

WOOD®

The World's Most Trusted Woodworking Resource

DIY Workstation

p.46

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Grizzly Industrial®

**PURVEYORS OF
FINE MACHINERY®
SINCE 1983**

Quality Machines, Great Prices!

10" 2 HP PORTABLE TABLE SAW WITH ROLLER STAND

- Motor: 2 HP, 120V, single-phase, 15A
- Table size: 22" x 26-3/8"
- Max. cutting height: 6"
- Table size: 14" x 14" x 1 1/2"
- Maximum width of dado: 13/16"
- Rip capacity: 28" right of blade
- Arbor speed: Variable, 2000 - 4000 RPM
- T30883 converts saw into functional disc sander
- Maximum depth of cut @ 90° 3-1/8"
- Overall dimensions: 41-1/2" W x 37-1/2" D x 41" H
- Approx. shipping weight: 106 lbs



MADE IN AN
ISO 9001
FACTORY

⚠ WARNING! †¹



\$125
shipping
lower 48 states

G0870 ONLY \$495⁰⁰

12" VARIABLE-SPEED BENCHTOP DRILL PRESS WITH LASER

- Motor: 1/2 HP, 120V, single-phase, 5.1A
- Swing: 12"
- Spindle taper: MT#2
- Spindle travel: 3 1/2"
- Spindle speeds: Variable, 400 - 2700 RPM
- Drill chuck: 1/32" - 5/8", JT3, keyless
- Drilling capacity: 5/8" mild steel
- Max. distance from spindle to table: 13 1/4"
- Table dimensions: 9 5/8" x 9 5/8"
- Table tilt: 45° left/right
- Table swivel around column: 360°
- Overall dimensions: 13" W x 22" D x 36" H
- Approx. shipping weight: 93 lbs.



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T31739 ONLY \$394⁰⁰ ⚠ WARNING! †¹

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15" PLANER WITH HELICAL CUTTERHEAD

- Motor: 3 HP, 230V, single-phase, 12A v
- Max. cutting width: 15"
- Max. cutting height: 6"
- Min. stock thickness 3/16"
- Min. stock length: 6"
- Max. cutting depth: 1/8"
- Feed rate: variable, 16-28 FPM
- Cutterhead speed: 5000 RPM
- Table size with extension rollers: 15" x 48"
- Approx. shipping weight: 595 lbs.



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SB1108 ONLY \$3045⁰⁰

17" HEAVY-DUTY BANDSAW

- Motor: 2 HP, 110V/220V (prewired 220V), single-phase, 19A/9.5A
- Table size: 17" x 17"
- Table tilt: 10° left, 45° right
- Floor to table height: 37-1/2" Max cutting height: 12 1/8"
- Max cutting width: 16 1/4 in.
- Blade size: 131 1/2" L (1 1/8"-1" W)
- Blade speeds: 1700 & 3500 FPM
- Overall size: 32" W x 32" D x 73" H
- Approx. shipping weight: 342 lbs.



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⚠ WARNING! †¹



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G0513 ONLY \$1225⁰⁰

12 SPEED HEAVY-DUTY 14" FLOOR DRILL PRESS

- Motor: 3/4 HP, 120V, single-phase, 7.5A
- Swing: 14"
- Drill chuck: 3/64" - 5/8"
- Drilling capacity: 3/4" steel
- Spindle taper: MT#2
- Spindle travel: 3 1/4"
- 12 speeds: 140-3050 RPM
- Collar size: 2.595"
- Precision-ground cast-iron table
- Table size: 11 3/8" square
- Table swing: 360°
- Table tilt: 90° left/right to mirror the T31739
- Overall height: 64"
- Approximate shipping weight: 156 lbs.



MADE IN AN
ISO 9001
FACTORY



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shipping
lower 48 states

G7944 ONLY \$495⁰⁰ ⚠ WARNING! †¹

2 HP CANISTER DUST COLLECTOR

- Impeller Motor: 2 HP, 220V, single-phase, 9A
- Main inlet size: 6" with three 4" adapter inlets
- Airflow capacity: 1103 CFM @ 3.5" SP
- Max. static pressure: 11.95"
- Filtration rating: 1-micron
- Filter surface area: 80 sq. ft.
- Impeller: 12" radial fin
- Material collection capacity: 33-1/2 gallons
- Sound rating 81-83dBww
- Overall dimensions: 39" W x 31 1/2" D x 76" H
- Approx. shipping weight: 165 lbs.



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FACTORY ⚠ WARNING! †¹

\$149
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SB1100 ONLY \$845⁰⁰

12" COMPACT SLIDING TABLE SAW

- Motor: 7-1/2 HP, 220V/440V* (prewired for 220V), 3-phase, 20A/10A
- Main blade size: 12"
- Main blade tilt: 0-45°
- Main blade speed: 4000 RPM
- Depth of cut: 3 5/16" @ 90°, 2 3/8" @ 45°
- Scoring blade size: 43/4" (120mm)
- Sliding table size: 63" x 12 1/4"
- Rip capacity: 33"
- Crosscut capacity: 63"
- Footprint: 45" x 35"
- Approx. shipping weight: 996 lbs.



⚠ WARNING! †¹

\$369
shipping
lower 48 states

G0820 ONLY \$5495⁰⁰

12-1/2" 2 HP BENCHTOP PLANER

- Motor: 2 HP, 110V, single-phase, 15A
- Max. cutting width: 12 1/2"
- Max. cutting height: 6"
- Max. cutting depth: 3/32"
- Min. board thickness: 13/64"
- Feed rate: 32 FPM
- Number of knives: (2) HSS reversible
- Knife size: 12 1/2" x 23/32" x 1/8"
- Cutterhead speed: 10,000 RPM
- Number of cuts per inch: 52
- Approx. shipping weight: 78 lbs.



G0505 ONLY \$415⁰⁰ ⚠ WARNING! †¹

\$49
shipping
lower 48 states

3 HP DOUBLE CANISTER DUST COLLECTOR

- Impeller Motor: 3 HP, 240V, single-phase, 12A
- Airflow capacity: 1429 CFM @ 3.2" SP
- Maximum static pressure: 12"
- Filtration rating: 1-micron
- Filter surface area: 160 sq. ft.
- Impeller: 12-3/4" radial fin
- Material collection capacity: 67 gallons
- Automatic self cleaning drum
- Sound rating 81-83dB
- Overall dimensions: 58" W x 31 1/2" D x 76" H
- Approx. shipping weight: 237 lbs.



⚠ WARNING! †¹

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SB1101 ONLY \$1325⁰⁰

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



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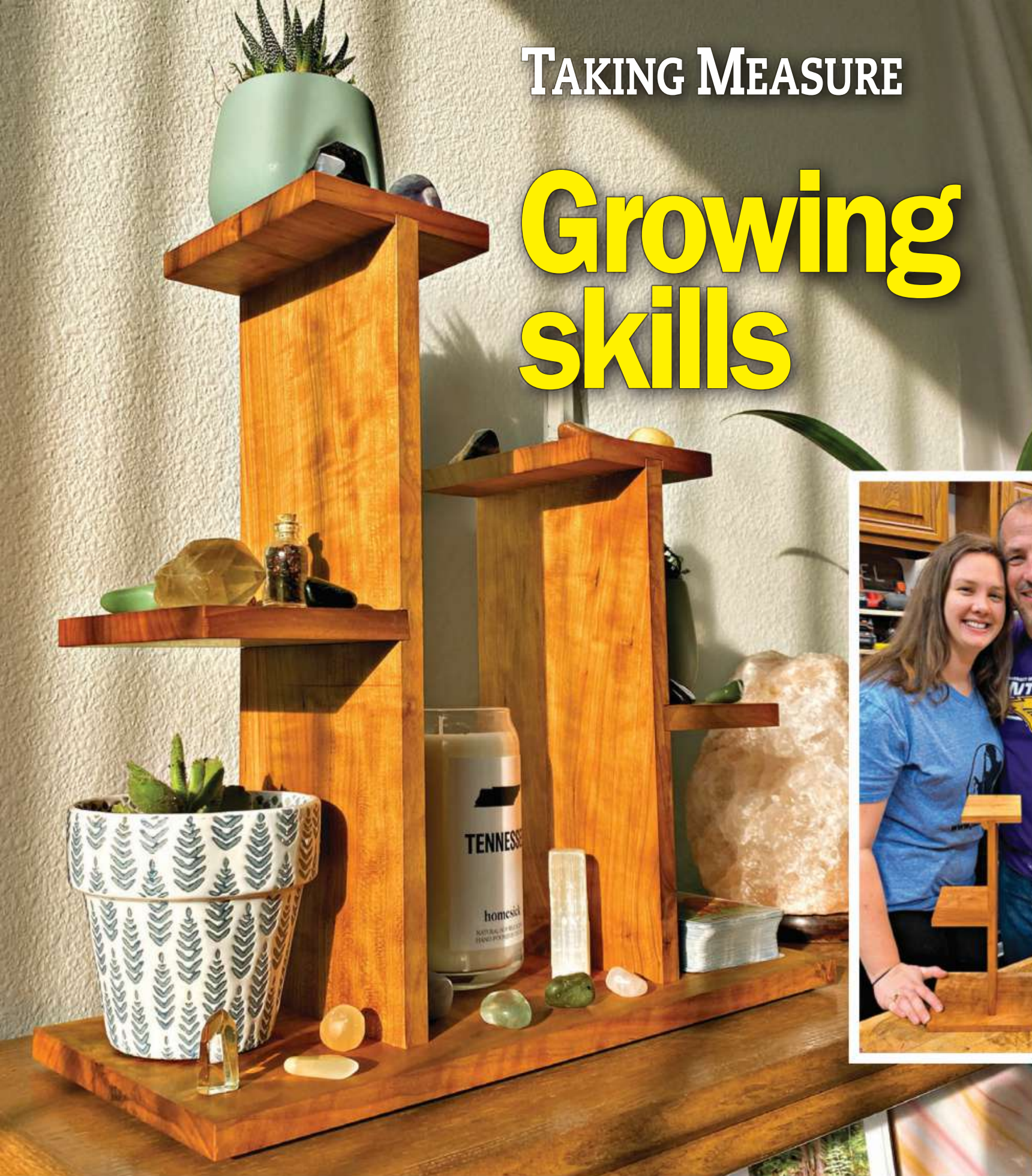
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Some products we sell can expose you to chemicals known to the State of California to cause cancer and/or birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov/product

TAKING MEASURE

Growing skills



Hey, do you have time for a quick weekend project? I want to make a small shelf for my succulents.” It’s the kind of text I love to get as a woodworker and parent, and it came from Katie one Thursday afternoon. “Sure,” I replied, “Come home and I’ll clear off the bench.”

Saturday morning, we headed into the shop armed with a few images of shelves that she’d seen online, the dimensions of her pots, and her eye for balance and proportion. (She’s a graphic designer by profession.) We started by sketching out some full-size designs on rosin paper to give us a better feel for the scale.

I explained options throughout the process, and she made all of the decisions, including how to handle a prominent streak of sapwood in the cherry board I found for the project. (She opted to bury it at the back rather than feature it at the front.) By Sunday afternoon, she was applying a hard-wax finish to the completed shelf, shown *above*.

That weekend reminded me how much fun it is to mentor an up-and-coming woodworker. Not only does the mentee experience the joy of learning while completing a project, but I always seem to learn a thing or two myself. Win-win.

This issue is chock-full of insightful, shop-proven plans and techniques for woodworkers of all skill levels. Newbies will love the Beginner’s Guide to Clamps on *page 62*; mentors will enjoy the challenge of the coved and tapered parts that make up the Pleated Table on *page 52*; and Dealing with Wood Movement on *page 28* is a must-read for *every* woodworker.

Let us carry some of your mentoring load by giving a free **WOOD®** magazine subscription to your favorite up-and-comers. To take advantage of this offer, simply renew your own subscription at woodmagazine.com/givetwo, and we’ll match it with a free one-year subscription for one or two folks you choose. Win-win.

Hang on... getting a text from my son, Colby. “Think you could help me with plans for a bed like this?”

“I’ll clear off the bench.”

See you in the shop!

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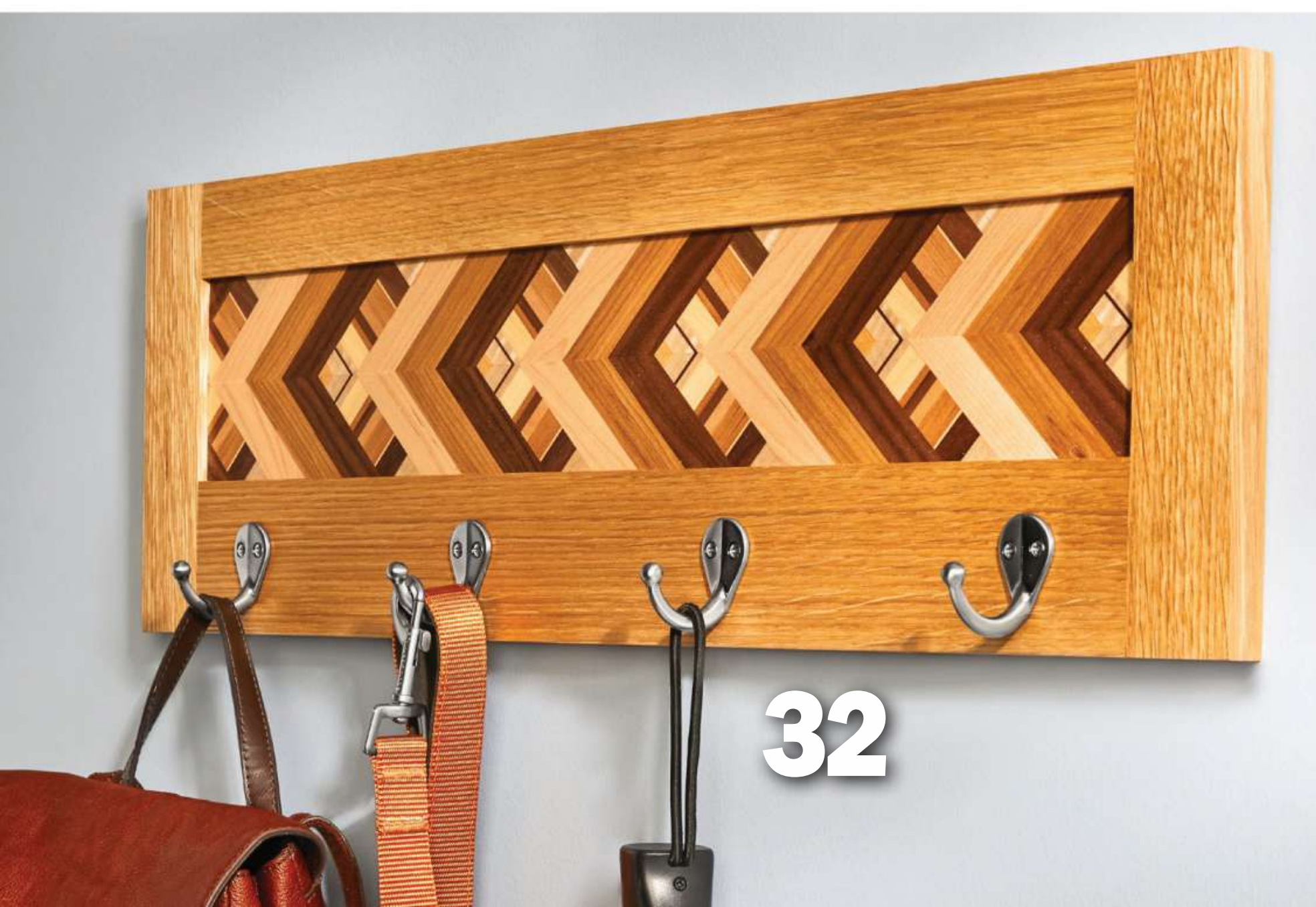
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58



28



32



40

Woodpeckers®

Precision Woodworking Squares

- One-piece central core machined to exacting tolerance.
- Stainless model includes scribing guides for perfect parallel layout.
- Lip formed by base keeps the square flat on your work.
- Scales engraved to a tolerance of $\pm .004$ " total stack-up error.
- Guaranteed accurate to $\pm .0085^\circ$ for life.
- Available in inch or metric graduations.



Precision Woodworking Square

Includes a Woodpeckers wall-mountable wooden case

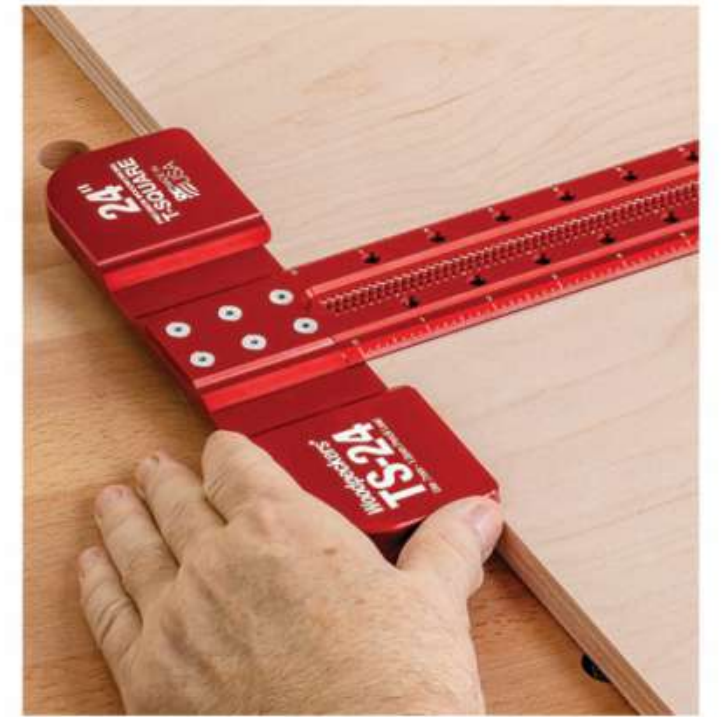
12" 1281....\$129.99

12" 1282SS Stainless Steel....\$139.99

Other Sizes Available on Woodpeck.com

Precision T-Squares

- Precisely spaced 1mm holes machined every 1/16".
- Laser engraved scale accurate to $\pm .004$ ".
- Outer edges machined to a 30° bevel for easy reading.
- 600mm metric version available.



