ISSUE 210 MARCH 2012

Better Homes and Gardens®

WOOD®

MAKE PERFECT MITERS IN SECONDS! p.26

One Bookcase 3 Ways

Adapt a basic case to suit your tastes and skills! p.30

Traditional

Classic

Country

5 More Great Projects Inside!

42 Facts Every Woodworker Should Know!

Restore a Hand Plane, Step by Step p.56

Sharpening Demystified: Hone Your Tools for Better Results p.60

Plus Dozens of Shop Tips!

Grizzly® Industrial

Purveyors of Fine Machinery®, Since 1983

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 change riving knife
- Cast iron trunnions
- Approx. shipping weight: 354 lbs.

INCLUDES BOTH REGULAR & DADO BLADE INSERTS

G0715P ONLY $795.00 $99 shipping

17" HEAVY-DUTY BANDSAW

BEAUTIFUL WHITE COLOR!

- 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

INCLUDES DELUXE EXTRUDED ALUMINUM FENCE, MITER GAUGE & ½" BLADE

G0513P ONLY $895.00 $99 shipping

ALSO AVAILABLE

G0513 HEAVY-DUTY 17" BANDSAW ONLY $950.00

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

- Motor: 1½ HP, 110V/220V, single-phase
- Precision ground cast iron table with wings
- Table size: 25 1/2" 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.

New!

MADE IN TAIWAN

MADE IN ISO 9001 FACTORY!

FREE 10" CARBIDE-TIPPED BLADE

G0732 ONLY $795.00 $99 shipping

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

- Motor: 3 HP or 5 HP, 220V, 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.

MADE IN TAIWAN

FREE 10" CARBIDE-TIPPED BLADE

$150 shipping

G1023RLW 3 HP ONLY $1250.00

G1023RLWX 5 HP ONLY $1350.00

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: 50"
- Max. dado width: 13/16"
- Approx. shipping weight: 542 lbs.

3 HP LEESON® MOTOR!

FREE 10" CARBIDE-TIPPED BLADE

G0690 ONLY $1325.00 $150 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.

TOP VALUE

3 HP LEESON® MOTOR!

G0691 ONLY $1425.00

FREE 10" CARBIDE-TIPPED BLADE

$150 shipping

ULTIMATE 14" BANDSAW

- Motor: 1 HP, 110V/220V, single-phase, TEFC
- Precision-ground cast iron table size: 14" sq.
- Table tilt: 10° 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.

MADE IN ISO 9001 FACTORY!

MADE IN TAIWAN

See our website for Reviews & Awards grizzly.com

G0555P ONLY $495.00 $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.

EXTREME SERIES

MADE IN ISO 9001 FACTORY!

DELUXE RE-SAW FENCE INCLUDED

G0514X2 ONLY $1495.00 $99 shipping

14419

PRICING CODE 12WOODM

MENTION THIS CODE WHEN PLACING YOUR ORDER

1-800-523-4777

TECHNICAL SERVICE: 570-546-9663

FAX: 800-438-5901

1 FULL YEAR WARRANTY GRIZZLY Power Tools Machinery

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

NOW SHIPPING TO CANADA!
EXCELLENT BROKERAGE RATES! SEE GRIZZLY.COM FOR DETAILS

- 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
- 24 HOUR ORDERING BY PHONE OR ONLINE • MOST ORDERS SHIP THE SAME DAY

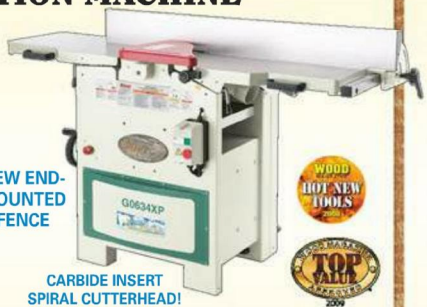
FREE 2012 CATALOG!
THOUSANDS OF HIGH QUALITY MACHINES & TOOLS AT INCREDIBLE PRICES!

12" JOINTER/PLANER COMBINATION MACHINE

MADE IN TAIWAN

BEAUTIFUL WHITE COLOR!

- 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.



NEW END-MOUNTED FENCE

CARBIDE INSERT SPIRAL CUTTERHEAD!

FREE SAFETY PUSH BLOCKS

G0634XP ONLY $2195.00

ALSO AVAILABLE
G0633 JOINTER/PLANER ONLY $1995.00
G0634Z SPIRAL CUTTERHEAD MODEL ONLY $2450.00

CYCLONE DUST COLLECTOR

BEAUTIFUL WHITE COLOR!

- Motor: 1½ HP, 110/220V, 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: 68½"
- Built-in remote control switch
- Approx. shipping weight: 210 lbs.

MADE IN TAIWAN

PLEATED FILTER IS PROTECTED BY A STEEL CAGE

FULLY MOBILE WITH BUILT-IN CASTERS

ONLY 68½" TALL!

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

BUILT-IN MOBILE BASE

CHOOSE EITHER 4 HSS KNIVES OR SPIRAL CUTTERHEAD MODEL

4 KNIFE CUTTERHEAD
G0656P ONLY $795.00
SPIRAL CUTTERHEAD
G0656PX ONLY $1195.00

$150 shipping

8" X 76" JOINTERS

- Motor: 3 HP, 220V, 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

BUILT-IN MOBILE BASE

4 KNIFE CUTTERHEAD
G0490 ONLY $945.00
SPIRAL CUTTERHEAD
G0490X ONLY $1250.00

$150 shipping

15" PLANERS

New!

- 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

G0453P ONLY $1050.00
WITH SPIRAL CUTTERHEAD,
G0453PX ONLY $1650.00

$150 shipping

20" PLANERS

SERIES

- Motor: 5 HP, 220V, 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!

BUILT-IN MOBILE BASE

4 KNIFE CUTTERHEAD
G0454 ONLY $1575.00
SPIRAL CUTTERHEAD
G0454Z ONLY $2495.00

$179 shipping

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: 2 15/16"
- Min. workpiece height: 3/16"
- Variable feed speeds: 1–10 FPM
- 4" dust port
- Approx. shipping weight: 220 lbs.

WHEELS & STOWABLE TRANSPORT HANDLES FOR MOBILITY

G0716 ONLY $415.00

$79 shipping

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 ONLY $174.95

GRIZZLY GIFT CERTIFICATES TAKE THE GUESSWORK OUT OF GIVING!

See our website for Reviews & Awards grizzly.com

grizzly.com®

OVER 12,000 PRODUCTS ONLINE!

PayPal VISA MasterCard BillMeLater AMERICAN EXPRESS DISCOVER NOVUS

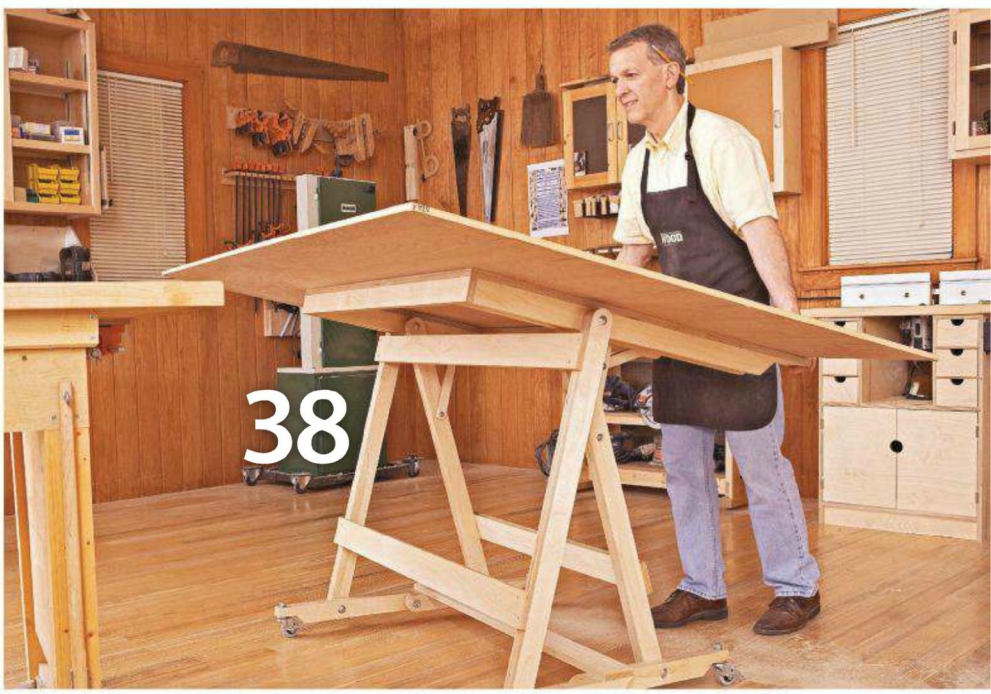
In this Issue

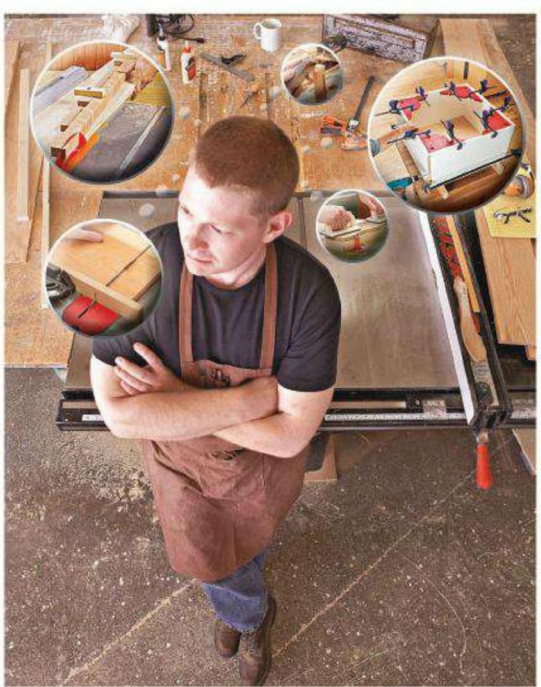
PROJECTS

SKILL BUILDERS

TOOLS & MATERIALS

DEPARTMENTS

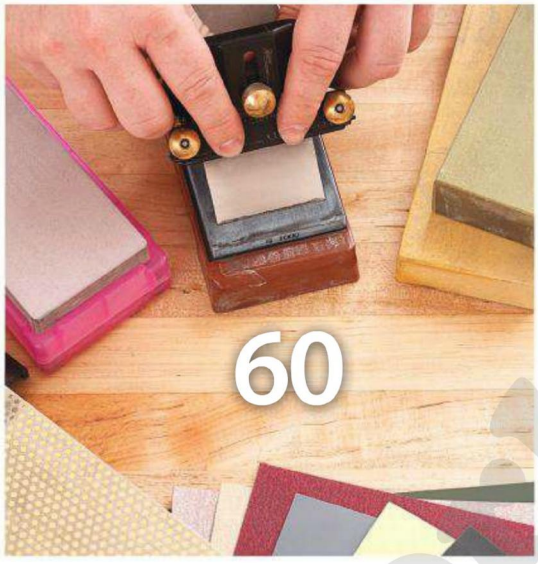




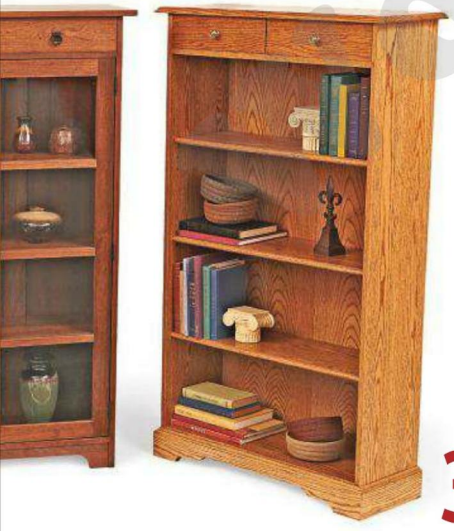
March 2012 Issue 210

47

This seal is your assurance that we build every project, verify every fact, and test every reviewed tool in our workshop to guarantee your success and complete satisfaction.



60



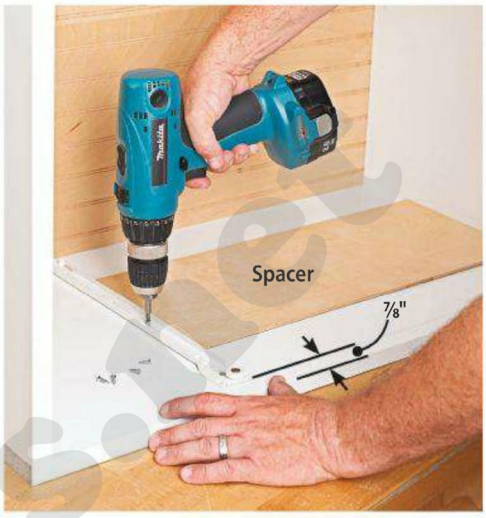
30

On our Web site

woodmagazine.com

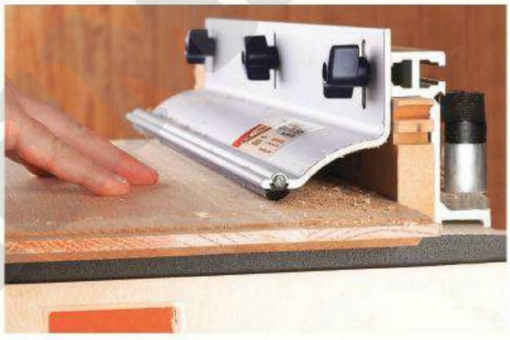
FREE WOODWORKING WISDOM, DISPENSED DAILY

The all-new "Shop Tip of the Day" app at woodmagazine.com/tips gives you a time- or money-saving tip each day and lets you browse tips you may have missed earlier.



TIP: A scrapwood spacer guarantees parallel alignment of drawer slides on opposite sides of a cabinet.

ACCESSORIES ADD ACCURACY TO TOOLS



WOOD editors scour the world looking for ways to make woodworking tools more precise and safer to operate. Learn which devices we recommend to amp up the performance of any machine. We even provide links to buy must-have accessories for each of these machines:

Tablesaw
woodmagazine.com/toptsacc
Bandsaw
woodmagazine.com/topbsacc
Router Table
woodmagazine.com/toprtacc
Dust Collector
woodmagazine.com/topdcacc

SUMMER'S COMING SOON! TIME TO PLAN YOUR OUTDOOR PROJECTS

Get a jump on warmer weather by starting your summer projects now. Check out these shop-proven outdoor project plans you can buy:

Build-to-Suit Pergola
woodmagazine.com/pergola
Porch Swing
woodmagazine.com/porchswing
Easy Glider
woodmagazine.com/ezglider
Picnic Table *(right)*
woodmagazine.com/picnictable
Chaise Lounge
woodmagazine.com/chaise
Adirondack Chair, Footstool, and Table
woodmagazine.com/ad3pack

INNOVATIVE PRODUCTS SINCE 1989!

SHOP FOX® machines are backed by a 2 Year Warranty!

10" TABLE SAWS with Riving Knife

- 3 HP, 220V, single-phase motor
- Cast iron table size: 27" x 40¼"
- Max. rip capacity: (W1819) 29½", (W1820) 50"

Free 10" Carbide-Tipped Blade

W1819 10" Table Saw
W1820 10" Table Saw w/ Long Ext. Table

SLIDING TABLE and ROUTER TABLE ATTACHMENTS for W1819 & W1820

SAW NOT INCLUDED

W1821
SLIDING TABLE ATTACHMENT
- Industrial grade anodized aluminum table size: 47" x 9"
- Max. cross cut: 48"

W1822
ROUTER TABLE ATTACHMENT
- Precision-ground cast iron table size: 27" x 20"
- Universal router mount

3 HP LOW PROFILE CYCLONE DUST COLLECTOR

- Motor: 3 HP, 220V, single-phase, TEFC class "F", 3450 RPM
- Air suction capacity: 1489 CFM
- Filter: 0.2–2 microns
- 55 gal. steel collection drum with casters

Only 80" Tall!

W1816
Cyclone Dust Collector

VARIABLE SPEED PLANER/MOULDER with Stand

- Motor: 2 HP, 220V, single-phase
- Precision ground cast iron table with wings: 36¼" L x 10" W
- Max. cutting width: 7"
- Max. planing height: 7½"
- Max. moulding depth: ¾"

We also carry an extensive selection of moulding knives for this machine!

W1812
Planer/Moulder

10" HYBRID TABLE SAW with Extension Table

New

Free 10" Carbide-Tipped Blade

- 2 HP, 110V/220V, single-phase motor
- Precision ground cast iron table measures 27" x 55" with phenolic extension
- Rip capacity 30" right, 12" left

W1824 10" Table Saw w/Extension Table

8" JOINTER with Parallelogram Adjustable Beds

- 3 HP, 220V, single-phase, TEFC motor
- Precision ground cast iron parallelogram design table measures 8" x 76⅝"
- Cutterheads: (W1741) 4 HSS knives (W1741S) spiral

Built-in Mobile Base

W1741 8" Jointer
W1741S with Spiral Cutterhead

OUTSTANDING SHOP FOX® ACCESSORIES

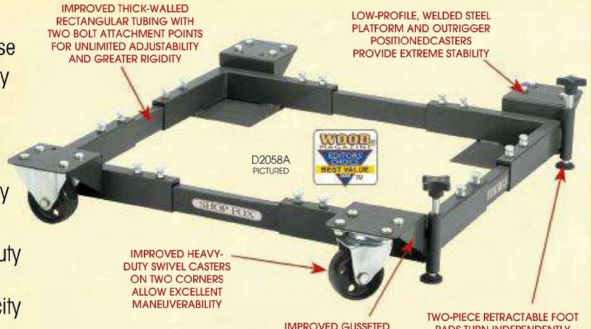
ADJUSTABLE MOBILE BASES

STRONGER FRAME WITH IMPROVED WHEELS AND GUSSETED SUPPORTS!

D2260A
Mini Mobile Base
600 lb. capacity

D2057A
Heavy-Duty Mobile Base
700 lb. capacity

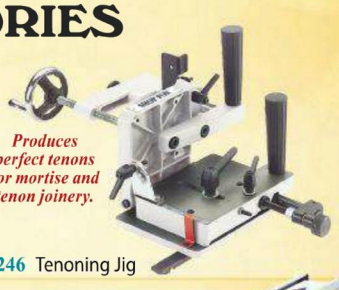
D2058A
Super Heavy-Duty Mobile Base
1300 lb. capacity



D2259A Extension Kit (fits all models)
D2246A 36" Extension Bars (fits all models)

TENONING JIG

- Heavy cast iron construction
- Precision adjustment points
- Adjusts for angled tenon cutting set-ups
- Standard ⅜" x ¾" miter bar fits all miter gauge slots including T-slots



Produces perfect tenons for mortise and tenon joinery.

D3246 Tenoning Jig

Aluma-Classic® FENCE

Extruded Aluminum & Steel Contruction
Precision Right Angle Design

W1716 Aluma-Classic® Fence w/ standard 57" rails
W1720 Aluma-Classic® Fence w/ long 79" rails & legs (50" cutting capacity)
W1721 79" rails & legs (fence not included)
W1722 Set of 3 powder coated sheet metal wings

Self-adhesive measuring tape & adjustable magnified cursor for quick positioning.

WOODSTOCK INTERNATIONAL, INC. IS ALSO HOME TO PRO-STICK®, PLANER PAL®, JOINTER PAL®, AND MANY OTHER FINE BRANDS.

PLEASE VISIT OUR WEBSITE OR CALL TOLL FREE TO FIND AN AUTHORIZED DEALER NEAR YOU.

SHOPFOX.BIZ
sales@shopfox.biz WHOLESALE ONLY

WOODSTOCK INTERNATIONAL INC.

1-800-840-8420

14504

Better Homes and Gardens®
WOOD®

March 2012 | Vol. 29, No. 1 | Issue No. 210

Craig designed and built a pedestal to display a World Trade Center artifact for a local fire department. See how at woodmagazine.com/wtcpedestal

Marlen crafted this Greene & Greene-style desk from African mahogany with ebony accents for his daughter.

Bob built this toy chest, and the building blocks that fill it, as a gift for his niece.

SUBSCRIBER SERVICE
Go to woodmagazine.com/help, write to WOOD magazine, P.O. Box 37439, Boone, IA 50037-0439 or call us at 800-374-9663, option 1.

Sounding Board

Our bulletin board for letters, comments, and timely updates

Crisscross clocks go cross-country to connect kin

My father-in-law and I both subscribe to *WOOD*® magazine, but live in different states and rarely get to see one another. So we decided to have a friendly long-distance competition by building the Crisscross Clock in issue 205 (July 2011), then trading them to each other upon completion.

It was amazing how our final designs were so different, even though they were built from the same plan! We had so much fun, it's going to become our ongoing tradition. Thank you for inspiring us to become closer in our shared hobby.

—Wade Owen, Fort Wayne, Ind.

Butch Lyon (*left*) and his son-in-law, Wade Owen, proudly display their finished Crisscross Clock designs before trading them to one another.

More danger for some critters

In "Make the Most of Sawdust" on p.22 of issue 207 (October 2011), you warn specifically against using walnut shavings for horse bedding. But even wood species commonly sold for animal bedding, like pine or cedar, can be harmful to certain species of animals. For instance, the phenols that give cedar its aroma have been found to be toxic to rabbits, gerbils, and other small pets.

Additionally, fine sawdust causes respiratory irritation for all pets, large or small, so only larger wood shavings should be used as bedding. It's always best to check with a veterinarian before using wood by-products for any animal's bedding.

— Jeff King, President, Pets Plus, Taylor Mill, Ky.

More than just a pushstick

After teaching woodworking to junior high students for 58 years, I shudder every time I see a pushstick like the one *below* being used. Instead, I advocate the use of those designed like the one *bottom*—the design prevents stock from lifting during a cut.

—Don Beeson, Watsonville, Calif.

A pushstick that contacts more surface area allows a user to apply downward force over a larger area for safer cuts. For a full-sized template of this pushstick, see the *WOOD Patterns*® insert.

— PLEASE WORK SAFELY —

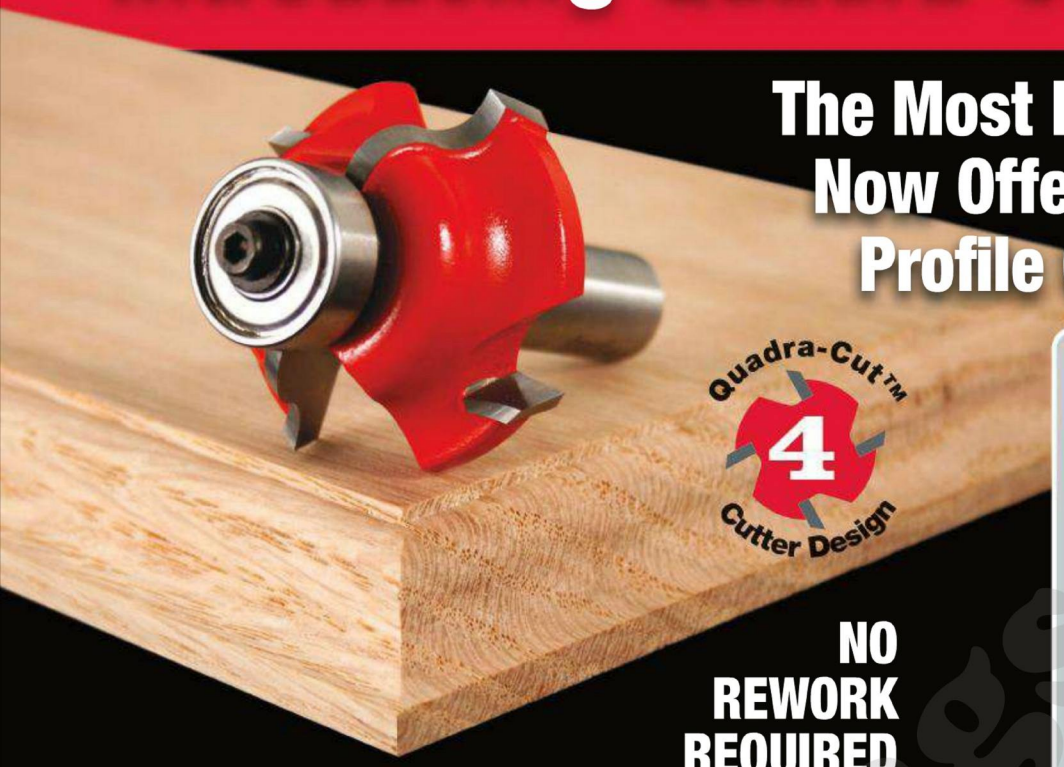
In order to show you precise details in photos, we frequently remove safety guards. In your work, be sure to use all safety devices, as well as wearing vision, breathing, and hearing protection.

—WOOD magazine editors

HOW TO REACH US

- **For woodworking advice:** Post your woodworking questions (joinery, finishing, tools, turning, dust collection, etc.) on one of our online forums at **woodmagazine.com/forums**.
- **To contact our editors:** Send your comments via e-mail to **woodmail@woodmagazine.com**; or write to *WOOD* magazine, 1716 Locust St., LS-221, Des Moines, IA 50309.
- **Subscription assistance:** To contact us about your *WOOD* subscription, visit **woodmagazine.com/service**; write to *WOOD*, P.O. Box 37439, Boone, IA 50037-0439; e-mail **wdmcustserv@cdsfulfillment.com**; or call 800-374-9663, option 1. Include your name and address as it appears on the magazine label, renewal notice, or invoice.
- **To find past articles:** See our index at **woodmagazine.com/index**.
- **To order past issues and articles:** For past issues of *WOOD* magazine in print or on DVD-ROM, our newsstand-only issues, or downloadable articles, visit **woodmagazine.com/store**.
- **Updates to previously published projects:** For an up-to-date listing of changes in dimensions and buying-guide sources from issue 1 through today, go to **woodmagazine.com/editorial**.

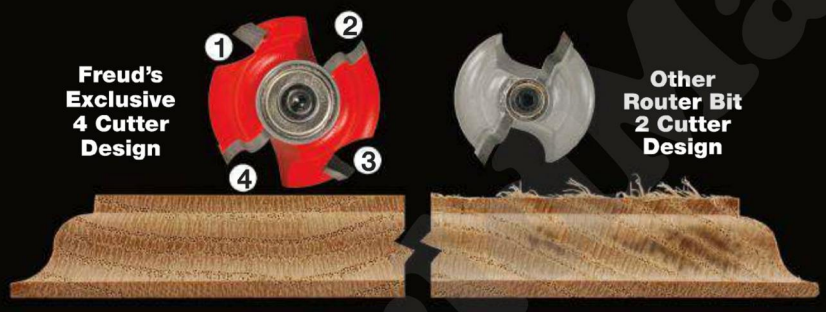
Introducing Quadra-Cut™ Sets



The Most Innovative Bits Now Offered In Popular Profile Combinations!

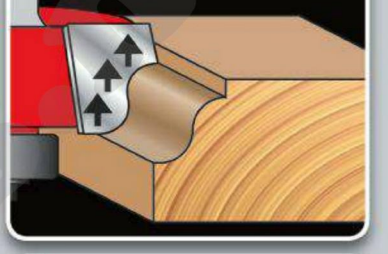
Quadra-Cut™ 4 Cutter Design

NO REWORK REQUIRED

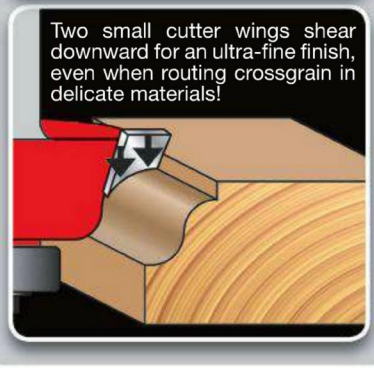


How It Works!

Two large cutter wings shear upward to remove most of the stock for fast, extremely smooth cuts.



Two small cutter wings shear downward for an ultra-fine finish, even when routing crossgrain in delicate materials!



U.S. Patent No. 8,899,252

Look For Freud's NEW Quadra-Cut™ Sets

4 Piece Set

#89-672

- 3/8" Rounding Over Bit, *#34-124*
- 1/2" Rounding Over Bit, *#34-126*
- 5/32" Roman Ogee Bit, *#38-104*
- Classical Cove & Bead Bit, *#38-362*

3 Piece Set

#89-674

- 5/32" Roman Ogee Bit, *#38-104*
- Classical Cove & Bead Bit, *#38-362*
- Classical Cove & Round Bit, *#38-614*

2 Piece Set

#89-676

- 3/8" Rounding Over Bit, *#34-124*
- 5/32" Roman Ogee Bit, *#38-104*

Ideal for Any Project that Requires a Flawless Finish!

SCAN WITH MOBILE DEVICE

freud®
Precisely the best.

Available for a limited time only. For more information visit: www.freudtools.com/Quadra-Cut

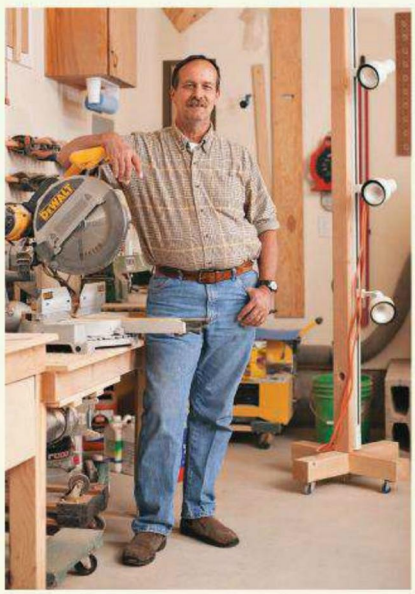
Track light goes vertical for a fine finish

In the shop, where lighting isn't always ideal, a project's finish may look fine—until you get it into the sunlight. After salvaging an 8' track light from a remodel job, I set about making this solution to my shop lighting problem.

To make one, machine and assemble the half-lapped 4×4 base pieces as shown; then drill two 9/16" holes through the joint at the base. Use those holes to guide an extra-long drill bit for making 12"-deep holes in the post. Drill an access hole through the post and insert two 17" pieces of ½" threaded rod through the base and post as shown. Then add a nut and washer on either end, using a wrench in the access hole to tighten the top nut.

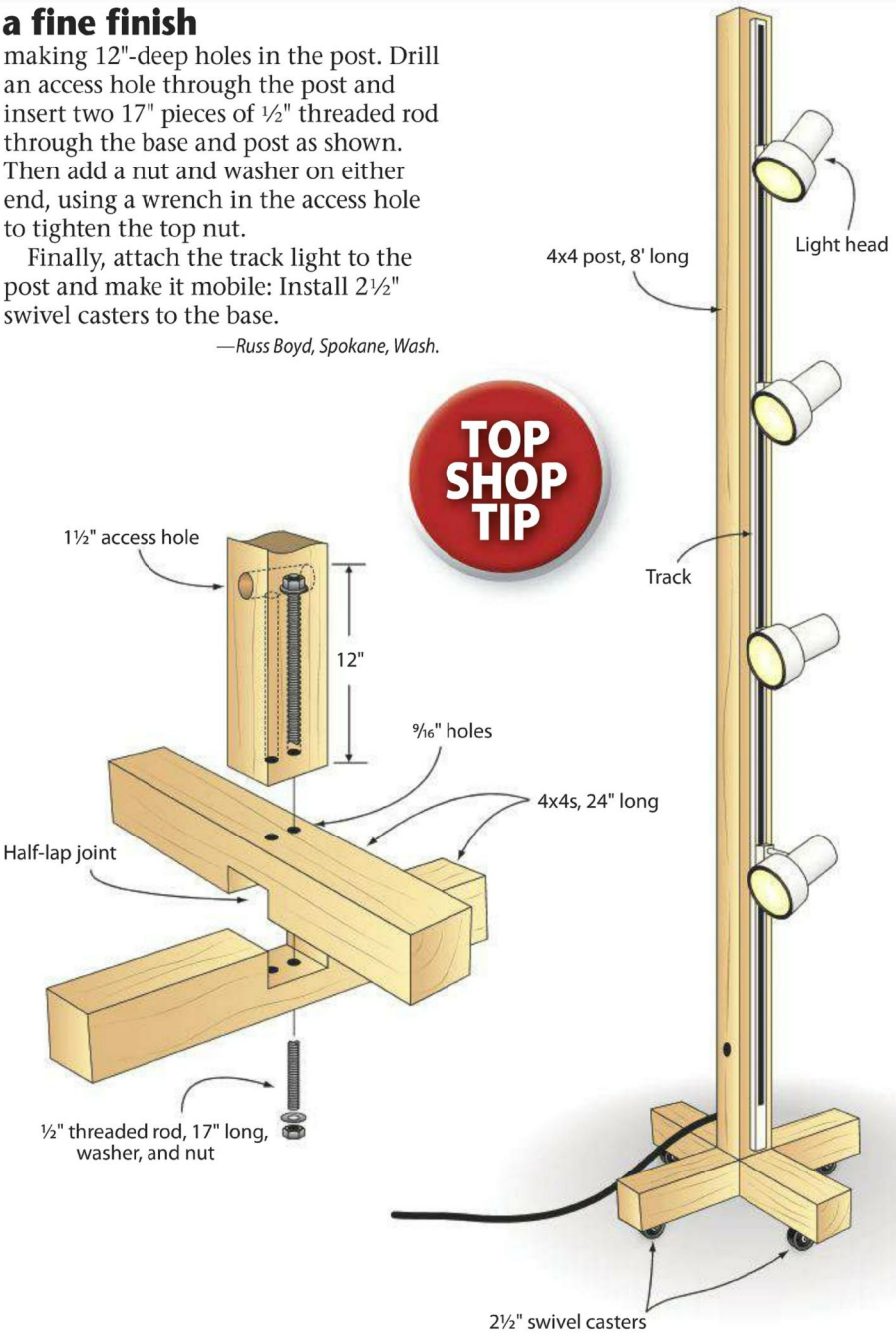
Finally, attach the track light to the post and make it mobile: Install 2½" swivel casters to the base.

—Russ Boyd, Spokane, Wash.



For sending this issue's Top Shop Tip, Russ receives Porter Cable's 16" Omnijig Joinery System.

TOP SHOP TIP



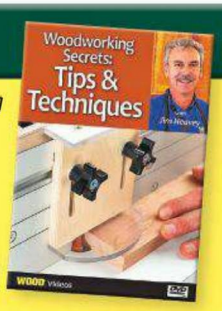
continued on page 10

YOUR TIPS EARN CA$H, TOOLS!

Tell us how you've solved a workshop stumper. If we print it, you'll get $100 and the video *Woodworking Secrets: Tips & Techniques* (woodmagazine.com/tipsdvd). And, if your idea garners Top Shop Tip honors, we'll also reward you with a tool prize worth at least $300.

Send your best ideas, along with photos or drawings and your daytime phone number, to **Shop Tips, *WOOD* Magazine, 1716 Locust St., LS-221, Des Moines, IA 50309-3023.** Or, by e-mail: shoptips@woodmagazine.com. Include your contact info in the e-mail.

Because we try to publish original tips, please send your tips only to *WOOD*® magazine. Sorry, submitted materials can't be returned.



Precision. Innovation. Simplicity.

Your projects deserve the very best … why not give it to them?

Precision Insert Plate
Standard size heavy-duty phenolic insert plate with 8-point adjustable levelers.

ITEM# PRS3030

Precision Router Stop
Solid and precise aluminum stop swings out of the way when not in use.

ITEM# PRS7850

True-FLEX™ Featherboards
Connect to Miter or T-Slot. Provide optimum workpiece pressure.

ITEM# PRS3010

Precision Fence
Heavy-duty aluminum self-squaring fence features built-in jointer.

ITEM# PRS1010

Precision Top
Vibration-resistant steel-reinforced Easy-Slide™ Micro-Dot MDF top.

ITEM# PRS1020

Router Table Switch
Add safety and convenience to your table. 2-Plug Design, 14 gauge power cord.

ITEM# PRS3100

Heavy-Duty Casters
3" dual-locking casters that won't roll OR pivot once engaged, resulting in an extremely stable work station.

ITEM# PRS3090

The full lineup of **Kreg Precision Routing Products** provide the innovative features and incredible precision your projects deserve. Visit your local Kreg Dealer today or see the entire line in action at www.kregtool.com.

Watch the video at www.kregtool.com

Kreg®

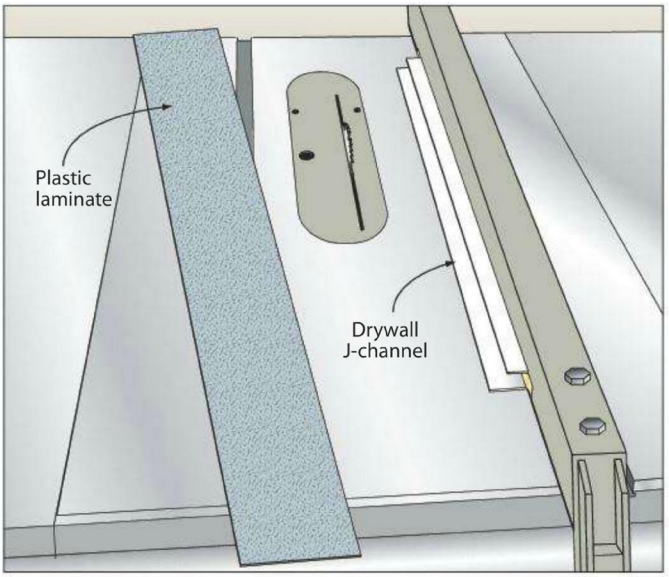
www.kregtool.com
800.447.8638

Shop Tips

Quick cutting trick for thin material

When cutting thin material, such as plastic laminate, on a tablesaw, it tends to creep under the fence. Here's a simple solution to keep it on track: Tape a length of drywall J-channel to the tablesaw's fence. The laminate rides securely in the channel without riding up or sliding down. Just remember to add an extra 1/16" to your dimensions to account for the thickness of the channel.

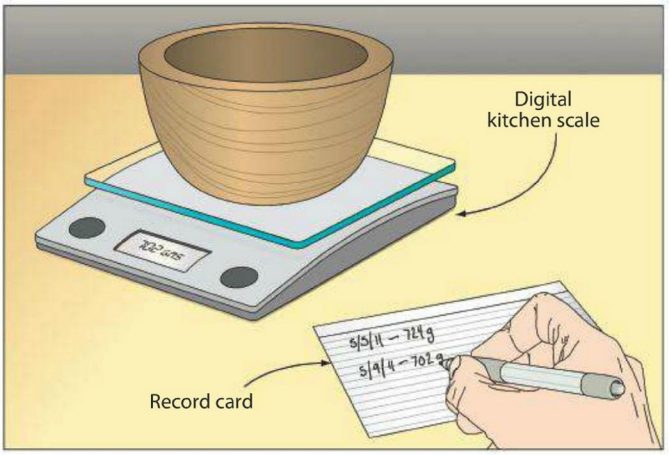
—Byron Manthey, Hutchinson, Minn.



The weigh-easy way to measure moisture content

I enjoy turning bowls from green stock, but knowing when the wood has reached equilibrium moisture content (the point where it neither gains nor loses moisture dramatically) requires a pricey moisture meter. Try this instead: Weigh each bowl on a simple and affordable digital kitchen scale after rough turning, note the date and weight on a card, and toss the card into the bowl. Periodically weigh each bowl, making note of the date and weight on the card each time. When the bowl stops losing weight, it's ready for final turning and finish application.

—Pete Stacy, Kansas City, Mo.

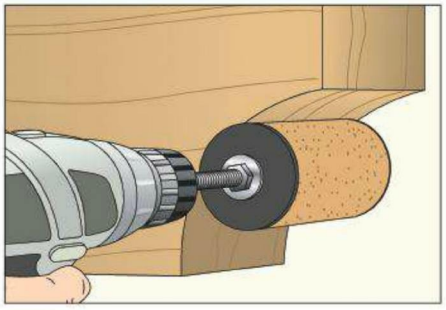


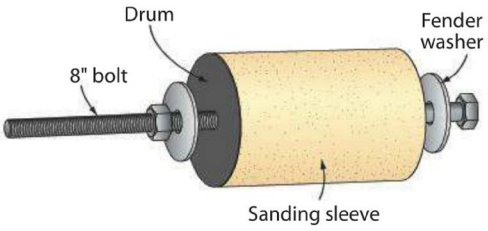
Take this simple spindle sander to your project

Need to shape project parts too big to bring to an oscillating spindle sander? Bring the sander to your project, instead.

Grab a sanding drum and sleeve from your sander; then run a bolt through it, as shown. Chuck this assembly into a handheld drill and begin sanding.

—George Hoffman, Dracat, Mass.

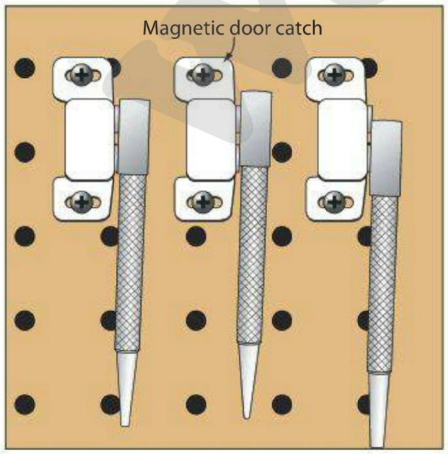




Magnetic door catches hang small tools

I have plenty of tools, such as nail sets, countersinks, and router bits, that are too small to hang on perforated-hardboard hooks; they usually end up in a drawer, hard to find. The solution: Mount magnetic door catches on perforated hardboard to create a visible and easily accessible home for those tiny tools and accessories.

—Carl Mascia, Greensburg, Pa.



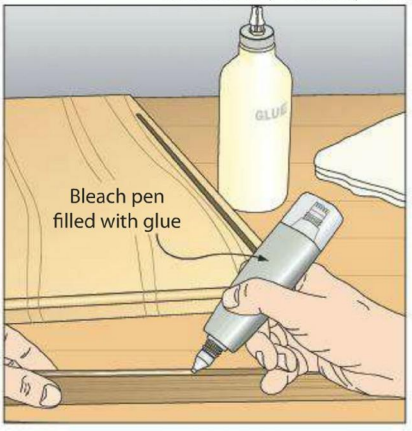
continued on page 12

Shop Tips

Clean up your glue beads with this laundry tool

Whenever I see an opportunity, I recycle. In this case, I thoroughly clean and reuse bleach pens by turning them into wood-glue dispensers. The tip end dispenses an even, pencil-size bead of glue for small areas, while the wider brush end spreads the glue over a larger area. The tip is easy to clean, and the cap does a nice job of sealing the glue.

—Carol Newton, Oakhurst, Calif.

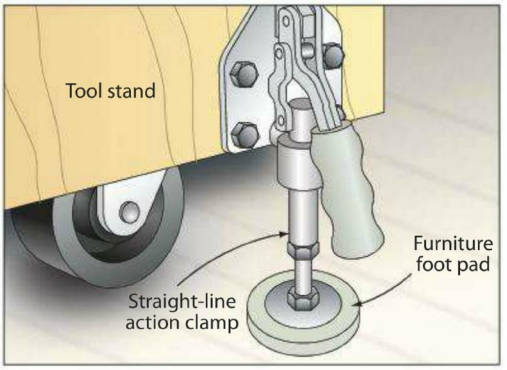


Keep tool stands still; use a toggle clamp

In a small shop, tool stands on casters allow you to reconfigure the space to work comfortably. But even with locking casters, tools may not seem stable when fixed.

For a firmer platform, install swivel casters and a straight-line action clamp at each corner of the tool stand. Simply wheel the tool to where it's needed and push the clamp handles down to lift the wheels off the ground. Attaching a protective furniture foot pad to the bottom of each clamp provides a no-slip, non-marring surface.

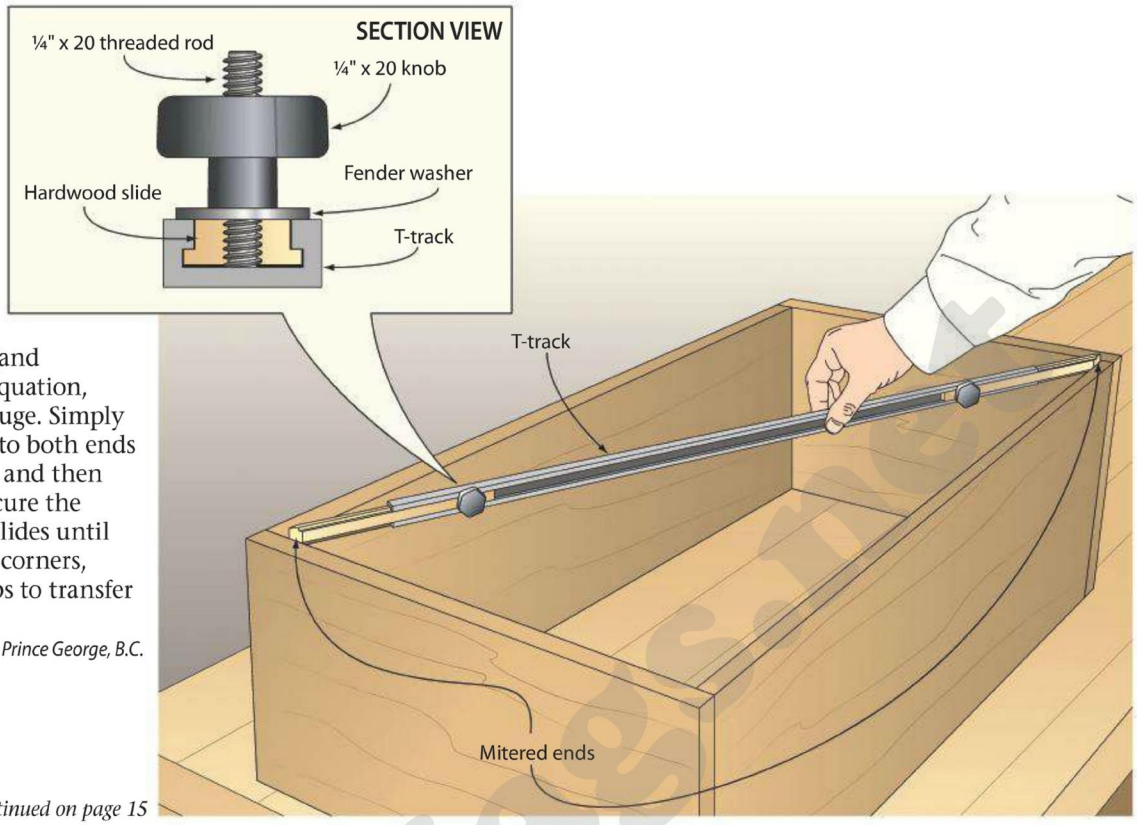
—David Ridge, Yucaipa, Calif.



