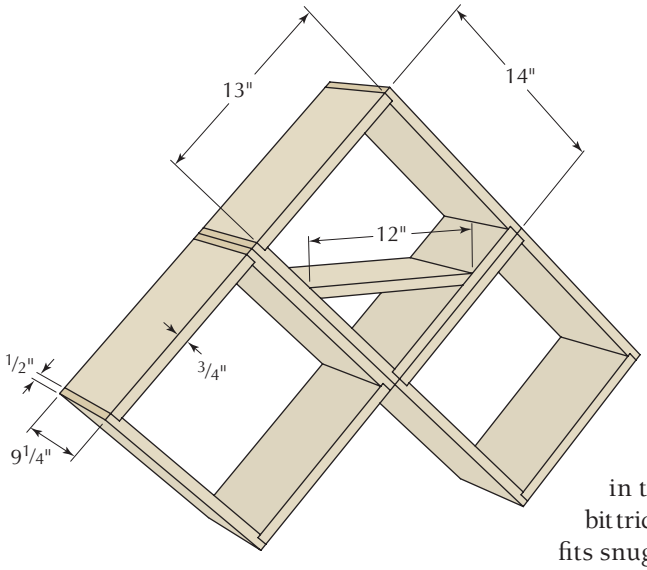
When all the rabbets have been cut, it's time to put the boxes together. Standing two 14" rabbeted pieces, and two 13" pieces on their sides, line up the shape of the box and apply a little glue to the joint surfaces. At this point, it's helpful to have an extra pair of hands to hold the sides together – children are particularly suited to this task, if you have any lying around.

Check the boxes with your combination square before adding a few clamps, and then check for square again. It's vital that you check twice because the force of the clamps can throw the boxes out of square. Adjust as necessary, and then leave the glue to dry overnight.

The next day, drill pilot holes for 6*d* nails (four to each rabbet) and tap them in to reinforce the joint.

Rabbets & fences. *Set up a fence to keep the router perfectly straight.*

LEAD PHOTO BY AL PARRISH;
STEP PHOTOS BY THE AUTHOR; ILLUSTRATIONS BY ROBERT W. LANG



Bookshelf & Wine Rack

NO.	ITEM	DIMENSIONS (INCHES) T	W	L	MATERIAL	COMMENTS
❑ 4	Sides	3/4	9 1/4	14	Pine	Rabbet both ends
❑ 4	Sides	3/4	9 1/4	13	Pine	
❑ 1	Shelf	3/4	9 1/4	12	Pine	45° bevel both ends

Make the Shelf

Choose one of your boxes, it doesn't matter which, to house the horizontal shelf. Grab the leftover piece of pine from earlier and use your square to mark a 45° angle on one end of the board. You should have about 18" of board to make the 12" shelf, so there is no need to measure length yet – just get fairly close to the end.

I considered using the miter saw for this (which would have eliminated the need for marking the angle), but the piece is so small that it would be a scary cut to make. Break out the jigsaw instead. Set it to 45° and find your fence placement from the line the same way you found the router fence placement.

Steady yourself, then make the cut. To get the correct length, measure 12" from the outside of the bevel you've created – that mark will be your next cut. Make sure that the bevels on both ends slope toward the bottom of the piece before making the second cut.

Installing the shelf in the box may seem a bit tricky. The piece, which fits snugly into exactly the right place with no measurements whatsoever, will want to slide around when you nail it. To avoid this, clamp the piece of 45° scrap you just cut to the inside of the box. The matching angle will provide all the support you need. Drilling pilot holes into the shelf will make this process even easier – just a few taps and you'll be in.

Tune-up & Assembly

The flip side to the convenience of big-box lumber is that the boards are seldom perfect. Those slight defects translate into less-than-pristine edge alignment in the joinery, even if your boxes are perfectly square. No worries – this is what a block plane is made for. Use it to trim the front edges flush.

Final assembly of the piece is the easiest part of the entire project. Place the middle box on its side and stack one of its companions on top. Make sure to align the sides so they match: rabbet with rabbet on one, non-rabbet with non-rabbet on the other. The continuity won't stand out as a feature, but discontinuity will.