Precision T-Square

Includes a wall-mountable Rack-It™

TS-12 12"....\$89.99

TS-24 24"....\$124.99

TS-32 32"....\$154.99

Paolini Pocket Rules

- Sliding stop simplifies repetitive marking.
- Stop doubles as stand to set router bit & saw blade height.
- Anodized aluminum or stainless steel blade with laser engraved scale accurate to $\pm .004$ ".
- Available individually or as a set.
- Available in inch, metric or combination.

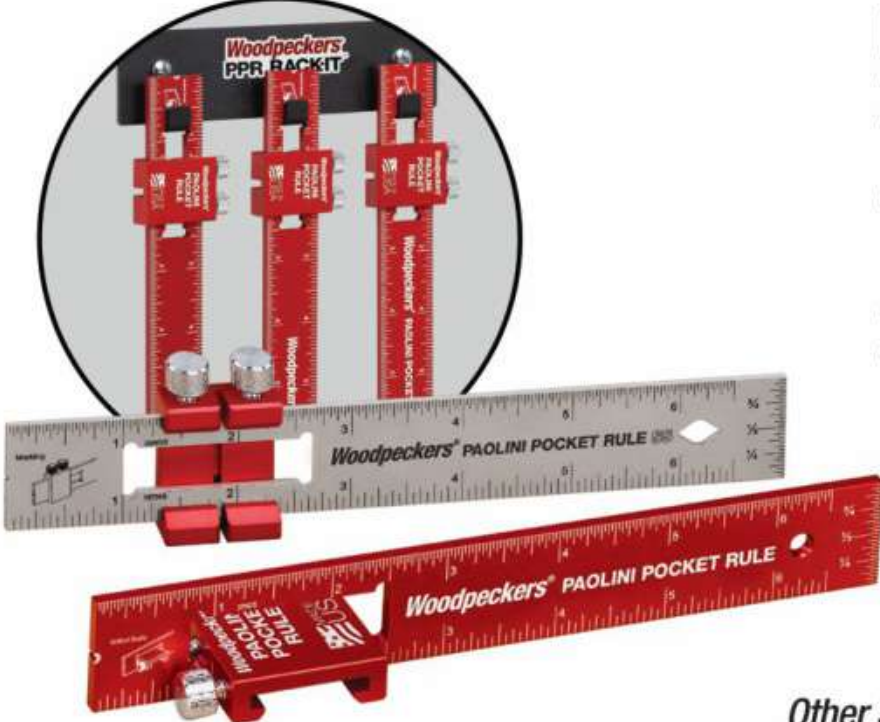
Paolini Pocket Rule

Includes a wall-mountable Rack-It™

6", 8", 12" Set....\$124.99

SS 6", 8", 12" Set....\$149.99

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Saddle T-Squares

- Scribing holes on 1/32" centers.
- Milled from solid aluminum billet.
- Mark face and edge at the same time.
- Edges beveled 30° to reduce parallax.
- Scale accurate to $\pm .004$ ".
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Includes a wall-mountable Rack-It™

Saddle T-Square Set....\$299.99

Includes a Systerainer case

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in-DEXABLE Combination & Double Squares

- Push-button index locks head at any full-inch.
- Laser-cut scribing guides for precision parallel lines.
- Retractable support keeps head aligned to your stock.
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- Plane sole is a perfect 90° to fit your stock.
- 3 radius profiles and 45° chamfer available.
- Hardened blades are easy to re-hone.
- Profile perfectly centered on your stock.

EZ Edge Corner Plane

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1/8", 3/16", 1/4" Radius
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Dust Port fits either end!



DP-PRO Drill Press Table System

- DP-PRO Fence integrates dust collection & delivers accuracy.
- Micro-adjustable DP-PRO Flip Stops.
- DP-PRO Drawer Base simplifies installation on any drill press.
- DP-PRO Tables are full 1" thick with laminate top & bottom.
- Extension Wings for long material support.
- Drawer Base and Fence compatible with all drill press tables.

NEW
TOOL

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36" Table, 24" Fence....\$399.99

36" Table, 36" Fence....\$419.99

48" Table, 36" Fence....\$449.99

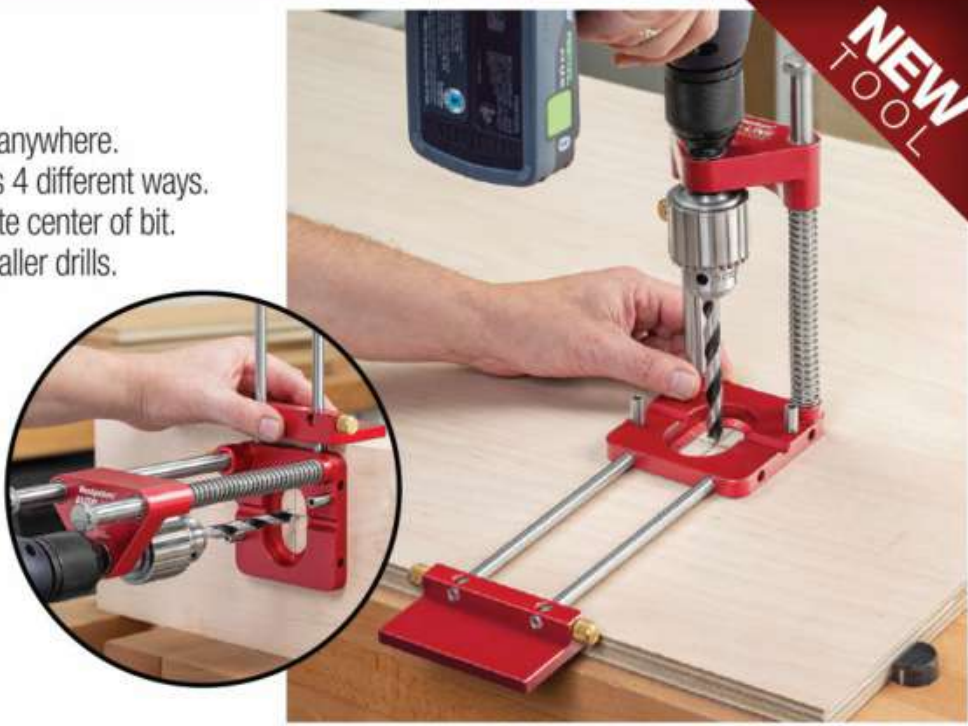
48" Table, 48" Fence....\$469.99

Drill Press & Hose not included.

AUTO-LINE DRILL GUIDE™

- Drill perfectly perpendicular holes anywhere.
- Fence fits on all 4 sides and works 4 different ways.
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- Works with nearly all 1/2" and smaller drills.
- 1" capacity inside frame and 2" capacity outboard.
- Optional extensions and stops available.

Auto-Line Drill Guide
Drill Guide....\$259.99
Deluxe Kit....\$369.99



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Made for Festool® Domino

- Attaches to both Festool Domino DF-500 & DF-700 XL.
- Wider, deeper referencing surface improves stability.
- Precision-milled spacers center mortise on standard dimensions.
- Outrigger carries stops for accurate repeat spacing.
- Available in inch or metric graduations.

Includes a Systainer case
Offset Base System....\$429.99



Domino not included.

Multi-Function Router Base

- Micrometer adjustment positions cutter perfectly.
- Cut parallel to existing edge or pivot in a perfect arc.
- Wide, stable base improves routing accuracy.
- Works with most routers that have guide rod holes.

Multi-Function Router Base
Includes 1 Pair Extension Rods
w/ 5/16" Guide Rods....\$239.99
w/ 3/8" Guide Rods....\$239.99
w/ 10mm & 1/4" Guide Rods....\$239.99



Router not included.

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Made for Festool® Track Saws

- Makes repetitive, parallel cuts with table saw accuracy.
- Maximum rip capacity of 52".
- Narrow stock guides deliver accurate results down to 1/4".

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Parallel Guide System....\$479.99



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- Bring your rip fence back to the same spot each and every time you need it.
- Stop drops out of the way when not needed, flips up when you want it.
- Couple two stops together for perfect fitting dados in two cuts.
- Models available for SawStop T-Glide Fences* and Powermatic Accu-Fences*.
- Extra stops and dado couplers available. Add as many as you need!

NEW
TOOL

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30" Capacity - Fits Powermatic*....\$219.99
52" Capacity - Fits SawStop*....\$219.99
50" Capacity - Fits Powermatic*....\$229.99

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- Offset base simplifies layout on standard 3/4" material.
- Perfect thirds for mortise and tenon layout.
- Perfect centers for dowel pins and loose tenons.
- Scribing Guides on eighth-inch centers.
- Machined steps in base create accurate set-up blocks.
- Angles in 1° increments plus 22-1/2° & 67-1/2°.

DelVe Square SS
Includes a wall-mountable Rack-It™
3-1/2"....\$99.99
6"....\$129.99
Inch Set....\$199.99



Woodworkers Edge Rules

- Wraps around the corner of your stock for instant alignment.
- Mark face and edge at the same time.
- Optional stops simplify repetitive marking.
- Easy to use in the middle of a panel, as well.
- Sizes to fit every need... 6-inch is perfect in your pocket.
- Available individually or as a set.
- Available in inch or metric graduations.

Woodworkers Edge Rule

Includes wall-mountable Rack-It™.
Edge Rule Kit & 4 Stops....\$109.99
Other Sizes Available on **Woodpeck.com**





Need a Chainsaw? Shop Smart

Check out our review of battery-powered chainsaws. Perfect for turners and better than a boomstick.
woodmagazine.com/batterychainsaws

WORLD WAR TREE

By the time you read this note, we are assuming that the skyrocketing prices of lumber have tipped already strained geopolitical relations into all-out global warfare. You may even be living in a post-apocalyptic wasteland devoid of big-box retailers. Fortunately, the postal system (most likely led by Kevin Costner) survived to deliver this magazine or you wouldn't be able to read these timely tips about harvesting, milling, and machining your own lumber that could save you money and/or ensure the very survival and furnishing of future society. Sorry that they're in the form of web links. The Internet was still working when we wrote this.



Off-grid Prepper

No electricity? No problem. We show you how to prep stock using hand tools.
woodmagazine.com/handprepstock

Bullet-riddled Lumber

Hiring a local sawyer for your urban lumber? A blade-breakage fee may be in your heavy-metal future.
woodmagazine.com/urbanlumber



Green, but not Soylent

Even in a dystopia, green wood will need time to dry. Here's how to do it, people.
woodmagazine.com/airdriedlumber



Stock Up on Square Stock

Got a jointer and planer? You may be the wealthiest person in the land as you machine your own low-dough lumber.
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NEW



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Natural Color
GLUE



Our MOST Durable Formula



Type I



Extended
Working Time



Our Most Durable
Wood Glue

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SOUNDING BOARD

YOUR VOICE



Yacht Rock builder floats design modifications

The Yacht Rock game in issue 272 (Dec/Jan 2020/2021) fascinated me, as an engineer, because of the physics of it, and the complexity of the various rockers and weighted “people.” As I built my version, shown above, I made some mods I thought you might be interested in.

First of all, the board size made it difficult to store with the rest of our games, so I designed a two-piece cherry board that fits into a box. And rather than use paint to identify the deck and cabin areas, I used my CNC router to inlay them with maple, padauk, and walnut. I also turned my own “people” from maple and walnut.

For the die, I wrapped a walnut core inside a thin maple shell, and CNC-drilled out the dot patterns, exposing the walnut. My son came up with a logo and laser-engraved it into the lid of the box, as well as the rules on the inside.



Please consider including more articles in WOOD® magazine that incorporate CNC woodworking. I think more and more woodworkers are investing in these great little tools, and I have been amazed how much I have been able to do with mine.

—Kevin Stokes
Jacksonville, Fla.

Tip stops top-tipping

I enjoyed your article “Mortising Perfect-fit Box Hinges” in issue 274. When I made a small jewelry box similar to the one in your article, though, I wanted the lid to stop in the vertical position rather than opening out flat at 180°. I know you can buy specialty hinges for this, but instead I chamfered to 45° the back edges of the box base and lid, as shown at left. Then, I installed the hinge with the barrel centered on the inner edge of the chamfer.

When the lid is opened, the chamfered edge of the lid rests on the chamfered edge of the box and prevents the lid from opening beyond the upright position. With this design, I find the box easier to use and it requires less space—very handy on a small dresser or dressing table.

—Kevin Goosman
Solihull, England



You won't be shocked by this

In issue 274 (“Make the Most of Your Garage Shop,” May 2021), you suggest plugging a cord reel into the unused receptacle in the garage-door-opener outlet. Practical advice, but possibly unsafe. If your garage is more than a few years old, it’s unlikely that outlet is protected by a ground-fault circuit interrupter (GFCI), which is designed to prevent accidental electrocution. And, in older garages, even the wall outlets may not be GFCI-protected.

The solution may be as simple as an in-line GFCI, like the one shown above, or replacing the existing receptacle with a GFCI model. I recommend checking with your jurisdiction’s electrical inspector or a licensed electrician to make sure your shop wiring is safe and up to code.

—Bill Fowler
Woodstock, Md.

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SOUNDING BOARD

YOUR PROJECTS

Jim Burton, of Sherwood, Ore., converted the now-grown kids' former playroom into a library, complete with built-in bookcases and a window seat, plus matching chairs and a coffee table. Jim used quartersawn white oak throughout.



Woodcarvers **Bill Snyder** and **Al Hyman** of Lake Placid, Fla., carved this full-size basswood replica of a WWII-era diving helmet. The piece was presented to a Navy diver by his wife upon his retirement.



Albert Craig, of Corvallis, Ore., made this nightstand—designed to be built in one evening because of its groups of identical parts—in his community-college woodworking class. The Catholic-priest teacher calls the project “A One Night Stand.”

To disguise a “rather large” printer in their home office, **Stan Cook**, of Washington, Ill., and his son, Jason, designed and built this walnut printer stand with a midcentury vibe.



SOUNDING BOARD

YOUR PROJECTS



Charlie Holdren, of Miamisburg, Ohio, designed and built this jewelry chest from cherry, maple, and walnut. Besides the four drawers and walnut wings, the project features two hidden compartments.



You won't find a lick of veneer in this sunburst table crafted by **David Janowitz**, of Houston. The tabletop, made of 32 pieces of osage orange and water oak, rests on a mesquite frame and legs.

Joe Oates, of Little Rock, Ark., double-sized the plans for the Swingin' Quilt Display in issue 266 (March 2020) to save one fold when displaying the beautiful quilts made by his wife, Joyce.



Inspired by an article in issue 272 (Dec/Jan 2020/2021), **Vern Graham**, of Carlisle, Pa., decided to try his hand at a bandsaw box. He got a little carried away and crafted this series of nesting hinged boxes.

Send us a photo of your work

Want to see your work showcased in WOOD® magazine? Send a high-resolution digital photo of your completed project to woodmail@woodmagazine.com.

Underground Escape



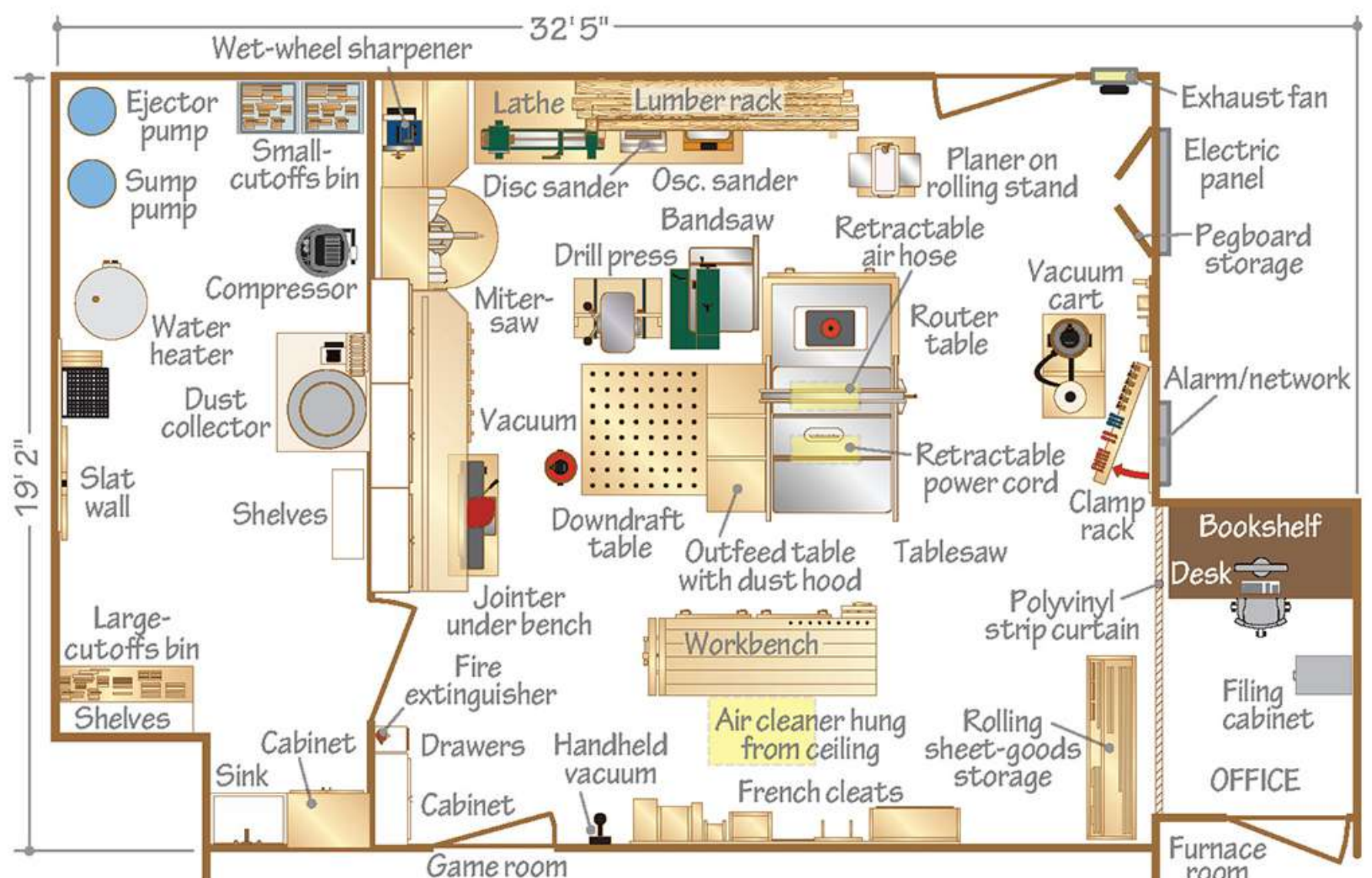
A benchtop jointer and reclaimed drawers tuck under a sturdy workbench that also functions as an extension wing for the miter saw station.