No-measure method to check square

If you rely on a tape measure to compare the diagonal lengths of a box or drawer when checking it for square, the wide tip of the tape may make you wonder about its accuracy. So, to take the imprecision (and numbers) out of the equation, build this diagonal gauge. Simply fit hardwood slides into both ends of a length of T-track, and then thread in knobs to secure the slides. Move the two slides until they touch the inside corners, then tighten the knobs to transfer inside measurements.

—Gary Dean, Prince George, B.C.



continued on page 15

All 27 Years of WOOD® on one DVD-ROM!

The easy searchable index takes you instantly to

325 Furniture Projects

940 Weekend Projects

1,700 Shop Tips

270 Shop Projects

645 Tool Reviews

875 Skill-building Techniques

Order online at **woodmagazine.com/DVDlibrary** or by phone at **888-636-4478**

Special pricing for owners of the 26-year collection!

AD#WD0312

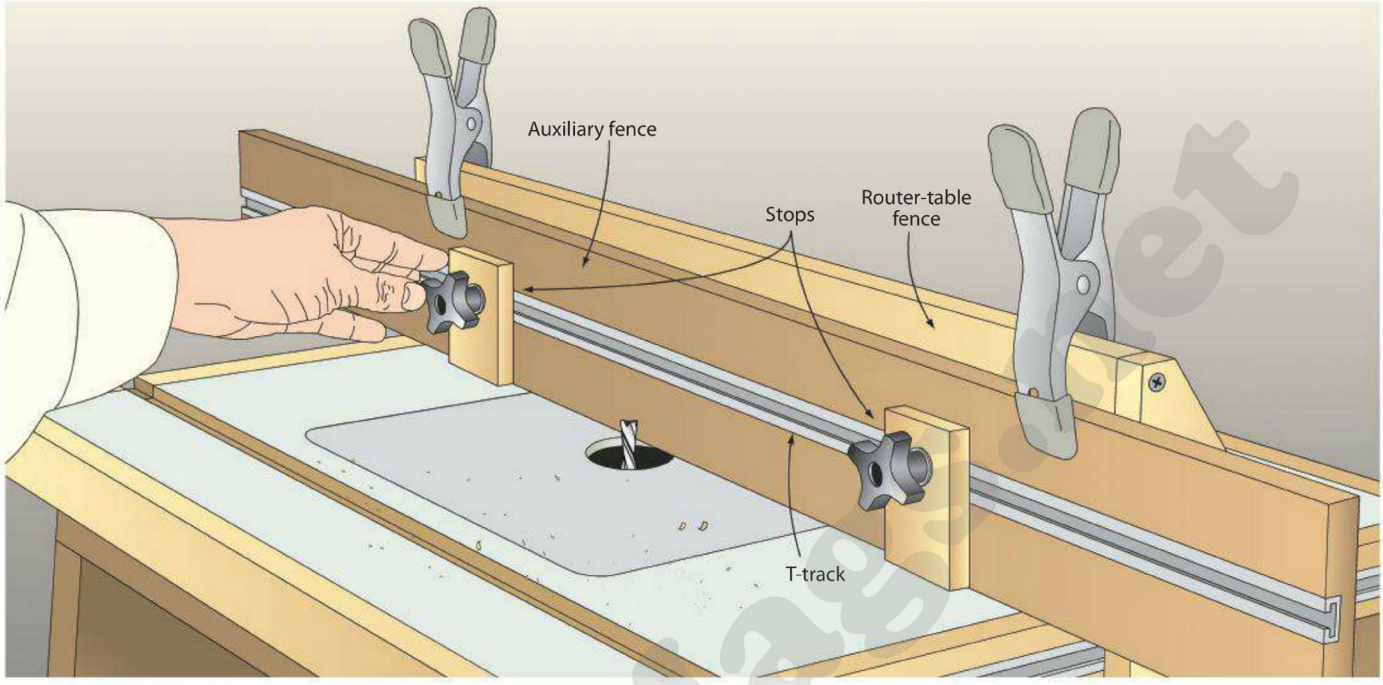
Shop Tips

Lengthy auxiliary fence extends router table range

When routing stopped slots on long boards, I had to pull the router out of my router-table and clamp guides and stops to the board. Not anymore.

The solution: this router-table auxiliary fence. Just clamp it to your router-table fence, set the stops, and rout the slots. The fence can be removed and stored when not in use, and also works great for drilling out mortises on a drill press.

—Serge Duclos, Delson, Que.



Challenge Skill

Sliding Dovetails

Try this mechanical joint for carcases that lock solidly together.

Sliding dovetails provide several advantages over a dado joint, such as the one used on the bookcase on *page 30*. First, they're stronger because they don't rely solely on glue. Second, the shoulders of the dovetailed piece hide the edges of the slot, much as a tenoned workpiece hides a mortise. And the exposed dovetail provides a visible signature of your craftsmanship.

To make this joint, you'll rout the dovetail slot first, then cut and size the dovetail to fit. For the slot you'll need a handheld router and the dado jig shown on *page 31*. In addition to a ⅝" guide bushing, you'll need a ¼" spiral downcut bit for clean cuts (a ¼" straight bit will also work) and a ½" dovetail bit. We chose a 7° dovetail bit because it leaves a thicker, stronger "neck" on the dovetail than a 14° bit would. You will shape the dovetail on a router table.

For testing the router-table setup, prepare a panel the same thickness and about the same width as the project panels to be dovetailed.

Lay out; then rout

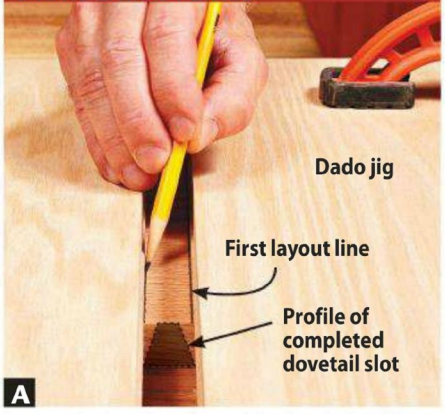
You will cut the dovetail slot in two operations. First, to reduce the load on the dovetail bit, remove most of the waste with the spiral downcut bit. Then switch to the dovetail bit to complete shaping the slot. Because the dovetail slot tapers from bottom to top, the inside edges of the jig do not align with the top edges of the slot [**Photo A**]. To reposition the jig accurately for each operation, use the jig to draw layout lines on your workpieces to define both sides of the slots.

Install the bushing and spiral downcut bit, and set the bit's cutting depth to 1/16" less than the final depth of the slot. Clamp the jig along the layout lines and rout across the panel [**Photo B**]. Rout each slot with this setup.

Quick Tip! *Make a setup gauge, too. Rout a slot across a piece of scrap to make a gauge for setting up the router table later.*

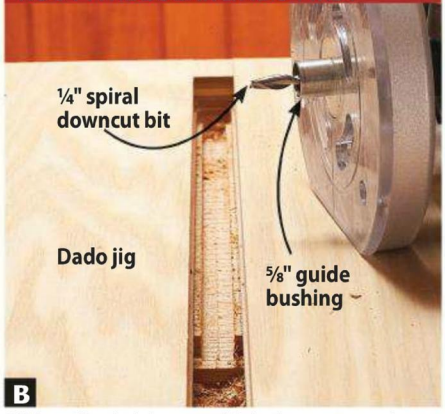
Mount the dovetail bit in the router and set the final depth. For the bookcase, the slot depth matches the rabbet for the back [**Photo C**].

DRAW LAYOUT LINES



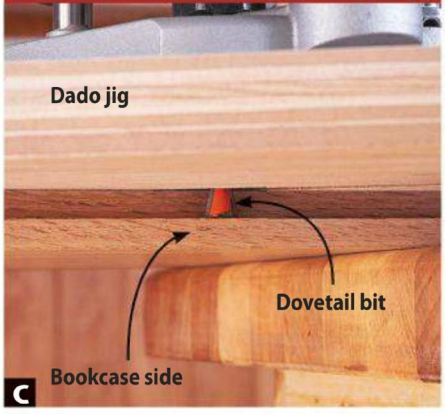
Lay out the location of one side of each slot. Align one inside edge of the jig with this line and trace along the opposite inside edge.

ROUT A REGULAR DADO FIRST



With a ¼" spiral downcut bit in the router, make a pass with the guide bushing pressed against each edge of the jig.

USE THE RABBET AS A DEPTH GAUGE



With the router resting on the jig and a bookcase side, set the dovetail bit's depth of cut so the bit rests on the rabbet in the side.

continued on page 18

The facts are hard to ignore.

Titebond® III outperforms polyurethane glues.

As the leader in wood glues, we want you to know the truth about polyurethane glue and woodworking. A straightforward comparison between Titebond® III Ultimate Wood Glue and polyurethane glue tells the story.

Titebond® III is THE ultimate choice for bonding wood to wood. Period.

WOOD MAGAZINE TOP GLUE APPROVED

For more information and a detailed comparison, please visit www.titebond.com/TBIIIvsPolyurethane

Made in the USA

Reposition the jig over the first slot, aligning it carefully with the layout lines, and clamp it down. Rout along both edges with the dovetail bit. Repeat this process for the remaining slots, and make a pass on your scrapwood setup gauge to complete it.

Now to the router table

Secure the dovetail bit in your table-mounted router and set the bit height using the scrapwood gauge [**Photo D**].

To steady the panels, attach a tall auxiliary fence to your router-table fence and position it to expose about one-third of the bit's width. Make cuts on your test panel with each face against the fence [**Photo E**]. Test the fit of the dovetail in a slot, and adjust the fence as needed to achieve a fit that slides in with just a little hand pressure or light taps from a mallet. Refer to **(Trouble)shoot the gap**, *bottom*, for help fine-tuning the bit height.

Quick Tip! *If a dovetail doesn't fit well in the slot, just cut off the end of the test panel and try again after making adjustments to the fence and/or bit.*

Once the test joint fits well, rout a dovetail on each end of the top and bottom panels.

Slide it all together

Get a feel for the assembly process by dry-fitting the parts first. For the bookcase, assemble the top and bottom with one side, then slide the remaining side in place.

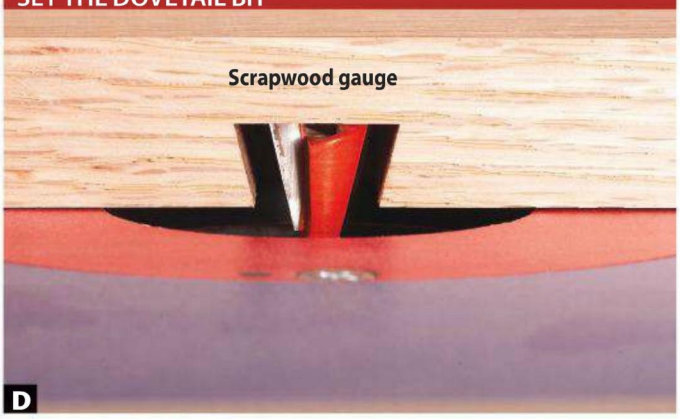
Quick Tip! *To fine-tune a dovetail's thickness, cut a section of the dovetail from your test piece, wrap it with sandpaper, and use it as a sanding block.*

If everything fits well, disassemble the parts.

Because a well-cut sliding dovetail has a strong mechanical connection, glue simply keeps the dovetailed piece from moving within the slot. We use white glue because, being thinner than yellow glue, it serves as a lubricant, helping the pieces move against each other. And, its longer open time allows more time for assembly.

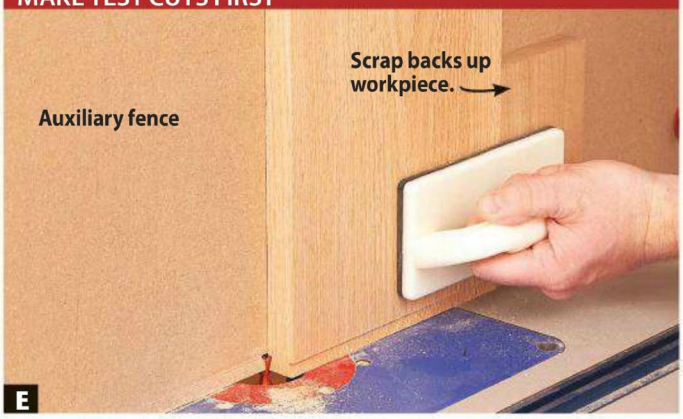
Apply glue to the leading edges of the slots in one side panel, then begin reassembly. Repeat for the slots in the remaining side and slide it in place.

SET THE DOVETAIL BIT



At the router table, raise the dovetail bit to just touch the bottom of the slot in your scrapwood gauge.

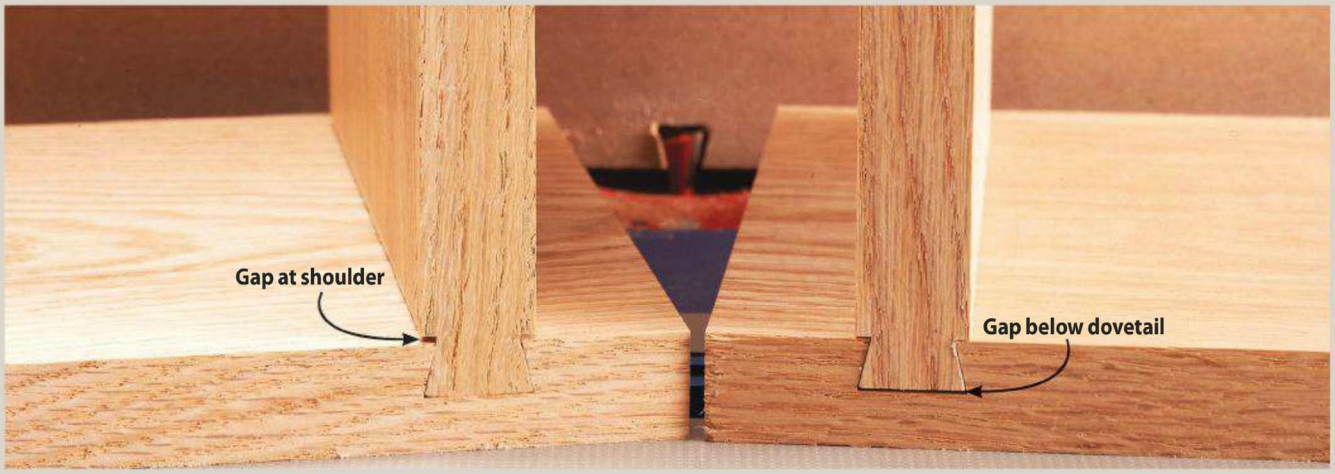
MAKE TEST CUTS FIRST



Back up the workpiece with a scrap, then make a pass on each face. Move the fence back for a looser fit, forward for a tighter fit.

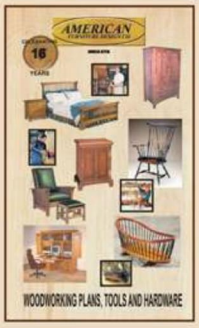
(Trouble)shoot the gap

If fitting a test joint reveals a gap above or below the dovetail, adjust the bit height in the router table by the amount of the space. For a gap at the shoulder, *left* in photo, lower the bit. If the space falls below the dovetail, *right* in photo, raise the bit.



CATALOGS FOR CRAFTSMEN

Select the catalogs you

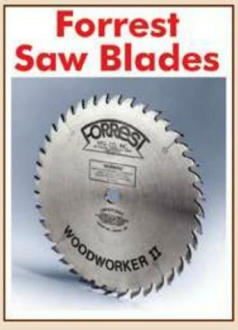


1 AMERICAN FURNITURE DESIGN – The leader in woodworking plans for furniture! Over 85,000 copies of our Mission Bed have been sold! CAD generated designs, 36"X48" with instructions. Hardware, hand tools, router bits, finishes & books.

2 COOK'S SAW MANUFACTURING – Cook's Saw is a leading manufacturer of Portable Sawmills, Board Edgers, Blade Sharpeners, Tooth Setters, Bandsaw Blades, and Sawmill Parts. FREE Catalog.

3 DETAILED PLAY SYSTEMS – Features wooden swing sets and backyard playground equipment kits, plans, and accessories to build children's outdoor play structures. Free catalog.

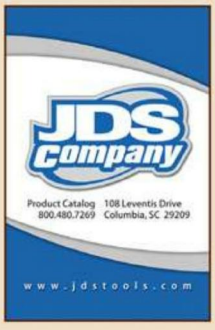
4 EPILOG – Add value to woodworking projects with laser engraving systems from Epilog. Customize anything with a touch of a button.



5 FORREST MANUFACTURING – The finest, quietest saw blades and dados! Full line of sizes available.

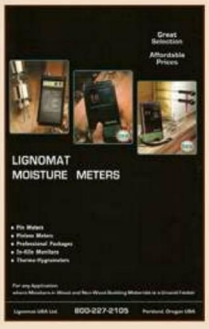
6 FREUD SAW BLADES – This 42-page catalog illustrates the features and benefits for all Freud saw blades.

7 HUT PRODUCTS – "Turn to Quality". A comprehensive catalog for Wood Turners from HUT Products.

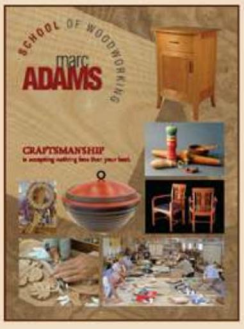


8 JDS COMPANY – Providing quality products for over 20 years! Find out more information on JDS Air Filtration, dust collection systems and the amazing Multi-Router!

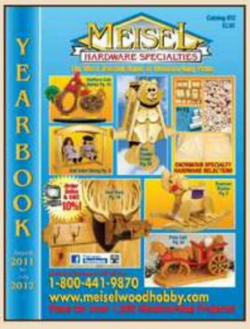
9 KLOCKIT – Whether your next project is to build a beautiful clock or repair a treasured heirloom, Klockit can supply all you need; Plans, Wood Kits and Clock Components.



10 LIGNOMAT – Catalog describes full line of wood moisture meters. Convenient, reliable and affordable moisture meters for any hobbyist and woodworker.

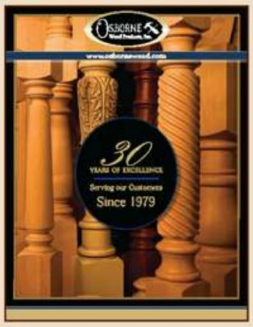


11 MARC ADAMS SCHOOL OF WOODWORKING – Committed to fine woodworking excellence through hands-on learning experiences with the best woodworkers of modern time.

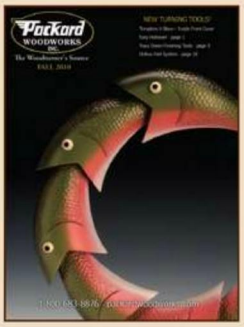


12 MEISEL HARDWARE SPECIALTIES – Over 2,000 woodworking project plans for indoor and outdoor furniture, toys, clocks, patriotic, birdhouses, Christmas, etc. Request our full-color catalog.

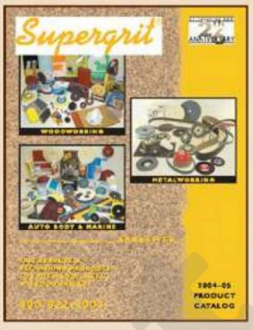
want from these 20 FREE LISTINGS! See the attached card for ordering info.



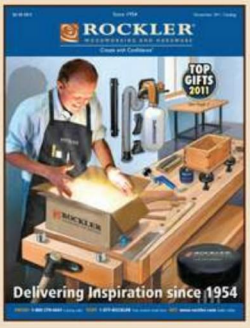
13 OSBORNE WOOD PRODUCTS – 40 full-color catalog pages containing the latest fresh and innovative product releases, our brand new corbels, bun feet, island legs, and molding.



14 PACKARD WOODWORKS – Catalog for Woodturners! All major brands of Turning Tools, Chucks, Penmaking Supplies, Finishes, Exotic Woods, Books and DVDs, Pyrography and Carving Supplies and much more!



15 RED HILL – Supergrit® Abrasives, industrial quality sandpaper and refinishing supplies at wholesale prices. FREE 48-page color catalog.

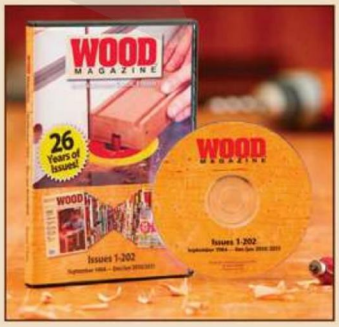


16 ROCKLER WOODWORKING AND HARDWARE – A Woodworker's Dream! Full-color catalog features thousands of woodworking solutions, including hard-to-find hardware, exclusive plans and workshop essentials.

17 WOOD STORE CATALOG – A free catalog of plans, DVDs, and other products from the editors at WOOD® magazine.

18 WOODCRAFT – Woodworking hand and power tools, finishing supplies, hardware, exotic woods and more! Exclusive brands and top-quality tools from around the world, plus hard-to-find jigs and accessories.

19 WOODMASTER – 4-Way Money-Maker planes, molds, sands, saws… creates high-profit moldings, picture frames, tongue & groove. 12", 18", & 25" models.



20 WOOD MAGAZINE BACK ISSUE DVD – Free catalog containing WOOD's newly updated back-issue DVD and shop-tested plans.

CATALOGS FOR CRAFTSMEN
Order Form

Fill out the coupon below, circle the numbers corresponding to the catalogs you'd like to receive, and mail to: WOOD® Magazine • Catalogs for Craftsmen • Dept. WOCCFM12 • P.O. Box 5135 • Buffalo, NY 14205-5135. This coupon expires July 17, 2012.
Allow 4–6 weeks for delivery. Expired cards will not be processed.

CIRCLE THE NUMBERS BELOW CORRESPONDING TO ITEMS IN THIS ISSUE. Dept. WOCCFM12

1	5	9	13	17	4000
2	6	10	14	18	
3	7	11	15	19	
4	8	12	16	20	

Discover how rewarding woodworking can be! Get one full year of WOOD® for just $28.00 (7 issues). Simply circle No. 4000. You will be billed later.

NAME _____

ADDRESS _____

CITY _____

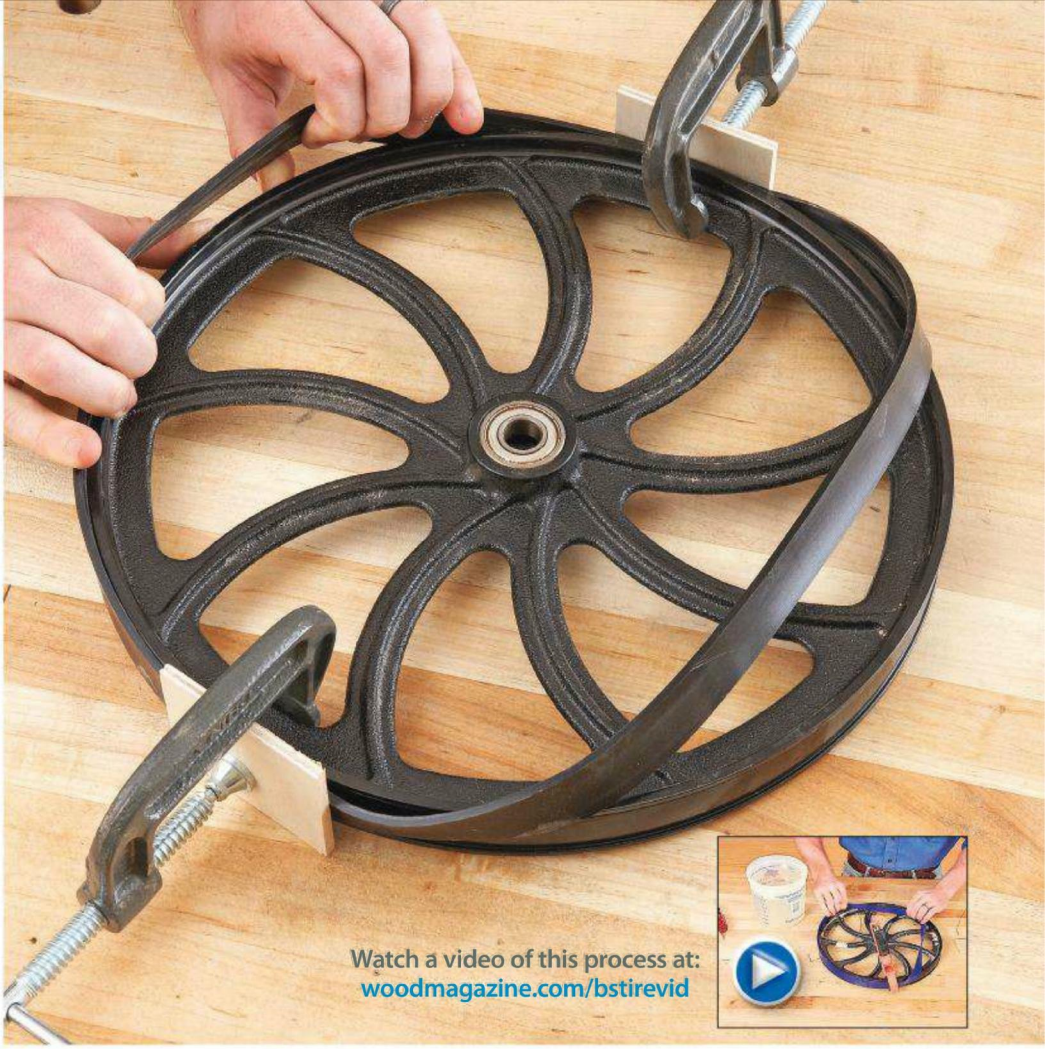
STATE _____

ZIP _____

E-MAIL ADDRESS _____

PHONE (OPTIONAL) _____

Changing Bandsaw Tires



You wouldn't dream of driving a car for years without checking its tires, so why do it with your bandsaw? To make a quick assessment, pop the bandsaw's hood, remove the blade, and inspect the tire for visible cracks or missing chunks. If there are any, it's time for a replacement. Here's how to do it.

Before installing a new tire, pry off the old one with a flathead screwdriver, or cut it off with a sharp utility knife. Scrape away old adhesive or remaining tire fragments with a putty knife, then remove any adhesive residue from the wheel using a rag and lacquer thinner.

As a final step, clean the wheel rim with denatured alcohol and allow it to dry thoroughly before mounting the new tire. You want a bare-metal surface for the tire to adhere to, and some solvents—including lacquer thinner—leave behind a residue that can reduce the adhesive's effectiveness.

Rubber tires: Stretch 'n' glue

To install a rubber tire, slide part of the tire onto the wheel rim with the rough-sided surface of the tire against the rim. Clamp it with a small C-clamp and a ¼"-thick piece of scrap. Stretch the tire to the wheel's opposite side; then clamp it. Work the tire over the rim, as shown *above*, using a wood or steel lever, if necessary.

Slip a short piece of ¾"-diameter rod or pipe between the tire and wheel. Roll the pipe around the rim once to equalize the tire's elasticity. Squeeze a small amount of industrial rubber adhesive (3M-TIRE, $19.95, 888-622-7837, carterproducts.com) onto a scrapwood applicator and apply it to the tire and wheel surface, as shown *below left*. Roll and repeat all the way around the rim. Let the adhesive dry for 24 hours before using the saw again.

Note: *Bandsaw tires fit a range of wheel widths, and may require trimming along one edge. Mount the tire flush to one side of the wheel, glue it in place, and then run a sharp utility knife around the edge.*

Urethane tires: Heat 'em and seat 'em

Urethane tires come slightly undersized so you can install them without adhesive for a firm hold. If you have limited hand strength, soak the tire in hot water—up to 120°F—for 5 minutes to make it pliable enough to stretch over the rim.

ROLL AROUND THE RIM

When applying the adhesive, roll the pipe or rod away from the fresh glue and apply more adhesive to the newly exposed gap.

URETHANE TIRES COST MORE BUT HAVE ADVANTAGES OVER RUBBER

TYPE	ADHESIVE NEEDED TO INSTALL	WAIT TIME AFTER INSTALLATION	TYPICAL COST FOR A 14" DIAMETER TIRE (each)	COMMENTS
Rubber tires	Industrial rubber adhesive ($19.95)	24 hours	$18.95	Prone to dry rot in dry climates
Urethane tires	None	When tire cools	$24.95	No dry rot; resistant to chemicals and wood-sap buildup; increased abrasion resistance for longer wear

consumes less. warms more.

introducing the stylish, new super-efficient **envi™ wall-mounted heater**

SAVE up to 50%

or more on your heating costs.

economical. safe. simple.

Say goodbye to rising heat bills! The super safe, low wattage, ***envi*** heater costs as little as ***4 cents per hour*** to heat an average room. It is fanless, has no moving parts yet is cool to the touch. Leave it running 24/7 with peace of mind for your children, seniors and pets. The ***envi*** is totally silent, eco and allergy friendly and is stunningly beautiful in any décor. The ***envi***, a revolution in healthy heating uses gentle "dual stack convection" so it doesn't blow dust around or dry out the air. 3yr Warranty & Made in the USA. **2011 UPDATED MODELS NOW AVAILABLE - INCLUDING FOR THE FIRST TIME NEW HARDWIRED ENVI VERSIONS!**

visit **www.eheat.com** or call **1-800-807-0107**

Exclusive 15% OFF Coupon Code: WOOD11A15

THE ALL NEW!

The Best Just Got Better!

Quick and Easy Tool Free Filter Change!

JDS Air-Tech HP

HIGH PERFORMANCE AIR FILTRATION

$379.00

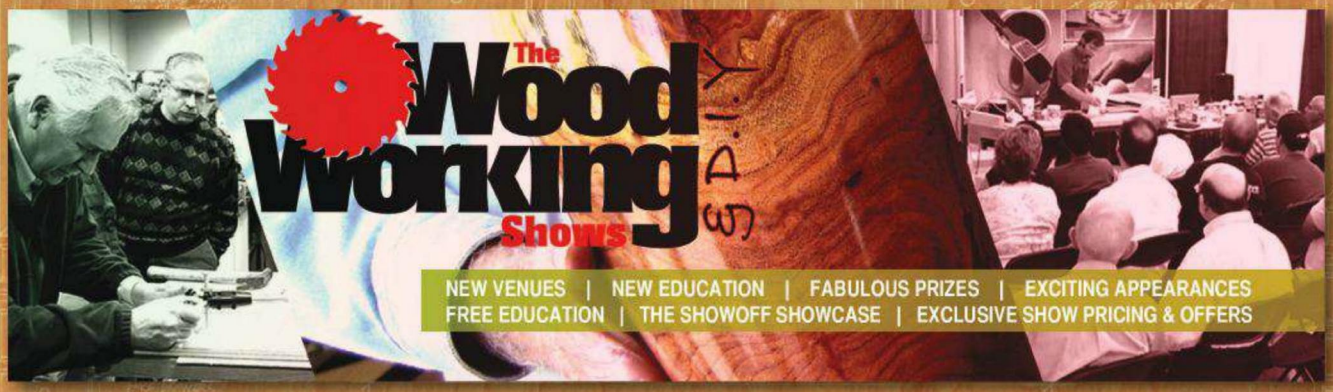
- Powerful 3 speed 1/3 hp motor!
- 1255 max CFM, 916 CFM filtered airflow!
- Washable electrostatic pre-filter.
- RF remote control with speed and timer function.
- Quick and easy, tool free, filter change.
- All welded steel construction.
- Beautiful powder coat finish.

Diffusing filter acces door allows for installation of an optional charcoal filter!

800.480.7269

JDS company SINCE 1987

www.jdstools.com



WOOD MAGAZINE WORKSHOP
with Jim Heavey

NORTHERN INSIGHTS
with Paul & Ethan Moore

START WOODWORKING - THE TOOLS
with author Roland Johnson

ROUGH CUT: WOODWORKING with Tommy Mac

CABINET MAKING EXPERIENCE
with Jeff Ziegmann

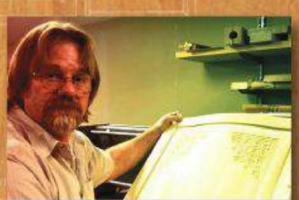
INDELIBLE INLAY
with Richard Wedler

LEARN TO TURN
with Craft Supplies

BANDSAW CLINIC
with Alex Snodgrass

LOGS TO LUMBER
with Wood-Mizer

JIG SECRETS REVEALED
with Joel Hansen



WOODWORKING WITH BYTE: THE BASICS OF COMPUTER CONTROLLED WOODWORKING
with Legacy Woodworking

A BRAND NEW POWERMATIC BANDSAW GIVEN AWAY AT EVERY SHOW

BALTIMORE, MD — CABINET MAKING
NEW ENGLAND — TIMBER FRAMING
INDIANAPOLIS, IN — MEET TOMMY MAC
KANSAS CITY, KS — MEET TOMMY MAC
COLUMBUS, OH — SUPERBOWL WEEKEND
ST. LOUIS, MO — MEET TOMMY MAC
MILWAUKEE, WI — BOSCH'S BIG BLUE
SOMERSET, NJ — HAND TOOLS
FREDERICKSBURG, VA — MUSICAL INSTRUMENTS
ATLANTA, GA — TURNING EXTRAVAGANZA
TAMPA, FL | **CHARLOTTE, NC** | **HOUSTON, TX**

TAKE ADVANTAGE OF OUR FREE EDUCATION SEMINARS

Find out more at www.TheWoodWorkingShows.com

STRIP PAINT COATINGS with SOYBEANS!

- Removes Multiple Coatings
- 100% Biodegradable
- Will Not Burn Skin
- Virtually No Odor

Want a better way to remove paints, urethanes, acrylics, epoxies, and enamels without the back-breaking work of sanding and chiseling? Made with 100% American Grown Soybeans, SOY•Gel does all that and more. Within minutes you can see the power of SOY•Gel start to lift the coatings, all while you spend time on other tasks. With SOY•Gel you won't have to deal with harsh odors that we all know so well with other strippers. SOY•Gel is the perfect helper for anyone wanting to remove paints, urethanes, and enamels.

CALL TODAY
1.800.538.5069

FRANMAR Chemical®

www.franmar.com

The most feature rich routers on the market ... built for your router table!

- Above the table bit adjustment with winder wrench
- Automatic collet lock for single wrench bit changes
- Superior dust collection
- Rack and pinion or free-plunge modes
- Soft start 3-1/4 hp and 2 hp models

EDITORS' CHOICE BEST VALUE TAUNTON'S 2009 TOOL GUIDE

READERS' CHOICE TAUNTON'S 2009 TOOL GUIDE

EDITORS' CHOICE BEST OVERALL TAUNTON'S 2009 TOOL GUIDE

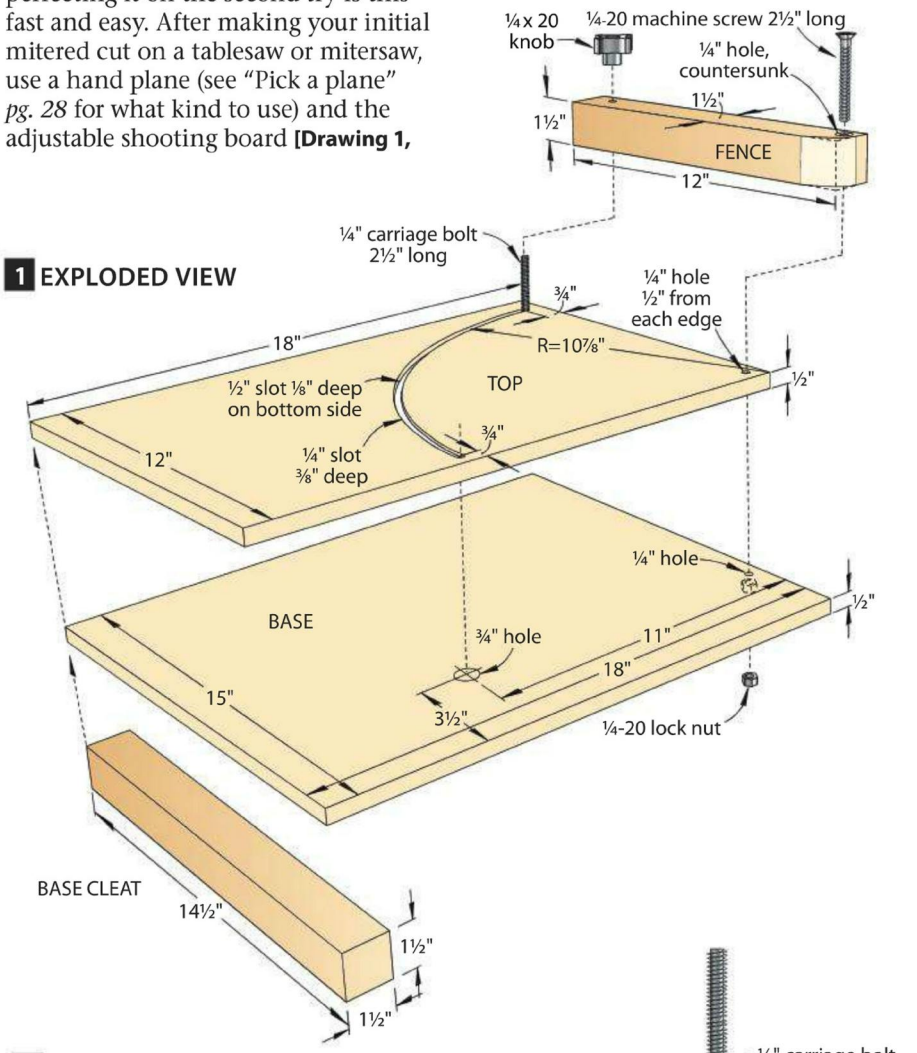
* As voted for in Taunton's Tool Guide

triton® Precision Power Tools

www.tritontools.com | 855.227.3478

Shoot Your Way to Perfect Miters

There's no need to agonize about getting the angle on your miter joints right the first time when perfecting it on the second try is this fast and easy. After making your initial mitered cut on a tablesaw or mitersaw, use a hand plane (see "Pick a plane" *pg. 28* for what kind to use) and the adjustable shooting board **[Drawing 1, Photo A]** to remove blade scoring and burns, and trim ends at any angle with hair-splitting accuracy.



continued on page 28

PowerLift™.

A Revolution In Table Mounted Routing.

The First Motorized Router Lift!

Perform true **Hands Free Plunge Cutting**. Raise the spinning router bit into the wood... *on the fly!* No cranks or handles.

- Pre-mounted 1/4" thick Aluminum Router Table Insert

Only The PowerLift...

has a bi-directional **Electronic Foot Pedal** that allows you to make micro-adjustments to the spinning router bit (within .005") for maximum precision and ease.

Only The PowerLift...

has a **Digital Control Panel** (with mounting arm included), so you can set the speed, direction, and height of the lift.

- Make repeatable plunge cuts for mortises and dados. The built in **Depth Stop** sets the maximum height the bit can protrude above the table.

WOOD® INNOV8 AWARD

Only The PowerLift...

DC motor action allows you to change the router bit above the table... in a matter of seconds.

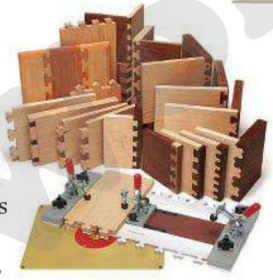
- Tap the footswitch to make incremental passes, achieving clean cuts without turning off the router.

- Make your table a mortising machine. A jig that controls the work piece up top, combined with raising the spinning bit via the footswitch yields perfect mortises.

PowerLift • #9450 ..... $389.95

See PowerLift™ & Table Combos at MLCSwoodworking.com

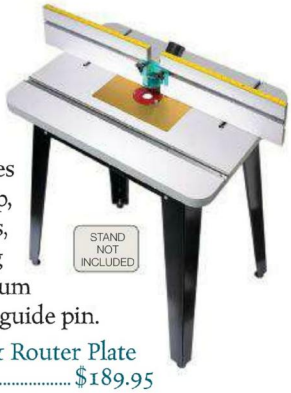
"Creative Joinery"



The Fast Joint System makes unique custom joints. Includes an aluminum jig, five clamps, two router bits, and bushings. The four template set includes heart, key, half-blind and thru dovetail joints. See additional 11 and 20 template sets at "**MLCSwoodworking.com**".

Four Template Set • #9411 ..... $169.95

"Top Table and Fence"

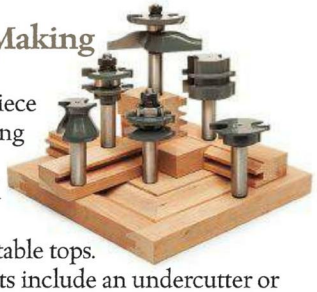


The customizable Router Table Top with Fence features a 24" x 32" tabletop, miter slot, T-tracks, high split 36" long fence, and Aluminum Router Plate with guide pin.

Tabletop, Fence & Router Plate #2393 ..... $189.95

PowerLift, Tabletop & Fence #2200 SAVE $40 ..... $519.95

"Cabinet Making Artistry"



Our "pro" 6 piece cabinet making router bit set creates raised panel doors, drawers and table tops. 1/2" shank bits include an undercutter or standard ogee raised panel, ogee rail & stile set, glue joint, drawer lock, and door lip. A wood storage box is included.

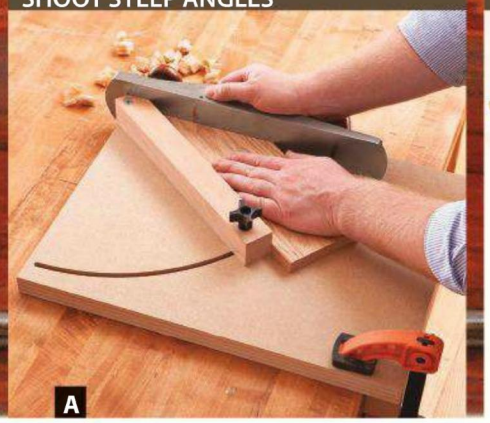
Undercutter Set • #8389 ..... $119.95
Standard Set • #8387 ..... $114.95

1-800-533-9298
PROFESSIONAL ROUTER BITS & WOODWORKING PRODUCTS

MLCS

FREE SHIPPING!
IN CONTIGUOUS USA • P.O. BOX 165 DK, HV, PA, 19006 ©2012

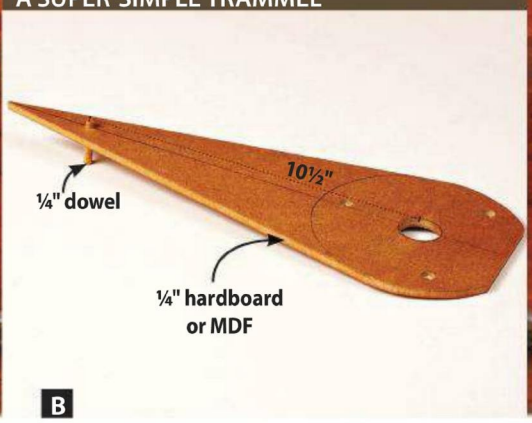
SHOOT STEEP ANGLES



A

Pivot the fence on this shooting board to trim the ends of boards to any angle between 5° and 90°—far exceeding the range of your mitersaw.

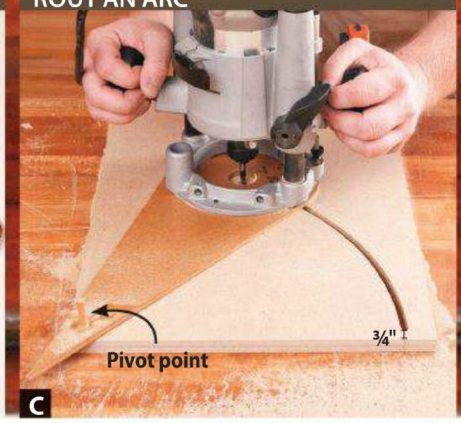
A SUPER-SIMPLE TRAMMEL



B

Your trammel may vary in design or appearance depending on your router's base. But the center of the router bit must be 10½" from the center of the pivot.

ROUT AN ARC



C

Use a ¼" straight bit and plunge router to rout a sweeping slot that stops ¾" from both edges of the board's top.

First, build the board

Start by cutting the base and top from ½"-thick medium-density fiberboard (MDF) [**Drawing 1**]. Clamp the two parts together with the ends and one long edge flush, then drill a ¼" hole through both parts where shown. Separate the top and base.

Make the router trammel shown in **Photo B**. Insert the trammel's ¼" dowel into the top's ¼" hole, then rout a ¼" slot in the top, ⅜" deep [**Photo C**]. ***Note:** The stability and affordability of MDF and hardboard make them excellent choices for router subbases.*

Flip the top over, switch to a ½" straight bit, and use the trammel to rout a ½" slot ⅛" deep over the ¼" slot [**Drawing 2**]. This makes room for the head of the carriage bolt. Drill a ¾" hole through the base corresponding with the end of the arc in the top [**Drawing 1**]. Glue the top and base together with the ½" radiused slot sandwiched between them.

Pivotal step: Add the fence

Next, cut a 12"-long fence from 1½×1½" hardwood and clamp it along the edge of the top over the ¼" hole. Use the hole in the base/top as a guide while you drill a ¼" hole through the fence [**Drawing 2**]. Counterbore a 7/16"-diameter hole in the bottom of the base for a ¼" lock nut. Epoxy the nut in place, then install the fence using a ¼" machine screw. Drive the screw snugly, but not so tightly that the fence cannot be adjusted.

