

ISSUE 196 MARCH 2010

Better Homes and Gardens®

WOOD

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BLOTCHY STAIN!** p.26

The World's Leading
Woodworking Resource

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only your tablesaw!
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Shop Tips
INSIDE**



Grizzly Industrial®

Purveyors of Fine Machinery®, Since 1983

10" Cabinet Table Saws with Riving Knife

- Motor: 3 HP, 220V, single-phase
- Table size with extension: G0690 - 27" x 40", G0691 - 27" x 74 1/2"
- Blade tilt: left • Arbor: 5/8"
- Arbor speed: 4300 RPM
- Max. dado width: 1 3/16"
- Max. rip capacity: G0690 - 29 1/2", G0691 - 50"
- Max. depth of cut: 3 1/8" @ 90°, 2 3/16" @ 45°
- Approx. shipping weight: G0690 - 542 lbs., G0691 - 572 lbs.



3 HP LEESON® MOTOR!

Product Reviews & Awards ONLINE grizzly.com



FREE 10" CARBIDE TIPPED BLADE!

\$139 ADDITIONAL COST

G0690 ONLY \$1250⁰⁰

G0691 WITH EXTENSION TABLES ONLY \$1350⁰⁰

Cyclone Dust Collector

- Motor: 1 1/2 HP, 110V/220V, single phase, TEFC, 3450 RPM, prewired 110V
- Air suction capacity: 775 CFM
- Static pressure at rated CFM: 2.08"
- Intake port: 6" with included 5" optional port
- Impeller: 13 1/2"
- Cartridge filter surface area: 6975 sq. in.
- Overall dimensions: 38 1/4" W x 23 1/4" D x 68 1/2" H
- Approx. shipping weight: 210 lbs.



COLLECTION DRUM IS MOUNTED ON CASTERS FOR EASY DUST REMOVAL

THE POWER OF A 2 STAGE CYCLONE IN A NEW COMPACT SIZE!

G0703 INTRODUCTORY PRICE \$850⁰⁰

\$69 ADDITIONAL COST

10" Left Tilting Super Heavy-Duty Table Saw with Riving Knife

- Motor: 3 HP, 220V, single-phase, 3450 RPM
- Precision ground solid cast iron table
- Table size with extension wings: 40" x 27"
- Arbor: 5/8" • Max. dado width: 3/4"
- Cutting capacity: 8" L, 26" R
- Max. depth of cut: 3" @ 90°, 2 1/4" @ 45°
- Approx. shipping weight: 514 lbs.



New!

SAW NOT INCLUDED

SUPERB QUALITY!

SLIDING TABLE ATTACHMENT

ROUTER TABLE ATTACHMENT

- Industrial grade anodized aluminum table size: 47" x 9"
- Telescopic anodized aluminum fence size: 28"-48"
- Max. cross cut: 48"
- Precision ground cast iron table size: 27" x 20"
- Unique "double cross" 3/4" x 3/8" T-slots
- Universal router mount
- Table insert size: 4"

T10222 ROUTER ATTACHMENT

T10223 SLIDING TABLE ATTACHMENT

\$395⁰⁰

\$550⁰⁰

SHOP FOX® CLASSIC FENCE

G1023RL

INTRODUCTORY PRICE

ONLY \$1125⁰⁰

\$89 ADDITIONAL COST

12" Left-Tilting Extreme Series® Table Saw with Riving Knife Feature

- Motor: 5 HP, 220V, single-phase
- Table size with extension: 30 3/4" x 48 3/4"
- Arbor speed: 3600 RPM
- Arbor: 5/8" & 1"
- Max. dado width: 3/4"
- Max. rip capacity: 36"
- Max. depth of cut: 4" @ 90°, 2 3/4" @ 45°
- Approx. shipping weight: 756 lbs.



FEATURES DIGITAL BEVEL ANGLE READOUT INCLUDES 12" BLADE

EXTREME SERIES

G0696X \$2195.00

SALE \$1995⁰⁰

\$169 ADDITIONAL COST

The Ultimate 14" Bandsaw

MADE IN ISO 9001 FACTORY!

- Motor: 1 HP, 110V/220V, single-phase, TEFC, 1725 RPM
- Precision ground cast iron table
- Table size: 14" sq.
- Table tilt: 45° R, 10° L
- Max. cutting height: 6"
 - Blade size: 92 1/2" to 93 1/2" L (1/8" - 3/4" W)
- Cast iron frame
- Approx. shipping weight: 198 lbs.



Product Reviews & Awards ONLINE grizzly.com

NEW

TOP

BEST BUY

INCLUDES QUICK RELEASE BLADE TENSION LEVER, FENCE & MITER GAUGE

G0555

ONLY \$450⁰⁰

\$69 ADDITIONAL COST

17" Heavy-Duty Extreme Series® Bandsaw with Cast Iron Wheels & Trunnion

MADE IN ISO 9001 FACTORY!

- Motor: 2 HP, 110V/220V, single-phase, TEFC
- Precision ground cast iron table size: 23 3/8" x 17 1/4"
- Table tilt: 5° left, 45° right
- Max. cutting height: 12"
- Blade size: 131 1/2" L (1/4" - 1" W)
- 2 blade speeds: 1700 & 3500 FPM
- Approx. shipping weight: 418 lbs.



Product Reviews & Awards ONLINE grizzly.com

DELUXE RESAW FENCE & MITER GAUGE

EXTREME SERIES

G0513X2

ONLY \$995⁰⁰

\$89 ADDITIONAL COST

19" Heavy-Duty Extreme Series® Bandsaw

- Motor: 3 HP, 220V, single-phase, TEFC, 1725 RPM
- Precision ground cast iron table size: 26 3/4" x 19"
 - Table tilt: 5° L, 45° R
 - Max. cutting height: 12"
 - Cutting capacity/throat: 18 1/4"
 - Blade size: 143" L (1/4" - 1 1/4" W)
 - Blade speeds: 1700 & 3500 FPM
- Approx. shipping weight: 480 lbs.



GEARED TABLE TILT MECHANISM

HEAVY-DUTY CAST IRON FENCE & CAST IRON TABLE TRUNNIONS!

MADE IN ISO 9001 FACTORY!

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6" Jointers with Mobile Base

- Motor: 1 HP, 110V or 1 1/2 HP, 110V/220V, single-phase
- Precision ground cast iron table size: 7 1/2" x 46"
- Max. depth of cut: 1/8"
- Rabbeting capacity: 1/2"
- Cutterhead diameter: 2 1/2"
- Cutterhead speed: 4800 RPM
- Approx. shipping weight: 270 lbs.

FREE SAFETY
PUSH BLOCKS



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BASE

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FENCE ADJUSTMENT

G0452 1 HP MOTOR \$435.00
SALE \$425.00

G0452Z 1 1/2 HP WITH SPIRAL CUTTERHEAD
~~\$695.00~~ **SALE \$675.00**

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ANYWHERE IN
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8" x 76" Parallelogram Jointers

- Motor: 3 HP, 220V, single-phase, TEFC, 3450 RPM
- Precision ground cast iron table size: 8" x 76 1/2"
- Cutterhead speed: 5350 RPM • Cutterhead dia.: 3 3/4"
- Deluxe cast iron fence: 36"L x 1 1/4"W x 5"H
- Max. rabbeting depth: 1/2"
- Approx. shipping weight: 597 lbs.

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SPIRAL CUTTERHEAD



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BLOCKS

G0490 **ONLY \$895.00**

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G0490X WITH SPIRAL CUTTERHEAD **ONLY \$1195.00**

12" x 83 1/2" Parallelogram Jointers

- Motor: 3 HP, 220V, single-phase
- Precision ground cast iron table size: 12 3/4" x 83 1/2"
- Cutterhead speed: 4950 RPM
- Max. depth of cut: 1/8"
- Max. rabbeting capacity: 3/4"
- Approx. shipping weight: 1059 lbs.

FEDESTAL MOUNTED
MAGNETIC
SAFETY SWITCH



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FREE
SAFETY
PUSH
BLOCKS

G0609 **ONLY \$1895.00**

G0609X WITH SPIRAL CUTTERHEAD
~~\$2295.00~~ **SALE \$2250.00**

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CONUS 48 STATES

15" Planer/Moulder

- Motor: 2 1/2 HP, 110V, single-phase
- Max. cutting width: 15"
- Max. cutting height: 6"
- Min. stock thickness: 1/8"
- Min. stock length: 17"
- Max. planer cutting depth: 1/32"
- Feed rate: 11 FPM & 22 FPM
- Cutterhead dia.: 3 1/4"
- Cutterhead speed: 5500 RPM
- Cuts per minute: 11,000
- Table size: 15" x 16"
- Approx. shipping weight: 181 lbs.

CONVENIENT
BUILT-IN DUST
COLLECTOR!



QUICK CAM
ADJUSTABLE
FEED ROLLERS

G0477 \$850.00
SALE \$795.00

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CONUS 48 STATES

15" Planer

- Motor: 3 HP, 220V, single-phase
- Max. stock thickness: 8"
- Min. stock thickness: 3/16"
- Min. stock length: 8"
- Max. cutting depth: 1/8"
- Feed rate: 16 & 30 FPM
- Cutterhead dia.: 3"
- Number of knives: 3
- Knife size: 15" x 1" x 1/8"
- Cutterhead speed: 5000 RPM
- Table size: 15" x 20"
- Approx. shipping weight: 675 lbs.

PRECISION GROUND
CAST IRON BED &
INFEED OUTFEED TABLES



Product
Reviews &
Awards
COULD
WIN GOLD!

BUILT IN
MOBILE BASE

G0453 **ONLY \$995.00**

\$139
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20" Planers

- Motor: 5 HP, 220V, single-phase
- Table size: 20" x 25 1/4" (20" x 55 1/2" with extension)
- Max. stock thickness: 8"
- Min. stock thickness: 3/16"
- Min. stock length: 7 1/2"
- Max. cutting depth: 1/8"
- Cutterhead speed: 5000 RPM
- Feed rate: 16 & 20 FPM
- Approx. shipping weight: 920 lbs.

PRECISION GROUND
CAST IRON BED &
INFEED OUTFEED TABLES



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MOBILE BASE

G0454
ONLY \$1495.00

G0454Z WITH SPIRAL CUTTERHEAD
~~\$2395.00~~ **SALE \$2295.00**

\$169
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12 Speed Heavy-Duty 14" Floor Drill Press

- Motor: 3/4 HP, 110V, single-phase
- Precision ground cast iron table
- Table size: 11 3/4" sq.
- Table swing: 360°
- Table tilts: 90° L & R
- Swing: 14"
- Drill chuck: 1/2" - 5/8"
- Drilling capacity: 3/4" steel
- Spindle taper: MT #2
- Spindle travel: 3 1/4"
- Collar size: 2.595"
- Approx. shipping weight: 171 lbs.

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1000
THIRD
CHOICE
AWARD

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INCLUDES BUILT-IN LIGHT
(BULB NOT INCLUDED)

G7944 **ONLY \$325.00**

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16" x 43" Swivel Head Wood Lathe w/Cast Iron Legs & DRO

- Motor: 2 HP, 110V, single-phase
- Precision milled cast iron bed
- Dist. between centers: 43"
- Swing over bed: 16" • Spindle bore: 3/8"
- Spindle & tailstock tapers: MT#2
- 10 speeds: 600-2400 RPM
- Approx. shipping weight: 372 lbs.

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SWIVELS
FOR OUTBOARD
TURNING



DIGITAL READOUT

12" TOOL REST

INCLUDES
6" FACE PLATE,
CUP LIVE CENTER
& SPUR CENTER

G0462
ONLY \$525.00

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2 HP Dust Collector w/2.5 Micron Bag

- Motor: 2 HP, 220V, single-phase, 3450 RPM
- Motor amp draw: 12 Amps
- Air suction capacity: 1550 CFM
- Static pressure: 11"
- Bag capacity: 5.7 cu. ft.
- Impeller: 12 3/4" balanced steel, radial fin
- Height w/bags inflated 78"
- Portable base: 21 1/4" x 33 1/2"
- Approx. shipping weight: 126 lbs.

FREE 93376
2 STAGE
CYCLONE
SEPARATOR



MADE IN
ISO 9001
FACTORY!

TOOL
BUYING GUIDE

TOP
TOOL
AWARD

G10292 **ONLY \$279.00**

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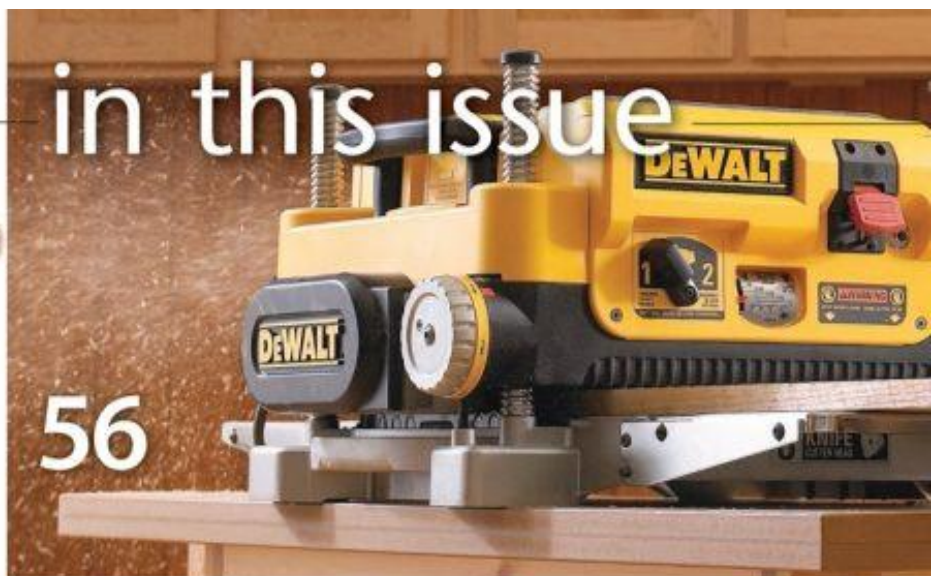
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GREAT PROJECTS MADE SIMPLE.

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It resists bugs, moisture, and rot, and costs less than synthetics and composites.
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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.



on the web

woodmagazine.com

GET A LOT MORE COUNTRY

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TWO BUCKS TO A SHARPER SHOP

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With *WOOD* Online's new forum section, you can subscribe to topics, get e-mail notification when another reader answers your question, and more (including improved searching of the forums). Check it out at woodmagazine.com/forums.

THESE TEENAGE WOODWORKERS WILL IMPRESS

Learn from these young 'uns building projects on *WOODTube* (woodmagazine.com/woodtube):

- Kosta Viennas (*below*), 14, builds a bookcase
- Alex Lesniak, 13, turns pens for college money
- Denis Rezendes, 16, and his bow-front desk





INNOVATIVE PRODUCTS SINCE 1989!



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

12" TABLE SAW

with Riving Knife & Extension Table

- 5 HP, 220V, single-phase motor
- Precision ground cast iron table size: 30 $\frac{3}{4}$ " x 78 $\frac{3}{4}$ "
- Arbor size: 1" • Arbor speed: 3600 RPM
- Blade tilt: left • Max. rip capacity: 52"
- Max. depth of cut: 4" @ 90°, 2 $\frac{1}{4}$ " @ 45°



Cast Iron Trunnions

W1761 5 HP, 12" Table Saw

VARIABLE SPEED PLANER/MOULDER with STAND

- Motor: 2 HP, 220V, single-phase
- Precision ground cast iron table & wings
- Table size with wings: 36 $\frac{1}{4}$ "L x 10"W
- Max. cutting width: 7"
- Max. planing height: 7 $\frac{1}{2}$ "
- Max. planing depth: $\frac{1}{8}$ "
- Max. moulding depth: $\frac{3}{4}$ "
- Knife size: 7 $\frac{1}{8}$ " x 1 $\frac{1}{2}$ " x $\frac{1}{4}$ " HSS
- Cutterhead speed: 7000 RPM
- 4" dust port
- Rubberized steel feed rollers
- Approx. shipping weight: 330 lbs.

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

PATENTED

Precision Ground Cast Iron Table

Heavy-Duty Cabinet Stand



Table Wings Have T-slots for Easy Guide Rail Adjustment

W1812

Planer/Moulder



See-Thru Cutterhead Window

Magnetic Switch

8" JOINTER

with Parallelogram Adjustable Beds

- 3 HP, 220V, single-phase, TEFC motor
- Precision ground cast iron parallelogram design table measures 8" x 76 $\frac{1}{16}$ "
- 4 knife, 5350 RPM cutterhead
- Large center mounted cast iron fence
- Rabbling capacity: $\frac{1}{8}$ "



Built-in Mobile Base

W1741
8" Jointer

SPIRAL CUTTERHEAD PLANERS

with Built-in Mobile Base

- 3 HP or 5 HP, 220V, single-phase motor
- Precision ground cast iron table & extension wings
- 2 speed gear box
- 2 adjustable bed rollers
- German-made carbide insert spiral cutterhead
- Pedestal mounted thermal overload magnetic safety switch
- Built-in locking mobile base

W1742S 15" Planer
W1754S 20" Planer



10" SLIDING TABLE SAW

with Scoring Blade & Riving Knife

- 5 HP, 220V, single-phase, TEFC motor
- Table size with extension wings: 40" W x 47" L
- Sliding table size: 12 $\frac{1}{4}$ " W x 63" L
- Scoring blade diameter: 3 $\frac{1}{2}$ "
- Scoring blade arbor speed: 8,000 RPM
- Main blade arbor speed: 4,000 RPM
- Single lever locking fence

W1811 10" Sliding Table Saw



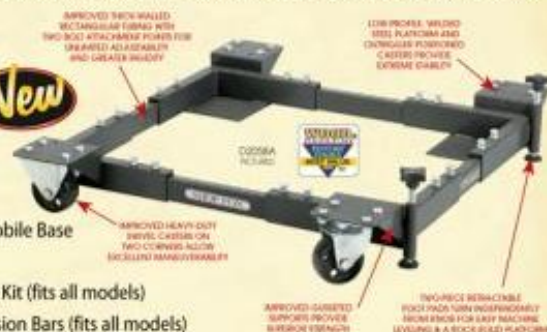
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- D2260A**
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600 lb. capacity
- D2057A**
Heavy-Duty Mobile Base
700 lb. capacity
- D2058A**
Super Heavy-Duty Mobile Base
1300 lb. capacity

New



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THREE-PRICE RETRACTIBLE FORCE-MADE TUBES PROVIDE INCREASED STABILITY FOR EASY MOVING AND A ROCK-SOLID PLATFORM



W1500

RIGHT ANGLE JIG

Cut tenons, dados, rail ends and finger joints safely & with complete accuracy. The SHOP FOX® Right Angle Jig is constructed using top quality aluminum castings & plates which are machined to exacting tolerances.

- Solid aluminum
- Extended depth: 13"
- Closed depth: 7 $\frac{1}{2}$ "
- Height: 8"
- Max. horiz. opening: 1 $\frac{1}{2}$ " x 8"



W1732

ADJUSTABLE ROLLER STAND

- Stand length is adjustable from 19 $\frac{1}{2}$ " to 54"
- Number of rollers: 9
- Stand height adjusts from 24 $\frac{1}{2}$ " to 38"
- Roller diameter: 2"
- Two-way locking swivel casters: 4 $\frac{1}{4}$ " diameter
- 300 lb. capacity

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Karl made gift boxes (issue 174) from maple and padauk for his wife and daughters.



Dave built this ash serving tray for a church fund-raising auction.

Photographers **JASON DONNELLY, SCOTT LITTLE, JAY WILDE**
Contributing Illustrators **TIM CAHILL, LORNA JOHNSON, ROXANNE LeMOINE**
Technical Consultants **BOB BAKER, DOUG HICKS**
Contributing Craftsman **JIM HEAVEY**
Contributing Proofreaders **BABS KLEIN, IRA LACHER, JIM SANDERS**

Publisher **MARK L. HAGEN**

ADVERTISING AND MARKETING

CHICAGO: 333 N. Michigan Ave., Suite 1500, Chicago, IL 60601

Marketing Manager **AMANDA SALHOOT**

Advertising Manager **JACK CHRISTIANSEN**

Direct Response Advertising Representative **LISA GREENWOOD**

Assistant **TIM BAARDA**

ATLANTA: Navigate Media

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Sounding Board

Our bulletin board for letters, comments, and timely updates

Readers respond to Norm's impact on woodworking

Thanks for the article about Norm Abram in issue 192 (September 2009). I've watched *The New Yankee Workshop* and *This Old House* for years, and have enjoyed learning from Norm's work and advancing my skills. He's long overdue to be recognized for his contributions to woodworking.

—John Parmelee, Centre Hall, Pa.

My friend was teaching his son how to turn wood on a lathe, and after a while the young man became frustrated and shut down the machine, ready to give up. Seeing this, my friend suggested they take a break. Then, father put his arm around son to console him and said, "You know, son, there's only been one perfect carpenter. Do you know who that was?" After thinking for a few seconds, his son blurted, "Ahh, you mean Norm!"

—Sean Brewer, Richmond, Ky.

I have enjoyed watching Norm grow from a carpenter into a craftsman. From the early days of "alternate the end grain," using mostly nails and way too much glue, to his total disregard of wood movement, to slopping polyurethane on everything, he has grown into a well-rounded craftsman. He even frequently corrects some of his early incorrect practices.

—Howard Acheson, Southport, N.C.

Although I don't always agree with Norm, I share his appreciation for the value and beauty of things wood.

—Ted Prinz, Webberville, Mich.

I am not a fan of *The New Yankee Workshop*. I sometimes watch an episode, but don't go out of my way to find it. I thought the term "America's Woodworker" was a bit overdone and too much hype. Norm might be responsible for starting some woodworkers on their way, but nowhere near all of us.

—John Rodgers, Whittier, Calif.



Norm Abram's instruction is the reason I'm a capable woodworker today. I began watching *The New Yankee Workshop* over a decade ago, and for a long time Norm provided my only exposure to woodworking. During those early years, I'd go to my shop and try to duplicate what Norm did, usually with embarrassing results.

But over time and with much practice, I developed enough skills to build projects, from small ones at first to, eventually, furniture for my house. So to his critics, I say, "Leave Norm alone." I have to believe he's helped countless people like me get started in woodworking, and those are skills I'll have for the rest of my life.

—Steve Anderson, Roann, Ind.

Thank you for featuring Norm Abram. The article was packed with good information that we don't get from his show. I have been a follower of Norm since his beginning on TV and have great respect for what he does and how he does it.

—John Roane, Sarasota, Fla.

When my brother and I were kids, we would stay up late at night to see *The New Yankee Workshop* reruns on PBS. We even placed a towel under the door so the light of the TV wouldn't give us away. Norm is an Everyman with an exceptional talent not just in woodworking, but just as importantly as a teacher. I have to wonder where my passion would lie today if not for Norm.

—Jose Salazar, Indian Springs, Nev.

New Yankee calls it quits

After 20 seasons of original programs, *The New Yankee Workshop* has hung up its tool belt. Last fall, NYW Executive Producer Russ Morash announced that the show had ceased production. No word yet on whether reruns will continue. Norm Abram will continue to co-host *This Old House*, now in its 30th year on PBS. 🌲

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Shop Tips

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At-the-ready pushblock

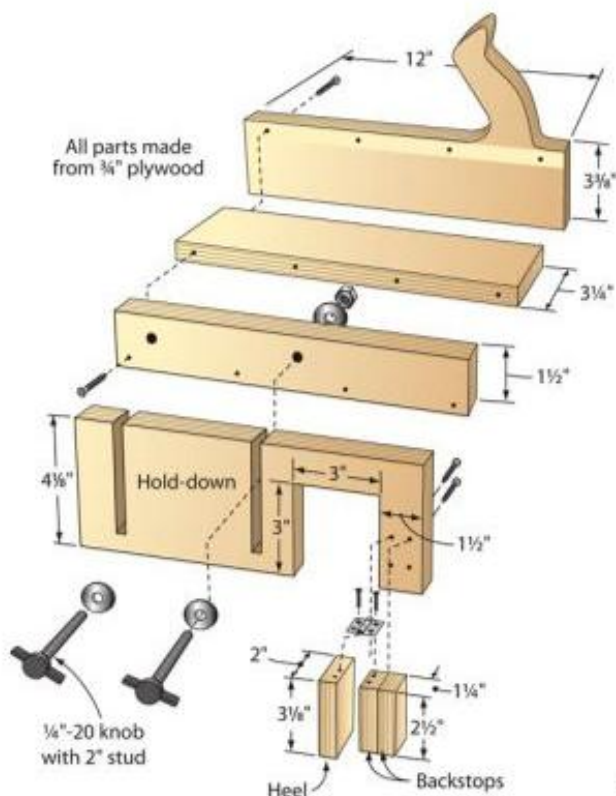
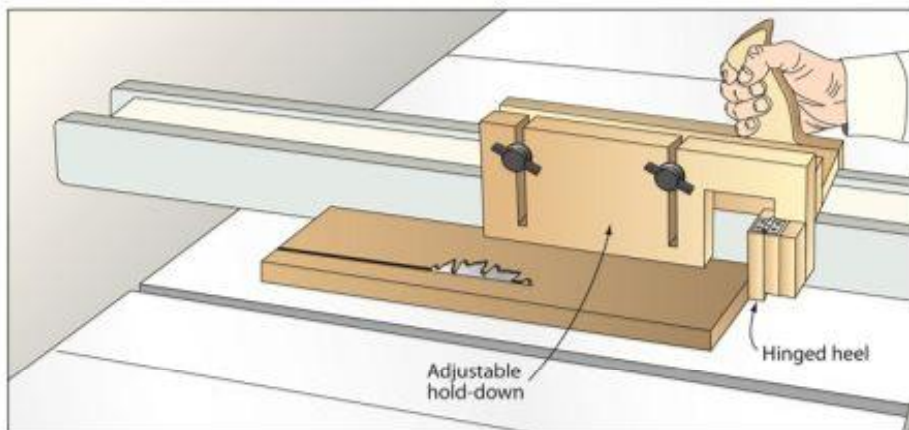
After once more fumbling for a pushblock in the middle of a tablesaw cut—a distraction that can cause uneven, burned cuts—I made this pushblock that stays on my fence just in front of the blade until I need it. The dimensions shown here are for a Beisemeyer-style fence, but you can adjust them to fit your fence. (See the *WOOD Patterns* insert, page 45, for the handle pattern.)

To use the pushblock, place it on the fence, near the front, with the hold-down adjusted to the workpiece

thickness. Grip the handle with your right hand; hold the pushblock stationary; and, with your left hand, push the workpiece under the holddown (the hinged heel will flip up). Continue feeding the workpiece into the blade. Once the tail end of the workpiece passes the hinged heel, the heel drops down allowing you to push the workpiece past the blade. Replace the heel when it gets chewed up from cutting narrow stock.

—Aaron Perkins, Lloydminster, Alta.

Top Shop Tip



continued on page 10

The Top Tipster



Photo: Kristen Howlley

Aaron Perkins didn't let a diagnosis of Lou Gherig's disease (*Amyotrophic lateral sclerosis*) defeat him. He got married, started a family, and took up woodworking. As the disease progresses, Aaron simply uses it as an opportunity to upgrade his shop and tackle new woodworking challenges. After mastering box-making, he is now buying a lathe and trying his hand at woodturning.



Aaron receives a Rockler dovetail jig package including a dust hood and extra templates. Thanks for the Top Tip, Aaron!

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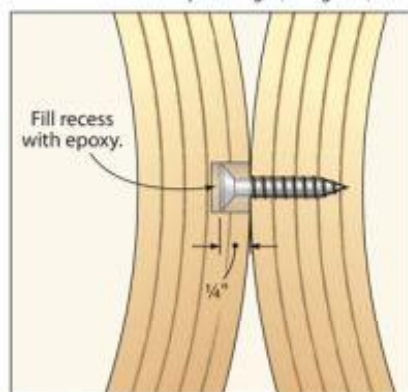
Shop Tips

Throwing joinery a couple of curves

My latest project, a free-form globe stand, required joining the concave sides of two curved pieces. Naturally, there is little gluing surface. Here's how I joined the two pieces:

On one piece, I drilled a pilot hole and drove in a wood screw, leaving the head protruding $\frac{1}{4}$ " or so. In the mating piece, I drilled a counterbore to fit the screw head, as shown. After filling the counterbore with fast-curing epoxy, I joined the pieces, inserting the screw head into the epoxy, and clamped the two pieces together. Be sure to clean up any squeeze-out with acetone before the epoxy cures.

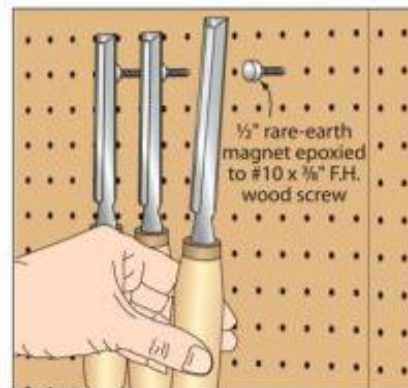
—Sylvio Dugas, Kedgwick, N.B.



No-hook hangers for perforated hardboard

Tool hooks seem to come off perforated hardboard as easily as the tools they hold, so I came up with a different solution. I epoxied $\frac{1}{2}$ " rare-earth magnets to the heads of #10 $\times \frac{1}{8}$ " flathead screws. These thread easily by hand into a typical $\frac{1}{8}$ " perforated-hardboard hole. I use them to hold chisels, screwdrivers, squares, files, and wrenches.

—Mark Thiel, Coral Springs, Fla.



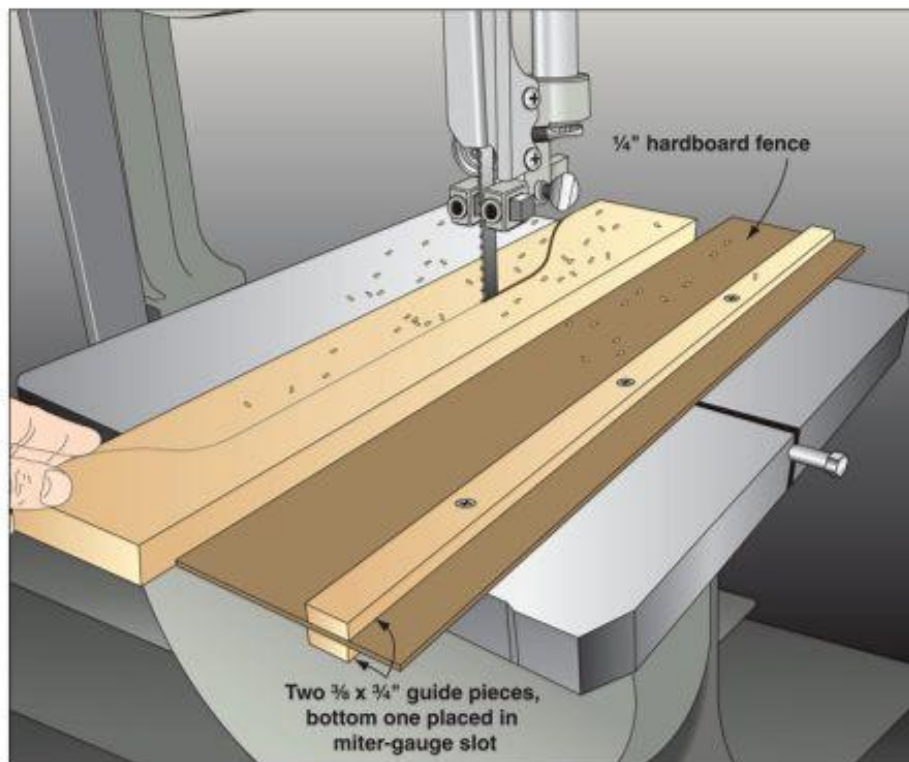
Quick cutting for curves and straightaways

A bed rail on a recent project called for curved ends with a long straight section in between. Normally, I would rough-cut curves on the bandsaw and sand them to final shape, but it's hard to freehand-cut the long straightaway precisely.

In order to make the straight portion of the cut truly straight, I came up with this removable guide that drops into my bandsaw's miter-gauge slot. Here's how to make it: Position a piece of hardboard to act as a fence for cutting the workpiece along the straight line. Sandwich the hardboard between two pieces of $\frac{3}{8} \times \frac{3}{4}$ " hardwood with wood screws, as shown.

Start the cut with the curved section. When you get to the straight section, pause to drop the guide into place, and continue the cut. When you reach the opposite curved end, remove the guide and complete the cut.

—Jeff Stikeleather, Mill Spring, N.C.



continued on page 12

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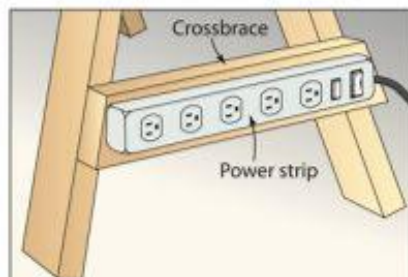
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Shop Tips

A new definition of "horse power"

To make sawhorses more convenient and eliminate tripping over power cords running to tools, I mounted a power strip to the cross brace. This means I only have to snake one extension cord to my work location, but I can work with multiple tools without constantly bending and chasing down the plug.