This shop-built router table (left) serves as an extension wing for the tablesaw. It incorporates pull-out trays for bit storage and drawers for accessories. Allan added a sheet-metal shroud that surrounds the router to funnel debris to the dust port.

Building a home from scratch gave Allan Kirson a clean sheet for designing his basement shop to reduce noise and contain dust. For example, he made sure the ceiling and walls, including interior walls, were well-insulated with fiberglass batts to reduce noise transmission. To keep dust from spreading throughout the house, he installed an exhaust fan that vents outdoors and had the HVAC system installed with only supply ducts routed into the shop space—no return ducts. He also sealed the doorway to an adjacent game room with weatherstripping to mitigate dust migration.

A separate room houses the dust collector, utility sink and air compressor, as well as providing overflow storage. Allan had trenches built under the shop floor to route dust-collection ductwork to the tools and a

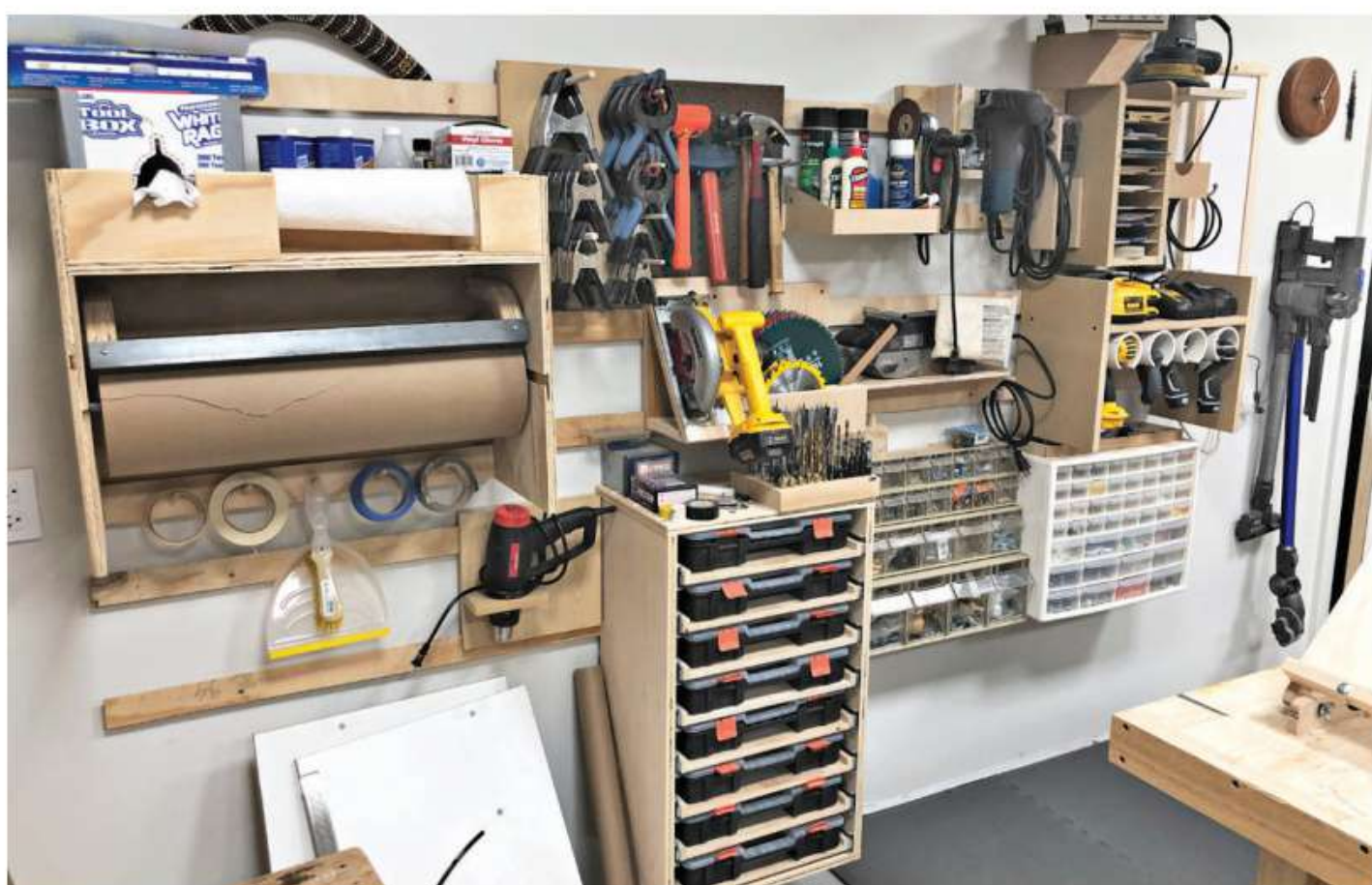


SOUNDING BOARD

YOUR SHOP



A traditional workbench with drawers stands near the tablesaw and downdraft sanding table. Allan enclosed the base of the tablesaw for improved dust collection.



Allan incorporated French-cleat storage throughout the shop. Rails mounted to the wall make it easy to hang and rearrange custom racks and cabinets.

220-volt circuit to the tablesaw. This eliminated the tripping hazards from hoses and cords running across the floor.

Allan finished off the shop walls with 5/8" drywall for fireproofing and additional soundproofing. The exterior door leads to outdoor stairs, providing a way to bring supplies in without traipsing through the house.

With a fresh start in his new shop, Allan also gave consideration to organization, workflow, and dust collection. You'll find drawers under benches, a French-cleat wall system for customizable storage, and pull-out pegboard racks for tablesaw accessories. Hinged pegboard panels hide the electric and alarm panels. Under a bench, Allan built a sliding shelf with heavy-duty drawer slides for his small jointer.

LED fixtures provide plenty of light, while reels for cords and hoses keep power and air readily accessible. An overhead air filter traps fine dust particles.

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YOUR SHOP



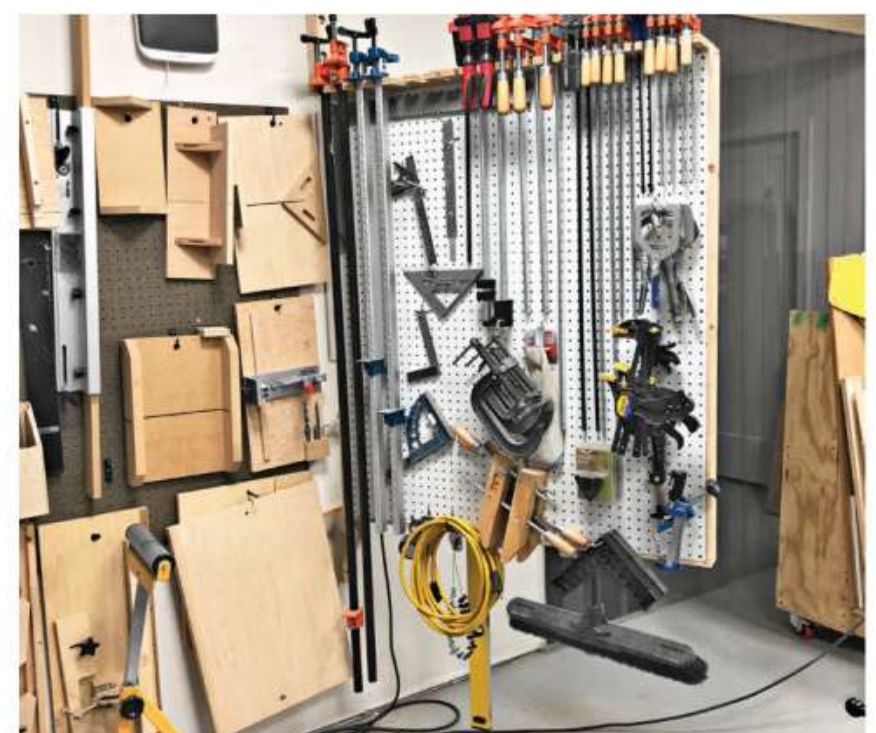
Allan's wet-wheel sharpening station slides on a shelf that tucks it behind the mitersaw fence when not in use.



Tablesaw accessories store on this sliding pegboard panel attached to the back of the router table.



Dividers and racks in the drawers of this custom bench keep lathe tools and accessories easily accessible.



To hide electric and alarm panels, Allan built swinging pegboard racks. This one incorporates clamp storage.

Allan built many of his shop accessories, including a dust shroud for his tablesaw, a downdraft sanding table, a mitersaw station along one wall, and a router table with plenty of storage for bits and accessories.

One corner of the shop serves as an office. A polyvinyl strip curtain, similar to those found in warehouses, helps keep dust from the shop at bay.

Allan enjoys his time in the shop building furniture for his kids and grandkids, toys, and gifts for friends. "Never a master craftsman and not too fussy, I just enjoy making stuff," he quips. 🌲



► To shop for strip curtains, point your smartphone's camera here or visit woodmagazine.com/stripcurtain



Allan Kirson started woodworking at eight years old. Born in South Africa, he lived and worked in Israel and Canada before moving to the Chicago area. When he's not in his shop, he might be found working on his antique cars.

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A composite image for a Woodcraft advertisement. On the left, a close-up of a hand holding a blue and white electric guitar. On the right, a woman wearing glasses is working on a piece of wood using a hand plane in a workshop setting.

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Q Pressure-treated lumber: to finish or not to finish?

I'm building some outdoor projects out of pressure-treated lumber and am wondering what finish, if any, I should use?

—Peter Vrooman, Canton, N.Y.

A Peter, pressure-treated lumber (often Southern yellow pine) is infused with a chemical solution that makes it less susceptible to insect infestation and rot. This solution initially gives the wood its distinct green or brown cast, which weathers to gray after a few years of exposure to the sun and elements.

Although you often see pressure-treated lumber left as-is, no rule says you *can't* finish it. But keep a couple of things in mind if you choose to go that route.

Upon emerging from the pressure-treating process, the wood contains a lot of moisture that may interfere with stains or finishes. To determine if the lumber is dry enough for finishing, sprinkle some water on the surface. If the wood readily absorbs the water, it's dry enough to proceed. But if the water just sits on the surface, let it dry for a few days (or weeks) and check it again.

As with any outdoor project, choose an outdoor finish with UV (ultraviolet) protection that also applies easily, because you'll need to refresh it periodically. Most film-forming finishes, such as polyurethane and

paint, crack and peel as the wood moves during the seasons, making them poor choices. Penetrating-oil finishes, on the other hand, soak into the wood, creating a flexible barrier to water and preventing the wood from drying out and cracking. But more important, many penetrating oils combine pigments with the finish, adding UV protection and allowing you to transform the green or brown hue common in pressure-treated lumber into something more attractive.

To apply a penetrating-oil finish, clean the wood first with a deck-cleaning solution and allow the wood to dry. First, test the finish on an inconspicuous area to see how the color looks on the treated lumber. Then roll, brush, or spray the finish. If rolling or brushing, maintain a wet edge to avoid lap marks in the color. If spraying, have a helper follow behind to back-brush the finish, ensuring complete coverage. Usually, two coats are sufficient. Reapply the finish every two or three years to maintain protection.

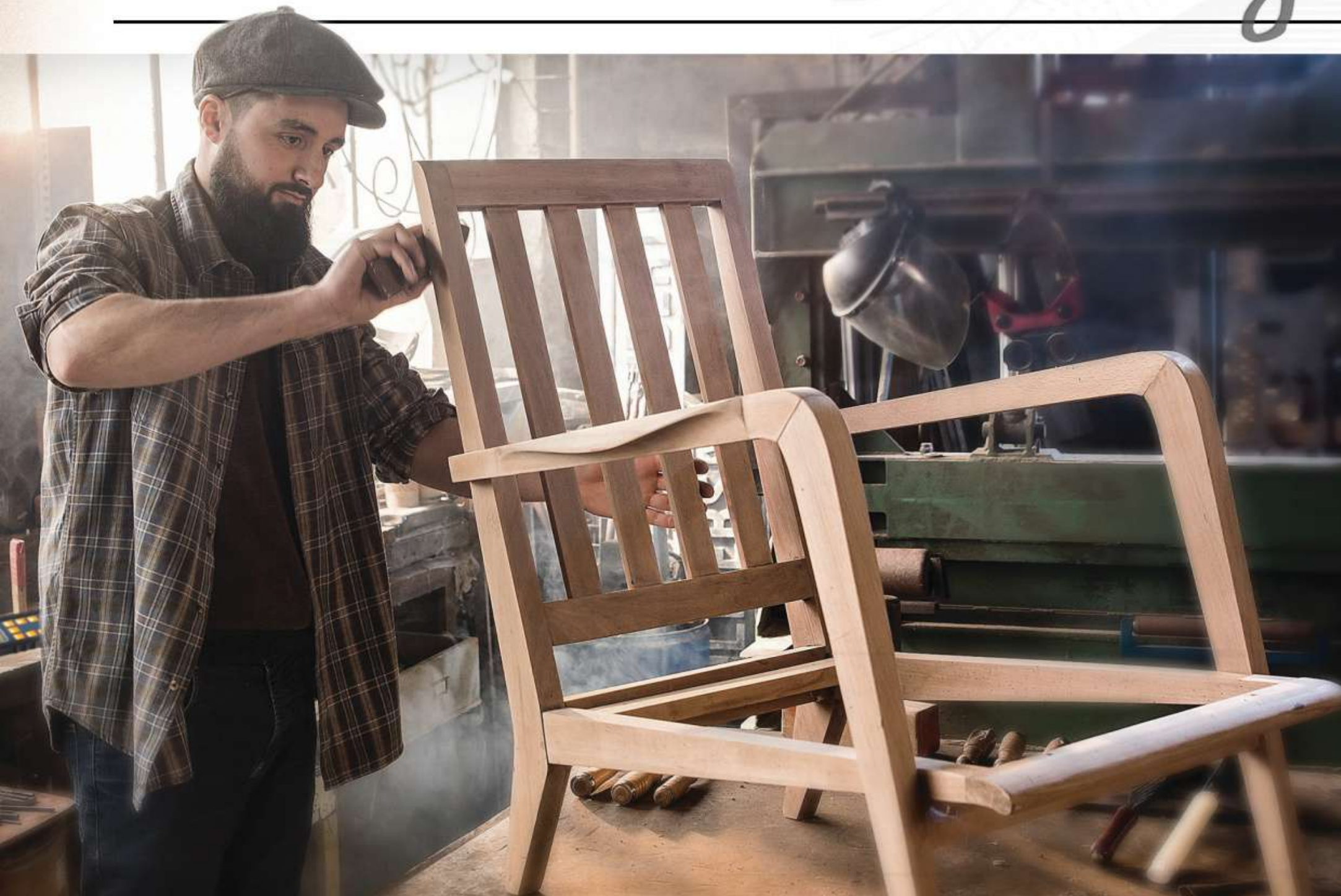
Deciding whether to finish pressure-treated lumber really comes down to the project and your personal preference, Peter. For structures such as fences or railings, skip the finish and let nature take its course. But to preserve decks or outdoor furniture, applying a pigmented penetrating-oil finish proves worth the time invested. 🌲

► The Forest Products Laboratory recommends pigmented penetrating-oil finishes, such as Total Wood Preservative, for outdoor projects. usetwp.com

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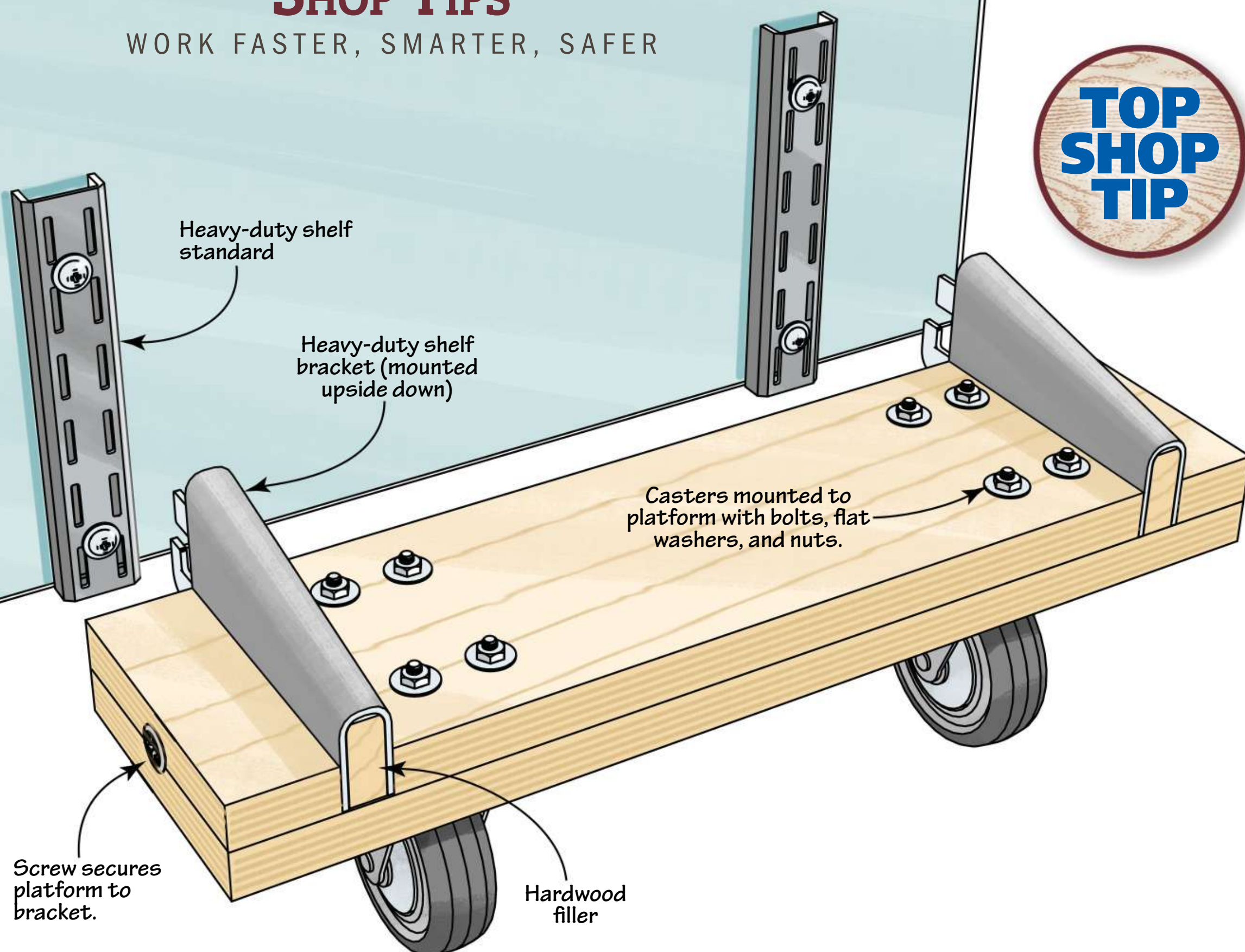
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SHOP TIPS

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**TOP
SHOP
TIP**



Clip-on casters carry the cabinet

When I built an outfeed cabinet for my tablesaw, I wanted it rock-solid, yet mobile, and the same height as the saw. This caster system installs and removes easily, so the cabinet rests solidly on the floor at the correct height.