Swing the fence over the ¾" hole, mark the center of the ¼"-wide slot on the bottom of the fence, then remove the fence and drill a ¼" hole on the mark. Reinstall the fence, then insert a ¼×2½" carriage bolt through the slot and fence and top it with a four-arm knob to complete the locking assembly. To hold the shooting board steady against your workbench when in use, add a cleat along the bottom front edge of the board, where shown.

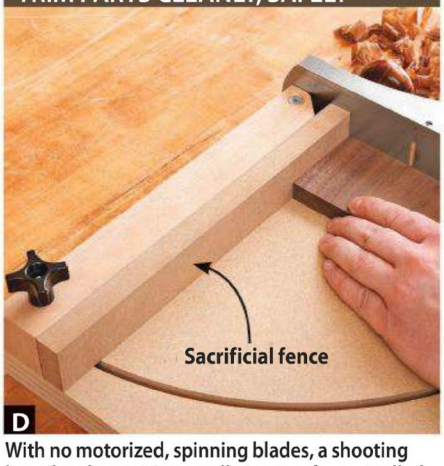
Ready, set, shoot

After cutting the workpiece to the correct length and angle, use an inexpensive drafting triangle to set the fence precisely; they're great for 30°, 45°, and 60° angles.

Place your workpiece on the board against the fence with the fresh-cut end just overhanging the edge of the board. After adjusting the blade of your plane to take a shallow cut, run it on its side with the blade against the board—making repeated passes until you see the smoother planed surface along the entire edge of your workpiece.

You may find that, because the shooting board's fence adjusts to match almost any angle, the end of the fence nearest your planing surface becomes rounded over time. This can lead to blowout when the fence rests at 90°. Cut a sacrificial fence and attach it with double-faced tape [**Photo D**]. The fence can be replaced easily by removing the four-arm knob and machine screw.

TRIM PARTS CLEANLY, SAFELY



D

With no motorized, spinning blades, a shooting board makes cutting small pieces safe, controlled, and precise.

Pick a plane

A miter plane works best with a shooting board, but these specialized tools cost $300 or more. If that's too rich for your blood, use a low-angle (37° to 42°) jack plane instead. Their long bodies have more mass, so they stay square and track well down a shooting board. But any plane with high sides and a sharp, low-angle blade should work satisfactorily.

More Resources

RELATED ARTICLES

- For a hand plane plan, go to: woodmagazine.com/handplane $
- Learn why you need a low-angle block plane: woodmagazine.com/lowangle

$ - Download this plan for a small fee

FREE VIDEO

- Watch a video on sharpening blades at: woodmagazine.com/sharpeningvid

Make Money In Metal Art

The PlasmaCAM machine makes it easy for you to cut intricate metal shapes that really enhance your wood projects. Call today for your FREE demo video to see what you can do with this amazing machine!

"We used to cut everything by hand and had a lot of trouble. Now our PlasmaCAM does it all, attaining levels of production not thought possible before. It's run 40-50 hours a week for the past three years. It attains incredible detail, is very easy and cost efficient to operate, and requires little maintenance. The bottom line is: ***this machine makes me money!"***

-Jon, Restaurant Lighting & Fixtures

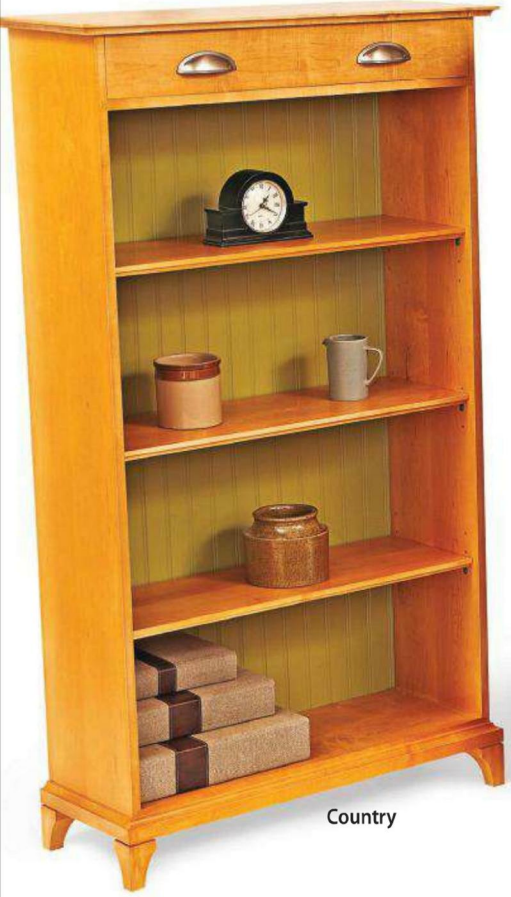
Ask about our exclusive Art Discs with ready-to-cut artwork!

(719) 676-2700 • www.plasmacam.com
PO Box 19818 • Colorado City, CO 81019

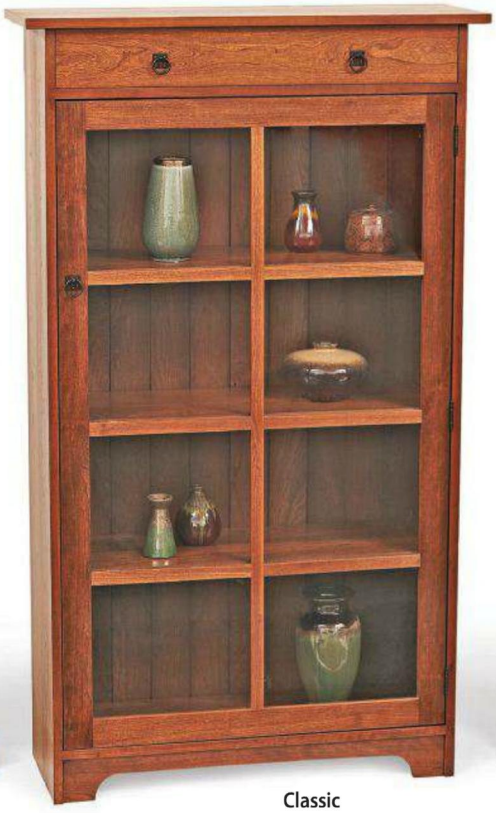
PlasmaCAM Inc.

Have-it-your-way Bookcases

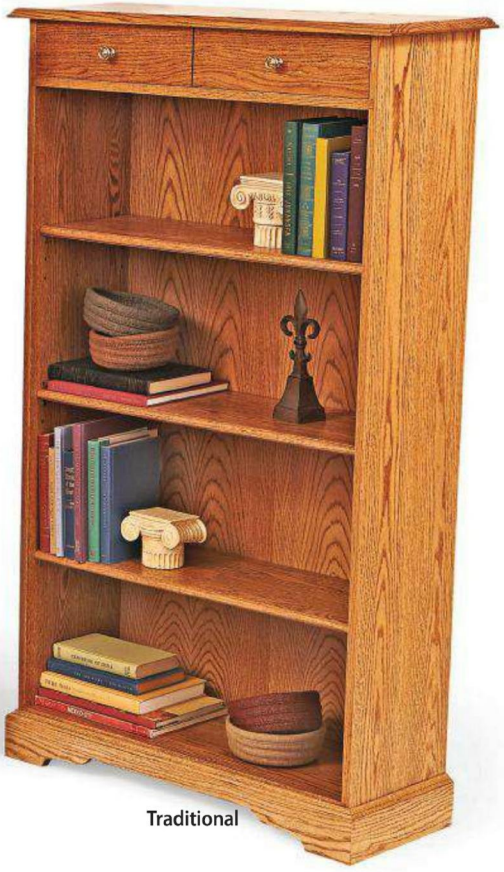
Build a basic box, then choose from a variety of options to make the bookcase you want.



Country



Classic



Traditional

Project Highlights

- **Approximate materials cost:** Classic–$240, Country–$175, Traditional–$150
- **Dimensions:** 35"W x 60"H x 13"D (Classic and Traditional versions)
  35"W x 61¼"H x 13"D (Country version)

Though distinctly different, these three bookcases share a common carcase. The classic cherry version includes a door; the maple country bookcase rests on feet; and the oak traditional version has a profiled base and a plywood back instead of slats.

Craft a carcase

Note: *These instructions focus on building the classic bookcase.* **Bold green** *headings indicate instructions specific to one of the bookcase styles. Refer to the* **Materials Lists** *for each style on* pages 35 and 36, *and* **Drawing 7** *for the country bookcase and* **Drawing 8** *for the traditional bookcase.*

If you'd like to learn a new skill, try using sliding-dovetail joinery, as we did on the oak version. Read about routing this joint on page 16.

1 Glue up panels for the sides (A) and fixed shelves (B) [**Drawing 1**], but do not plane the shelves to finished thickness yet. Cut the sides and fixed shelves to the sizes shown in the **Materials List** after the glue dries.

Country: Cut the side panels 56¼" long instead.

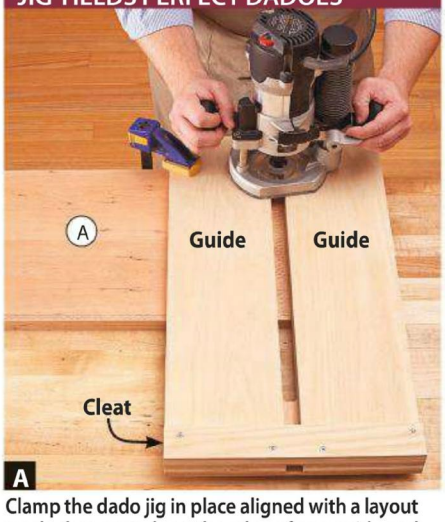
For all versions, rout ⅜" rabbets ⅜" deep along the rear inside edges of the sides (A).

2 Construct the dado jig shown in **Drawing 2**. Both the dado joints and sliding dovetail joints use the same jig.

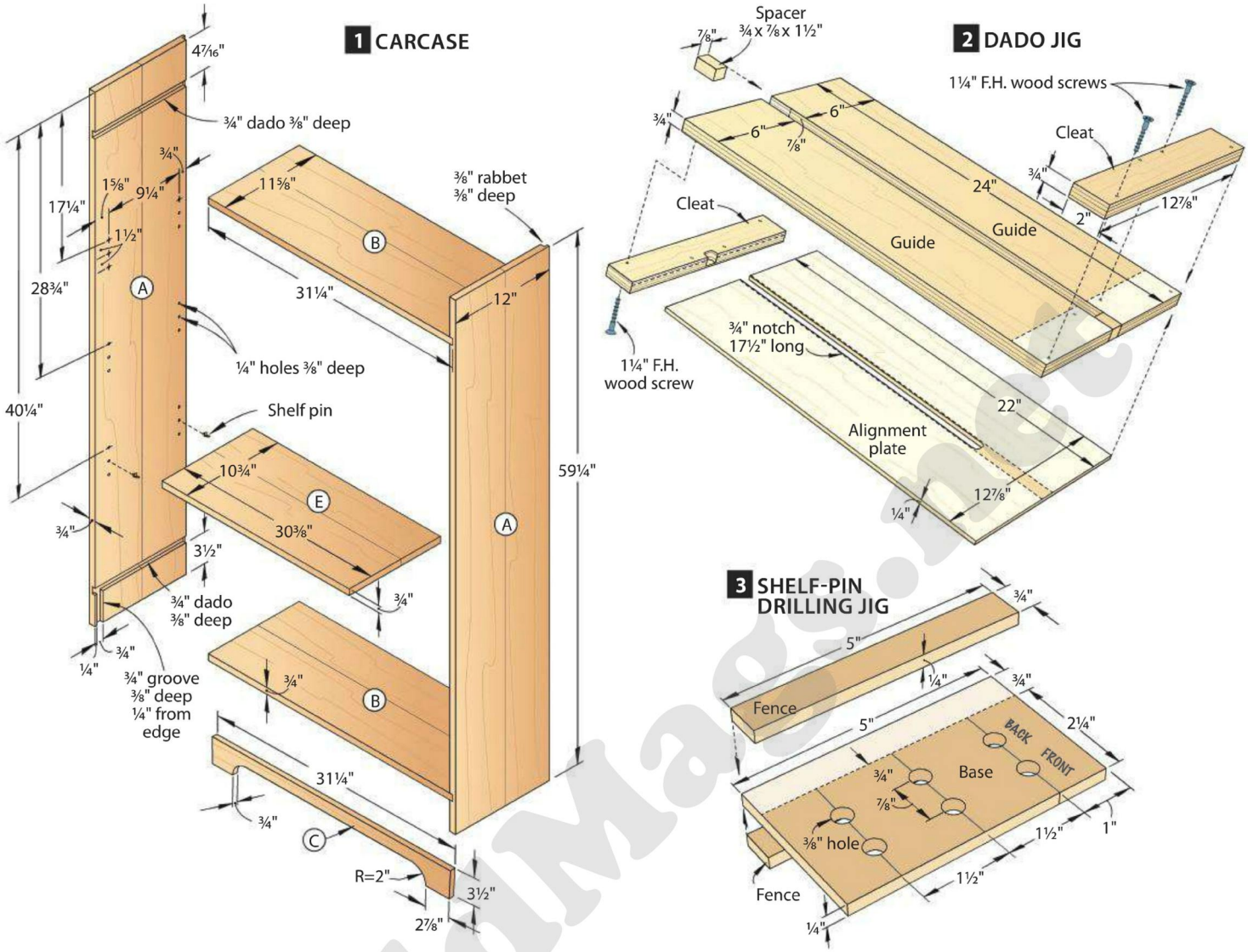
Note: *If you choose sliding dovetails, see* page 16 *for details about making the joint, then skip to* **Step 3** *to continue with the* **Classic** *bookcase. If you're building the* **Traditional** *or* **Country** *version, skip to* **Step 4** *after cutting the joinery.*

To cut the dado joint, mount a ⅝" guide bushing and ½" spiral downcut bit in your router. With the router sitting on

JIG YIELDS PERFECT DADOES



Clamp the dado jig in place aligned with a layout mark, then rout along the edge of one guide and back along the opposite guide.



the jig, set the bit for a ⅜"-deep cut. Lay out the locations of the fixed-shelf dadoes [**Drawing 1**], position the notch in the jig's alignment plate along a layout line, then rout the dadoes [**Photo A**].

3 **Classic only:** To rout the groove for the bottom rail (C), clamp the dado jig in position on a side (A), and place your router on the jig. Position the bit in the dado, butted against the shoulder nearest the end of the side [**Photo B**]. Double-faced-tape a stopblock against the router base to stop its travel at this point, then rout the groove.

With the router off, and the bit resting in the dado cut earlier, position a stopblock to halt the router's travel before it cuts across the full width of the dado.

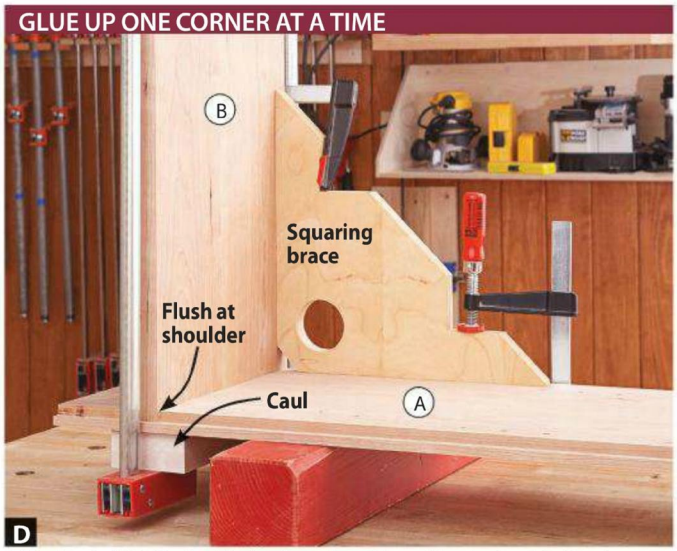
4 Draw lines across each side (A) to locate the top shelf-pin hole in each set of three [**Drawing 1**]. Make a shelf-pin drilling jig [**Drawing 3**] and transfer a line through the centers of the top holes and around the edge of the jig. Use this line to align the jig before drilling the ⅜"-deep holes [**Photo C**]. Flip the jig face-for-face to drill the rear sets of holes.

5 Plane the fixed shelves (B) to fit snugly in the dadoes in the sides (A), then sand the shelves and the inside faces of the sides to 220 grit. With a squaring brace (see **More Resources** to get a free plan) helping to position the parts, glue a fixed shelf to a side [**Photo D**]. After the glue dries, add the second fixed shelf, then glue the remaining side to this assembly. Carefully check the carcase for square.

Country and **Traditional:** Skip to **Step 7**.

6 **Classic only:** Cut the bottom rail (C) to size [**Drawing 1**]. Lay out and bandsaw the profile and finish-sand the

The holes in the jig fit a ¼" self-centering bit. Press the fence against the edge of the side (A) and align the mark on the edge of the jig with the layout line.



With the shelf (B) flush with the shoulder of the rabbet in the side (A), clamp a thick caul across the panels to distribute clamping pressure.

rail to 220 grit. Glue it in place below the bottom fixed shelf (B).

7 Finish-sand the outside faces and edges of the sides (A), easing the sharp corners, and stain the assembly, if desired. (We wiped on General Finishes Antique Cherry oil-based stain.)

Country: Zar Honey Maple no. 117 topped with amber shellac.

Traditional: Varathane Golden Oak.

Add a top, shelves, and a back

1 Glue up panels for the top (D) and three shelves (E) and cut them to size [**Drawings 1** and **4**].

Country: Rout a ½" cove on the bottom side and front edges of the top (D). Rout ⅜" coves along the bottom front edges of the shelves.

Traditional: Rout a ¼" cove-and-bead profile (we used Freud bit no. 38-314) around the top side and front edges of the top (D). Rout a ⅜" round-over with a 1/16" shoulder on the top and bottom front edges of the shelves.

2 Screw two figure-8 fasteners to the top of each side (A) 2¼" from each edge [**Drawing 4**] and position them perpendicular to the outside face of the side. Place the top (D) on the carcase (A–C) flush at the back and centered side-to-side. Transfer the figure-8 fastener locations to the bottom face of the top [**Photos E, F**]. With Forstner bits, drill ⅝" and 13/16" counterbores in the top to accept the fasteners [**Drawing 4b**].

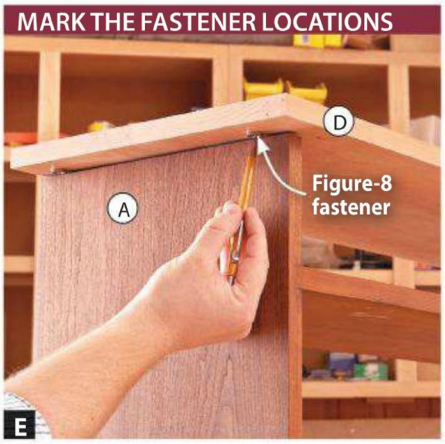
3 **Classic:** Rip and crosscut the back slats (F) to size [**Drawing 4**]. Set up a ½" dado blade in your tablesaw, and attach an auxiliary face to the rip fence. Position the fence and set the blade to cut a ⅜" rabbet 3/16" deep. Test your setup on scrap before cutting the rabbets on the back slats [**Drawing 4a**]. Rip one slat to 2⅞" wide, then finish-sand the back slats to 220 grit.

Country and **Traditional:** Cut a plywood or beaded hardboard back panel to fit between the top (D) and the bottom of the bottom fixed shelf (B).

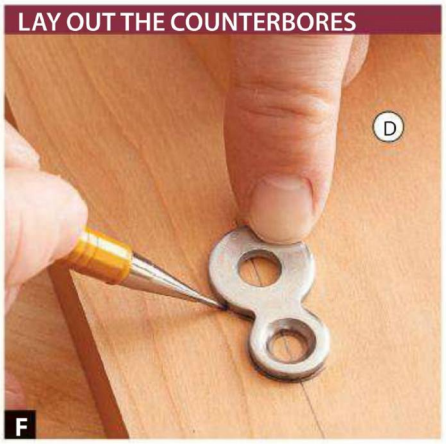
4 Stain the top (D), shelves (E), and back slats (F) or back to match the carcase (A–C). (We painted the **Country** bookcase back with Sherwin-Williams 6424 Tansy Green latex paint.) After the stain dries, attach the top using figure-8 fasteners. Set the shelves aside for now.

Classic: Screw the 2⅞"-wide slat in place driving the screws near the edge with the rabbet [**Drawing 4a**]. Slide the next slat in place so the rabbets interlock, then place a ⅛" spacer between the rabbet shoulders and screw the second slat in place [**Photo G**]. Repeat the process to install the remaining slats, ripping the last slat to width if needed.

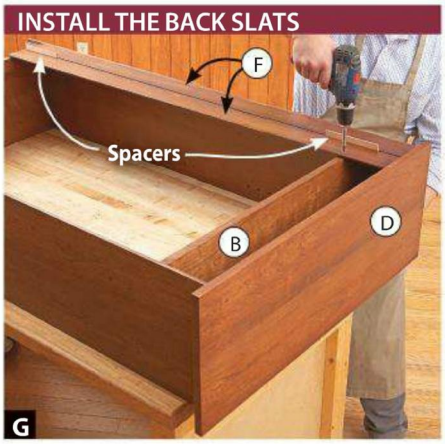
Country and **Traditional:** Install the back panel, driving three screws into each fixed shelf (B).



With the top (D) centered side-to-side and flush at the back, trace the exposed hole in each figure-8 fastener onto the top.

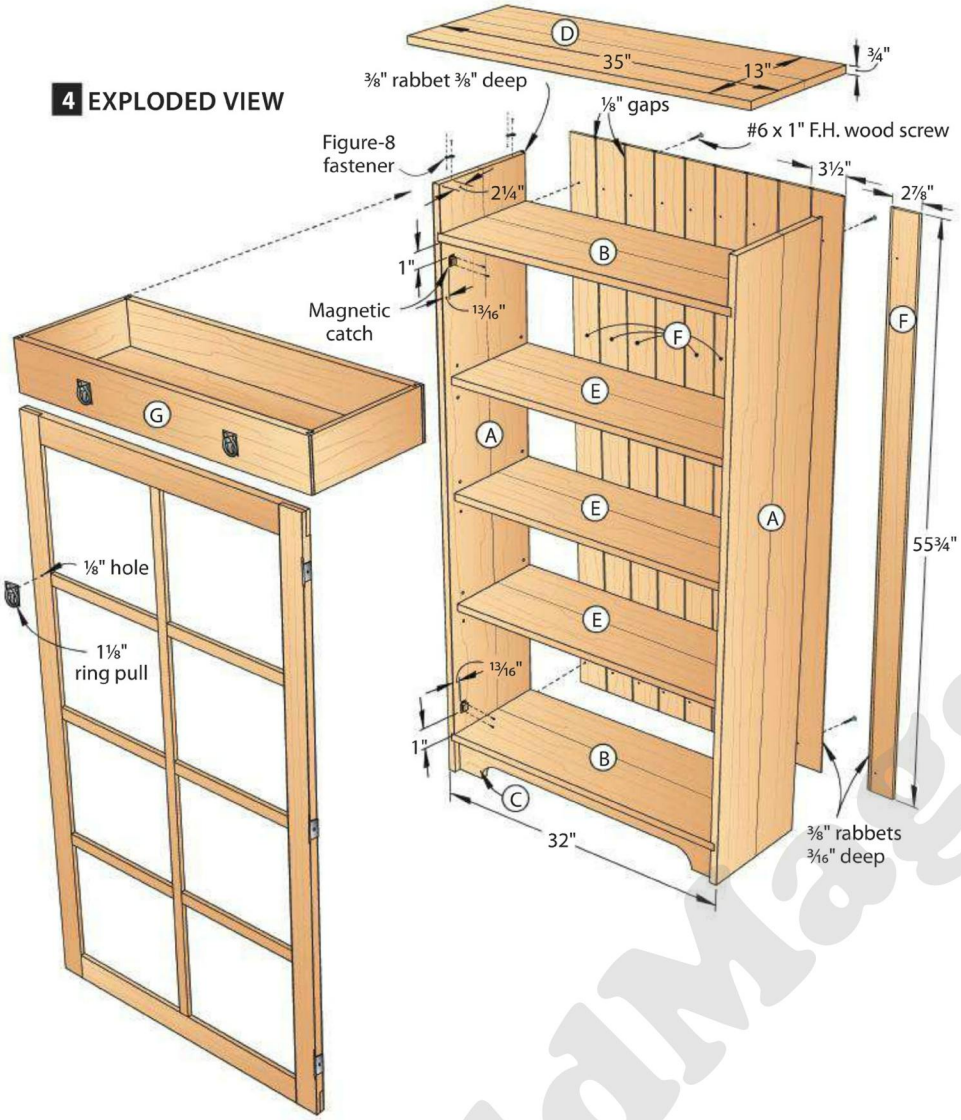


Extend a centered line through each hole location perpendicular to the end. Position a figure-8 fastener and trace around it.



Slide the rabbet in each slat (F) under the rabbet of the previous slat, then screw the second slat in place. Work your way across the bookcase.

4 EXPLODED VIEW



4a SLATTED BACK (Top view)

Build a drawer (and a door, if you like)

1 Measure the width and height of the drawer opening in the carcase (A–F). Rip the drawer front and back (G) and sides (H) 1⁄16" narrower than the opening's height. Crosscut the front and back ⅛" shorter than the opening's width [**Drawing 5**].

Traditional: Cut a ⅛" kerf ¼" deep centered on the drawer front's length.

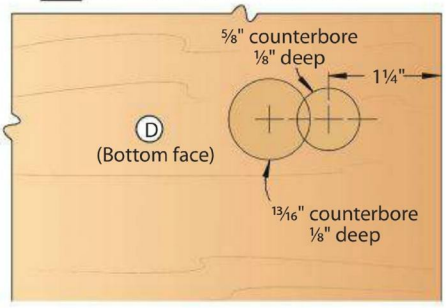
2 With a ¼" dado blade in your tablesaw, cut the dadoes in each drawer side (H) [**Drawing 5a**], and the groove in each piece (G, H) to accept the drawer bottom (I) [**Drawing 5**]. Next, raise the blade to match the thickness of a drawer side, and cut the groove in each end of the drawer front and back (G). Lower the blade slightly and trim away the inside ends of the front and back.

3 Dry-fit the drawer and check its fit into the carcase. Cut the drawer bottom (I) to size [**Drawing 5**] and glue up the drawer.

Country and **Traditional:** Skip to **Step 8**.

4 Cut the door stiles (J) and rails (K) to size [**Drawing 6**]. Set up a ¾" dado blade and auxiliary rip fence on your tablesaw and cut a ⅜" rabbet on the inside edge of each piece [**Drawing 6a**].

4b TOP MOUNTING DETAIL

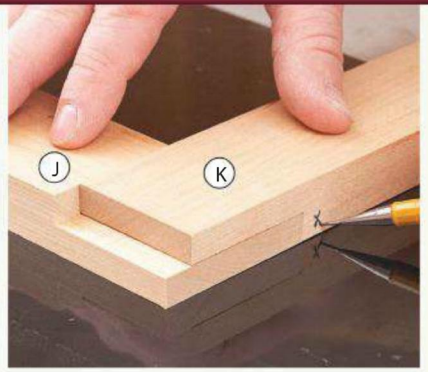


SHOP TIP

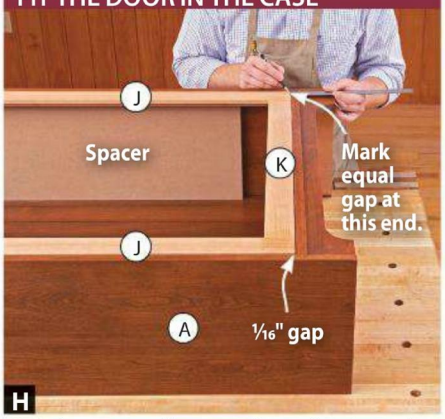
Take the confusion out of rabbeted half-laps

Typically, when cutting a half-lap joint in equal-width pieces, you cut both halves of the joint with one blade and fence setting. However, rabbeting the stiles (J) and rails (K) to accept glass changes things. When cutting away the front face of the rails *right*, you also remove the rabbet, which dictates a narrower half-lap on the stile [**Drawing 6a**]. It's easy to get confused, so follow these foolproof steps to cut this asymmetrical joint.

Start with the rip fence at the setting for the narrower half of the joint, 1⅞" in this case (the 2¼" width of the rails and stiles minus the ⅜" width of the rabbet). Cut a half-lap in both parts at this setting, then dry-fit the joint, *far right*. It will be obvious which piece needs more stock removed. Mark it, reset the rip fence, and complete cutting the joint on the marked pieces.

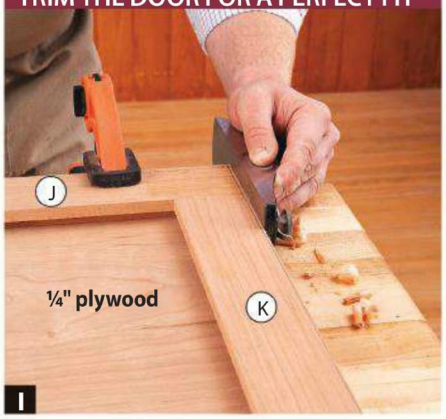


FIT THE DOOR IN THE CASE



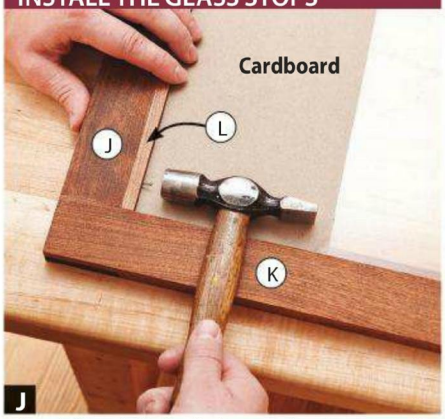
Mark the amount, if any, needing to be trimmed from each corner of the door and connect the marks with a straight line.

TRIM THE DOOR FOR A PERFECT FIT



To plane the full thickness of the edge, clamp the door on ¼" plywood. Avoid tear-out on the stiles (J) by planing toward the rails (K).

INSTALL THE GLASS STOPS



After drilling 1/16" pilot holes, put the glass stops (L, M) in place, protect the glass with thin cardboard, and drive the brads with a tack hammer.

5 Cut the half-lap joinery [**Drawing 6a**] as shown in the **Shop Tip** on *page 33*.

***Quick Tip!** Set up your tablesaw carefully, and a half-lap joint squares itself during assembly. Set your miter gauge exactly 90° to the blade, and check that the rip fence clamps parallel to the blade.*

Glue the stiles (J) and rails (K) together, clamping each joint, and check the door for square.

6 To achieve an even 1/16" gap around the door, lay the carcase (A–F) on its back. From ¾" MDF or plywood, cut two spacers to place inside the carcase and support the door flush with the front edge of the sides (A) [**Photo H**]. Position the door in the case, creating gaps as uniform as possible. Mark tight spots, then plane and/or sand them to create even gaps [**Photo I**]. Save the spacers for use later when mounting the door.

7 Cut the glass stops (L, M) and muntins (N, O) to size [**Drawing 6**]. To capture squeeze-out, cut ⅛" grooves in the rear face of each muntin [**Drawing 6b**]. Set these pieces aside.

8 Stain the drawer (G/H/I) and, if you built them, the door (J/K), glass stops (L, M), and muntins (N, O), then apply a topcoat to these pieces and the carcase (A–F). (We used a satin-finish water-based polyurethane.)

Classic: Skip to **Mount the door**.

9 Attach the pulls to the drawer [**Drawing 7** or **8**]. Insert shelf pins where desired and put the shelves (E) in place. Slide the drawer into the carcase.

Country: Skip to **Build the country base.**

Traditional: Skip to **Wrap up a traditional base**.

Mount the door

1 Cut, or have cut, a piece of ⅛" glass to fit in the door. With the door face-down and the glass in place, position the vertical glass stops (L) on the glass. Mark and drill 1/16" pilot holes, then secure the stops with #17×¾" brads [**Photo J**]. Install the horizontal glass stops (M) the same way.

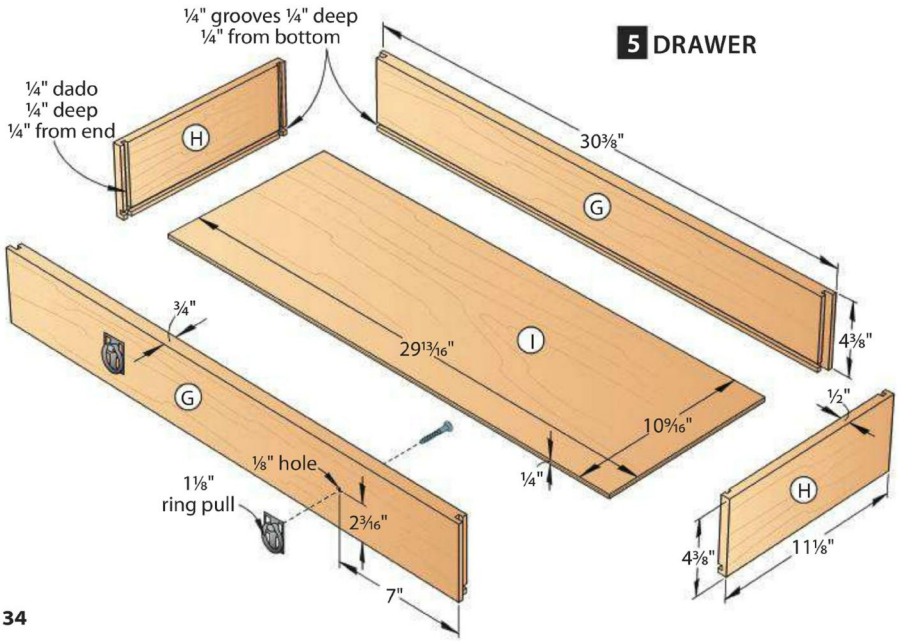
***Quick Tip!** You could hold the glass in place with a bead of silicone around the edges, but for glass this size, we prefer the holding power of nailed-in glass stops.*

2 Place the door on risers, outside face up, and dry-fit the muntins (N, O) [**Drawing 6**]. To keep the muntins in place during clamping, cut 12 spacers 10½×¼" to fit between between the top rail (K) and the horizontal muntins [**Photo K**], and four spacers ¼" thick to fit between the bottom muntins and the door rail. Apply a light bead of clear silicone sealant between the grooves on the rear face of each muntin and gently clamp the muntins in place. Allow the sealant to cure for 1 hour before removing the clamps.

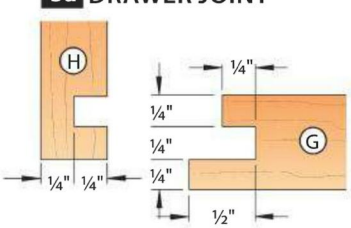
3 Screw the hinges to the door at the locations shown in **Drawing 6**. Rest the carcase (A–F) on its back, retrieve the spacers used earlier, and rest the door (J–O) on them. Transfer the hinge locations to the sides (A) [**Photo L**], then have a helper hold the door in position while you screw the hinges to the sides. Remove the tape, stand the bookcase upright, and test the door swing.

4 Attach the ring pulls to the drawer and door [**Drawings 5, 6**]. Install the door catches where shown [**Drawing 4**], and the Classic Bookcase is complete.

5 DRAWER



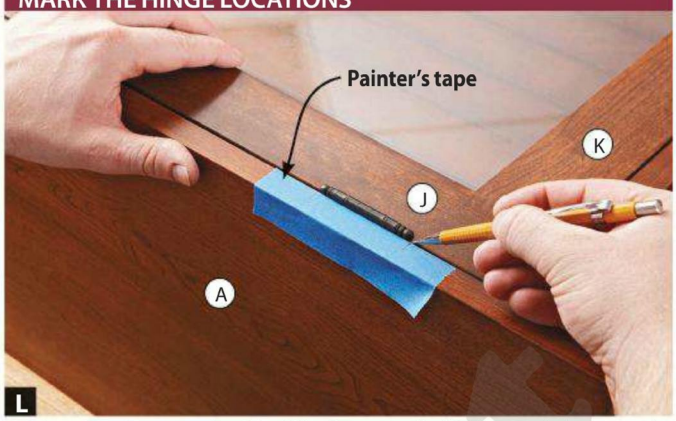
5a DRAWER JOINT



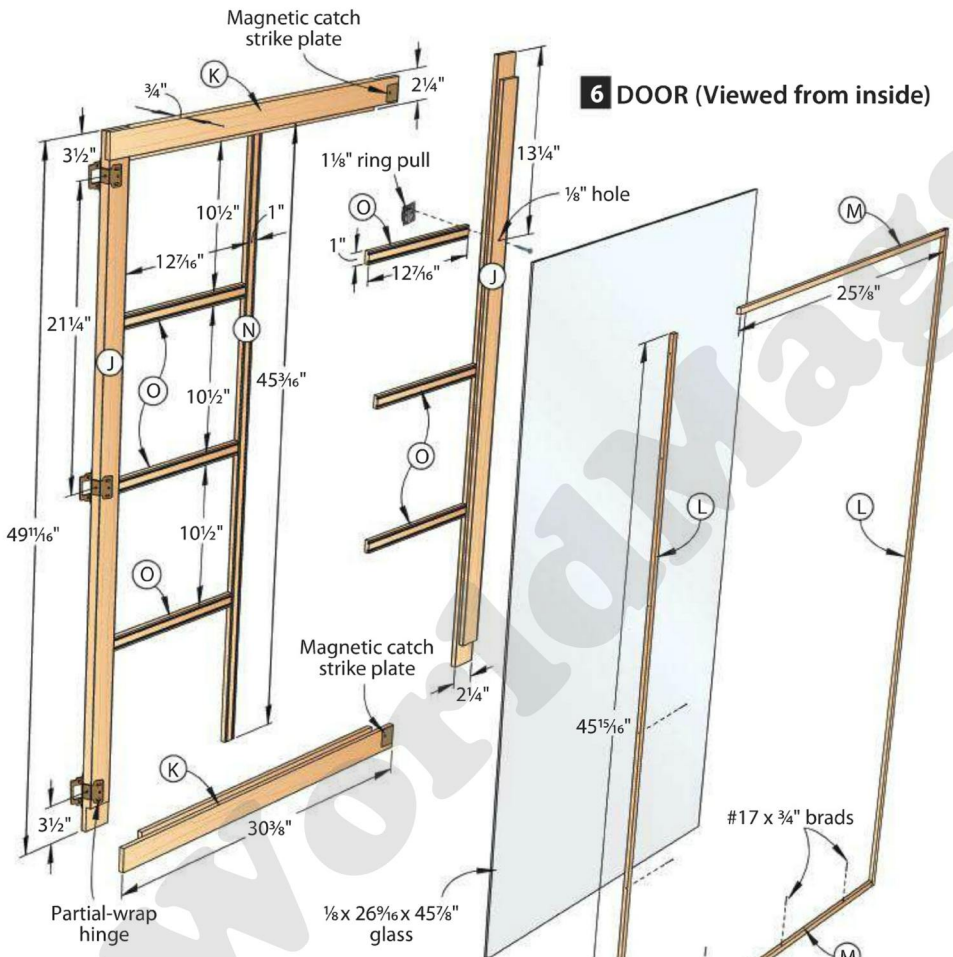
MUNTINS GIVE DOORS CHARACTER

Cauls spread the clamping force across the muntins (N, O). Apply just enough pressure to seat the muntins against the glass.

MARK THE HINGE LOCATIONS

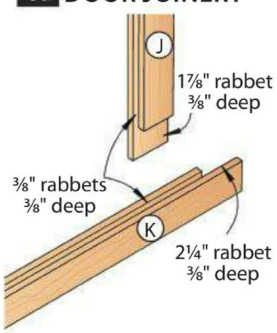


Apply painter's tape to the sides (A) adjacent to the hinges. Mark the top and bottom of the hinge barrels on the tape.

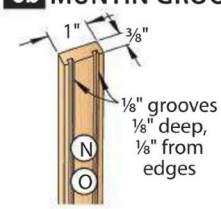


6 DOOR (Viewed from inside)

6a DOOR JOINERY



6b MUNTIN GROOVES



Materials List
Classic Bookcase

Part		FINISHED SIZE T	W	L	Matl.	Qty.
Carcase						
A	sides	¾"	12"	59¼"	EC	2
B*	fixed shelves	¾"	11⅝"	31¼"	EC	2
C	bottom rail	¾"	3½"	31¼"	C	1
D	top	¾"	13"	35"	EC	1
E	shelves	¾"	10¾"	30⅜"	EC	3
F	back slats	⅜"	3½"	55¾"	C	10
Drawer						
G	front/back	¾"	4⅜"	30⅜"	C	2
H	sides	½"	4⅜"	11⅛"	C	2
I	bottom	¼"	10⁹⁄₁₆"	29¹³⁄₁₆"	CP	1
Door						
J	stiles	¾"	2¼"	49¹¹⁄₁₆"	C	2
K	rails	¾"	2¼"	30⅜"	C	2
L	vertical glass stops	¼"	⅜"	45¹⁵⁄₁₆"	C	2
M	horizontal glass stops	¼"	⅜"	25⅞"	C	2
N	vertical muntin	⅜"	1"	45³⁄₁₆"	C	1
O	horizontal muntins	⅜"	1"	12⁷⁄₁₆"	C	6

*Parts initially cut oversize. See the instructions.

Materials key: EC–edge-glued cherry, C–cherry, CP–cherry plywood.
Supplies: ⅛ × 26⁹⁄₁₆ × 45⅞" glass, #17 × ¾" brads, ¼" shelf pins (12), figure-8 fasteners (4), magnetic door catches (2), #6 × 1" flathead wood screws (20), clear silicone sealant.
Blade and bits: Dado blade; ¼" self-centering, 1⁄16", ⅛" drill bits; ⅝", 13⁄16" Forstner bits; ½" spiral downcut router bit.

Source

Hinges and pulls: Partial-wrap hinges (3) no. 01H31.92, $4.20; 1⅛" ring pulls (3) no. 01A28.44, $2.80, Lee Valley, 800-871-8158, leevalley.com.

Build the country base

1 Cut a filler (P) to size [**Materials List**]. Glue it between the sides (A) below the bottom fixed shelf (B) [**Drawing 7**].

2 Cut the side cleats (Q) and front cleat (R) 2" longer than listed [**Materials List**]. Miter-cut the ends of the front cleat so its length matches the distance between the outside faces of the sides (A). Then miter the front ends of the side cleats so their length matches the width of the sides.

3 Cut the side trim (S) and front trim (T) 2" longer than listed and rout ½" coves along their top edges.

Quick Tip! Cut the trim pieces from one long board for best color and grain match.

Miter-cut the trim pieces to fit around the bookcase. Glue the cleats inside the trim flush at the bottom.

4 Make a blank for the feet (U) by laminating three layers of ¾×2½×16" stock. Rip the blank to 2¼" square and crosscut four 3½"-long feet from it [**Drawing 7**]. At the tablesaw, cut ⅛" rabbets around the top end of each foot.

5 Spray-adhere a copy of the **Foot Pattern** from the *WOOD Patterns®* insert to a piece of ¼" plywood or hardboard, and bandsaw and sand it to shape. Use this template to transfer the curve to two adjacent sides of each foot (U). Bandsaw and sand the feet to shape, then screw them to the cleats (Q, R) [**Drawing 7**]. Glue and screw the base assembly to the bottom of the bookcase.

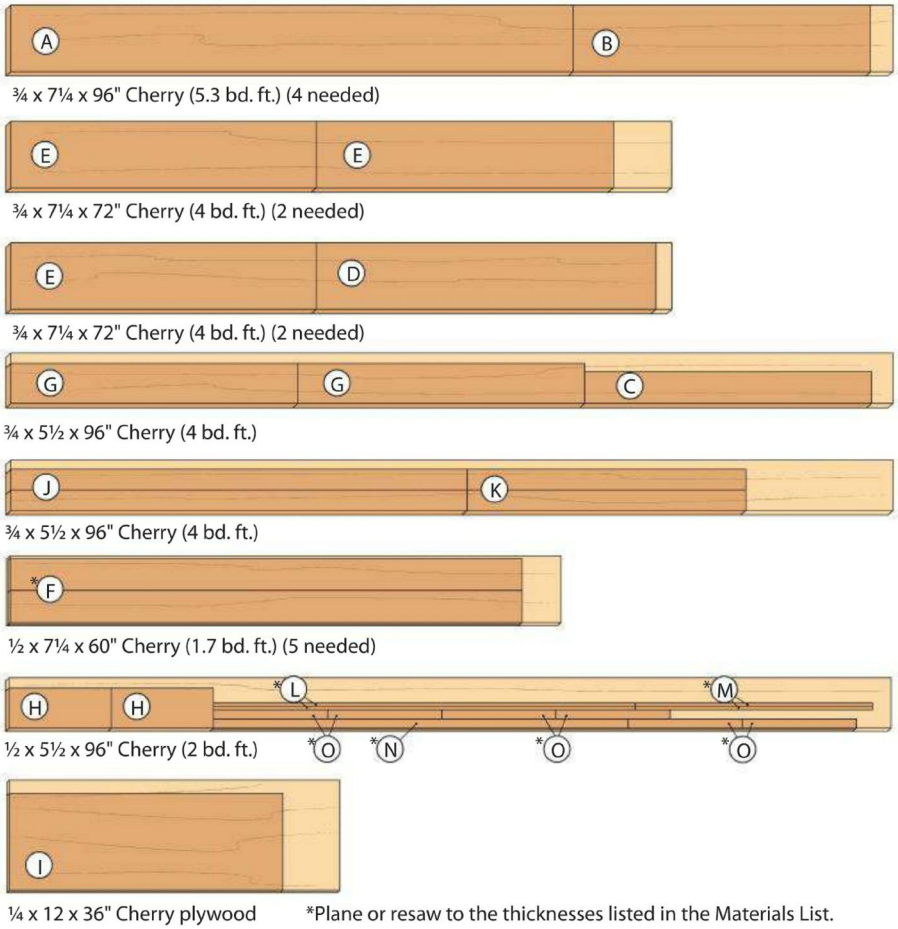
Wrap up a traditional base

1 Cut the trim pieces (P, Q) 2" longer than listed [**Materials List**], and rout the cove-and-bead profile along the top edges [**Drawing 8**]. Miter-cut the pieces to fit around the bookcase. Photocopy the **Front Trim Pattern** from the *WOOD Patterns* insert and trace it onto each end of the front trim. Bandsaw and sand the profile to shape.