Clamp the boxes together and tweak the alignment as necessary. Drill four countersunk pilot holes about 1 1/2" from each corner, and install the screws. Flip the whole thing over and attach the third box.

Add a few coats of clear Watco Danish Oil (or the finish of your choice) and this piece is ready hold books. Or wine. But preferably both.

The wonderful thing about this piece: If you get sick of it sitting on its corners, flip it over to stand upright. It's even small enough to hang on a wall. And of course you can always expand it by building more modules. **PMW**

Tom is the online community editor of Popular Woodworking Magazine. *He can be reached at tom.nunlist@fwmedia.com.*

A jigsawn bevel. *Set your jigsaw's baseplate to a 45° angle to cut the shelf to size.*

Trim up the edges. *Dimensional lumber seldom results in perfect boxes – but a block plane can easily solve the problem.*

ONLINE EXTRAS

For links to all online extras, go to:

- **popularwoodworking.com/dec12**

PLAN: *Download a free SketchUp model for the "Bookshelf & Wine Rack."*

ARTICLES: *All the "I Can Do That" articles are free online.*

Our products are available online at:

- **ShopWoodworking.com**

About This Column

I Can Do That

Our I Can Do That column features projects that can be completed by any woodworker with a modest (but decent) kit of tools in less than two days of shop time, using materials from any home center. Our free PDF manual explains how to use all the tools in the kit. Visit PopularWoodworking.com/ICanDoThat to download the free manual.

Sealers & Washcoats

Understand the difference between these often misused terms.

It would be difficult to find wood finishing subjects that have been made more confusing than sealing and washcoating. This is unfortunate because these procedures are very simple and easy to understand.

Washcoating. *This blotchy pine board shows the impact of thinning a washcoat to various degrees before applying a stain. Left to right are sprayed full-strength lacquer, lacquer thinned 1-to-1 with lacquer thinner, 1-to-2, 1-to-3 and finally 1-to-4. It's clear that getting the mix optimized for maximum color and minimum blotching is no easy matter.*

Definitions

A sealer is the first coat of finish you apply to the wood. It enters the pores, dries and stops them up so liquids don't penetrate easily. It "seals" the wood. The sealer can be the finish itself (any finish), or it can be a special product designed to solve a problem.

A washcoat is any finish thinned to 10 percent-or-less solids content and used to partially stop up the pores in the wood (so a stain will still add some color), or provide a thinner barrier between color coats (stain, glaze, filler or toner) to limit the total finish build. The commercial varnish product labeled "wood conditioner" is a washcoat.

Finishing Steps

The steps for getting good results with any finish are as follows:

1. After preparing the wood, apply the first coat – by definition, the sealer coat.
2. Let the coat dry.
3. Sand this coat smooth so subsequent coats will be smooth (the first coat is always a little rough).
4. Remove dust and apply the next coat.
5. Apply as many more coats as you want. Sand between these coats if there are problems or roughness you want to remove.

Use the finish itself for the first coat unless you want to avoid one of two problems: the finish you're using for final coats clogs the sandpaper, or there's something in the wood that you want to block off. Use sanding sealer to avoid the clogging. Use shellac to block off problems.

Sanding Sealer

Oil-based polyurethane and all water-based finishes sand and powder easily without clogging sandpaper, but varnish and nitrocellulose lacquer gum up sandpaper. So manufacturers provide a special product to be used under varnish and lacquer, properly called "sanding sealer," but sometimes misleadingly labeled "sealer."

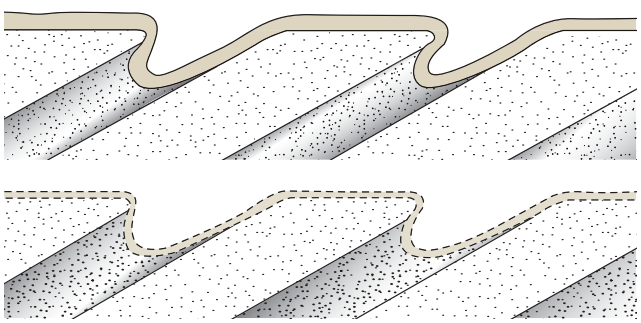
The purpose of sanding sealer is simply to speed production. It takes significantly less effort (and less sandpaper) to sand large surfaces.