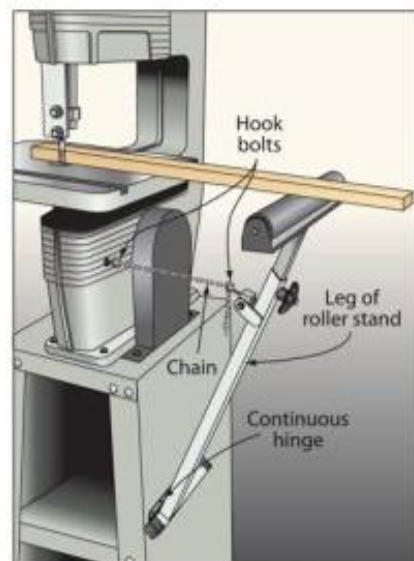
—Ron Whittemore, Rehoboth, Mass.



Stowaway stock support tucks in tight spaces

I don't have room for a dedicated bandsaw outfeed support, so this stowable roller is just the ticket. To make it, I sacrificed an adjustable roller stand by removing the stationary leg, and shortening one foot of the adjustable leg so it didn't stick out from the bandsaw base. Then I mounted the stand on the bandsaw base with a continuous hinge. A chain between the bandsaw and the outfeed stand allows me to extend the support, or stow it against the bandsaw.

—Curtis Simpson, Anaheim, Calif.



continued on page 14

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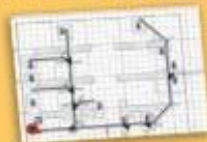
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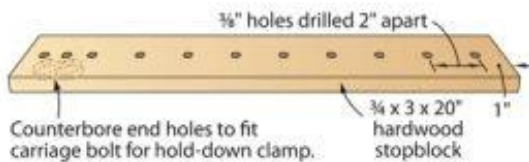
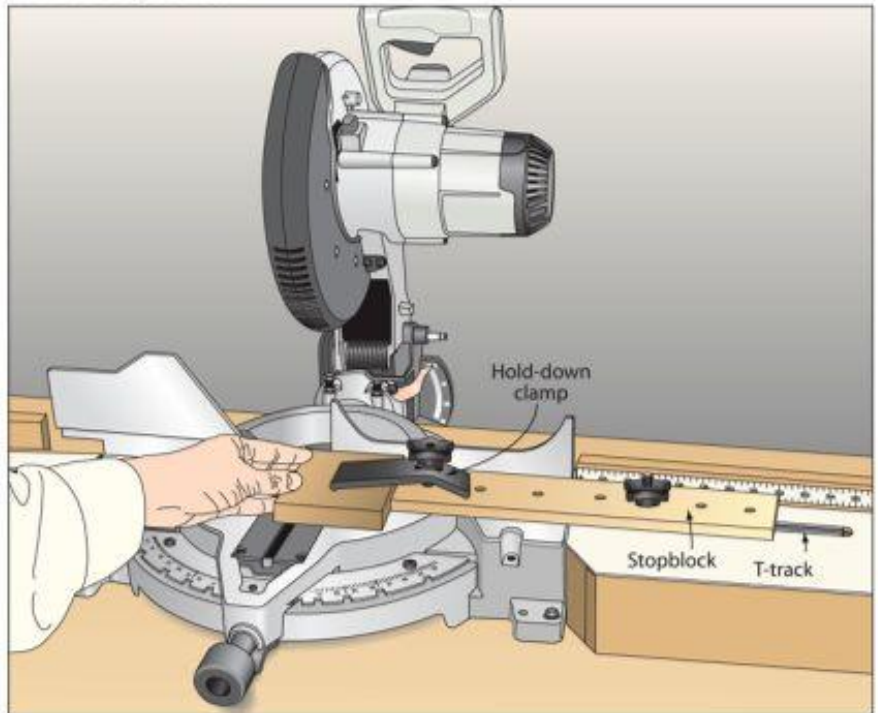
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Shop Tips

Finger-saving hold-down for small workpieces

I came up with this adjustable hold-down to keep my fingers safely out of the way while cutting small pieces on the miter saw. First, I added a short section of T-track to both sides of my miter saw table. Then I made the simple stopblock, shown below. Because it is exactly 20" long, simply add 20" to the size of the workpiece being cut and put the end of the block at that mark on the fence scale. I drilled $\frac{3}{8}$ " holes every 2" so I can use it with longer workpieces. To secure the hold-down clamp, I counterbored the end holes to accept a carriage bolt and fastened it in place with a star knob.

—David Breen, Loudon, Tenn.



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While painting some shelves recently, I ran out of space to stack drying boards. So I took a large scrap of plywood and attached one-handed bar clamps along the edges. In no time, I had an impromptu drying rack. Be sure to tilt it back a little when you set it aside. Otherwise the weight of your boards will topple it.

—Rob Kurtz, Amherst, Ohio



“Pocket” square measures extra large

Your article “Don’t Swear, Get Square” in issue 177 (July 2007) prompted me to send in this tip for a collapsible, square-checking triangle. All it takes is the tape from a broken tape measure and some $\frac{1}{16}$ ” pop rivets.

The triangle shown here is cut to 3’, 4’ and 5’, but you could make the sides any length so long as you maintain that 3-4-5 ratio. Tape each corner together and drill a $\frac{1}{16}$ ” hole through both pieces at each intersection. Pop

rivet two of the angles together, leaving the joints loose to allow rotation. For the third angle, insert the rivet into only one leg leaving the two sides unattached.

When checking a project or sheet of plywood for square, connect the legs of the open angle by loosely hooking the rivet into the hole. For easy storage, you can fold the triangle into a straight line, and roll it up. 🌲

—Mark Thorsell, Golden Valley, Minn.



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Editor rating: ★★★★★

Editor test-drive:

This large table has more features than any other. With four T-track slots in the table and two hold-down clamps, I found it easy to clamp almost any size workpiece. The 36"-long, 3¼"-tall aluminum fence has two T-slots on its face for mounting the stopblock, with adjustment screws on the back side to square it to the table. I like the cam-style fence clamps because the fence doesn't shift when you tighten the clamps as it can do with threaded knobs. The ½"-thick, melamine-coated MDF top proved flat, but the kit comes without

hardware for mounting to the drill press. Following the instructions, I drove four screws with washers into the bottom through the table slots. The 5×6" particle-board insert sat below flush with the tabletop, resulting in tear-out on the bottom of workpieces. (I replaced it with a flush-fitting MDF panel.)

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—Tested by Bob Hunter,
Tools & Techniques Editor

4 years as an editor at *WOOD* magazine, 22 years of woodworking experience



PEACHTREE WOODWORKING, #1015, \$120



Dimensions:
15×24"

Editor rating: ★★★★★

Editor test-drive:

If you don't have the time to build your own table, this model offers plenty of good features for a reasonable price. To start with, you get two aluminum hold-down clamps and a UHMW stopblock. The 2¼"-tall MDF fence sports a T-track along its 32" length, and mounts solidly to the table track with aluminum angle (although I had to shim it square to the table). The table itself is 2"-thick MDF with

plastic laminate on both faces, rather than the thinner melamine coating on some. I found it quick to install and remove from my drill press with two threaded knobs that fit through the slots in my table.

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—Tested by Bill Krier,
Editor-in-Chief

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WOOD® MAGAZINE PLAN-BUILT, (ISSUE 156, JUNE/JULY 2004), \$85



Dimensions
14½×29½"

Editor rating: ★★★★★

Editor test-drive:

I might be a little prejudiced when it comes to this table—because I designed it—but it fulfills all of my needs, and for about half the price of manufactured tables. Two T-track slots in the table accommodate hold-down clamps as well as the fence; a third T-track helps me quickly position and clamp the microadjustable stopblock. The 3"-tall fence gives plenty of vertical support without being in the way of the quill-feed handles. Plus, it

telescopes on each end for a maximum length of 48", and the table has replaceable center inserts. You'll invest a few hours making it, but the payoff is worth it.

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—Tested by Kevin Boyle,
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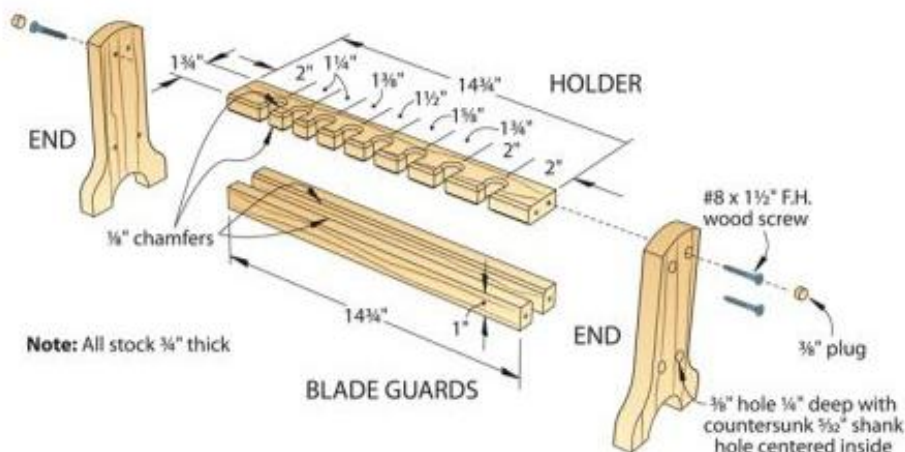
Great Ideas for Your Shop

Hold and Protect Chisel Rack

Whether you're cleaning mortises or squaring the corners of a picture-frame rabbet, this handsome accessory shields your chisels and keeps them close at hand. To create this rack, first measure the diameter of your chisel ferrules and then drill holes in scrap stock $\frac{1}{8}$ " larger than the measured diameters to test the fit. Adjust the hole sizes, if necessary, for a good fit. Drill the holes in the holder, cut from the front edge of the holder to the holes using a handsaw or bandsaw, and rout a chamfer along the edges (not ends) and holes of the holder.

Use the full-size **End Pattern** in the *WOOD Patterns* insert to mark the outline and hole centerpoints for the ends. To simplify assembly, use four spacers as shown at right. For our particular chisels we used two $2\frac{1}{4}$ "-long and two $3\frac{3}{8}$ "-long spacers, to keep the holder and blade guards level when gluing and screwing them between the ends.

Note: We built this rack to fit a set of eight WoodRiver chisels from Woodcraft (item #147049). You may have to slightly vary the rack and hole dimensions to suit your chisels. 🌲



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Beyond kiln-drying

The idea of thermally modifying wood is nearly as old as toolmaking. Early hunters heated wooden spears over the fire to harden them. But it wasn't until the 1990s that Scandinavian wood processors and kiln manufacturers, such as Stellac Oy, took the process into the lab for closer scrutiny. The resulting technology has been employed for years in Europe, but is only recently making its way into North American retail markets via such companies as Radiance Wood Products (radiance-wood.com), EcoVantage (ecoprem.com), Bay Tree Technologies (purewoodproducts.com), and Northland Forest Products (cambiawood.com).

The thermal modification process (see illustration at right) starts where kiln-drying leaves off, subjecting the wood to temperatures near 500° F. This "bakes" the sugars in the wood, making it unpalatable to rot-inducing microbes and wood-munching insects. Components in the wood's cell walls that normally absorb and release moisture become permanently water-insoluble during thermal modification. Robbed of ready moisture, the wood becomes not only less vulnerable to decay by biodegrading, but also more dimensionally stable and resistant to warping. And, just like those spears of old, the wood hardens as the cell structure is transformed.

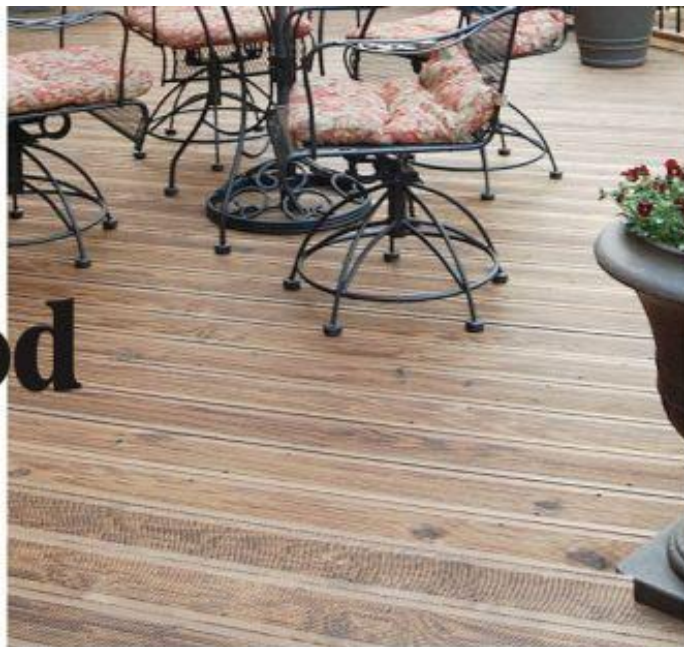


Photo courtesy: Radiance Wood Products

The end-product is a lightweight, strong, durable, stable, and chemical-free wood. The process imparts a rich brown color that permeates the board and a pleasantly sweet, baked smell.

The wood is machined into deck boards, siding, or dimensional lumber after undergoing the process, and most of its tendency to warp gets left behind.

continued on page 22

The Thermal-modification Process

Kiln-dried wood with a moisture content ranging from 14–19% enters the computer-controlled thermal-modification kiln.

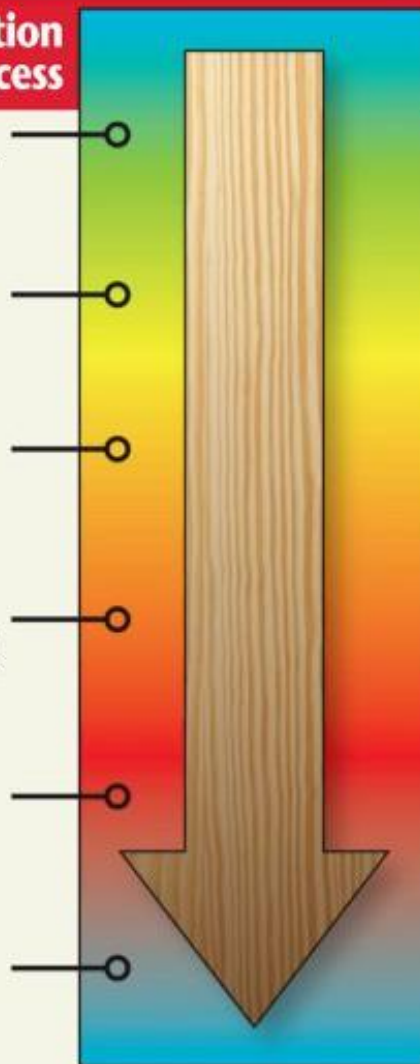
Initial heating: The temperature inside the kiln rises to 212° F, the boiling point of water.

Preconditioning and drying: The heat continues and steam is introduced to slowly bring the drying wood to a uniform 7–8% moisture content.

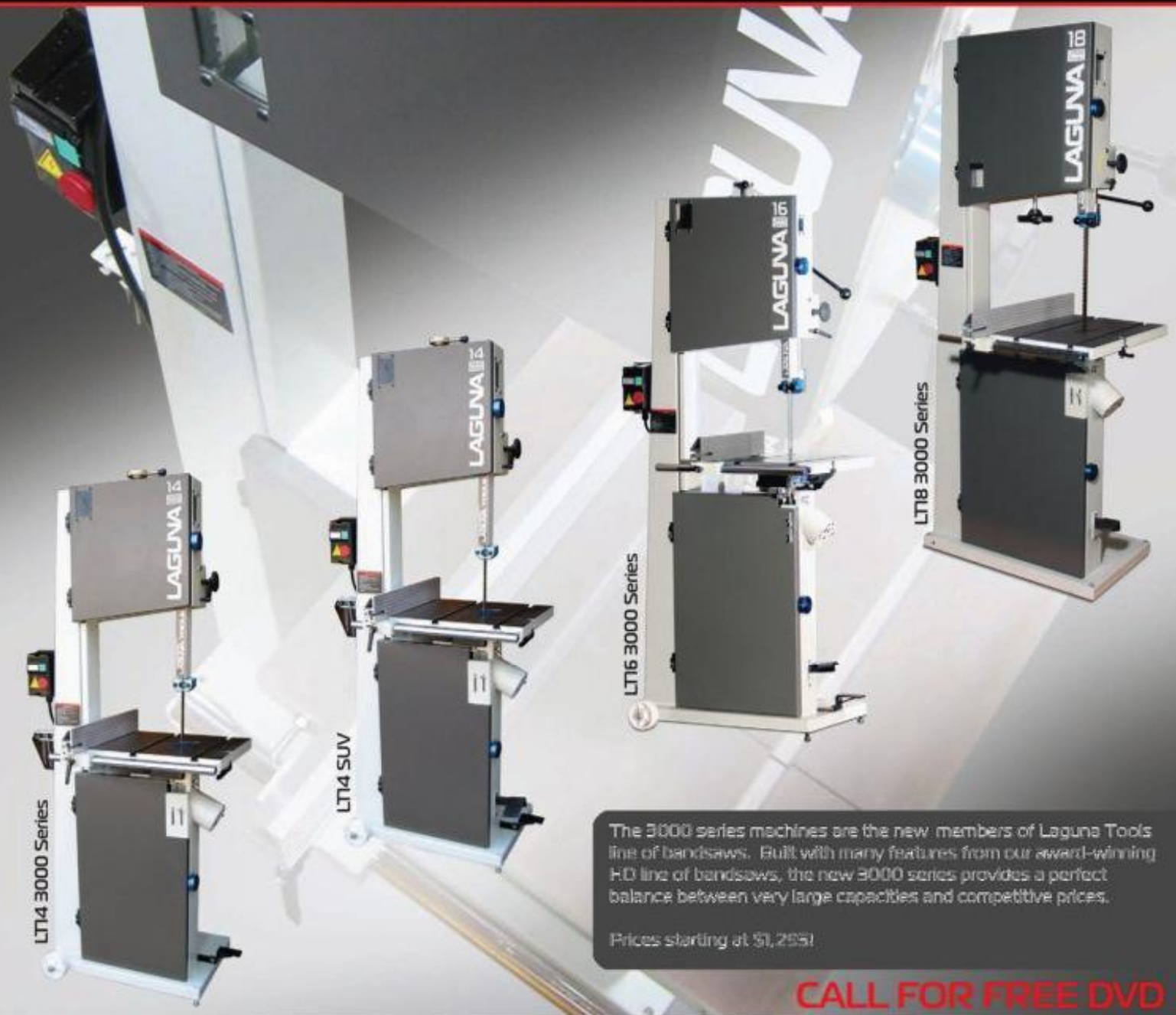
Thermal Modification: As the temperature of the kiln boosts to 480° F, the increased heat "bakes" the sugars and tannins in the wood making them inedible to microbes and insects. The wood darkens and hardens.

Conditioning: Steam once again is introduced to stabilize the wood and prevent it from drying completely in the high heat.

Cooling: Computers slowly lower the temperature of the kiln to minimize stresses on the wood as it cools. Only 24–48 hours after it entered, the wood is ready to be removed.



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Lumber Aisle

Environmental impact

The thermal-modification process works on any species of wood, but most manufacturers utilize Southern Yellow Pine because of its low price and sustainability. The chemical-free process leaves behind no chemical waste at the kiln and nothing toxic to leach from the wood into your backyard soil.

One manufacturer, Radiance Wood Products, carries the green aspect a step further by adding a resin-based, volatile-organic-compound-free finish called One TIME in the factory. Bond Distributors, maker of One TIME recommends refinishing with their product within seven years.

Thermally modified wood weighs so little, a truck can hold more than two

times the number of board feet compared to pressure-treated wood, saving fuel and reducing emissions. (Although the latter is offset somewhat by the increased fuel necessary to heat the kilns.)

Waiting for the other shoe to drop?

Here it is, but it's more like a moccasin than a work boot: The process that leaves the wood harder also reduces its splitting resistance; several manufacturers recommend predrilling screw holes, especially near the ends of boards. The wood becomes more vulnerable to UV light, fading to a silver-gray faster than unmodified wood, so refinishing is necessary every year or two.

One other caveat: Because the process is fairly new, most products have not

yet been certified for ground contact. So for now, you'll still need to build your deck framework with pressure-treated lumber. That's why most manufacturers are focusing their product lines on 5/4 deck boards, posts, balusters, and railings, rather than standard dimensional lumber.

Availability and cost

Currently, thermally modified wood is making its way into lumber yards and specialty decking stores, with limited inroads into home centers. Its cost lands somewhere between that of cedar decking and composites. Warranties range from 20 to 30 years. Watch for increased availability and possibly lower prices as companies rev up production and distribution. 🌱

How thermally modified wood stacks up against other outdoor materials

Material	Pros	Cons	Cost per 1x6 Lineal Foot
 Thermally modified wood	Hard, lightweight, stable, rot-resistant, insect-resistant, and chemical-free.	Care must be used to avoid splitting when driving fasteners, and it grays quickly if not regularly finished. Limited availability.	\$2
 Pressure-treated pine	Strong, inexpensive, and readily-available, pressure-treated wood has a long and proven track record of impressive rot- and insect-resistance. You can buy it certified for ground contact.	Pressure-treating wood saturates it with water-based preservatives, leaving it heavy, wet, and warp-prone. The chemicals accelerate corrosion in fasteners and necessitate special handling procedures.	\$1
 Western red cedar	Even-grained with some natural decay-resistance. Widely available in the West and Midwest. Look for comparable redwood in the West and cypress in the Southeast.	Tannin bleeding can make finishing problematic without some additional prep work. Care must be used to avoid splitting when driving fasteners.	\$1-2
 White Oak	Dense, strong white oak has a decay-resistant, moisture-resistant heartwood and it accepts finishes readily.	You won't find white oak in dimensional lumber for deck-building, so save it for benches, arbors, and chairs. Heavy.	\$2
 Ipe	Super-dense, strong, and stable, ipe can last 40 years or more even if left untreated. It resists warping, cracking, decay, even denting.	Expensive and sometimes hard to find, ipe's hardness also accelerates dulling of tools, blades, and bits. Heavy.	\$3-4
 Wood/plastic composites	Rotproof, defect-free, dimensionally stable, and widely available in home centers. No splintering.	It lacks rigidity so it can't be used for structural purposes. Weighs more than most woods and can experience expansion, especially along the length in hot weather. In the sun, becomes hot to the touch.	\$2-3



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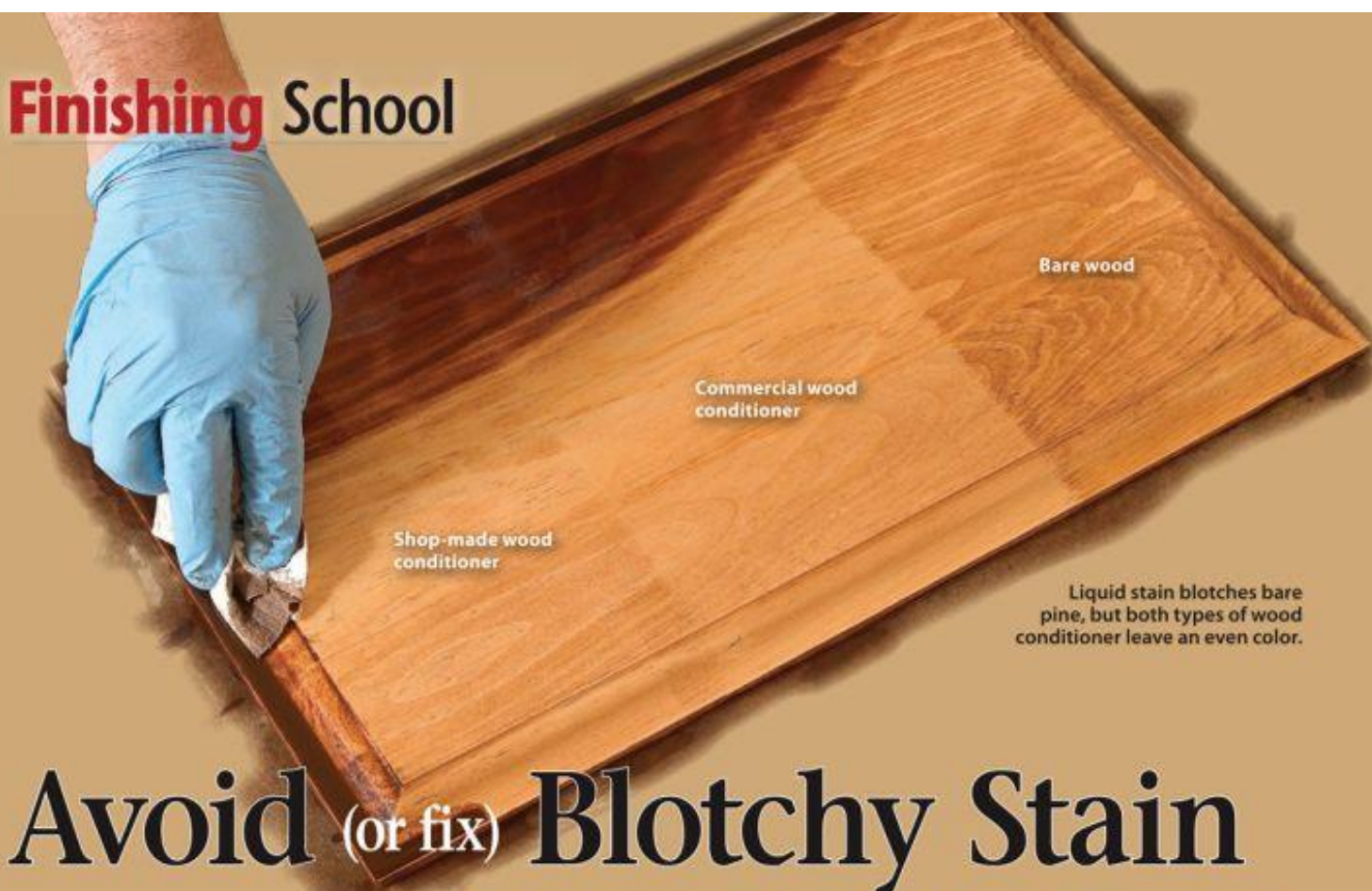


Kit P348

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Finishing School



Liquid stain blotches bare pine, but both types of wood conditioner leave an even color.

Avoid (or fix) Blotchy Stain

Don't lose your project to a motley mess at finishing time. There's more than one way to achieve even color.

Blotching happens when areas of varying wood density absorb liquid stain differently, resulting in an unevenly stained surface that detracts from the natural beauty of the grain. Some woods, such as oak and walnut, absorb liquid stain evenly. On pine, cherry, maple, poplar, and birch, however, spongy areas soak up more liquid—and more color—than dense areas.

Any blotch-prevention program starts with evenly sanding to 180 grit on face grain, and to 220 grit on end grain. If you use a random-orbit sander, follow up by hand-sanding with the grain using the same final grit.

After sanding, wipe all surfaces with mineral spirits and inspect for scratches or sander swirls. Once those are gone, apply a gel stain or equalize the wood density with a washcoat. Choose the gel stain option if you want an easy solution straight from the can with predictable color. But go for the washcoat if you want absolute protection against blotching or plan to use a water-based stain.

More on gel stains

Unlike deep-penetrating liquid stains, gel stains hold their dye in suspension [Photo A] so it can't oversaturate absorbent areas of the wood. Depending on the formula, however, some gel stains still produce high contrast between earlywood and latewood in pine [Photo B].

Before applying gel stain, thoroughly mix any liquid at the top of the can back into the gel. Wipe on stain generously but evenly. Allow the stain to sit for the time recommended by the manufacturer—usually about three minutes—and then wipe off the surplus, working with the grain.

Don't expect gel stains to get you out of sanding end grain to a finer grit. A rough surface there still traps more stain pigment particles than on other surfaces.

Clean up with a washcoat

Whether you use a store-bought wood conditioner or make your own from varnish and mineral spirits (more on that later), these so-called "washcoats" work the same: Solvent carries a small amount of varnish extra-deep into the absorbent, blotch-prone areas, partially sealing them. This equalizes the absorbency so liquid stain penetrates more evenly without blotching [Photo C].

continued on page 28

YOU THINK WOOD ACTS SPONGY?



A Just as on wood, liquid stain quickly penetrates deep into the left sponge, while gel stain rests on the surface without being absorbed.

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Finishing School

You can use an oil-based washcoat beneath oil-based or water-based stain [Photo D] once it dries thoroughly. To create your own, mix two parts of the varnish you'll use as a top coat with eight parts mineral spirits. However, don't attempt to thin water-based finish to make your own washcoat. Stick with the store-bought types.

Now the downsides: Partially filling the pores with a washcoat leaves fewer places where stain pigments can catch. That produces a lighter color than on wood with no washcoat. Washcoats also require some experimentation to prevent blotching while still coloring the wood.

Application pointers

Apply the washcoat generously to a test board until the spongy areas and end grain become saturated. When these areas stop pulling in liquid, wipe the surface thoroughly to remove the excess. Allow an oil-based washcoat to dry overnight and water-based washcoat to dry for three hours.

Conditioner labels may say you can apply stain sooner than that, but resist the temptation. You'll risk dissolving the washcoat with the solvent in the stain. If blotches appear, gradually add varnish to the homemade mix or apply additional coats of conditioner until it blocks the blotch. Don't exceed one part varnish to two parts mineral spirits.

Lightly sand the wash-coated surface using the same grit you used on the unfinished wood. Then stain according to the manufacturer's instructions.

Too late to prevent? Hide those blotches

If despite your best efforts a stained surface still shows blotching, don't give up. Conceal light blotching with a glaze. That's any thick stain applied over a film finish covering the blotched stain.

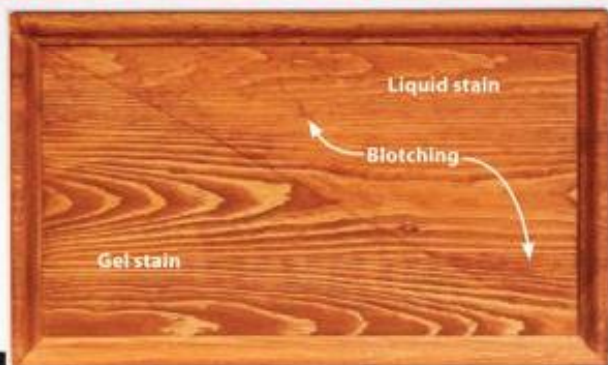
Begin by applying a full-strength "sealer" coat of the same finish you'll use for your top coats. After the finish dries, lightly roughen it in the direction of the grain using 0000 steel wool to provide scratches where pigment particles in the glaze can catch. Then apply an even coat of oil-based gel stain as your glaze.

If you only need a small amount of glaze to fix the blotching problem, wipe off the excess stain as you would on bare wood, allow it to dry, and apply two topcoats [Photo E].

If you need a darker glaze to cover up the blotchy areas, use just the tip of a dry, natural-bristle brush to distribute the stain (instead of wiping it off) until it's an even color. Wipe the brush off frequently as you work. If you remove too much, restain that area and start over. If you make a mistake, wipe the surface before the glaze dries using a cloth soaked in mineral spirits; then try again. 🌱

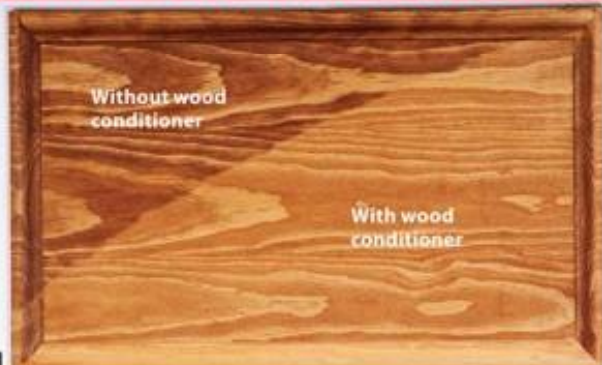


GEL STAIN HIGHLIGHTS GROWTH RINGS IN PINE



B Gel stain produced less blotching in pine than the liquid version of the same color, but still produced high contrast between growth rings.

WOOD CONDITIONER EVENS WOOD COLORS



C A washcoat (a store-bought wood conditioner) reduced the growth ring contrast caused by a light walnut liquid stain on this pine panel.

CONDITIONER HELPS WATER-BASED STAINS



D A water-based wood conditioner washcoat keeps water-based stain from soaking into pine and drying before you can wipe off the excess.