2 Drill two holes and two slots in each side (A) where shown in **Drawing 8.** Glue the front trim (P) in place, using the side trim (Q) to help position it, then secure the side trim with screws.

Produced by **Craig Ruegsegger** with **John Olson**
Project design: **Kevin Boyle**
Illustrations: **Lorna Johnson**

Cutting Diagram



*Plane or resaw to the thicknesses listed in the Materials List.

Materials List Country Bookcase

Part		FINISHED SIZE T	W	L	Matl.	Qty.
Carcase						
A	sides	¾"	12"	56¼"	EM	2
B*	fixed shelves	¾"	11⅝"	31¼"	EM	2
C		*not needed*				
D	top	¾"	13"	35"	EM	1
E	shelves	¾"	10¾"	30⅜"	EM	3
F	back	¼"	31¼"	55¾"	H	1
Drawer						
G	front/back	¾"	4⅜"	30⅜"	M	2
H	sides	½"	4⅜"	11⅛"	M	2
I	bottom	¼"	10⁹⁄₁₆"	29¹³⁄₁₆"	MP	1
Parts J–O not needed						
Base						
P	filler	½"	1½"	30½"	M	1
Q*	side cleats	¾"	1½"	12"	M	2
R*	front cleat	¾"	1½"	32"	M	1
S*	side trim	¾"	1⅝"	12¾"	M	2
T*	front trim	¾"	1⅝"	33½"	M	1
U*	feet	2¼"	2¼"	3½"	LM	4

*Parts initially cut oversize. See the instructions.
Yellow highlight indicates new or changed parts.

Materials key: EM–edge-glued maple, H–beaded hardboard, M–maple, MP–maple plywood, LM–laminated maple.
Supplies: ¼" shelf pins (12), figure-8 fasteners (4), #6×1" flathead wood screws (6), #8×1¼" flathead wood screws (8), #8×2" flathead wood screws (4).

Materials List Traditional Bookcase

Part		FINISHED SIZE T	W	L	Matl.	Qty.
Carcase						
A	sides	¾"	12"	59¼"	EO	2
B*	fixed shelves	¾"	11⅝"	31¼"	EO	2
C		*not needed*				
D	top	¾"	13"	35"	EO	1
E	shelves	¾"	10¾"	30⅜"	EO	3
F	back	¼"	31¼"	55¾"	OP	1
Drawer						
G	front/back	¾"	4⅜"	30⅜"	O	2
H	sides	½"	4⅜"	11⅛"	O	2
I	bottom	¼"	10⁹⁄₁₆"	29¹³⁄₁₆"	OP	1
Parts J–O not needed						
Base						
P*	front trim	¾"	3⅞"	33½"	O	1
Q*	side trim	¾"	3⅞"	12¾"	O	2

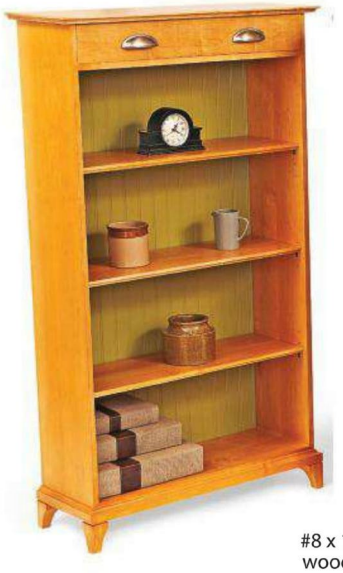
*Parts initially cut oversize. See the instructions.
Yellow highlight indicates new or changed parts.

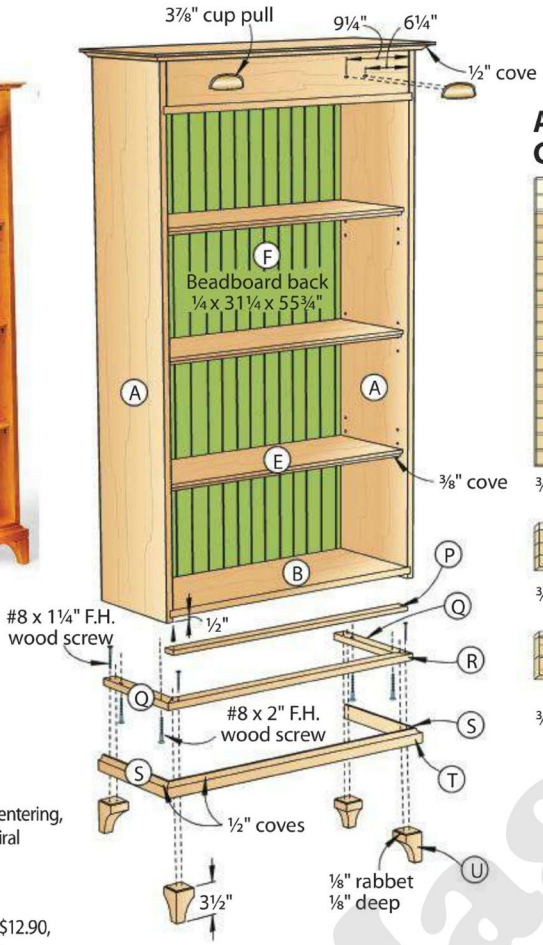
Materials key: EO–edge-glued oak, OP–oak plywood, O–oak
Supplies: ¼" shelf pins (12), figure-8 fasteners (4), #6×1" flathead wood screws (6), #8×1¼" flathead wood screws (8).
Blade and bits: Dado blade; ¼" self-centering, ⅛" drill bits; ⅝", ¹³⁄₁₆" Forstner bits; ¼" spiral downcut, 7° dovetail, ¼" cove-and-bead, ⅜" round-over router bits.

Source

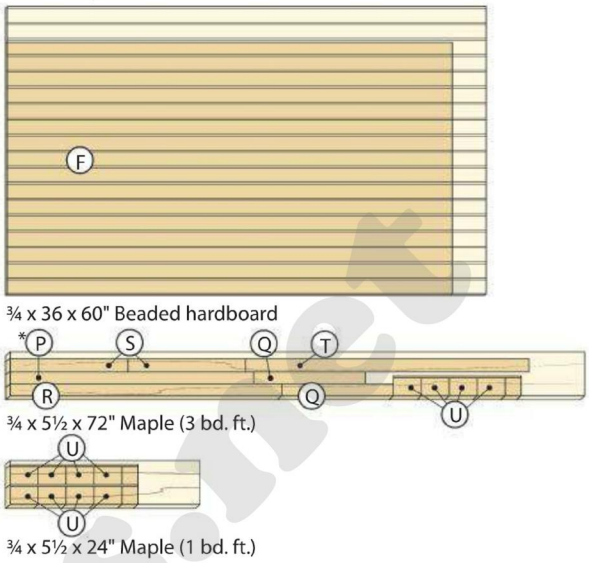
Knobs: 1⅛" brass knobs (2) no. 02W32.01, $5.10, Lee Valley, 800-871-8158, leevalley.com.

7 COUNTRY BOOKCASE





Additional materials for Country bookcase

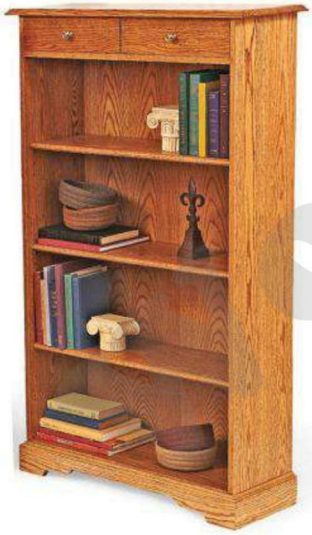


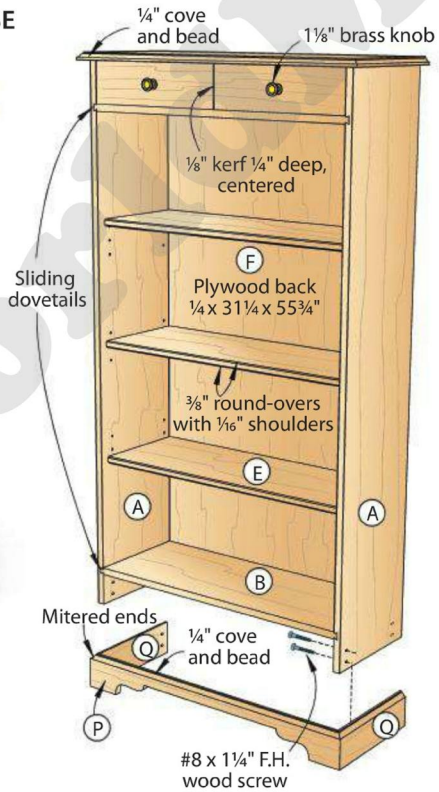
Blade and bits: Dado blade; ¼" self-centering, ⅛" drill bits; ⅝", 13⁄16" Forstner bits; ½" spiral downcut, ½" cove, ⅜" cove router bits.

Source

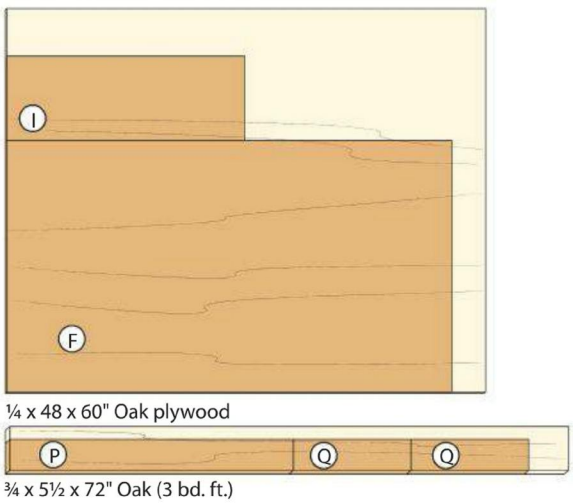
Pulls: 3⅞" cup pulls (2) no. 02W18.30, $12.90, Lee Valley, 800-871-8158, leevalley.com.

8 TRADITIONAL BOOKCASE





Additional materials for Traditional bookcase



More Resources

- Get a free squaring brace plan at woodmagazine.com/brace.
- Find more bookcase plans at woodmagazine.com/storage. $

$=Download each plan for a small fee.

Fold-Flat Sheet-Goods Mover

Handle heavy plywood, MDF, and particleboard with ease.

READER PROJECT

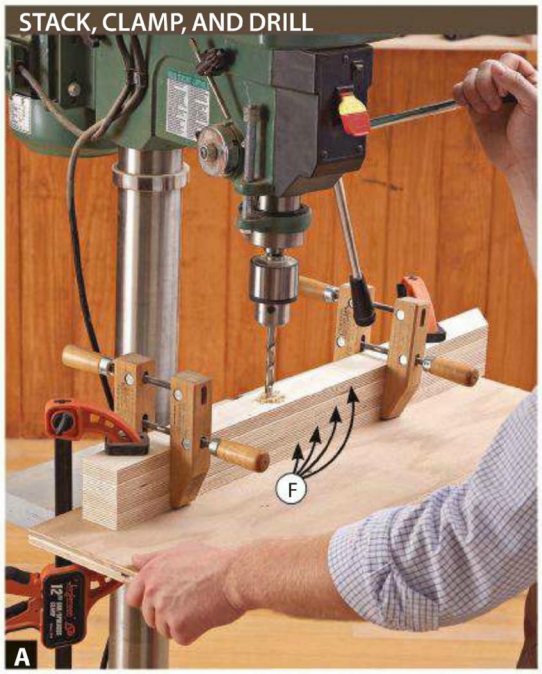
Gary Dean of Prince George, B.C., designed this ingenious shop helper.

Dimensions:
43"W × 32"D × 43"H (unfolded);
43"W × 4¼"D × 52½"H (folded)

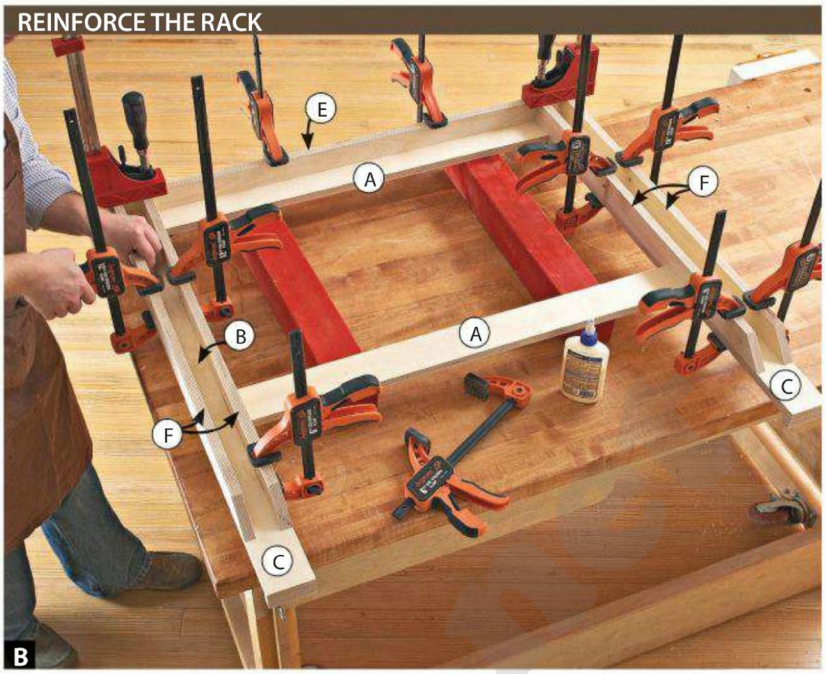
Made from just one sheet of ¾" Baltic birch plywood, a handful of hardware, and four locking swivel casters (an investment of about $65), this handy project makes transporting sheet goods around the shop a breeze. You simply tip the rack to vertical, rest a sheet upright on it, then roll the mover to your tablesaw or bench (photo *near right*). Next, tilt the rack horizontal and slide the sheet onto the worksurface, shown *above*. At the tablesaw, you may want to push the mover to one side of the saw and use it as an infeed support to help steady the sheet as you cut. With the job complete, fold the mover flat, *far right*, and store it against a wall or hang it out of the way.

SAVE YOUR BACK, THEN SAVE ON SPACE

Swivel casters at all four corners allow you to maneuver the mover easily. Lock them before you offload the sheet. Then collapse the mover for storage.



Stack the four stile supports (F) with their edges and ends flush, then drill a ⅜" hole through all four pieces at once.



After gluing on the rail support (E), glue and clamp each stile support (F) against the rail support and flush with the edges of the stiles (B, C).

First, hit the rack

1 Cut the rails (A), long stiles (B), short stiles (C), and cleats (D) to the sizes listed in the **Materials List** on *page 54*. Butt the long stiles between the rails, check the assembly for square, then glue and clamp them together [**Drawing 1**]. While this assembly dries, glue the cleats to the short stiles. Glue the short stiles to a rail [**Drawing 1**].

2 Cut the rail support (E) and stile supports (F) to size [**Drawing 1**]. Cut the miter on one end of each stile support. Stack the stile supports, mark the hole centerpoint, and drill a ⅜" hole through them [**Photo A**].

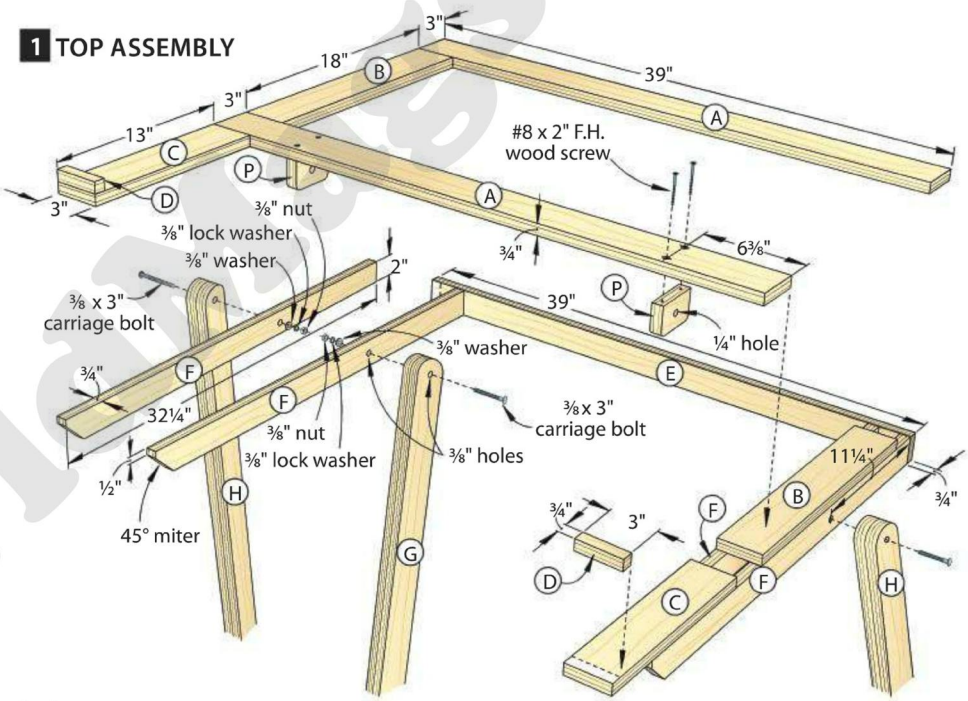
3 Place the rack frame (A–D) upside down on risers on your bench. Glue the rail support (E) to the bottom of the outside rail (A) flush with its outside edge. Then glue the stile supports (F) to the bottom of the stiles (B, C) [**Photo B, Drawing 1**].

Build a folding base

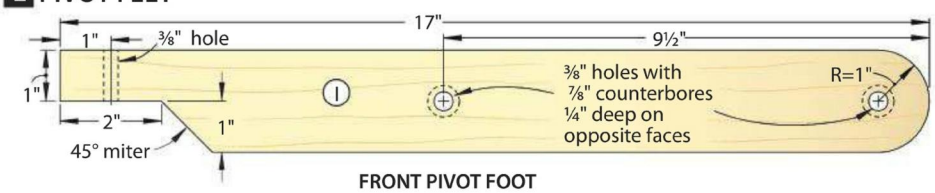
1 For the front legs (G), rear legs (H), front pivot feet (I), and rear pivot feet (J), cut two strips of ¾" plywood, 4½" wide and 1" longer than the listed lengths for each part [**Materials List**]. Laminate each matching pair of strips to make four 1½"-thick blanks. After the glue dries, rip and crosscut the parts to size.

2 With an awl, mark a point 1" from each end of each

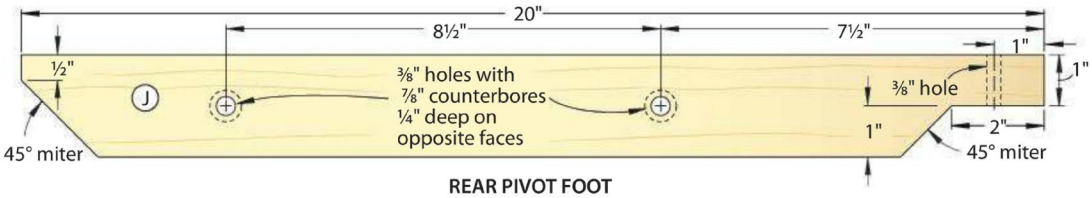
1 TOP ASSEMBLY



2 PIVOT FEET



FRONT PIVOT FOOT



REAR PIVOT FOOT

GIVE IT STURDY LEGS TO STAND ON

After tapping the bolt with a hammer to seat the shoulders into each leg, tighten the nut between the stile supports (F) just enough to allow the leg to pivot.

PUT SOME "PIVOT" IN THE PIVOT FEET

Bolt the the pivot feet (I, J) together to make a mirrored set, snugging the nuts just enough to allow the feet to pivot.

leg (G, H) and one end of each front pivot foot (I), centered on their widths [**Drawing 2**]. Using the points and a compass, lay out 1" radii on each leg and pivot foot, then bandsaw and sand them to shape.

Quick Tip! *Make identical curves in half the time by stacking the legs and feet in matching pairs and sanding the radii together.*

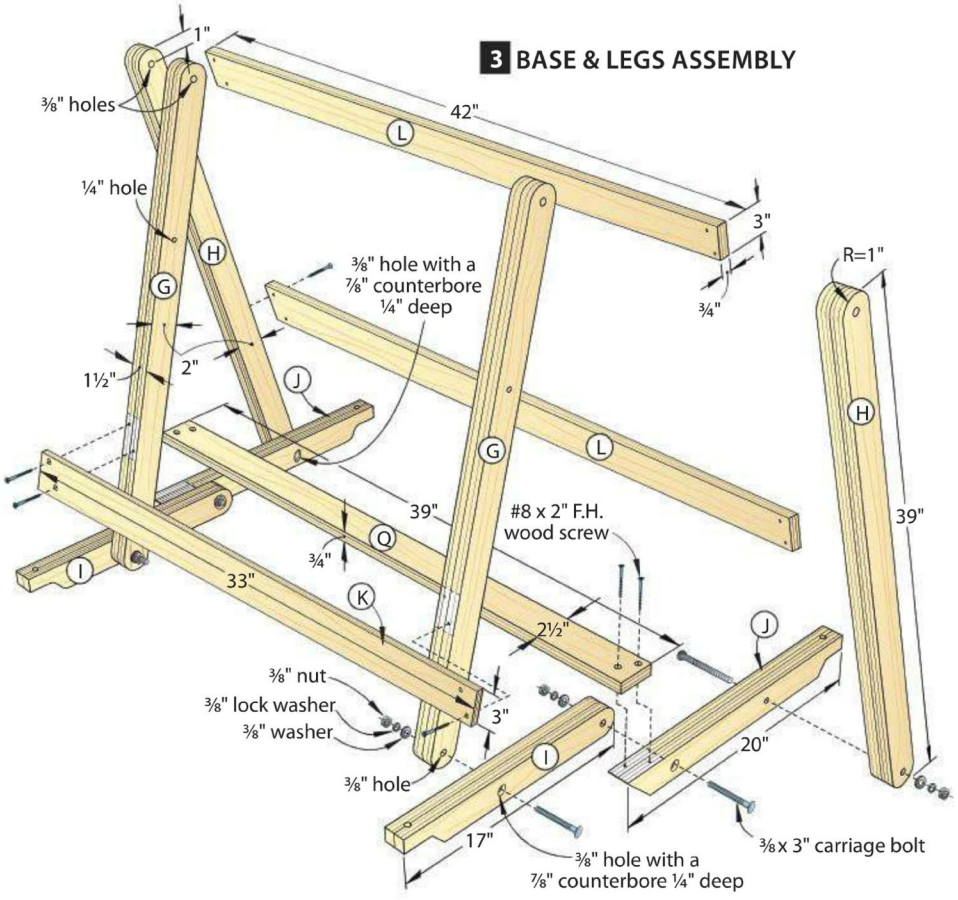
Drill ⅜" holes through each leg centered on the awl marks.

3 Insert a carriage bolt through each front and rear leg (G, H) and secure them to the stile supports (F) with ⅜" washers, lock washers, and nuts [**Drawing 1, Photo C**].

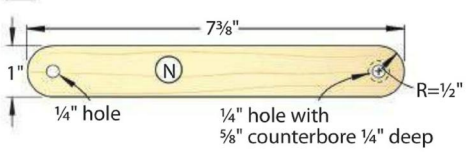
4 Lay out and drill counterbored ⅜" holes in the front (I) and rear pivot feet (J) [**Drawing 2**]. ***Note:*** *Drill the counterbores on opposite faces, making the parts mirror images of each other.* Lay out the notches on the feet and the miters on the rear pivot feet and bandsaw them. In each pivot foot, drill a ⅜" hole centered on its thickness to accept the casters, but do not install the casters yet.

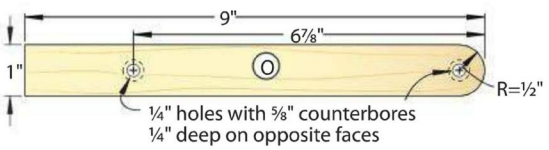
5 Join the front and rear pivot feet (I, J) with carriage bolts, washers, lock washers, and nuts [**Drawing 3, Photo D**].

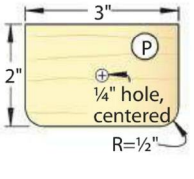
3 BASE & LEGS ASSEMBLY



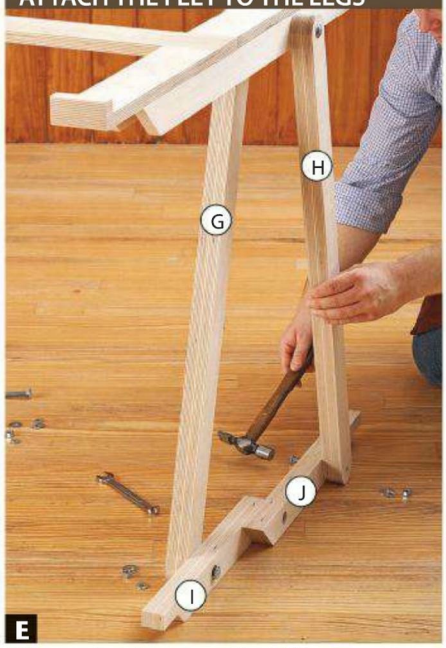
4 PIVOT ARMS & BLOCKS





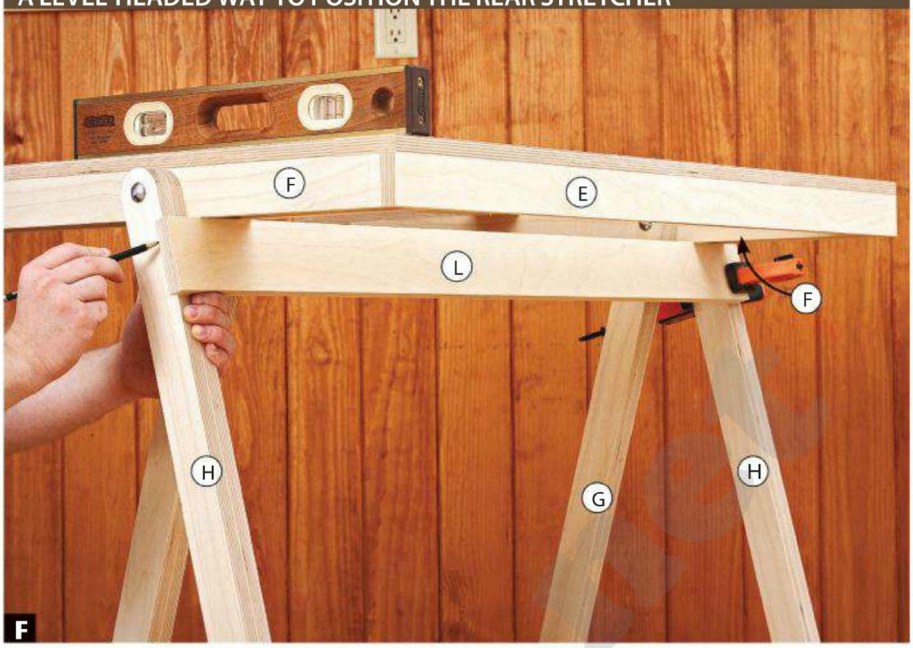


ATTACH THE FEET TO THE LEGS



With the pivot-feet assemblies (I/J) between the legs (G, H), and the front feet pointing the same direction, install the bolts.

A LEVEL-HEADED WAY TO POSITION THE REAR STRETCHER



To mark the final length of the rear base stretcher (L), clamp it under the stile supports (F) with one end flush with the outside face of a rear leg (H). Mark the opposite end.

Then bolt the pivot feet to the front and rear legs (G, H) [**Photo E**].

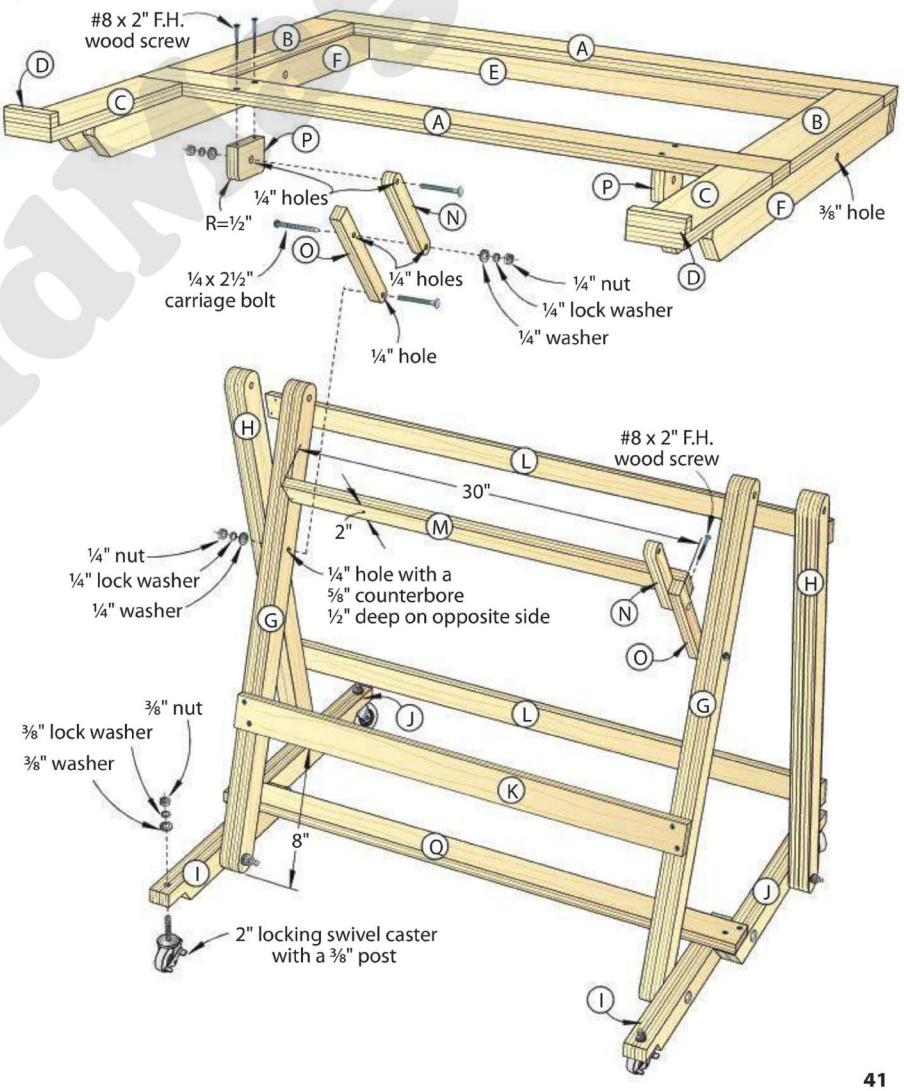
6 Cut the front and rear base stretchers (K, L) and front pivot stretcher (M) to finished width and 1" overlength [**Drawings 3, 5**]. Set the pieces aside except for one rear base stretcher. Level the rack (A–F), then clamp the rear base stretcher under it [**Photo F**]. (The stretcher serves as a stop when the rack lies flat.) Mark the stretcher's final length and mark the location of its bottom edge on the rear legs (H). Cut the stretcher to length, then glue and screw it in place.

A call to arms

1 Cut to size the short and long pivot arms (N, O) and the pivot blocks (P). Cut and sand the radii and drill the holes and counterbores where shown [**Drawing 4**]. ***Note:*** *The counterbores on the long pivot arms (O) are on opposite faces, and the parts mirror each other.*

2 Assemble the pivot arms (N, O) and pivot blocks (P) with ¼×2½" carriage bolts, washers, lock washers, and nuts [**Drawing 5**]. Clamp this assembly under the center rail (A). Level the rack (A–F), extend the long pivot arm (O) to the centerline of the front leg (G), and mark through the hole onto the leg [**Shop Tip,** *page 42*]. Drill a 1/16" through-hole on the mark, then use that hole to locate and drill a ⅝" counterbore ½" deep on the outside face of the leg to accept the nut and washers. Center and drill a ¼" through-hole in the counterbore.

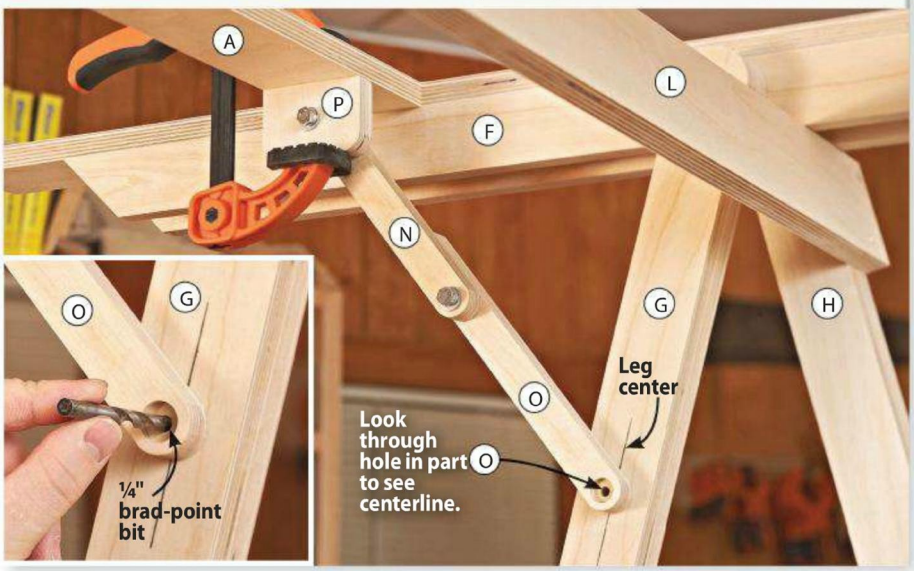
5 EXPLODED VIEW



SHOP TIP

Brad-point bits double as marking tools

To precisely mark the center of a hole, as for the pivot arm (O) location (below), insert a brad-point drill bit the same diameter as the hole, then tap on the end of the bit (inset).



3 Glue and screw the pivot blocks (P) to the rail (A), then bolt the long pivot arms (O) to the front legs (G) [**Drawing 5**]. Mark the excess length of the carriage bolts extending past the face of the front legs, remove the bolts and cut them to length [**Shop Tip**, *below left*], then reinstall them.

SHOP TIP

Say "nuts" to thread burrs

Cutting a bolt creates burrs that make it difficult to thread on a nut. To clean up the burrs, thread a nut on the bolt above the cut line *before* making the cut. Remove the nut afterwards to restore the threads at the end of the bolt.

Finish it up

1 Cut the pivot-feet stretcher (Q) to size, and glue and screw it to the rear pivot feet (J) [**Drawing 3**]. Glue and screw the front base stretcher (K) to the front legs (G) [**Drawing 5**], and the rear base stretcher (L) to the rear legs (H).

2 Install the casters in the pivot feet (I, J). Separate the rack (A–F/N–P) from the base and apply a finish. (We brushed on two coats of water-based polyurethane.) Reassemble the mover and kiss your days of lugging heavy sheet goods good-bye.

Produced by **Craig Ruegsegger** with **John Olson**
Project design: **Gary Dean**, Prince George, B.C.
Illustrations: **Lorna Johnson**

TIGHT ON SPACE? STORE YOUR WORKSHOP AGAINST A WALL

This is the fourth in our series of space-saving Fold-Flat workshop projects. Find the 3-in-1 workbench, *below*, in issue 207 (October 2011), and the sawhorses and drop-down workbench, *middle and bottom*, in issue 208 (November 2011). If you missed those issues, find the projects at woodmagazine.com/foldflat.


October 2011


November 2011


November 2011

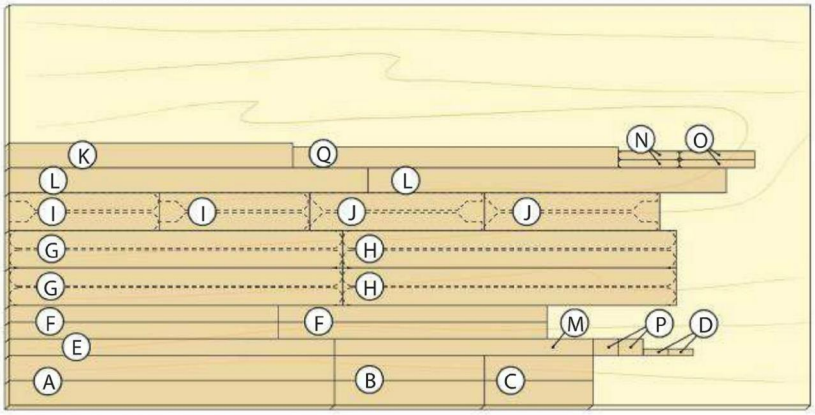
Materials List

Part		FINISHED SIZE T	W	L	Matl.	Qty.
Rack						
A	rails	¾"	3"	39"	BB	2
B	long stiles	¾"	3"	18"	BB	2
C	short stiles	¾"	3"	13"	BB	2
D	cleats	¾"	¾"	3"	BB	2
E	rail support	¾"	2"	39"	BB	1
F	stile supports	¾"	2"	32¼"	BB	4
Base						
G*	front legs	1½"	2"	39"	LBB	2
H*	rear legs	1½"	2"	39"	LBB	2
I*	front pivot feet	1½"	2"	17"	LBB	2
J*	rear pivot feet	1½"	2"	20"	LBB	2
K*	front base stretcher	¾"	3"	33"	BB	1
L*	rear base stretchers	¾"	3"	42"	BB	2
M*	front pivot stretcher	¾"	2"	30"	BB	1
N	short pivot arms	¾"	1"	7⅜"	BB	2
O	long pivot arms	¾"	1"	9"	BB	2
P	pivot blocks	¾"	2"	3"	BB	2
Q	pivot-feet stretcher	¾"	2½"	39"	BB	1

*Parts initially cut oversize. See the instructions.

Materials key: BB–Baltic birch plywood, LBB–laminated Baltic birch plywood.
Supplies: #8×2" flathead wood screws (24), ¼×2½" carriage bolts (6), ¼" nuts (6), ¼" lock washers (6), ¼" washers (6), ⅜×3" carriage bolts (10), ⅜" washers (14), ⅜" lock washers (14), ⅜" nuts (14), 2" locking swivel casters (4).
Bits: 1⁄16", ⅛", ¼", ⅜" brad-point drill bits; ⅝", ⅞" Forstner bits.

Cutting Diagram

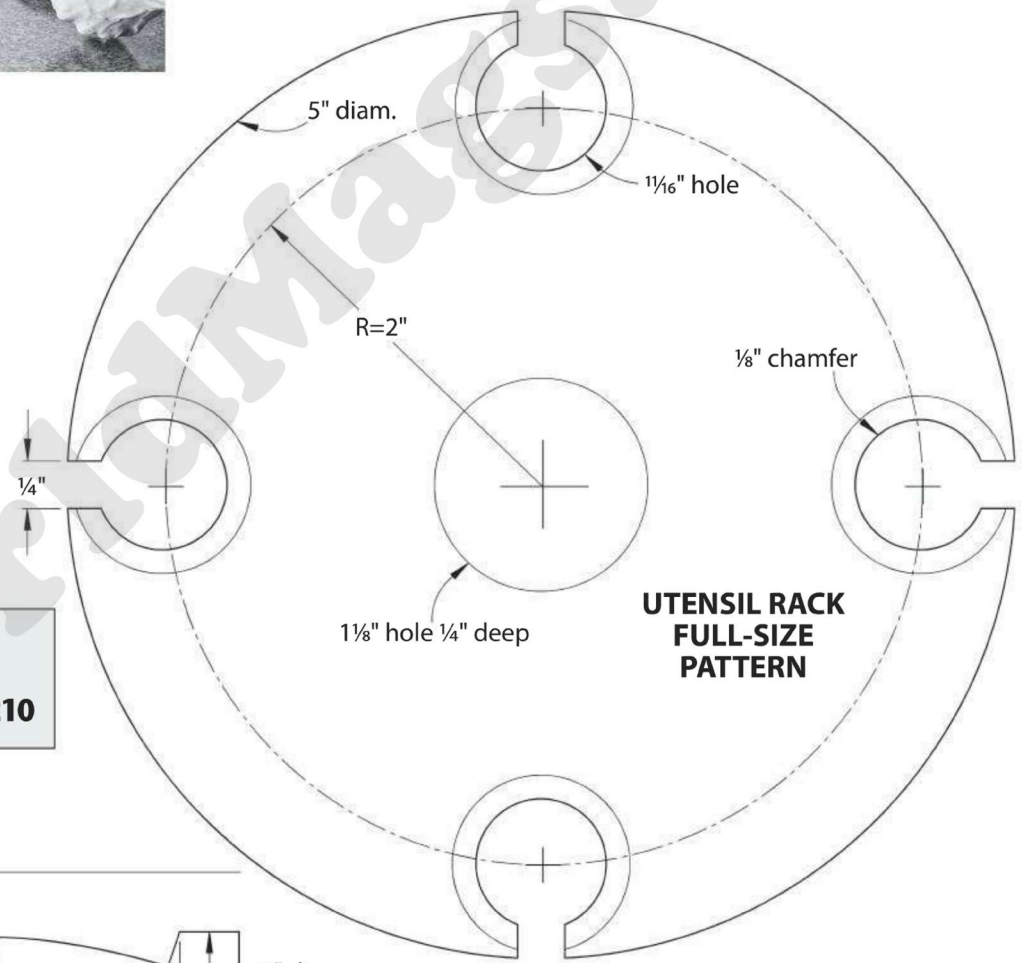


¾ x 48 x 96" Baltic birch plywood

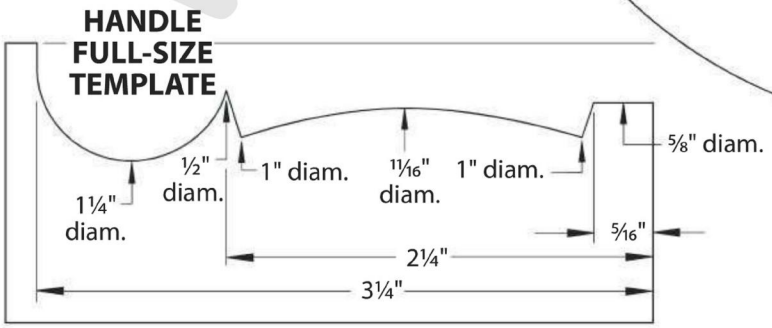
Better Homes and Gardens®
WOOD®
PATTERNS®
March 2012 Issue 210

Dear Reader: As a service to you, we've included full-size patterns on this insert for irregular-shaped and intricate project parts. You can machine all other project parts using the Materials List and the drawings accompanying the project you're building.