But sanding sealer reduces the durability of the total finish build because it doesn't dry as hard or as water resistant as the finish itself, and subsequent coats of finish don't bond as well to the sealer as they do to the wood or to previous coats of finish. So more is lost than gained by using sanding sealer on smaller objects.

Shellac is often recommended for sealing, but it adds little in the way of reduced sandpaper clogging. Shellac still clogs sandpaper, just less than varnish and lacquer.

Some manufacturers provide a sanding sealer for water-based finishes, but I see only disadvantages because water-based finishes are already easy to sand.

For easier sanding without using sanding sealer, thin the first coat of finish by about half so the build is thinner. The thinner the build, the easier the finish sands and powders.



Sealing & washcoating. *Sealing is the first full coat of any finish. It stops up the pores of the wood so liquids don't penetrate easily (top). Washcoating under a stain with a thinned finish partially stops up the pores so some stain can get through (bottom).*

CONTINUED ON PAGE 62

PHOTOS BY THE AUTHOR, ILLUSTRATIONS BY HAYES SHANESY

See our top selling router tables, bits & jigs at MLCSwoodworking.com

"Cabinet Making Set"

Six 1/2" shank carbide tipped router bits make classic kitchen and fine furniture cabinet raised panels and drawers.

Undercutter #8389....$119.95

Standard #8387....$114.95

"Don't Stand Stock On Edge"

Rout wide stock FLAT on the table with tall bits in horizontal position! The Horizontal Benchtop Router Table is perfect for raised panels and mortise and tenon. The miter T-track accepts accessory tops.

#9767.....$179.95

"Tilting Top"

Accessory top tilts up to 45°. Create offset angles that cannot be cut on a regular router table.

#9764.....$59.95

"Mortising Top"

Accessory top. A safer and easier way to cut mortise and tenon joints.

#9766.....$79.95

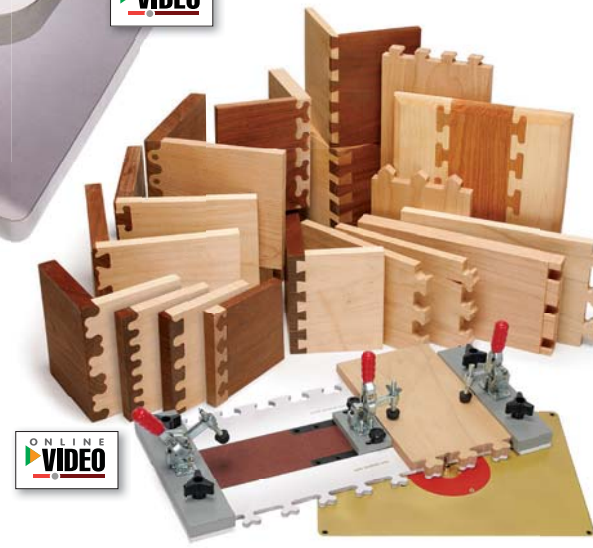
ONLINE VIDEO

"Route 66"

66 piece carbide tipped router bit set includes straight, round over, chamfer, cove... 30 total profiles! Wood storage box can be wall mounted.

1/2" shank • #8383.....$189.95

1/4" shank • #6083.....$189.95



ONLINE VIDEO

"Sliding Table Top"

Free Shipping! The Precison Router Table's large, smooth sliding, extruded aluminum top makes difficult routing easy and exact. Variable opening inserts in "rock solid" fixed cast-iron. Split fence & dust hood.

#9463 .....$469.95

ONLINE VIDEO

"When Any Old Joint Won't Do..."

The Fast Joint System with matching templates makes creative, custom joinery simple. Includes the jig, joint templates, clamps, bushings and router bits. See the 20 Template Set online.

4 Template Set #9411.....$169.95 • 11 Template Set #9422.....$269.95

1-800-533-9298

PROFESSIONAL ROUTER BITS & WOODWORKING PRODUCTS

MLCS

FREE SHIPPING!