By installing heavy-duty shelf standards and upside-down brackets, I created a “shelf” that becomes a platform for attaching casters to the underside. I used a pair of 3" swivel casters on one platform and fixed casters on the other.

For the platforms, glue up two layers of $\frac{3}{4}$ " stock (you can also use $1\frac{1}{2}$ " stock). I made

them $5\frac{1}{2}$ " wide to provide clearance for the swivel casters. Cut a $\frac{3}{4}$ "-deep dado near each end to fit each shelf bracket. Trim the brackets to match the width of the platform. To make the brackets more rigid, cut hardwood fillers to fit inside.

Drill into the end of the platform and through the bracket before installing a screw to hold the bracket in place. Mount the casters to each platform and install the wall standards on the cabinet.

To install and remove the casters, use a crowbar to raise one side of the cabinet while slipping the brackets into the slots in the standards.

—Michael Behrmann, Lampe, Mo.

Tips earn up to \$150.

If your tip is the best of the issue, it wins **Top Shop Tip** honors, and you receive a **tool prize** worth at least **\$300**.

Send your tip, photos or drawings, and contact info to shoptips@woodmagazine.com

Because we try to publish original tips, please send yours only to **WOOD**® magazine.



For sending this issue's *Top Shop Tip*, Mike receives an Orion model 950 smart pinless wood moisture meter from Wagner Meters, worth \$480.



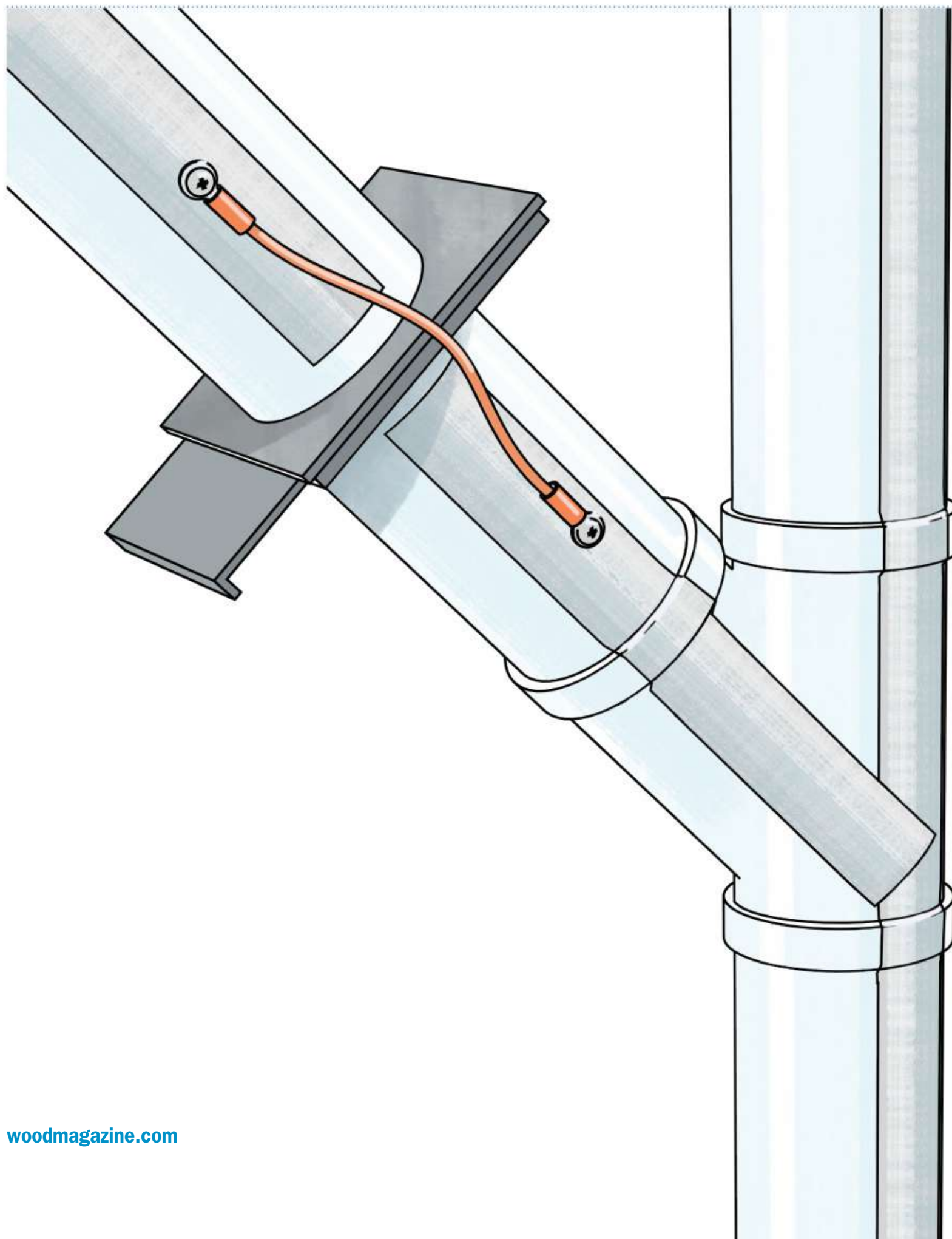
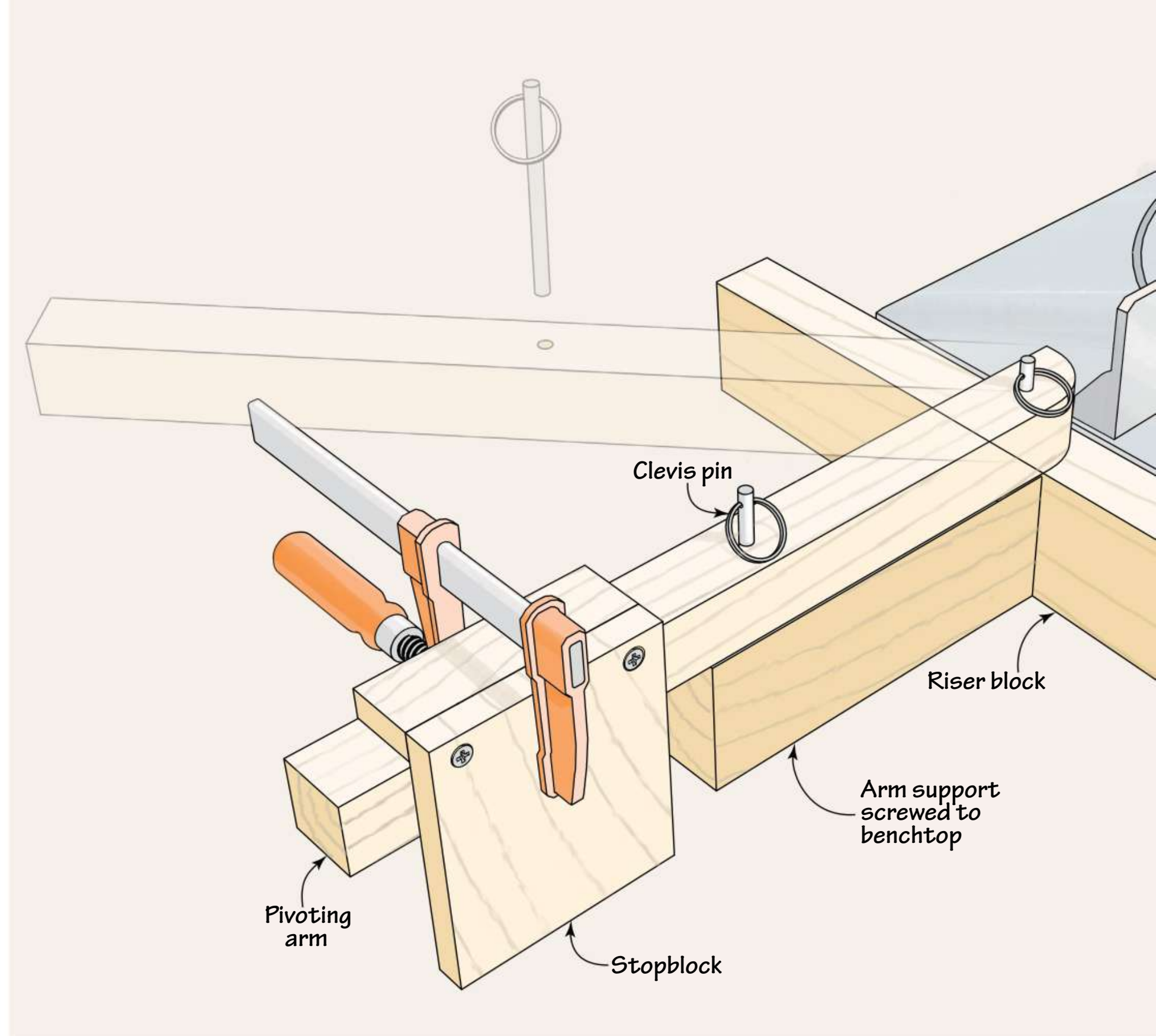
SHOP TIPS

Swing-away solution for repeatable mitersaw cuts

For the small projects I build, this swinging fence system for my mitersaw makes repeatable cuts easy. The pivoting arm swings out of the way or can be removed and stored when it's not needed.

Start by installing a riser block and arm support on one side of the saw that rests flush with the height of the saw table. Fasten these to the benchtop, aligning the arm support with the mitersaw fence. This support prevents the pivoting arm from sagging and provides an anchor point for fixing the arm in position. Make the pivoting arm as long as you need, then drill holes through the arm and into the riser block and fence support to accept clevis pins. The end nearest the saw serves as the arm's pivot point. A simple stopblock clamped to the arm sets the length of the cut.

—Rich Paeth, Huntley, Ill.



Sticky solution for static shock

Using PVC pipe for a dust-collection system can create static buildup. Grounding the PVC eliminates the problem, but running ground wire inside the pipe is a pain, especially if you've glued the joints together. Grounding on the outside works just as well, so I came up with an inexpensive, easy method using aluminum tape available from home centers.

Apply a continuous ribbon of this paper-backed adhesive tape along the length of each run of ductwork. To ensure a continuous connection throughout the length of the ductwork, span any branch PVC fittings, such as blast gates, with stranded automotive wire, each end secured with a sheet-metal screw.

—Craig Walker, Hilham, Tenn.

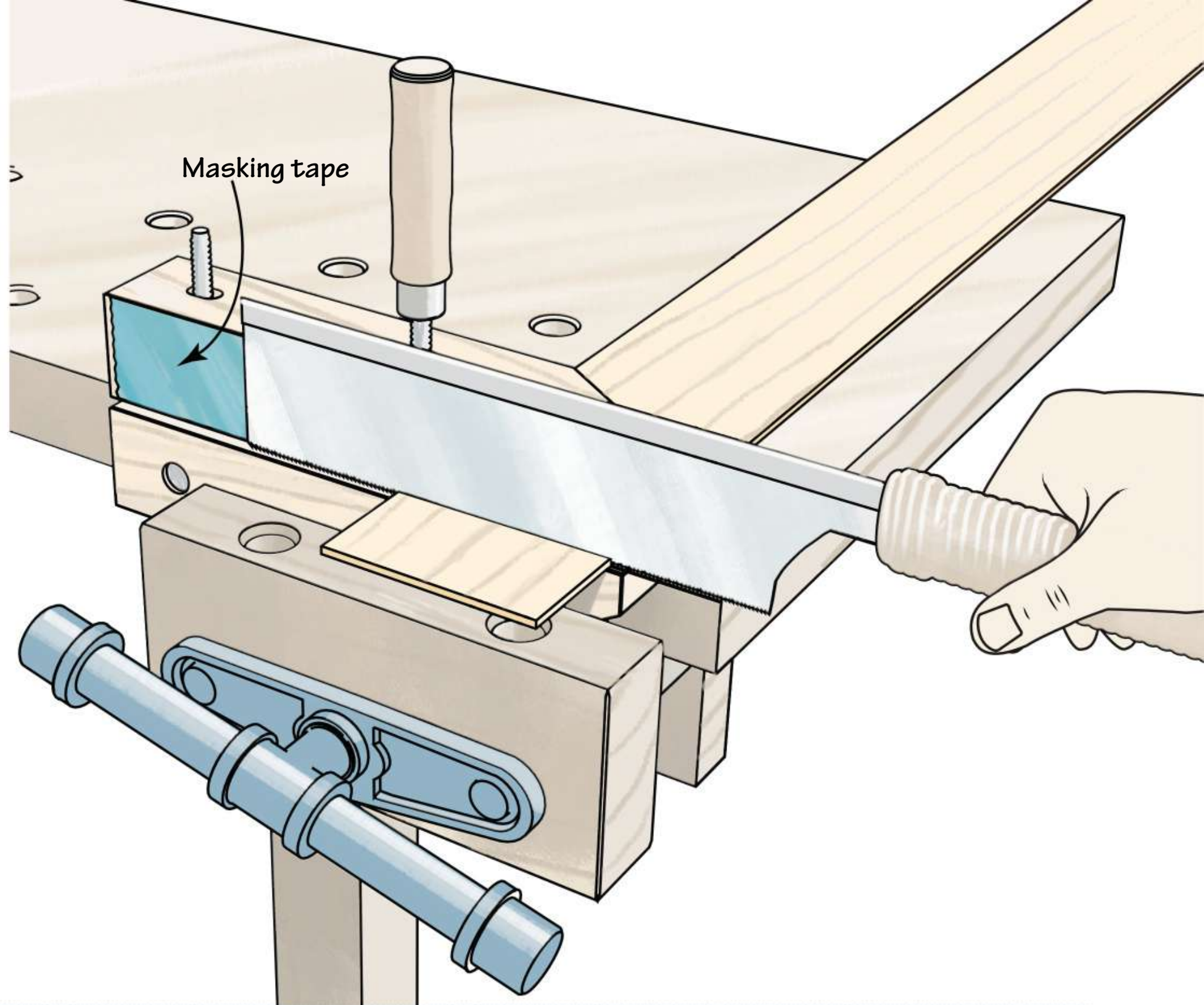
SHOP TIPS

Always-ready saw guide

I needed to cut a small piece of bendable plywood to final length for my project, but the piece was too unwieldy and fragile to cut safely with power tools. I pulled into service a traditional woodworker's tool—a handscrew—to act as a guide for my handsaw.

Line one side of the handscrew with masking tape to keep the saw teeth from damaging the clamp. Clamp the handscrew to the workpiece while holding the saw against it to align the saw on the cut line. Then clamp the handscrew in your vise to make the cut, guiding the saw flat against the jaw. This technique works so well I've started using it on other projects that require small workpieces.