Download these full-size printable patterns at **woodmagazine.com/zinio210**

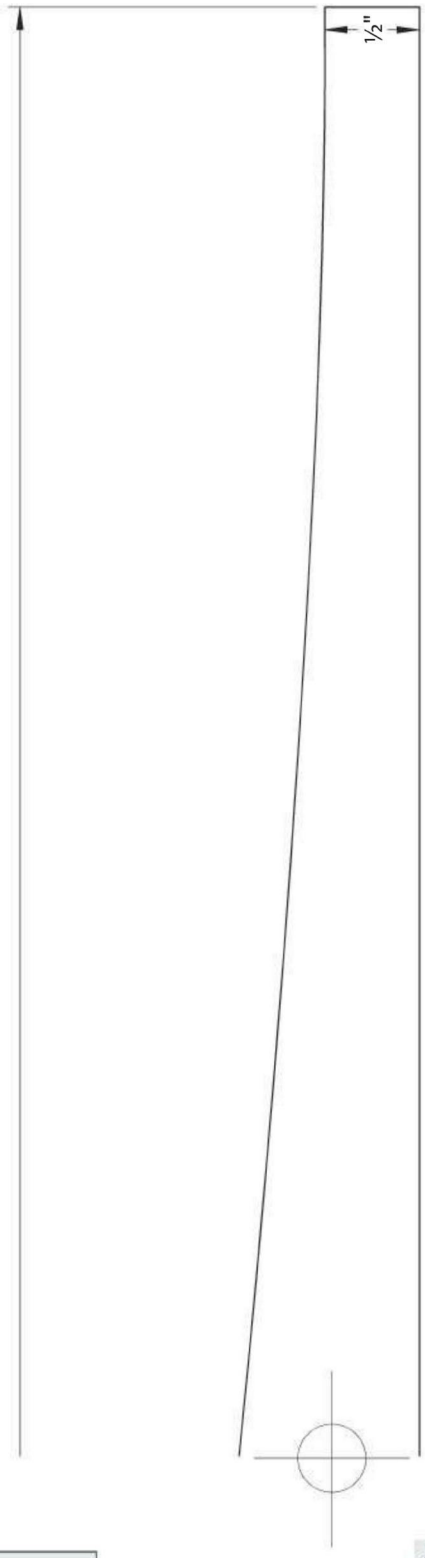


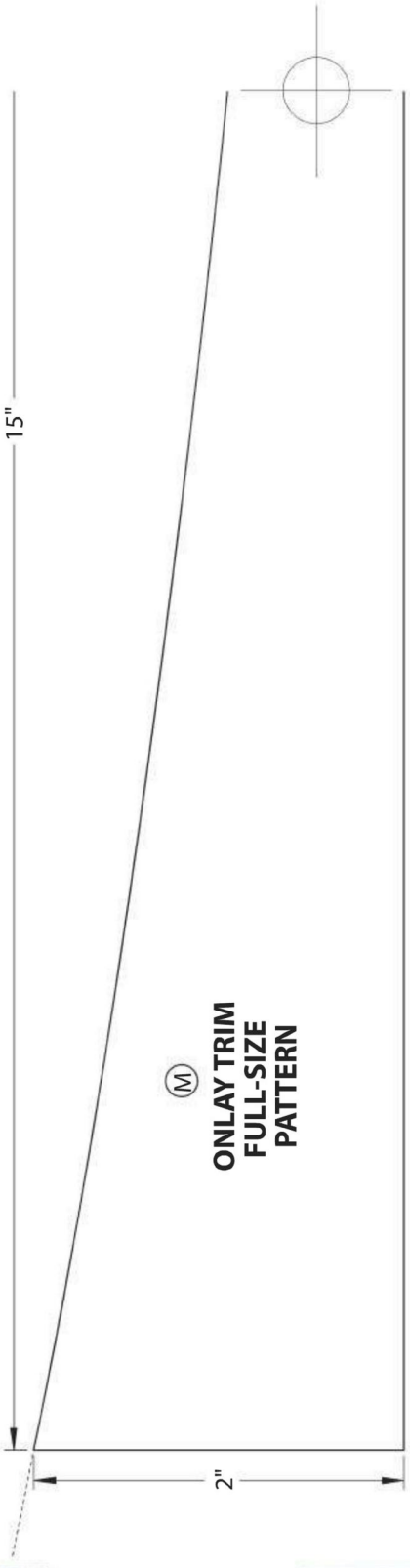
UTENSIL RACK FULL-SIZE PATTERN



HANDLE FULL-SIZE TEMPLATE

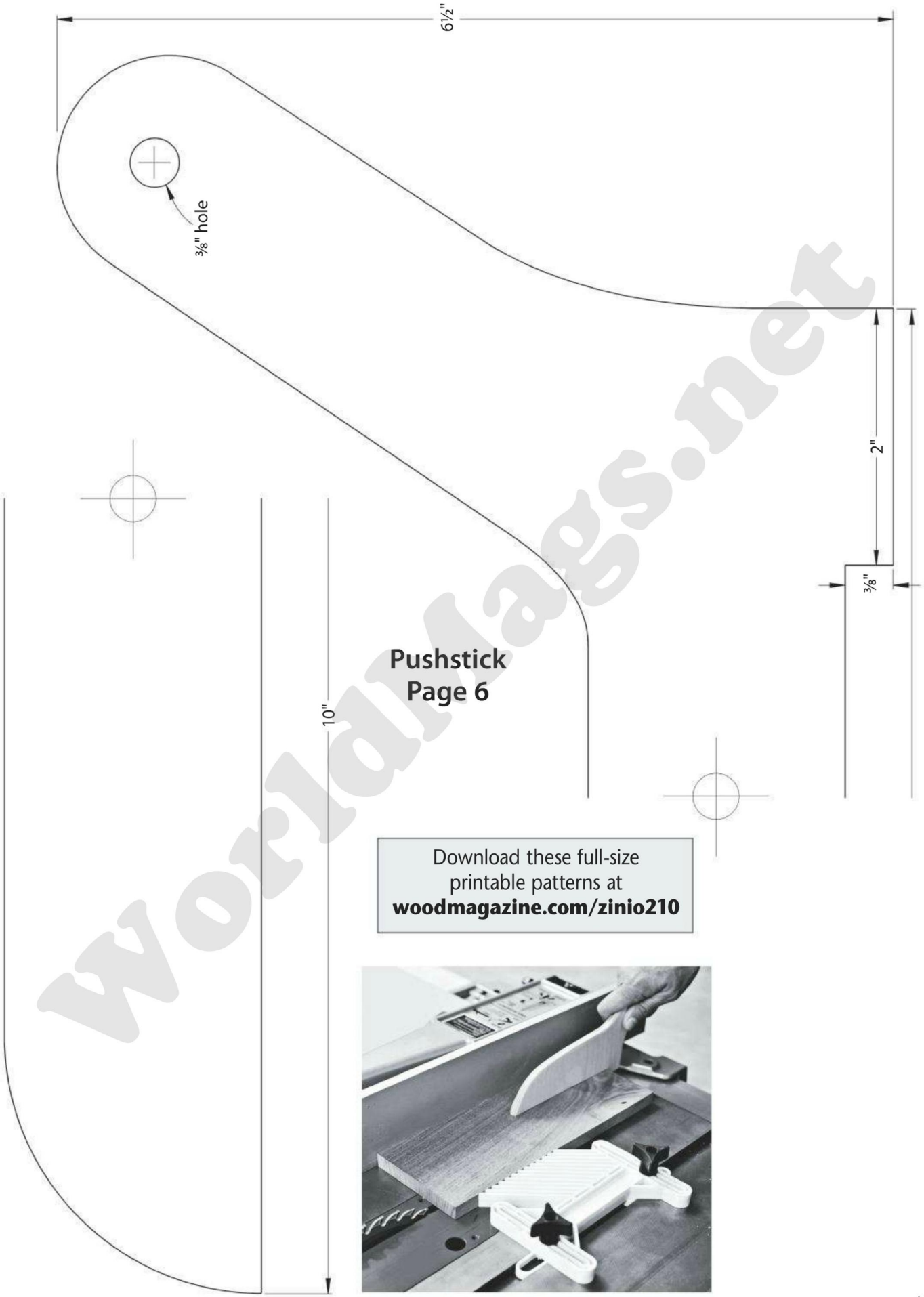
Hors d'Oeuvre Server
Page 47





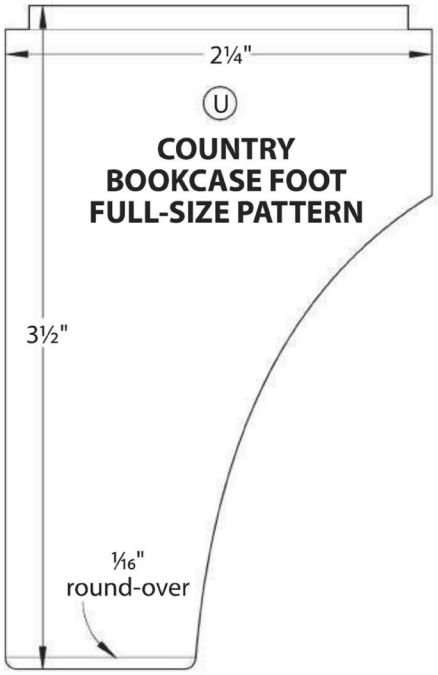
Download these full-size printable patterns at **woodmagazine.com/zinio210**

Blanket Chest
Page 66



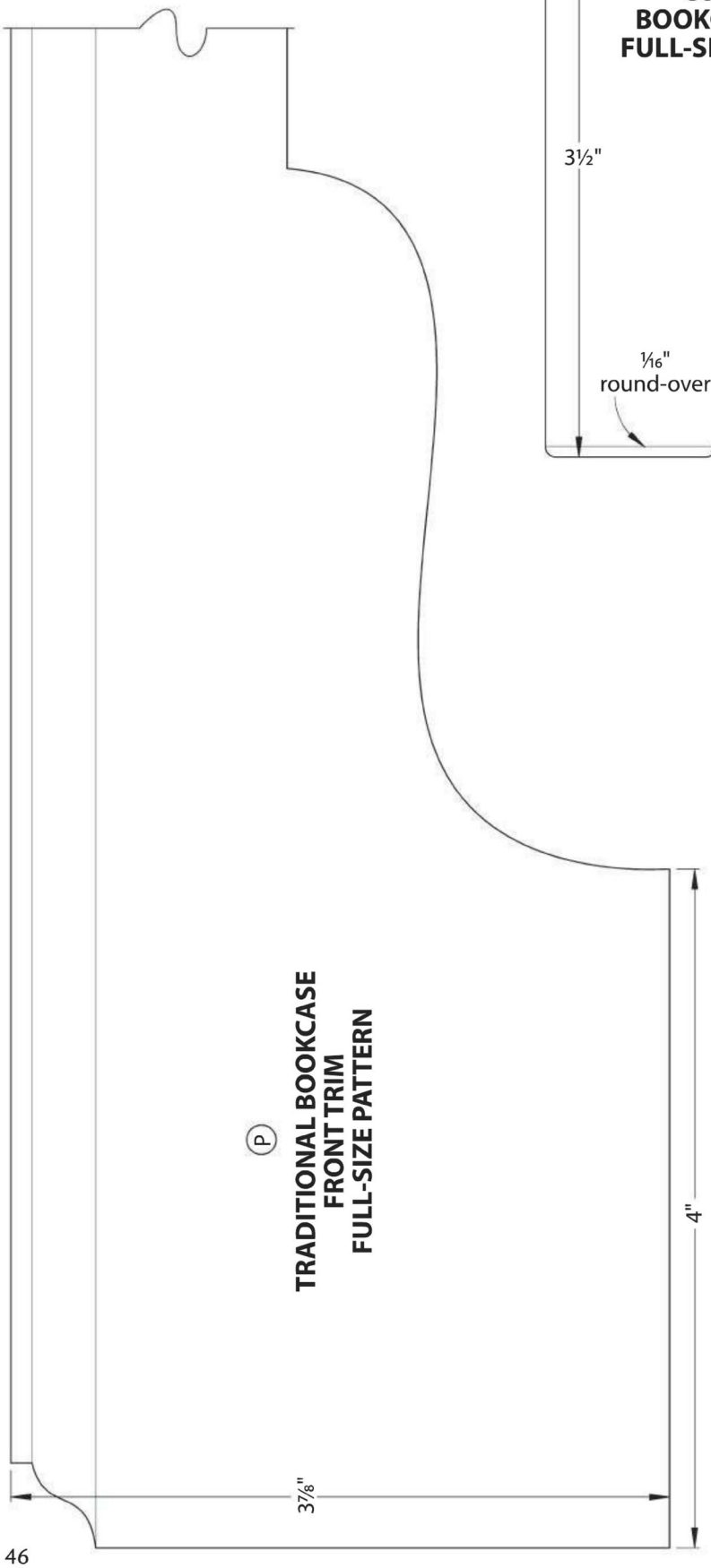
Pushstick
Page 6

Download these full-size printable patterns at **woodmagazine.com/zinio210**



Country Bookcase
Page 30

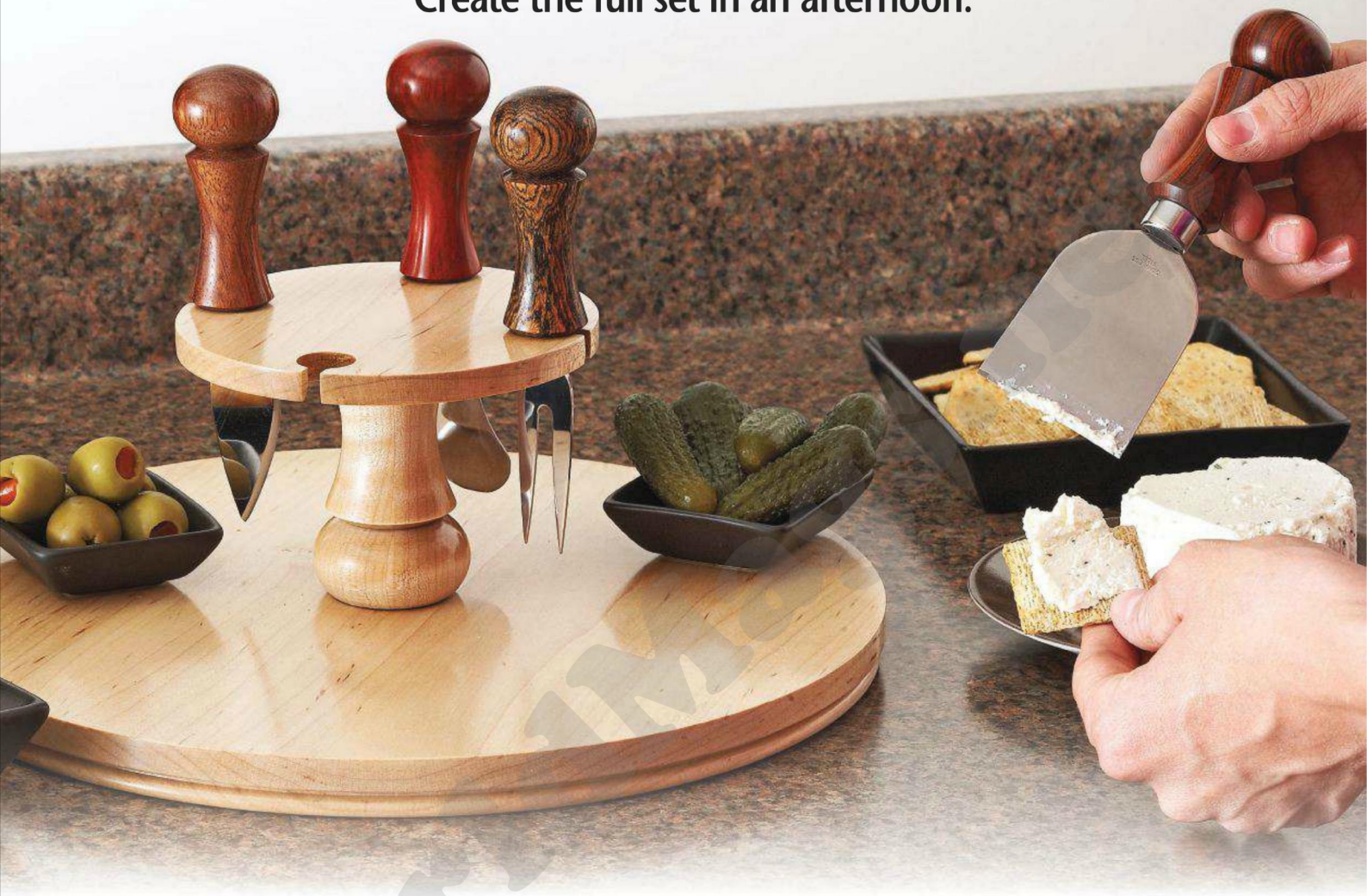
Download these full-size printable patterns at **woodmagazine.com/zinio210**



Traditional Bookcase
Page 30

Hors d'Oeuvre Server

Create the full set in an afternoon.



Serve snacks to friends and watch their attention turn to this attractive serving tray and the handsome handles of the stainless steel cutlery **[Source]**. Then point out that the column supporting them shares the shape of the handles.

We used hard maple for the server and chose a different exotic wood (Honduras redheart, cocobolo, bocote, and bubinga) for each handle to distinguish the utensils. Feel free to use any hardwoods you like to customize the set.

Gather your materials, then shape the base and rack

Bits: 11/16" drill bit, 1⅛", 1¼" Forstner bits; ⅛" beading, 45° chamfer router bits

Prepare a ¾×12×12" blank for the base, a ⅜×5½×5½" blank for the utensil rack, a 2×2×3½" blank for the column, and four 1½×1½×3¾" blanks **[Source]** for the utensil handles.

Make a photocopy of the **Handle Template** from the *WOOD Patterns®* insert, spray-adhere it to a piece of card stock or hardboard, cut out the profile, and set it aside.

Spray-adhere a copy of the **Utensil Rack Pattern** to the bottom face of the blank. Drill 11/16" holes where shown, then drill a centered 1⅛" hole ¼" deep in the bottom face. Using a 45° chamfer bit in your table-mounted router, rout ⅛" chamfers on the bottom faces of the through holes. Bandsaw and sand the rack to shape, then bandsaw the ¼" openings along the edge of each hole. Apply mineral spirits to the pattern and scrape it off.

Lay out a 12" circle on the base blank. Bandsaw close to the line, then sand up to it. With a 1¼" Forstner bit, bore a ¼"-deep hole in the top face of the base. Mount a ⅛"-radius beading bit (we used Freud no. 80-122) in your table-mounted router and shape the profile around the bottom face of the base [**photo** *above*].

Drill the handles and turn them round

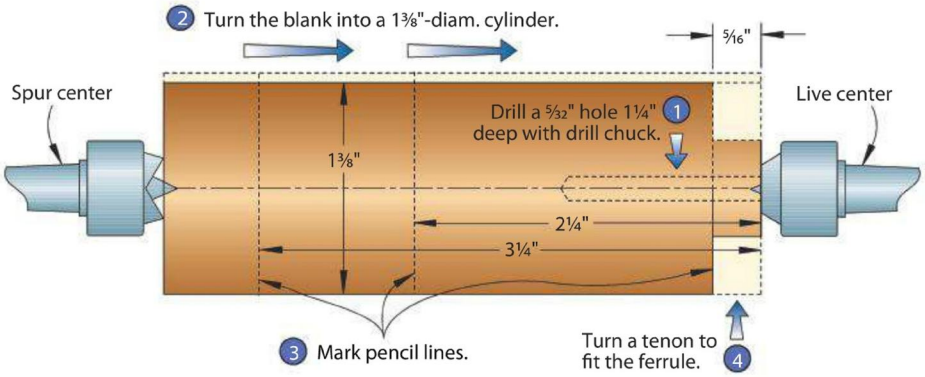
Tools: Roughing gouge, parting tool **Speed:** 1,500 rpm

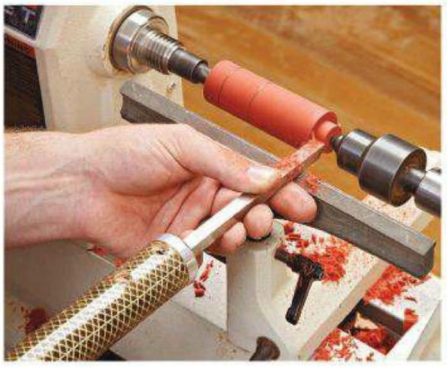
Each utensil's tang fits into a hole drilled into one end of its handle. Mark the center of each end of the handle blanks and drive your spur drive into one end.

Mount a drill chuck with a 5/32" bit in the headstock of your lathe, and the spur center and blank in the tailstock. Drill 1¼" deep into the blank. Repeat this step for each handle blank.

Remove the drill chuck, then install the spur center in the headstock and a live center in the tailstock. Mount a handle blank between them and use your roughing gouge to turn it 1⅜" in diameter. Retrieve the **Handle Template** and, working from the right end of the handle, transfer the reference lines from the pattern to the blank at 5/16", 2¼", and 3¼". Use a parting tool to turn a tenon on the right end, checking the fit as you go for a press fit with the ferrule.

Note: *Don't install the ferrule yet.*





Now let's handle the details

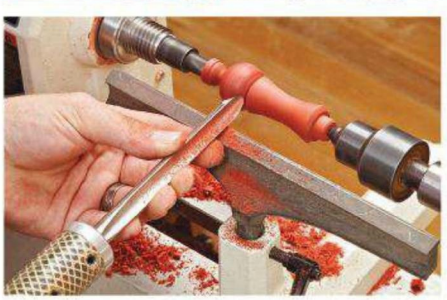
Tools: Gouge, parting tool, skew chisel, ⅜" spindle-detail gouge **Speed:** 1,200 rpm

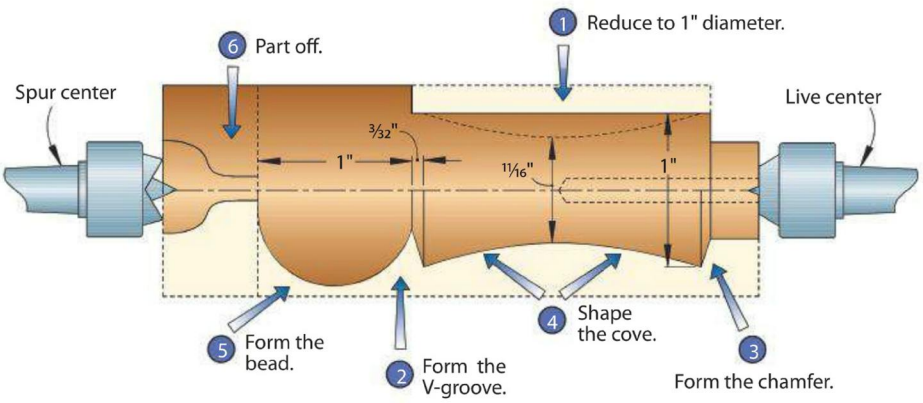
With a gouge and parting tool, turn the section between the tenon and 2¼" mark to 1" in diameter. Switch to the skew chisel and create a "V" centered on the 2¼" mark. Also create a chamfer just above the tenon.

Form the cove using a gouge, bringing the center to 11/16" diameter. With the parting tool, reduce the waste on the left end of the blank to about ½" diameter. This creates room to form the bead using the spindle-detail gouge. Check your progress with the pattern as you work and touch up any areas needing it.

Sand the handle to 320 grit and apply a finish. We wiped on three coats of General Finishes Arm-R-Seal, buffing lightly between coats with a 400-grit sanding sponge. We then buffed on three coats of paste wax with steel wool. Part off the handle, sand the end, and apply a finish to the area.

Mount each of the remaining handles in turn and shape them.

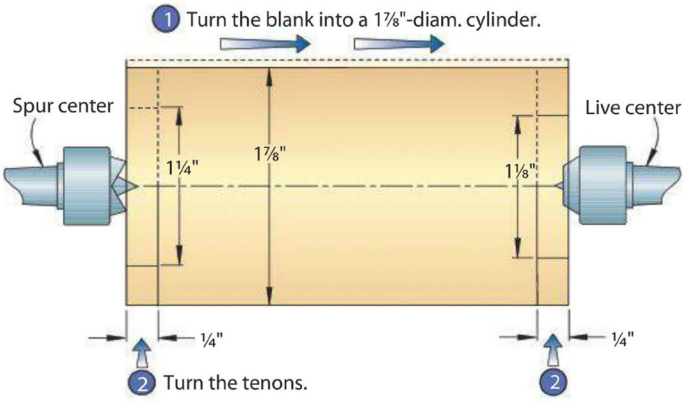


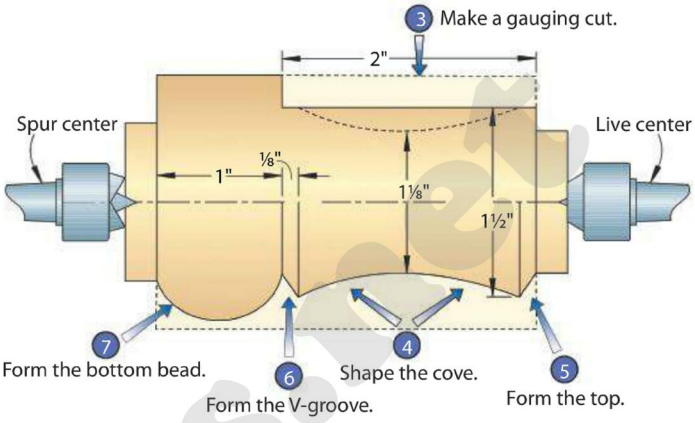


The column is just a larger handle

Tools: Gouge, parting tool, skew chisel, ⅜" spindle-detail gouge **Speed:** 1,200 rpm

Mount the column blank between centers and turn it to 1⅞" diameter. Mark pencil lines on the cylinder at ¼", 2¼", and 3¼" from the right end. With your parting tool, turn the tenon on each end. Make a gauging cut for the depth of the cove, then switch to your gouge to create the cove. Using the skew chisel, chamfer the right end next to the tenon, and create the "V." Turn the bead at the bottom with your detail gouge, then sand the column to 220 grit.





Assemble the utensils and server

Finish-sand the column, rack, and base to 220 grit, then tape off the tenons on the column and apply the same finish used on the handles. Allow the finish to dry, then remove the tape and glue these parts together.

Note: *Use caution and wear leather gloves when assembling the sharp utensils.*

Check the fit of each tang into the hole in a handle; they should almost fit into the hole. Do not install the blades yet. If needed, enlarge a hole by drilling it out with larger bits, working up in 1/64" increments.

Press a ferrule onto each handle, seating it fully. Wrap a blade in a cloth and clamp it in a vise with wood jaws. Using a soft-faced hammer, drive a handle onto the tang. Repeat for each utensil. Place each utensil in the rack and let the party begin.

Source: Artisan mini cutlery—Fork $3.65, Wide-blade knife $3.65, Semi-heart blade knife $3.65, Spreader $4.15. Turning blanks, each 1½×1½×12"—bocote no. 207-1515, $5.50; bubinga no. 207-1715, $3.55; cocobolo no. 207-1815, $7.05; Honduras redheart no. 207-1111, $5.75; Craft Supplies, 800-551-8876, woodturnerscatalog.com.

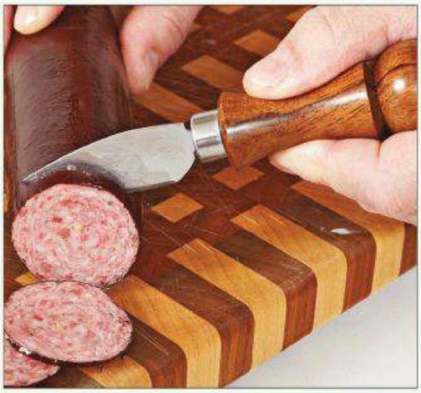
Produced by **Craig Ruegsegger** with **Brian Simmons**
Project design: **Brian Simmons**
Illustrations: **Kevin Boyle; Lorna Johnson**

About the set

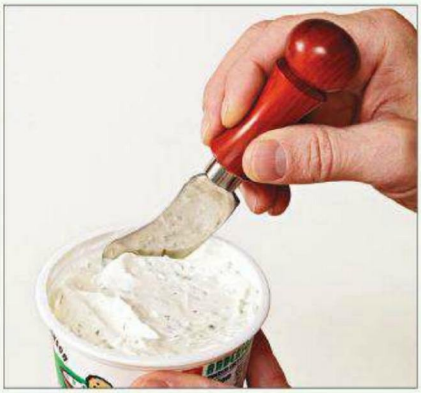
Downsized delicacies deserve their own specialized serving utensils. Here's a closer look at each of the pieces in this set.

Fork: Spear small veggies, cheese chunks, and other bite-size morsels.

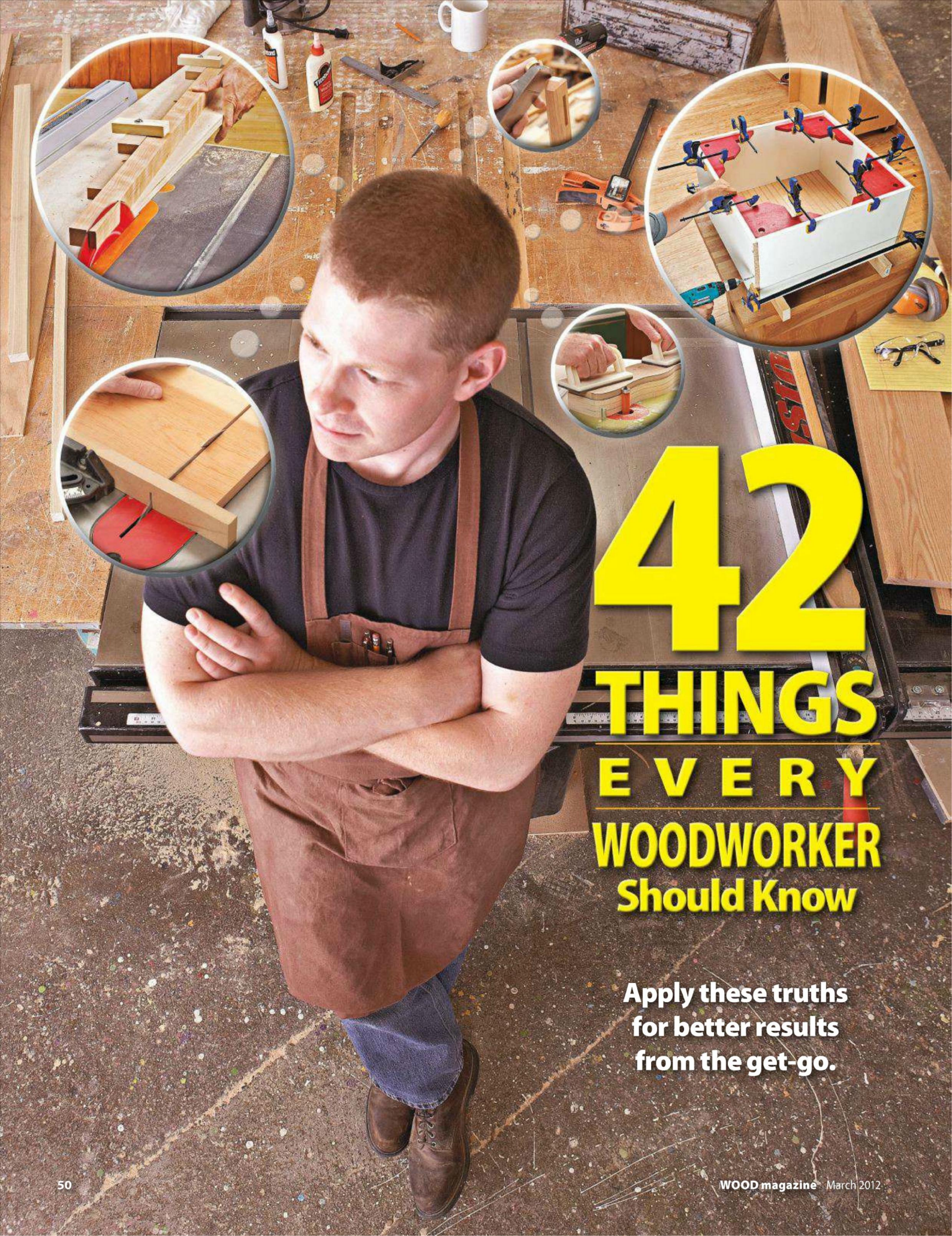
Wide-blade knife: Cut and spread soft and semisoft items such as dip and cheese logs.



Semi-heart blade knife: The sharp edge slices meats, cheeses, and other firm appetizers.



Spreader: Carve out and apply portions from dip and other soft spreads.



42 THINGS EVERY WOODWORKER Should Know

Apply these truths for better results from the get-go.

These tips put you on solid footing

1 Frame of mind matters

Don't go into the shop when you're tired, in a bad mood, or distracted. At best, your woodworking results will be mediocre; at worst, you'll injure yourself.

2 Eyes, ears, and lungs need protection

Always wear eye and hearing protection—anything with at least a 22-dB noise-reduction rating (NRR)—when using power tools. Of course, a common dust mask protects your lungs better than nothing, but a respirator with a rating of N95 works much better. For spray-finishing, use a respirator with a P95 or P99 rating.

3 Seek help from others

Most woodworkers gladly share their expertise and tips. A few minutes spent with a peer or neighbor can turn a complex process into an enjoyable and simple one. Also turn to the multitude of woodworkers on the *WOOD* Online® forums at woodmagazine.com/forums.

4 Keep a well-stocked shop

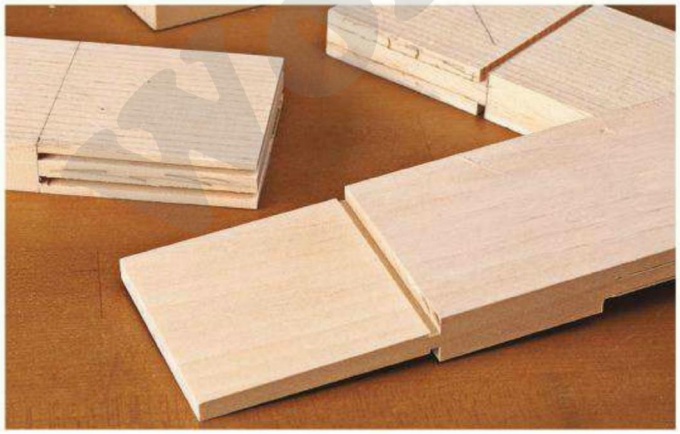
Always maintain a good supply of these shop necessities: painter's tape, double-faced tape, orange-based hand cleaner, tweezers with a magnifying glass, first-aid kit, and fire extinguisher.

5 You can't be too organized

Buy or make cabinets, shelves, or parts bins to suit your needs. Once things are in order, you'll work smarter, be happier, and spend less time searching for tools and supplies.

6 Always make extras

Machine additional project parts when dimensioning stock, and use these test pieces instead of your project pieces to check and adjust tool setups. Use other leftovers to test stain colors and other finishes to get an accurate representation of how they will look on your project.



7 You don't have to pinch *every* penny

It's okay to be frugal, but know when to say when. Wood *does* grow on trees, so you can get more if you mess up a piece. Sandpaper wears out in 5–10 minutes. Glue has a shelf life (usually about a year or two). Finishes with a tough skin over them in the can should be tossed.

8 Life's too short for a crappy workbench

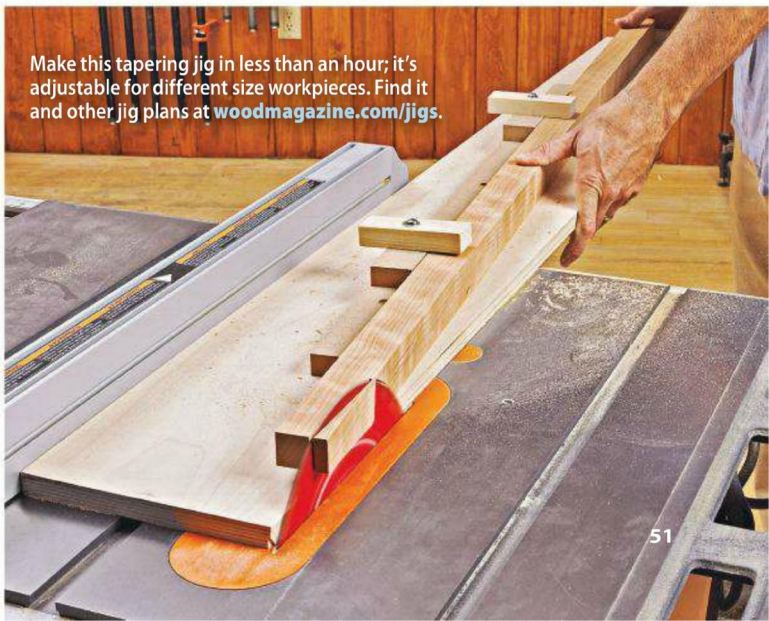
Whether you build or buy one, make sure your workbench is sturdy, flat, and has at least one beefy vise.

9 Don't expect perfection

Trying for a flawless project can be paralyzing: It's nearly impossible. So don't sweat the mistakes you'll inevitably make. Instead, learn how to repair them—and how to avoid them in the future.

10 Invest time in jig-building

It's worth the hour or two it takes to build a jig for a 5-second cut because jigs make operations safer, more precise, and repeatable.



Make this tapering jig in less than an hour; it's adjustable for different size workpieces. Find it and other jig plans at woodmagazine.com/jigs.

More Resources

Whenever you see this symbol, go to woodmagazine.com/42things for related information.

Proper milling and joinery give great results

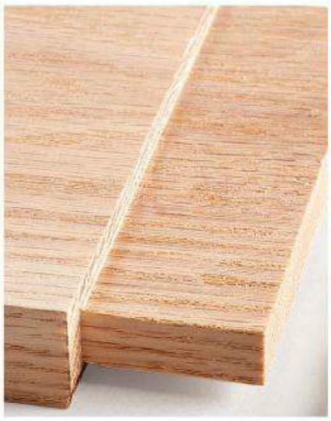
11 It's OK to waste some wood for appearance sake

Use chalk to lay out project parts on boards and sheet goods to maximize the material, but know when to instead cut parts to avoid defects or take advantage of spectacular grain patterns or colors. When you buy lumber, plan to lose about 10–20 percent of it to waste.

12 Glue + smooth wood = maximum bond

Forget what some old-timer might have told you about glue needing "tooth." Smooth wood surfaces bond better with glue compared with rough surfaces. So take the time to make your joint faces smooth and snug-fitting. Also, glue does not adhere well to burnt-wood surfaces, so avoid them.

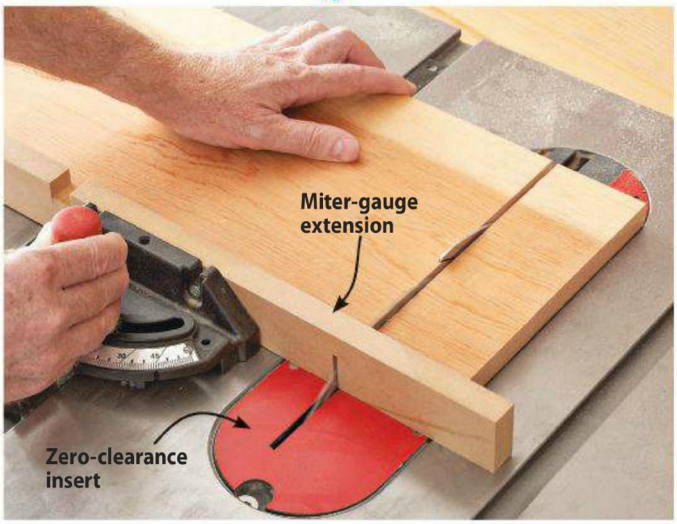
This tenon, cut with a tablesaw dado blade, retains subtle ridges that will impede the joint's glue adhesion.



This tenon, also cut with a dado blade, will bond better because we removed the ridges with a shoulder plane.

13 Tame tear-out with two simple fixes

Grain tear-out can damage a workpiece beyond repair, so prevent it by backing up cuts with auxiliary supports. Buy or make zero-clearance inserts for your tablesaw, bandsaw, mitersaw, and drill press to stop face-grain tear-out. Add a wooden extension to your miter gauge to control blowout on the back edge. In a similar fashion, back up router cuts with scrap stock.



Make custom zero-clearance inserts for different blade angles and setups, such as beveled cuts and dadoes.

14 Use the correct machining order for rough lumber

Here's how to mill rough lumber square and true:

1. Crosscut to rough length (¼" or so longer than final length), removing end checks.
2. Flatten one face on the jointer.
3. Plane the board parallel and to final thickness, removing equal amounts of material from each face.
4. Joint one edge square to the faces.
5. Rip to final width on the tablesaw.
6. Crosscut to final length.

15 There's no substitute for accurate layout

No amount of glue or wood filler will compensate for a sloppy joint. So buy, and learn how to use, quality layout tools: combination square, steel rule, marking knife, and marking gauge.

16 If man made it, it doesn't go into the planer or jointer

Compared with solid wood, composite products, such as plywood, particleboard, and MDF, dull planer and jointer knives much quicker because of their high glue content.

17 Templates yield fast *and* accurate results

When you need to make multiple parts with curves or cutouts, save time and ensure a perfect match by stack-cutting the parts and flush-trimming them on a router table.

Bind multiple workpieces together with the template using double-faced tape. A starting pin helps anchor the stack when beginning the cut.

Plan your work, work your plan

18 Assemble first, glue next

Always dry-clamp assemblies before applying glue. You don't want to discover misfit joints or unsquare assemblies after the glue goes on.

19 Presanding pays

Finish-sand as many parts as you can before assembly, especially inside faces and edges that will be more difficult to access once assembled.

20 Don't be a clamp snob

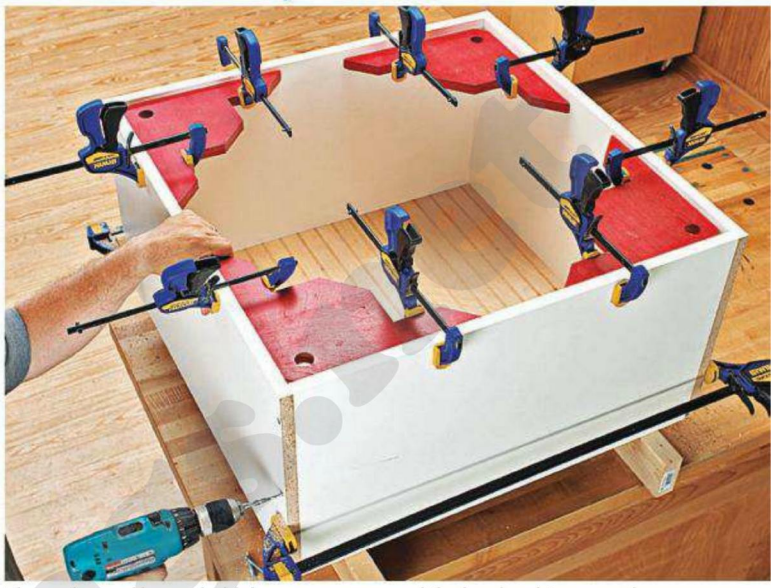
Most woodworkers need little more than inexpensive, time-tested pipe clamps. Outfit your shop with sets of four in 12", 24", 36", and 48" lengths. You can couple pipes together to make longer clamps, or simply keep longer lengths of pipe and swap the jaws as needed. Add a few one-hand ratcheting bar clamps (such as Quik-Grip) for general use in 6" and 12" lengths. Buy other clamps only when needed.

21 Hardware should be installed, removed, and then reinstalled

Before applying stain or clear finish, assemble your projects with the hardware intact to make sure everything works and fits as planned. Then remove all hardware, apply finish, and reinstall to ensure complete finish coverage on everything *but* the hardware.

22 "Square enough" isn't square

When assembling projects with 90° corners, it's critical to get all the corners perfectly square, especially when your project has doors and drawers that must fit inside openings. So buy or make 90° braces to clamp corners square. Without them, you'll be chasing mistakes throughout the rest of your project.

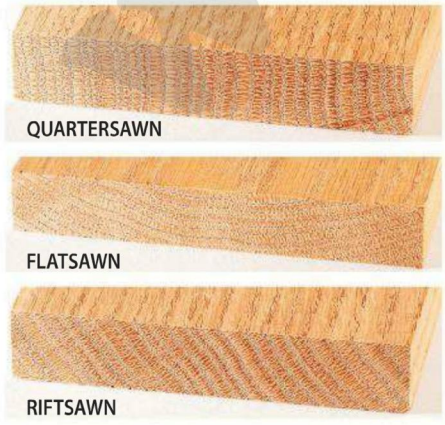


These plywood braces hold the carcase square while the glue dries or until you can solidify it with screws.

Know the wood you work

23 Know your wood and how it was cut

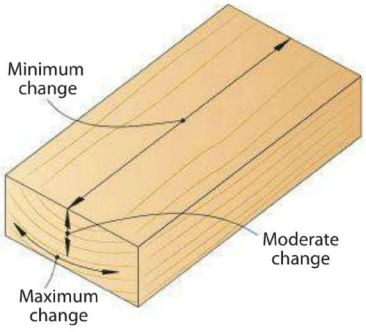
Familiarize yourself with common wood species—especially those native to your region—to tune your deal-spotting radar. Then stretch your dollars by shopping for rough lumber at local sawyers and lumber mills. Start by understanding these types of cuts: Quartersawn wood costs the most, and proves most resistant to warp and waste. Flatsawn costs the least, but could warp and leave more waste. Riftsawn wood falls in between.



24 Wood moves—deal with it!

Solid wood shrinks and swells with changes in seasonal humidity, mostly across the grain and only negligibly along its length. Allow for this when you build projects—otherwise, wood movement will cause parts to split, joints to come apart, and sliding parts to stick. Minimize the problem by letting the wood acclimate to your shop's humidity for a few days before working it.

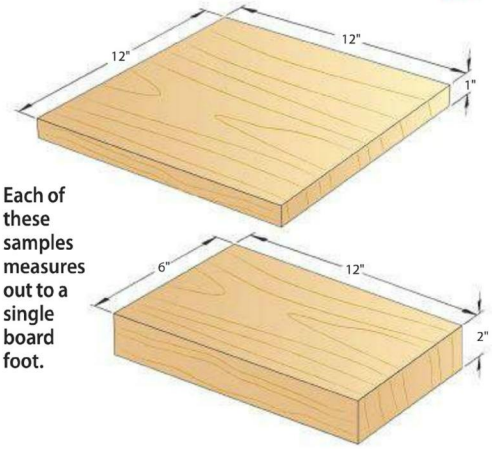
WOOD EXPANSION AND CONTRACTION



Even after wood has reached a moisture level where it's stable in the surrounding environment, it will still change with the seasons.

25 Know what a board foot really means

Outside of home centers, hardwood is sold by the board foot (the equivalent of a 12"×12" board 1" thick). Be aware that the board-foot calculations are made as though the board were still in its roughsawn (not planed) condition. Wood sold as 4/4 (four-quarter) measures 1" thick in its roughsawn condition. But many mills and dealers skip-plane the lumber—revealing just enough face grain to grade it—until it's ⅞"–15⁄16" thick. Many plane it on both faces to ¾" thick.



Each of these samples measures out to a single board foot.

Tools Work as Well as You Can Use Them

26 Sharp tools = safer tools

Dull knives or chisels require greater effort to cut wood than sharp ones. That extra force increases the likelihood you'll slip or lose control of the tool, and potentially be injured. So hone your hand tools regularly.

27 Know when to splurge, and when to scrimp, on tools

Buy top-quality tools if you plan to use them for decades (router, tablesaw, planer). Opt for bargain-priced tools when you need them only on occasion (oscillating multi-tool, pneumatic nailer, belt sander).

28 Rust management preserves your tool investment

Steel tools rust. Know how to remove and prevent it, especially if you live in a humid environment. Skip the home remedies and try one of these proven rust-busters: Empire Top Saver rust remover and protectant, 8 oz, item #148040, $22.99; Boeshield Rust-Free rust remover, 8 oz, item #03Q57, $12; Boeshield T-9 protectant, 12 oz, item #03Q56, $17.99, Woodcraft Supply, 800-225-1153 or woodcraft.com.

29 Planers won't make boards flat

A planer will make two board faces parallel, but it can't remove cup or twist. You need to do that on one face of the board using a jointer first. So invest in both machines. They will pay for themselves in lumber savings by enabling you to work with lower-cost, roughsawn material.

30 Sometimes hand tools are faster than power tools

Two quick examples: You can usually chamfer a board with a block plane in less time than it takes to install and adjust a chamfer bit in your router. And a sharp handsaw cuts a haunch on a tenon quicker than setting up your tablesaw for the job.

Chamfering the top of a dining-chair leg proves a snap when you use a sharp block plane. Setting up a router table for this task takes too much time.