IN CONTIGUOUS USA • P.O. BOX 165 PM, HV, PA, 19006 ©2012

CARD #81 or go to PWFREEINFO.COM

CONTINUED FROM PAGE 60

Clogging. *Lacquer and varnish clog sandpaper, even stearated sandpaper, which slows the sanding process and forces you to use more sandpaper.*

Powdering. *Lacquer and varnish sanding sealer powder when they are sanded. So do oil-based polyurethane and water-based finish. Shellac still clogs a little.*

Fish eye. *Shellac blocks silicone oil from furniture polishes (right), which causes fish eye (left). Shellac also blocks other common refinishing problems such as resin from pine knots and oily tropical woods.*

Shellac

Shellac is often promoted as the "best" sealer. This is silly, as explained above. All full-strength finishes seal the wood.

Shellac's benefits to the finsher are that it is unique for its blocking qualities. It blocks, or "seals in," very low-surface-tension silicone oil from furniture polishes, which causes "fish eye" (the finish bunching up into craters or ridges). It also blocks odors from animal urine and smoke, and residue wax from waxed furniture or from strippers (many of which contain wax).

These are all refinishing problems, not new-wood problems.

SEALERS AREN'T PRIMERS

It would be easy to think of sealers as equivalent to primers for paint. They're both first coats, after all. But sealers and primers have very different purposes.

The best paints hide well because they contain a high ratio of pigment to binder (finish). As a result, they don't bond very well to porous wood. So primers, with a higher ratio of binder to pigment (and reduced hiding), were created for the first coat.

In contrast, finishes are all binder, so they bond perfectly well to wood. Finishes don't need a separate product to achieve a better bond. — BF

On new wood, shellac also blocks the resin from pine knots and very oily tropical woods, which can slow the drying of lacquer and varnish significantly.

Shellac is great for dealing with these problems. But if you are finishing new woods other than pine or very oily wood, shellac's only benefit would be to add a little warmth to the color under water-based finish. The same thing could also be achieved with any solvent finish.

Washcoats

A washcoat is any finish thinned to 10 percent-or-less solids content: lacquer with at least 1½ parts thinner; varnish thinned with at least two parts thinner; or a ¾-or-less-pound cut of shellac.

Washcoats are used to partially stop up the pores of the wood to reduce blotching and to create a thin barrier between color layers so the colors don't smear or mix. Used as a barrier, the washcoat is usually sprayed.

It's confusing and wrong to call washcoating "sealing," as is commonly done, because you're not sealing anything.

Washcoating Under a Stain

If you've ever used a wood conditioner to prevent blotching, you know how difficult it is to achieve success. Besides the instructions on the cans being incorrect, you lose a lot of the stain's color intensity and you usually still get blotching anyway. (The can's instructions say to apply a stain within two hours, but to be fully effective you have to give the thinned varnish at least six hours to dry completely.)

Washcoating to reduce blotching is a trade-off. The higher the solids content of the finish and/or the more washcoat you apply (and let dry), the more you reduce the blotching but the lighter the resulting stain color. Successful washcoating takes practice, meaning experimentation, to optimize the ratios and application methods.

Factories usually achieve a darker coloring on blotch-prone woods such as cherry and birch using glazes and sprayed toners applied over a sealed surface. They put most of the color in the finish rather than in the wood. (This is why it's almost impossible to imitate many factory finishes with only a stain and finish.)

Because of the instructions, which almost guarantee failure, and the resulting confusion the product causes, the woodworking community would probably be better off if wood conditioners were removed from the market. **PWM**

Bob Flexner is author of "Wood Finishing 101," "Flexner on Finishing," and "Understanding Wood Finishing."

ONLINE EXTRAS

For links to all online extras, go to:

- popularwoodworking.com/dec12

ARTICLE: *Read Bob Flexner's article on finishing cherry, free on our web site.*

IN OUR STORE: *"Flexner on Finishing" – 12 years of columns illustrated with beautiful full-color images and updated, and "Wood Finishing 101."*

Our products are available online at:

- ShopWoodworking.com

HARBOR FREIGHT TOOLS

Quality Tools at Ridiculously Low Prices

LIFETIME WARRANTY ON ALL HAND TOOLS!