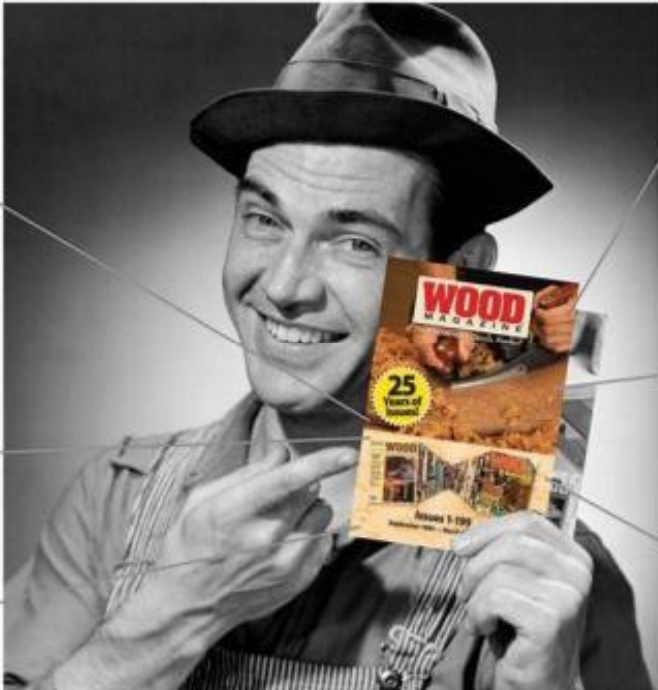
GLAZE DEEPENS COLOR EVENLY



E Gel-stain glaze darkens the right side of this cherry panel without increasing the contrast caused by blotches.

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Fixing **Workshop Goofs**

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Before you trash that tattered plywood, try these fixes to tame the tear-out.

Whether it comes from using a dull blade, the wrong blade, or a misaligned tablesaw fence, grain tear-out can haunt your crosscuts in veneered sheet goods. Here are three ways to salvage ragged edges.



Fix #1: Cover it

If you don't mind altering your project design, hiding the tear-out behind molding proves the easiest and quickest fix. Use off-the-shelf molding or rout your own in matching stock. Secure it to the assembled project with glue and pins or brads—no one will be the wiser!

HIDE TORN GRAIN WITH MOLDING



Fix #2: Wrap it up

This fix might not look good for some project parts, such as case sides, but for tops, bottoms, and shelves you can "wrap" the workpiece with solid-wood edging. Trim off the tear-out by first

making a $\frac{1}{8}$ "-deep scoring cut to trim the veneer cleanly, and then raising the blade to cut off the scrap end. Next, glue matching hardwood strips around the perimeter to bring the panel to final dimensions.

TEAR-OUT THAT'LL TEAR YOU UP



CUT IT CLEANLY; THEN EDGE IT



Fix #3: Highlight it

Use a small cove or chamfer bit to rout away the torn-out grain. Sand; apply a sanding sealer to the entire workpiece, reveal included; and sand smooth. Then use a cotton swab to apply a stain darker than the stain used on the rest of the project to the reveal. This creates a shadow effect that becomes a design element. 🌱

REPLACE TEAR-OUT WITH REVEAL



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Wall Shelf & Mirror

Add a mirror to a shelf with drawers and you've got the perfect project for an entry hall, bedroom, or bathroom.



BASIC-BUILT
GREAT PROJECTS MADE SIMPLE.

WHAT YOU'LL NEED



- **Materials:** Cherry ($\frac{1}{2}$ "- and $\frac{3}{4}$ "-thick stock available at many home centers) and $\frac{1}{4}$ " birch plywood.
- **Bits:** $\frac{1}{2}$ " cove router bit, $\frac{1}{2}$ " straight router bit.

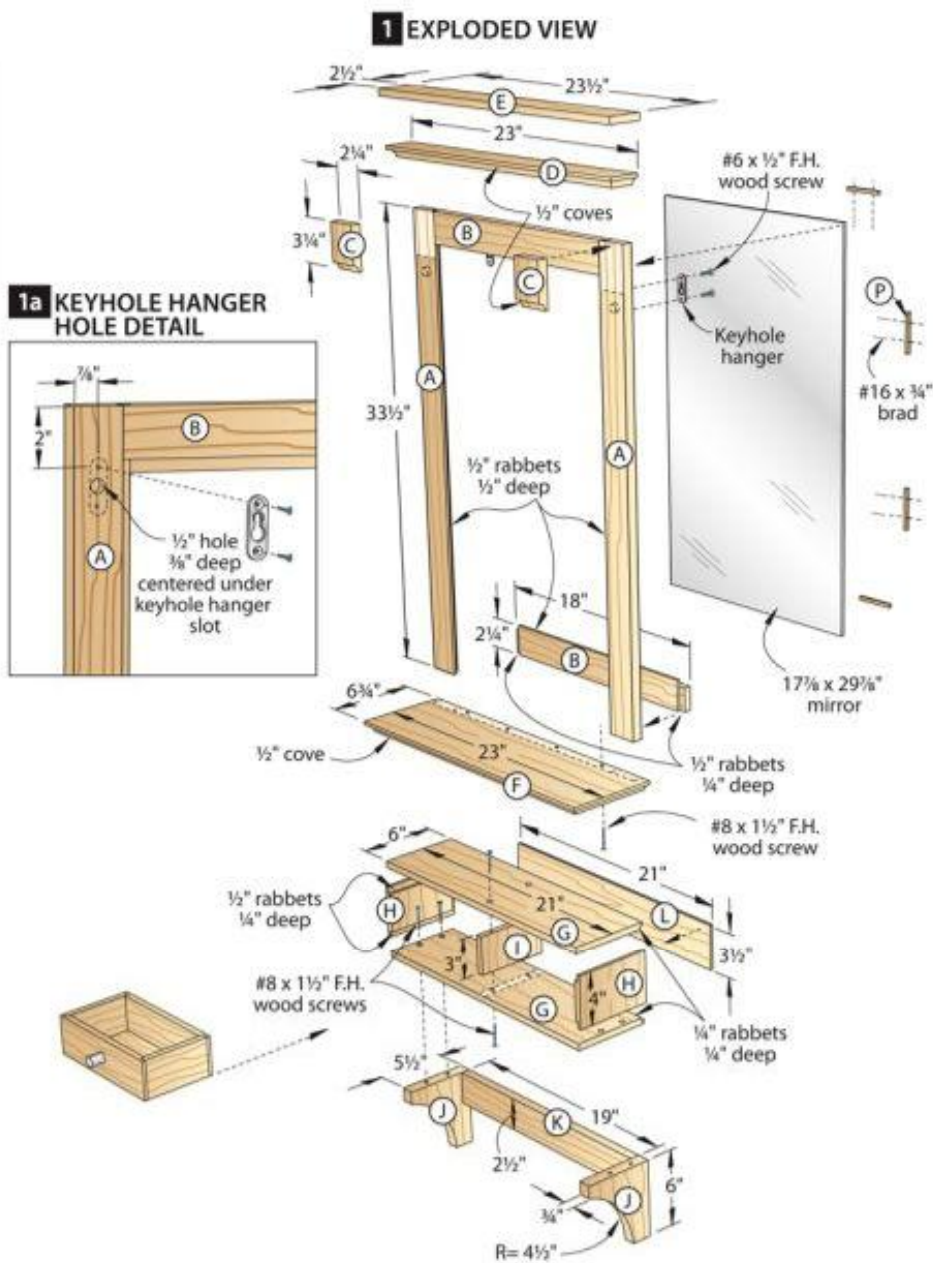
When you gaze into this mirror, you won't believe the person looking back at you built such a stylish project using only basic tools and commonly available lumber.

The frame comes first

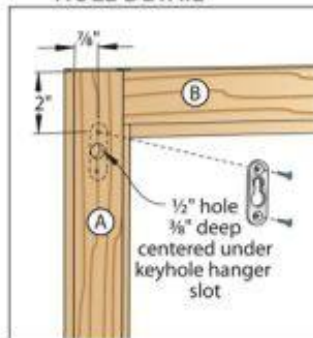
1 Rip the stiles (A), rails (B), and a 10"-long blank to cut the two corner blocks (C) to width [Materials List, page 35]. Set the blank aside.

2 Mount a $\frac{1}{2}$ " straight bit in your table-mounted router. [If you don't own a router table, see **More Resources**, page 35 for free plans to make a simple MDF router table.] Raise the bit to $\frac{1}{4}$ " and adjust the fence to cut a $\frac{1}{2}$ "-wide rabbet. Then rabbet one back edge of both stiles (A) and rails (B) [Drawing 1]. Raise the bit $\frac{1}{8}$ " and repeat until the rabbet reaches $\frac{1}{2}$ " deep [Photo A].

3 Place a rail (B) facedown on the router table and set the bit height flush with the lip formed by the rabbet [Photo B]. Rout rabbets on both ends of the rails [Photo C].



1a KEYHOLE HANGER HOLE DETAIL

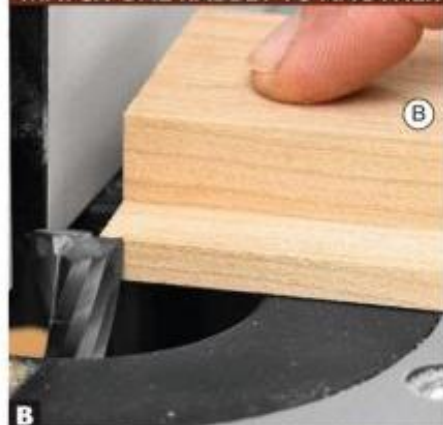


CUT RABBETS A HAIR AT A TIME



To avoid tear-out, raise your router bit no more than $\frac{1}{8}$ " at a time. Make the last pass your lightest to act as a cleanup cut.

MATCH ONE RABBET TO ANOTHER



Raise the bit to rout the rail (B) end rabbets flush with the edge rabbets and position the rail faces flush with those of the stiles (A).

BACK UP RABBET ROUTER CUTS



A pushblock stops tear-out when rabbeting rail (B) ends. Rabbet the pushblock bottom before routing the opposite rail end.

4 Glue and clamp the stiles (A) and rails (B) to form the frame [Drawing 1, Photo D].

5 Drill a $\frac{1}{2}$ " hole in the back face of each stile (A) to accommodate the keyhole hangers [Drawing 1a].

6 Cut the mirror top (D), cap (E), and shelf (F) to size. Then install a $\frac{1}{2}$ " cove bit in your router. In multiple $\frac{1}{8}$ "-deep passes, cut coves under the front edge and both ends of the mirror top and shelf [Drawing 1].

7 Retrieve the corner block (C) blank, and rout $\frac{1}{2}$ " coves on both ends.

Note: You can rout one long piece more easily and safely than two short parts. Then cut both corner blocks to length. Finish-sand the frame (A/B), corner blocks, mirror top (D), and shelf (F) to 220 grit.

8 Glue and clamp the mirror cap (E) centered on the mirror top (D). After the glue dries, glue and clamp the mirror top and cap to the frame (A/B) and allow to dry.

9 Glue and clamp the corner blocks (C) to the stiles (A) with the block ends against the underside of the mirror top (D). Then glue, center, and clamp the shelf (F) to the bottom of the frame (A/B). Drill and drive four screws to reinforce the joint.

Making a case for drawers

1 Cut the box top and bottom (G) and sides (H) to size. Install a $\frac{1}{2}$ " straight bit in your router table and set the fence to cut a $\frac{1}{4}$ "-deep rabbet the thickness of the box top/bottom on the inside ends of the box sides.

2 Rout a $\frac{1}{4}$ " rabbet along the back of the box top, bottom (G), and the

SHOP TIP

Waste knot, want not

Instead of tossing pieces of wood with loose or ugly knots into the fireplace, work around these defects, as we did with the brackets (J). Position the workpiece to drop the knot into a waste area and cut it away. Not every knot belongs in the scrap bin, though. Small, tight knots away from joints add character to your project.



sides (H). **Quick Tip!** Double-check plywood thicknesses. Not all $\frac{1}{4}$ " birch plywood measures a true $\frac{1}{4}$ " thick. Check the actual thickness before rabbeting the box top, bottom, and sides.

3 Cut a blank to width for the box divider (I). Place a box side (H) on the divider and mark the blank [Photo E], then cut the blank to length. Sand the box top and bottom (G), sides, and divider to 220 grit and set aside.

4 Cut blanks for the brackets (J) and cut the bracket rail (K) to size. Mark a $4\frac{1}{2}$ "-radius curve on both brackets, cut on the waste side of the arcs, and sand to the line [Shop Tip, above].

5 Glue and clamp the brackets (J) to the bracket rail (K). After the glue dries, glue and clamp the bracket assembly to the box bottom (G) with $\frac{1}{2}$ " insets on both sides. Drill $\frac{1}{8}$ " countersunk pilot holes and drive screws [Photo F] $\frac{3}{8}$ " from the ends [Drawing 1].

6 Glue and clamp together the box top (G), sides (H), and box-bottom assembly (G/J/K) [Photo G].

7 Cut two scrap spacers 10" long to center the box divider (I). With the box-divider edge flush with the front edges of the box top and bottom (G), clamp and screw the divider to the top and bottom [Photo H].

8 Measure between the rabbets along the box top/bottom (G) and between the sides (H) and cut the box back (L) to those dimensions. Glue and clamp the back in place.

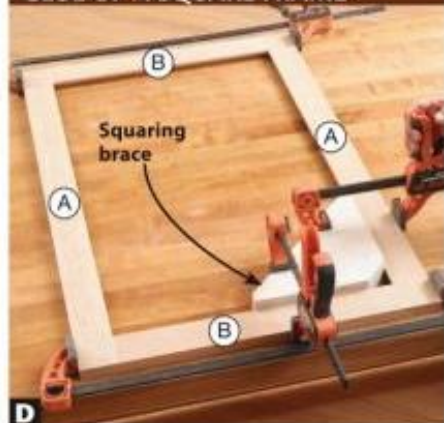
9 Glue, center, and clamp the mirror frame (A-F) to the box (G-L) with the back edges flush.

Make two clutter catchers

1 Cut the drawer fronts and backs (M) and sides (N) to size. **Quick Tip!** Measure twice, cut fronts. Double-check the drawer-opening width before cutting drawer fronts and backs to size. They should be $\frac{1}{16}$ " narrower and shorter than the opening.

2 Using a $\frac{1}{2}$ " straight bit in your table-mounted router, rabbet the inside faces of the drawer fronts and backs (M)

GLUE UP A SQUARE FRAME



Rabbets make the stiles (A) and rails (B) self-squaring, helped by a brace in one corner. [See More Resources for free brace plans.]

CUT THE BOX DIVIDER TO FIT



Use the face between the rabbets on the box sides (H) to define the box opening height and length of the divider (I).

MOUNT BOX BRACKET ASSEMBLY



A countersinking pilot bit (see Sources) drills a pilot hole and countersink to screw the bracket assembly (J/K) to the box bottom (G).

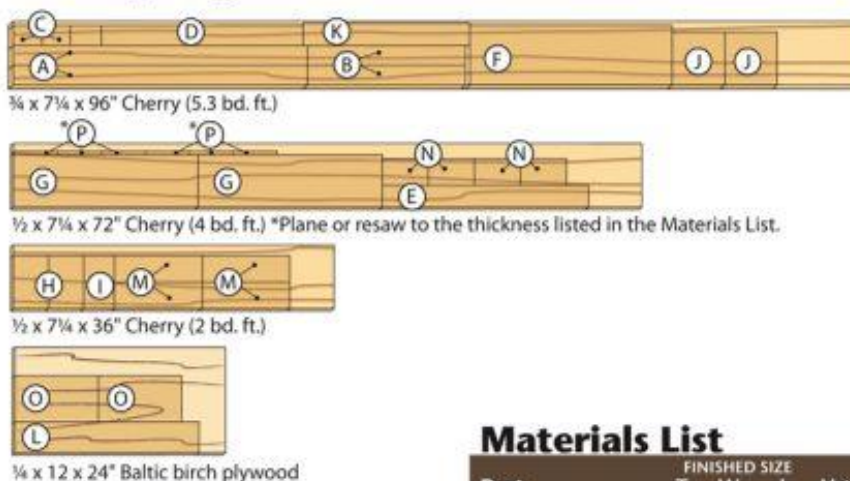
[Drawing 2]. Then rout the ¼" rabbets on the drawer fronts, backs, and sides (N).

3 Cut the drawer bottoms (O) to fit between rabbets in the fronts/backs (M) and sides (N). Glue and clamp the sides to the fronts and backs; then add the drawer bottoms.

4 Drill centered holes to suit your drawer pulls. Sand all parts to 220 grit and apply stain. (We used Varathane Traditional Cherry gel stain no. 445.) Then apply three coats of clear finish. (We used aerosol satin lacquer, sanding with 220 grit between coats.)

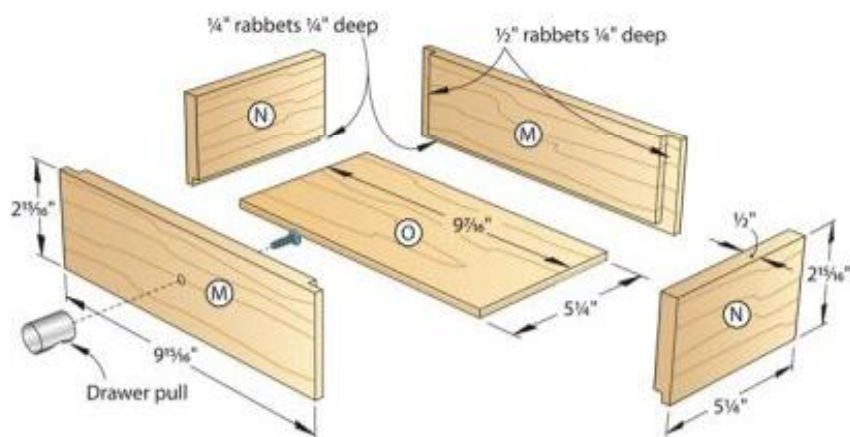
5 Cut the mirror stops (P) to size. Then cut mirrored glass ⅛" shorter and narrower than the rabbeted openings. Place the mirror in the frame and nail the stops in place. Attach the drawer pulls and keyhole hangers. Now find a wall where you can display a project that reflects you and your craftsmanship. 🌱

Cutting Diagram



Written by **Bob Wilson** with **Jeff Mertz**
Project design: **Kevin Boyle**
Illustrations: **Roxanne LeMoine; Lorna Johnson**

2 DRAWER



Materials List

Part	FINISHED SIZE			Matl.	Qty.
	T	W	L		
Mirror frame					
A stiles	¼"	2 ¼"	33 ½"	C	2
B rails	¼"	2 ¼"	18"	C	2
C* corner blocks	¼"	2 ¼"	3 ¼"	C	2
D top	¼"	2 ¼"	23"	C	1
E cap	½"	2 ½"	23 ½"	C	1
F shelf	¼"	6 ¾"	23"	C	1
Box					
G top/bottom	½"	6"	21"	C	2
H sides	½"	6"	4"	C	2
I* divider	½"	5 ¾"	3"	C	1
J brackets	¼"	5 ½"	6"	C	2
K bracket rail	¼"	2 ½"	19"	C	1
L back	¼"	3 ½"	21"	BP	1
Drawers and stops					
M fronts/backs	½"	2 ½"	9 ½"	C	4
N sides	½"	2 ½"	5 ¾"	C	4
O bottoms	¼"	5 ¾"	9 ¾"	BP	2
P mirror stops	¾"	¾"	5"	C	6

*Parts initially cut oversize. See the instructions.

Materials key: C—cherry; BP—Baltic birch plywood.
Supplies: #6x½" flathead wood screws (4), #8x1½" flathead wood screws (12), #16x¼" brads, keyhole hangers (2), drawer pulls (2), 17½x29¾" mirror.
Bits: ½" straight and ½" cove router bits; ½" drill bit.
Optional: ⅛" pilot hole countersinking drill bit.

Source

Countersinking pilot bit: Snappy 5-piece countersinking drill set no. 830846, \$28, Woodcraft, 800-225-1153 or woodcraft.com.

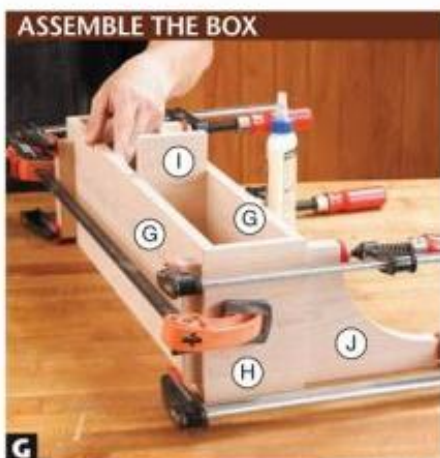
MORE RESOURCES

FREE DOWNLOADS

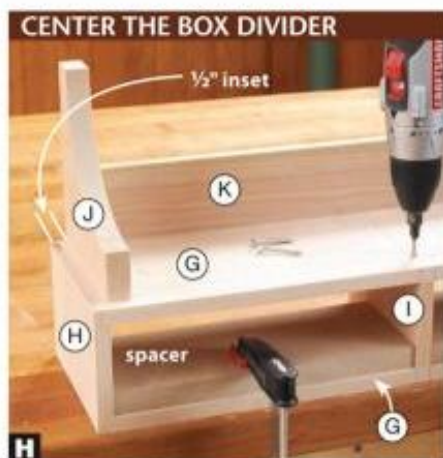
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G Place the box divider (I) loosely in position to prevent the box (G/H) from bowing under clamping pressure.



H Two equal-length spacers that leave a ½" gap help center and square the box divider (I) while you screw it in position.

Making Nice with Knots



Knots need not be a nuisance. Featured judiciously, they become a striking focal point in your project.

Know your knot anatomy

A knot is nothing more than the base of a tree branch where it intersected the tree trunk, interrupting the otherwise straight grain pattern, causing it to flow around it. Knots can be grouped into two basic categories, but you'll see them in all stages between the two.

Tight knots appear as dark, dense circular or oval spots with irregular grain. The wood remains unbroken between the tree trunk and the embedded branch. They represent a relatively weaker spot in the wood, and, over time, could split as the knot moves at a different rate than the surrounding wood.

Loose knots are generally darker and have shrunk away and detached from the surrounding wood during the growing process. They contain visible cracks or gaps and are often surrounded by a thin layer of scar tissue called *callus*. Some are loose enough to be removed by hand and require extra precautions when cutting.

TIGHT KNOT



This tight knot is integrated into the wood and will not affect the way you saw, joint, or plane the board.

LOOSENING KNOT



Gaps have formed around some of this knot indicating signs of loosening. It could chip out when jointed or planed.

LOOSE KNOT



These loose knots show noticeable movement when touched. Machining this board risks turning the knots into projectiles.

Keep your knots where they belong

Before you can machine them, use 5-minute epoxy to lock loose and loosening knots into place and fill any gaps and voids. When the epoxy cures, you can saw, joint, or plane the wood without fear of knocking the knot out, or worse, sending it flying across the shop or damaging your machinery.

Be sure to choose clear-drying epoxy so the knot retains its natural look. (The epoxy will appear transparent in its applicator.) White-drying, opaque, or colored epoxy often highlights the knot, emphasizing it with an unnatural ring.

Here are two approaches for locking in loosening and loose knots.

A LOOSENING KNOT: SECURE IT WITH SUCTION



Small gaps in loosening knots may require injecting epoxy with a glue syringe in order to lock in knots.



To draw the epoxy into the gaps, use a shop vacuum. Protect the hose by rubber-banding a paper towel over the end.

A LOOSE KNOT: POP IT OUT, EPOXY IT, POP IT BACK IN



After removing the knot, clean any loose bark and debris from the knothole and the knot using a brass wire brush.



Mix up a small amount of epoxy and spread it liberally on the outside of the knot and reposition it in the board.



Spread additional epoxy to fill any remaining voids. After the epoxy cures fully, machine as you would any other board.

Show off your knots

Knots make an acceptable feature in many projects, especially those made of pine and cedar. In fact country-style or

rustic furniture almost requires them. Rather than letting knots dot the project will-nilly, be deliberate about their

placement as you would any other wood figure. Take a look at some of our favorite examples:



We found two knotty pine boards sequentially cut, and used the opportunity to arrange them into mirrored door panels.



This tight cluster of knots on the top rail of a pine bookcase receives a front-and-center treatment. We used a paper cutout of the part overlaid on the uncut board to easily visualize the knots' location in the final part. 🌲

PROJECT HIGHLIGHTS

- Biscuit joinery simplifies assembly.
- Spray-on shellac provides an instant aged patina.
- Find low-cost pine at home centers.

Country Pine Cabinet



Build only the lower half for an attractive and compact storage cabinet suitable for any room in the house.

Just right: That describes the size of this project. Not so big that it dominates a kitchen or dining room, but big enough to offer ample storage and display space. The lower cabinet alone makes an attractive sideboard, above. Simple joinery includes rabbet joints for the drawers, and stub tenons and grooves for the doors. Once the doors are built, hinges with screw slots make it easy to position the doors up and down and side-to-side for a perfect fit.

Start on the lower cabinet

1 Edge-glue stock for the sides (A) and bottom (B) [Materials List, page 44; Drawing 1]. While the panels dry, cut the top cleats (C) to size and drill $\frac{3}{16}$ " slots in one of them for the screws that secure the top (O) [Drawing 1].

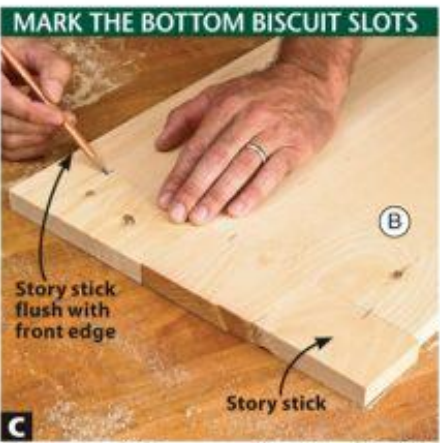
Overall dimensions:
30 $\frac{1}{4}$ " wide x 15 $\frac{1}{2}$ " deep x 76 $\frac{1}{4}$ " high.



A Use a cutoff from the side or bottom panels as a story stick. Another cutoff from a panel positions the story stick.

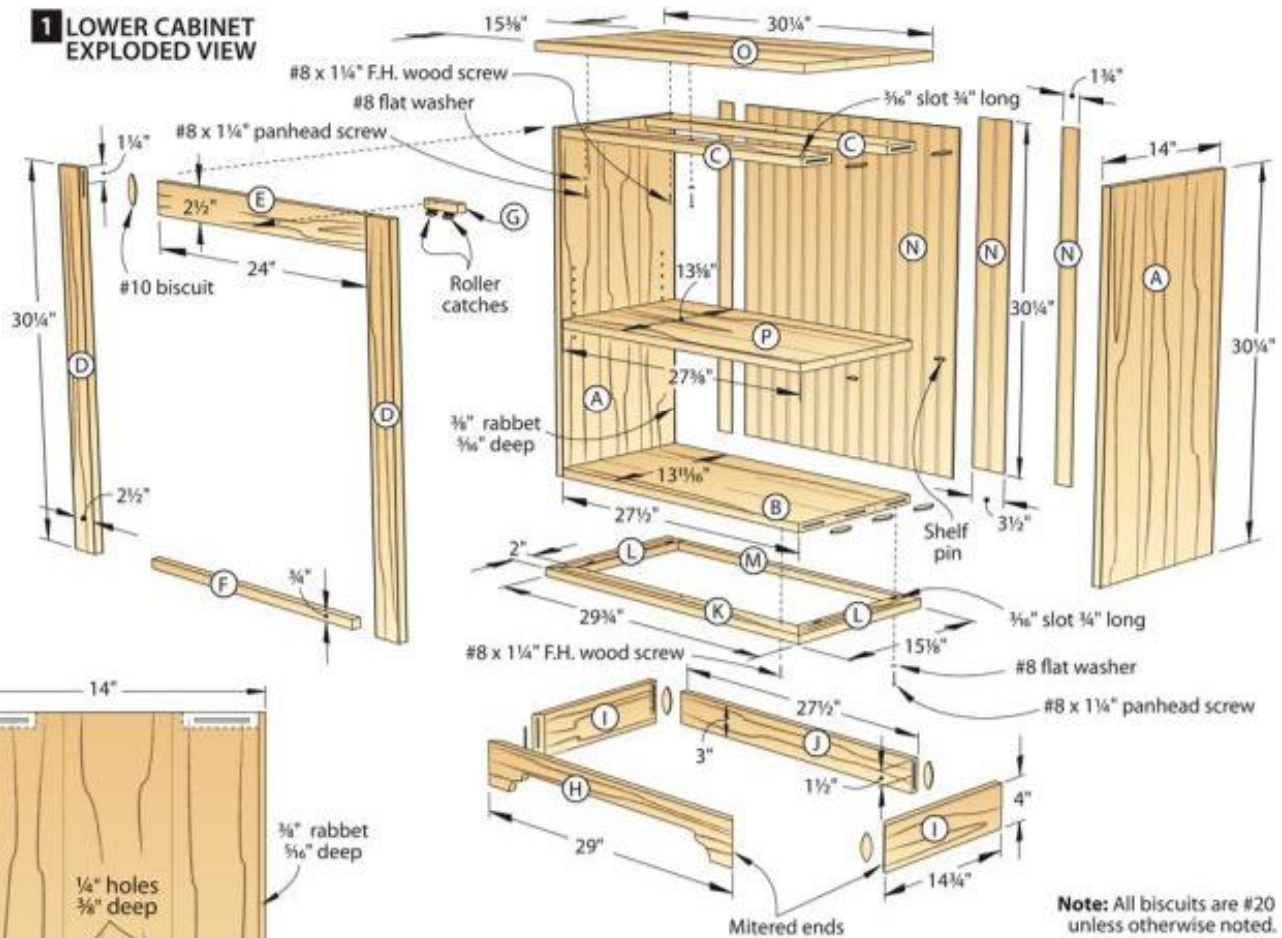


B Align the mark on the base of the biscuit joiner with the marks on the story stick and cut the biscuit slots.

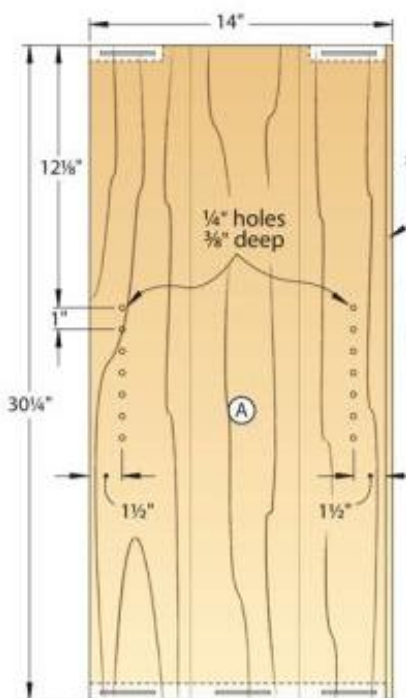


C The bottom (B) is narrower than the sides (A) so align the story stick flush with the front edge, then mark the biscuit-slot locations.

1 LOWER CABINET EXPLODED VIEW



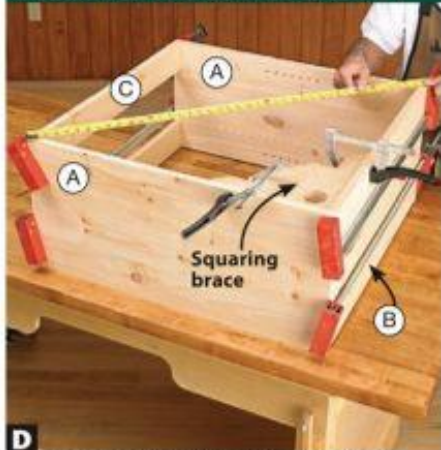
1a LOWER CABINET SIDE (left inside face shown, right is a mirror image)



2 Trim the sides (A) and bottom (B) to size. **Quick Tip! Make a story stick**. Save a cutoff from the end of one of the panels. Lay out the locations of the biscuit slots on the cutoff and use this story stick to lay out biscuit locations quickly. Set up a dado blade in

your tablesaw and cut a 3/8" rabbet along the back edges of the sides [Drawing 1a]. **3** Position the story stick [Photo A] and cut the biscuit slots in the sides (A) [Photo B]—two slots at the top and three at the bottom [Drawing 1a]. Now align the end of the story stick with the front

ASSEMBLE THE LOWER CABINET



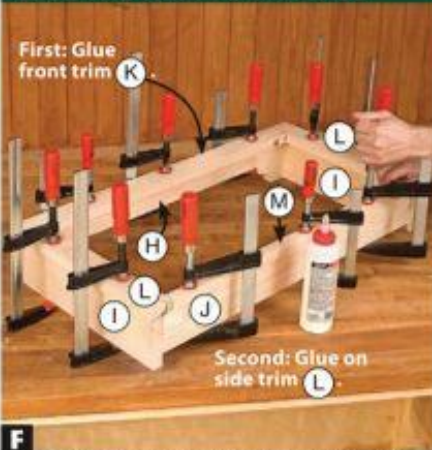
D Double-check for square by comparing diagonal measurements. A squaring brace holds the case square during assembly.

GLUE THE FACE FRAME IN PLACE



E Use the bottom rail (F) as a spacer when gluing the stiles (D) and upper rail (E) to the case. Then glue the bottom rail in place.

GLUE THE TRIM TO THE BASE



F Center the front trim (K) on the width of the base (H/I/J), with a $\frac{3}{8}$ " overhang. Then glue the remaining trim pieces in place.