31 Upgraded dust-collection filters: Well worth the upcharge

When purchasing a dust collector, remember that filtration is as important—if not more so—than airflow (CFM) or horsepower. The 30-micron filter bags that come standard on most collectors allow too much fine dust to return to the air you breathe. Instead, upgrade to a 5-micron or finer filter; go for 1 or 2 microns if you can get it.

32 Your best router value comes in a kit

If you can afford only one router, make it a midsize (1¾- to 2¼-hp) kit with both plunge and fixed bases. Mount the fixed base in a router table and swap the motor to the plunge base for handheld work.

33 Both cheap and premium router bits have a place

Sure, there's value in those big kits that sell for $1 or $2 per bit *if* you rarely use them. But for the bits you use most often—for most of us, that's round-overs, flush-trimmers, cove bits, straight bits, spiral bits, chamfers, and rabbeting bits—premium brands cut cleaner, stay sharper, and stand up better to regular use.

34 Tools need TLC to remain accurate

Virtually every new tool needs some adjustment for absolute accuracy. Confirm (and correct, when necessary) these adjustments from time to time with regular maintenance. For example, your tablesaw's miter slots and rip fence must be aligned parallel to the blade to make accurate—and safe—cuts.

To align a tablesaw top to the blade, adjust it until a dial indicator (or combination square) reads the same at the front and back of the blade.

Finishing Makes Projects Pop or Flop

35 Oily materials can cause fires

Rags and brushes soaked with oil-based stains or finishes can combust if left wadded up or thrown away wet. Spread them out to dry before disposing of them.

36 Prefinish panels to avoid shrinkage woes

The solid-wood center of a frame-and-panel door or case side should be stained or finished prior to assembly. This way, when the panel inevitably shrinks, it won't reveal unfinished edges.

37 Go backless when spray-finishing

Spray a project with the back in place and the overspray will bounce back in your face—not fun. Instead, remove the back panel and spray it separately.

38 Hand-sand for best looks

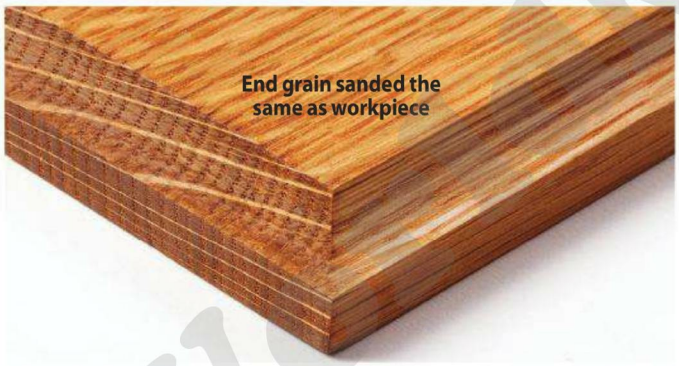
Despite all of the power sanders available today, you should still do your last round of sanding by hand—with the grain—to eliminate cross-grain scratches.

39 Find a finishing sweet spot

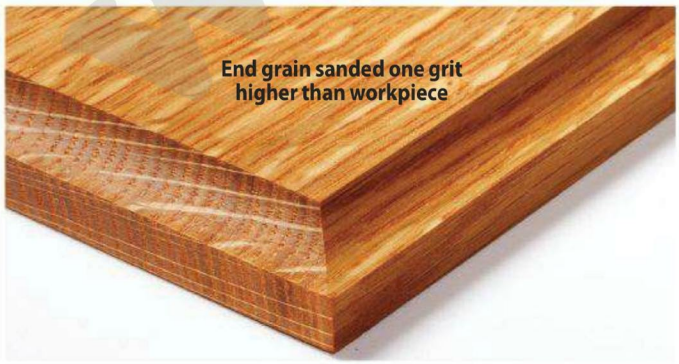
You don't need to master every finish out there. Find one or two finishes that work for you—say an oil finish for rarely handled projects and polyurethane for pieces that need tough protection—and then master those.

40 Fix too-dark end grain with one extra sanding

Sand visible end grain one grit higher than faces and edges so the end grain soaks up less stain and matches surrounding surfaces.



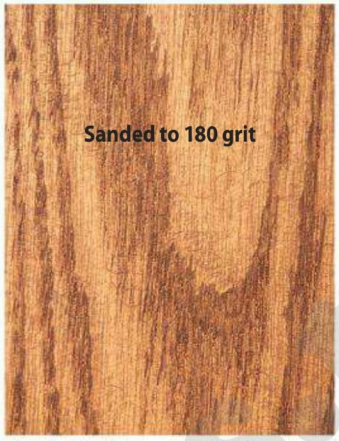
This end grain, sanded to 220 grit like the rest of the workpiece, soaked up more finish and looks darker than the face and edge grain.



By sanding only the end grain to 320 grit—but stopping at 220 for the face and edges—the end grain's color better matches the overall tone.

41 Sand one more step for stained projects

For planed project parts, start sanding with 120-grit abrasive, and then follow up with 150 and 180 grit. If you're going to apply an oil or clear finish, stop sanding at 180. But if you'll use a stain or dye, sand to 220 to remove the fine scratches that show up under colorants.



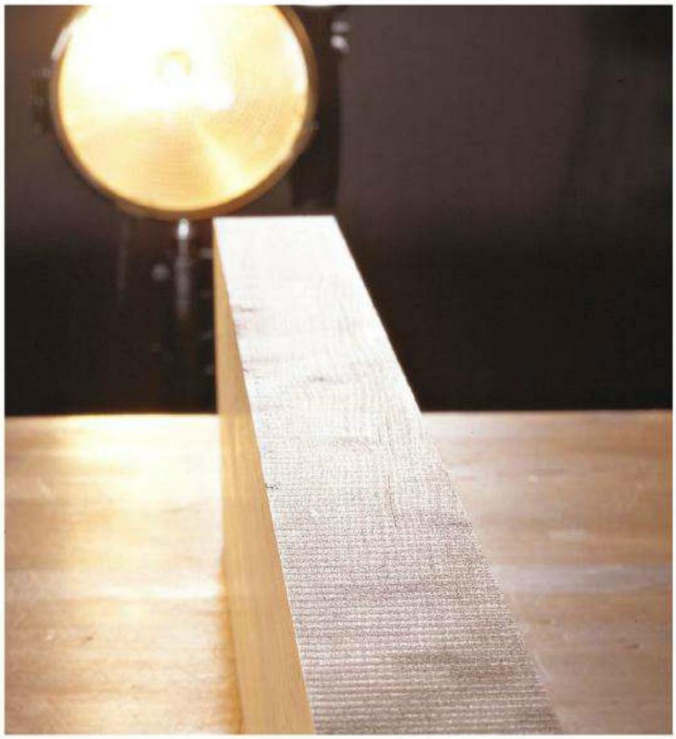
This oak board, sanded to 180 grit and stained, reveals swirl marks.

Sanding this board to 220 grit eliminates unsightly scratches.

42 Detect tool marks before it's too late

Even though you might not be able to see them in natural-lighting conditions, tooling marks (blade scoring, planer scallops, snipe) could be lurking on your project's surfaces, waiting to expose themselves after you apply finish. Check your work with a low-angle raking light to expose these marks, and then sand, plane, or scrape them away.

Produced by **Bob Hunter**



A low-angle raking light reveals scallop marks left on this board's edge by a jointer's straight-knife cutterhead.

How to Restore a Hand Plane

Elbow grease and basic shop supplies are all it takes to reinstate a vintage plane to its former woodworking glory.

Most of us have one or more old bench planes sitting on shelves gathering everything but sawdust. Recently, hand-tool expert and Contributing Craftsman John Olson took it upon himself to rehab one such plane—a turn-of-the-century knock-off of a Stanley No. 5 jack plane. Its design makes a nice compromise between a smoother and a jointer, and a great starter bench plane. And the No. 5 remains one of the best-selling models in history, making parts easy to find. Even if your plane isn't identical to ours, these steps improve many planes—including new-in-the-box models.

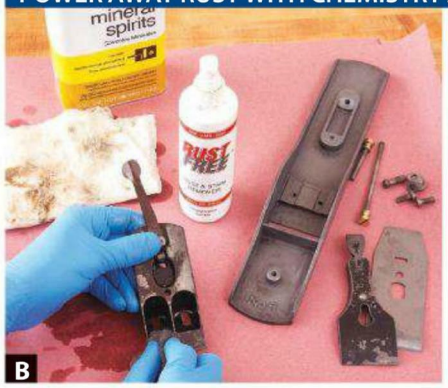
First, determine if it makes sense to restore your plane

The plane John chose to restore had only minor surface problems, but showed signs of frequent use—a clue that it had once been a favored working plane [**Photo A**]. To assess your plane, disassemble it completely and check for:

▶***Rust.*** You can remove most corrosion, so don't let it cause much concern. But if deep pitting and nicks affect the integrity of smaller parts or heavy rust has frozen screws, levers, and knobs into immobility, take a pass on restoration.

▶***Cracks.*** A hard drop onto a concrete shop floor has doomed many otherwise

THE WEAR AND TEAR TELLS A STORY



B

Allow the rust remover to penetrate for 30 seconds before scrubbing with 0000 steel wool. Wipe clean with mineral spirits.

C

A rotary tool or grinder with a polishing wheel makes quick work of shining brass knobs and nuts.

D

Mask areas not getting paint; then use a craft knife to precisely trim the tape. Cut from the center, out, drawing the blade along the iron.

good planes to uselessness. If you see the telltale signs—cracks in the body near the mouth or snapped adjustment levers—forgo this fix-up.

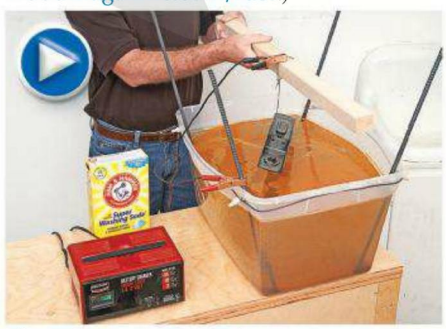
▶***Missing parts.*** Most bench-plane parts are easy to find, either by purchasing new replacement parts or seeking out a second spare-parts plane from eBay. (See the **Drawing,** *right*, to double-check your plane's parts.) But if mounting costs threaten to make that bargain plane more expensive than a shiny new one, reconsider the restoration.

Spit, polish, elbow grease... and electrolysis?

There's really no avoiding it: Cleaning up a rusty plane requires some manual labor. John's favorite clean-up method: Work Rust Free, a rust-removal solution (Woodcraft, $12 for 8.5 oz. bottle, item #03Q57, 800-225-1153, woodcraft.com), into all the nooks and crannies with 0000 steel wool [**Photo B**].

For stubborn corrosion and leftover paint, 320-grit sandpaper or a rotary tool with sanding, wire-bristle, and polishing attachments [**Photo C**] gets the job done.

If you find it slow going removing heavy rust pitting with those methods, try powering it away using electrolysis. (For a video about electrolysis, go to woodmagazine.com/rust.)

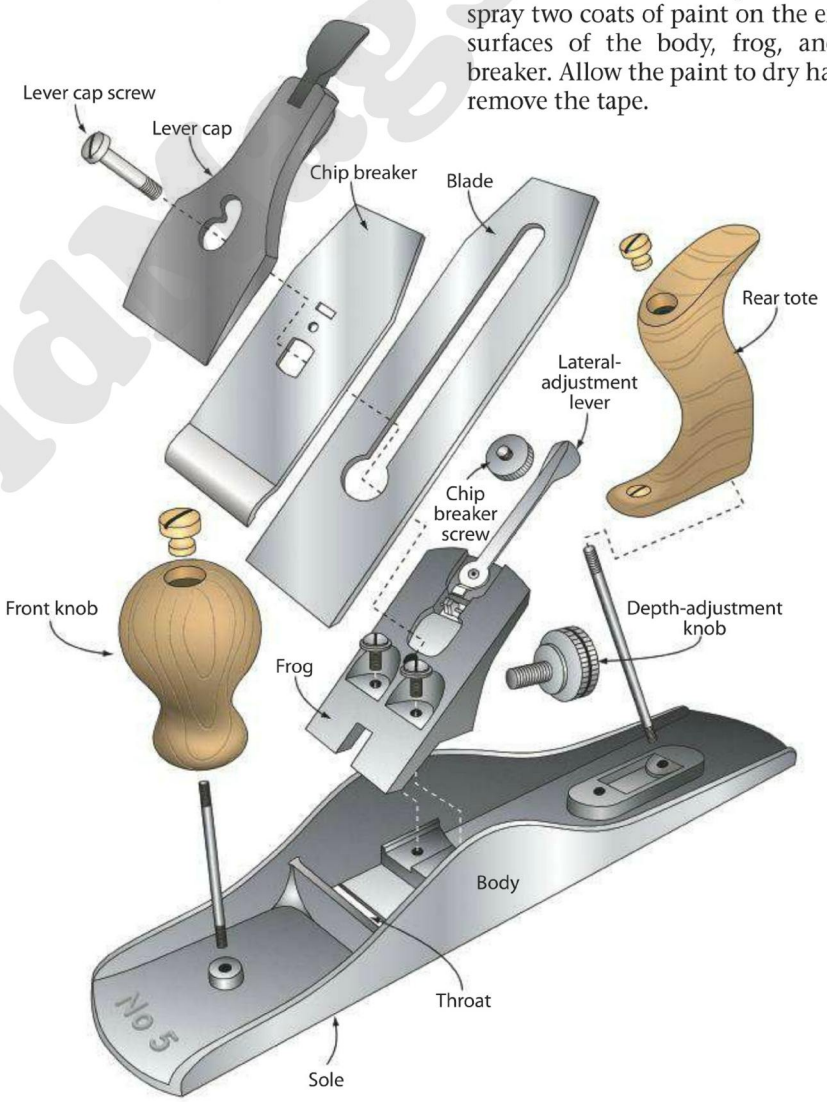


Electrolysis rust removal

Prevent rust's return by protecting with paint

Back in the day, most plane makers coated plane bodies using proprietary japanning formulas that either remain secret or lost to history. In their place, John prefers a rustproofing paint, such as black Rustoleum (rustoleum.com).

First, mask the sole and sides of the plane body, along with the protrusions where the frog mates with the body [**Photo D**]. Tape the flat areas where the frog contacts the blade and the body (and the adjustment lever, if you choose), as well as the bottom of the lever cap where it contacts the chip breaker. Then spray two coats of paint on the exposed surfaces of the body, frog, and chip breaker. Allow the paint to dry hard and remove the tape.



THE FROG GETS A BACK RUB

E

Angle the frog to avoid wear on the lever and yoke. Lap one side. Then move the lever aside to lap the other, flattening the entire surface.

Replace or repair damaged parts?

The damage John found on his plane included a rear tote that had been snapped in two and reglued unevenly—a recipe for blisters—and a bent blade that rocked when placed on a flat surface. The damage indicated that the plane had suffered a topside impact in its past.

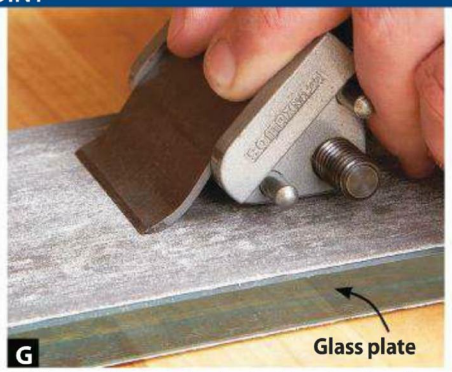
John could have repaired the tote break, and then smoothed and refinished it and the knob. However, chunks of missing wood made salvage difficult. So he opted instead to spend $40 for a replacement rosewood handle set from Highland Hardware (Item 105010, highlandwoodworking.com, 800-241-6748). Highland also carries a range of other replacement parts for several styles of planes.

Likewise, most vintage blades are easily rejuvenated with rust cleanup and sharpening. But this one was damaged beyond repair. So, John purchased a new blade from Lee Valley for $35 (item 05P31.03, leevalley.com, 800-871-8158). The $75 investment still puts the price tag far below the $125-plus price of a comparable new plane.

TIDY UP THE CHIP BREAKER'S RAGGED POINT

F

The ragged edge on this chip breaker creates gaps where shavings will wedge, leading to inconsistent smoothing.



G

With the chip breaker locked in a honing jig at an angle that mimics its curve, sharpen the end on 120-, then 220-grit sandpaper.

H

Using the edge of your workbench as an angle guide, clean up the inside of the chip breaker's curve on 120, then 220 grit.

Dissect the frog and correct the anatomy

In order for the frog to hold the blade steady while adjusting depth and angle, it must make complete contact with both the body and blade. Check this by holding the frog in position in the body: It should seat solidly without rocking or wiggling. If you feel some wobble, apply valve-grinding compound (check your local auto-parts store) to the bottom of the frog. With the body mounted in your vise, slide the frog forward and backward until it seats solidly. Clean the slurry away with mineral spirits.

Next, flatten the top of the frog where the blade rests. Apply 120-grit adhesive-backed sandpaper to a piece of plate glass, and lightly secure the glass, using your bench vise, dogs, and a sandwich of protective wood cauls. Rotate the lateral-adjustment lever aside and rub the frog along the edge of the sandpaper [**Photo E**]. Check your progress often; when the entire surface shines, switch to 220-grit paper to lap away scratch marks.

Look sharp, chip breaker and blade!

The chip breaker (not surprisingly) controls the breaking point of the shaving, preventing the wood from splitting out ahead of the wedge-shaped blade. A damaged or worn chip breaker [**Photo F**] instead creates choke points for shavings, preventing proper chip ejection and surface smoothing. Tune up your chip breaker by following the steps in **Photos G** and **H**.

SHARPEN THE BLADE

I

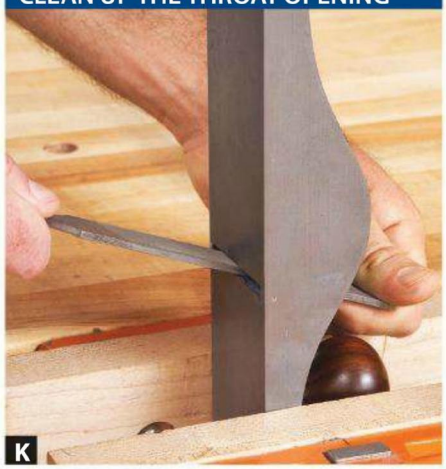
Sharpen the blade on 120 grit until the edge shows a single facet. Then make a few strokes each on 220-, 320-, and 2,000-grit paper.

J

Polish the back of the blade on 220-, 320-, and 2,000-grit sandpaper. Friction holds the 2,000-grit paper in place.

Next, sharpen the blade (old or new) using your preferred method. (See page *60* for some options.) Because John already had the sandpaper out, he used it to sharpen the blade at a 25° angle using 120-, 220-, and 320-grit abrasives. Then he honed it on 2,000-grit paper at 30° [**Photos I** and **J**].

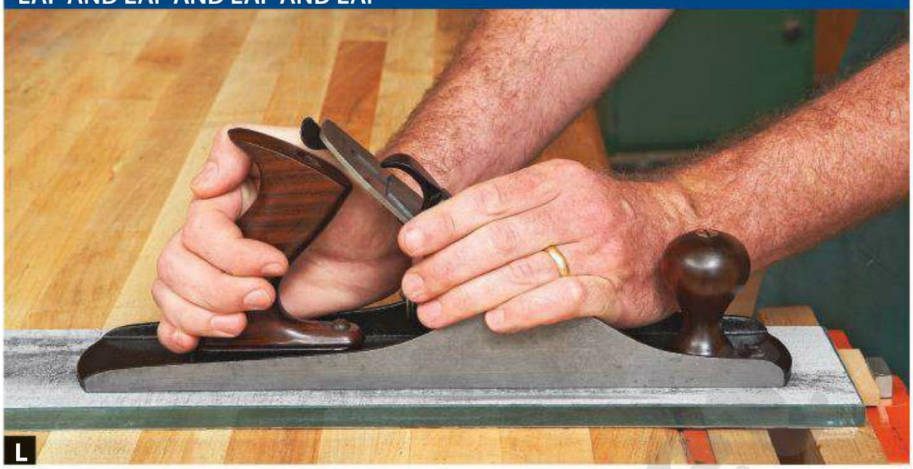
CLEAN UP THE THROAT OPENING



K

File at a slight angle to relieve the material backing the throat without significantly widening the opening.

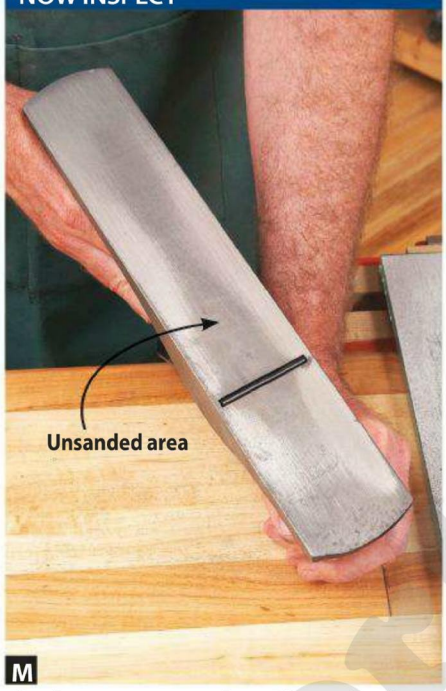
LAP AND LAP AND LAP AND LAP



L

Your body naturally tends to slide the plane in an arch, with more pressure in the middle of the stroke. You must combat this motion to avoid lapping the sole into a curve. One method: Flip the plane around while lapping. Most of your time will be spent on the coarser 120-grit paper.

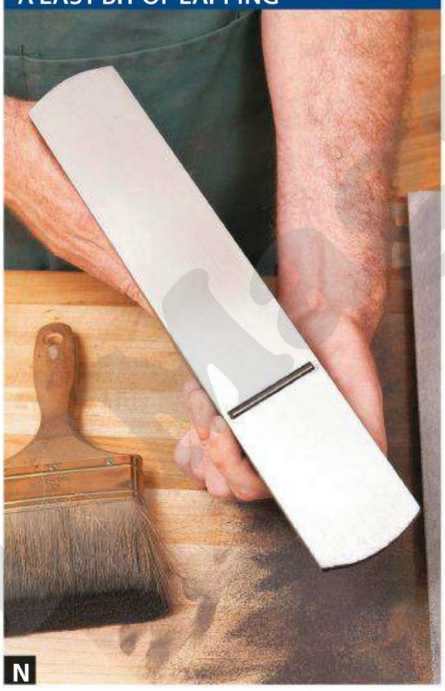
NOW INSPECT



M

Check your progress often. After only a few strokes, the wear pattern begins to show the plane's hard-working history.

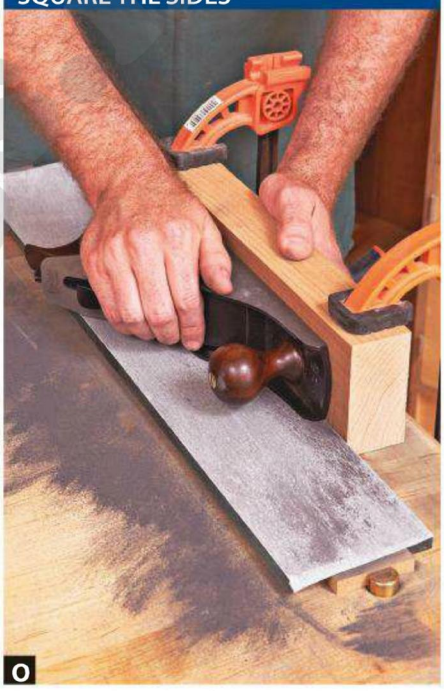
A LAST BIT OF LAPPING



N

With the sole completely lapped, finish by polishing out any scratch marks using 220-, then 320-grit sandpaper.

SQUARE THE SIDES



O

To square the sides of the plane, lap them while pressing the sole against a jointed piece of scrap hardwood.

Complete the refurb: Body and sole

The bowed leading edge of a Stanley-style chip breaker maintains pressure against the blade, stiffening it. But it also has a tendency to crowd the throat opening, leaving the shavings little escape. For best results, John likes to relieve the throat opening. To do this, use a combination square to mark a pencil line parallel along the leading edge of the throat opening. Clamp the body in your vise, and use a file to remove some bulk from the material backing the leading edge of the throat [**Photo K**]. Use the line as a guide to ensure the throat remains straight.

To properly flatten the sole of the plane, the plane's body needs to be under the same tension it will experience when in use. So, fully reassemble the plane, leaving the blade retracted above the sole. Then it's back to the sandpaper.

Gripped properly, your body's tendency is to move the plane in a scooping motion. While this is fine when using the plane, during lapping, it curves the sole, front to back. John suggests turning the plane backwards during lapping for a better chance at a flat sole. Follow the steps in **Photos L–O** to flatten the sole and square the sides of the body.

Finally, all that remains is a last cleanup with mineral-spirits-soaked shop towels. Coat the freshly lapped sole and sides with a light coat of paste wax to protect against reoccurring rust, and adjust your newly refurbished plane for cutting. Congratulations, you're the proud owner of a shop-ready classic bench plane!

Written by **Lucas Peters** with **John Olson**
Illustration: **Tim Cahill**

Sharpening Showdown

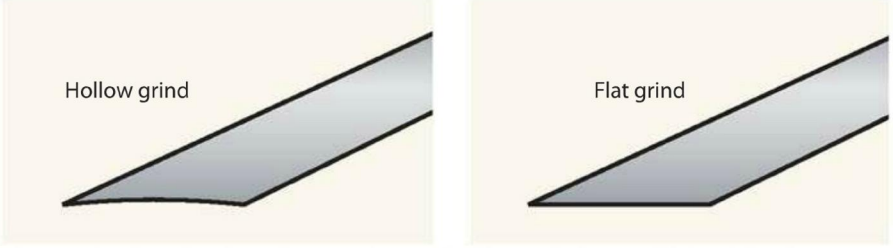
We tested more than a dozen products in four categories—sandpaper, water stones, ceramic stones, and diamond stones—to find the best at imparting a super-sharp edge in the least amount of time.

Sharpening chisels and plane irons is like working out at the gym: You know you should do it, but getting started can seem daunting. Like working out, the more you sharpen your tools, the better you get at it. And pretty soon you actually begin to enjoy it. To get to that point, you must first settle on the tools and methods that suit your needs. Before we get around to comparing the four best sharpening media, though, let's cover the basic procedures that apply to all of them.

First comes shaping

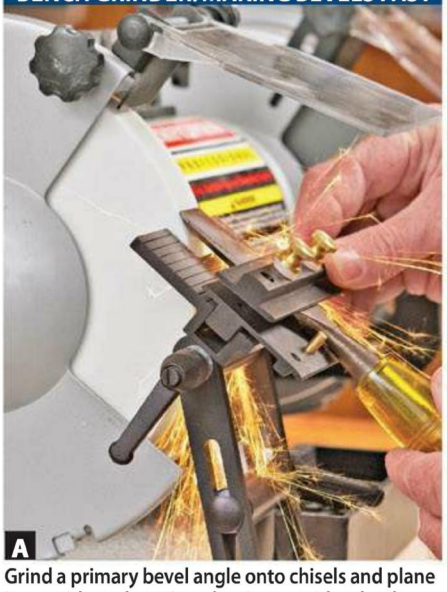
Before honing a razor edge onto a tool, first establish its primary bevel angle, a process known as shaping. (Most chisels and plane irons have either a 25° or 30° primary bevel angle.) During shaping,

TWO TYPES OF SHAPING



Shaping a bevel on a bench grinder's round stone wheel forms a hollow grind (left), while a sharpening stone or sandpaper forms a flat grind (right).

BENCH GRINDER: MAKING BEVELS FAST

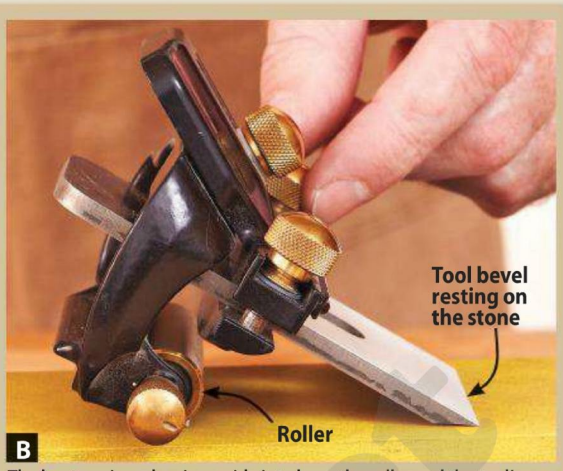


Grind a primary bevel angle onto chisels and plane irons with cool-cutting aluminum oxide wheels and a tool rest to maintain a consistent angle.

Use a honing guide for repeatable results

To consistently and accurately flat-grind an edge or hone a microbevel, start with a honing guide (such as the Veritas Mk.II, shown in **Photo B** and listed in **Sources**) that holds your tool securely at a precise angle. We like this model because it holds chisels and plane irons from ¼" to 2⅞" wide, at bevel angles from 15° to 54°—more than adequate for the vast majority of chisels and plane irons. And its 2"-wide roller fits nicely onto all the stones we tried.

To use a honing guide, secure a tool following the product's instructions to ensure a beveled cutting edge that's square to the sides. With the tool bevel and honing-guide roller resting on the stone or sandpaper, rub the guide/blade assembly back and forth until the bevel looks uniform and a slight burr develops on the back of the bevel. Start with a coarse grit for shaping (100–325), and then hone with successively finer-grit stones (three or four from 600 to 8,000 grit, roughly doubling the grit rating with each step up) without changing the tool's position in the guide. If you're honing a microbevel, stop when it measures about 1⁄16" wide.



The key to using a honing guide is to keep the roller and the tool's beveled edge in constant contact with the sharpening medium.

you create a fresh beveled surface that's square to the sides and free of nicks or scratches.

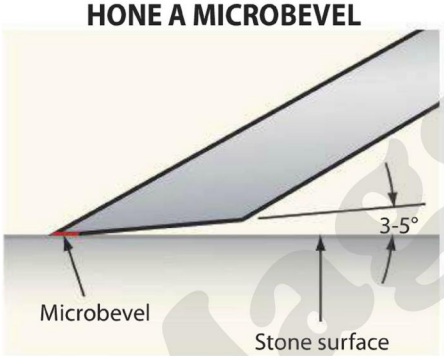
A bench grinder [**Photo A**] shapes the tool fastest—especially if your chisel or plane iron has been damaged and needs a lot of material removed. A bench grinder makes a hollow grind on your tool; see the "Two Types of Shaping" drawings on the *previous page*. For best results, use a slow-speed grinder (less than 2,000 rpm) with a 100- or 120-grit aluminum oxide wheel. (The coarse silicone carbide wheels that come with most grinders cut too roughly for woodworking tools.) To avoid overheating the tool and turning it blue (which weakens the steel), dip it frequently in a water-filled quench cup.

If you don't have a grinder, shape your tools using a honing guide to hold the tool—see the sidebar *above*—and a coarse stone or sandpaper (approximately 100 to 325 grit). This creates a flat grind, as shown on the *previous page*. Upon finishing the sharpening process, a flat grind ultimately yields a cutting edge as sharp as a hollow grind, but the process takes longer because you're removing more metal and at a slower rate than a grinder.

Now hone the edge

Regardless of how you shape the tool's edge, you now need to hone it to razor sharpness. For this step, raise the tool angle 3–5° in your honing guide and hone a microbevel, as shown in the drawing *above center*, using a series of stones or sandpaper from about 600–1,000 grit up to the 5,000- to 8,000-grit range. Because the tool will cut using only the tip of the bevel, you don't need to hone the entire primary bevel. This saves you time and effort and extends the life of your sharpening media.

HONE A MICROBEVEL



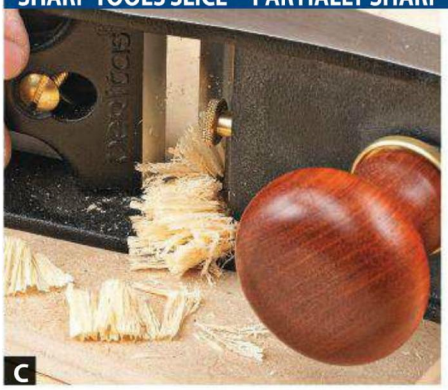
After shaping the primary bevel angle, create a microbevel by raising the tool from its primary bevel to hone only a short section near the tip.

Know when to stop

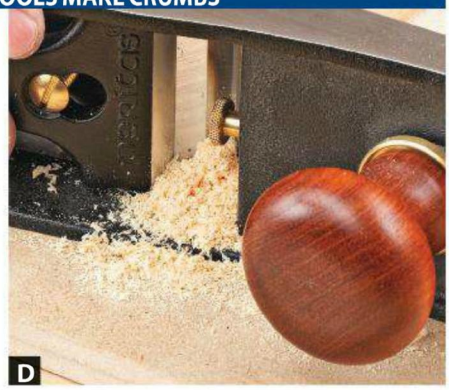
With each finer grit of sandpaper or stone you run a tool across, you'll remove metal and further refine the edge. Successively finer grits not only remove scratches left behind from the previous grit, but also further hone that edge to a crisp point that will slice through wood with ease. Stop too soon and your tool may remove wood, but probably with some tear-out, greater effort on your part, and a short edge-life expectancy. The sharper you get a tool, the longer that edge will stay sharp. Read ahead to find the targeted stopping point for each sharpening medium.

While cutting wood with the sharpened tool, the edge will wear away; how quickly that happens will depend on the wood and the tasks you're doing. When it dulls—you'll notice it not cutting as easily or cleanly as when freshly sharpened [**Photos C and D**]—simply hone the edge again at that same microbevel angle to resharpen. Start back at a mid-point honing grit (1,000–4,000) and continue through the polishing stages (5,000–8,000). After rehoning three or four times, the microbevel will begin to catch up to the primary bevel. Before you get to that point, it will be quicker to simply reshape the primary bevel and then hone a new microbevel.

SHARP TOOLS SLICE—PARTIALLY SHARP TOOLS MAKE CRUMBS



This plane's iron, sharpened to a mirror polish with an 8,000-grit stone, yields shaved ribbons when cutting end-grain pine.



Sharpened only to 1,000 grit, this plane leaves crumb-like shavings and torn-out grain in its wake. Two more grits would improve this cut.

4 Effective hand-honing media

1. Sandpaper

What you'll need: If you plan to shape your tools with a hollow grind at the bench grinder, you'll need sandpaper in 220, 320, 600, and 1,200 grit, as well as an ultrafine abrasive (between 2,000 and 4,000) for final polishing. (Stopping short of the ultrafine grits will produce an edge that cuts wood, but dulls quicker.) For flat-grind shaping, add 120 grit. You can use self-adhesive sandpaper rolls, but few rolls come in grits higher than 400, and your brand choices dwindle past that point.

You'll need a flat surface on which to adhere the sandpaper. You can use glass or granite, but we find ¾"-thick MDF flat enough for everyday sharpening. Adhere the sandpaper to 3×8" blocks of MDF, as shown at *right*. (Use spray adhesive to mount regular sandpaper.) Once the abrasive wears out, simply toss the block and make another.

How it works: Use a rubber nonslip mat to keep your sharpening substrate from scooting during use. Using the same grits listed above, flatten and polish the back of the tool—but only the ½" or so nearest the cutting edge—after shaping the bevel and before honing the cutting edge. (Watch a video on sharpening with sandpaper and a honing guide at woodmagazine.com/sharpeningvid.)

PROS:

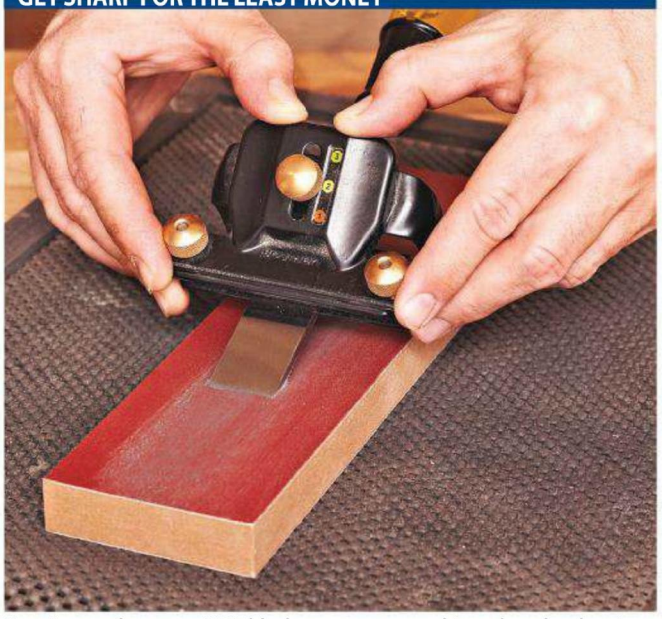
- This system has the lowest buy-in cost: The sandpaper should cost you less than $50, and a sheet of MDF $30 or so. If you get the glass, expect to pay less than $20 for a 10" square.
- You can find quality sandpaper (600 grit and under) almost anywhere. (See **Sources** on *page 65* for where to buy ultrafine papers.)
- You don't need a messy lubricant; just sharpen dry and get great results.

CONS:

- The abrasive in sandpaper wears out quickly when sharpening tools, especially the harder A2 steel. Each of the four sandpaper brands we tested lost its fast-cutting ability within the first 30 seconds. (See the chart *below*.) Then you're left with a slow-cutting abrasive that's completely spent in 5–7 minutes.
- Costs add up if you're sharpening more than the occasional tool. Because you'll need to replace sandpaper so often, the low initial buy-in can become a regular money drop. And the ultrafine sheets—essential to honing the final edge—cost $2–$4 *per sheet*.

BOTTOM LINE: If you only sharpen a few tools two or three times a year, and you want to minimize your investment, look no further than sandpaper.

GET SHARP FOR THE LEAST MONEY



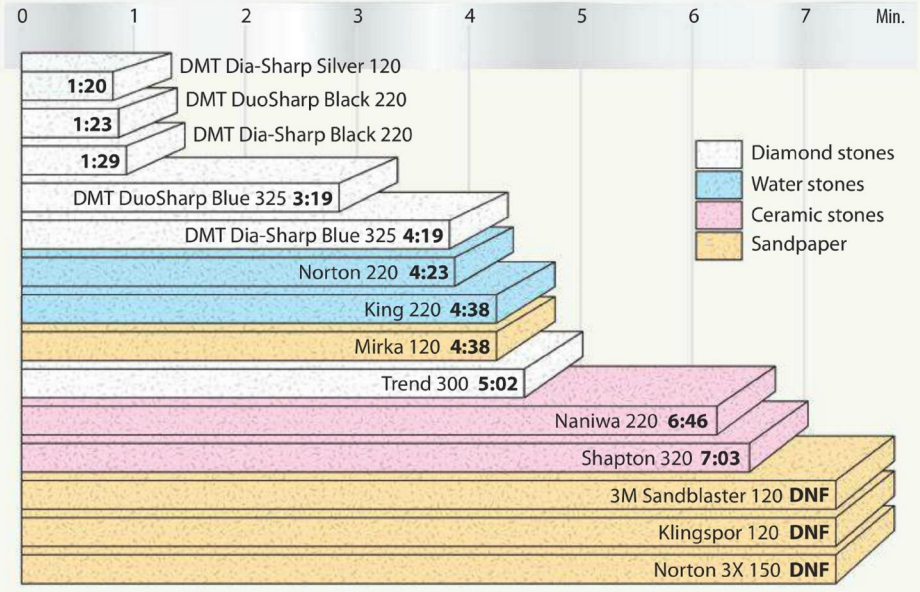
By using sandpaper on MDF blocks, you toss everything when the abrasive wears out, saving you a lot of hassle versus having to clean worn abrasives from float glass or granite.

SHAPING OR HONING, DIAMOND STONES CUT STEEL

We all want our tool-sharpening time kept to a minimum so we can get back to working wood. So to find which of the sharpening media (sandpaper, water stones, ceramic stones, and diamond stones) get the job done quickest, we put more than a dozen products to the test in the *WOOD*® magazine shop.

There's no beating a bench grinder for fast shaping, but if you prefer to do your shaping on a flat stone or sandpaper, look for something in the 120- to 325-grit range. As you can see from our test results, the coarsest diamond stones did the job in less than a minute and a half. Even diamond stones around 300 grit performed better than or as well as the rest of the field. The bottom line: For the fastest flat grinds, get a diamond stone.

SHAPING: DO IT WITH DIAMONDS; SKIP THE SANDPAPER



Time required to shape a 25° primary bevel on identical plane irons, average of three tests.
DNF–did not finish the test because the abrasive wore out.

2. Water stones

What you'll need: Three stones, in 1,000, 4,000, and 8,000 grit (about $130 to $175 combined), will handle all your honing needs. You can get a 220-grit stone for shaping, but as shown in the chart on the *previous page*, a diamond stone does the job much quicker. A good option to save money: Buy combination stones with a different grit on each side for about 20–30 percent less cost than single-grit stones.

How it works: Use a honing guide as described earlier, but only after a bath—for the stones, that is. Essentially bricks made of aluminum oxide particles pressed tightly together with a binder, water stones must be submerged in water at least 15 minutes prior to use. And then during use, you'll need to splash water on the top surface occasionally to aid the cutting action and clear away metal filings. After you've established a hollow grind or flat grind, hone the tool starting with 1,000 grit and finish with 4,000 and 8,000.

SOAK 'EM, THEN STROKE 'EM

Water stones must soak 15 minutes before use. We store them on maple strips in an $8 plastic cake carrier.

PROS:

▶ A set of three water stones costs about 30–50 percent less than a similar set of ceramic or diamond stones.

▶ You can store water stones 4,000 grit and coarser in the water bath so they're always ready to use; finer stones, though, might break apart if stored in the water.

CONS:

▶ Water stones gouge easily from the tool's sharp bevel and dish out quickly, and consequently must be flattened using a special flattening stone, sandpaper, or coarse-grit diamond stone. How often this needs done will depend on your choice of brand; just to be sure, flatten at the beginning of each sharpening session.

▶ Some water stones hone so slowly, especially on third and fourth efforts, we found it faster to reshape the primary bevel after the second round of honing and then hone a new microbevel. With the Norton water stones, you can rehone a microbevel three times on a fine stone without it being a chore.

▶ The water and messy, grayish swarf could stain your workbench or cast-iron tool surfaces if spilled.

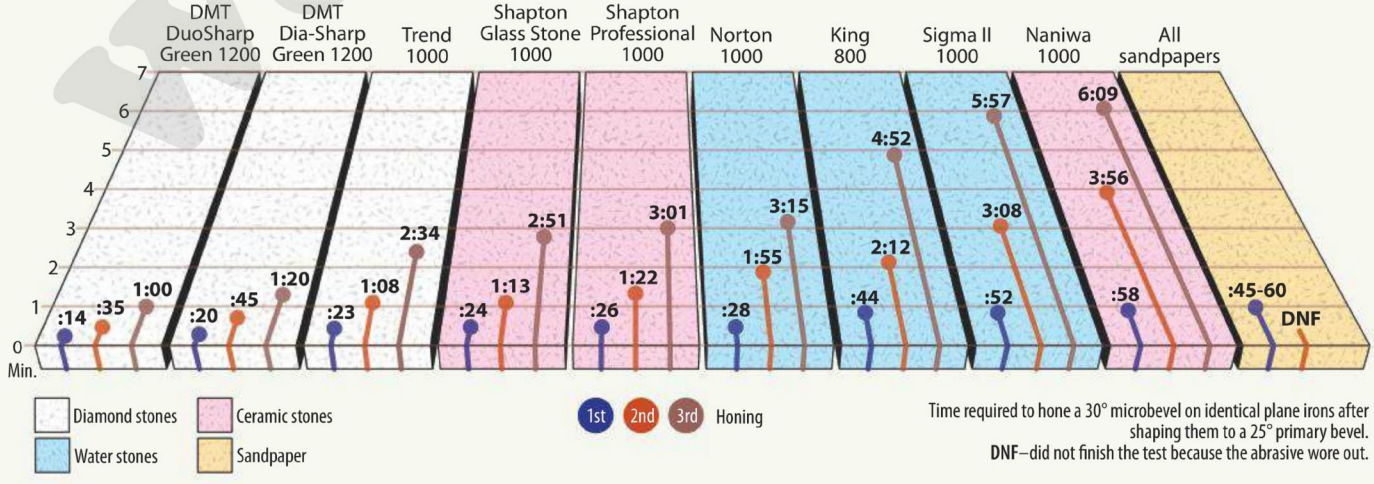
▶ Stones soaked in water or still wet from use will freeze and crack if stored below 32°F.

BOTTOM LINE: Water stones give you a nice combination of reasonable price and good overall performance with no learning curve.

FASTER THAN STONES OR SANDPAPER

Refining an edge to a crisp, sharp point comes after shaping the primary bevel, and it's done on finer-grit stones or sandpaper. To test comparable products in the 800- to 1,200-grit range, we honed the tools' edges, recorded the times, dulled the tools equally, and repeated the process two more times. (Each successive honing takes longer because you're removing more steel each time.) As with shaping, diamond stones proved quickest at honing. All the sandpaper brands we used could produce just one effective honing, so toss the sheet after each use.

HONING: AGAIN, DIAMONDS ARE YOUR BEST FRIEND



Time required to hone a 30° microbevel on identical plane irons after shaping them to a 25° primary bevel.
DNF–did not finish the test because the abrasive wore out.

3. Ceramic Stones

What you'll need: Get a 1,000-; either a 4,000- or 5,000-; and an 8,000-grit stone. Don't bother with the 220 or 320 coarse shaping stones—they cut slower and cost more than a similar-grit diamond stone.

How it works: Ceramics work almost identically to water stones, except you don't soak them. (They'll actually break apart if soaked.) Instead, just spritz a little water on the surface to lubricate and clear the swarf.

PROS:

▶ The Shapton professional stones and Shapton glass stones honed tools faster than water stones and left a fine, polished edge second to none. In fact, to save some money you could skip the 8,000-grit stone and just stop at the 5,000 without noticing a dramatic difference.