—Lucas Peters, WOOD® magazine

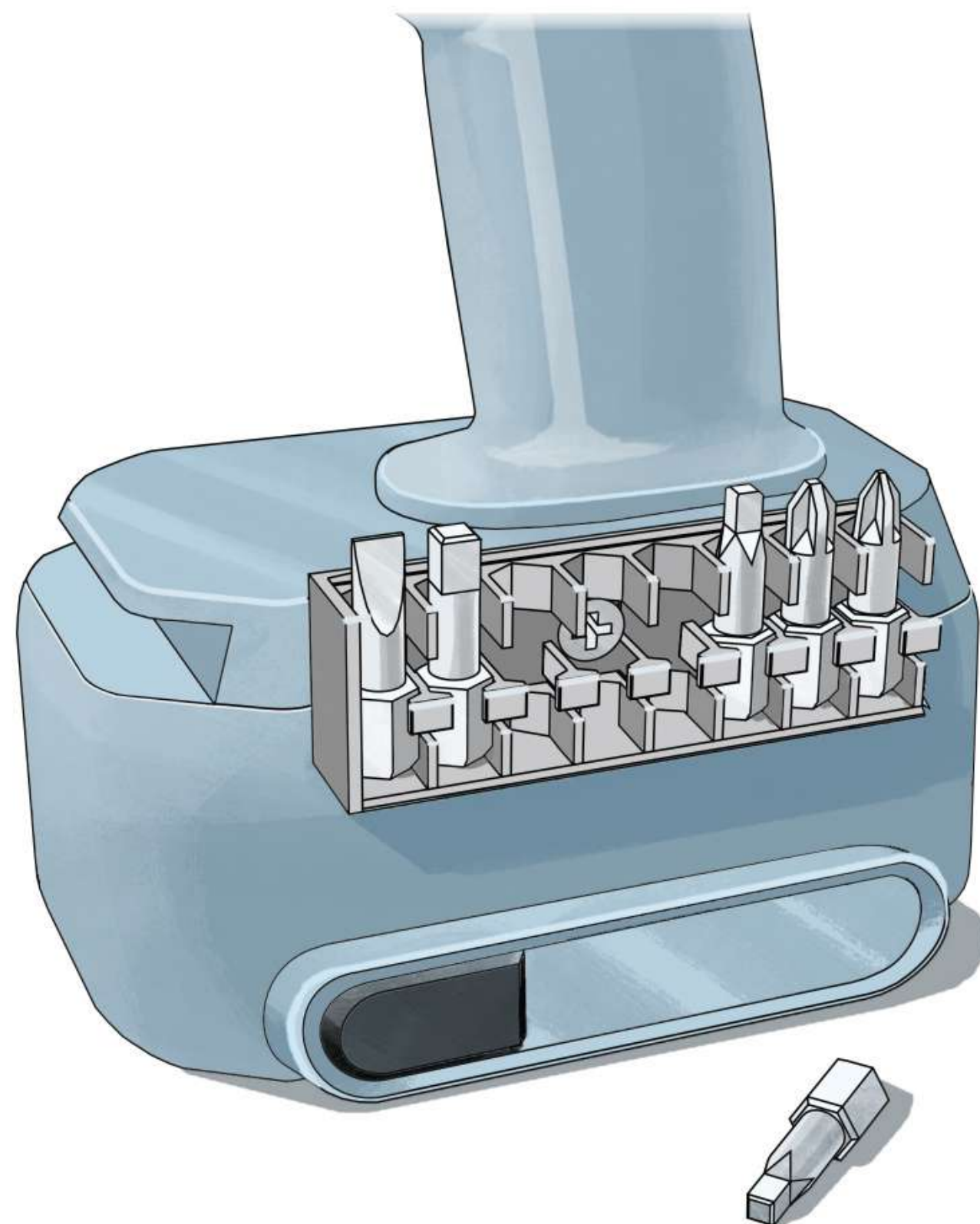
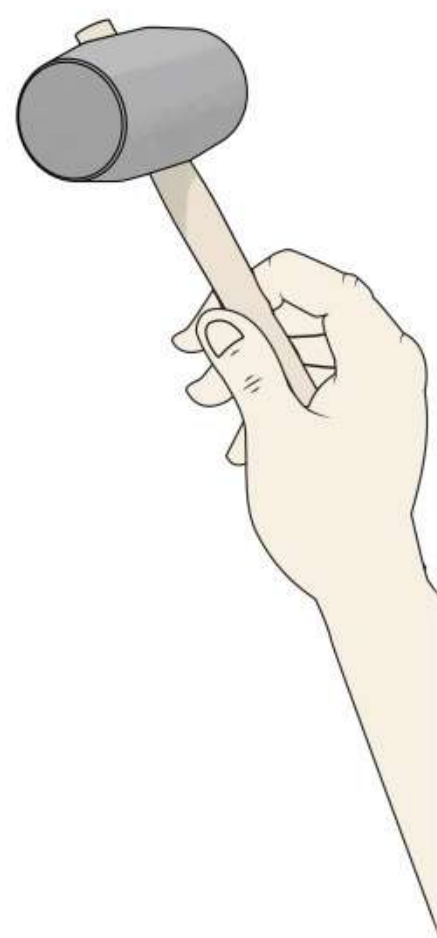
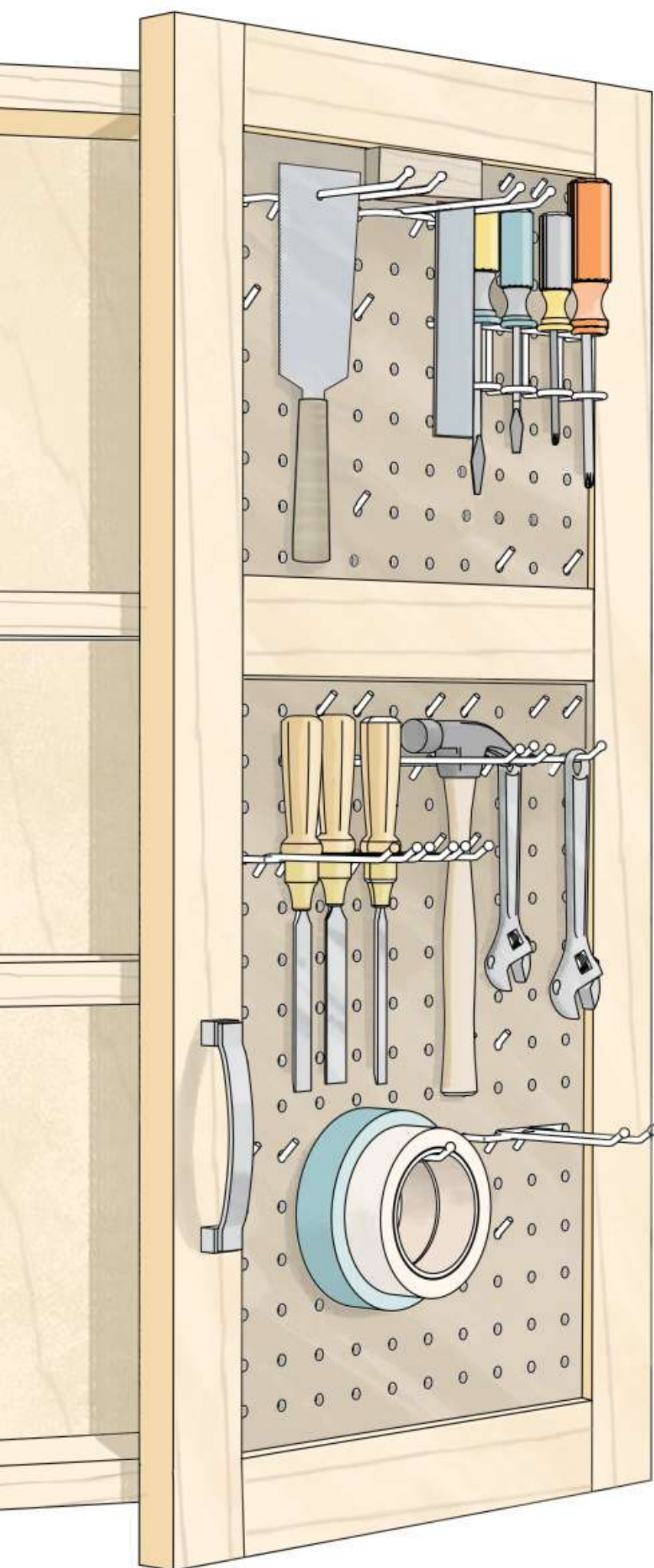


Redefining the term “hanging doors”

Several years ago I made shop cabinets with pegboard panels so the doors do double duty. I hang tools on both sides of the pegboard to really maximize storage space.

I made the door frames using stub-tenon-and-groove joinery, with the grooves and tenons the same thickness as the pegboard. Choose hinges that hold up to the weight of the items hung on the pegboard.

—Roger Mickelson, Mesa, Ariz.

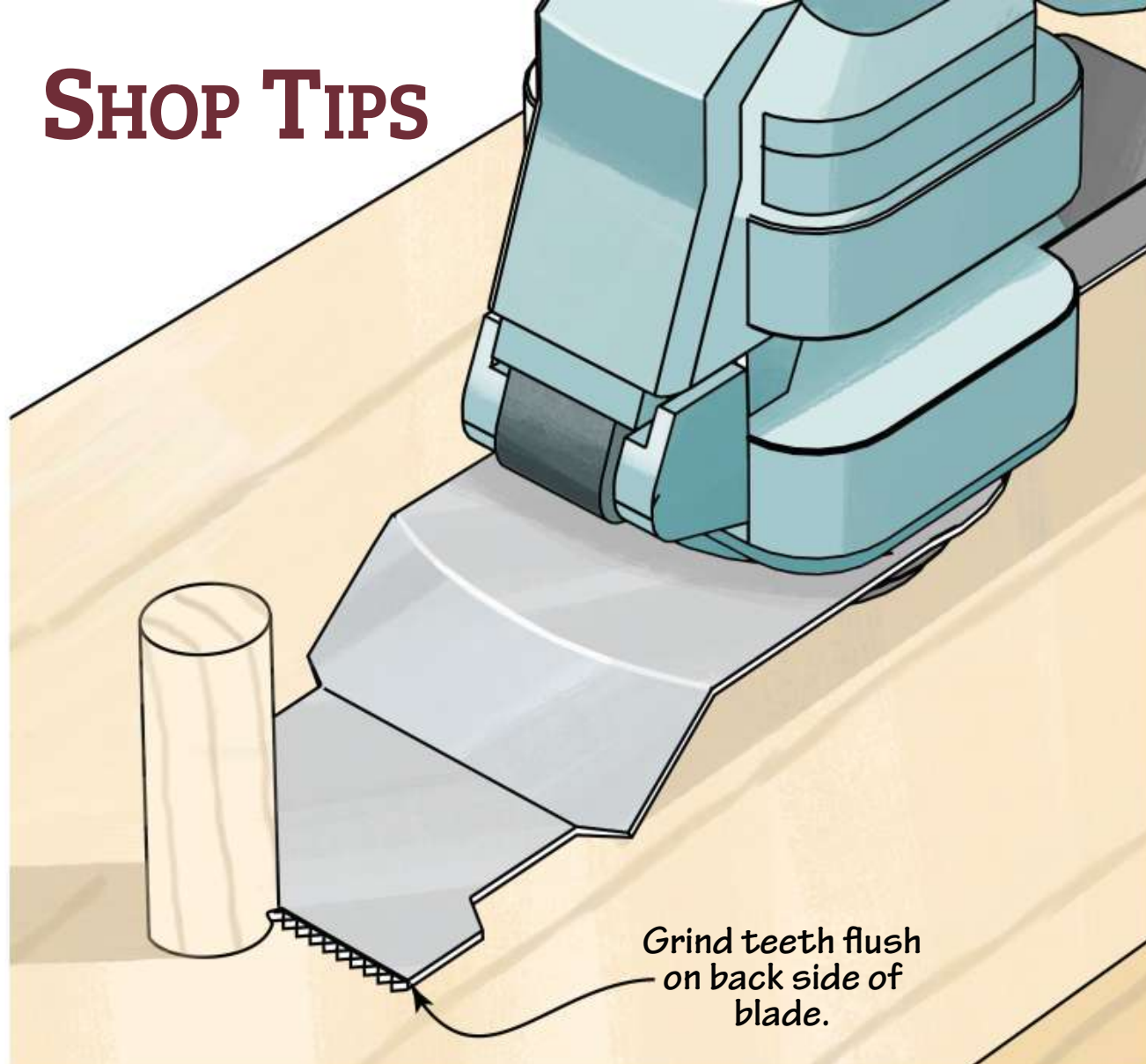


Onboard bit storage for easy access

To keep a selection of bits at hand when using my drill driver, I replaced its belt clip with a plastic bit holder that came with a set of bits. After drilling a hole in the bit holder, I used a machine screw to fasten it to the driver, using the hole intended for the belt clip.

—Kellan Aldous, Bend, Ore.

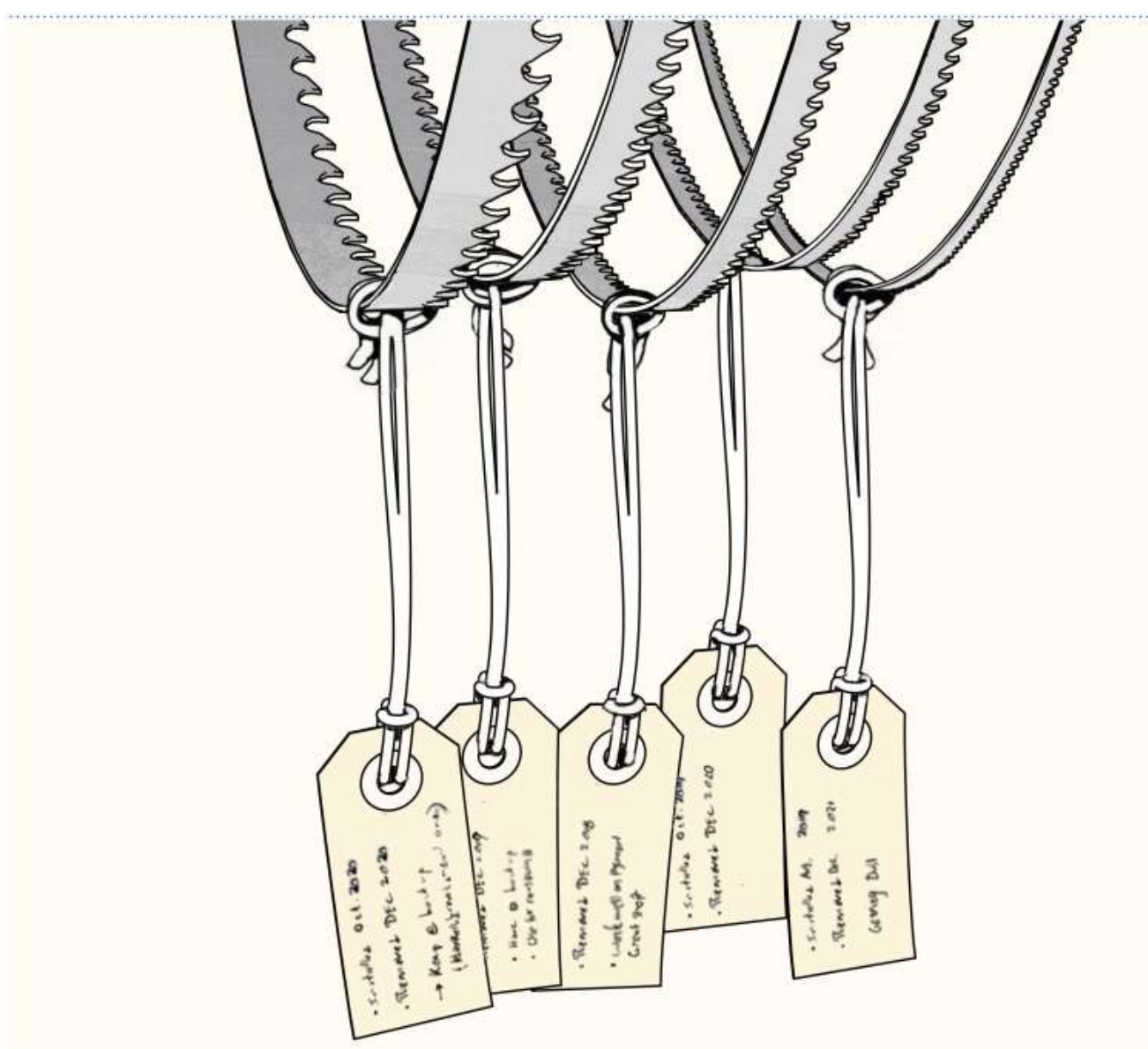
SHOP TIPS



Grind your teeth for no-stress flush cuts

While remodeling my front porch, I needed to flush-trim about 150 dowel plugs in screw holes without marring the surrounding surface. Using my bench grinder, I ground the back of my oscillating multi-tool's offset blade to remove any set in the saw teeth. I flush-trimmed all of the plugs quickly without damaging the boards.

—John Spain, Marvin, N.C.



Bag tags bring bandsaw blade benefits

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I use luggage tags with strings to help me organize my bandsaw blades. On each tag I record blade information such as pitch, width, manufacturer or source, and so on.

When installing a blade, I hang the tag on the bandsaw's upper door handle so I know which blade is on the saw and when it was installed. Plus, the tags work better than tape, which can leave a residue. 🌲

—Paul Baker, San Francisco, Calif.

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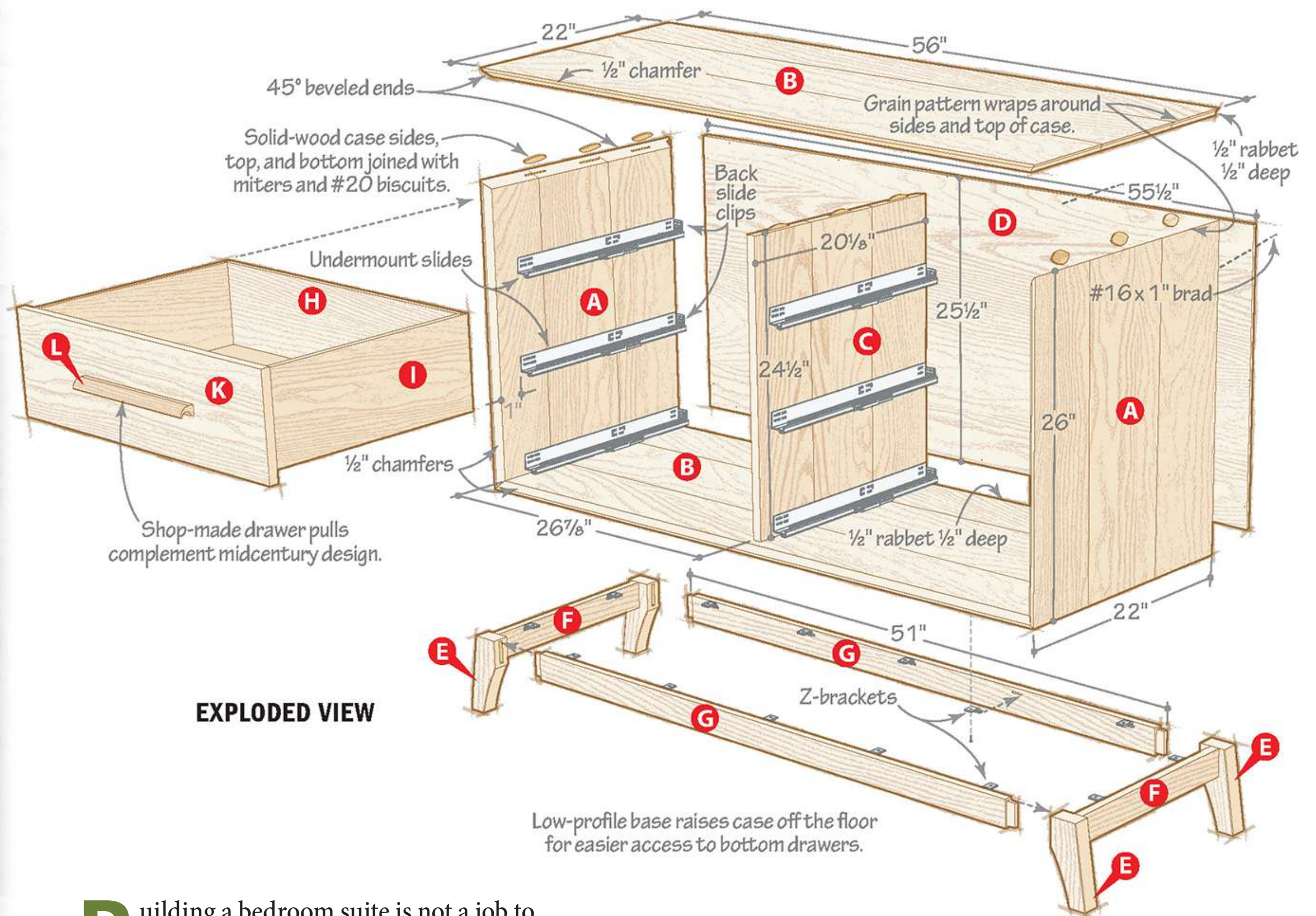
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Note: This matching
three-piece bedroom suite
works beautifully in a
main or guest bedroom.
Find plans for the head-
board and nightstand
in the next issue (277,
October 2021).