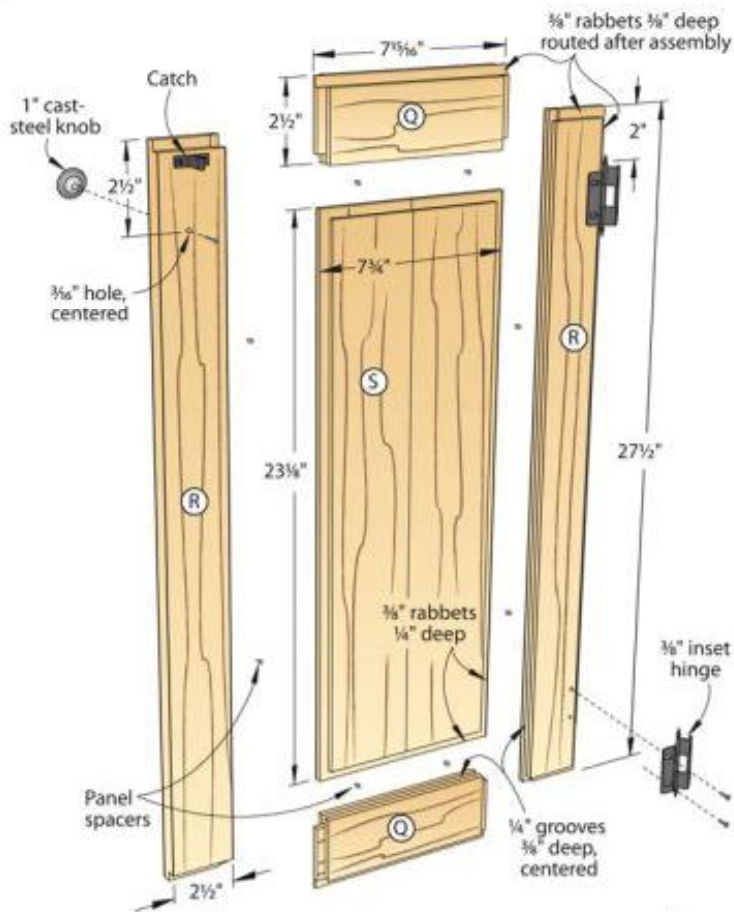
edge of the bottom (B), transfer the marks to the panel [Photo C], then cut these slots. Cut biscuit slots in the ends of the top cleats (C) also [Drawing 1].

4 Lay out and drill the shelf-pin holes in the sides (A) [Drawing 1a; More Resources, page 43]. Apply glue to the biscuit slots in a side, one end of the bottom (B), and the top cleats (C). Insert biscuits, and assemble these pieces [Drawing 1]. Glue the remaining side to this assembly [Photo D].

5 Cut the face-frame stiles (D) and rails (E, F) to size. **Quick Tip!** *Shave later.* Cut the stiles to width so that they overhang the sides by about $\frac{1}{2}$ ". This allows you to plane or sand them perfectly flush with the sides after assembly. Cut slots for #10 biscuits in the top edge of the stiles and the ends of the top rail (E). Glue the top rail and stiles to the case, with the bottom rail (F) in place as a spacer [Photo E]. After clamping, glue the bottom rail to the case. Cut the catch block (G) to size and glue it to the back of the top rail, centered, with their bottom edges flush. Sand the lower cabinet to 220 grit.

6 Rip the base front (H), sides (I), and back (J) to width and 1" longer than listed. Bevel-cut both ends of the base front to bring it to finished length, then bevel-cut one end of each base side to finished length. Dry-fit the base front and sides, then crosscut the base back to fit between the sides. Cut slots for #20 biscuits in each piece [Drawing 1]. Make a copy of the **Base Front Pattern** from the **WOOD Patterns** insert and spray-adhere it to a piece of $\frac{1}{4}$ " hardboard or plywood. Cut and sand the edges smooth. Trace this template onto both ends of the base front, bandsaw the front to shape, then

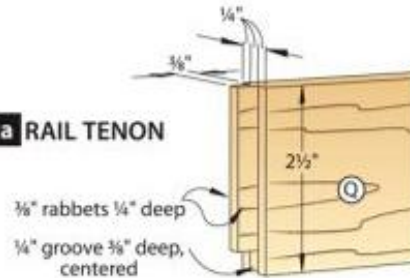
2 DOOR (left door, inside face shown)



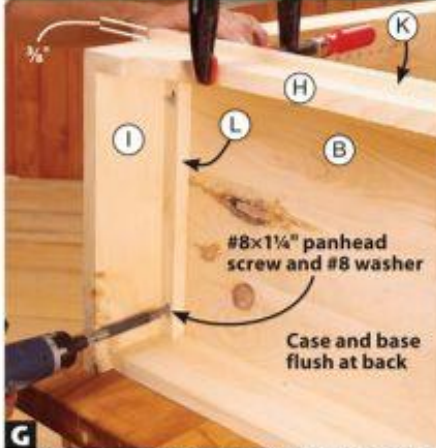
glue and clamp the base together. Save the template to use again later.

7 Rip the front base trim (K), side base trim (L), and back base trim (M) to width and 1" longer than listed. Miter-cut the front trim $\frac{3}{8}$ " longer than the lower-cabinet width. Miter-cut the side trim $\frac{3}{8}$ " longer than the case depth, then

2a RAIL TENON



ATTACH THE BASE TO THE CASE



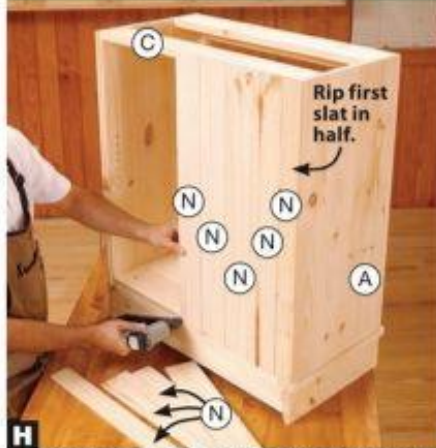
G Lay the case on its back to align the base and case. Drive panhead screws with washers through the slots in the side trim (L).

drill $\frac{3}{16}$ "-wide slots in the side trim [Drawing 1]. Dry-fit the front and side trim to the base (H/I/J) and cut the back trim to fit between the sides. Then glue the trim pieces to the base [Photo F]. After the assembly dries, sand it to 220 grit, then center the base on the case width and screw it in place [Photo G].

8 Note: You can cut a single panel from beadboard plywood instead of using individual beadboard slats. Cut the beadboard slats (N) to length [Drawing 1]. Rip one slat in half, place the ripped edge in the rabbet in a side (A), and staple or nail it in place. Then staple full-width slats across the back [Photo H], ripping the final slat to fit.

9 Glue up panels for the top (O) and shelf (P) [Drawing 1]. Cut them to size. Attach the top with panhead screws and washers at the front and wood screws at the rear.

BUILD THE BACK, SLAT BY SLAT



H Start with a slat ripped in half, then work your way across the carcass. Angle the staple gun to reduce the chances of splitting the slats.

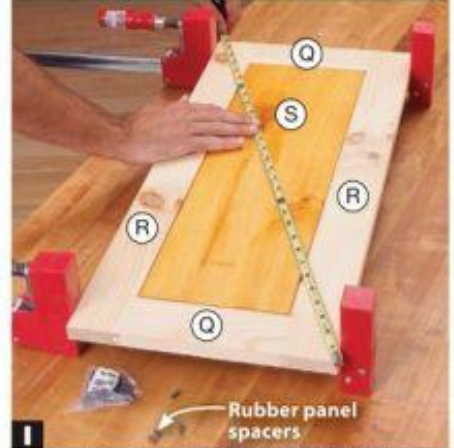
Take a swing at the doors

1 Cut the door rails (Q) and stiles (R) to size and glue up stock for the door panels (S) [Drawing 2]. After the glue dries, cut the panels to size and rabbet the edges and ends. Using a dado blade in the tablesaw, cut a $\frac{1}{4}$ " groove centered on the inside edge of each rail and stile, and form stub tenons on the rails to fit the grooves [Drawing 2a].

2 Sand the door panels (S) and apply a finish to them before assembling the door. (We sprayed on a coat of amber shellac.) After the finish dries, glue up the door [Photo I].

3 After the glue dries, cut $\frac{3}{8}$ " rabbets on the ends and outside edge of each door [Drawing 2]. Drill a hole for the knob, attach the hinges, then mount the doors to the cabinet [Shop Tip, right]. Install the catches on the doors and the roller catches to the catch block (G).

EQUAL DIAGONALS EQUAL SQUARE



I Place rubber panel spacers in the grooves before inserting the panel and gluing up the frame. Check the door for square.

Build the upper cabinet

1 Edge-glue stock for the sides (T), fixed shelves (U), and a 13"-long panel for the dividers (V) [Drawing 3]. Cut these panels to size after the glue dries. Save a cutoff to make a story stick as before.

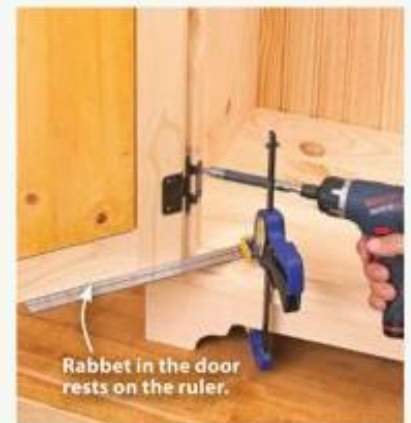
2 Rout a $\frac{3}{8}$ " stopped rabbet on the back inside edge of each side (T) [Drawing 3a]. Drill the shelf-pin holes, then lay out and cut the biscuit slots on the inside face and ends of each side (T) [Drawing 3a; Photos J, K].

SHOP TIP

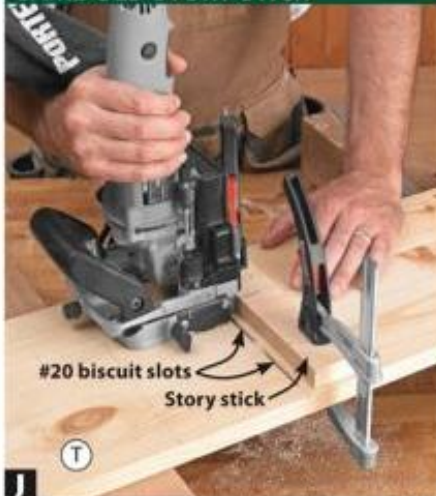
A rule for hanging doors

Use the ruler from a combination square to help position the doors. The ruler's thickness makes it stiff enough to support the door, and it provides the perfect amount of clearance between the rabbet in the door and the cabinet.

Clamp the ruler to the bottom of the cabinet, then rest the door rabbet on the ruler. Slots in each leaf of the hinges allow for fine-tuning the door's position.



SAME OLD STORY STICK



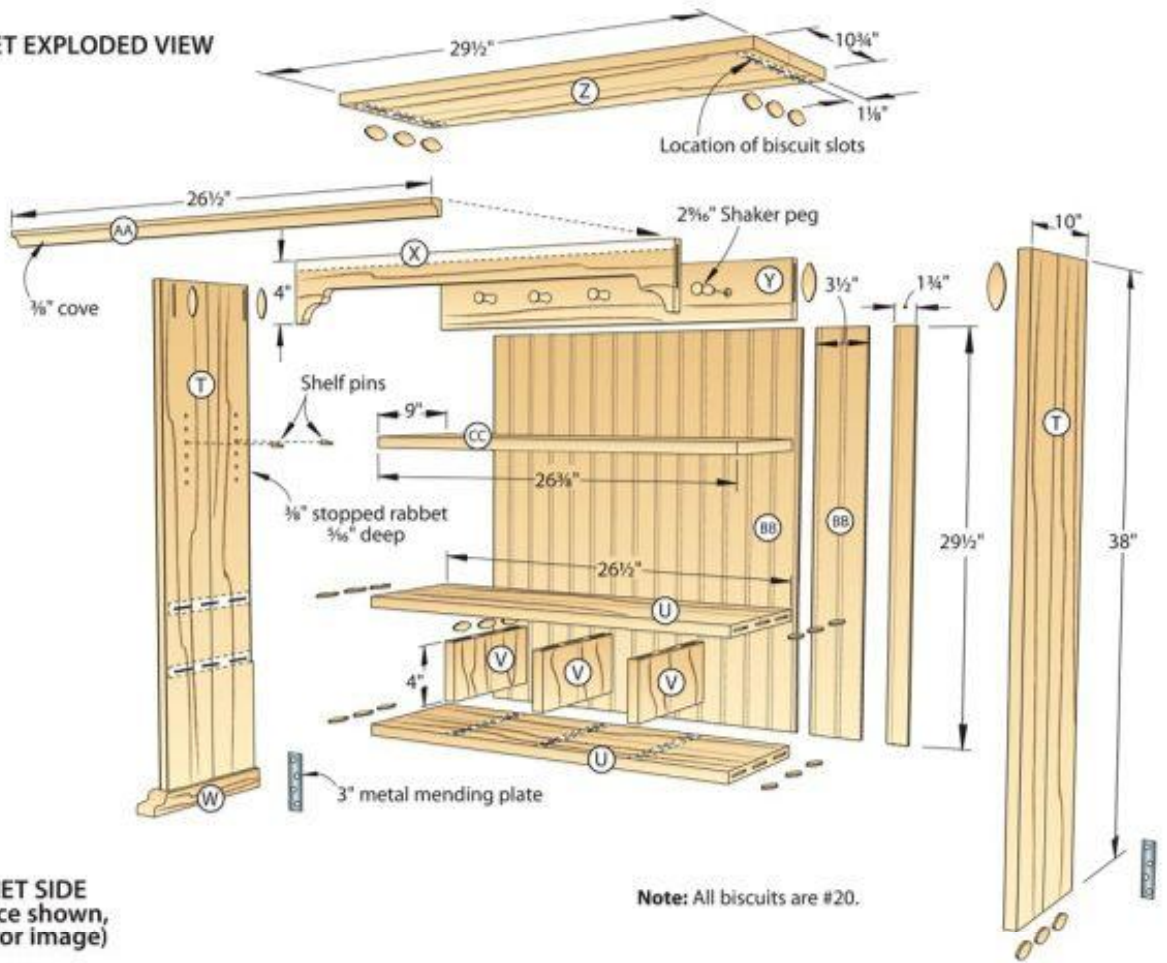
J Lay out biscuit-slot locations on a story stick made from a cutoff from the panels. Then use the story stick to position the biscuit joiner.

FENCE ME IN

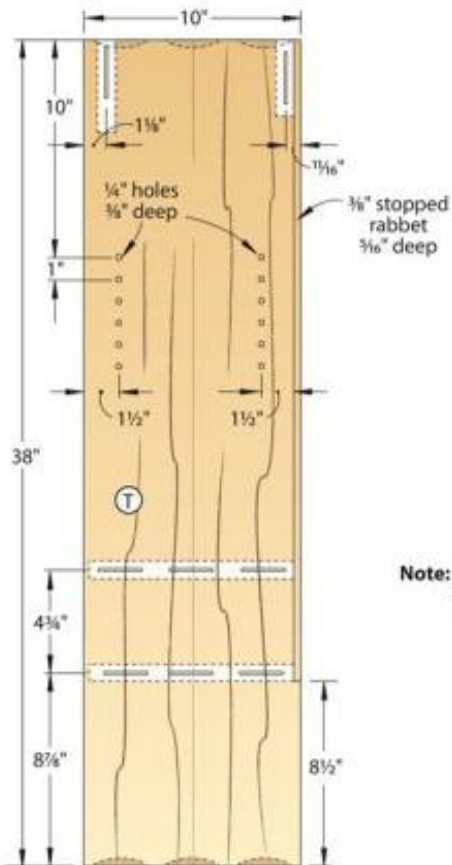


K Using the measurements in Drawing 3a, align a scrapwood fence to cut biscuit slots parallel to the front edge and the rabbet.

3 UPPER CABINET EXPLODED VIEW

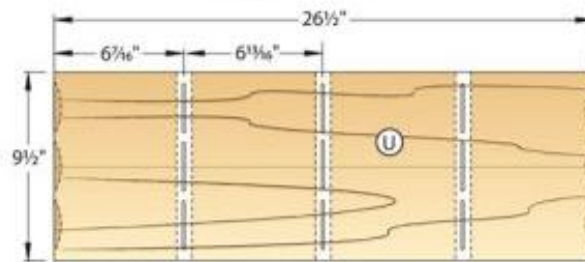


3a UPPER CABINET SIDE (left inside face shown, right is a mirror image)



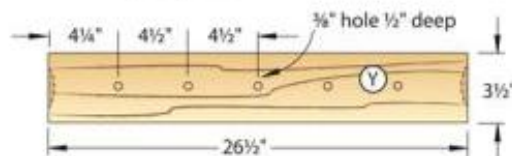
Note: All biscuits are #20.

3b FIXED SHELF



3c BACK UPPER RAIL

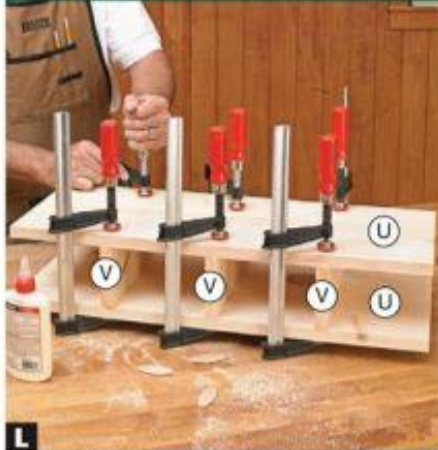
Note: All slots are for #20 biscuits.



3 Retrieve the fixed shelves (U) and dividers (V). Use your story stick to lay out the biscuit slots [Drawing 3b]. Then cut the slots, and glue up these pieces [Photo L].

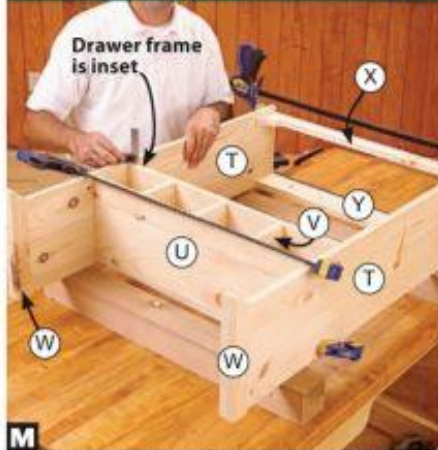
4 From 1 1/2"-thick stock (or laminated 3/4" stock), cut the feet (W) to size. Make two copies of the **Upper Cabinet Foot Pattern**, adhere one to each foot, and bandsaw and sand the feet to shape.

ASSEMBLE THE DRAWER FRAME



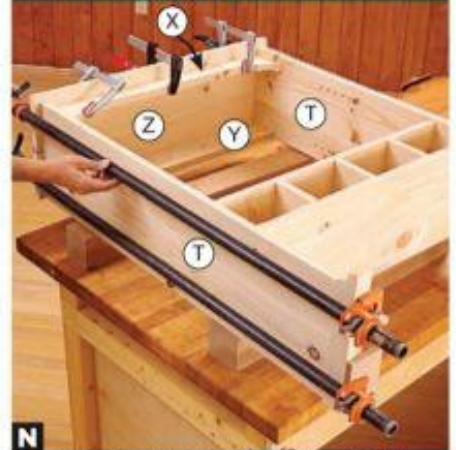
L Glue and clamp the fixed shelves (U) and dividers (V). The edges of the shelves and dividers should be flush.

ASSEMBLE THE UPPER CABINET



M The back edge of the drawer frame (U/V) should align with the edge of the rabbet along the back of the sides (T).

TOPPING IT OFF



N Glue and clamp the top (Z) to the sides (T) and front rail (X). Do not glue the top to the back rail (Y) to allow for wood movement.

Use the story stick to lay out biscuit slots in each foot. Cut the slots, then glue the feet in place [Drawing 3].

5 Cut the front upper rail (X) and back upper rail (Y) to size. Lay out and drill holes for the Shaker pegs in the back rail [Drawing 3c], then cut biscuit slots in the ends of the rails. Retrieve the base front template, trim it along the shaded portion of the pattern, then lay out the cutout on the front rail. Cut and sand the front rail to shape. Then glue up the sides (T/W), drawer frame (U/V), and upper rails (X, Y) [Photo M].

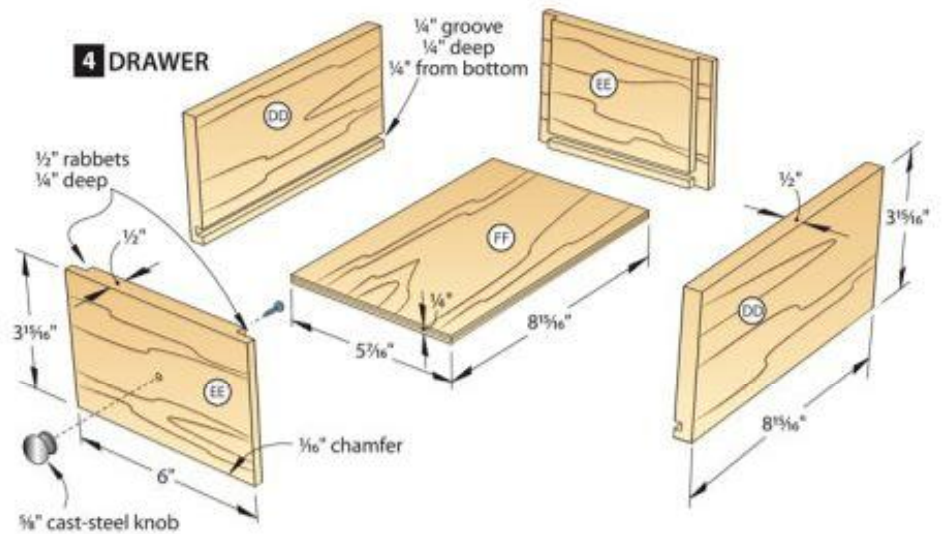
6 While the glue dries, glue up a panel for the top (Z). After cutting it to size, cut biscuit slots toward each end and glue the top in place [Photo N], but do not glue it to the back upper rail (Y). Glue the Shaker pegs into the holes in the back rail.

7 In a $\frac{1}{2} \times 2 \times 27$ " blank, rout a $\frac{3}{8}$ " cove. Rip the cove (AA) from this blank, crosscut it to fit between the sides (T) [Drawing 3], and glue and clamp it in place. Cut beadboard (BB) to length to fit between the top (Z) and the lower edge of the drawer frame (U/V) and install it in the same fashion as on the lower cabinet.

8 Glue up a panel for the shelf (CC). After the glue dries, cut it to size to fit between the sides (T) with $\frac{1}{8}$ " clearance.

Make the drawers and finish it up

1 From $\frac{1}{2}$ " stock, cut the drawer sides (DD) and fronts/backs (EE) to size. Cut or rout the rabbets on the fronts and backs to accept the sides [Drawing 4]. Then cut or rout a groove in each drawer piece to accept the bottom (FF). Cut the bottoms to size, then dry-fit the drawers to check their fit into the drawer frame



(U/V). Glue up the drawers, gluing the bottoms into the grooves.

2 Rout or plane a $\frac{1}{16}$ " chamfer along the front bottom edge of each drawer front (EE) to create an even gap at the top and bottom. Drill a hole centered on each drawer front for the knob.

3 Remove the hardware from the cabinet, remove the tops (O, Z), and apply a finish. (We used amber shellac to seal the pine and create a warm tone, then topped it with two coats of a water-based satin-finish polyurethane.) After

the finish dries, reinstall the hardware and tops and move the upper and lower cabinets to their new home. Place the upper cabinet on the lower one and screw a mending plate between the sides (A, T) to secure the two assemblies [Drawing 3].

Written by **Craig Rueggeger** with **Kevin Boyle**
Project design: **Jeff Mertz**
Illustrations: **Roxanne LeMoine; Lorna Johnson**

continued on page 44

MORE RESOURCES

FREE PLAN

■ Squaring braces at woodmagazine.com/brace

FREE VIDEO

■ "Drilling Shelf Support Holes" at woodmagazine.com/shelfholes

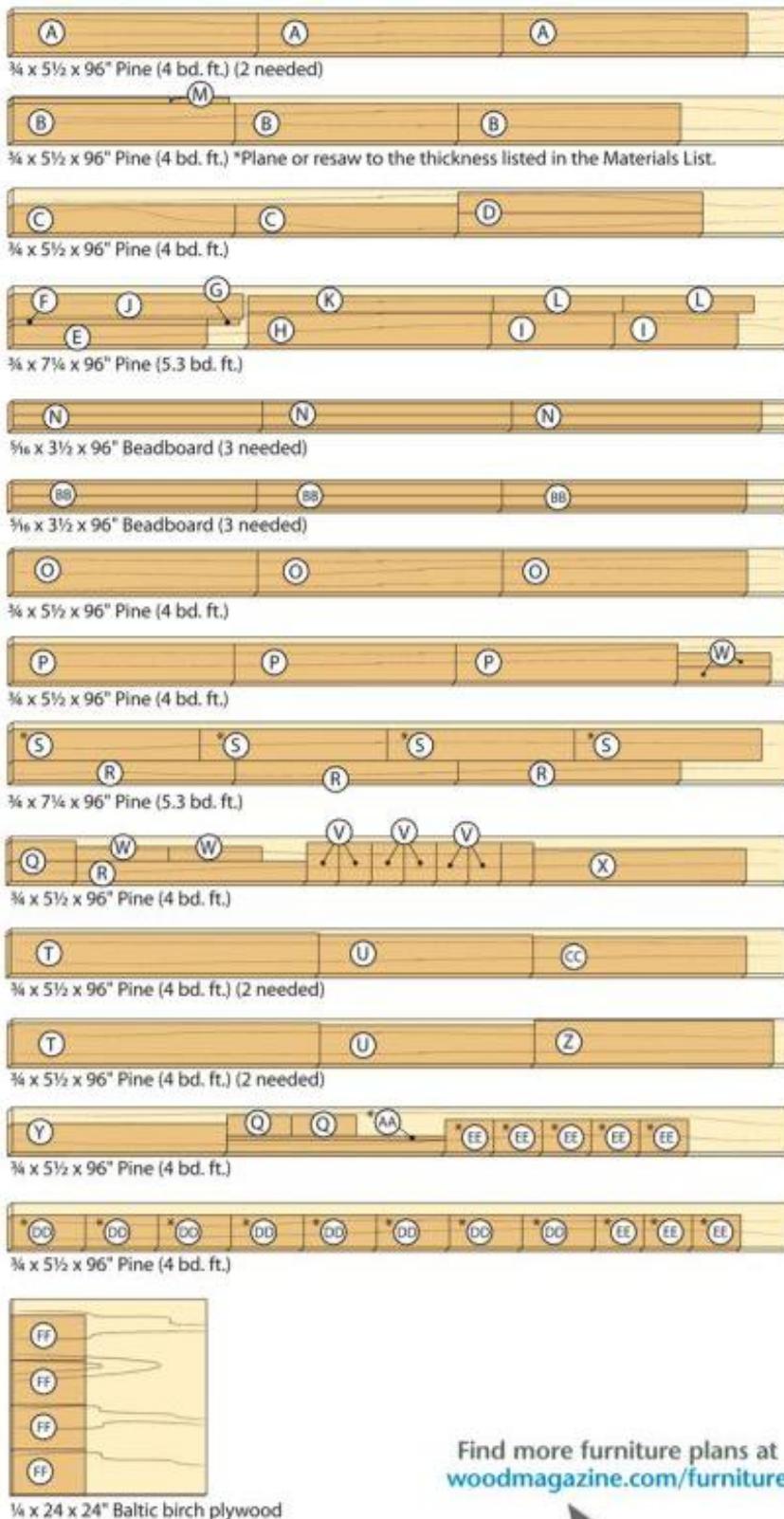
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■ "How to Get Started in Biscuit Joinery" issue 128 (November 2000) §

■ "Avoiding Biscuit Joiner Blunders" issue 193 (October 2009)

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Cutting Diagram



Materials List

Part	FINISHED SIZE			Matl.	Qty.
	T	W	L		
Lower cabinet and base					
A sides	$\frac{3}{4}$ "	14"	30 $\frac{1}{4}$ "	EP	2
B bottom	$\frac{3}{4}$ "	13 $\frac{1}{16}$ "	27 $\frac{1}{2}$ "	EP	1
C top cleats	$\frac{3}{4}$ "	3 $\frac{1}{2}$ "	27 $\frac{1}{2}$ "	P	2
D face-frame stiles	$\frac{3}{4}$ "	2 $\frac{1}{2}$ "	30 $\frac{1}{4}$ "	P	2
E face-frame top rail	$\frac{3}{4}$ "	2 $\frac{1}{2}$ "	24"	P	1
F face-frame bottom rail	$\frac{3}{4}$ "	$\frac{3}{4}$ "	24"	P	1
G catch block	$\frac{3}{4}$ "	$\frac{3}{4}$ "	4"	P	1
H* base front	$\frac{3}{4}$ "	4"	29"	P	1
I* base sides	$\frac{3}{4}$ "	4"	14 $\frac{1}{2}$ "	P	2
J* base back	$\frac{3}{4}$ "	3"	27 $\frac{1}{2}$ "	P	1
K* front base trim	$\frac{3}{4}$ "	2"	29 $\frac{3}{4}$ "	P	1
L* side base trim	$\frac{3}{4}$ "	2"	15 $\frac{1}{8}$ "	P	2
M* back base trim	$\frac{3}{4}$ "	$\frac{3}{4}$ "	25 $\frac{3}{4}$ "	P	1
N beadboard slats	$\frac{5}{16}$ "	3 $\frac{1}{2}$ "	30 $\frac{1}{4}$ "	BB	9
O top	$\frac{3}{4}$ "	15 $\frac{3}{8}$ "	30 $\frac{1}{4}$ "	EP	1
P shelf	$\frac{3}{4}$ "	13 $\frac{3}{8}$ "	27 $\frac{1}{2}$ "	EP	1

Doors

Q rails	$\frac{3}{4}$ "	2 $\frac{1}{2}$ "	7 $\frac{5}{8}$ "	P	4
R stiles	$\frac{3}{4}$ "	2 $\frac{1}{2}$ "	27 $\frac{1}{2}$ "	P	4
S panels	$\frac{1}{2}$ "	7 $\frac{1}{8}$ "	23 $\frac{1}{8}$ "	EP	2

Upper cabinet

T sides	$\frac{3}{4}$ "	10"	38"	EP	2
U fixed shelves	$\frac{3}{4}$ "	9 $\frac{1}{2}$ "	26 $\frac{1}{2}$ "	EP	2
V* dividers	$\frac{3}{4}$ "	9 $\frac{1}{2}$ "	4"	EP	3
W feet	1 $\frac{1}{2}$ "	1 $\frac{3}{4}$ "	11 $\frac{1}{2}$ "	P	2
X front upper rail	$\frac{3}{4}$ "	4"	26 $\frac{1}{2}$ "	P	1
Y back upper rail	$\frac{3}{4}$ "	3 $\frac{1}{2}$ "	26 $\frac{1}{2}$ "	P	1
Z top	$\frac{3}{4}$ "	10 $\frac{3}{4}$ "	29 $\frac{1}{2}$ "	EP	1
AA* cove	$\frac{1}{2}$ "	$\frac{1}{2}$ "	26 $\frac{1}{2}$ "	P	1
BB beadboard slats	$\frac{5}{16}$ "	3 $\frac{1}{2}$ "	29 $\frac{1}{2}$ "	BB	9
CC shelf	$\frac{3}{4}$ "	9"	26 $\frac{1}{8}$ "	EP	1

Drawers

DD sides	$\frac{1}{2}$ "	3 $\frac{1}{8}$ "	8 $\frac{5}{8}$ "	P	8
EE fronts/backs	$\frac{1}{2}$ "	3 $\frac{1}{8}$ "	6"	P	8
FF bottoms	$\frac{3}{4}$ "	5 $\frac{7}{8}$ "	8 $\frac{5}{8}$ "	BP	4

*Parts initially cut oversize. See the instructions.

Materials key: EP—edge-glued pine, P—pine, BB—beadboard, BP—birch plywood.

Supplies: Spray adhesive, #8 x $1\frac{1}{4}$ " flathead wood screws (6), #8 x $1\frac{1}{4}$ " panhead screws (7), #8 flat washers (7), #10 biscuits (2), #20 biscuits (62), $\frac{3}{8}$ x 3" mending plates (2).

Blade and bit: Dado blade, $\frac{3}{8}$ " cove router bit.

Source

Hardware: $\frac{3}{8}$ " inset wrought-iron hinges (4) no. 00H32.50, \$5.40 [pair]; 2 $\frac{1}{2}$ " Shaker pegs (5) no. 41K25.08 \$0.28; shelf pins (8) no. 63Z06.04, \$7.50 [pack of 20]; roller catches (2) no. 00W11.02, \$1.10; rubber panel spacers (16) no. 00S08.14, \$4.60 [pack of 100]; 1 x 1" cast-steel knobs (2) no. 01W96.03, \$3.10; $\frac{3}{8}$ x $\frac{3}{8}$ " cast-steel knobs (4) no. 01W96.01, \$2.30, Lee Valley, 800-871-8158, leevalley.com.