FACTORY DIRECT TO YOU!

How does Harbor Freight Tools sell high quality tools at such ridiculously low prices? We buy direct from the factories who also supply the major brands and sell direct to you. It's just that simple! See for yourself at one of our 400 Stores Nationwide and use this 20% Off Coupon on one of our 7,000 products*, plus pick up a Free 6 Piece Screwdriver Set, a $4.99 value. We stock Shop Equipment, Hand Tools, Tarps, Compressors, Air & Power Tools, Woodworking Tools, Welders, Tool Boxes, Generators, and much more.

- Over 20 Million Satisfied Customers!
- 1 Year Competitor's Low Price Guarantee
- No Hassle Return Policy!
- 100% Satisfaction Guaranteed!
- Over 400 Stores Nationwide

Nobody Beats Our Quality, Service and Price!

SUPER COUPON!

FREE!

WITH MINIMUM PURCHASE OF $9.99

PITTSBURGH

6 PIECE SCREWDRIVER SET

ITEM 47770

REG. PRICE $4.99

HARBOR FREIGHT TOOLS - LIMIT 1 Only available with qualifying minimum purchase (excludes gift value). Coupon good at our stores or website or by phone. Cannot be used with other discount, coupon or prior purchase. Offer good while supplies last. Shipping & Handling charges may apply if not picked up in-store. Original coupon must be presented. Non-transferable. Valid through 3/27/13. Limit one coupon per customer per day.

79456677

SUPER COUPON!

20% OFF

ANY SINGLE ITEM!

HARBOR FREIGHT TOOLS - LIMIT 1 Save 20% on any one item purchased at our store. Coupon good at our stores or website or by phone. *Cannot be used with other discount, coupon, gift cards, Inside Track Club membership, phone or online orders, extended service plans or on any of the following: compressors, generators, tool storage or carts, welders, floor jacks, Campbell Hausfeld products, open box items, in-store event or parking lot sale items. Not valid on prior purchases after 30 days from original purchase date with original receipt. Non-transferable. Original coupon must be presented. Valid through 3/27/13. Limit one coupon per customer per day.

58076229

SUPER COUPON!

MECHANIC'S GLOVES

LARGE LOT NO. 93640/60447

X-LARGE LOT NO. 93641/60448

Item 93640 shown

YOUR CHOICE!

$3.99 REG. PRICE $7.99

SAVE 50%

30150450

HARBOR FREIGHT TOOLS - LIMIT 8

Good at our stores or website or by phone. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 3/27/13. Limit one coupon per customer per day.

SUPER COUPON!

6" DIGITAL CALIPER

PITTSBURGH

LOT NO. 47257

$9.99 REG. PRICE $29.99

SAVE 66%

Includes two 1.5V button cell batteries.

31230895

HARBOR FREIGHT TOOLS - LIMIT 9

Good at our stores or website or by phone. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 3/27/13. Limit one coupon per customer per day.

SUPER COUPON!

4 PIECE WOOD CHISEL SET

Item 42429 shown

SAVE 43%

$4.49 REG. PRICE $7.99

LOT NO. 42429/69471

70583311

HARBOR FREIGHT TOOLS - LIMIT 7

Good at our stores or website or by phone. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 3/27/13. Limit one coupon per customer per day.

SUPER COUPON!

CHICAGO ELECTRIC POWER TOOLS

80 PIECE ROTARY TOOL KIT

LOT NO. 68986/97626/69451

Item 68986 shown

SAVE 72%

$6.99 REG. PRICE $24.99

28110381

HARBOR FREIGHT TOOLS - LIMIT 6

Good at our stores or website or by phone. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 3/27/13. Limit one coupon per customer per day.

SUPER COUPON!

CENTRALPNEUMATIC

18 GAUGE 2-IN-1 NAILER/STAPLER

LOT NO. 68019

WE CARRY A FULL LINE OF FASTENERS

SAVE 46%

$15.99 REG. PRICE $29.99

21424060

HARBOR FREIGHT TOOLS - LIMIT 6

Good at our stores or website or by phone. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 3/27/13. Limit one coupon per customer per day.