Building a bedroom suite is not a job to take lying down. Breaking up the task into components makes it more manageable. Start with this six-drawer dresser. Once completed, you'll have the skills needed to take on the matching headboard and nightstand in the next issue.

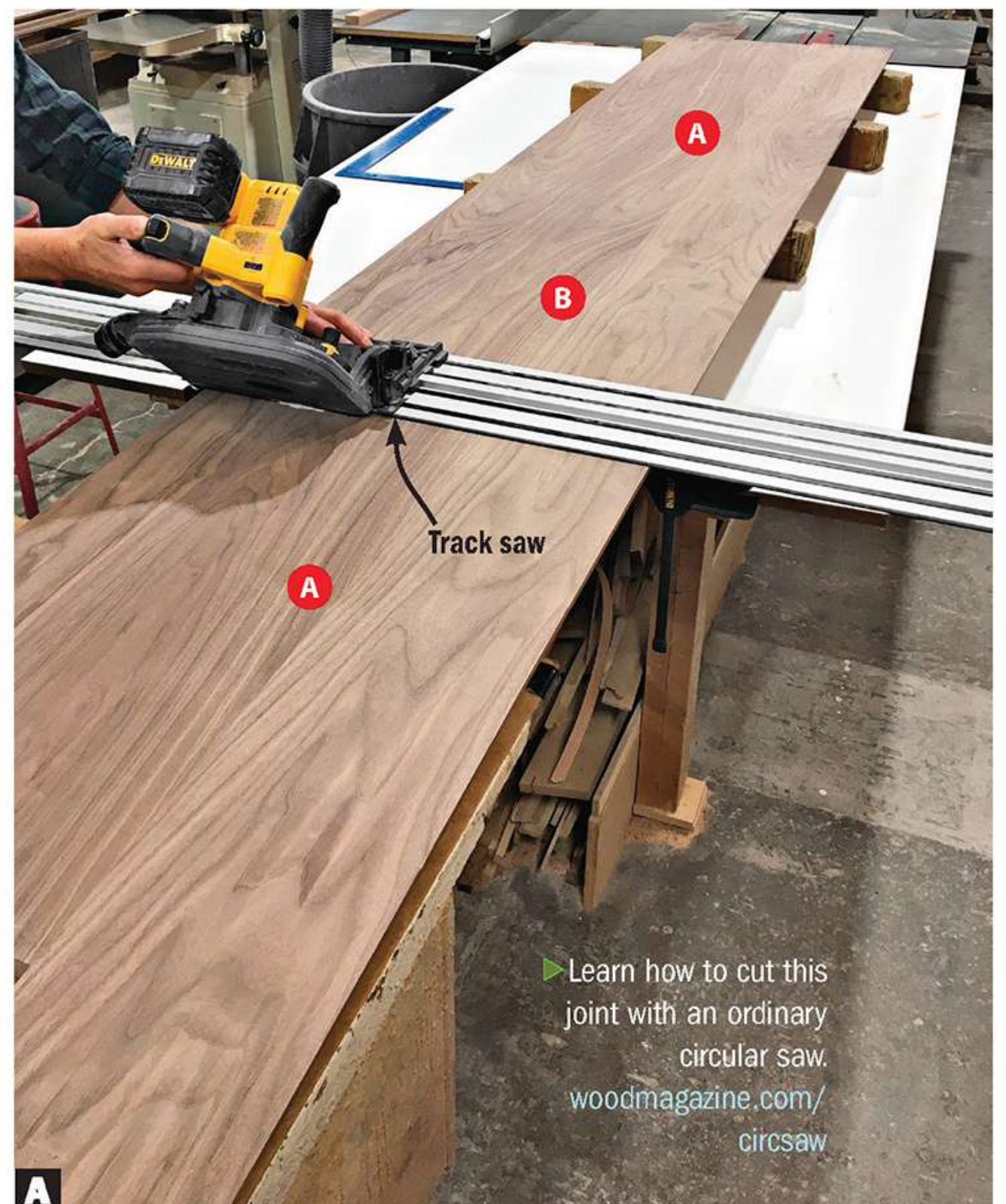
Continuous grain wraps the case like a waterfall

1 From $\frac{3}{4}$ " stock, glue up a 22×112" panel for the sides (A) and top (B) [Exploded View]. Glue up two additional oversize panels for the bottom (B) and the divider (C) [Materials List, Exploded View].

2 Lay out the sides and top on the long panel, with the top in the center. Bevel-cut parts in the following order: the ends of the top to length [Photo A, Exploded View]; the mating ends of the sides, as close to the end as possible; and then the opposite ends of the sides to length. Bevel-cut the bottom panel (B) to match the length of the top panel.

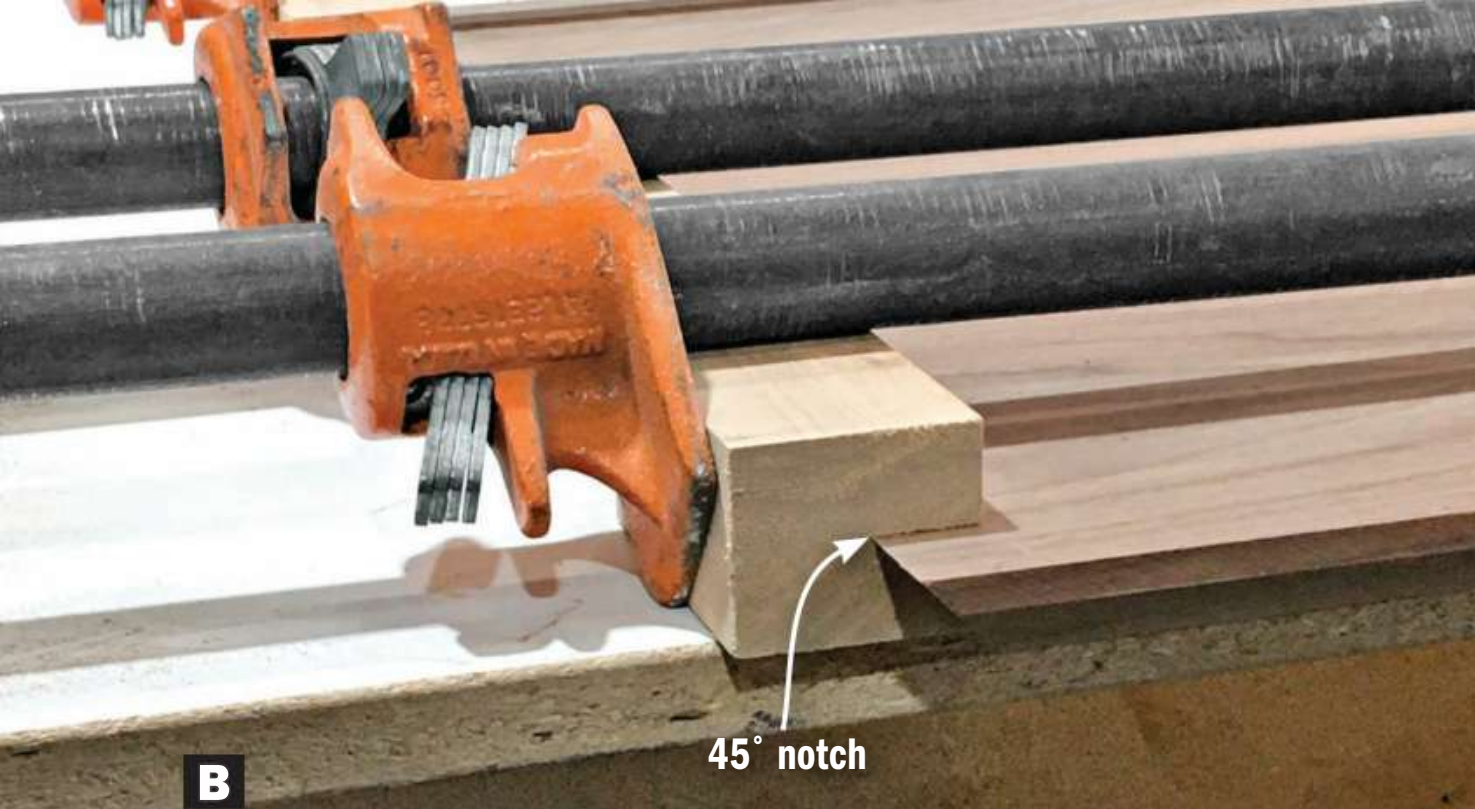
3 Cut biscuit slots in the bevels [Exploded View]. Rabbet the back edges of the panels (A, B), and chamfer the front edges. Finish-sand the inside faces of the panels.

Tip! Label the mating ends of the top and sides to avoid confusion during assembly.



A Cut the top (B) from the middle of the panel so the grain wraps continuously around the sides and top of the case.

► Learn how to cut this joint with an ordinary circular saw.
woodmagazine.com/circsaw



B Shop-made, notched clamping blocks fit snug against the bevels and prevent them from damage during glue-up.

4 Make a set of clamping blocks [Photo B]. Then, using biscuits to align the pieces, glue the top to one of the sides and the bottom to the other side, creating two L-shape assemblies [Photo C].

5 Dry-assemble the two halves of the case and measure the opening height to determine the length of the divider (C). Cut the divider to size and form biscuit slots on the ends and at the center of the top and bottom panels (B). Finish-sand the divider.

6 Glue up the two halves of the case, sandwiching the divider (C) in between, aligning the rear edge with the rabbets in the top and bottom panels (B) [Photo D]. From 1/2" plywood, cut the back (D) to fit in the rabbeted opening and set it aside.

Add a base on the down-low

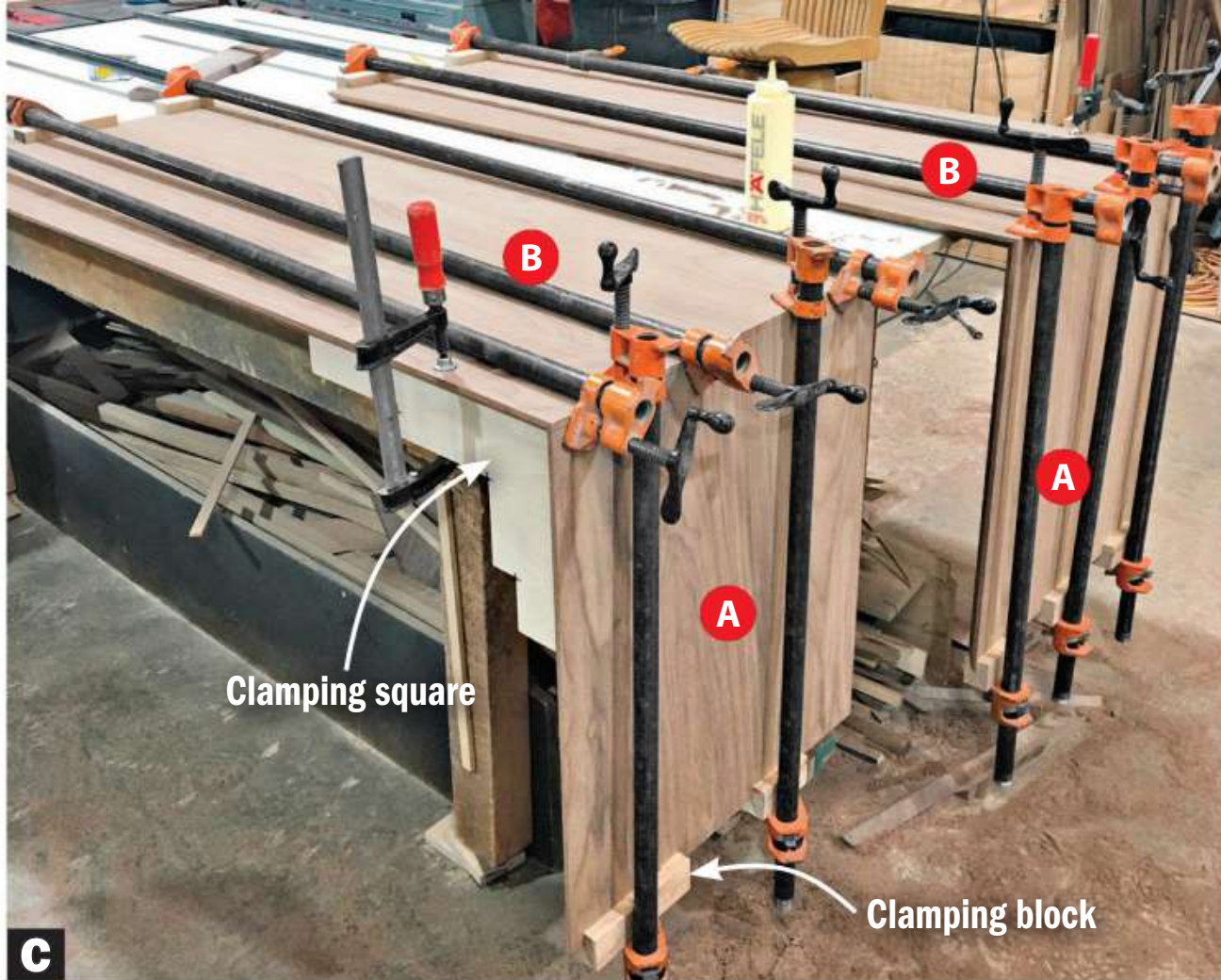
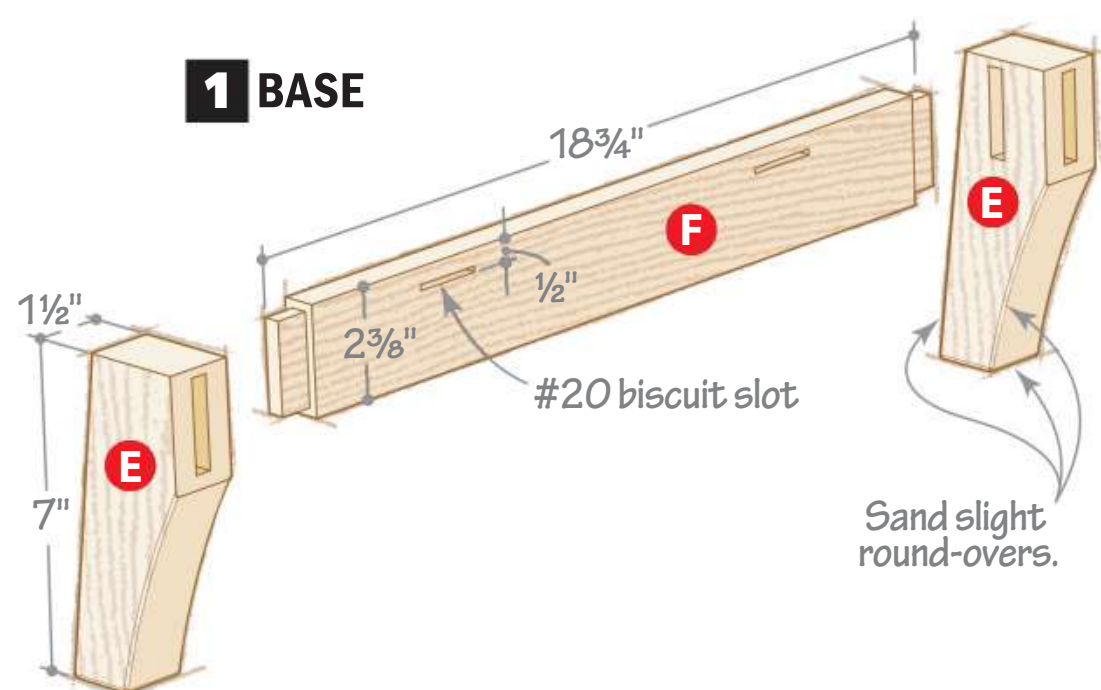
1 From 1 1/2" stock, cut to size the blanks for the feet (E) [Materials List, Drawing 1]. Mark the location of each foot on top of the blanks. Then form the mortises [Drawing 1a].

2 Lay out the profile on each foot blank [Drawing 1b]. Bandsaw the profile and sand the curves smooth. Ease the edges with sandpaper and finish-sand the surfaces.