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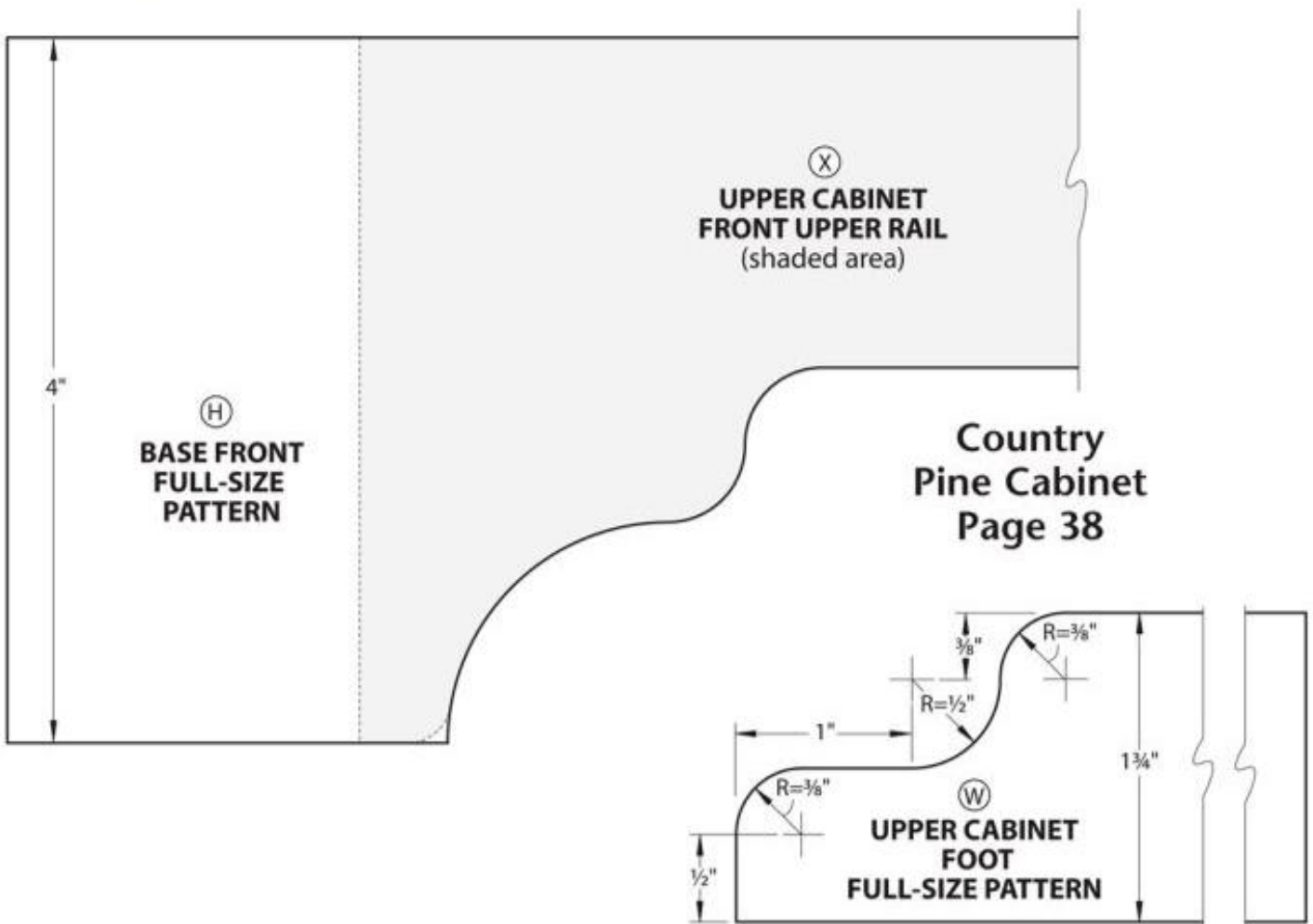
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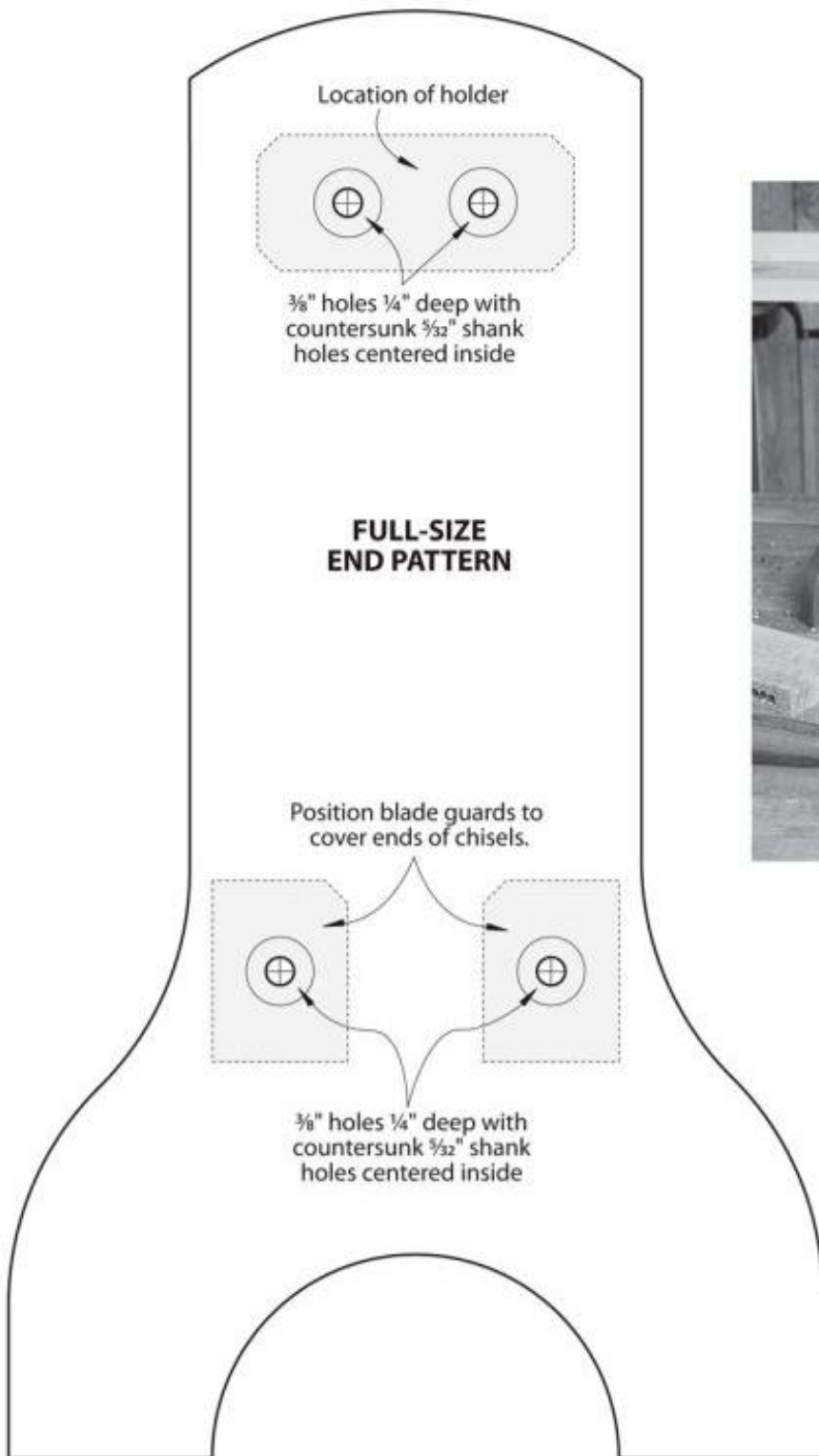
March 2010

Issue 196

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.

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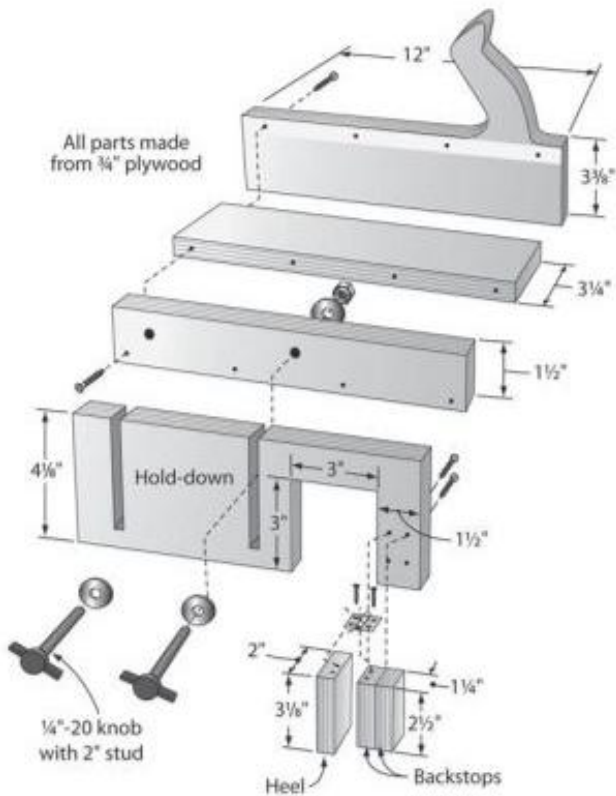
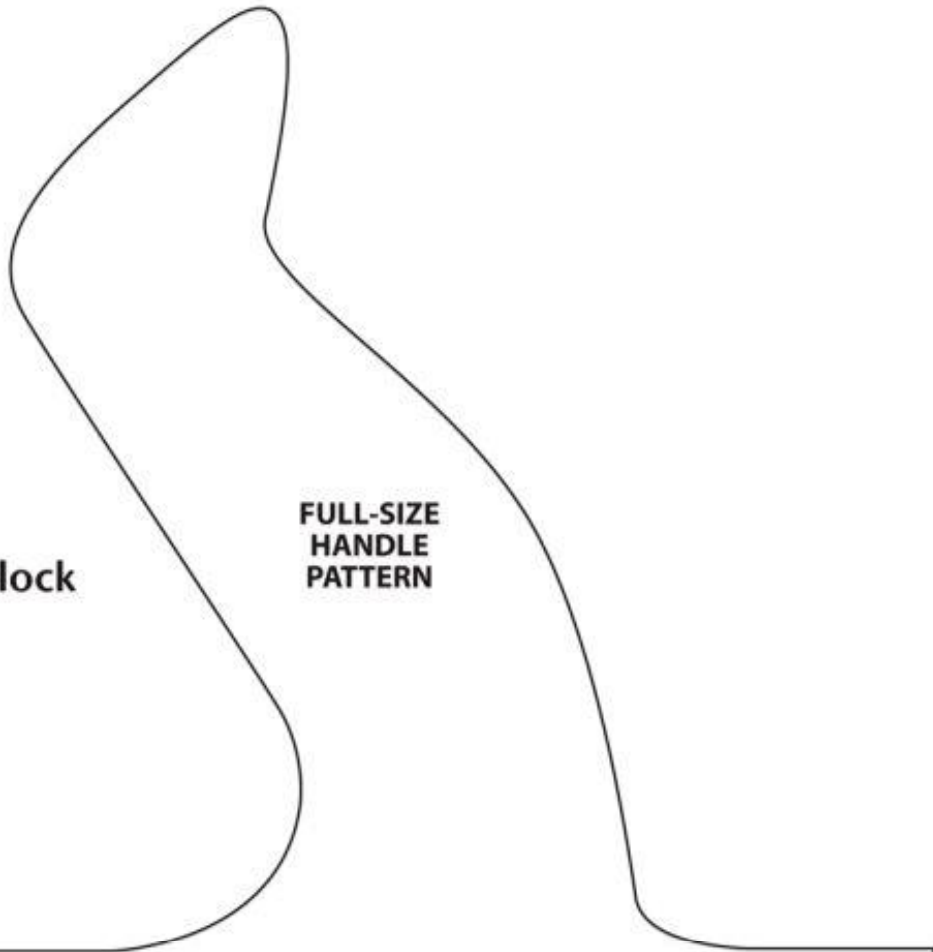


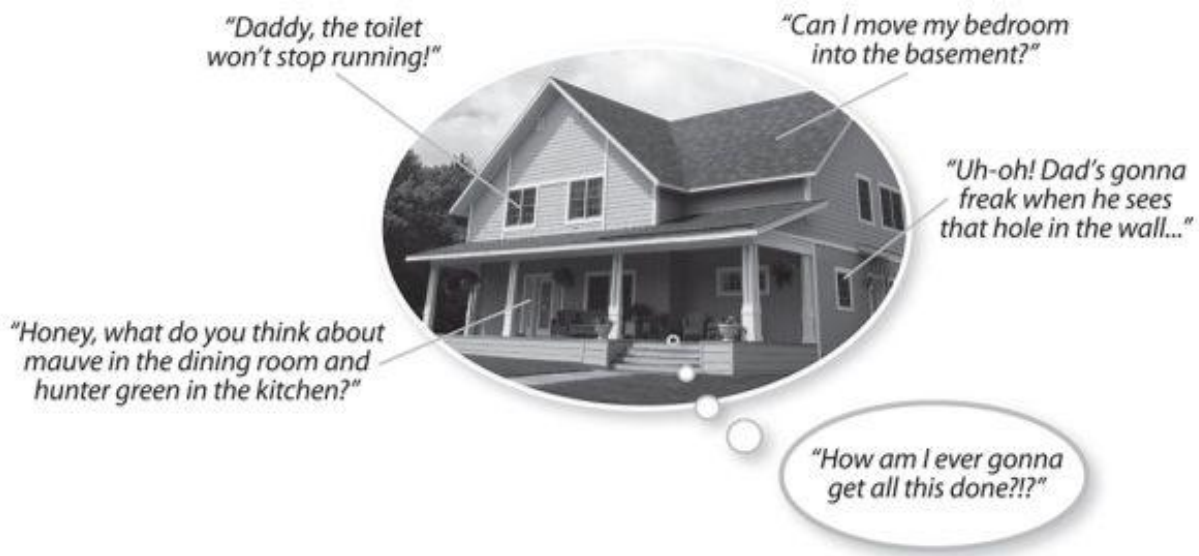


Chisel Rack
Page 18

At-the-ready Pushblock Page 8

FULL-SIZE
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PATTERN





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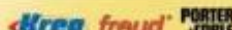
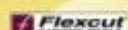
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LEARN FROM A MASTER

All About Wood Chisels

Author and teacher Tim Peters shows you which ones you need, how to use them correctly, and how to keep them sharp.

At the root of all woodworking lies a simple notion: A sharp tool can quickly and effectively change the shape of wood. And for several millennia, wood chisels have served as one of the fundamental tools for cutting and shaping wood. In the classes I teach, we use them for chopping mortises, paring tenons, cutting dovetails, carving reliefs, shaping table and chair legs, and so on. In this article, I'll focus on getting more from the most common furnituremaking chisels.

First, understand the blade/handle connections

Chisels come in primarily two styles: socket chisels or tang-type chisels, as shown at *right*. That means the handle either slips into a tapered hollow socket, or it slips over a tapered square or round tang milled into the blade. One big difference between the two is the relative strength of the blade-to-handle connection. Both types can be struck with a mallet, but socket chisels prove best for heavy chopping and prying. That's because the force of mallet blows gets dispersed around the rim of the socket and evenly down the shank to the cutting edge. The more you strike it, the tighter its handle fits in the socket. This style of chisel also resists bending and fracturing in situations, such as mortising, where the tool might be subjected to prying forces or twisting as you retract the cutting edge from a tight joint.

At the top of the handle where you strike it,

manufacturers often place a metal ring, known as a ferrule, or a leather washer to protect the wood endgrain from splintering. Over time the wood mushrooms over the ferrule, further protecting the integrity of the handle shaft. Socket chisels typically cost about one-and-a-half times the price of tang chisels because they're more complex to manufacture.

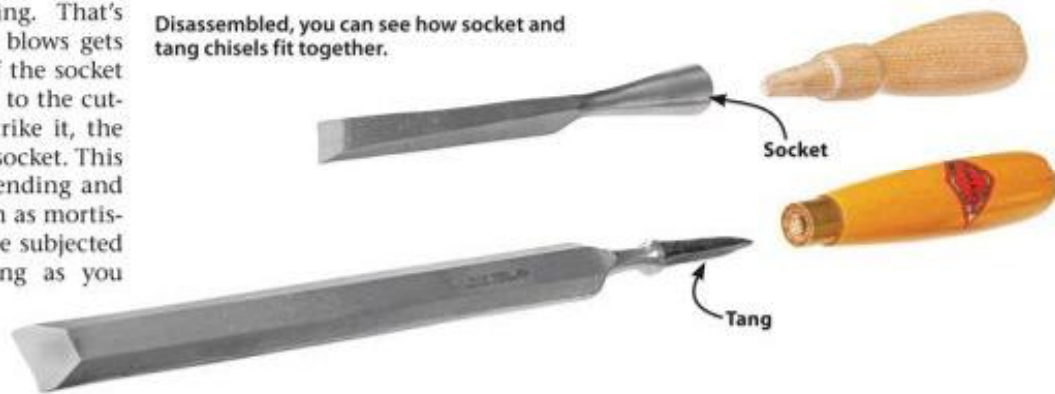
Tang chisels, on the other hand, feature a 2"- to 3"-long tang, typically with four sides that taper to a point. The tang almost always has a bolster (or shoulder) for the handle to seat against and absorb mallet strikes. Many manufacturers reinforce this area with a metal ring at the neck of the handle to resist splitting. The handle top on most of these chisels features metal rings, leather washers, or metal striking caps, meant to absorb and distribute mallet blows.



Tim Peters, master furnituremaker and professed hand-tool junkie, heads the woodworking department at Orange Coast College in Costa Mesa, California. This is his third article for *WOOD*® magazine; his first two were reviews of block planes and shoulder planes.

CHISEL ANATOMY

Disassembled, you can see how socket and tang chisels fit together.



Bench chisels: Buy these first

Fortunately, most woodworkers don't need dozens of specialized chisels. You can do the vast majority of your work with just a few common bench chisels. Bench chisels have 4"- to 6"-long blades with flat backs and beveled edges, as shown at *right*. The beveled edges make it easier to reach into tight spaces, such as narrow mortises or dovetail sockets. The cutting edge on a bench chisel typically has a 25° bevel, steep enough to resist wear, but too acute for heavy prying.

Butt chisels are a subset of bench chisels, with similar design but shorter blades and handles. These chisels work great for tasks where a longer chisel proves obtrusive or unwieldy, as with joinery on small projects, such as jewel-

ry boxes or toys. I use butt chisels when making shallow hinge mortises, shown on *page 53*, because the short lengths give me greater control.

For most home woodworkers, I suggest you buy a set of bench chisels with at least three or four different widths from ¼" to 1". You can do great work with a set of Stanley or Irwin chisels (available at home centers and hardware stores) as long as you keep them sharp. These will dull quicker than chisels made of harder steel, so be prepared to sharpen more often.

(Learn sharpening techniques, *page 54*.) If you prefer professional-quality chisels made with harder steel, see "Chisel Sources" on the *next page*.



Paring chisels handle fine-cutting tasks

These chisels should never be struck with a mallet. Most paring chisels use tang-style construction, although any really sharp chisel could be employed to do some paring, slicing off thin layers of wood as you fine-tune a joint. Chisels specifically designed for paring usually have slender 6"- to 8"-long blades used for reaching deep into joints. Paring chisels typically have steeply beveled edges, nar-

row necks (the transition area between blade and handle), and wooden handles with rounded ends, made to seat comfortably in your palm. Chisels used exclusively for paring often-times have small-diameter tangs, but don't have washers, rings, or caps. Paring cuts should be made only with hand pressure pushing the tool.

You'll find a more acute bevel angle, 15° to 20°, on the cutting edge. This pro-

vides a sharper edge for cutting precision, but the trade-off is an edge that is not as durable, particularly when paring harder woods, such as white oak, hard maple, or many exotics. Buy paring chisels if you do joinery that requires fine tuning, such as dovetails, box joints, or mortise and tenons. When you are ready, buy a ½" and 1" pair; add sizes as your needs grow.

PARING CHISEL



Opt for specialty chisels only when needed

You might find these specialized chisels handy for your home shop.

■ **Mortising chisels.** Whether you're a hand-tool traditionalist or you just don't want to fuss with setting up a mortiser or drill press, you can, with a little practice, chop mortises by hand with these heavy-duty chisels. Beefy, tapered blades separate these chisels from others. The back of the blade is often slightly wider than the front to keep it from getting wedged or bruising the side walls of a mortise. And the cutting edge, with a bevel in the 30° to 40° range, withstands hard mallet blows without breaking down the tip.

You can also pry with these chisels after sinking the tip into the wood to break loose the chips, as shown *below*. Mortising chisels connect to the handles, which are usually elliptical in shape, with a large, stout tang and substantial bolster for the handle to rest against.

■ **Corner chisels.** These prove handy for squaring up corners of rabbets, dados, grooves, and mortises when struck by a mallet. So if you don't have a dedicated mortiser or mortising chisel, you can drill out most of the waste at the drill press, and then clean up the corners with one of these. Same goes for stopped channels made with a router.

■ **Crank-neck chisels.** Marrying the best features of a hand plane and a paring chisel, a crank-neck slices away material while you rest the chisel blade flat on the workpiece. The bent handle lets you grip it comfortably without scraping your knuckles on the wood.

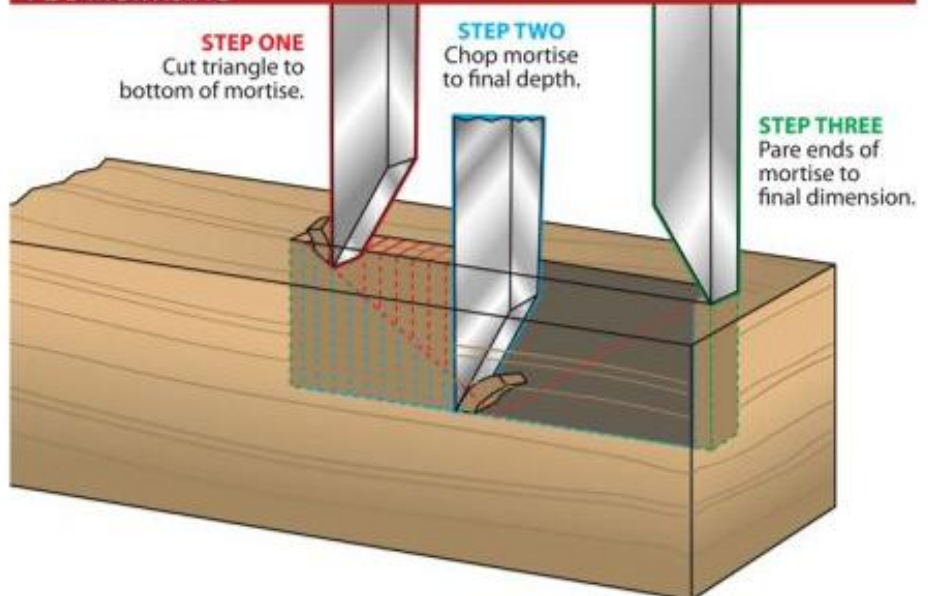
These work well for shaving off proud wood plugs or dowels and for removing glue squeeze-out from inside corners.

■ **Skew chisels.** Another form of paring chisel, the angled cutting edges on these work great for reaching into difficult

areas to trim away material. I use them for paring dovetail sockets, shown *next page*, because I can hold the back flat against a surface and ensure a true cut. It's best to get right- and left-facing models for use on opposing sides of a socket.



1-2-3 MORTISING



To hand-cut a mortise with a mortising chisel, begin by chopping out chips between your scribed lines, leaving ⅛" at the ends. Move the chisel about ⅛" at a time, and strike it with a mallet. Then pry out the chips. Make a triangular pattern to the desired depth; then begin back-cutting the rest to match that depth. Finish by cutting away the remaining ⅛" at each end.

Chisel Sources

Tools For Working Wood: 800-426-4613, toolsforworkingwood.com

Traditional Woodworker: 800-509-0081, traditionalwoodworker.com

Garrett Wade: 800-221-2942, garrettwade.com

Lie-Nielsen: 800-327-2520, lie-nielsen.com

Japan Woodworker: 800-537-7820, japanwoodworker.com

Consider Japanese chisels for durable performance

The Western-style chisels I've shown you up to now originated in Europe and are perfectly adequate for most work. But in my opinion, Japanese chisels have no equal. Here's why. Japanese chisels feature two layers of steel forged together into the blade: a harder, thin layer laminated behind a softer, thick front. As a result, the harder portion holds its sharp cutting edge longer than most Western-style chisels. Japanese-chisel manufacturers also grind a hollow back onto the blades, as shown at *right*, so you have less material to remove when lapping the back flat.

At the handle end, these chisels use a hybrid socket-and-tang fit that gives them the benefit of both basic types of chisel construction. They combine the

strength and rigidity of a socket fit with the easier manufacturing of a longer, larger tang. A tapered ferrule at the union of the handle and blade serves as the socket for the handle's mating wood end, while also keeping the handle from splitting during mallet strikes or prying.

Because Japanese chisels are handmade from high-quality materials, they can cost \$100 or more per chisel. Before using a new Japanese chisel, you'll



have to fit and seat the tapered ring at the top of the handle. The chisel's instructions explain how to do this. As a basic set I recommend chisels with blades 3, 6, 9, 12, and 15mm wide. This should be adequate for most cabinet- and furniture-making joinery.

Chisel out a perfect hinge mortise in 3 easy steps



1 Begin by making a series of angled "chops," keeping back $\frac{1}{16}$ " from the ends and back.



2 Hold the chisel parallel to the edge of the workpiece and pare away the chips.



3 Clean up the bottom and perimeter walls with light cuts until the hinge fits snugly.

Hand-cut half-blind dovetails with only a pair of chisels and a mallet



1 Remove the socket waste with a bench chisel, keeping $\frac{1}{16}$ " from the scribed sides and back.



2 After making a vertical cut, counter with a horizontal cut to remove the chip.



3 Pare the angled sidewalls down to the bottom of the sockets.



4 Using a clamped-on guide board, pare away the final material from the back walls.



5 Finally, use a skew chisel to clean out the corners to finish the sockets.



6 Now you have two perfect pin sockets for a project part, such as an inset drawer front.

Your chisels will only be as good as your sharpening makes them

I see several hundred new students in my classroom each year, all anxious to start chopping wood. But there's a little tough love waiting for them: I provide students with the least expensive, home-center chisels available for two reasons. First, any accidental damage is no big deal because they cost only a few bucks to replace. Second, and most important, these chisels have relatively soft steel blades, so they dull quickly. Why's that a good thing? Because frequent sharpening ingrains in their minds and muscle memory correct sharpening techniques, which are the same regardless of the chisel quality. And having a *sharp* chisel always trumps having an *expensive* chisel.

No matter what technique or mechanism you use to sharpen your chisels, get comfortable using it and return to it regularly to touch up your tools. I favor sharpening freehand on waterstones—years of sharpening experience mean I don't need fancy machines or gadgets. And, if treated properly, the stones last for years. But if you prefer to use a honing guide to hold your chisels at the correct bevel angle, or maybe a motorized sharpener, by all means do it. They all work if you take the time to get familiar with them.

Always start out a new—or, dare I say it, an abused—chisel with a hollow grind on a benchtop grinder, as shown

START WITH A HOLLOW GRIND



Holding your chisel against the tool rest for leverage, grind a recess on the bevel that's perpendicular to the blade sides.



FLATTEN THE BACK



Slide the chisel forward and back on the wet sharpening stone. Latex gloves keep the soupy swarf from dirtying your hands.

below left. I use 36- and 60-grit wheels because I want to shape the steel quickly and avoid heating up the tools. Overheating, usually indicated by a blue hue of the steel, causes the cutting edge to dull more quickly. And I prefer a hollow-ground bevel because it's easier and quicker to sharpen and touch up on the stones. (With less steel dragging across the stone, there's less friction, and the bevel's two-point contact helps to maintain correct angle orientation on the face of the sharpening stone.)

After making the hollow grind, lap the back face of the chisel to make it perfectly flat, as shown *above*. You only need to do this on the bottom two inches. Some chisel work won't require a flat back, but other tasks, such as mortising and paring, do; so just get in the habit of lapping. Start with a coarse stone (800 grit) and repeat on several finer grit stones. This only needs to be done again if the back goes out of flat or if you have used up the flat portion of the chisel blade.

Next, sharpen the cutting edge on stones or sandpaper grits. Begin with a coarse grit (800 waterstone, gray Arkansas oilstone, or 150 sandpaper) to define the bevel, creating two narrow, flat points of contact above and below the scooped-out hollow grind (*left*). Progress through several finer grits, up to 15,000 stone or 1,000 sandpaper, to hone the bevel to a razor-sharp edge. I go a step further and burnish the bevel on brown butcher paper or grocery bags.

Although it's not necessary, I like to add a secondary microbevel, about 1° steeper than the main bevel, for an even

HONE THE BEVEL



The texture of common butcher paper produces a mirror finish and a cutting edge that's beyond scary-sharp.

"If I had eight hours to chop down a tree, I'd spend the first six hours sharpening my ax."

—Abraham Lincoln

finer edge. To do this, after you've finished the first bevel, go back to an 8,000-grit stone or 1,000-grit sandpaper, raise the chisel slightly off the bevel so only the tip touches, and gently give it a few strokes. If you are anticipating doing a lot of heavy chopping or are working with a particularly hard or abrasive timber, such as white oak or silica-rich teak, add a secondary bevel. The more obtuse microbevel will dramatically increase the edge-holding durability of the chisel in these situations.

The more you sharpen, the more you'll dish out the stones. Keeping the stones flat guarantees your chisels' edges remain flat. Use a flattening stone to remove the high spots. I probably do this more than I need to, but I'm in the habit of flattening every stone before I sharpen with it. 🌱

Written by **Tim Peters** with **Bob Hunter**
Illustration: **Tim Cahill**

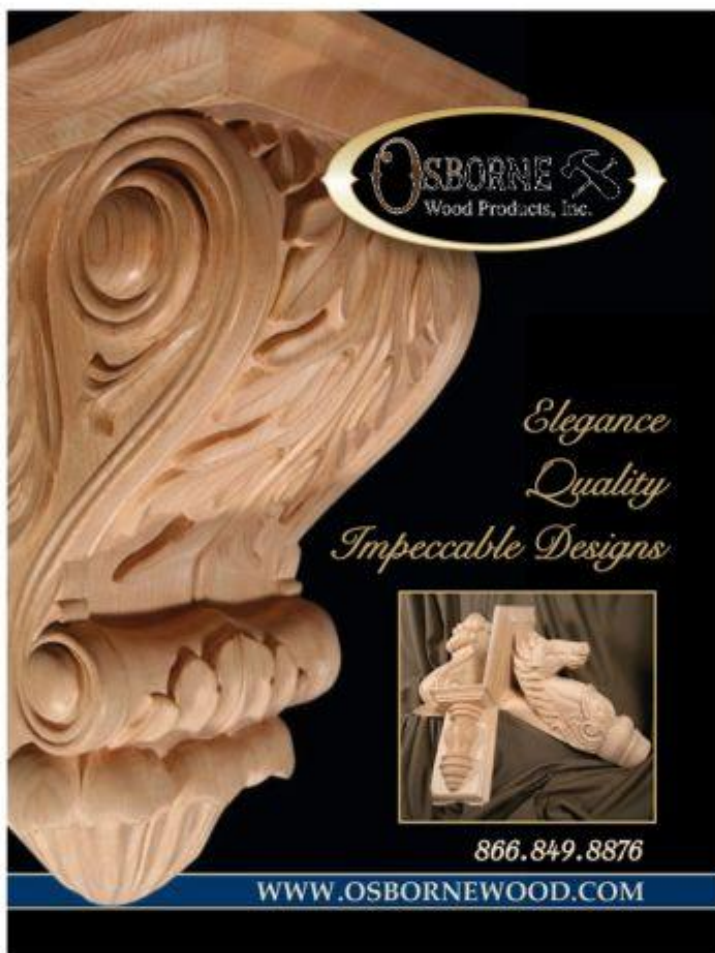
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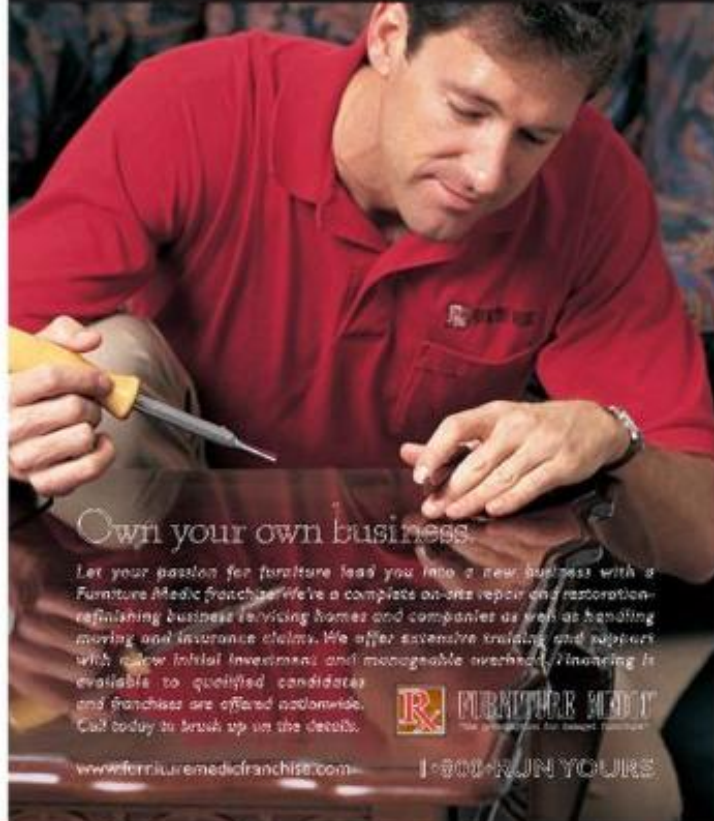
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SHOP TESTED



Benchtop Planers

Here's the skinny on thickness planers: They'll all dimension wood accurately, but the best machines leave less cleanup work for you to do afterward.