▶ Shapton glass ceramic stones are half as thick and mounted on glass, but sharpen just as well as the full-thickness Shaptons. They also sell for 30–40 percent less.

▶ Most ceramic stones are harder and denser than water stones and wear about twice as long, so they stay flat and retain their abrasiveness longer.

▶ Cleanup with ceramics is a snap: Just rinse with water and wipe dry.

CONS:

▶ The three ceramic stones we recommend for honing will cost you about $200 to $350—a big payout.

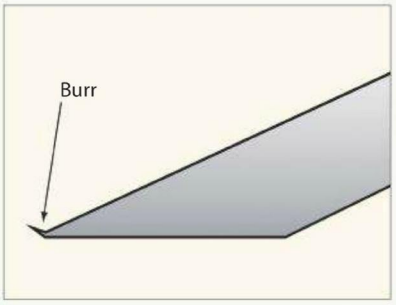
▶ Naniwa ceramics cut slowly, load up fast with metal filings, gouge easily, and need flattening more often than other ceramics we tested.

BOTTOM LINE: For the most part, ceramics sharpen cleaner and faster than water stones and sandpaper, and leave supersharp, polished edges. Ceramics are a big investment, but you'll likely use them for 20 years or more. But you'll still need a shaping source.

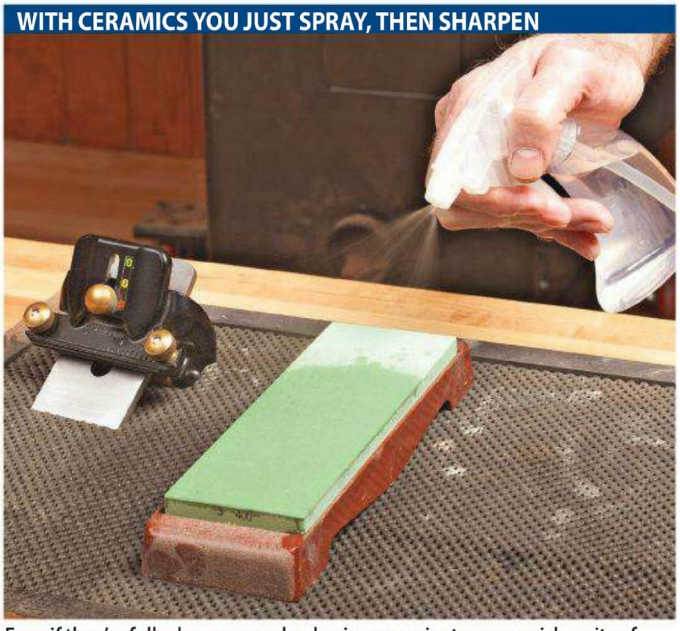
MYTH BUSTER

Don't shave the burr

Conventional wisdom says, with each grit stone or sandpaper you use in your sharpening process, to flip the tool over after honing the bevel and rub away the inevitable burr. But that's not necessary if you've flattened the tool's back. As you continue sharpening the tool at the same angle on successively finer grits, the burr will eventually fall away on its own as the sharp edge comes to a crisp point.

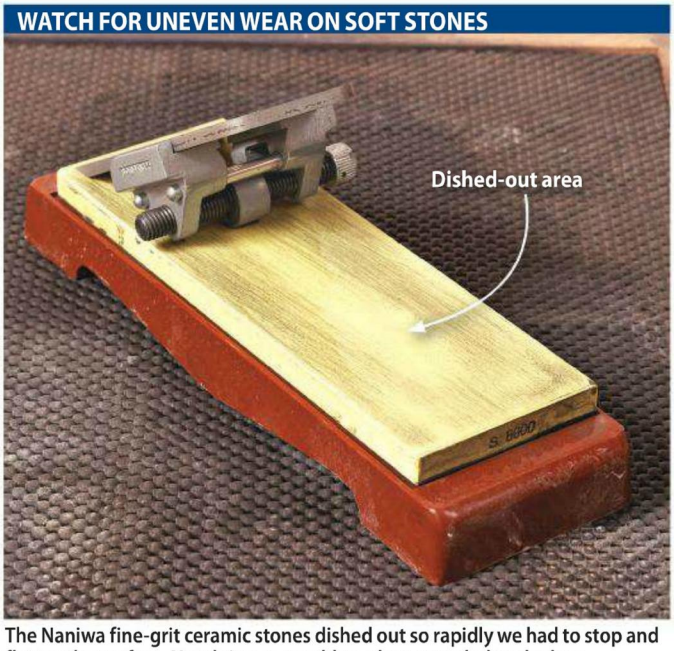


WITH CERAMICS YOU JUST SPRAY, THEN SHARPEN



Even if they're fully dry, you need only give ceramic stones a quick spritz of water before sharpening tools.

WATCH FOR UNEVEN WEAR ON SOFT STONES



The Naniwa fine-grit ceramic stones dished out so rapidly we had to stop and flatten them often. Not doing so would produce rounded tool edges.

Don't bother with oil stones

These standbys have been around a long time, but oil stones just aren't practical any longer—for three good reasons:

▶ **Costly.** These natural stones have become more scarce and expensive.

▶ **Ineffective.** They don't cut the newer tool steels and alloys, such as the A2 steel now used in a lot of plane irons. Instead, the filings just clog the stone's surface.

▶ **Messy.** Which would you rather clean up: water or oil? Thought so. And some modern sharpening media require no lubrication at all.

4. Diamond Stones

What you'll need: Nothing's harder than diamonds, and these diamond-particle-coated steel plates cut quickly and evenly every type of tool steel we threw at them. But we just couldn't get tools sharp enough using diamond stones alone, so plan to pair them with another type of media for final honing and polishing.

We recommend getting a two-sided 8"-long diamond stone because it gives you two grits to speed through the shaping/early honing process. Get a 120- to 325-grit stone for shaping a flat grind, and a 1,000 or 1,200 for the next step. Or, for following up a hollow grind, get a 600/1,200 stone.

How it works: You stroke the tool on a diamond stone just as you do with other media. Diamond stones need lubrication to prevent metal filings from building up and clogging the abrasive, but it's not as messy as with water stones.

DMT's DuoSharp stones, *below left*, feature an abrasive-coated plate with a pattern of dotted recesses throughout, providing a place for the swarf to pool. That helps them cut quicker than DMT's Dia-Sharp stones, which have more densely packed diamonds that give them the appearance of diamond sandpaper. Spritz both of these with water as needed during use.

Trend's Classic Pro stone has a diamond-shaped pattern with recessed flutes for drainage, but the oil that comes with the stone dissipated quickly and was more difficult to clean up than with water. The oil costs $15–$50 to replace, depending on size, so skip the oil in favor of water. (Trend recommends oil to prevent rusting of the steel plate. We dried ours after use to prevent rust.)

PROS:

▶ DMT stones cut at least four times faster than the other media we tested.

▶ Two-sided stones provide value. The DuoSharp ($80–$110 each) comes in four combinations of different grits. The Trend Classic Pro ($135) stone comes only in 300/1,000, although Trend offers a 220-grit single-sided stone for $155. Dia-Sharp single-sided stones cost $65–$100 and come in six grits.

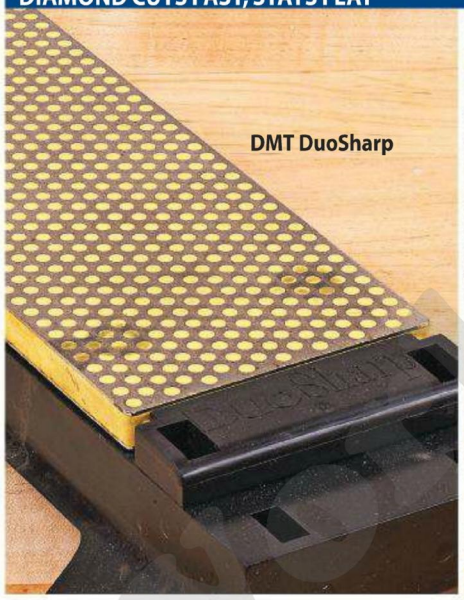
CONS:

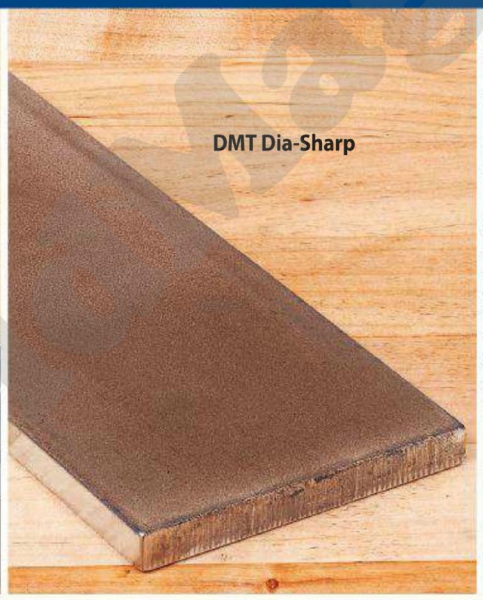
▶ Trend's diamond stone shaped and honed slower than the DMT models, but it's still about as fast or faster than water stones, ceramics, and sandpaper.

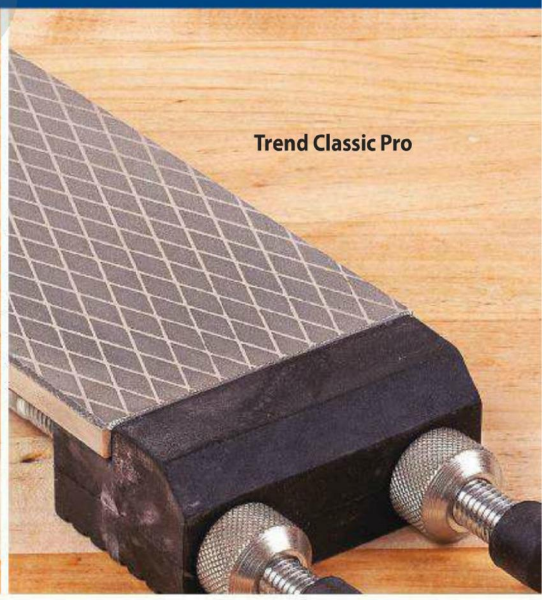
▶ Because coarse diamond stones (120 to 325 grit) cut so aggressively, you'll need to follow up with a finer diamond stone (600 to 1,200) and a water or ceramic polishing stone (5,000 to 8,000) or sandpaper (2,000 to 4,000) to remove the shaping scratches.

BOTTOM LINE: This is a good place to begin your sharpening-stone system because a diamond stone cuts fast, needs no maintenance other than an occasional rinsing, and can be used to flatten water and ceramic stones.

DIAMOND CUTS FAST, STAYS FLAT







Diamond stones vary in surface appearance. Recessed dots and flutes (left and right) help clear swarf from the abrasive. Some stones (center) lack this feature.

Here's where you should spend *your* money

After buying a bench grinder ($125 for the grinder, $30 for a 120-grit wheel) and a quality honing guide, we recommend you invest in two stones: a two-sided DMT DuoSharp in coarse (325) and extra-fine (1,200) grit, and a 6,000-grit Shapton glass ceramic stone. With this setup ($175 for the two stones) you'll make a hollow grind at the grinder, hone the microbevel with the coarse side of the diamond stone, refine it with the extra-fine side, and then polish it with the ceramic stone. The last three steps will flatten tool backs. The quick-cutting media will have you spending less time sharpening and more time using your sharp tools.

Produced by **Bob Hunter** with **John Olson**

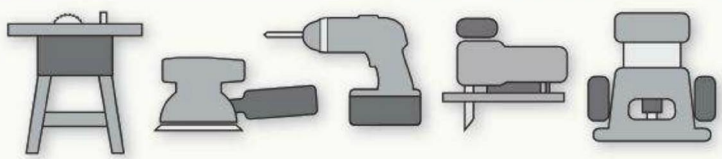
Sources

Mk.II honing guide: part #05M09.01, $64.50, Lee Valley, 800-871-8158, leevalley.com.
Norton water stones, Sigma II water stones, ultrafine sandpaper: Lee Valley.
King water stones: Traditional Woodworker, 800-509-0081, traditionalwoodworker.com.
Shapton ceramic stones, ultrafine sandpaper: The Japan Woodworker, 800-537-7820, japanwoodworker.com.
Naniwa ceramic stones, ultrafine sandpaper: Tools For Working Wood, 800-426-4613, toolsforworkingwood.com.
DMT diamond stones: DMT Manufacturing, 800-666-4368, dmtsharp.com.
Trend diamond stones: Trend Routing Technology, 877-918-7363, trend-usa.com.
Shapton glass ceramic stones: Woodcraft Supply, 800-225-1153, woodcraft.com.

A Beauty of a Blanket Chest

BASIC-BUILT
GREAT PROJECTS MADE SIMPLE.

WHAT YOU'LL NEED



Project Highlights

- Overall dimensions: 43" wide × 20" deep × 25" high.
- Learn to cut perfect, repeatable curves using a simple jig.
- Screws and glue are all you need to know about joinery.
- Master the flush-trim router bit for perfectly fitting parts.
- Cost of materials: about $120, plus $30 for hardware.

Don't let the layered look alarm you. This blanket-bearing beauty puts some craftiness in your craftsmanship as you skip tricky frame-and-panel joinery in favor of plywood construction with an easy onlay look-alike.

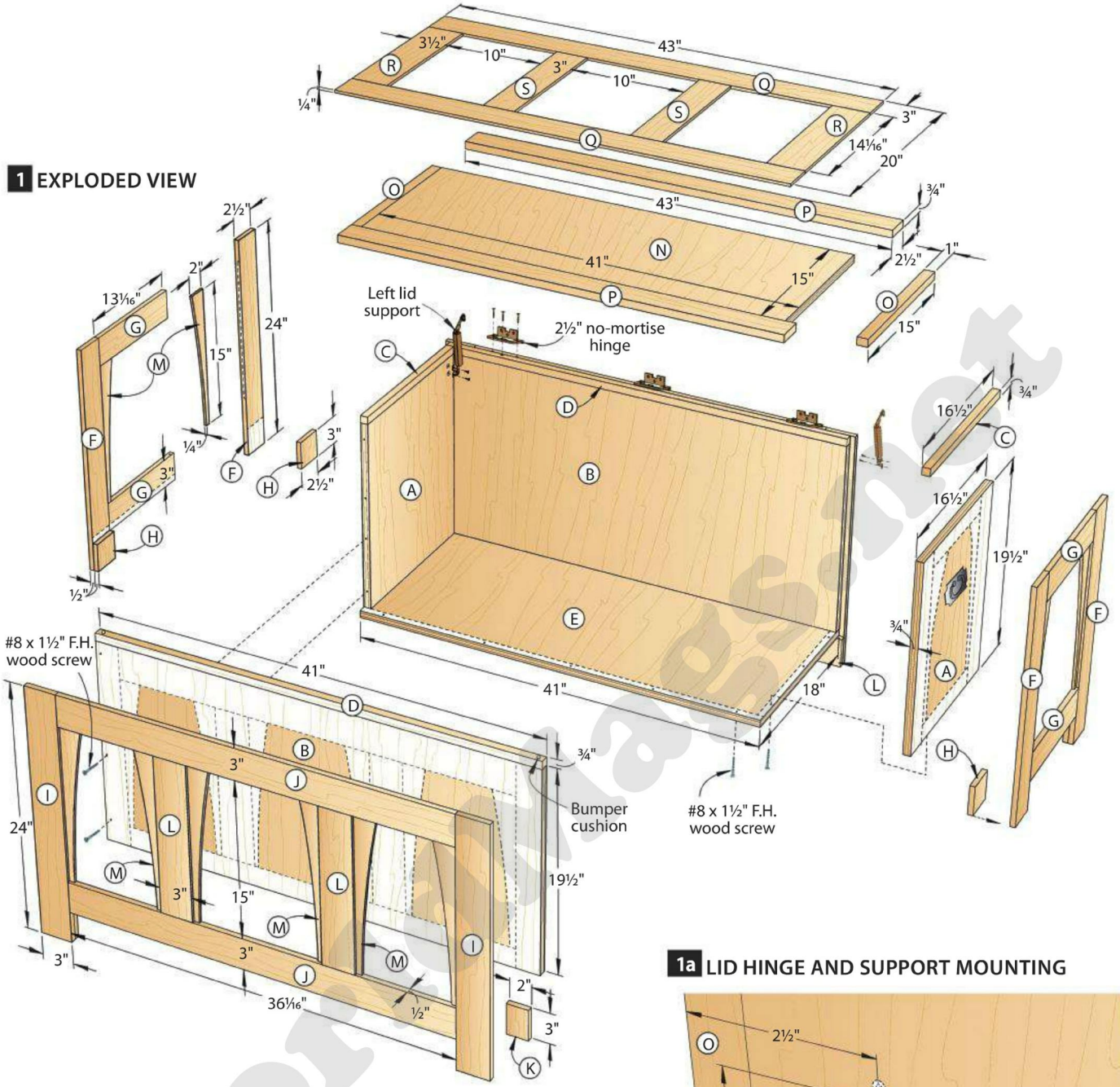
Start with a solid case

1 Cut the chest ends (A) and front and back (B) to size from ¾" plywood [**Materials List**, *page 70*, **Drawing 1**], making sure to orient the grain as shown in the **Cutting Diagram** on *page 70*.

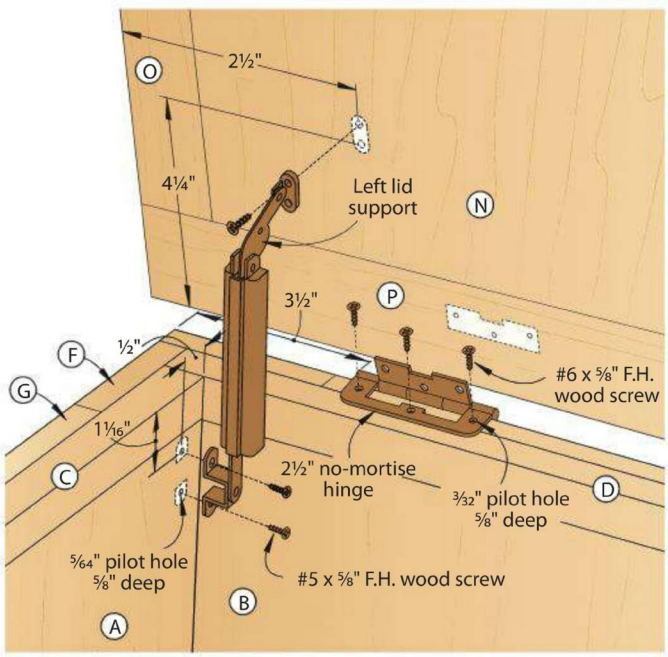
2 Carefully measure the thickness of your plywood; it will most likely be slightly less than ¾". Rip ¾"-thick oak to match the plywood's thickness. Then crosscut the end edging (C) and front and back edging (D) to length. Glue and clamp the edging to the top ends of the ends (A), front (B), and back (B) [**Drawing 1**]. After the glue dries, sand the panels to 220 grit.

3 Use a corner-clamping brace (for a free plan, see **More Resources**) to hold the ends (A/C) in place and square to the front and back (B/D) [**Photo A**].

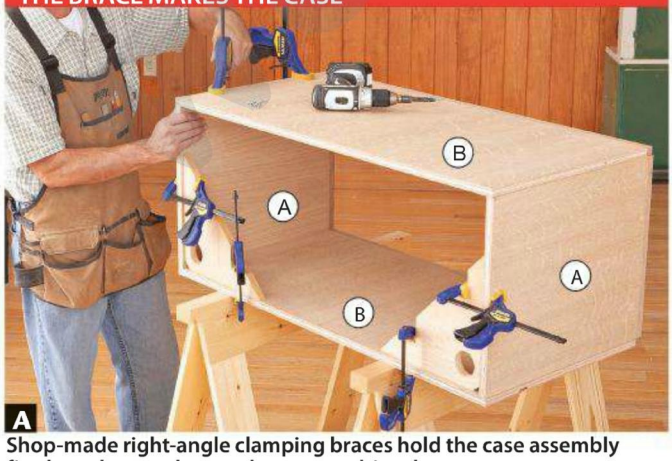
1 EXPLODED VIEW



1a LID HINGE AND SUPPORT MOUNTING

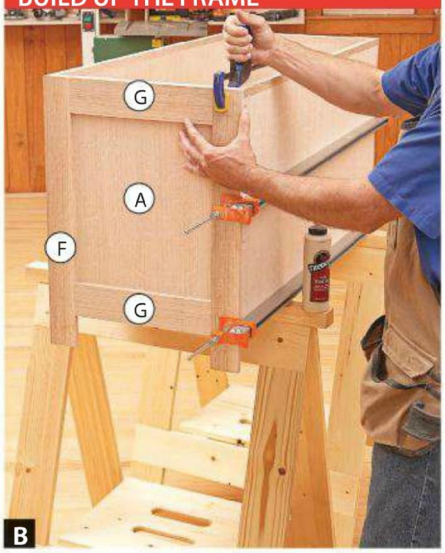


THE BRACE MAKES THE CASE



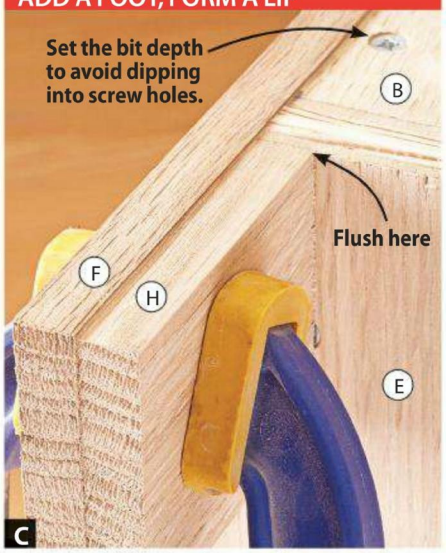
Shop-made right-angle clamping braces hold the case assembly firmly and squarely together as you drive the screws.

BUILD UP THE FRAME



Wait for the glue to dry on one leg and the rails before gluing on the second leg. Repeat with the other end.

ADD A FOOT; FORM A LIP



Clamp and glue the foot (H) flush with the chest (A–E), completing the bearing surface for the flush-trim bit to trim the leg to width.

TAPE COMPLETES A CLAMPING CAUL

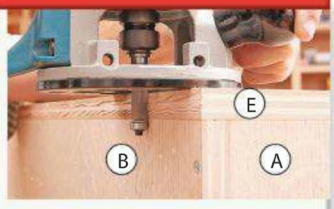
Tape layers create a bulging pressure point in the center of the caul. Start with a 3" strip, centered, then add successively longer strips.

EXTEND THE REACH OF YOUR CLAMPS

The masking-tape bulge distributes the pressure of the clamps to the center of the stiles, where they could not otherwise reach.

SHOP TIP

Measure once, cut twice for flush parts



To trick the eye into believing that this chest consists of frame-and-panel construction, the onlay must join perfectly at the corners. Such precision comes courtesy of a flush-trim router bit.

If you cut parts to the listed sizes, you'll find that edges often overhang rather than landing exactly flush. A flush-trim bit makes short work of getting the surfaces to match. The bearing of the bit rides along the face of the adjacent piece, guiding the equal-diameter bit as it trims the two surfaces perfectly flush, as shown *above*.

Not only does this method prove faster and more precise than attempting to sneak up on the final size of a part at the tablesaw, but it's also more forgiving, because it trims mating parts perfectly flush even if they are slightly out of square.

Drill and countersink 7/64" pilot holes. Then glue and screw the front and back to the ends.

4 Measure the chest size, then cut the chest bottom (E) 1/16" wider and longer than the measured size. Screw the bottom in place, leaving an overhang on all four sides. Then use a flush-trim bit in your router to trim the edges of the bottom even (**Shop Tip**, *above right*).

Add a faux frame

1 From 1/2" stock, cut the end legs (F) and the end rails (G) to size. Glue and clamp one end leg to the end (A/C) [**Drawing 1**] with the tops and edges flush. After the glue dries, glue the end rails to the chest, one flush with the top, one flush with the bottom. Allow the glue to dry before gluing another end leg to the chest [**Photo B**]. (The end leg will overhang the chest slightly.) Repeat the process with the other end of the chest.

2 Cut the end feet (H) to size [**Drawing 1**]. Then glue and clamp them in place on the inside of the end legs (F).

Note: *Position the feet flush with the chest bottom (E) rather than the legs* [**Photo C**].

When the glue dries, use your router and flush-trim bit to trim the edges of the overhanging end legs flush with the face of the chest.

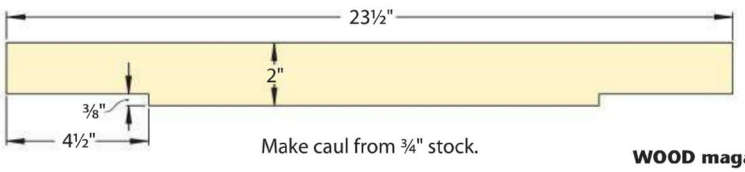
3 Cut and attach the remaining legs (I) and rails (J) to the front and back (B/D) in the same manner as you did on the ends (A/C), flush-trimming the overhanging leg even with the end leg (F). Cut the front/back feet (K) to size and glue them in place.

4 Rip the front/back stiles (L) to width [**Drawing 1**], and crosscut them to fit between the front/back rails (J). From 3/4" scrap stock, create two clamping cauls [**Drawing 2, Photo D**]. Glue the stiles in place and secure them with the cauls [**Photo E**].

Tackle the trim

1 From 1/4" stock cut 16 blanks for the onlay trim (M) 1/4" longer and 1/4" wider than the size listed in the **Materials**

2 CLAMPING CAUL



Make caul from ¾" stock.

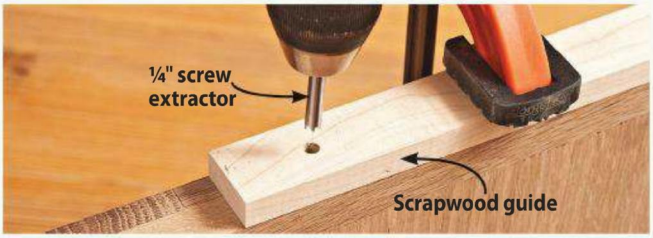
SHOP TIP

Quick fix for snapped screws

Oak is hard; brass hinge screws, not so much. To make driving them easier, drill pilot holes first. Then drive and remove a steel screw of the same size and thread count as the hinge screw. This plows the way for the often-softer hinge screw. Insert the hinge screws by hand, tightening them with a screwdriver.

If this method still fails you, and you break the head off a screw, don't despair. There's a tool for that. Pick up a ¼" screw extractor (Woodcraft no. 124210, $11, 800-225-1153, woodcraft.com) and a ¼" plug cutter (no. 146724, $12). Make a guide for the task by drilling a ¼" hole in scrap. Then clamp this over the broken screw. Chuck the extractor in your drill and insert it into the guide hole. Drill into the oak about ¾", and back the extractor out. The plug it forms around the broken screw will usually pop out with the extractor. If not, break it loose with an awl.

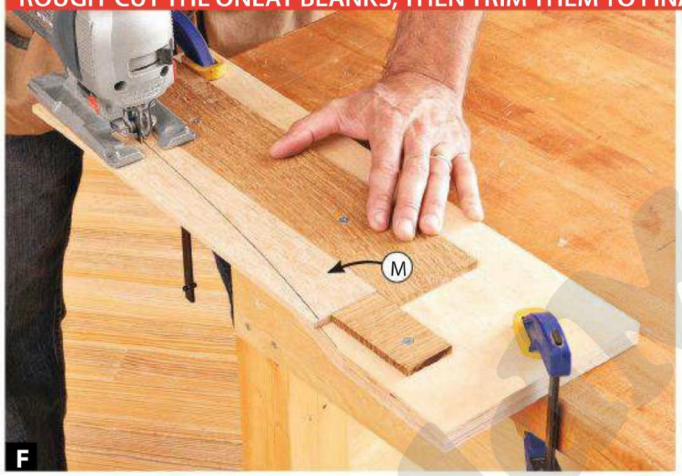
Then use the plug cutter in your drill to create a plug from similarly grained scrap oak. Glue this in place with the grain in alignment and, after the glue dries, chisel and sand away the excess plug material. Good as new!



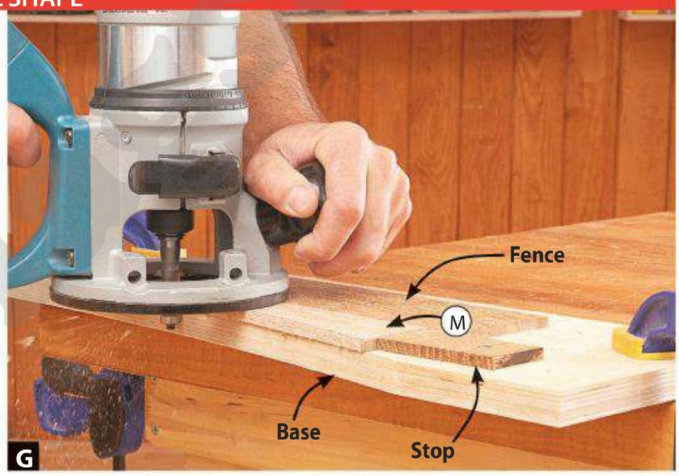
Scrapwood serves as a guide and splinter-preventing backer for the screw extractor as you drill into the oak surrounding the screw.

To avoid marring the project, pare away the excess plug, holding the chisel bevel-side down. Then sand the plug smooth.

ROUGH-CUT THE ONLAY BLANKS, THEN TRIM THEM TO FINAL SHAPE



With the onlay trim blank (M) taped in the jig, use a 10-tooth-per-inch jigsaw blade to saw within 1/16" of the line on the waste side.



Break out the flush-trim-bit-equipped router again to ride the bearing against the jig base, trimming the onlay's curve to its final shape.

List. Cut a template blank the same size from ¼" hardboard or plywood. Make a copy of the **Onlay Trim Pattern** from the *WOOD Patterns®* insert. Use spray adhesive to affix the pattern to the template blank, aligning the wide end of the pattern with one end of the blank.

2 Build the onlay jig [**Drawing 3**]. Using double-faced tape, attach the template blank to the jig abutting the fence and stop. Use your jigsaw to cut just outside the line through both the jig and the template. Then sand both to the line. Remove the template from the jig.

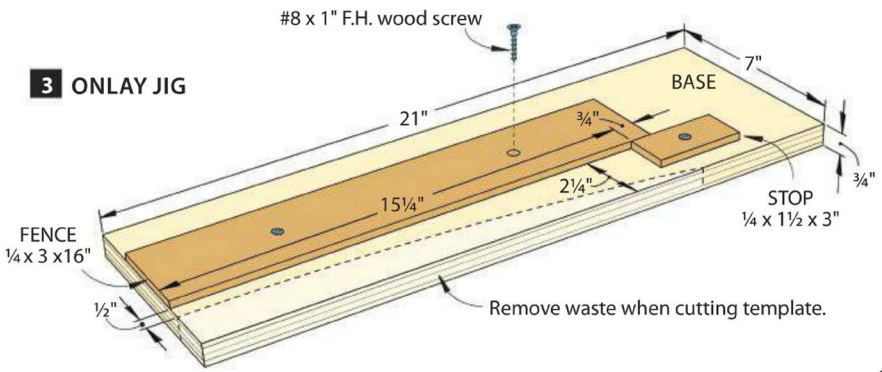
3 Use the template to mark the curve on the onlay trim blanks (M). Double-faced-tape a blank in the jig, jigsaw close to the line [**Photo F**], then rout the final curve with a flush-trim bit [**Photo G**], using the jig as the guide. Repeat with the remaining blanks. Sand the onlay trim, cut each to fit, and glue in place, securing them with the clamping cauls.

On to the onlay lid

1 Cut the lid panel (N) and lid edging (O, P) to size. First, glue and clamp the end edging in place, flush at the top and ends [**Drawing 1**]. After the glue dries, glue and clamp the front/back edging in place. Sand the lid to 220 grit.

2 Cut the lid rails (Q) and end stiles (R) to size and affix the frame to the lid (N/O/P), as you did with the legs and rails on the ends (A/C), trimming the last rail with a flush-trim bit. Cut the lid dividers (S) to fit between the rails and glue them in place using the clamping cauls.

3 ONLAY JIG



3 Sand the surfaces to 220 grit and soften the edges with sandpaper. Predrill and install the hinges [**Photo H, Drawing 1a**]. Attach the lid supports, following the manufacturer's instructions, and add the trunk handles.

Note: *The trunk handles we purchased came with 1"-long screws. To make them work with the ¾" plywood, we clipped them in half with nail-cutting nippers before installing.*

Disassemble and remove all hardware and finish as desired. (We used Zar Teak Natural 120 stain, then applied three coats of satin oil-based polyurethane.)

Produced by **Lucas Peters** with **Kevin Boyle**
Project design: **John Olson**
Illustrations: **Lorna Johnson** and **Kevin Boyle**

Materials List

	Chest	FINISHED SIZE T	W	L	Matl.	Qty.
A	ends	¾"	16½"	19½"	OP	2
B	front/back	¾"	41"	19½"	OP	2
C	end edging	¾"	¾"	16½"	O	2
D	front/back edging	¾"	¾"	41"	O	2
E*	bottom	¾"	41"	18"	OP	1
F	end legs	½"	2½"	24"	O	4
G	end rails	½"	3"	13 1/16"	O	4
H	end feet	½"	2½"	3"	O	4
I	front/back legs	½"	3"	24"	O	4
J	front/back rails	½"	3"	36 1/16"	O	4
K	front/back feet	½"	2"	3"	O	4
L	front/back stiles	½"	3"	15"	O	4
M*	onlay trim	¼"	2"	15"	O	16
Lid						
N	panel	¾"	41"	15"	OP	1
O	end edging	¾"	1"	15"	O	2
P	front/back edging	¾"	2½"	43"	O	2
Q	rails	¼"	3"	43"	O	2
R	stiles	¼"	3½"	14 1/16"	O	2
S	dividers	¼"	3"	14 1/16"	O	2

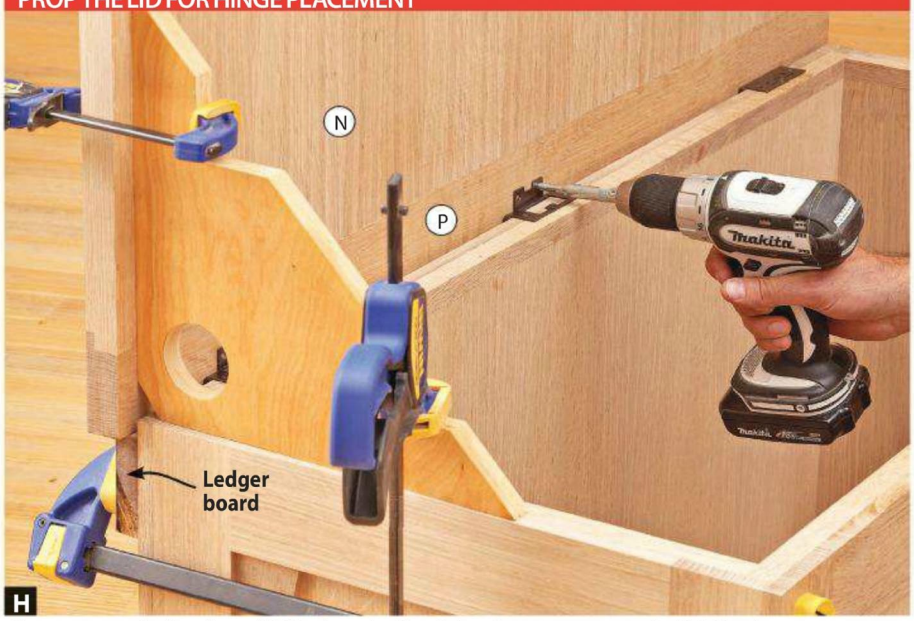
*Parts initially cut oversize. See the instructions.

Materials key: OP–oak plywood, O–oak.
Supplies: #8×1½" flathead wood screws, double-faced tape, spray adhesive.
Bits: 5/64", 3/32", 7/64" drill bits; countersink bit; flush-trim router bit.

Sources

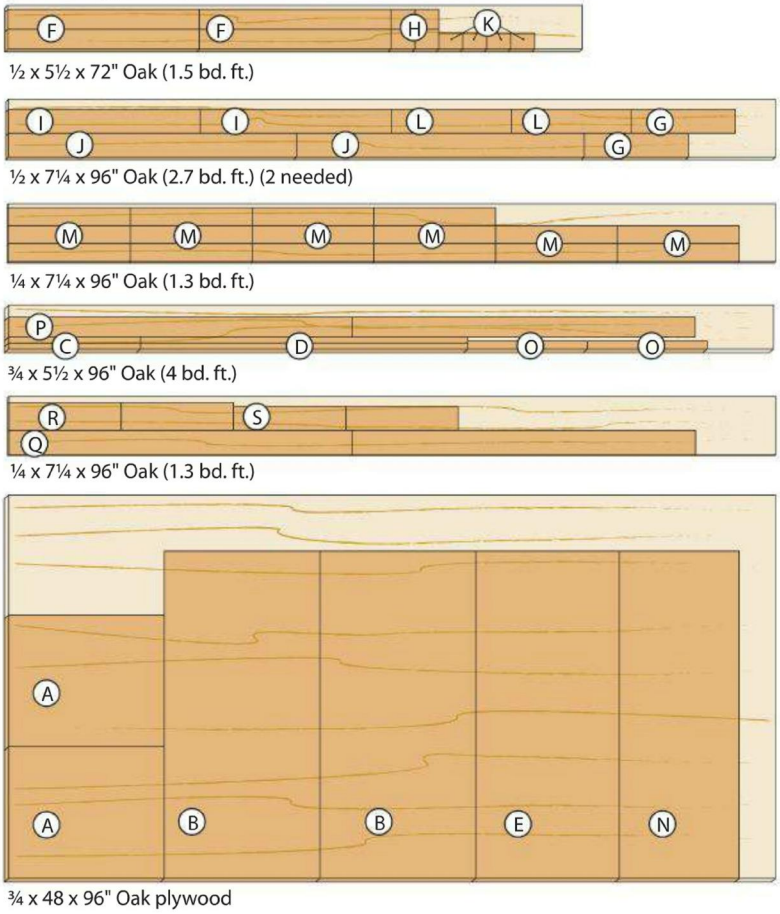
Hardware: Left and right lid supports no. 311978 and 311979, $3 each, Lowe's, 800-445-6937, lowes.com; no-mortise hinges (3 required), no. 209639, $2.50/pair and trunk handles no. 02018070, $9 each, Van Dyke's Restorers, 800-558-1234, vandykes.com.
Bumper cushions: ½×⅛" no. 37931 [pack of 25], $4, Rockler, 800-279-4441, rockler.com.
Better Homes and Gardens Solid Quilt with Border, Ivory/Tan (*page 66*) available at Walmart Stores and online at walmart.com.

PROP THE LID FOR HINGE PLACEMENT



Clamp a scrap ledger board ½" below the lip of the chest to support the lid. Use braces to square and hold it as you install the hinges.

Cutting Diagram



More Resources

- For a free right-angle clamping brace plan, go to: **woodmagazine.com/clampingbrace**.
- Watch a video on crosscutting fundamentals at: **woodmagazine.com/crosscut**.

Turn Your Hobby into a New Career.

Learn furniture and cabinet making with training from Penn Foster.

With Penn Foster, you can learn the skills you need to turn a hobby into a profitable career in as little as six months. Learn the advanced woodworking techniques used in furniture and cabinet making. You can work for an established woodworking business or even start a business of your own.

Convenient. Penn Foster programs are designed to train adults for employment in the fastest-growing fields. You choose the time and place to complete your coursework, and you work at your own pace. All learning materials are sent directly to you.

Flexible. Study online, in print, or a combination of both. You decide which method best suits your learning style. You work independently, but not alone. Expert instructors and support staff — dedicated to helping you complete your coursework — are just a phone call, message board, or email away. And you can interact with other Penn Foster students through *eCampus,* the school's online community, which includes social networks, blogs, forums, and discussion groups.

Accredited. Penn Foster Career School and Penn Foster College are nationally accredited by the Accrediting Commission of the Distance Education and Training Council (DETC). In addition, Penn Foster Career School is regionally accredited by the Commission on Secondary Schools of the Middle States Association of Colleges and Schools.

Affordable. We offer 0% APR financing and customized payment plans to best meet your individual needs. Choose your program and tuition plan to save up to 20% today!

SAVE UP TO 20% TODAY

Career Services. Current students and graduates are notified — through their personal message boards — of job openings submitted directly to Penn Foster by employers from around the country. Penn Foster graduates can take advantage of Career Services, which include access to online searches for jobs by industry and region, and even one-on-one help in creating your resume with a Certified Professional Resume Writer.

For fastest service, call toll free:

1-800-572-1685 ext. 7022

Call anytime, 24 hours a day, 7 days a week.

Or visit our website at

www.PennFoster.edu

Online enter ID# AW8S12T

Or mail the coupon today.

PENN FOSTER CAREER SCHOOL ☐ **384 Furniture and Cabinet Maker**

925 Oak Street, Scranton, PA 18515-0700
www.PennFoster.edu

Building Trades
- ☐06 Electrician
- ☐104 Carpenter
- ☐15 Home Inspector
- ☐145 Home Remodeling and Repair
- ☐14 HVAC Technician
- ☐102 Landscaper
- ☐151 Plumber

Business
- ☐70 Small Business Mgmt.

Mechanics
- ☐04 Auto Repair Technician
- ☐55 Diesel Mechanics
- ☐33 Motorcycle Repair Technician
- ☐89 Small Engine Repair

High School
- ☐07 Penn Foster High School
- ☐756 Penn Foster High School w/ Carpentry Concentration
- ☐755 Penn Foster High School w/ Electrical Concentration

Technology
- ☐492 Computer Support Technician
- ☐54 Drafting with AutoCAD®
- ☐79 Electronics Technician
- ☐27 PC Maintenance and Repair
- ☐83 Web Page Designer

Other Exciting Programs
- ☐72 Appliance Repair
- ☐25 Gunsmith
- ☐58 Private Investigator
- ☐31 Professional Locksmithing

PENN FOSTER COLLEGE

Administrative Office
14300 N. Northsight Blvd.
Suite 120
Scottsdale, AZ 85260
www.PennFosterCollege.edu

Associate Degree Programs
- ☐61 Accounting
- ☐60 Business Management
- ☐418 Computer Information Systems
- ☐498 Construction Technology
- ☐406 Criminal Justice
- ☐499 Engineering Technology
- ☐81 Finance
- ☐407 Graphic Design
- ☐412 Human Resources Management
- ☐80 Marketing
- ☐408 PC Maintenance Technology
- ☐456 Retail Management

Please send me FREE information on the Career School or College program I have selected above. No obligation. Choose ONE only.

Name _____ Age _____

Street _____ Apt. # _____

City/State _____ Zip _____

Phone ( ) _____ Email _____

Mail coupon to Student Service Center,* Dept. AW8S12T, 925 Oak Street, Scranton, PA 18515-0700.

*Under contract with Penn Foster College, AZ

186GJ

Ask WOOD

Answers to your questions from letters, e-mails, and WOOD Online®

Have a Question?

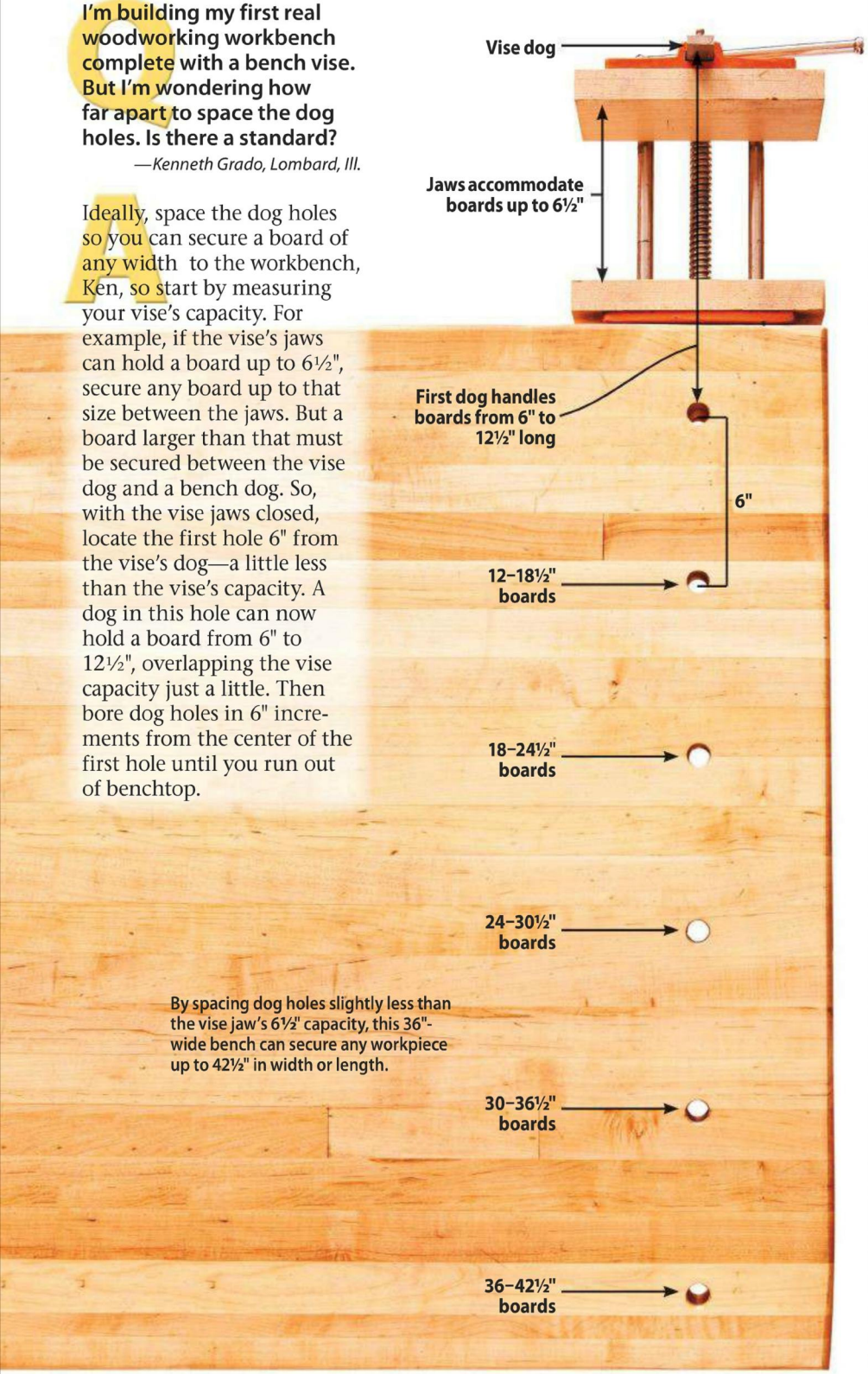
For an answer to your woodworking question, write to **ASK WOOD, 1716 Locust St., LS-221, Des Moines, IA 50309-3023** or e-mail us at **askwood@woodmagazine.com**. For immediate feedback from your fellow woodworkers, post your questions on one of our woodworking forums at **woodmagazine.com/forums**.