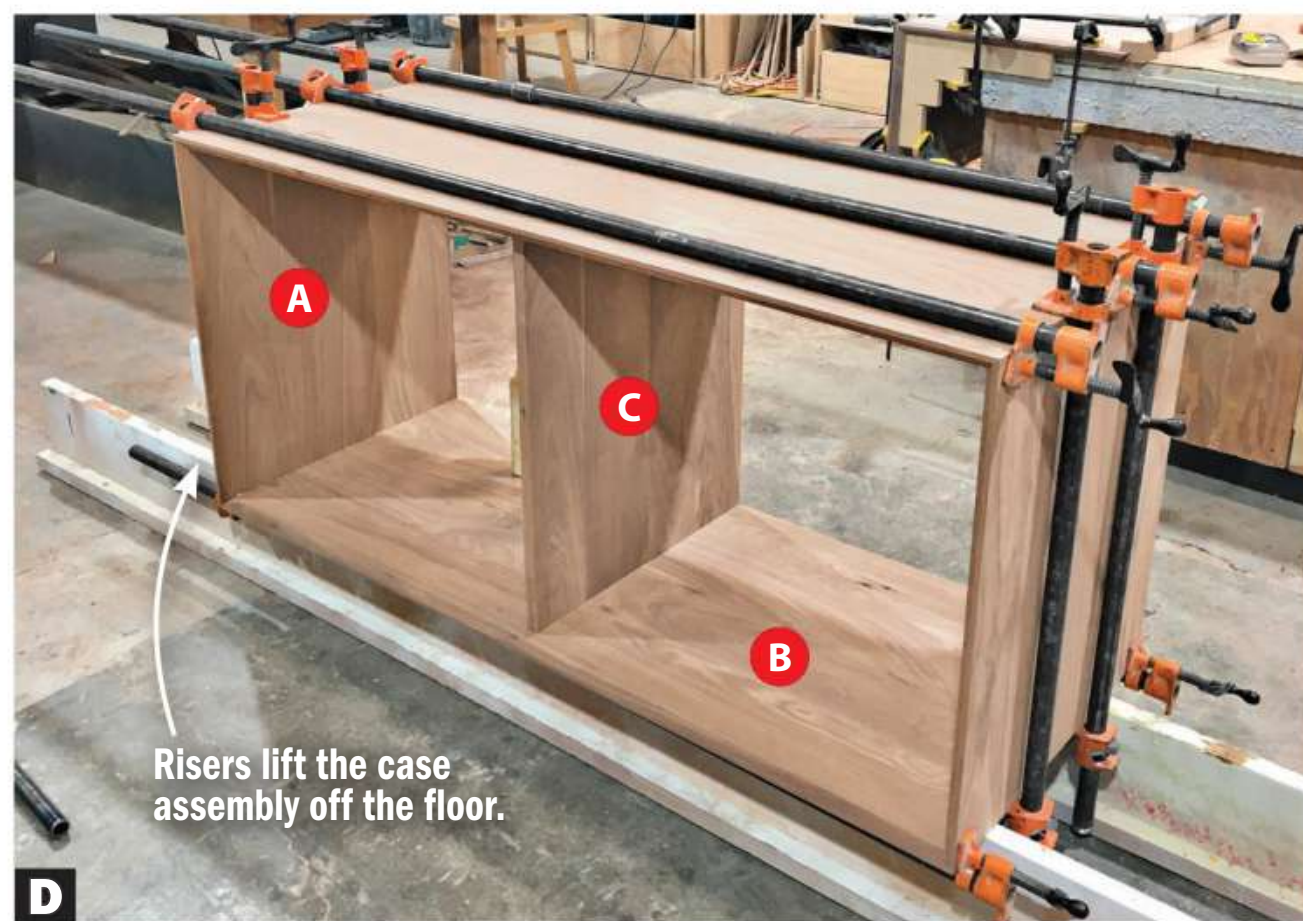
3 Cut the stretchers (F, G) to size. Form tenons on the ends of the stretchers [Drawing 1c] and biscuit slots on the inside face of each stretcher for the Z-brackets [Exploded View, Drawing 1, Sources].

4 Finish-sand the stretchers and glue up the base.

► Watch how to install and use a drill-press mortising attachment. woodmagazine.com/drillpressmortising

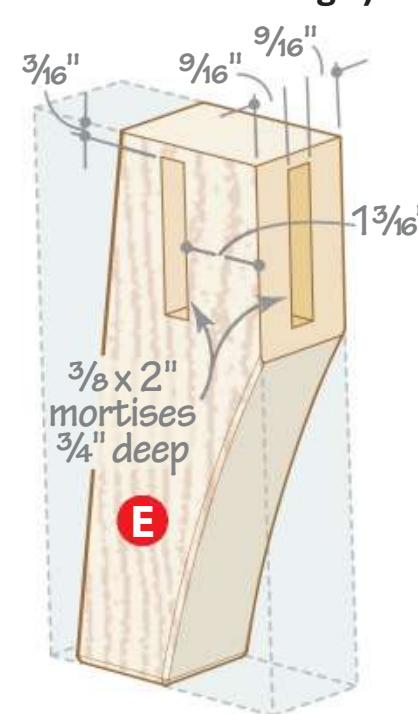


C Using clamping squares and the clamping blocks, glue up two subassemblies maintaining the continuous grain orientation of the sides and top.

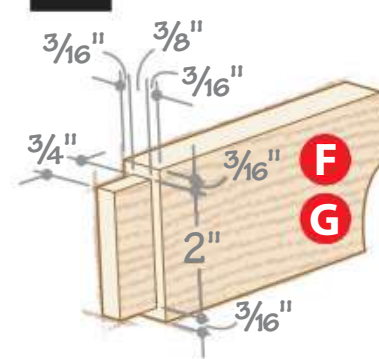


D Rest the case assembly on risers during the glue-up to provide clearance for the clamps.

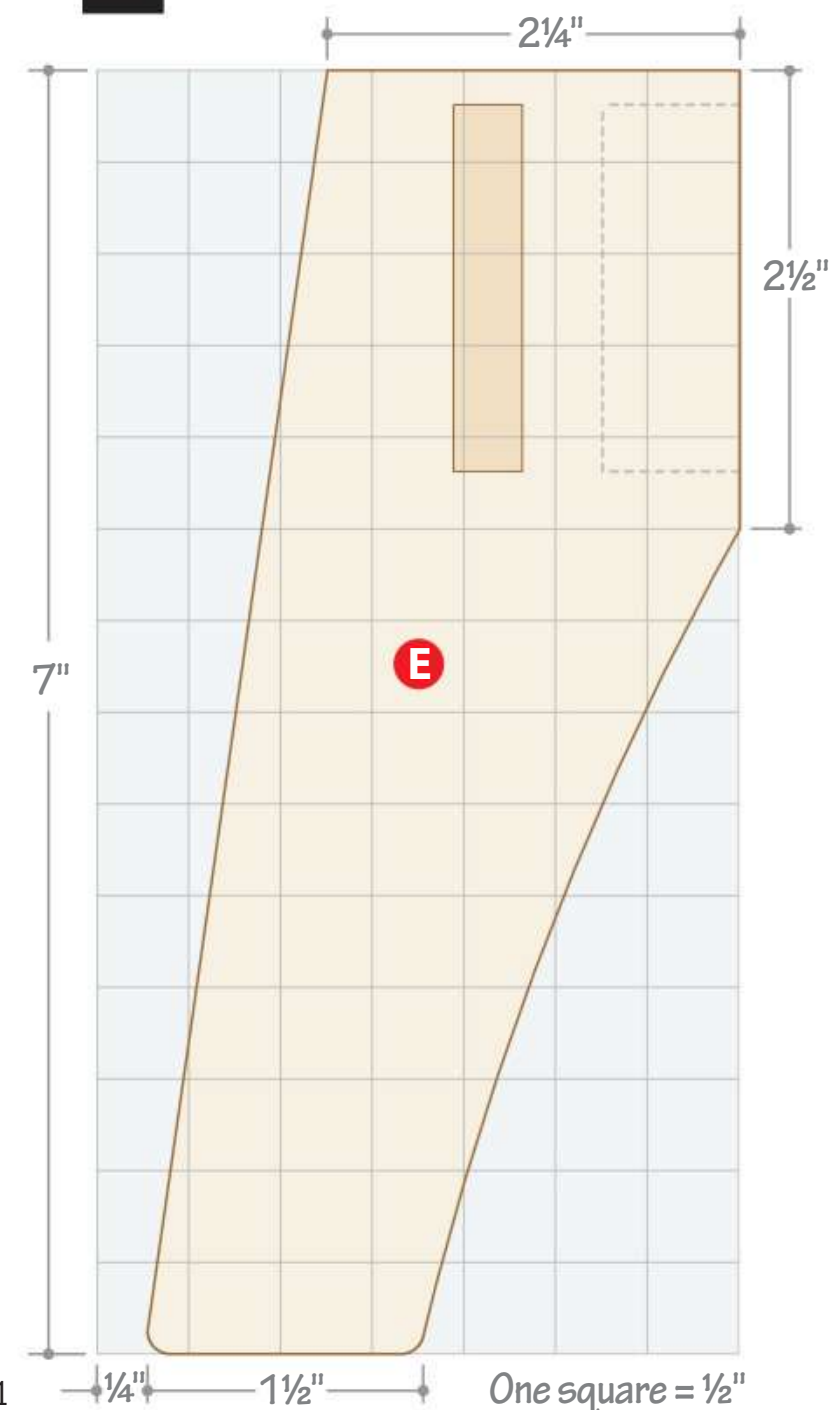
1a MORTISE DETAIL (Left rear and right front shown. Right rear and left front are mirror image.)



1c TENON DETAIL



1b FOOT GRIDDED PATTERN



Fill the case with drawers

1 Cut to size the drawer fronts, backs, and sides (H, I). Dado the ends of the sides [Drawing 2], then rabbet the fronts and backs to fit in those dados.

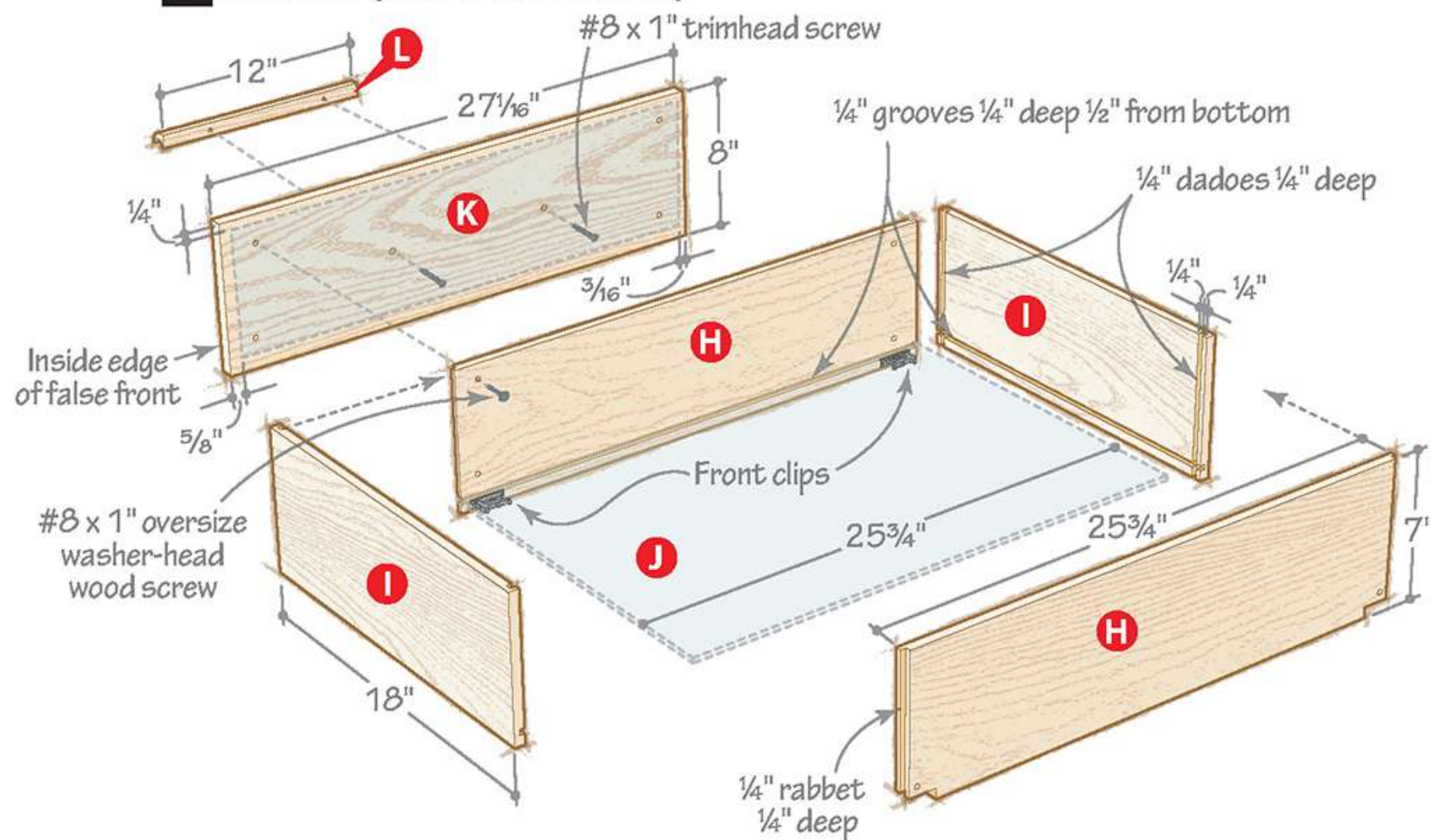
2 Groove the inside face of the drawer box parts for the drawer bottoms (J) [Drawing 2]. Cut the drawer bottoms to size.

3 Finish-sand the inside faces and glue up the drawers, checking for square.

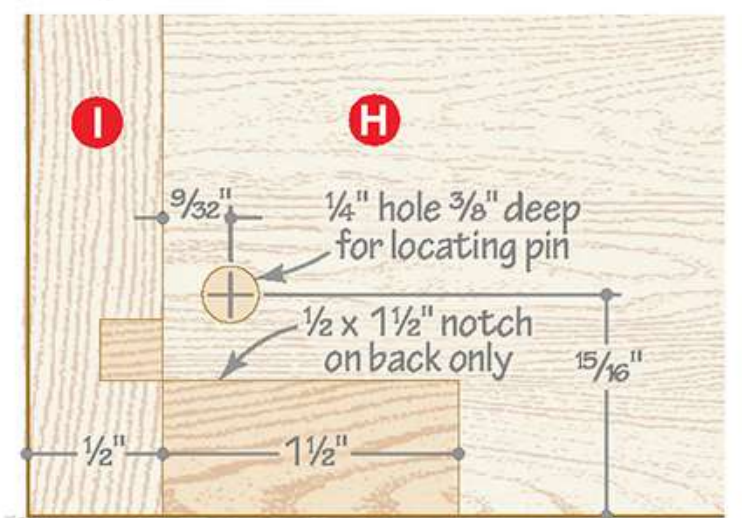
4 After the glue dries, finish-sand the outside of the drawer boxes. Use a handsaw and chisel to quickly notch the drawer backs, then drill locating holes for the drawer slides [Drawing 2a].

5 Cut the false fronts (K) to size and finish-sand them. Make the drawer pulls (L) [Elegant two-bit drawer pulls].

2 DRAWER (Left drawer shown)



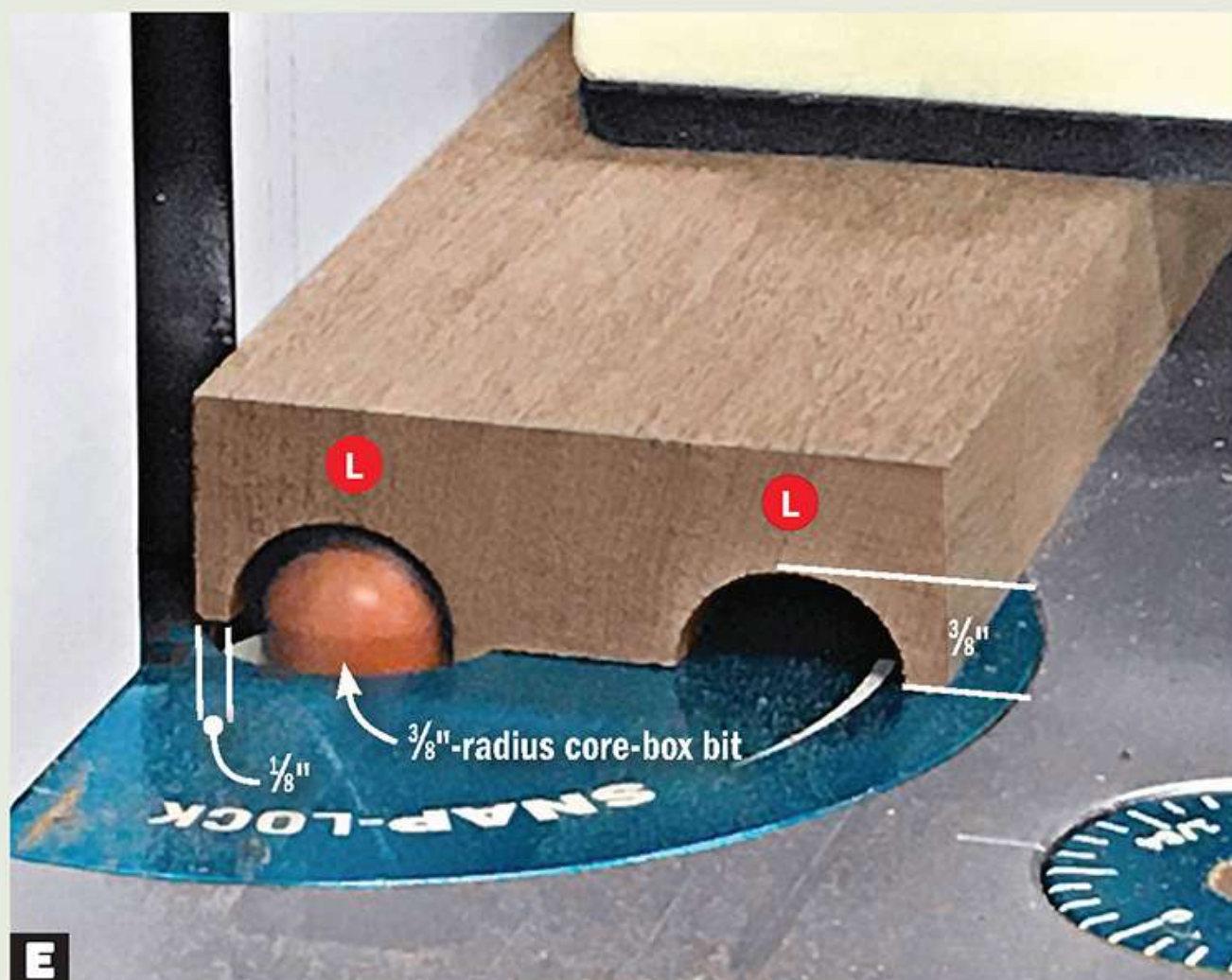
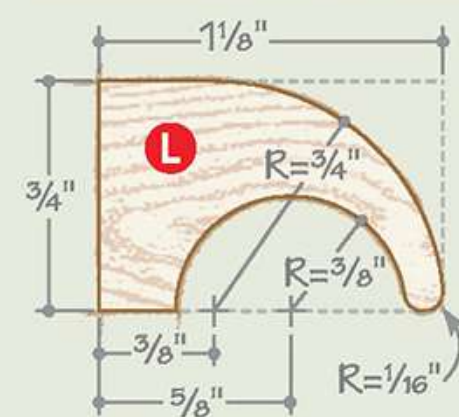
2a DRAWER BACK DETAIL



Elegant two-bit drawer pulls

Keep true to the mid-century style by making your own drawer pulls using a pair of router bits. Start by cutting three 3/4 x 2 3/8 x 12 1/2" blanks. Using a 3/8"-radius core-box bit, rout a pair of flutes in each blank [Photo E]. Replace the core-box bit with a 3/4" round-over bit and rout the opposite face of the blanks [Photo F]. Rip the blank into two equal-width pulls, and sand them smooth. Sand a slight round-over on the front edges of the pulls.