Think of buying a benchtop planer as an investment that pays dividends in lumber savings. By using it to surface less-expensive, roughsawn stock, you free yourself from buying costly presurfaced lumber. Although these machines get the job done, don't mistake them for heavy-duty planers with beefy 3-hp and larger motors, which can chew through hardwoods quickly and handle deeper cuts without bogging down. Benchtop planers have universal motors and typically work best removing $\frac{1}{16}$ " or less at a time, thus creating longer work time to surface lumber. That said, a benchtop model works great for most home shops that aren't working on a production-like schedule. To make sure you get the right planer, we put 11 benchtop models through extensive testing to sort the smooth operators from the roughnecks.

Give top priority to cut quality and snipe

Only a few of the tested planers do not create significant work for you in the form of power sanding or heavy scraping to remove scallop marks or snipe. (Snipe is the scooplike gouges

SCALLOPED CUT



CLEAN CUT



on the ends of a board caused by the cutterhead when gripped by just one feed roller.)

To check cut quality, we ran poplar and red oak through each machine, removing $\frac{1}{32}$ " with each pass. We then rubbed chalk on the just-planed faces to reveal scallop marks, as shown *above left*, caused by the cutterhead knives. Three



machines produced grade-A surfaces: DeWalt's DW734 and DW735 and Makita's 2012NB. With sharp knives, these planers turned out boards that needed only light sanding to remove any barely noticeable scallops.

The DW735 is one of two machines with two feed speeds. (General International's 30-010 M1 is the other, but its cut quality merits only a B grade.) DeWalt's faster speed, 24 feet per minute (fpm), works best for rough dimensioning, while the 14-fpm rate excels at final finishing. As you'd expect, we got the best surface quality at the slower speed. But even the faster speed's cut quality exceeds that of most other models.

Although four machines have three-knife cutterheads and six have two knives, we could not tie cut quality to cutterhead design. For example, Makita's two-knife planer outperforms two three-knife machines for cut quality. The bottom line: Focus on a machine's cut quality more than its specifications.

By contrast, with most models, it took sanding with coarse sandpaper to remove the scallops, and then with finer grits to erase the sanding scratches just to match the unsanded surface quality of the DeWalt and Makita planers.

As for snipe, we could not get any of the planers to crank out snipe-free boards. When we tested all of them as equipped from the factory, the Makita led the field with snipe so minimal it was hard to see, and removed easily with light sanding. (See chart, *above right*, for snipe comparisons.) Out of the box, the DeWalt DW735 sniped like most of the plan-

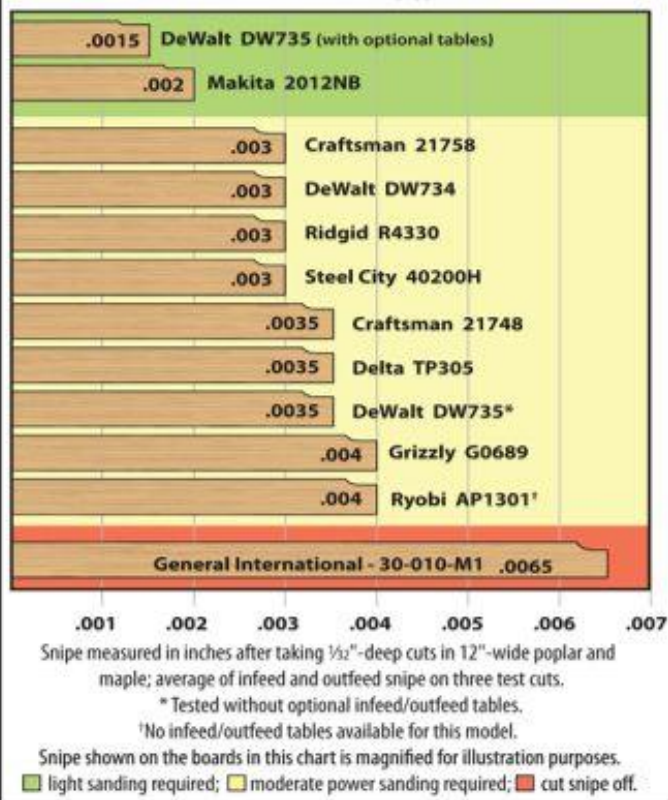
ers in the test (.0035"). But when we added and fine-tuned the optional infeed and outfeed tables (\$50), the DW735 nudged ahead of the Makita with a mere .0015" of snipe. Both of these units feature cutterhead carriages that lock on their posts automatically when a board engages the infeed roller, preventing the carriage from moving up or down during the cut.

Four planers sport manual-locking carriages, which you engage before each pass and then disengage before adjusting the depth again. But we found no advantage to this feature, as machines so equipped sniped about the same whether we engaged the locks or not.

Of the 11 planers, only the General International sniped so deeply we had to forego sanding and simply cut off the ends of the boards. To reduce snipe, we adjusted the infeed and outfeed tables on each unit (except the Ryobi AP1301, which has none) to elevate the ends about a penny's thickness above the planer table. (Go to woodmagazine.com/woodvision to watch a free video showing this technique.) Only Makita recommends this technique in its owner's manual. Most others

Most planers create snipe you can live with

We decreased snipe in nearly all the planers by making adjustments to the infeed and outfeed tables, if so equipped.



SELF-INDEXING KNIVES MAKE FOR EASY CHANGES

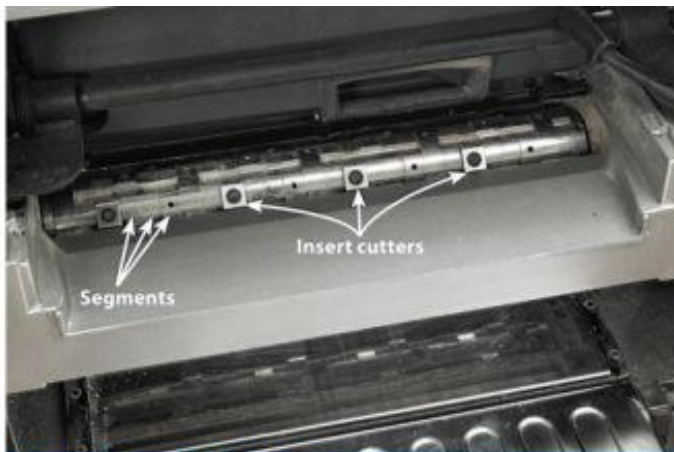


Magnetic knife holders, like this on the DeWalt DW734, keep your fingers clear of the razor-sharp edges when changing knives.

concede that snipe is unavoidable and you should just cut off the sniped ends.

Features that separate these planers

• **Changing knives.** Depending on how much you plane and what materials you use, your frequency of changing



CHANGE WHAT YOU NEED

With the Steel City, you rotate or replace only the cutters that need it. But this cutterhead doesn't lock; you have to hold it steady.

knives will vary. But the process should be easy and intuitive. Here's where an automatic cutterhead lock helps, preventing the head from rotating while you remove the bolts and knives. Only Delta's TP305 and Steel City's 40200H lack this feature.

All the straight-knife cutterhead models, except Ryobi, feature self-indexing, double-edged knives, as shown on *previous page*. Ryobi's knives, though double-edged, are not self-indexing. Changing knives on this planer proved to be the most difficult and time-consuming in the test.

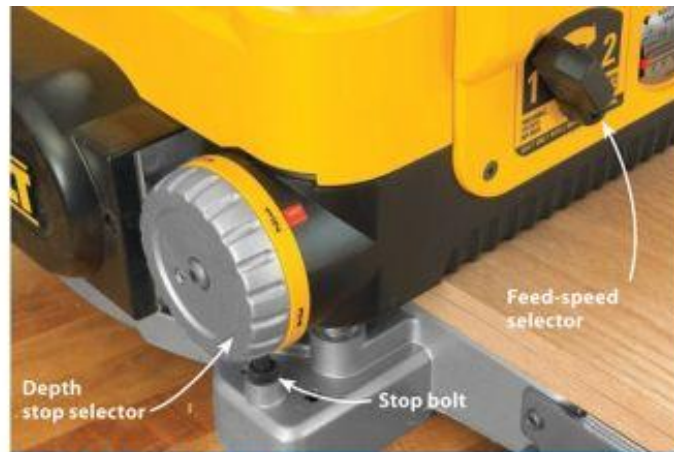
The Steel City unit comes standard with a segmented cutterhead, shown *above*, composed of 26 1/2"-thick rings on a shaft. Each segment holds a high-speed-steel insert cutter, each with four cutting edges. It's not a true spiral cutterhead because the cutters do not sit at a slight angle and make a true shearing cut. The chief advantage to this head is that, should you nick one or more cutters, you simply rotate the affected inserts a quarter-turn for a fresh cutting edge. No need to replace a full set of knives. To check knife durability, we accelerated dulling by planing particleboard—an abrasive material you should not purposely plane—until the original cutting edge showed obvious wear. We found that Steel City's inserts remained sharp at least 33 percent longer per edge than all but one competitor, beating runner-up Makita by 25 percent.

Craftsman's 13"-wide 21748 comes with a three-knife cutterhead, but offers a segmented head similar to Steel City's as an option (\$250). We tested both heads and found their cut



SHAVE A LITTLE OFF THE TOP

Material-removal gauges help you set the cutting depth before plunging the wood into the rotating cutterhead.



A GOOD SAFETY NET

Depth stops work like rotating turret stops on a plunge router. To fine-tune the accuracy, simply adjust the stop bolt up or down.

quality, snipe, and edge wear so similar, we can't make an argument for the upgrade.

• **Setting cutting depth.** Eight machines feature a gauge, similar to the one shown *bottom left*, that indicates the amount of material being removed with each pass. These gauges help you avoid taking too large a bite, which might result in tear-out or deeper snipe. Most work well and read easily. However, Makita does not have a scale on its gauge, making it difficult to determine the depth of cut accurately.

We like the preset depth stops included on seven of the planers; Craftsman 21758, Delta, Makita, and Ryobi don't have them. These adjustable stops, shown *above*, prevent planing a board thinner than a targeted thickness, a handy feature when planing multiple project parts to identical thickness.

• **Dust collection.** These planers generate loads of chips that make a mess if you don't hook up a dust collector or vacuum. The DeWalt DW735 and Grizzly feature built-in fans that suck chips away from the cutterhead and blow them out the dust port for the most effective dust collection. This proves helpful if your planer sits near the far end of your dust-collection system and needs that boost.

Most of the planers have dust hoods with 4" ports, but the Craftsman 21758 has only an unusual 2" port, and the Grizzly and Ryobi have just 2 1/2" ports sized for shop vacuums. Craftsman's 21748 has 2", 2 1/2", and 4" port sizes, and the DeWalt DW735, Ridgid, and Steel City have 2 1/2" and 4" sizes. The



DUELING DUST SHOWDOWN

Four planers sport both 2 1/2" and 4" dust ports (shown on the Ridgid) so you can easily hook them up to a shop vacuum or dust collector.

Delta, General International, and Makita do not come with a dust hood, but you can buy optional ones for about \$25.

• **Power.** To our surprise, power was not a critical factor. All planers showed enough oomph to handle even 1/8"-deep cuts in 12"-wide hard maple and oak. The Ridgid bogged down slightly, but still handled every job we threw at it.

• **Noise.** Makita makes the quietest planer, running at 90

decibels (dB) under no load and 94dB while planing 12"-wide red oak. But even those noise levels rank well above the threshold (85 dB) where you should be wearing hearing protection. The two Craftsman models were loudest at 102dB planing the oak. The 21748 dropped 7dB, however, with the segmented cutterhead. Bottom line: No matter the machine, wear hearing protection at all times.

A machine-by-machine comparison



Craftsman 21758, \$280 800-383-4814, craftsman.com

High Points:

- ◆ Auto-locking two-knife cutterhead and magnetic tool make knife changes easy.
- ◆ The smooth, flat granite table won't warp.

Low Points:

- ◆ Short infeed and outfeed tables (7") provide less support for long workpieces.

- ◆ No preset thickness stops and no depth-of-cut gauge.
- ◆ It comes only with a 2" dust port.
- ◆ At 99 dB running without load, it's the loudest in the test.



Craftsman 21748, \$500 800-383-4814, craftsman.com

High Points:

- ◆ Auto-locking cutterhead makes knife changes easy with the standard three-knife head.
- ◆ Preset thickness stops were accurate and needed no adjustment.
- ◆ The smooth, flat granite table won't warp.

More Points:

- ◆ The magnetic T-wrench helps lift the knives from the cutterhead, but the magnet also grabs onto the spring-

loaded gib plate, which doesn't come out, making it tricky to free the knives.

- ◆ The dust hood includes 2", 2½" and 4" ports, but the narrow chute chokes a collector using a 4" hose.
- ◆ The optional segmented cutterhead (\$250) features easy-to-change steel square inserts, but the auto lock doesn't work with it, and we saw no improvement in performance over the three-knife cutterhead.



Delta TP305, \$280 800-223-7278, deltaportercable.com

High Points:

- ◆ It produced the best cut quality among sub-\$300 planers.
- ◆ It comes with a test-best five-year warranty.

Low Points:

- ◆ Short infeed and outfeed tables (7") provide less support for long workpieces.
- ◆ No preset thickness stops and no depth-of-cut gauge.

- ◆ Cutterhead knives wore quicker than most.
- ◆ Dust hood with 4" port is optional (part #50-359, \$25).

More Points:

- ◆ The magnetic T-wrench helps lift the knives from the cutterhead, but the magnet also grabs onto the spring-loaded gib plate, which doesn't come out, making it tricky to free the knives.



DeWalt DW734, \$400 800-433-9258, dewalt.com

High Points:

- ◆ Auto-locking cutterhead and magnetic tool make knife changes easy.
- ◆ Three-knife cutterhead produces superior cut quality.
- ◆ It comes with a three-year warranty.
- ◆ Depth-of-cut gauge and thickness scale are accurate and easy to use.

Low Points:

- ◆ Power switch does not have a removable lock-out key for safety.

More Points:

- ◆ After slight adjustments, the preset thickness stops proved accurate.
- ◆ Carriage lock must be locked and unlocked by hand.



DeWalt DW735, \$650 800-433-9258, dewalt.com

High Points:

- ◆ Auto-locking cutterhead and magnetic tool make knife changes easy.
- ◆ Three-knife cutterhead and two feed speeds produce superior cut quality (at slowest speed).
- ◆ One of only two tested machines with an auto-locking carriage, which helps reduce snipe.
- ◆ A built-in chip-ejection fan clears debris better than any other machine. And it has 2½" and 4" dust ports.
- ◆ Depth-of-cut gauge and thickness scale are accurate and easy to use.

- ◆ It comes with a three-year warranty.

Low Points:

- ◆ Power switch does not have a removable lock-out key for safety.
- ◆ Without optional infeed and outfeed tables (part #DW7351, \$50), this planer snipes more than twice as much.

More Points:

- ◆ After slight adjustments, the preset thickness stops proved accurate.
- ◆ Optional infeed and outfeed tables have side-mounted leveling crews, making it easy to all but eliminate snipe.





General International 30-010 M1, \$650 888-949-1161, general.ca

High Points:

- ◆ Height-adjustment handwheel mounts to the top of the unit on either the left or right side, allowing you to locate it to suit your needs.

Low Points:

- ◆ The infeed and outfeed tables have rollers at the ends that are proud of the table surface and are the most difficult to adjust, resulting in test-worst snipe we could not control.
- ◆ Despite two feed speeds, cut quality from the two-knife cutterhead was middle-of-the-pack.

- ◆ When planing stock as thin as 1/8", this machine creates excessive chatter and chews up the workpiece.
- ◆ Depth-of-cut scale and preset thickness stops proved the most difficult to use.
- ◆ Dust hood with 4" port is optional (part #30-020, \$26).

More Points:

- ◆ Auto-locking cutterhead and magnetic tool make knife changes easy. But you'll do that more often because this unit's knives wore quickest in our accelerated wear test.



Grizzly G0689, \$375 800-523-4777, grizzly.com

High Points:

- ◆ Height-adjustment handwheel mounts to the top of the unit on either the left or right side, allowing you to locate it to suit your needs.

- ◆ Depth-of-cut gauge is accurate and easy to use.

Low Points:

- ◆ Cut quality proved slightly better than fair.
- ◆ Short infeed and outfeed tables (7") provide less support for long workpieces.
- ◆ The depth scale is marked in confusing increments, making it more difficult than others to use.

- ◆ There's no place on the machine to store the knife-changing T-wrench.

More Points:

- ◆ A built-in chip blower clears debris into an included collection bag, but it has only a 2 1/2" dust port if you choose to hook to a dust collector.
- ◆ After slight adjustments, the preset thickness stops proved reliable.



Makita 2012NB, \$530 800-462-5482, makitatools.com

High Points:

- ◆ Its two-knife cutterhead produced superior cut quality.
- ◆ Infeed and outfeed tables have side-mounted leveling screws, making it easy to all but eliminate snipe.
- ◆ Auto-locking cutterhead and magnetic tool make knife changes easy.
- ◆ Its knives showed the longest durability among straight knives and second overall.
- ◆ At 90 dB no-load, it's the quietest in the test.

Low Points:

- ◆ No preset thickness stops, and its depth-of-cut gauge lacks a scale.
- ◆ Dust hood with 3" port is optional (part #193036-7, \$25).

More Points:

- ◆ This unit has the narrowest width capacity at 12" (the others are 12 1/2" or 13" wide).
- ◆ An LED indicator light stays on to alert you that the machine is plugged in.



Ridgid R4330, \$370 866-539-1710, ridgid.com

High Points:

- ◆ Three-knife cutterhead produced cut quality just slightly below the leaders.
- ◆ Auto-locking cutterhead and magnetic tool make knife changes easy.
- ◆ It comes with a three-year warranty.
- ◆ The dust hood includes 2 1/2" and 4" ports, and has a flip-open exhaust if you don't use a dust collector.
- ◆ An extra set of knives can be stored on the planer.

- ◆ Depth-of-cut gauge and thickness scale are accurate and easy to use.

Low Points:

- ◆ This unit bogged down slightly in our power test, although its cut quality was not affected.

More Points:

- ◆ After slight adjustments, the preset thickness stops proved accurate.



Ryobi AP1301, \$200 800-525-2579, ryobitools.com

High Points:

- ◆ Depth scale is accurate and easy to use.
- ◆ At 53 lbs it's the lightest machine in the test.

Low Points:

- ◆ Cut quality proved the lowest-scoring in the test.
- ◆ There are no infeed/outfeed tables available for this machine, making it impossible to remove snipe, which required moderate power sanding to remove.

- ◆ No preset thickness stops and no depth-of-cut gauge.
- ◆ Knife changes were the most difficult on this planer because the knives are not self-indexing.

More Points:

- ◆ The dust hood's only port is 2 1/2", but it has a flip-open exhaust chute if you choose to not use a dust collector.



Steel City 40200H, \$600 877-724-8665, steelcitytoolworks.com

High Points:

- ◆ The high-speed-steel insert cutters showed the longest durability in the test, and each insert has four cutting edges.
- ◆ The dust hood includes 2 1/2" and 4" ports on opposing sides.
- ◆ Preset thickness stops were accurate and needed no adjustment.
- ◆ It comes with a test-best five-year warranty.

Low Points:

- ◆ Height-adjustment handwheel is stiff and difficult to adjust.
- ◆ The cutterhead carriage lock is difficult to lock and unlock.

More Points:

- ◆ The depth scale is accurate, but the viewfinder makes it difficult to read.

Here's what we'd buy

Two planers stood out from the field in this test: The 13" DeWalt DW735 (\$650) and 12" Makita 2012NB (\$530). Both produced exceptional cut quality that needed little sanding, and both left boards nearly snipe-free, although the DW735 needed its optional infeed and outfeed tables (an extra \$50) to do this. The DW735 features two feed speeds, easy-to-use depth stops, a depth-of-cut gauge, and a built-in chip blower powerful enough to clear nearly all chips and inflate the bags on a dust collector by itself. The Makita offers few frills, but exhibited the second-longest knife wear and lowest noise level; however, a dust hood will cost an extra \$25.

If you can't pay \$500 or more for a planer, we recommend the Ridgid R4330 for \$370. Although not the lowest-priced unit in the test, it delivers nice cut quality with manageable snipe, with accurate and easy-to-use scales and gauges. If that's still too steep, consider the Craftsman 21758 for \$280. It's a bare-bones unit that thicknesses wood accurately with respectable knife wear, although you will have to sand a little more to clean up board surfaces. 🌲

Written by **Bob Hunter** with **Bob Baker**

New Delta on the way

Delta's venerable 13" planer, model 22-580, has been discontinued and will be replaced later this spring by a similar-sized, three-knife unit (above) that will sell for about \$450, according to Delta's Bill Harman.

Jet has also discontinued its 13" planer, model JWP13DX, but will not replace it. Instead, Jet has launched 8"- and 10"-wide jointer/planer combination machines (\$300 and \$400, respectively) as part of its new benchtop line of tools.



BENCHTOP PLANERS: AFFORDABLE, PORTABLE TOOLS FOR THICKENING WOOD

BRAND	MODEL	CUTTERHEAD			CAPACITIES, INCHES			DUST-PORT DIAMETER, INCHES (3)	DIMENSIONS H×W×L, INCHES (4)	PERFORMANCE RATINGS (5)					ACCESSORIES (7)		NOISE LEVEL, DECIBELS (8)	WEIGHT, LBS	CORD LENGTH	WARRANTY, YEARS	COUNTRY OF ASSEMBLY (9)	SELLING PRICE (10)					
		TYPE OF KNIVES (1)	CUTS PER INCH	FEED RATE, FPM	TYPE OF CARRIAGE LOCK (2)	MAX. WIDTH OF CUT	MAX. WORKPIECE THICKNESS			PRESET THICKNESS STOPS? (YES, NO)	DEPTH OF CUT GAUGE? (YES, NO)	PRIMARY			SECONDARY								STANDARD	OPTIONAL			
												CUT QUALITY	ABSENCE OF SNIPE (6)	OBSERVED POWER	DURABILITY OF KNIVES	EASE OF CHANGING KNIVES									EASE OF USING DEPTH SCALE	EASE OF USING THICKNESS STOPS	EASE OF USING DEPTH-OF-CUT GAUGE
CRAFTSMAN	21758	2	60	26	N	12½	6	N	N	2	18½×24×24	B-	B	A	B	A	A	N/A	N/A	H,T		99	67	6'6"	1	C	\$280
	21748	3	96	26	N	13	6	Y	Y	2, 2½, 4	24½×21½×34	B-	B-	A	B	B	A	B	A	H,T	C	97	94	8'1"	1	C	500
DELTA	TP305	2	51	26	N	12½	6	N	N	4"	18×20×23½	B	B-	A-	C	A	A-	N/A	N/A	T	H	94	62	65"	5	T	280
DEWALT	DW734	3	96	26	M	12½	6	Y	Y	4	20×20×33	A	B	A	B	A-	A-	B	A-	H,T		93	80	7'	3	T	400
	DW735	3	96/179	14/24	A	13	6	Y	Y	2½, 4	14×27×19½*	A	B+	A	B	A-	A	A	A	H	B,T	92	92	7'4"	3	T	650
GENERAL INT.	30-010 M1	2	61/88	18/26	M	13	6	Y	Y	4"	20×22½×37½	B	D	A-	D	B	A	C	B	T	H	94	84	85"	2	T	650
GRIZZLY	G0689	2	70	19	M	13	6	Y	Y	2½	20½×25½×24½	C+	C+	A	B	A-	B-	A	A	B,H,T		95	95	7'9"	1	C	375
MAKITA	2012NB	2	50	28	A	12	6	N	Y	3"	18½×19×30	A	A	A	A-	A	A-	N/A	C	T	H	90	61	75"	1	C	530
RIDGID	R4330	3	96	26	N	13	6	Y	Y	2½, 4	18½×24×34	A	B	B+	C	B+	A	A	A	H,T		93	73	10'4"	3	C	370
RYOBI	AP1301	2	66	26	N	13	6	N	N	2½	19×23×14	C	C+	A	B	B-	A	N/A	N/A	H		93	53	6'	2	C	200
STEEL CITY	40200H	H	29	26	M	13	6	Y	Y	2½, 4	19½×24×34	B	B	A	A	A	B-	A	A	H,T		92	83	10'3"	5	C	600

- (2) Two steel straight knives
(3) Three steel straight knives
(H) High-speed-steel inserts
- (A) Automatic
(M) Manual
(N) None
- (*) Dust hoods are optional.

- (*) Length is 38" with optional infeed/outfeed tables.
- (*) Grade is an **A** with \$50 optional infeed/outfeed tables.
- | | |
|-----|-----------------------------|
| A | Excellent |
| B | Good |
| C | Fair |
| D | Poor |
| N/A | Not available on this model |

- (B) Dust-collection bag
(C) Segmented insert cutterhead
(H) Dust-collection hood
(T) Infeed/outfeed tables
- Measured under no-load
- (C) China
(T) Taiwan
- Prices current at time of article production and do not include shipping, where applicable.

Cook Up a Kitchen Makeover in Your Shop

How to affordably breathe new life into a kitchen using tools and skills you already have.



Before & After



A A wall oven limits access to the upper cabinets, and the peninsula lacks a snack counter for casual meals.



B Replacing the wall-oven cabinets with a pantry mirrors the bump-out created by the refrigerator surround.

PULL-OUTS ADD CONVENIENCE



C Replacing a narrow cabinet with a pull-out cookie sheet organizer takes advantage of space that was wasted in the old kitchen.

Think of your kitchen as a wood-working project, not a remodeling job, and you'll see how easy it is to bring old cabinets back to life. Your skills can create a fresh look that also boosts your home's value.

The secret: Reuse existing cabinets and only add new ones to solve kitchen layout problems. To prove that's possible, we changed the following in this '50s-era kitchen for less than \$2,000:

- Replaced the doors and drawers.
- Stained the existing face frames to match the new doors and drawer fronts.
- Replaced the wall oven with a pantry cabinet [Photos A and B].
- Replaced the cooktop peninsula with a snack counter that houses a range.
- Added decorative cabinet accents, such as a simple crown molding, and up-to-date knobs and pulls.
- Added pull-out organizers [Photo C].

On top of what we did for \$2,000, the homeowner added a new dishwasher, sink, faucet, lights, and countertops.

First, size up the project

Older kitchens, such as the one shown, may have one large site-built cabinet with several doors and drawers instead of individual one- or two-door cabinets. Plan any cabinet alterations, such as the refrigerator surround [Photos D and E], to avoid removing the entire assembly.

Now decide whether to match new doors and drawers to the existing wood color, or choose a new tone and stain the face frames and end panels to match. In this kitchen, the owner wanted to change it from a drab brown to a more contemporary cherry color.

Finally, list the new or replacement parts you'll need to make. Photocopy "Doors and drawers you'll need to build" on page 64 (or make one of your own) and list the number and size of each door and drawer front needed. You may be able to apply the old door dimensions to the new ones, but make sure they'll work with the hinges you'll install. We mounted 110° European-style hinges (see Sources) to doors with a 3/4" overlay because they're easy to install and adjust, and a closed door hides them.

We'll outline the basics of making doors and drawers. You can get detailed information on these and other kitchen makeover skills at **More Resources** on

page 67. Now, with your lists in hand, it's time to head for the shop.

Build stylish new doors

Once you add up the number of cabinet doors you'll need, list the part dimensions for each door size. Cut the stiles, rails, and panels to size for each group of doors. Then rout rail-and-stile profiles [Photo F] or saw stub tenons and grooves [Drawing 1]. Sand and stain the panels, then assemble the doors. Clamp each glue-up for a couple of hours, but allow doors to dry overnight before you sand, stain, and finish them.

To mount European-style hinges on each cabinet door, mark the 35mm (or

Before & After



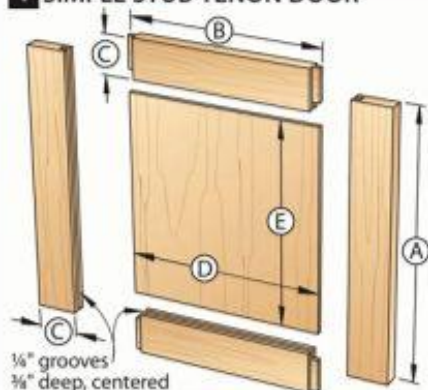
D The shiny refrigerator dominates the kitchen and nearby breakfast room. Cabinets of the same depth line up in plain rows.



E Deep cabinets break up the line of wall cabinets, add storage, and ease access to items above the fridge.

HOW TO CALCULATE CABINET DOOR DIMENSIONS

1 SIMPLE STUB-TENON DOOR



To size a door so that $\frac{3}{8}$ " along each edge overlaps the face frame, begin by adding $1\frac{1}{2}$ " to the width and height of the cabinet opening. Then do the following:

- Cut the stiles (A) to the length you calculated.
- Measure the length of the tenon. You can cut tenons on your table saw or with a stick-profile router bit. For the profile shown in **Photo F**, the tenon measures $\frac{3}{8}$ ".
- Figure the rail length (B) by taking your frame width, *subtracting* two times the stile width (C) and *adding back* two times the tenon length.
- Measure between the bottoms of the stile grooves on an assembled frame. Subtract $\frac{1}{8}$ " for the panel width (D) and between the rail grooves minus $\frac{1}{8}$ " for the panel height (E).

$1\frac{3}{8}$ " hole location and drill mounting-screw pilot holes [**Photo G**]. Drill the hinge-cup hole. Then screw the hinge-cup side to the door.

Next, center the door on the height of the frame opening and drive one screw through each hinge into the face frame [**Photo H**]. Adjust the door alignment before driving the remaining screws.

Finally, mount a pull on each door and add bumpers to the inside of the frame to keep the door from marring the cabinet frame.

Now, match drawers to your doors

When it comes to drawers, you have two options: Replace only the drawer fronts while saving the drawer boxes or replace the entire drawer. If the existing drawer

boxes have held up well and slide smoothly, simply replace the drawer fronts. You can make frame-and-panel drawer fronts to match the cabinet doors using the same method. For solid-wood drawer fronts like the ones we used in this kitchen, cut panels to match your door widths [**Photo I**]. Or, for a stacked-drawer cabinet with no door, duplicate the sizes of the old drawer fronts. Then drill and mount drawer pulls and screw the fronts to the old drawer boxes.

If the drawer boxes fell apart, or if the old drawer lacks a detachable front, build new boxes using our super-simple drawer method. (Watch free videos about building and installing these drawers. See **More Resources**.) First cut drawer-box parts from $\frac{1}{2}$ "-thick stock the width of the original drawer sides.

POSITION HINGES WITH THIS JIG



Create a jig to suit your hinge type with the hinge-cup marking hole centered on the gauge length. This one has countersinks to accept a self-centering drill bit.

SCREW HINGES TO THE CABINET



A scrap strip clamped to the lower cabinet rail supports the door while you screw the hinge to the face frame. Center screws in the hinge holes to allow the door to be adjusted.

Doors and drawers you'll need to build

Total up the replacement doors and drawer fronts of each size you'll need.

Cabinet door 1

Door size: _____" wide x _____" long

Quantity: _____
 _____ stiles, _____" wide x _____" long
 _____ rails*, _____" wide x _____" long
 _____ panels, _____" wide x _____" long

Cabinet door 2

Door size: _____" wide x _____" long

Quantity: _____
 _____ stiles, _____" wide x _____" long
 _____ rails*, _____" wide x _____" long
 _____ panels, _____" wide x _____" long

Cabinet door 3

Door size: _____" wide x _____" long

Quantity: _____
 _____ stiles, _____" wide x _____" long
 _____ rails*, _____" wide x _____" long
 _____ panels, _____" wide x _____" long

Cabinet door 4

Door size: _____" wide x _____" long

Quantity: _____
 _____ stiles, _____" wide x _____" long
 _____ rails*, _____" wide x _____" long
 _____ panels, _____" wide x _____" long

Drawer front 1

Size: _____" wide x _____" long

Quantity: _____

Drawer front 2

Size: _____" wide x _____" long

Quantity: _____

Drawer front 3

Size: _____" wide x _____" long

Quantity: _____

Drawer front 4

Size: _____" wide x _____" long

Quantity: _____

* Include tenon lengths in rail lengths.