Dog-hole spacing gives reader pause

I'm building my first real woodworking workbench complete with a bench vise. But I'm wondering how far apart to space the dog holes. Is there a standard?

—Kenneth Grado, Lombard, Ill.

Ideally, space the dog holes so you can secure a board of any width to the workbench, Ken, so start by measuring your vise's capacity. For example, if the vise's jaws can hold a board up to 6½", secure any board up to that size between the jaws. But a board larger than that must be secured between the vise dog and a bench dog. So, with the vise jaws closed, locate the first hole 6" from the vise's dog—a little less than the vise's capacity. A dog in this hole can now hold a board from 6" to 12½", overlapping the vise capacity just a little. Then bore dog holes in 6" increments from the center of the first hole until you run out of benchtop.



By spacing dog holes slightly less than the vise jaw's 6½" capacity, this 36"-wide bench can secure any workpiece up to 42½" in width or length.

Why dimension dimensional lumber?

I'd like to build the fold-flat workbench from the October 2011 issue (Issue 207). As a beginning woodworker, I'm curious: What is the logic behind planing the dimensional lumber in that project?

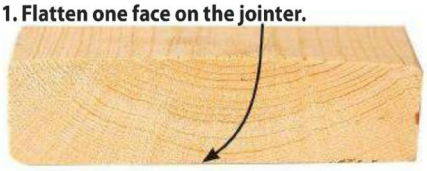
—Tom Walker, Boonville, Mo.

Along with cupping and warping, Tom, minor differences in thickness and width are common in dimensional lumber (2×4s, 2×6s, etc). Also, the rounded edges of most dimensional lumber make measuring and marking difficult.

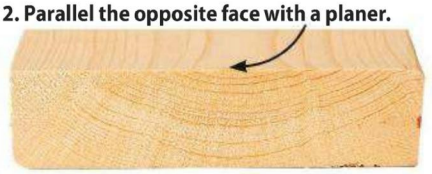
To use these construction-grade materials in better-quality furniture and shop projects, you need to treat dimensional lumber as you would rough lumber. Follow the steps *below*:

Dimensional lumber straight from the bin

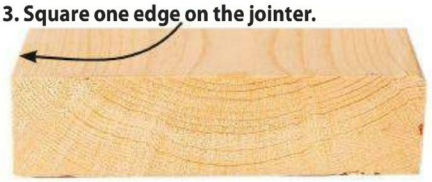
1. Flatten one face on the jointer.



2. Parallel the opposite face with a planer.



3. Square one edge on the jointer.



4. Rip to final width on the tablesaw.

continued on page 74

A BIG ASS FAN FOR MY SHOP?

ABSOLUTELY!

You've got this great shop with high ceilings. It's too hot in the summer (sweat dripping on a new project is NOT good) and too cool in the winter (why do knuckle-busters hurt more in the cold?). The solution is the all new ShopFan® from the Big Ass Fan Company®, engineered with our patented airfoil technology to improve conditions in workshops up to 5000 square feet.

The monthly operating cost of a ShopFan is less than a dollar per day... yet it does the work of more than twenty standard ceiling fans. It's an investment that will pay dividends for a lifetime.

Try a ShopFan in Your Shop for 30 Days
Contact us for details (877) 326-0599
www.bigassfans.com

Truly a Big Ass Fan
- High Volume/Low Speed air movement technology
- Industrial ceiling fan quality

Easy Installation
- Weighs less than 145 lbs
- Pre-wired for 115V 20A operation
- Includes 50-ft motor cord

Keeps Things Cool
- Sized for Small Shops
- Air circulation for spaces up to 70 ft x 70 ft
- For ceilings as low as 14 ft
- 14 ft diameter fan

Full-featured Controls
- Fully adjustable speed settings
- Compact control unit is pre-wired

Year-round Energy Savings
- Low energy air circulation
- Provides cooling breezes in summer
- Heater runs less frequently by redistributing rising heat back down to floor level

BIG ASS FANS®
No Equal.

Ask WOOD

Measure once, cut twice

Woodworking plans sometimes say to cut certain parts oversize before later cutting them down to exact size. Why not just cut them to size to start with? Wouldn't that waste less wood?

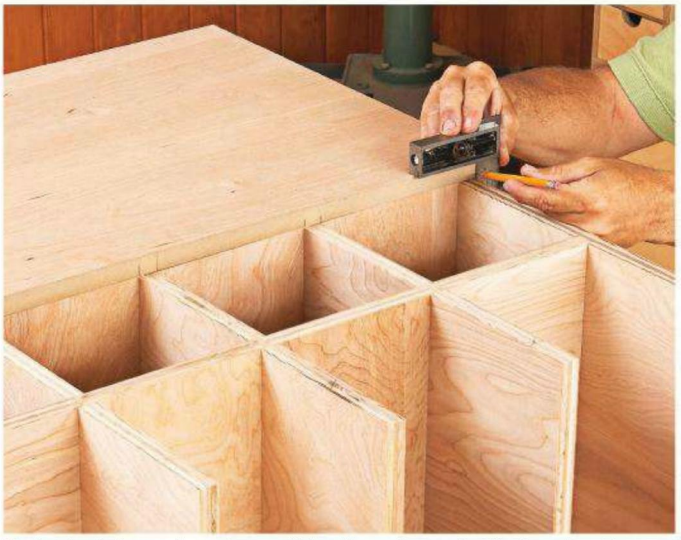
—Jeffrey Walker, Odessa, Texas

Paradoxically, Jeffrey, cutting parts oversize helps you cut the part perfectly the second time.

In cases where parts have unusual angles or must fit perfectly between two other parts, it's important to size the part based on the project rather than using a numerical measurement. Leaving a little wiggle room to mark, rather than measure, the exact dimension, as shown *below*, eliminates the potential for frustration over an imperfect fit. Here are two examples where it might be necessary to size parts down from oversize blanks.

continued on page 76

Test and perfect the angle of the miter on an oversized blank before marking and cutting the trim piece to the final length.



Undersized plywood can throw off the dimensions called for in a plan. For a perfect fit, mark the back panel to size against the dry-fit case.

Introducing 13 discs in the WOOD® COMPLETE GUIDE series

Each DVD-ROM* comes packed with hundreds of tips, skill-building articles, projects by the dozens, and helpful videos!

$29.95 each or SAVE when you buy 2 for only $49.95

To order call **888-636-4478** or go to
woodmagazine.com/CompleteGuide

(For a detailed description of each disc's contents, go to the Web site)

*Mac and PC-compatible digital content

AD#WD0312

Ask WOOD

To sharpen mortising chisels, hone with a cone.

The chisels on my hollow-chisel mortiser have dulled, making an already strenuous task more difficult. Because the bevel is on the inside, I'm not sure how to sharpen them. Can you offer advice?

—Philip Lewis, Wallingford, Conn.

If you've found mortising a strenuous operation even before your chisels dulled, Phillip, it's likely that yours were never properly sharpened to begin with. Mortising chisels, like many other bladed tools, often require an initial sharpening.

Pick up a mortise chisel sharpening kit like the one from Rockler, shown at *right* (item #24727, $29.95, 800-279-4441, rockler.com). It comes with a quick-change handle as well as coarse and fine cone-shaped diamond hones capable of sharpening up to ½" chisels.

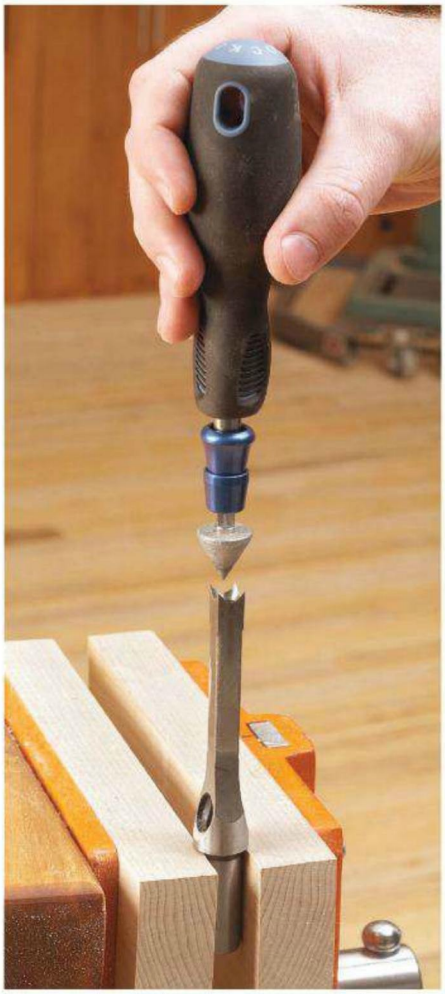
Start by marking the inside bevel of the mortising chisel with a dark-colored felt-tipped pen; then clamp the chisel in your vise. Install the coarse cone in either the included handle or your cordless drill and turn the cone slowly in the end of the hollow chisel until you've removed all pen marks.

Remove the chisel from your vise and rub the outside edges of the chisel on adhesive-backed, 220-grit sandpaper applied to your tablesaw wing or other hard, dead-flat surface, as shown below. Rub equally on all four sides until the burr disappears (10–15 strokes). Don't worry about making the chisel smaller. This step shouldn't have to be repeated in the chisel's lifetime.

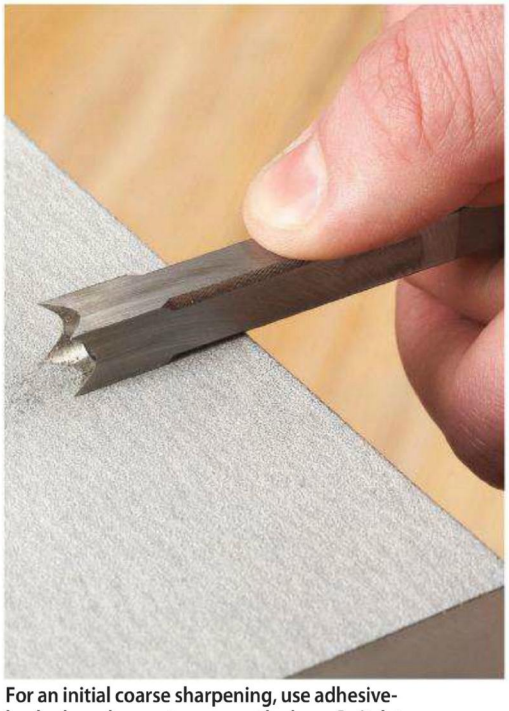
To hone the chisel, switch to the fine cone and sharpen for a few seconds until you raise a burr. Then remove the burr as before, this time with a 1,000-grit sharpening stone.

Once you've used these chisels, you'll never want to let them get dull again. So touch them up once in a while; skip the coarse cone and go straight to the fine cone and stone for a quick honing before returning to mortising.

continued on page 78



The cone-shaped sharpening stone seats itself in the chisel's bevel for fool-proof sharpening.



For an initial coarse sharpening, use adhesive-backed sandpaper to remove the burr. Switch to a 1,000-grit stone for subsequent honings.

Ask WOOD

Solving the mystery of clock-face Roman numerals

I was about to buy the clock kit for the Art Deco Desk Clock in issue 208 (Nov. 2011), when I noticed that the Roman numeral 4 is written out as "IIII." I've always seen 4 as "IV" in Roman numerals. Was this a misprint?

—Jerry Nelson, Baltimore, Md.

Although you probably learned "IV" as the Roman numeral 4 in elementary school, Jerry, clock faces often show "IIII" instead. Without a definitive reason, we offer V theories for the discrepancy:

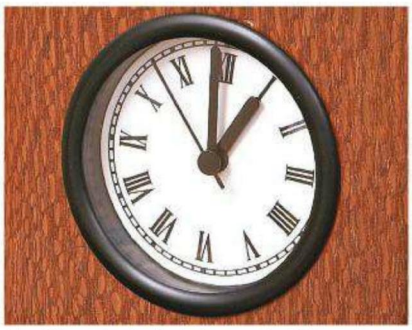
I: One tradition says the IIII form was used to avoid invoking the wrath of the Roman god Jupiter, whose Latin name, IVPPITER, begins with IV.

II: Clockmakers may have held over the form from before subtractive notation was the norm. (However, the IX on the clock face renders this theory inconsistent at best).

III: Another theory suggests that the IIII provided an economical way to cast metal numerals: The four Vs, 20 Is, and four Xs required for a clock face could be cast four times in the form "VIIIIIX." Then each casting could be strategically separated and rotated to form all the necessary numbers. (One VIIIIIX separates into VI, III, and IX. Another into VII, I, and IIX, and so on.)

IV: It may be simply a convenient way to divide the dial at a glance. (Only I shows up in the first third, V begins all the numbers in the second third, and X only appears in the final third of the dial.)

V: Finally, it may be nothing more than a way to balance the clock face aesthetically. Each number mirrors one of similar "weight," creating a visual symmetry, as shown.



The IIII aesthetically balances the VIII on the opposite side of the clock face better than the less-weighty IV form.

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 370 Stores Nationwide and use this 20% Off Coupon on one of our 7,000 products*, plus pick up a Free 1" x 25 Ft. Tape Measure, a $5.99 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!

Nobody Beats Our Quality, Service and Price!

SUPER COUPON!

FREE!

WITH MINIMUM PURCHASE OF $9.99

PITTSBURGH

1" x 25 FT. TAPE MEASURE

ITEM 47737 REG. PRICE $5.99

HARBOR FREIGHT TOOLS - LIMIT 1 Free item only available with qualifying minimum purchase (excluding price of free gift item). Cannot be used with any other discount or coupon. Coupon not valid on prior purchases. Offer good while supplies last. Shipping & Handling charges may apply if free item not picked up in-store. Coupon cannot be bought, sold or transferred. Original coupon must be presented in-store, or with your order form, or entered online in order to receive the offer. Valid through 5/17/12. Limit one coupon per customer and one coupon per day.

73352996

SUPER COUPON!

20% OFF

ANY SINGLE ITEM!

HARBOR FREIGHT TOOLS - LIMIT 1 Use this coupon to save 20% on any **one** single item purchased when you shop at a Harbor Freight Tools store. *Cannot be used with any other discount or coupon. Coupon not valid on any of the following: gift cards, Inside Track Club membership, extended service plans, Compressors, Generators, Tool Cabinets, Welders, Floor Jacks, Campbell Hausfeld products, open box items, Parking Lot Sale items, Blowout Sale items, Day After Thanksgiving Sale items, Tent Sale items, 800 number orders or online orders. Coupon not valid on prior purchases after 30 days from original purchase date with original receipt. Coupon cannot be bought, sold, or transferred. Original coupon must be presented in-store in order to receive the offer. Valid through 5/17/12. Limit one coupon per customer and one coupon per day.

11475844

SUPER COUPON!

6" DIGITAL CALIPER

PITTSBURGH

LOT NO. 47257

SAVE 66% $9.99 REG. PRICE $29.99

Includes two 1.5V button cell batteries.

HARBOR FREIGHT TOOLS - LIMIT 9 This valuable coupon is good anywhere you shop Harbor Freight Tools (retail stores, online, or 800 number). Cannot be used with any other discount or coupon. Coupon not valid on prior purchases after 30 days from original purchase date with receipt. Offer good while supplies last. Coupon cannot be bought, sold, or transferred. Original coupon must be presented in-store, or with your order form, or entered online in order to receive the coupon discount. Valid through 5/17/12. Limit one coupon per customer and one coupon per day.

52647337

SUPER COUPON!

12" RATCHET BAR CLAMP/SPREADER

PITTSBURGH

LOT NO. 46807/68975/ 69221/69222

Item 46807 shown

SAVE 77% $1.99 REG. PRICE $8.99

HARBOR FREIGHT TOOLS - LIMIT 6 This valuable coupon is good anywhere you shop Harbor Freight Tools (retail stores, online, or 800 number). Cannot be used with any other discount or coupon. Coupon not valid on prior purchases after 30 days from original purchase date with receipt. Offer good while supplies last. Coupon cannot be bought, sold, or transferred. Original coupon must be presented in-store, or with your order form, or entered online in order to receive the coupon discount. Valid through 5/17/12. Limit one coupon per customer and one coupon per day.

2774248

SUPER COUPON!

CHICAGO ELECTRIC POWER TOOLS

Item 68303 shown

OSCILLATING MULTIFUNCTION POWER TOOL

SAVE 66%

LOT NO. 68303/67256/68861

8 Functions: Sanding, Cut Flooring, Cut Metal, Scrape Concrete, Remove Grout, Cut Plastic, Scrape Flooring, Plunge Cut

$19.99 REG. PRICE $59.99

HARBOR FREIGHT TOOLS - LIMIT 5 This valuable coupon is good anywhere you shop Harbor Freight Tools (retail stores, online, or 800 number). Cannot be used with any other discount or coupon. Coupon not valid on prior purchases after 30 days from original purchase date with receipt. Offer good while supplies last. Coupon cannot be bought, sold, or transferred. Original coupon must be presented in-store, or with your order form, or entered online in order to receive the coupon discount. Valid through 5/17/12. Limit one coupon per customer and one coupon per day.

15885793

SUPER COUPON!

SAVE 60%

CEN-TECH

12" COMBINATION SQUARE SET

LOT NO. 92471

$3.99 REG. PRICE $9.99

HARBOR FREIGHT TOOLS - LIMIT 6 This valuable coupon is good anywhere you shop Harbor Freight Tools (retail stores, online, or 800 number). Cannot be used with any other discount or coupon. Coupon not valid on prior purchases after 30 days from original purchase date with receipt. Offer good while supplies last. Coupon cannot be bought, sold, or transferred. Original coupon must be presented in-store, or with your order form, or entered online in order to receive the coupon discount. Valid through 5/17/12. Limit one coupon per customer and one coupon per day.

60542027

SUPER COUPON!

4 PIECE CHISEL SET

LOT NO. 42429

1/4" 1/2" 3/4" 1"

SAVE 50% $3.99 REG. PRICE $7.99

HARBOR FREIGHT TOOLS - LIMIT 9 This valuable coupon is good anywhere you shop Harbor Freight Tools (retail stores, online, or 800 number). Cannot be used with any other discount or coupon. Coupon not valid on prior purchases after 30 days from original purchase date with receipt. Offer good while supplies last. Coupon cannot be bought, sold, or transferred. Original coupon must be presented in-store, or with your order form, or entered online in order to receive the coupon discount. Valid through 5/17/12. Limit one coupon per customer and one coupon per day.

91819354

SUPER COUPON!

5" RANDOM ORBITAL PALM SANDER

CHICAGO ELECTRIC POWER TOOLS

LOT NO. 93431

SAVE 33% $19.99 REG. PRICE $29.99

HARBOR FREIGHT TOOLS - LIMIT 5 This valuable coupon is good anywhere you shop Harbor Freight Tools (retail stores, online, or 800 number). Cannot be used with any other discount or coupon. Coupon not valid on prior purchases after 30 days from original purchase date with receipt. Offer good while supplies last. Coupon cannot be bought, sold, or transferred. Original coupon must be presented in-store, or with your order form, or entered online in order to receive the coupon discount. Valid through 5/17/12. Limit one coupon per customer and one coupon per day.

57552697

SUPER COUPON!

CENTRAL MACHINERY

4" x 36" BELT/ 6" DISC SANDER

LOT NO. 93981/97181

$54.99 REG. PRICE $99.99 SAVE $45

Item 93981 shown

HARBOR FREIGHT TOOLS - LIMIT 5 This valuable coupon is good anywhere you shop Harbor Freight Tools (retail stores, online, or 800 number). Cannot be used with any other discount or coupon. Coupon not valid on prior purchases after 30 days from original purchase date with receipt. Offer good while supplies last. Coupon cannot be bought, sold, or transferred. Original coupon must be presented in-store, or with your order form, or entered online in order to receive the coupon discount. Valid through 5/17/12. Limit one coupon per customer and one coupon per day.

43754282

SUPER COUPON!

CENTRALPNEUMATIC

3 GALLON, 100 PSI OILLESS PANCAKE AIR COMPRESSOR

LOT NO. 95275

SAVE 46% $39.99 REG. PRICE $74.99

HARBOR FREIGHT TOOLS - LIMIT 3 This valuable coupon is good anywhere you shop Harbor Freight Tools (retail stores, online, or 800 number). Cannot be used with any other discount or coupon. Coupon not valid on prior purchases after 30 days from original purchase date with receipt. Offer good while supplies last. Coupon cannot be bought, sold, or transferred. Original coupon must be presented in-store, or with your order form, or entered online in order to receive the coupon discount. Valid through 5/17/12. Limit one coupon per customer and one coupon per day.

37859843

SUPER COUPON!

CENTRAL MACHINERY

LOT NO. 97869

2 HP INDUSTRIAL, 5 MICRON DUST COLLECTOR

$149.99 REG. PRICE $249.99 SAVE $100

HARBOR FREIGHT TOOLS - LIMIT 3 This valuable coupon is good anywhere you shop Harbor Freight Tools (retail stores, online, or 800 number). Cannot be used with any other discount or coupon. Coupon not valid on prior purchases after 30 days from original purchase date with receipt. Offer good while supplies last. Coupon cannot be bought, sold, or transferred. Original coupon must be presented in-store, or with your order form, or entered online in order to receive the coupon discount. Valid through 5/17/12. Limit one coupon per customer and one coupon per day.

86772016

SUPER COUPON!

SAVE $60

500 LB. CAPACITY ALUMINUM CARGO CARRIER

Haul Master

LOT NO. 92655

$69.99 REG. PRICE $129.99

HARBOR FREIGHT TOOLS - LIMIT 5 This valuable coupon is good anywhere you shop Harbor Freight Tools (retail stores, online, or 800 number). Cannot be used with any other discount or coupon. Coupon not valid on prior purchases after 30 days from original purchase date with receipt. Offer good while supplies last. Coupon cannot be bought, sold, or transferred. Original coupon must be presented in-store, or with your order form, or entered online in order to receive the coupon discount. Valid through 5/17/12. Limit one coupon per customer and one coupon per day.

54494575

SUPER COUPON!

WINDSOR DESIGN

60" HARDWOOD WORKBENCH

LOT NO. 93454

Tools sold separately.

SAVE $90 $139.99 REG. PRICE $229.99

HARBOR FREIGHT TOOLS - LIMIT 4 This valuable coupon is good anywhere you shop Harbor Freight Tools (retail stores, online, or 800 number). Cannot be used with any other discount or coupon. Coupon not valid on prior purchases after 30 days from original purchase date with receipt. Offer good while supplies last. Coupon cannot be bought, sold, or transferred. Original coupon must be presented in-store, or with your order form, or entered online in order to receive the coupon discount. Valid through 5/17/12. Limit one coupon per customer and one coupon per day.

13957427

370 Stores Nationwide

Order Online at HarborFreight.com and We'll Ship Your Order FedEx

Shop-Proven Products

These woodworking wares passed our shop trials

About our product tests

We test hundreds of tools and accessories, but only those that earn at least three stars for performance make the final cut and appear in this section. Prices are current at the time of article production and do not include shipping, where applicable.

No-fuss toggle clamps self-adjust to thickness

Toggle clamps have been around for years, but getting them to apply just the right amount of clamping force takes a lot of trial-and-error tinkering. With Bessey's Auto-Adjust hold-down clamps, you set the bolt to an approximate depth, and the spring-loaded tensioning system automatically locks your workpiece in place—even when going from 1"-thick stock to 2" material. And you can vary the amount of clamping force, from 25 to 550 lbs, by adjusting a screw under the handle.

These clamps come in hold-down style with low- and high-clearance mounting bases, as well as inline style. The hold-down clamps have a capacity up to 2⅝"; the inline clamps have 1" of clamping range.

—Tested by Bob Hunter, Tools Editor

Auto-Adjust Toggle Clamps

Performance	★★★★★
Price	$20–$25 each

Bessey Tools
800-828-1004;
besseytools.com

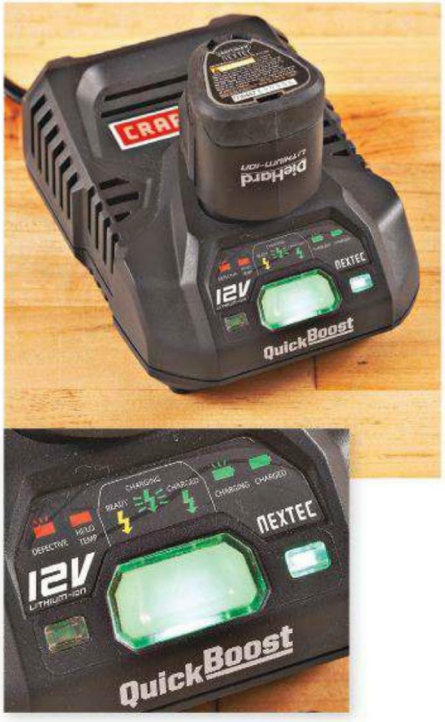
Rapid charger gets you back to work in 3 minutes

If your cordless drill's battery runs dead just a few screws from completing a job, and you don't have a spare battery ready to go, you might as well take a break while the charger slowly replenishes it. But with Craftsman's NEXTEC QuickBoost charger you can restore ¼ of a 12-volt NEXTEC/DieHard battery's capacity in just three minutes.

As a test, I drained the battery by driving 281 screws on a full charge. Then I poppped the battery into the QuickBoost charger immediately. Three minutes later I used that battery to drive 68 additional screws—about 25 percent of the full-charge test.

Here's how it works: When you insert a depleted battery and push the center button, the charger evaluates the battery. If it has less than 25 percent power stored up, the charger goes into hurry-up mode. Once it achieves a ¼ charge, the center-button light goes off. You can then either use the battery or leave it on to complete the charge; the charger automatically slips into standard-charging mode to finish the job. (Charging a battery to full capacity at this fast rate would dramatically shorten its life.) If you don't use the QuickBoost feature, it simply charges to full capacity in standard mode in about 30 minutes.

—Tested by Lucas Peters, How-To Editor

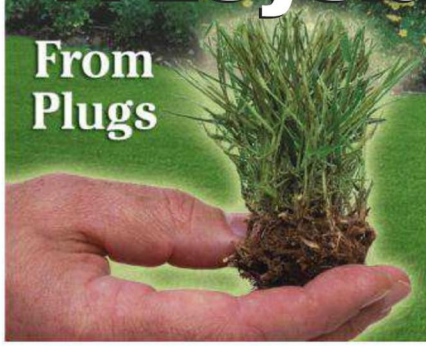


QuickBoost 12-volt Battery Charger, #5325

Performance	★★★★★
Price	$40

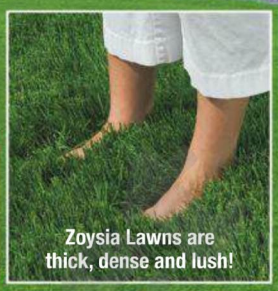
Craftsman
800-383-4814;
craftsman.com

SAVE When You Grow A Zoysia Lawn From Plugs!



To A Fabulous Lawn

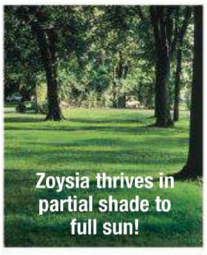
ZOYSIA FARM NURSERIES
Improving America's Lawns Since 1953



GRASS SEED WILL *NEVER* GROW A LAWN LIKE THIS!

Save Water! Save Time! Save Work! Save Money!

Grass Seed Is For The Birds!



Stop wasting money, time and work sowing new grass seed each spring, only to see birds eat the seed – or rain wash it away – before it can root. Plant a genuine Amazoy™ Zoysia lawn from our living Plugs only once... and never plant a new lawn again!

Zoysia Grows Where Other Grass Doesn't!

Zoysia is the perfect choice for hard-to-cover spots, areas that are play-worn or have partial shade, and for stopping erosion on slopes. North, South, East, West – Zoysia will grow in *any* soil, no ifs, ands or buts!

Each Zoysia Plug You Plant In Your Soil Is
GUARANTEED TO GROW
Within 45 Days Or We'll Replace It FREE!

To ensure best results, we ship you living sheets of genuine Amazoy™ Zoysia Grass, harvested direct from our farms. Plugs are not cut all the way through. Before planting, simply finish the separation by cutting 1"-sq. Plugs with shears or knife. Then follow the included easy instructions to plant Plugs into small plug holes about a foot apart. Our guarantee and planting method are your assurance of lawn success backed by more than 5 decades of specialized lawn experience.

Eliminates Endless Weeds And Weeding!

No more pulling out weeds by hand or weeds sprouting up all over your lawn. Zoysia Plugs spread into a dense, plush, deep-rooted, established lawn that drives out unwanted growth and stops crabgrass and summer weeds from germinating.

Environmentally Friendly, No Chemicals Needed!

No weeding means no chemicals. You'll never have to spray poisonous pesticides and weed killers again! Zoysia lawns are safer for the environment, as well as for family and pets!

Cuts Watering & Mowing By As Much As 2/3!

Many established Zoysia lawns only need to be mowed once or twice a season. Watering is rarely, if ever, needed – even in summer!

Meyer Zoysia Grass was perfected by the U.S. Gov't, released in cooperation with the U.S. Golf Association as a superior grass.

www.ZoysiaFarms.com/mag

Stays Green In Summer Through Heat & Drought!

When ordinary lawns brown up in summer heat and drought, your Zoysia lawn stays green and beautiful. The hotter it gets, the better it grows. *Zoysia thrives in blistering heat (120°)*, yet it won't winter-kill to 30° below zero. It only goes off its green color after killing frosts, but color returns with consistent spring warmth. Zoysia is the perfect choice for water restrictions and drought areas!

Our Customers Love Their Zoysia Lawns!

One of our typical customers, Mrs. M.R. Mitter of PA, wrote how "I've never watered it, only when I put the Plugs in... Last summer we had it mowed 2 times... When everybody's lawns here are brown from drought, ours just stays as green as ever!"

Order Now And Save!

The more Amazoy™ Zoysia Plugs you order, the more you SAVE! And remember, once your Zoysia lawn is established, you'll have an endless supply of new Plugs for planting wherever you need them. Order now!

FREE! PLANTING TOOL With Order of 400 Plugs or More!
Saves time, work and effort when making holes for Plugs!

Order Your ZOYSIA Plugs Now — Harvested Daily From Our Farms And Shipped To You Direct!

ZOYSIA GRASS SUPER SALE — SAVE OVER 50%! Get Up To 900 Plugs — FREE!

Please send me guaranteed Amazoy as checked:

	# PLUGS	+ FREE Plugs	FREE Bonus	Retail Value	Your PRICE	+ Shipping	SAVINGS
❑	100	–	–	$ 8.95	$ 8.95	$ 5.00	–
❑	200	+ 100	–	$ 26.85	$17.90	$ 5.00	30%
❑	400	+ 200	Free Step-on Plugger	$ 62.65	$35.80	$ 7.50	40%
❑	500	+ 300	Free Step-on Plugger	$ 80.55	$44.75	$10.00	42%
❑	600	+ 400	Free Step-on Plugger	$ 98.45	$53.70	$12.50	44%
❑	900	+ 700	Free Amazoy Power Auger	$168.15	$80.55	$15.00	50%
❑	1000	+ 900	Free Amazoy Power Auger	$195.00	$89.50	$17.50	54%

❑ Extra Step-on Plugger **$8.95** + $3 Shipping ❑ Extra Amazoy Power Auger™ for 3/8" Drill **$24.95** + $5 Shipping

Mail to: **ZOYSIA FARM NURSERIES**
3617 Old Taneytown Road, Taneytown, MD 21787
Dept. 5828

Write price of order here $_____
Md. residents add 6% tax $_____
Shipping $_____
ENCLOSED TOTAL $_____

Payment method (check one)
❑ Check ❑ MO
❑ MasterCard
❑ Visa

Card # _____ Exp. Date _____
Name _____
Address _____
City _____ State _____
Zip _____ Phone _____

We ship all orders the same day plugs are packed at earliest correct planting time in your area.

Amazoy is the trademark registered U.S. Patent Office for our Meyer Zoysia grass.

Order Now! www.ZoysiaFarms.com/mag

Not shipped outside the USA or into WA or OR

WOODWorkersCenter.com

FREE Product Information from Advertisers in This Issue

Looking for FREE product information? Fill out the coupon in this section to receive FREE product info and catalogs. Or, for quicker service and instant access to information, visit us online at www.woodworkerscenter.com

Adhesives & Finishes

TITEBOND® III ULTIMATE WOOD GLUE Superior bond strength, waterproof, longer open-assembly time. The Best Wood Glue Ever! **Circle No. 24.**

OLD MASTERS: CRAFTSMAN-QUALITY STAINS AND FINISHES For over 50 years, Old Masters has provided quality stains and finishes to protect and enhance wood's beauty and richness. **Circle No. 95.**

Bits, Blades, Cutting Tools

DISPOZ-A-BLADE LLC Use your "head" and our affordable self-setting jointer/planer knives for perfect set-ups every time. **Circle No. 188.**

EAGLE AMERICA Largest selection of professional quality, American-made router bits + 100's of unique accessories. **Circle No. 193.**

FORREST MFG. CO., INC. Top quality blades and dados for an ultra smooth finish. **Circle No. 206.**

FREUD SAW BLADES This 42-page catalog illustrates the features and benefits for all Freud saw blades. **Circle No. 219.**

FREUD ROUTER BITS All Freud router bits are represented in this 84-page catalog, including more than 130 new bits and sets. **Circle No. 232.**

MLCS WOODWORKING Best quality, huge selection, low prices, superior service. Free Shipping! **Circle No. 245.**

SAWSTOP SawStop table saws stop the blade upon contact with skin. **Circle No. 280.**

Books, Plans and Videos

AMERICAN FURNITURE DESIGN CO. 150 of America's best furniture plans, comprehensive instruction guide. Catalog. **Circle No. 336.**

MEISEL HARDWARE SPECIALTIES CATALOG 2,000+ full-size project plans and hard-to-find hardware. **Circle No. 401.**

WOOD MAGAZINE WOODWORKING PLANS 1,300+ top-quality furniture, shop, and gift plans from the editors of WOOD® magazine. Catalog. **Circle No. 459.**

General Woodworking Catalogs

THE BEALL TOOL COMPANY Inventive solutions for shop problems: wood threading, buffing & more. **Circle No. 558.**

OLIVER MACHINERY COMPANY A tradition of innovation. **Circle No. 653.**

ROCKLER WOODWORKING & HARDWARE Our premium tools make woodworking efficient and enjoyable. FREE Catalog. **Circle No. 661.**

WOODCRAFT SUPPLY CORP. Over 15,000 top quality woodworking tools, supplies, and accessories. **Circle No. 700.**

Hand Tools, Jigs & Clamps

BLOKKZ Universal clamping blocks and accessories. **Circle No. 746.**

DIRECT SALES, LTD. Air-powered staple, nail and pin guns. **Circle No. 757.**

KREG TOOL CO. Your one stop shop for everything Pocket-Screw related. **Circle No. 802.**

MORTISE PAL Mortises made easy! **Circle No. 824.**

Hardwood & Lumber

WOODWORKERS SOURCE Hardwoods from around the world. **Circle No. 869.**

Income Opportunities & Education

FURNITURE MEDIC Offering franchise licenses to qualified individuals to perform mobile, on-site furniture repair & restoration services. **Circle No. 895.**

MARC ADAMS SCHOOL OF WOODWORKING Over 125 summer hands-on workshops with the best instructors of modern time. **Circle No. 916.**

THE WOODWORKING SHOWS Featuring free education in daily 'Master Clinics' and 'Woodworking A to Z', paid seminars, live demonstrations, and more! **Circle No. 934.**

Kits

BUILD YOUR OWN MURPHY BED Create-A-Bed® murphy bed mechanism includes complete illustrated instructions and DVD. **Circle No. 951.**

DETAILED PLAY SYSTEMS Wooden swingsets and playground equipment for the backyard. Free catalog. **Circle No. 958.**

KLOCKIT The leading supplier of clock-making supplies for over 35 years! **Circle No. 973.**

WOODEN-GEAR-CLOCKS.COM Create a wooden gear clock—kits and plans available. **Circle No. 1008.**

Lawn & Garden

ZOYSIA FARMS NURSERIES Amazoy Zoysia grass saves you time, work and money. **Circle No. 1017.**

Miscellaneous

AZTEC STEEL CORP. Quality pre-engineered arch-style steel buildings at the lowest cost anywhere. **Circle No. 1064.**

ENTAB INDUSTRIES, LLC Cut crown molding easily with our Crown Master Mitre Box. **Circle No. 1161.**

FRANMAR CHEMICAL Soybean paint stripper and other environmentally-friendly products. **Circle No. 1164.**

Power Tools

COOK'S SAW MFG., L.L.C. Portable sawmills, Edgers, Sharpeners, Band Blades… Free catalog. Video available. **Circle No. 1480.**

EPILOG Wood engraving and cutting systems — Low Price, High-Quality Laser Systems. **Circle No. 1515.**

LAGUNA TOOLS Fine woodworking machines for professionals and hobbyists. Award-winning design bandsaws, European quality machines with over 25 years of experience. **Circle No. 1593.**

SAWMILL $3895.00 Manufacturer of Lumbermate 2000 Portable Sawmills, Edgers, ATV Skidders, Hydraulic tractor-mounted Skidding Winches and Hydraulic tractor-mounted Wood Splitters. **Circle No. 1615.**

PLASMA CAM, INC. Put metal into your wood projects! **Circle No. 1641.**

RADARCARVE Manufacturer of specialized wood carving duplicators. **Circle No. 1673.**

PANEL PRO VERTICAL PANEL SAW Economical panel saw makes handling and cutting wood/plastic sheets easy. **Circle No. 1708.**

WOOD-MIZER PRODUCTS Eight Portable Sawmills Available starting with the LT10 at $3995. **Circle No. 1805.**

WOODMASTER TOOLS Multi-duty planers that mold, sand & saw. **Circle No. 1820.**

Project Parts & Materials

OSBORNE WOOD PRODUCTS, INC. A free catalog of table legs, corbels, and island legs. **Circle No. 1849.**

WHOLESALE CABINET COMPONENTS Fulterer drawer slides at wholesale prices. **Circle No. 1856.**

Shop Accessories

THE JDS COMPANY Specializing in the finest air filtration and dust collection equipment. **Circle No. 1974.**

LIGNOMAT USA, LTD. Affordable, reliable, pin and pinless moisture meters for wood. Free catalog. **Circle No. 2013.**

ONEIDA AIR SYSTEMS, INC. Free informative catalog contains dust collection systems and complete ductwork. **Circle No. 2039.**

PENN STATE INDUSTRIES Award-winning dust collection. Collectors, Cyclones, Ductwork and more. **Circle No. 2045.**

PHASE-A-MATIC, INC. Convert 1-phase electric power into 3-phase; run 3-phase equipment anywhere. **Circle No. 2052.**

RED HILL CORP. SUPERGRIT® ABRASIVES Industrial quality sanding belts, discs, rolls, sheets at wholesale prices to small consumers. **Circle No. 2065.**

Woodturning Supplies

BEREA HARDWOODS Quality pen kits and other turning kits. **Circle No. 2127.**

HUT PRODUCTS Woods, acrylics and supplies for pen and game call turning. **Circle No. 2133.**

PACKARD WOODWORKS Free Catalog for WOODTURNERS! — Quality Lathes, Tools and Supplies. **Circle No. 2143.**

WOODWorkersCenter.com

FREE Product Information

DEPT. WOFM12

CIRCLE THE NUMBERS BELOW CORRESPONDING TO ITEMS IN THIS ISSUE.

24	245	700	934	1164	1805	2052
95	280	746	951	1480	1820	2065
188	336	757	958	1515	1849	2127
193	401	802	973	1593	1856	2133
205	459	824	1008	1615	1974	2143
206	558	869	1017	1641	2013	4000
219	653	895	1064	1673	2039	
232	661	916	1161	1708	2045	

Discover how rewarding woodworking can be! Get one full year of WOOD® for just $28.00 (7 issues). Simply circle No. 4000. You will be billed later.

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

E-MAIL ADDRESS _____

PHONE (OPTIONAL) _____

TO ENSURE PROMPT HANDLING OF YOUR ORDER, PLEASE:

- **Circle Your Choice(s) in the box above**
- **Send card to WOOD® Magazine, Dept. WOFM12, P.O. Box 5135, Buffalo, NY 14205-5135**
- **Allow 4-6 weeks for delivery**
- **This card expires July 17, 2012**

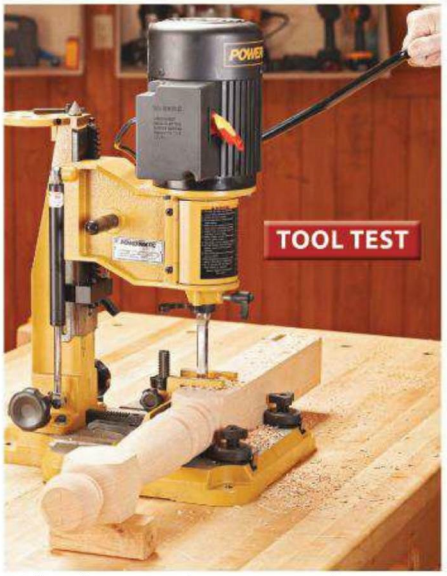
What's Ahead

A sneak peek inside the May issue (on sale March 13)

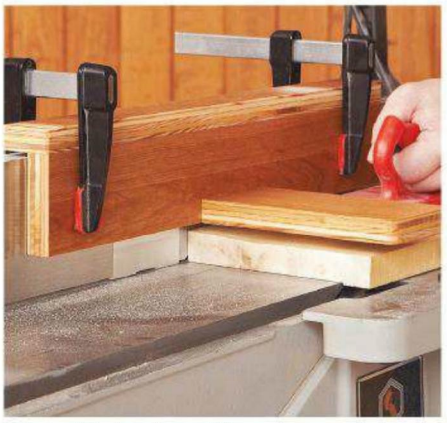
Settle into a settee
Why limit the comforts of home to the indoors? Create this handsome patio parking spot from cedar, then add easy-to-buy outdoor cushions.

Benchtop router table
With room for the smallest or largest of routers, and many accessories, this easy-to-build, low-dough router table gives you plenty of performance in a portable package.

Dig this little dirt mover
In a leisurely weekend you can build our newest Construction-grade toy, a nimble skid loader.



10 benchtop mortisers compared
For fast, square, and clean mortises, nothing beats a machine dedicated to making them. Find out which of these affordable units does it best.



Joint wide lumber with ease
Learn a simple trick to flatten boards wider than your jointer's cutterhead.

Better Homes and Gardens® WOOD® magazine (ISSN-0743-894X) is published seven times a year in March, May, July, September, October, November, and December/January by Meredith Corporation, 1716 Locust St., Des Moines, IA 50309-3023. Periodicals postage paid at Des Moines, Iowa, and additional mailing offices. Better Homes and Gardens trademark registered in Canada and Australia. Marca Registrada en México. One-year subscription prices: U.S. and its possessions, $28; Canada, $41; other countries, $49. Canada Post Publications Mail Sales Product Agreement No. 40069223. Canadian BN 12348 2887 RT. Return undeliverable Canadian addresses to Better Homes and Gardens WOOD magazine, PO Box 882 STN Main, Markham, ON L3P 929. POSTMASTER: Send address changes to Better Homes and Gardens WOOD magazine, PO Box 37439, Boone, IA 50037-0439.

STEP UP TO A NEW LEVEL

Laguna customers are passionate. They understand that quality tools make the difference. We invite you to join the Laguna family and find out for yourself.

LT–14 SUV

WOOD MAGAZINE TOP TOOL APPROVED

- Motor: 3HP leeson 220 volt single phase
- 1" blade capacity
- Resaw capacity: 12"
- Cuts as straight as a tablesaw
- Flywheel diameter: 16"

$1,395.00

DELUXE SERIES SHAPER

- Motor: 4HP Leeson 220 volt
- Spindle Travel: 3"
- Working Surface: 31" x 28" 1/2" with extension
- 3/4" and 1/4" spindle
- 1/4" and 1/2" Router collets
- Table Height: 34"
- Spindle Travel: 3"

$1,995.00

LEFT TILT DOVETAIL

- Motor: 3.0 hp
- Blade Diameter: 10"
- Rip Capacity: 50"
- Tabletop Extensions: 33" x 27"
- Weight: 485 lbs.

$1,995.00

LAGUNA

Se habla español www.lagunatools.com 800.234.1976

YOU KNOW THIS GUY, AND HE'S GOOD

Most woodworkers know someone with life-changing saw injuries like this guy. That's because it's common, with one table saw injury every 9 minutes. These woodworkers are often skilled and careful. Then, in a microsecond, something goes wrong. **Take action. Protect yourself.**

SawStop

The only table saw that stops on contact with skin.

See the full line at a dealer near you.

facebook.com/sawstop

Over 3 million views

sawstop.com/demo