SUPER COUPON!

Haul Master

TRIPLE BALL TRAILER HITCH

Item 94141 shown

SAVE 55%

LOT NO. 94141/69874

$19.99 REG. PRICE $44.99

64526294

HARBOR FREIGHT TOOLS - LIMIT 5

Good at our stores or website or by phone. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 3/27/13. Limit one coupon per customer per day.

SUPER COUPON!

CHICAGO ELECTRIC POWER TOOLS

5" RANDOM ORBITAL PALM SANDER

LOT NO. 93431/69857/69917

Item 93431 shown

$19.99 REG. PRICE $29.99

SAVE 33%

14729625

HARBOR FREIGHT TOOLS - LIMIT 3

Good at our stores or website or by phone. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 3/27/13. Limit one coupon per customer per day.

SUPER COUPON!

500 LB. CAPACITY DELUXE CARGO CARRIER

Haul Master

LOT NO. 66983/69623

SAVE $50

$49.99 REG. PRICE $99.99

62181673

Item 66983 shown

HARBOR FREIGHT TOOLS - LIMIT 4

Good at our stores or website or by phone. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 3/27/13. Limit one coupon per customer per day.

SUPER COUPON!

2 HP FIXED BASE ROUTER

drillmaster

SAVE 25%

LOT NO. 68341

$44.99 REG. PRICE $59.99

51306808

HARBOR FREIGHT TOOLS - LIMIT 4

Good at our stores or website or by phone. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 3/27/13. Limit one coupon per customer per day.

SUPER COUPON!

CENTRAL MACHINERY

4" x 36" BELT/ 6" DISC SANDER

LOT NO. 97181/ 93981

SAVE $45

$54.99 REG. PRICE $99.99

Item 97181 shown

85873256

HARBOR FREIGHT TOOLS - LIMIT 4

Good at our stores or website or by phone. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 3/27/13. Limit one coupon per customer per day.

SUPER COUPON!

30", 11 DRAWER ROLLER CABINET

US★GENERAL

INCLUDES:
- 6 Drawer Top Chest
- 2 Drawer Middle Section
- 3 Drawer Roller Cabinet

SAVE $150

LOT NO. 67421

$149.99 REG. PRICE $299.99

53934778

HARBOR FREIGHT TOOLS - LIMIT 5

Good at our stores or website or by phone. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 3/27/13. Limit one coupon per customer per day.

SUPER COUPON!

60" WORKBENCH WITH FOUR DRAWERS

WINDSOR DESIGN

Item 93454 shown

SAVE $90

LOT NO. 93454/69054

$139.99 REG. PRICE $229.99

31224961

HARBOR FREIGHT TOOLS - LIMIT 3

Good at our stores or website or by phone. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 3/27/13. Limit one coupon per customer per day.

SUPER COUPON!

CENTRALPNEUMATIC

2.5 HP, 21 GALLON, 125 PSI VERTICAL AIR COMPRESSOR

LOT NO. 67847/69091

SAVE $70

$149.99 REG. PRICE $219.99

Item 67847 shown

54582022

HARBOR FREIGHT TOOLS - LIMIT 4

Good at our stores or website or by phone. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 3/27/13. Limit one coupon per customer per day.

SUPER COUPON!

PITTSBURGH AUTOMOTIVE

RAPID PUMP® 1.5 TON ALUMINUM RACING JACK

3-1/2 PUMPS LIFTS MOST VEHICLES!

WEIGHS 27 LBS.

SAVE $60

$59.99 REG. PRICE $119.99

LOT NO. 68053/ 69252/ 60569

Item 68053 shown

82983068

HARBOR FREIGHT TOOLS - LIMIT 5

Good at our stores or website or by phone. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 3/27/13. Limit one coupon per customer per day.

Order at HarborFreight.com or 800-423-2567

We FedEx® Most Orders in 24 Hours for as Low as $6.99

GRAND OPENINGS

Covina, CA
Downey, CA
Indio, CA
Lakewood, CO
Waterbury, CT
Hyannis, MA
Medford, MA
Pennsauken, NJ

Past Imperfect

If anyone ever sees that, they're looking too closely.