REMODELING TIP

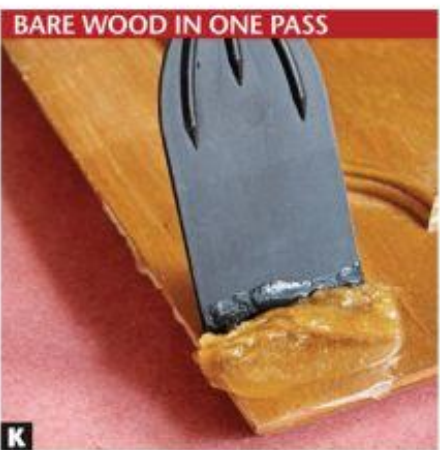
To save money down the road, replace dated appliances. Today's refrigerators and dishwashers operate 30 percent more efficiently than ones sold only 10 years ago. Make appliance decisions before planning your cabinet work to allow for different dimensions.



I By installing the cabinet doors first, you can align overlay drawer fronts with doors of the same width.



J Centered slide parts automatically center the drawer within the opening. The mounting cleat helps the slide fit this cabinet depth.



K Unlike sanding, chemical stripper dissolves finish even down inside the pores of the wood, making it easier to stain.

If you're building drawers for a new cabinet, make the drawer box 1" shorter than the cabinet depth and up to 1/4" narrower than the height of the drawer opening. Make the drawer box width 1" narrower than the width of the drawer opening to accept side-mounted slides, or 1/4" for bottom-mounted slides.

Cut lock-rabbit joints in the drawer parts [Drawing 2] and grooves on the

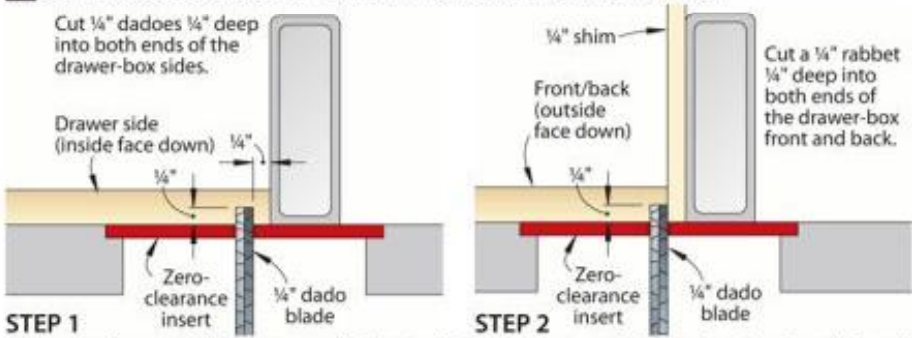
inside faces of the sides, front, and back to accept 1/4" bottoms. Measure between the bottoms of the grooves from side to side and front to back, and cut drawer bottoms to fit. Working on a dead-flat surface, glue and clamp the drawer boxes together [Drawing 3].

To mount the drawer fronts, cut a spacer the distance you want between drawers or between a drawer and cabinet

door below. Use double-faced tape to hold the drawer front in place while you screw it to the drawer box from inside.

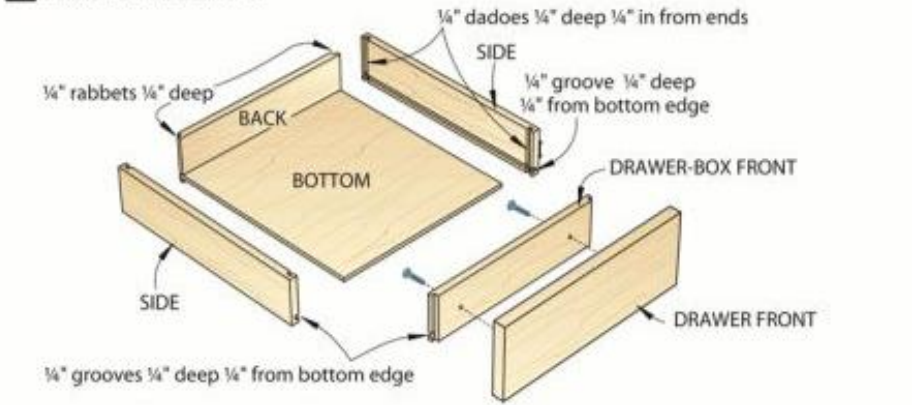
Finally, install drawer slides. We chose single under-mount drawer slides (see Sources) that were easy to install without the pairs of mounting blocks needed for side-mounted slides. First, center the cabinet-mounted portion of the slide within the drawer opening [Photo J]; then screw it to the cabinet back and face frame. (We added a cleat to help the slide reach to the back of the cabinet.) Then center and screw the rest of the slide to the underside of the drawer-box front and back.

2 CUT LOCK-RABBET JOINTS WITH A SINGLE TABLESAW SETUP



STEP 1 To test the fence and blade setups in Step 1, dado two scraps and check that they interlock end to end. Then dado both ends of each drawer side. For Step 2, mount a 1/4"-thick shim to the rip fence with double-faced tape, and rabbet both ends of each drawer front and back.

3 DRAWER ASSEMBLY



Put a new face on frames

Now you're ready to transform the face frames. Begin by wiping the old finish with a rag soaked in mineral spirits to remove old polish and cooking grease that could contaminate the surface. Then test the old finish by first wiping it with lacquer thinner. If the finish comes off, remove the rest of it using lacquer thinner while wearing a respirator and with lots of ventilation.

If lacquer thinner doesn't work, you're probably dealing with a varnish that's

REMODELING TIP

We reused as many kitchen cabinet parts as possible, but in some situations, new parts may save time. For example, we replaced trim panels on the sides of some end cabinets instead of refinishing them. That eliminated time spent stripping finish and sanding the panels. And because they were stained and finished at the same time as the new doors and drawer fronts, they matched better than where we stripped and stained old panels.

TEST STAINS ON OLD DOORS



L First test stripper on the varnish. Then see how different stains and multiple stain coats will look on the face frames.

COLOR DIFFERENCES DISAPPEAR



M Face frames can vary slightly from stain colors on doors and drawer fronts and still blend together in the finished kitchen.

GET CREATIVE WITH DETAILS



N Shop-made brackets below the snack counter provide a personal touch. You can also buy ready-to-stain brackets in many styles.

best removed using a gel-type stripper according to the manufacturer's directions [Photo K]. Stripping finish also requires good ventilation.

After stripping the old finish, sand the face frames up to 120 grit if you'll leave the wood its natural color, or up to 180 grit if you'll stain it. (A detail sander speeds up this job and reaches into tight corners and face-frame edges.) Finally, hand-sand with the grain using your final grit and clean off all dust.

Now you need to match the color of your old frames and the new doors and drawers. If the old doors were made from the same wood as the face frames, strip and sand the door to use as a test board. Try different sanding grits and stains to fine-tune the color [Photo L]. You can tweak stain colors by applying multiple

coats or sanding to a lower grit to darken the wood. For lighter color, sand to a grit higher than 180. After you find the right sanding and stain combination, stain the face frames to match your new doors and drawers [Photo M].

You'll need a tough, clear finish, such as polyurethane, for the face frames, doors, and drawer fronts because they need to survive dings, splashed water, and airborne cooking grease. Brush finish onto newly sanded or stained face frames just thick enough to cover the surface; then check for drips and sags in an angled light. Apply three coats, sanding with 320 grit between coats.

Tackle the big changes

To make room for the combination cooking peninsula and snack counter

shown on page 67, we first removed the old countertop and separated the old peninsula from the adjoining cabinets.

Don't let the size of the new peninsula intimidate you. The side seen from the breakfast area goes together like a wide, flat-panel door [Drawing 4], with support brackets [Photo N] screwed to the stiles. We then screwed a framed end panel to the front panel. On the kitchen side of the peninsula, we left an opening to hold the new range [Photo O]. After finishing the peninsula and end panel to match the cabinet doors, we screwed them to both the floor and adjoining cabinet. We then topped the peninsula with plastic-laminate counters that are glued and clamped in place.

Another big change was to shroud the refrigerator from the nearby eating area.

A NEW HOME FOR THE RANGE



O A spacer to the right of the range provides clearance for the oven door. A laminate backsplash makes cleanup easy.

PANTRY CREATES SUPER STORAGE



P For the 53"-tall doors on this pantry, we divided the panels with center rails and added a third hinge for support.

MIX UP MOLDINGS



Q Chamfered molding tops the bumped-out cabinets. Flexible quarter-round molding follows the soffit above the cabinets.

We cut away the shallow cabinets over the fridge and replaced them with extra-deep cabinets [Photo E] with long sides that would mirror the pantry cabinet.

We also extended the cabinets above the former wall-oven location and tied the old and new cabinets together with a shared face frame. Extra-tall doors turned it into a pantry [Photo P].

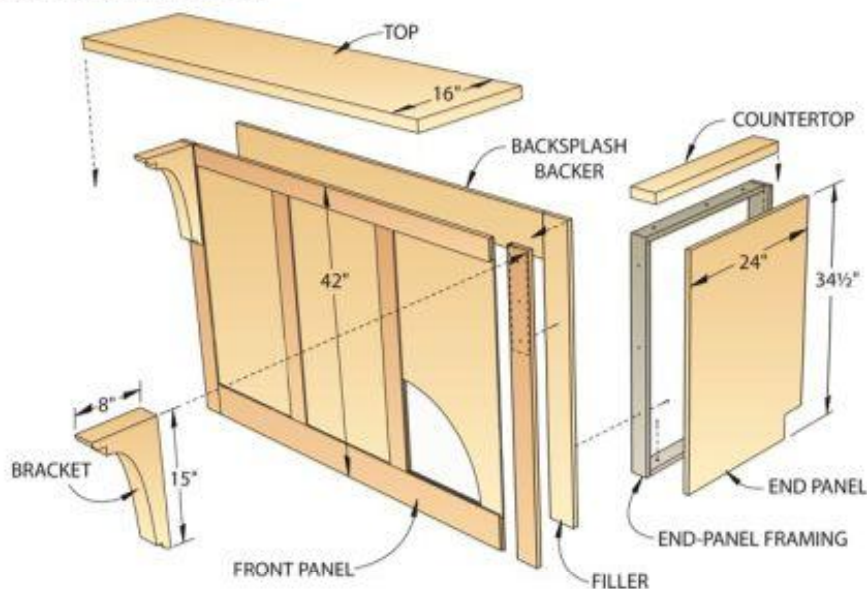
Put it all together

Our cabinet crown molding plans hit a snag when the rigid molding wouldn't conform to waves in the soffit. Instead, we used quarter-round molding to follow the soffit, and a chamfered crown molding atop the two extra-deep cabinets [Photo Q]. For other ways to dress up your kitchen, see "Give your kitchen a woodworker's touch" below.

With the final details in place, you're ready to reinstall or replace the countertops and appliances. Then fire up the stove and prepare a meal of your favorite foods to celebrate your new kitchen. 🌿

Written by **Bob Wilson** with **Kevin Boyle**
Project design: **Kevin Boyle**
Illustrations: **Roxanne LeMoine; Lorna Johnson**

4 KITCHEN PENINSULA



MORE RESOURCES

FREE VIDEOS

- "Making Super-Simple Drawers" woodmagazine.com/simplesdrawer.
- "Super-Simple Drawer Mounting" woodmagazine.com/drawermount.
- "Cutting Crown Molding" woodmagazine.com/crownmldg.
- "Gluing and Sanding Panels Flat" woodmagazine.com/panels.
- "Matching a Stain Color on Solid Wood and Plywood" woodmagazine.com/stainmatch.

RELATED ARTICLES

- "Make Cabinets the Easy Way" Issue 191 (July 2009) or at [\\$](http://woodmagazine.com/easycab)
 - "How to Apply Plastic Laminates" Issue 80 (August 1995) or at [\\$](http://woodmagazine.com/laminate)
- (\$—Download this article for a small fee.)

Sources

Drawer slides: 22" center-mount slide no. 02K40.22, \$5.25 to \$6.30 (depending upon quantity), Lee Valley Tools, 800-871-8158 or leevalley.com.
Hinges: 110", edge-mount European-style hinge no. 00B07.03, \$7.70 to \$9.60 per pair, Lee Valley Tools.
Knobs: Westerly Suite 1 1/4x1 1/2" satin-nickel finish round knob no. 02A16.51, \$2.90 to \$3.40, Lee Valley Tools.
Stain: Minwax Gunstock no. 231, \$7.47 per quart from home centers.
Clear finish: Semigloss polyurethane, Old Masters, 800-747-3436 or [\\$13.70](http://oldmasters.com) from thepaintstore.com.

Give your kitchen a woodworker's touch

To keep your kitchen from looking like everyone else's, add woodworking accents. Faux feet and a strip along the bottom cabinet rail (right) give base cabinets the look of fine furniture. Turned table legs from mail-order sources such as Osborne (bunfeet.com) relieve the boxy look of kitchen island cabinets (below). If your tastes exceed your carving skills, buy corbels to attach as counter supports. Then rout flutes in extra-wide face-frame stiles (below right).



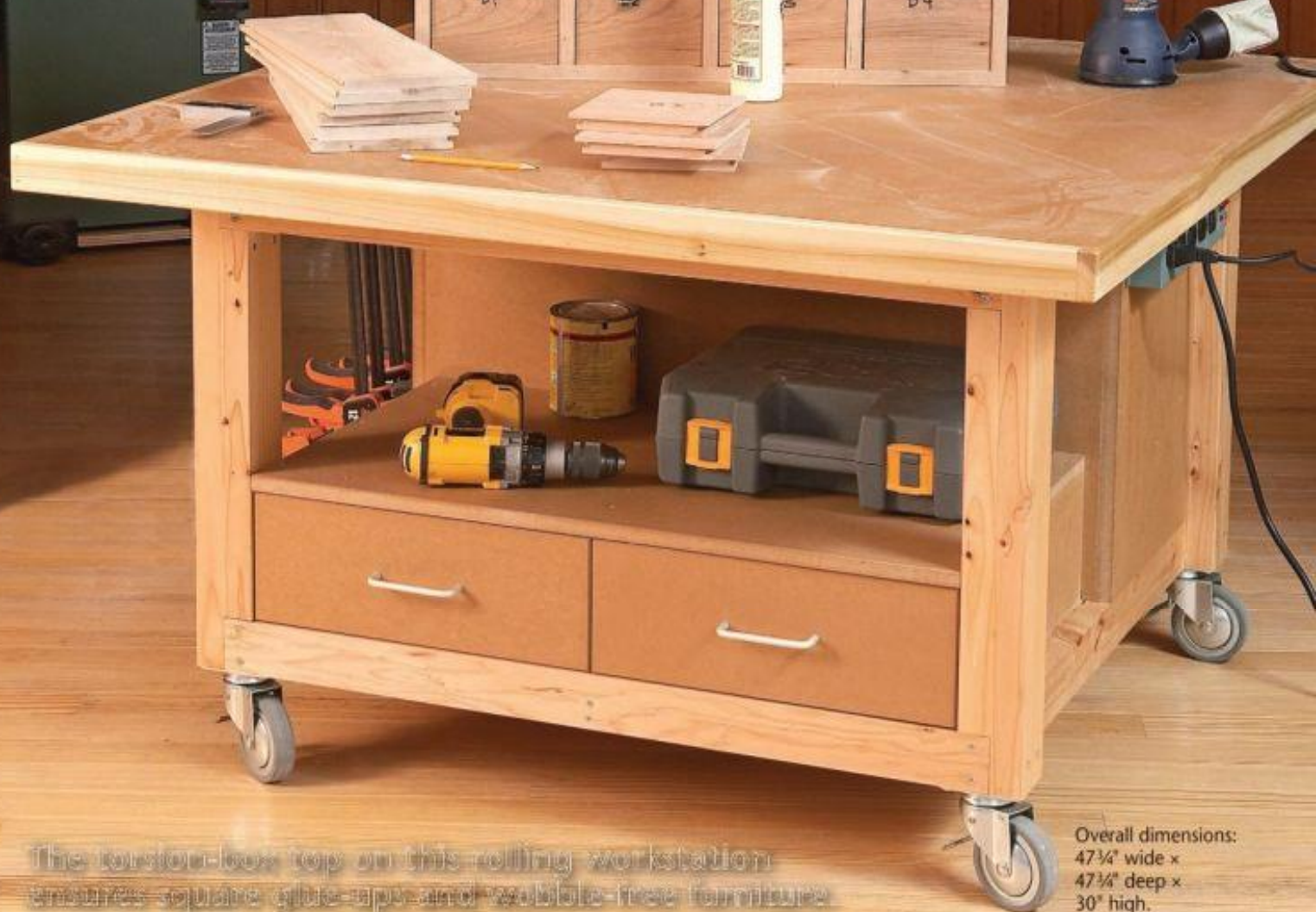
COMING NEXT ISSUE

We stretched this kitchen's storage space by building in slide-out trays and organizers. For the details on making organizers to fit your own kitchen, see issue 198 (July 2010).



Reliably Rugged

Assembly Table



This torsion-box top on this rolling workstation ensures square glue-ups and wobble-free furniture.

Overall dimensions:
47 1/4" wide x
47 1/4" deep x
30" high.

Build this project and you'll gain a dead-flat worksurface plus storage for glue-up supplies, clamps, and equipment such as a pancake air compressor and nailers. You can put the top to work immediately to glue up the rest of the table.

Create a torsion-box top

1 Cut a 4x8' sheet of 3/4" medium-density fiberboard (MDF) into equal halves to create a temporary assembly surface. Clamp the half-sheets together on a pair of sawhorses and check the flatness of the sheets in all directions with a straightedge [Photo A].

START ON A FLAT WORKSURFACE



To correct unevenness, shim between the bottom sheet of MDF and the sawhorses. Then reclamp at the corners.

GLUE EDGING TO THE BOTTOM



The edging (C) extends beyond one end of the bottom (A) a distance equal to the edging thickness. Spacers provide clamp clearance.

Notch up another time-saving tablesaw jig

The torsion-box grid requires 20 precisely notched inside supports (B)—no problem for this jig.

From 1/2"-thick MDF, cut a 7/16x4" indexing pin and set it aside. From 3/4" plywood or solid wood, cut a 2 1/2x42" miter-gauge extension. Center and screw the extension to a miter gauge.

Install a dado set as wide as the thickness of the 1/2" MDF. Gradually raise the blade to 1/2" or until test joints assemble with their edges flush and no

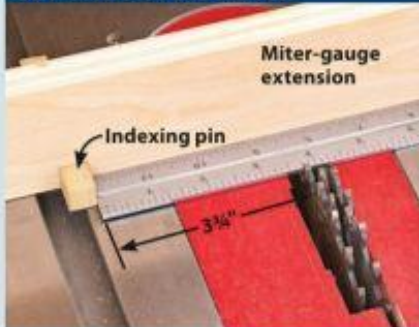
gaps. **Note:** Notched joints should slip together with only light finger pressure to avoid cracking the MDF.

Remove the extension from the miter gauge and glue the indexing pin in the notch with one end flush with the back face of the extension. Hold the extension against the miter gauge and position the indexing pin 3 3/4" from the blade (below left). Clamp the extension to your miter gauge while you screw it in position.

To use the jig, position the workpiece against the indexing pin and make your first notch (below center). Place that notch over the indexing pin and make a second notch. Repeat for the remaining notches (below).

To avoid minor misalignments when assembling the grid, mark each end where you make your final notch. Later, assemble the grid with the marks together on both the horizontal and vertical groups of pieces.

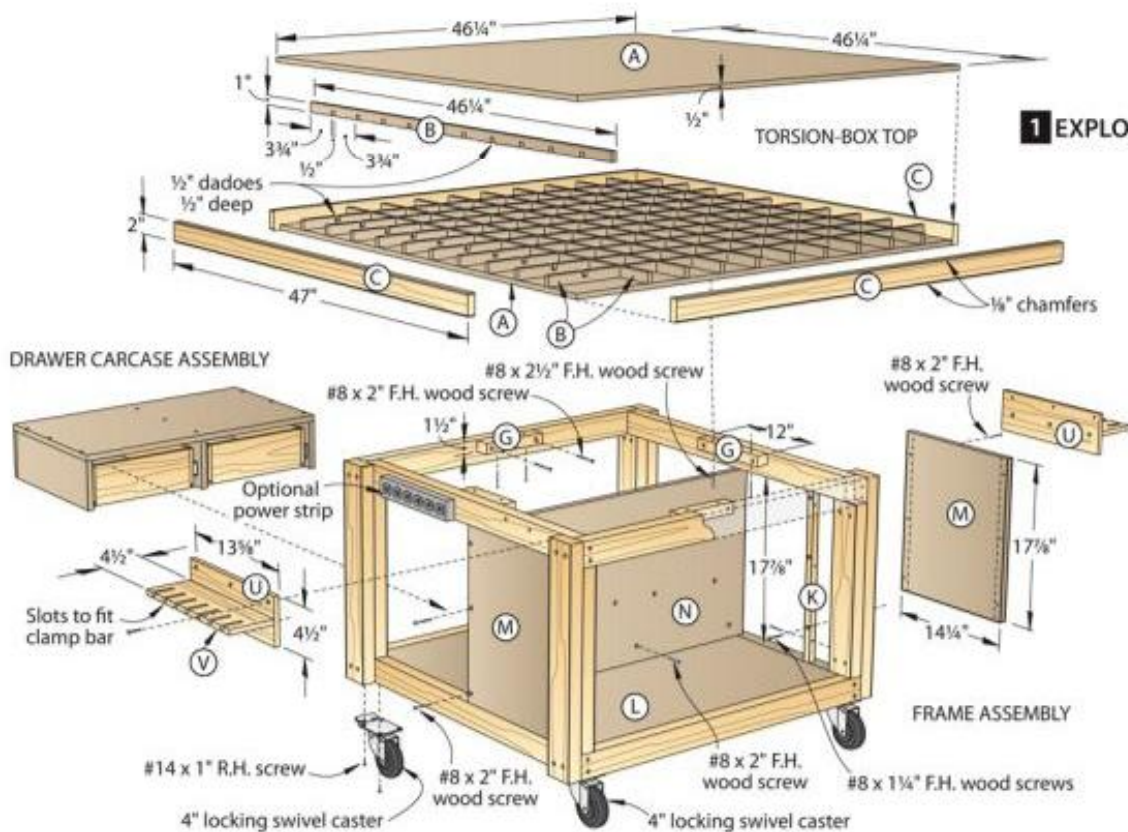
SET THE PIN DISTANCE



CUT THE FIRST NOTCH



CUT EVENLY SPACED NOTCHES



1 EXPLODED VIEW

2 Cut the top/bottom (A) and inside supports (B) to size [Materials List, page 73]. Set the top aside, taking care not to mar the MDF edges or corners. Place the bottom on your temporary assembly surface.

3 Make the jig shown in "Notch up another time-saving tablesaw jig" above. Then notch each support (B).

4 Rip edging (C) 1/32" oversize in width. Glue and clamp one piece of edging to the bottom (A), with its lower edge

and one end flush [Drawing 1, Photo B]. After that glue-up dries, glue and clamp a second piece of edging to the bottom, butting one end against the protruding face of the first edging piece. Set aside the other two edge pieces.



C ASSEMBLE THE SUPPORT GRID

Align the inside supports (B) against the two installed pieces of edging (C). Then assemble the joints without glue.



D TRACE THE GRID FOR GLUING

Hold the inside supports (B) grid in position by clamping it to the edging (C). You only need to trace alternating openings.

5 Dry-assemble the grid of inside supports (B) [Photo C]. (Work carefully to avoid cracking the MDF.) With the assembled grid clamped against the edging (C), mark the grid pattern on the bottom [Photo D].

6 Carefully remove the inside supports (B) as a grid. Apply glue to the bottom (A) where marked [Photo E] and replace the supports. Without gluing, lay the top (A) on the supports. Clamp around the edges and place heavy objects in the center until the glue dries. **Quick Tip! Split up the glue-up.** Don't be tempted to glue both edges of the inside supports at once to join the top and bottom. Even when you're not being too tidy, applying glue beads for 20 inside supports can exceed the working time of your glue.

7 After the glue dries, remove the top (A). Apply glue to the top edges of

the grid (B), and return the top with its edges flush with the edging (C). Clamp and weight the top in the center until the glue dries [Photo F].

8 Glue and clamp the remaining edging (C). Sand the ends flush with the adjoining faces and the edges flush with the top and bottom (A). Chamfer the edges and sand to 180 grit.

Frame the table base

1 Remove the temporary worksurface and save it for parts L–P and T. Place the torsion-box top (A–C) on the sawhorses and add shims to eliminate gaps and wobbles.

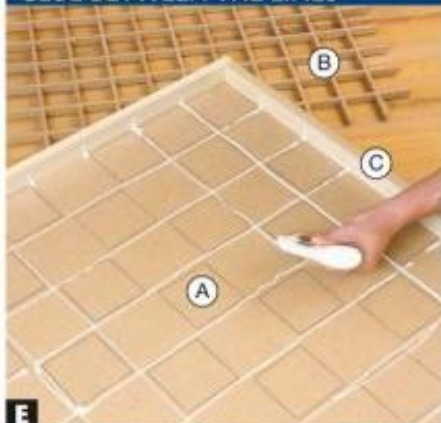
2 Cut the long rails (D), short rails (E), middle cleat (F), and top-mounting cleats (G) to size. Cut eight leg (H) pieces to size from 1½" stock, but do not laminate the legs yet. **Quick Tip! Use the best of the board.** By cutting parts

from oversized construction lumber—we used 10' 2×8s—you can cut around knots and defects. Cut long bottom cleats (I), short bottom cleats (J), and sidewall cleats (K) to size.

3 Clamp a long rail (D) and short rail (E) together on the torsion-box top (A–C). Drill and screw the rails together [Photo G]. (For #8 screws, we drilled countersunk 7/64" pilot holes.) Repeat for the remaining corners to complete the top frame [Drawing 2]. Follow the same steps to assemble the lower frame; then attach the middle cleat (F) flush with the bottom of the lower frame.

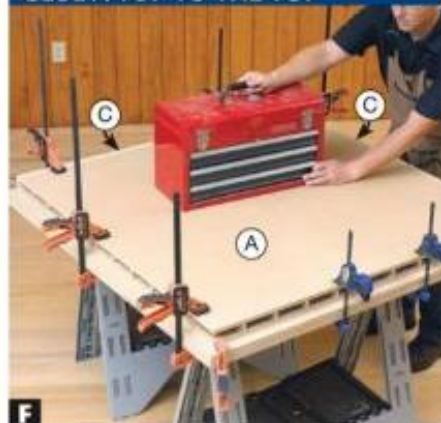
4 Drill, glue, and screw the long bottom cleats (I) to the short rails (E) [Photo H]. The upper face of the frame bottom (L) should rest flush with the top edge of the rails. Attach the short bottom cleats (J) flush with the middle cleat (F) and long bottom cleats.

GLUE BETWEEN THE LINES



E Using the pencil marks as guides, quickly lay beads of glue from edge to edge on the bottom (A) and on the edging (C).

GLUE A TOP TO THE TOP

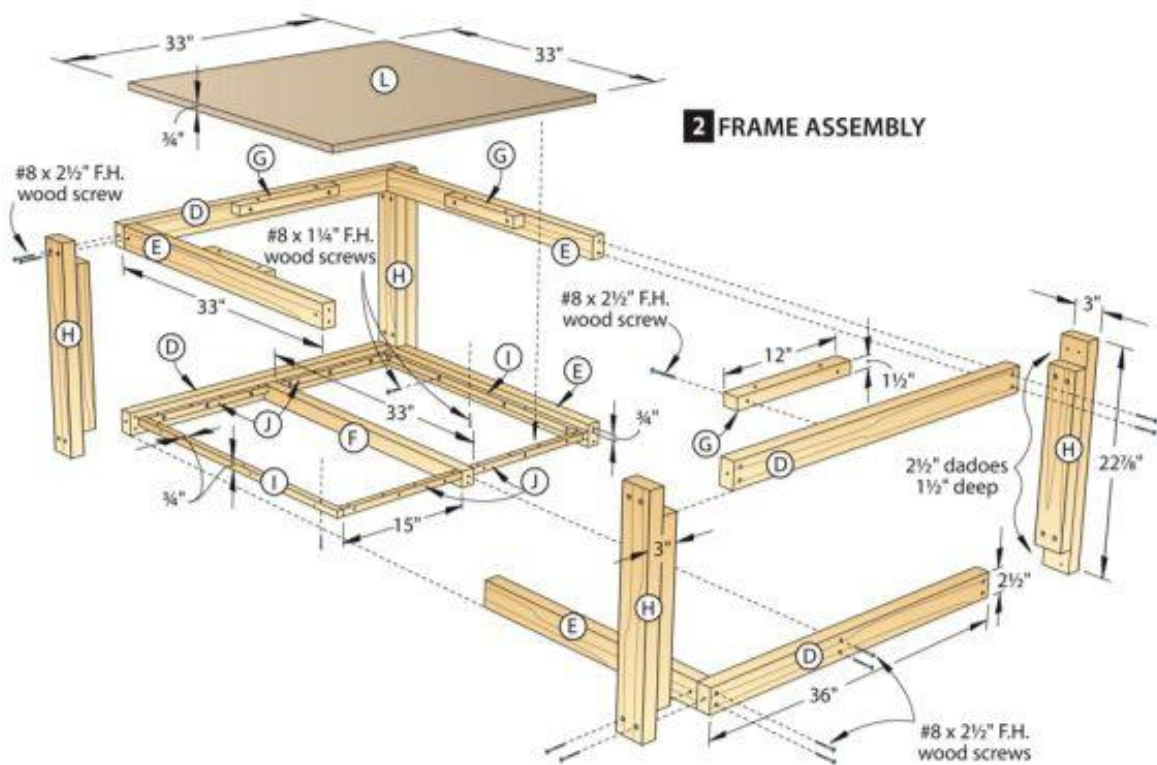


F The edges (C) align the top and bottom (A). We weighted the center with a toolbox, but full paint cans and benchtop tools also work.

ASSEMBLE THE FRAME RAILS



G Clamp the long and short rails (D, E) to the tabletop and check for square. Clamps hold the rails together while you drive 2½" screws.



2 FRAME ASSEMBLY

5 Cut the bottom (L) to fit the opening between the long and short rails (D, E). Glue and clamp the bottom to the middle cleat (F) and bottom cleats (I, J). After the glue dries, turn the bottom frame upside down. Then drill and drive screws through the cleats (F, I, J) to reinforce the glue joint.

6 Cut 5" off four of the leg parts (H) to be laminated. Center, glue, and screw a shortened leg piece to a longer one, leaving 2 1/2" notches at both ends [Drawing 2]. Repeat for the other legs.

7 Clamp a leg (H) to the face of a short rail (E) on the upper frame (D/E) and check for square. Repeat for the remaining legs. Then clamp the lower frame to

the legs. Screw the legs to the upper and lower frames [Photo I].

Make a case for storage

1 Double-check the height between the upper and lower frames (D/E) against the dimensions for the sidewalls (M) and back (N) [Materials List]. Then cut them to size.

2 Glue and screw sidewall cleats (K) to the legs (H) so that the sidewalls (M) will sit flush with the outside faces of the short rails (E) [Drawing 1]. (You can check this with a piece of MDF scrap.)

3 Glue, drill, and screw a sidewall (M) to a sidewall cleat (K) [Photo J]. Repeat for the other sidewall.

4 Cut the back (N) to fit between the inside faces of the sidewalls (M) and short rails (E). Drill and screw the back to the sidewalls.

5 Cut the drawer carcase top (O) and sides/divider (P) to size [Drawing 3]. Chamfer the front edges of the top. Then drill, glue, and screw the carcase sides and centered divider to the top.

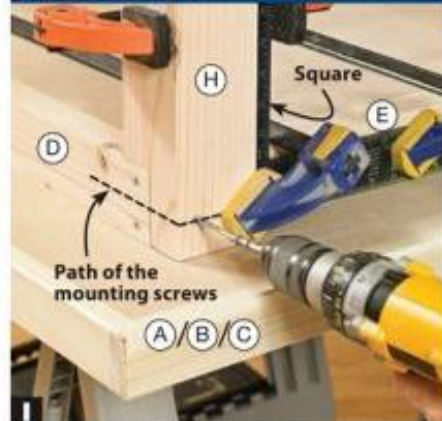
6 Place the drawer carcase (O/P) in position. Trace its edge profile on the bottom (L) and back (N) and remove it. Drill pilot holes in the bottom and back [Photo K]. Reinstall the drawer carcase. Drill countersunk pilot holes into its edges through the back and bottom holes and screw it in place.

INSTALL CLEATS ON THE FRAME



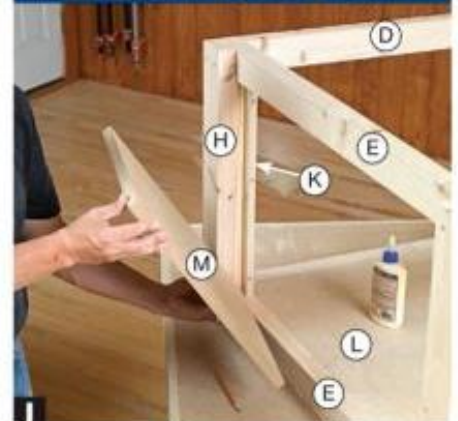
H A scrap of 3/4"-thick MDF gauges the setback needed for the long bottom cleat (I), which supports the bottom (L).