A peek below. *A look underneath can reveal important details. Or another furniture nerd (here, Jerome Bias).*

I spend a lot of time looking at antique furniture, often from below. My interest is pieces made about 100 years ago, from the Arts & Crafts period of the early 20th century. I share a passion with those who collect these pieces, but I look at them with a different eye. The lines and proportions draw me in, and I appreciate the rarity and value. But my mind isn't on the dollar value of any particular piece; I'm out to connect with the guy who made it way back when.

On tours of old houses I hold up the group by crawling under things for a closer look. At museums I set off alarms by getting too close or reaching out to touch when the guard is distracted. My fascination is with how these things go together, and I wonder what constraints of time, money and resources the original maker had to contend with. It's a reality check against the overload of information in print and online. It's one thing to read about how things should be done and quite another to look at the tangible legacy of someone's work.

My favorite moments are when I discover something that only a woodworker would recognize, details that fly over the head of the collector or curator. Building furniture involves compromise; the material and tools don't always cooperate, and the mind of the cabinetmaker isn't always as sharp as his chisels.

We strive for perfection, but when it escapes us we have decisions to make. As we build, each part becomes more valuable. Each dovetail, mortise or tenon cut in a piece of wood is an investment of time. When things don't work out, a painful choice must be made: Scrap the investment and start over or try to fix it so no one will know?

I'm no stranger to those choices, and when I look at old work I don't search for flaws, but now and then I come across one. Recently I was lying on the floor, pointing my camera up to record how a drawer was built and how it slid in and out of a cabinet. On my way out from under, I noticed a bump in a back leg, just below where a side rail connected. I took a closer look and realized what I was seeing.

On this piece, a side panel sat in a groove in the square leg. Below the panel, a rail joined the leg with a tenon. The mortise is in the groove, a deeper portion at the end. The bump I saw was in line with the panel, and I knew that the original builder had made a classic woodworking mistake.

The groove has to stop so that it doesn't show, but it's easy to lose track of where to stop when milling the groove and go too far. I've done it, and I've been faced with that same dilemma another cabinetmaker faced a century ago: Throw out the leg, or try to make an invisible patch?

He chose to patch, and I can't find fault with him for putting it in. The leg below the rail is in a shadow, and the grain and color of the patch matched the leg. What gave it away was wood movement. The leg had shrunk or the patch had swelled. Below the rail was a neat, rectangular area a few inches long that just broke the surface of the leg. I wondered if he had cussed and thrown something or just quietly looked for a matching piece of scrap.

I stepped back and looked at the patch from a normal point of view and I couldn't see it. I crouched down for a closer look, and again the repair was lost in the shadow. I could feel it if I ran my hand in just the right place, but it wasn't visible unless my head was near the floor.

We tend to idealize craftsmen of the past, but I think I admire the man more for finding evidence of his lapse and the execution of his repair. None of us is perfect, and the discovery of this kind of thing makes a better connection to workers of the past than absolutely perfect work.

There's a chance that I'm the only person to ever spot this repair. I'm sure that it ruined the man's day and he likely worried about what would happen if it were seen. In the end, it's a small flaw in a hidden location in what is considered to be a masterpiece. Its presence makes sense to me, and if the original maker and I were to meet through time-travel or some other cosmic happenstance, I would shake his hand and say, "That's OK brother, your secret is safe with me." **PWM**

Bob is executive editor of Popular Woodworking Magazine. *He can be reached at robert.lang@fwmedia.com.*

ONLINE EXTRAS

For links to all online extras, go to:

- **popularwoodworking.com/dec12**

BLOG: *See some of the pictures Bob has taken of period pieces.*

PHOTO BY THE AUTHOR

DETAILS MATTER

THE RIGHT BALANCE OF FEATURES FOR A FINE FINISH

BN200C

NS150C

It's all about the details. In your finishing touches and our finishing tools. The Porter Cable BN200C 2" Brad Nailer has been updated from its previous version to be more compact, lightweight and easy to use. All at a lower price. Touting an oil-free design, rear exhaust, tool-free depth of drive, tool-free jam release and more, it's the right balance of features to add your finishing touches. The same great features also available in the NS150C Finish Stapler.

To learn more about Porter Cable Finish Nailers, visit portercable.com or stop by a retailer near you.

www.PorterCable.com

PORTER CABLE®

Veritas® PM-V11™ Bench Chisels

These chisels are among the first edge tools milled from PM-V11 steel (Rc61-63), an innovative proprietary alloy. This metal's microstructure makes it extremely durable, so it can withstand the impact of heavy chopping cuts without chipping or deforming as readily as other tool steels, even at bevel angles as low as 20°. It is also highly wear-resistant, with an edge typically lasting at least twice as long in use as an A2 blade before it needs sharpening. Despite its toughness, it is as easy to sharpen as A2 steel using common abrasive media such as water stones.

Our chisel blades taper from shoulder to tip for strength and rigidity, and have parallel sides and true bevel edges for clearance and minimal friction when working into an angled corner or a tight recess. To ensure the face of the blade is both smooth and true, we lap each blade to a flatness tolerance of ±0.0005″ over the entire surface.

The blade and handle are connected with a tang and a socket-like ferrule. Flats on the tang prevent the handle from rotating. Turned from solid stainless steel, the ferrule seats directly onto the shoulder of the blade. Repeated mallet blows tighten the joint through use. Each chisel is superbly balanced, with the center of gravity at or below the tang/socket connection.

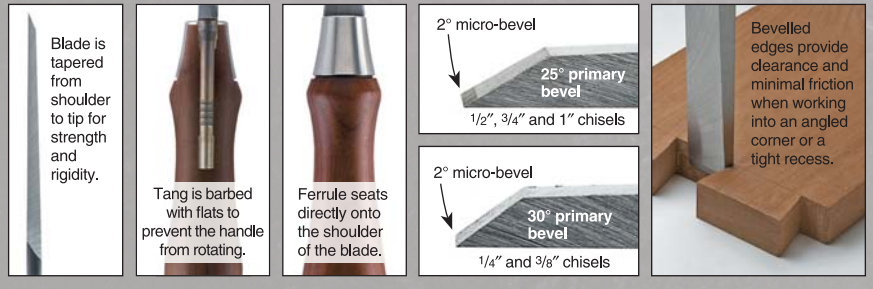
The hard maple handle has been kiln-baked at a high temperature to eliminate nearly all moisture and caramelize the natural sugars in the wood. This imparts a rich, dark color to the wood, while helping to seal it against humidity changes, making it resistant to swelling and shrinkage. The contoured handle fits the hand nicely and has shallow flats parallel to the blade back for finger placement. The domed end resists chipping from glancing mallet blows.

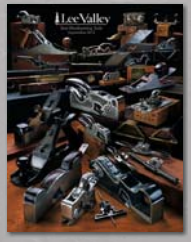
The chisels are available in 1/4″, 3/8″, 1/2″, 3/4″ and 1″ widths, with blades from 4 5/8″ to 5 1/8″ long. The 1/4″ and 3/8″ chisels have 30° primary bevels; the others are 25°. All have 2° micro-bevels, and require only final honing before use. Made in Canada.

05S21.04	PM-V11™ Bench Chisel, 1/4″	**$ 74.00**
05S21.06	PM-V11™ Bench Chisel, 3/8″	**$ 74.00**
05S21.08	PM-V11™ Bench Chisel, 1/2″	**$ 79.00**
05S21.12	PM-V11™ Bench Chisel, 3/4″	**$ 84.00**
05S21.16	PM-V11™ Bench Chisel, 1″	**$ 89.00**
05S21.50	PM-V11™ Set of 5 Chisels	**$359.00**

Shipping and N.Y. sales tax extra.

Some Features of Veritas® PM-V11 Bench Chisels





To order these chisels, call or visit us online. Request a copy of our free 284-page woodworking tools catalog or browse it online.

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

Lee Valley 35 YEARS

Lee Valley & veritas®