SCREW LEGS TO THE FRAMES

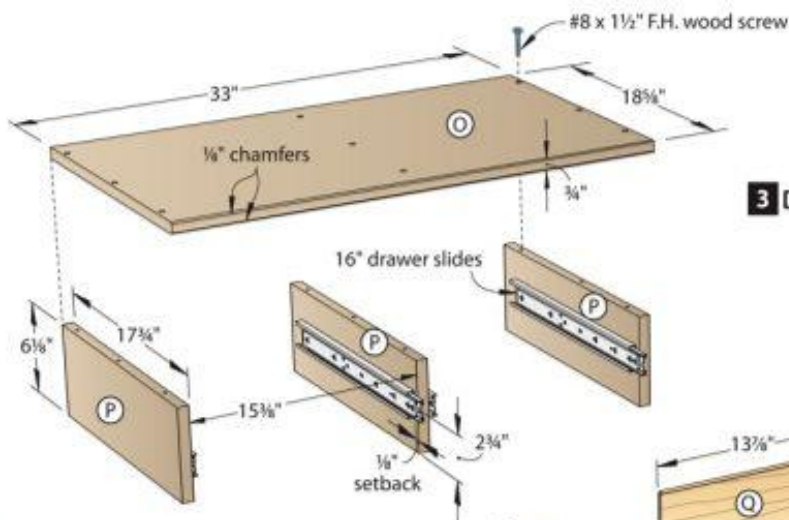


I Clamp a square to the leg (H) and short rail (E) while driving screws between the two frame (D, E) screws.

FIT SIDES TO THE FRAME

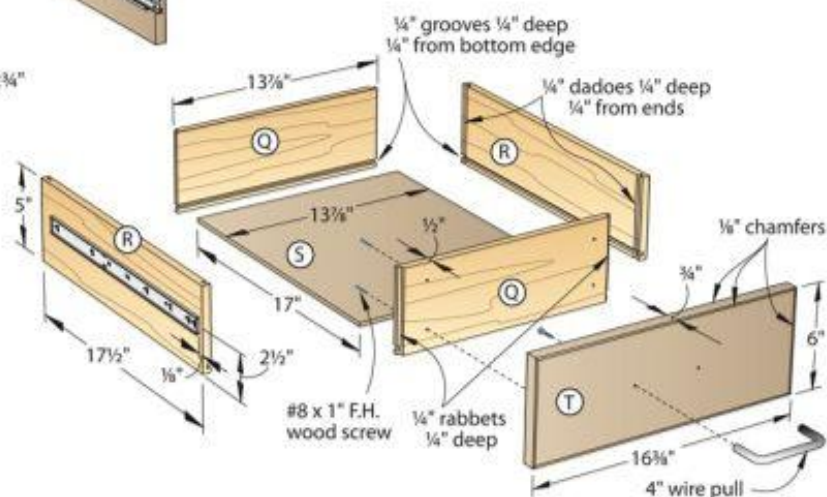
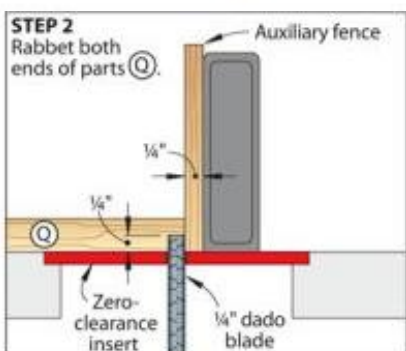
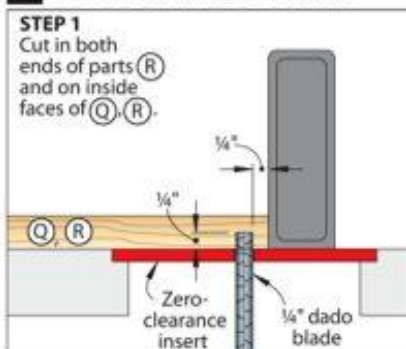


J Test the height of the sidewalls (M) between the short rails (E) before gluing and screwing them in place against the sidewall cleat (K).



3 DRAWER CARCASE ASSEMBLY

3a CUT LOCK-RABBET JOINTS



Now add two drawers

- 1 Cut the drawer fronts/back (Q) and sides (R) to size [Drawing 3].
- 2 Install a 1/4" dado blade and zero-clearance tablesaw insert and adjust the blade and fence as shown in Step 1 of Drawing 3a. Cut drawer-bottom (S) grooves in the drawer fronts/back (Q) and drawer sides (R). Then dado both ends of each drawer side.
- 3 Attach a 1/4"-thick auxiliary fence to your tablesaw rip fence with double-

faceted tape and rabbet the outside face on both ends of each front/back (Q), as shown in Step 2 of Drawing 3a.

4 Dry-assemble a drawer front, back (Q), and sides (R) and measure for the drawer bottom (S). Then cut the drawer bottoms to size.

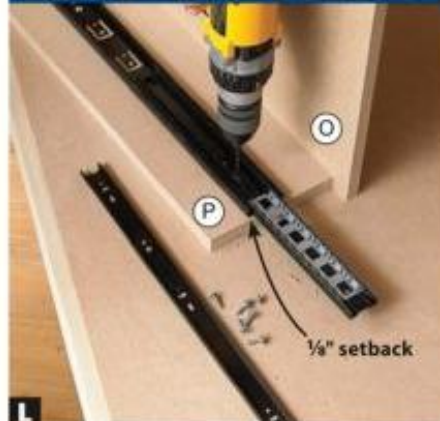
5 Sand the fronts/back (Q), sides (R), and bottoms (S) to 220 grit. Then glue and clamp the drawers, checking for square [Drawing 3]. Finish-sand the assembled drawers.

DRILL DRAWER CARCASE HOLES



Use lines traced around the drawer carcass (O/P) to center pilot holes for attaching the carcass to the bottom (L) and back (N).

SCREW SLIDES TO THE CARCASE



Pull the slide out for access to the mounting holes. Center the slots on the drawer carcass (O/P) centerline.

MOUNT SLIDES TO THE DRAWERS



Drill pilot holes in the center of slide slots so the slides can move the drawers forward or backward within the drawer carcass (O/P).

6 Divide the drawer-side width in half and add $\frac{1}{8}$ ". Then mark that distance up from the bottom edges of the drawer carcass sides/divider (P). At each mark, draw a line from end to end and a $\frac{1}{8}$ " setback from the front. Drill and screw carcass-mounted slide parts to the drawer carcass sides and divider [Photo L].

7 Draw a centerline on the drawer sides (R) from front to back and a mark $\frac{1}{8}$ " from the drawer front (Q) edge. Drill and screw the drawer-mounted portions of the slides to the drawers [Photo M].

8 Apply a glue bead between the lines traced earlier on the back (N) and bottom (L). Slide the drawer carcass into position, and screw in place. Then slide the drawers (Q–S) in place.

Nearly ready to assemble

1 Cut two drawer faces (T) to size and chamfer the edges [Drawing 3]. Drill holes and center-mount the drawer pulls. Countersink the mounting screws flush with the inside surface.

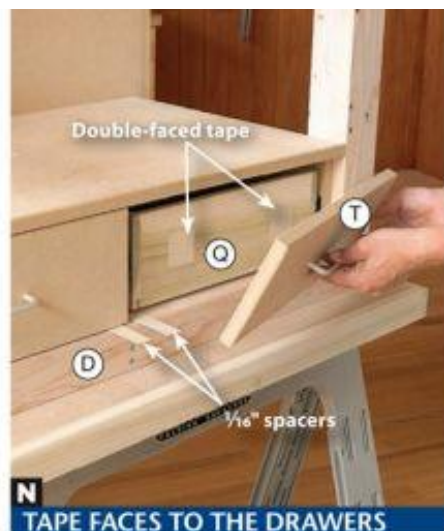
2 Cut four $\frac{1}{16}$ "-thick spacers. Then apply double-faced tape to the drawer fronts (Q). Use the spacers to help center the faces against the drawer boxes (Q–S) [Photo N]. Screw the faces to

the boxes. **Quick Tip! Close the gap.** If tape on the drawer-box front doesn't touch the drawer face, add spacers to push the box forward until it does. You can adjust the drawer glides forward after applying a finish and re-installing the hardware.

3 Cut the clamp-rack backs (U) and holders (V) to size. Then bandsaw or dado notches to suit your clamps. Glue and clamp the holders to the backs. Drill and screw the racks to the bench.

4 Remove all hardware and finish-sand the top and base to 180 grit. Wipe on three coats of satin polyurethane, sanding with 220 grit between coats. Reattach the hardware and an optional power strip. Then mount 4" swivel casters to the legs (H) and lower rails (D, E) [Drawing 1]. Finally, attach the top to the table using the top-mounting cleats (G). Now, if this table wobbles, shim the wheels because you know you've just built the flattest surface in your shop. 🌲

Written by **Bob Wilson** with **Jeff Mertz**
Project design: **Kevin Boyle**
Illustrations: **Roxanne LeMoine; Lorna Johnson**



N TAPE FACES TO THE DRAWERS

Spacers provide clearance between the drawer face (T) and long rail (D). Double-check clearances along the sides and top.

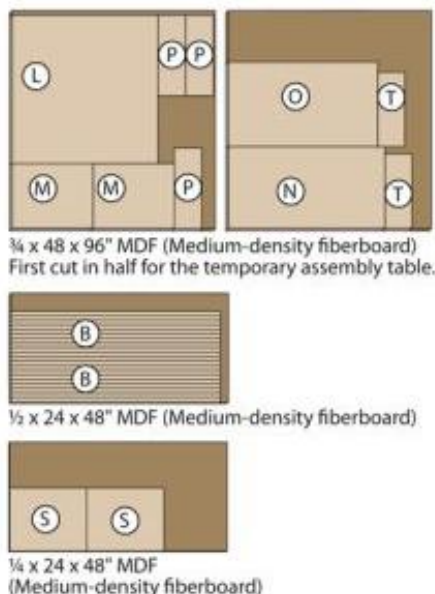
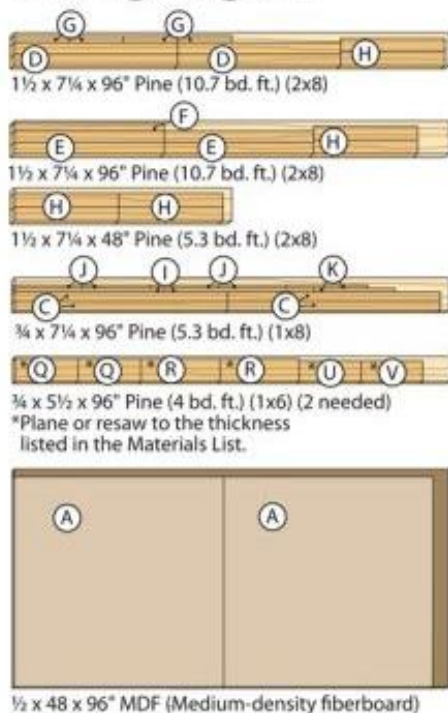
Materials List

Part	FINISHED SIZE			Matl.	Qty.	
	T	W	L			
Torsion-box top						
A	top/bottom	$\frac{1}{2}$ "	46 $\frac{1}{2}$ "	46 $\frac{1}{4}$ "	MDF	2
B	inside supports	$\frac{1}{2}$ "	1"	46 $\frac{1}{4}$ "	MDF	20
C*	edging	$\frac{3}{8}$ "	2"	47"	P	4
Frame						
D	long rails	1 $\frac{1}{2}$ "	2 $\frac{1}{2}$ "	36"	2x	4
E	short rails	1 $\frac{1}{2}$ "	2 $\frac{1}{2}$ "	33"	2x	4
F	middle cleat	1 $\frac{1}{2}$ "	1 $\frac{3}{4}$ "	33"	2x	1
G	top-mounting cleats	1 $\frac{1}{2}$ "	1 $\frac{1}{2}$ "	12"	2x	4
H**	legs	3"	3"	22 $\frac{1}{2}$ "	LP	4
I	long bottom cleats	$\frac{3}{8}$ "	$\frac{3}{4}$ "	33"	P	2
J	short bottom cleats	$\frac{3}{8}$ "	$\frac{3}{4}$ "	15"	P	4
K	sidewall cleats	$\frac{3}{8}$ "	$\frac{3}{4}$ "	17 $\frac{1}{2}$ "	P	2
L	bottom	$\frac{3}{8}$ "	33"	33"	MDF	1
M	sidewalls	$\frac{3}{8}$ "	14 $\frac{1}{2}$ "	17 $\frac{1}{2}$ "	MDF	2
N	back	$\frac{3}{8}$ "	34 $\frac{1}{2}$ "	17 $\frac{1}{2}$ "	MDF	1
Drawer box, drawers						
O	drawer carcass top	$\frac{3}{8}$ "	18 $\frac{1}{2}$ "	33"	MDF	1
P	drawer carcass sides/divider	$\frac{3}{8}$ "	6 $\frac{1}{8}$ "	17 $\frac{1}{4}$ "	MDF	3
Q	drawer fronts/back	$\frac{1}{2}$ "	5"	13 $\frac{3}{8}$ "	P	4
R	drawer sides	$\frac{1}{2}$ "	5"	17 $\frac{1}{2}$ "	P	4
S	drawer bottoms	$\frac{1}{4}$ "	13 $\frac{3}{8}$ "	17"	MDF	2
T	drawer faces	$\frac{3}{8}$ "	6"	16 $\frac{3}{4}$ "	MDF	2
Clamp racks						
U	back	$\frac{1}{2}$ "	4 $\frac{1}{2}$ "	13 $\frac{1}{2}$ "	P	2
V	holder	$\frac{1}{2}$ "	4 $\frac{1}{2}$ "	13 $\frac{1}{2}$ "	P	2

*Parts initially cut oversize. See the instructions.
**Half of the lamination will be 5" shorter. See the instructions.

Materials key: MDF—medium-density fiberboard, P—poplar, 2x—dimensional pine or fir, LP—laminated pine.
Supplies: #8x1", #8x1 $\frac{1}{4}$ ", #8x1 $\frac{1}{2}$ ", #8x2", #8x2 $\frac{1}{2}$ " flathead wood screws; #14x1" roundhead screws (16); 4" locking swivel casters (4); 16" drawer slides (2 sets); 4" wire pulls (2); optional power strip (1).
Blade and bit: Chamfer router bit, dado set.

Cutting Diagram



MORE RESOURCES

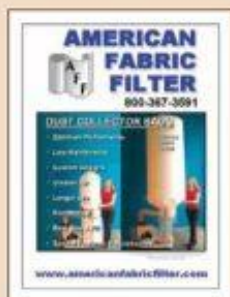
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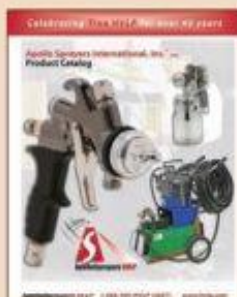
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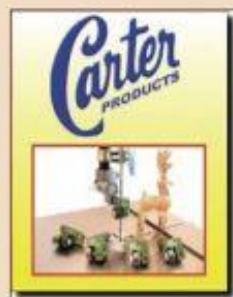
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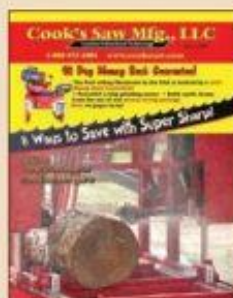
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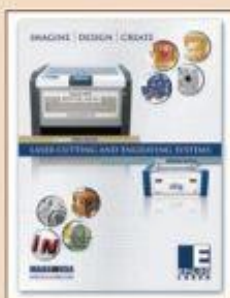
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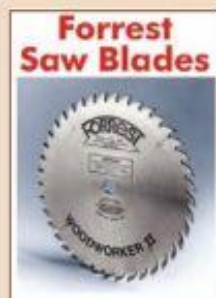
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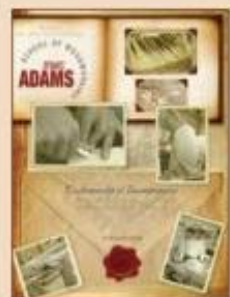
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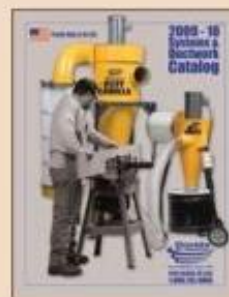
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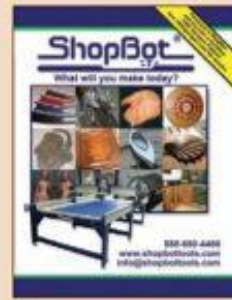
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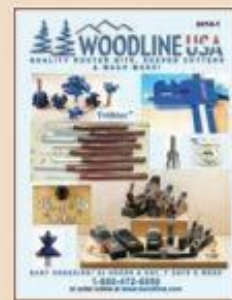
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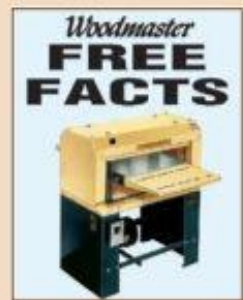
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A plan for building from plans

Q: I really want to build the toy excavator from issue 194 (Nov. 2009), but I'm intimidated by all the steps. Can you give me some tips to get over this fear and get started?

—Al Prevedel, Memphis, Tenn.

A: Lie back, Al, the doctor is in. The first step to overcoming your fears is to confront them head-on. Read through every step of the instructions. Many plans like the excavator also come with full-size patterns in the *WOOD Patterns*® insert. Familiarize yourself with them as well. Pay attention to the tools mentioned. Some projects require a full complement of woodworking tools and the skills to use them safely. But we also include in every issue a "Basic Built" project that needs only a minimum of tools.

Next flip to the back of the plan. *WOOD*® magazine project plans include a complete materials list along with any specialty blades and bits you'll need. Hardware is listed along with sources. Gather all of your materials before you start: You don't want to find out near the end of construction that you have to alter the plan because your hardware doesn't match ours.

Then, take a second look at the illustrations. Each project plan will contain one illustration that features a



complete exploded view of the project. It can sometimes look intimidating, but additional illustrations provide detailed understanding.

At last, it's time to dive in. Don't be intimidated by all those steps you see. In reality, more steps usually means

more simplicity as our designers and editors break down the construction process into easy sub-assemblies.

If you're still stuck, feel free to email us at woodmail@woodmagazine.com or pose your question in the forums at woodmagazine.com.

Rout 'round the bend with a starter pin

Q: I want to build arched-top paneled doors. How do I cut a dado on the concave side of the curved top rail to accept the panel?

—Dick Rosenboom, Gainesville, Fla.

A: Pick up a slot-cutting bit for your table-mounted router, Dick. Slot cutters usually come in three parts—the arbor, a slot cutter, and a guide bearing—so that you can customize one to fit your cut. Choose a cutter to match your panel's edge thickness and a guide bearing that properly limits the depth of the cut.

To use the bit, remove the fence from your table, and set the bit height so that it is centered on the rail. Install a starter pin for leverage so you can ease the workpiece into the bit to start the cut, as shown. Then, simply guide the workpiece against the bit's bearing.



Feed the workpiece against the rotation of the bit.



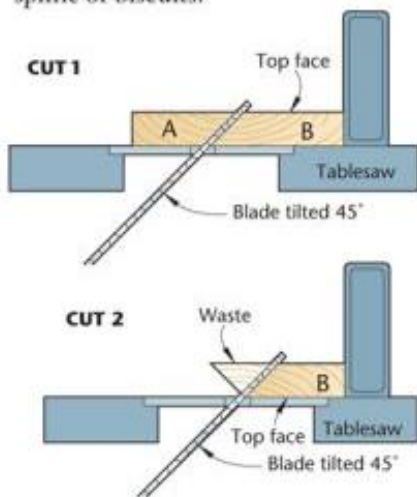
The splashy waterfall joint

Q: A *WOOD* Online forum member suggested a “waterfall joint” for the table legs I’m building. But I can’t find reference to the joint anywhere. Could you explain?

—Lester Das, Cortland, N.Y.

A: The eye-catching look of the waterfall joint has more to do with the grain pattern and careful matching than it does the joinery, Lester. It gets its name from the matched grain that cascades down the corner of the joint like running water. The joinery boils down to a long miter joint cut on the tablesaw.

But the trick is in the grain selection. For this joint, choose a board with a bold, arched, cathedral grain pattern. With your tablesaw blade beveled at 45°, and the workpiece face up, make the first cut down the middle of the grain pattern, as shown below. Then flip the board so the workpiece faces down, and make the second cut, discarding the center waste piece. This leaves a satisfyingly symmetrical grain wrap when assembled. Finally, join the two pieces with a spline or biscuits.



continued on page 78

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Ask WOOD

Casting color mismatches in a whole new light

Q: When I built my wife a jewelry box I was careful to dye and stain the wood to match a drawer from our dresser. But when I set the box on the dresser, the color was way off. What went wrong in my finishing process between the shop and the bedroom?

—Nathan Puckett, Baldwin Park, Calif.

A: The answer more likely resides on your ceiling than on your finishing table, Nathan. If your shop is like most, you have fluorescent lights overhead. But your project will reside in a bedroom where it sits under incandescent lights or sunlight or a combination of both. The different types of lights have color makeups that will skew the look of your finish.

For instance, fluorescent lights lack red, but emphasize green and blue, so projects created in your shop could seem redder in your house. Incandescents, on the other hand, emphasize red and yellow, minimizing blue and green.

For best results, match colors under a light source similar to the environment where the project will live. If you have to, bring incandescent lamps into your shop to simulate your home's lights. Or make color samples to test in the same room as your dresser. Another option: Replace the low-price cool white tubes in your shop lights with warm white tubes that produce a broader spectrum of light.



Supplement your shop's lighting with the same type of light your project will be displayed under.

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A string or a chalkline makes a ready reference for checking the straightness of a sheet of plywood.

Straight and square is as easy as 3-4-5

Q: To make shop cabinets, I'm cutting a lot of plywood. Is it safe to consider the factory edges of plywood to be straight and square, or will I need to true them up?

—Jonathan Walters, Bryantsville, Ky.

A: If you're concerned, Jonathan, do some quick double-checks on



If the diagonal measures 5' at the 3' mark of a 4' wide sheet of plywood, then the corner is square. Just remember: Not all plywood is exactly 4' wide.

the sheet goods. Sight along the edge to see any curves or wobbles from the manufacturing process. This will also reveal dinged edges or delaminating areas that might not be visible straight-on. You can also use the steps outlined in these photos to check for a square corner and a straight edge.

If you do find problems, your best straightener is your tablesaw. Cut your project pieces to $\frac{1}{8}$ " or more oversize with the factory edge against the tablesaw fence. Then cut them to final size with the newly ripped edge against the fence. Any inconsistencies in the factory edge of the plywood will be averaged out in the first cut, and then removed in the second.

continued on page 80



✓Yes



✓Yes



✓Yes



✓Yes



✓Yes



xNo



✓Yes



✓Yes

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Ask WOOD

Wood like a rock

Q: I recently made some toy blocks out of an old gnarled Osage orange fence post. It sure made my planer work, but it got me to wondering: What is the world's hardest wood?

—Ronald Martin, Worthington, Ohio

A: Interesting question, Ronald. The hardness of wood is measured using the Janka Hardness Test. This test measures the force required to push a steel ball with a diameter of 0.444" into the wood to a depth of half the ball's diameter. Generally acknowledged as the hardest wood, lignum vitae (*Guaiaacum sanctum* and *Guaiaacum officinale*) measures in at 4,500 pounds-force (lbf) on the Janka scale. That's more than twice as hard as Osage orange (one of the hardest domestic woods) at 2,040 lbf and more than three times harder than red oak at 1,290 lbf.

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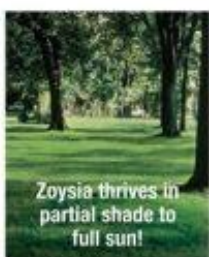
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We test hundreds of tools and accessories, but only those that earn at least three stars for performance make the final cut and appear in this section. Prices are current at the time of article production and do not include shipping, where applicable.

Make perfect box joints on your router table

I can't imagine an easier way of cutting box joints than with Rockler's Router Table Box Joint Jig. It's almost fool-proof: Within 15 minutes of opening the box I had made four perfect-fitting joints. Here's how it works. The melamine-coated MDF base mounts in the miter slot of any router table. You install a $\frac{1}{4}$ ", $\frac{3}{8}$ ", or $\frac{1}{2}$ " upcut or downcut spiral bit in the router and a matching indexing guide on the base. Use a setup bar (set available at Rockler, #36918, \$18) equal to the bit diameter to set the spacing between the bit and indexing guide. Holding your workpiece against the sled's fence, slide it over the bit to cut a notch. Slip that notch onto the indexing guide and rout another one. Repeat across the board's width.

The only joints I routed that didn't fit perfectly resulted from off-brand bits that did not measure exactly the same as the indexing guides, which proved dead-on. (Bits are not included with this kit.)



—Tested by Bob Hunter,
Tools & Techniques Editor



Router Table Box-Joint Jig, # 29502

Performance	★★★★
Price	\$80
Rockler	
800-279-4441; rockler.com	

Versatile magnetic jig provides a helping hand—or two

The Magswitch MagFence Combo Kit works as an auxiliary fence or hold-in on any steel or cast-iron surface. This kit comes with a base, two turn-on-and-off magnetic MagJigs, a Dual-Roller Guide for holding stock flat against a fence or tabletop, and a MagFence Resaw Guide for resawing on a bandsaw. The MagJigs fit into two holes on the base, and when you turn their knobs a quarter-turn they lock onto the surface with incredible strength.

I used the MagFence kit in every application where I might need a helping hand: to hold stock against the fences on my tablesaw, jointer, and shaper; to hold down boards while face-jointing on my jointer; and to hold workpieces squarely on my drill press. Never a problem. I even used two of the Resaw Guides, with their $7\frac{1}{2}^\circ$ tapered faces on each side of the blade, to sandwich my board while resawing on my bandsaw, and still had 15° of steering room to counter blade drift. And for those times when the MagFence might not work, I can take the



MagJigs out and use them in other shopmade jigs, such a dust-hose holder on my oscillating spindle sander.

—Tested by Randy Zimmerman,
a cabinet- and furnituremaker
for 15 years



MagFence Combo Kit

Performance	★★★★
Price	\$150
Magswitch	
303-468-0662; magswitch.com.au	



Rout with Wizard-like precision using this jig

A lot of aftermarket router jigs seem gimmicky to me, but the Router Wizard Pro has become my go-to choice for any routing that calls for ultra-precision—especially joinery where there's no room for error—or requires a straightedge for reference. With this multipurpose jig and my plunge router I can rout dados, grooves, rabbets, mortises, and circles with reliable repeatability on almost any size workpiece.

After mounting your plunge router onto the heavy-duty plastic plate, you install the plate into the aluminum base. Now you can use the rack-and-pinion adjusters to dial in the bit location with unbelievable precision. Adjustable stops and a reference pin on the plate set slot limits for mortises and stopped dados or grooves. There's also a guide mounted below one edge to reference on workpiece edges for routing parallel slots or grooves. Remove this to register against a straightedge guide for field routing; it also fits into the existing slots on some straightedge guides. I used the included radius attachment for routing dead-on circles up to 4' in diameter.

—Tested by Steve Feeney,
a woodworker with 25 years experience
and a WOOD magazine
tool tester for 5 years



Router Wizard Pro

Performance ★★★★★

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continued on page 84

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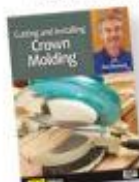
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Believe it: A kick-free miter saw that cuts cleanly

Makita's new 10" dual-compound sliding miter saw provides the cut capacity for nested crown molding (6 $\frac{3}{8}$ ") comparable to a 12" slider. But I like its soft-start motor most of all. Almost every miter saw, slider or not, kicks like a startled mule when you power up and down. But not this one. Squeeze the trigger and the beveled-gear motor eases up to speed in about a second-and-a-half. Nice!

This saw also features two sets of sliding rails with three linear bearings per rail for increased rigidity and decreased side-to-side play, which results in greater cutting accuracy. I crosscut 12"-wide stock with the saw at 90° and just shy of 9" when set for a 45° miter. The saw rotates 52° to the left and 60° to the right, with nine miter detents that proved dead-on. The miter lock takes some getting used to because there's not only a finger-lift to bypass the detents, but also a push-and-twist lock. Six bevel stops prove helpful, but the bevel lock is on the rear of the saw and difficult to reach and use.

Lasers often prove meaningless, but this one needs no batteries, works great, and adjusts easily for spot-on cut placement. And you even get a 60-tooth blade that makes furniture-quality cuts, saving the price of buying a replacement blade. 🌿

—Tested by Bob Hunter,
Tools & Techniques Editor



10" Sliding Dual-Compound Miter Saw, #LS1016L

Performance	★★★★★
Price	\$550
Makita	
800-462-5482; makita.com	

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It happened on our last trip to South America. After visiting the "Lost City" of Machu Picchu in Peru, we ventured through the mountains and down the Amazon into Brazil. In an old village we met a merchant with an impressive collection of spectacular, iridescent emeralds. Each gem was tumbled smooth and glistened like a perfect rain forest dew drop. But the price was so unbelievable, I was sure our interpreter had made a mistake.

But there was no mistake. And after returning home, I had 20 carats of these exquisite emeralds strung up in 14k gold and wrapped as a gift for my wife's birthday. That's when my trouble began. She loved it. Absolutely adored it. In fact, she rarely goes anywhere without the necklace and has basked in compliments from total strangers for months now.

So what's the problem? I'm never going to find an emerald deal this good again. In giving her such a perfect gift, I've made it impossible to top myself.

To make matters worse, my wife's become obsessed with emeralds. She can't stop sharing stories about how Cleopatra

cherished the green gem above all others and how emeralds were worshiped by the Incas and Mayans and prized by Spanish conquistadors and Indian maharajahs. She's even buying into ancient beliefs that emeralds bring intelligence, well-being and good luck to anyone who wears them. I don't have the heart to tell her that I'm never going to find another deal this lucky.

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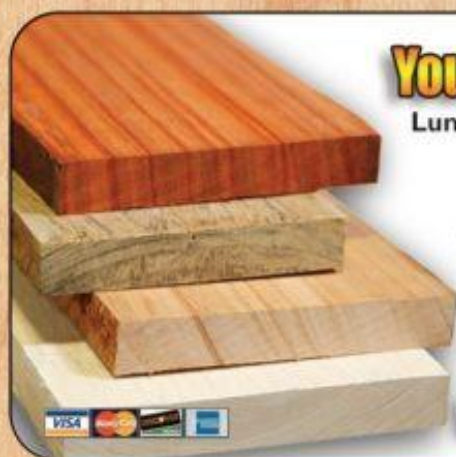
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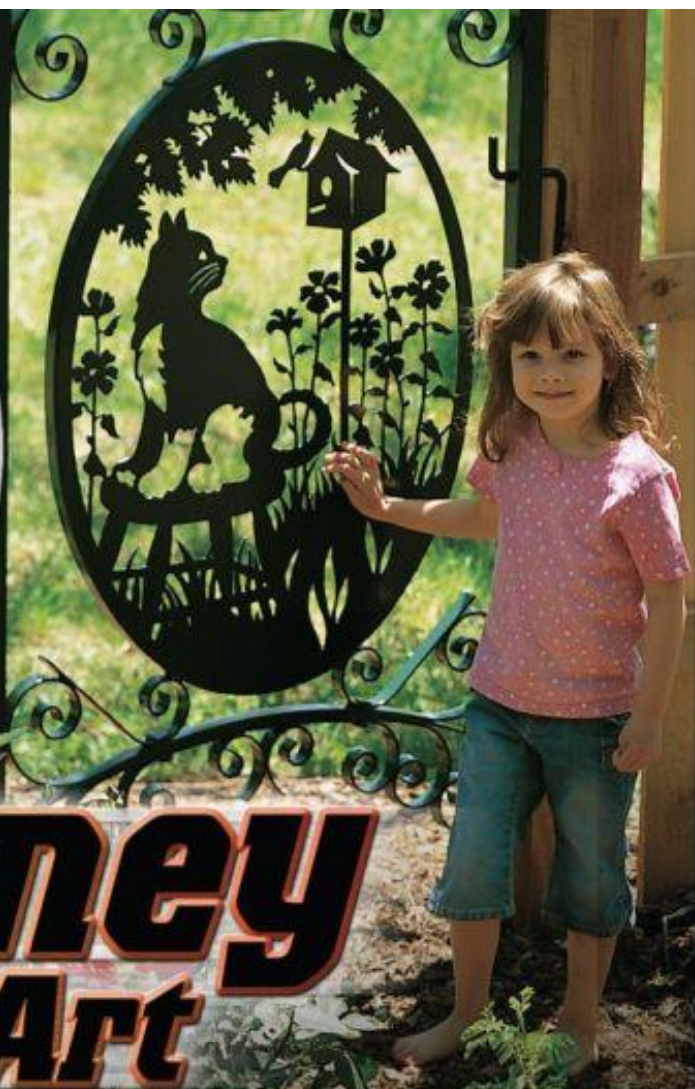
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