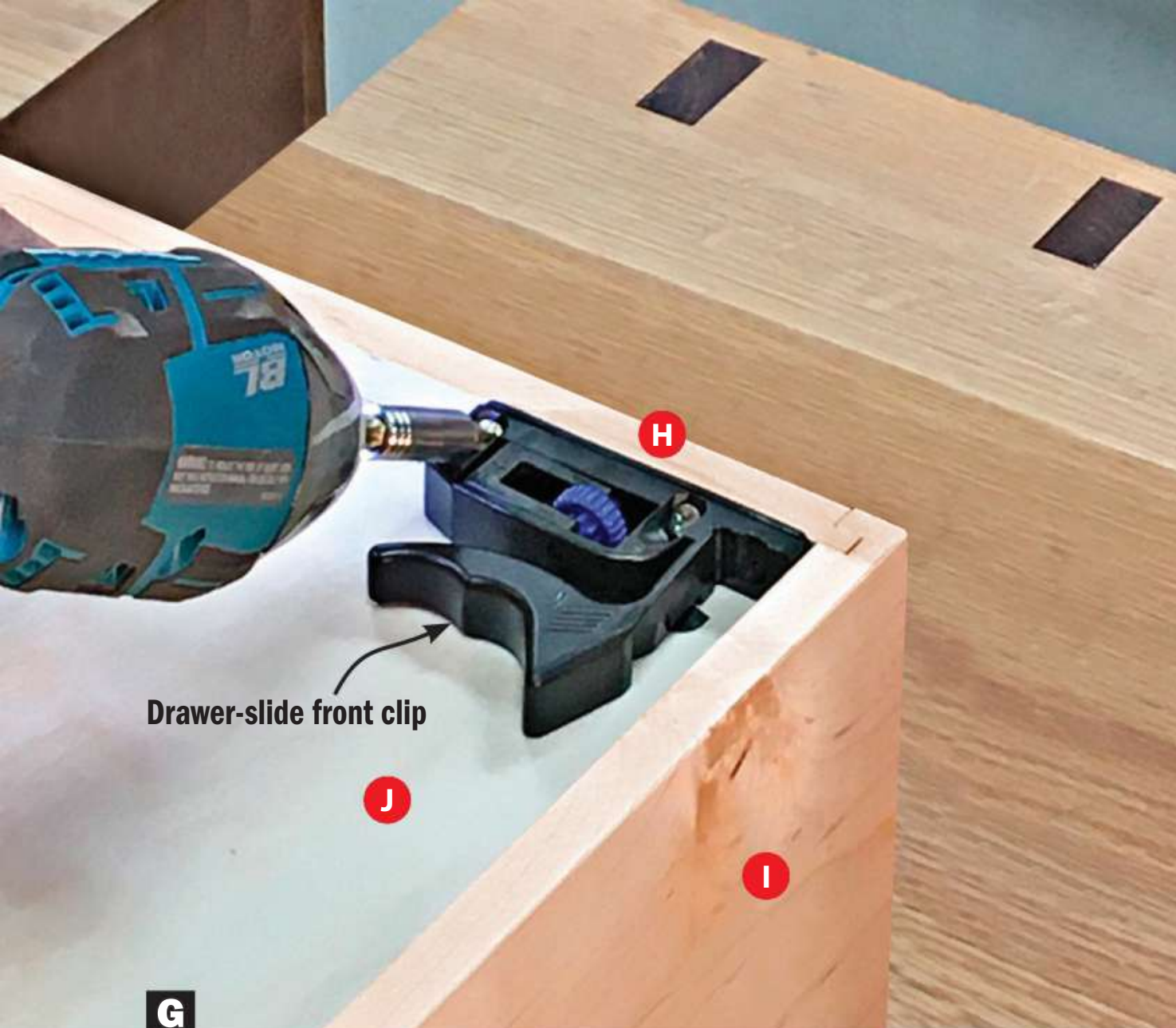
DRAWER PULL DETAIL



E After routing the first flute, flip the blank end for end to rout the second flute.



F Position the fence flush with the bearing and round over both edges.



Drawer-slide front clip

G Attach the drawer-slide clips in the front corners below the drawer bottom.



Drawer-slide back clip

H Stand the rear bracket on end to trim the protruding edge at the bandsaw.

Slide it all together

- 1** Finish-sand the remaining outside faces. Apply a finish to all the parts and assemblies. (We used a satin-finish lacquer.)
- 2** Turn the case upside down and center the base assembly (E–G) on the bottom (B) and attach it with Z-brackets [Exploded View]. Secure the back (D) to the case with brads.
- 3** Screw the front clips for the drawer slides to the drawer boxes [Photo G].
- 4** At the bandsaw, trim off part of the rear brackets so the drawer slides fit flush

against the sides of the case [Photo H]. (Trim an equal number of left- and right-side brackets.)

5 Insert the rear brackets onto the drawer slides and screw the slides to the case sides and divider [Exploded View, Photo I]. The bottom slides rest on the bottom of the case.

6 Center the pulls on the false fronts using double-faced tape. Drill pilot holes from the back of the false fronts into the pulls. After removing the tape, drive trimhead screws into the pulls.



Set square to 1½".

16¹³/₁₆"

Spacer

I Use a spacer to position the top drawer slides. Cut the spacer down to 8⁹/₁₆" to install the middle slides.

7 Install the bottom drawer boxes in the case, and the false fronts on the drawers [Photo J]. Drive screws into the false fronts from inside the drawers. Repeat the process with the second and third rows of drawers.

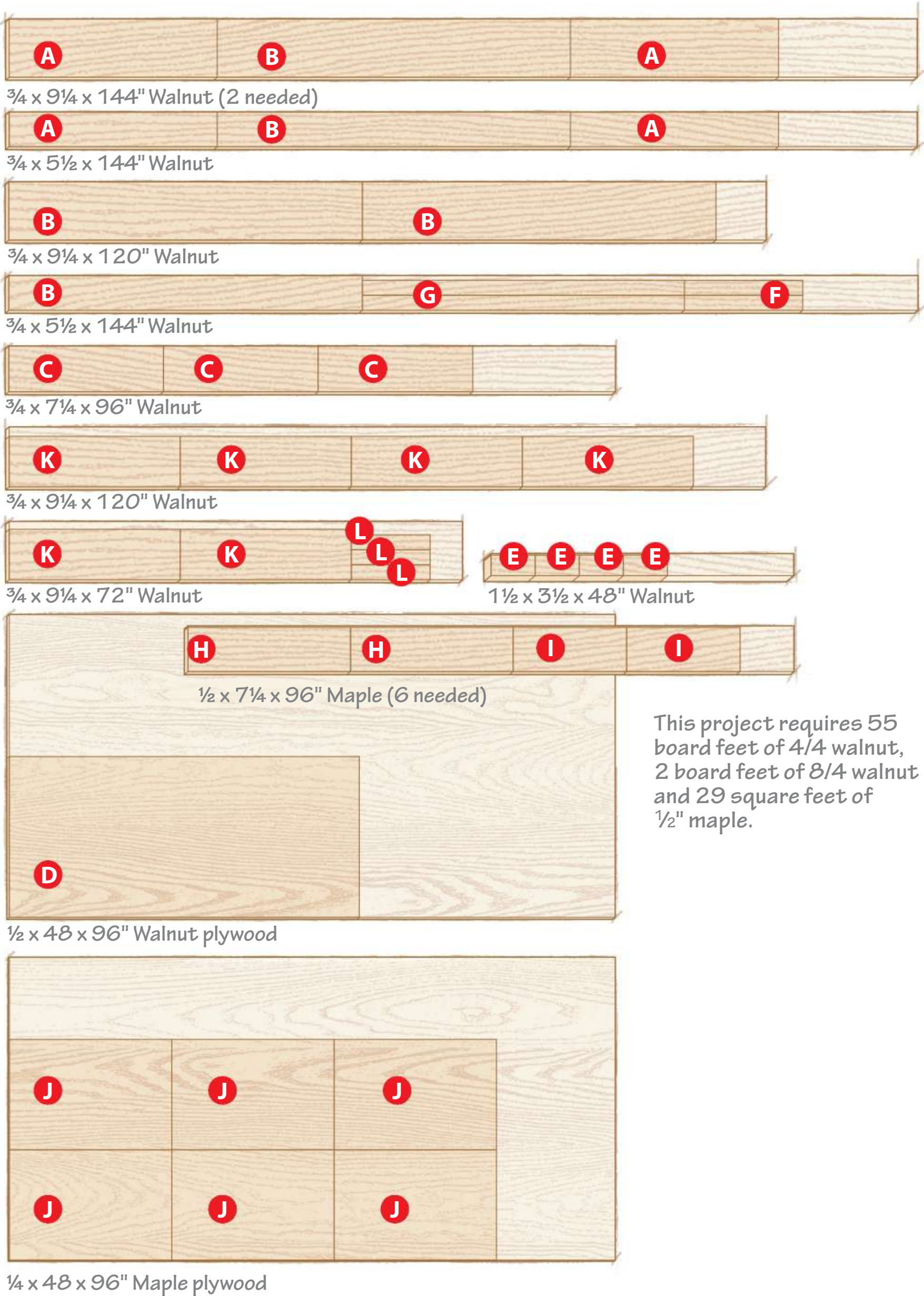
8 Move the dresser into a suitable spot in the bedroom and load up the drawers. You'll sleep easy knowing that you've built a piece of furniture that will last for years. 🌳

Produced by **Vince Ancona** with **Kevin Boyle** and **Brian Bergstrom**
Project design: **Kevin Boyle**
Illustrations: **Roxanne LeMoine, Lorna Johnson**



J Apply double-faced tape to the back face of the false front (K). Rest the false front on spacers and press it against the drawer box.

Cutting Diagram



This project requires 55 board feet of 4/4 walnut, 2 board feet of 8/4 walnut and 29 square feet of 1/2" maple.

Materials List

Part	FINISHED SIZE			Matl.	Qty.
	T	W	L		
A* case sides	3/4"	22"	26"	W	2
B* case top/bottom	3/4"	22"	56"	W	2
C* case divider	3/4"	20 1/8"	24 1/2"	W	1
D case back	1/2"	25 1/2"	55 1/2"	WP	1
E feet	1 1/2"	3 1/4"	7"	W	4
F side stretchers	3/4"	2 3/8"	18 3/4"	W	2
G front/back stretchers	3/4"	2 3/8"	51"	W	2
H drawer fronts/backs	1/2"	7"	25 3/4"	M	12
I drawer sides	1/2"	7"	18"	M	12
J drawer bottoms	1/4"	17 1/2"	25 3/4"	MP	6
K drawer false fronts	3/4"	8"	27 1/16"	W	6
L* drawer pulls	3/4"	1 1/8"	12"	W	6

*Parts initially cut oversize. See the instructions.

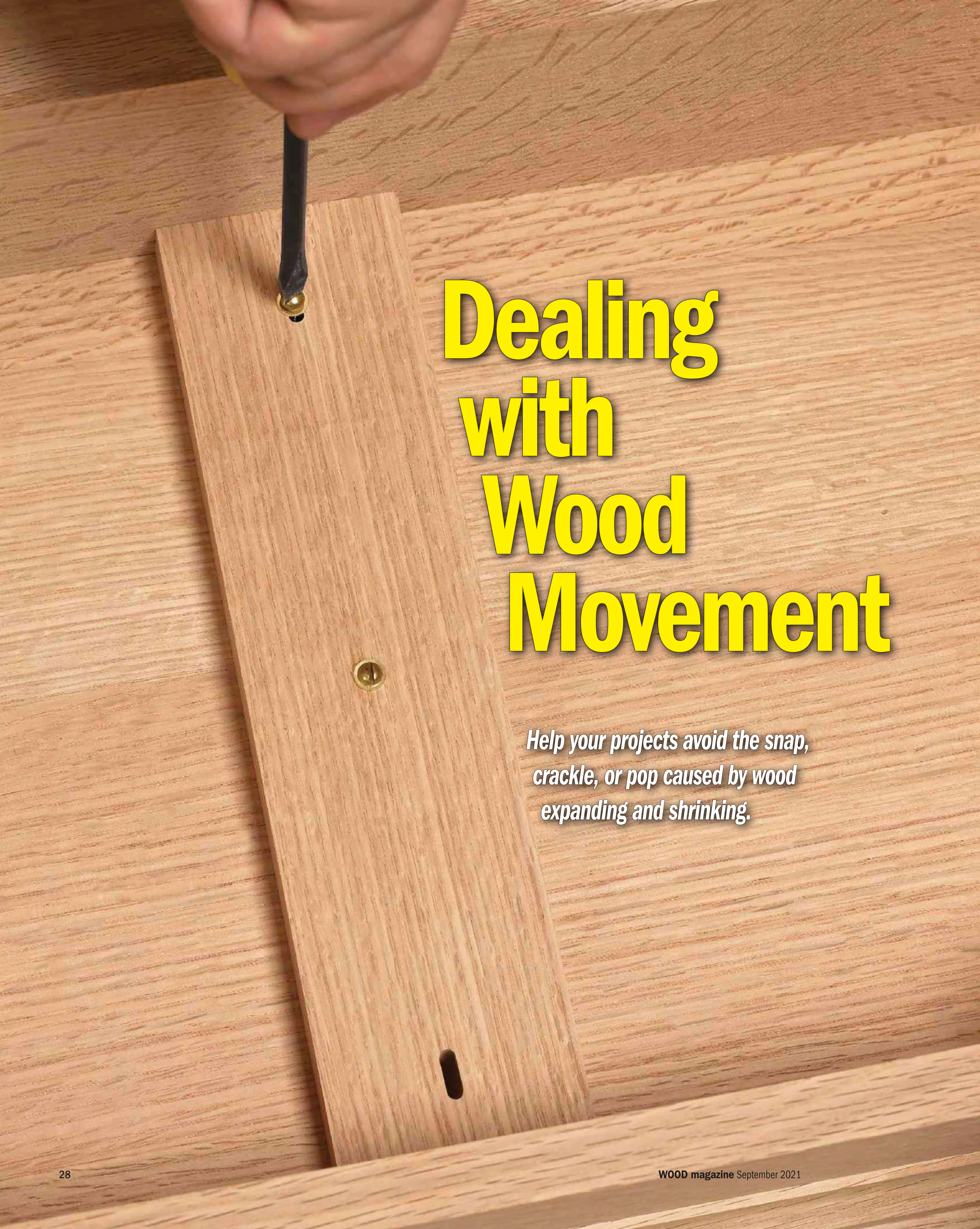
Materials key: W-walnut, WP-walnut plywood, M-maple, MP-maple plywood.

Supplies: #20 biscuits, #16 x 1" brads, #8 x 1" oversize washer-head screws, #8 x 1" trimhead screws.

Blade and bits: Dado set; 45° chamfer bit, 3/8"-radius core-box bit, 3/4" round-over bit.

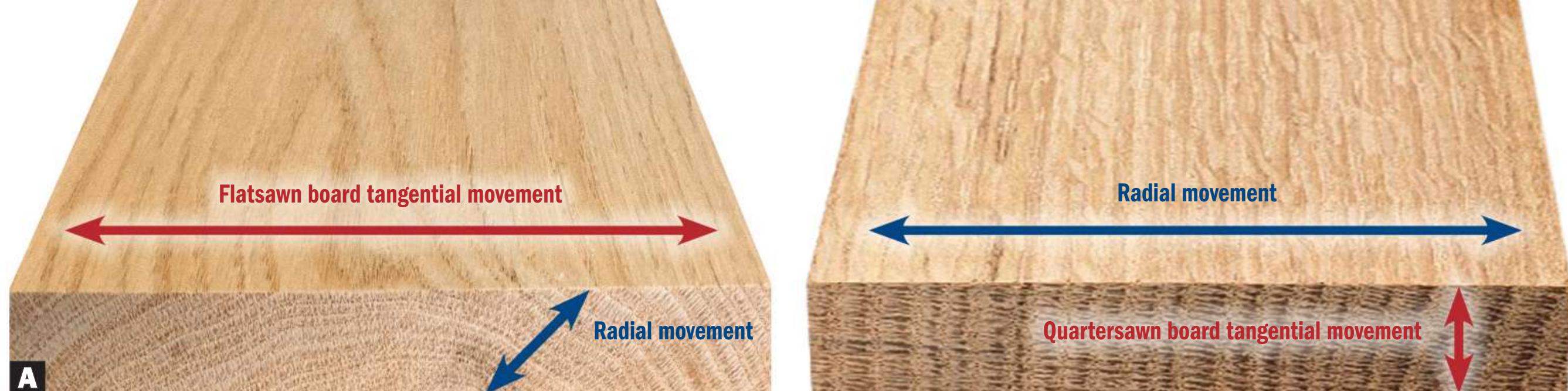
Sources: Z-brackets (14), no. KV0334, \$0.64, 18" drawer slides (6 pr.) no. HT9134339, \$19.89, front clips (12), no. HT9140416, \$2.02, plastic rear brackets (12), no. HT1135181, \$1.93, Woodworker's Hardware, www.hardware.com.

Opening photo: Better Homes & Gardens, 28" Black Metal Round Mirror, \$48.00, Claren Planter, 10", \$14.97, 12" \$19.97, or 15" \$26.97, Colton Bench, \$104.00, Faux Leather and Linen Reversible Pillow, \$14.88. Find these items exclusively at Walmart stores or walmart.com.



Dealing with Wood Movement

*Help your projects avoid the snap,
crackle, or pop caused by wood
expanding and shrinking.*



A Flatsawn boards move most across their width. Quartersawn boards, with the growth rings oriented vertically, move least across their width.

Woodworkers must understand three fundamental truths about our favored material:

1. Wood moves.
2. Wood never stops moving.
3. Attempts to constrain wood movement will cause problems.

The reason? Moisture. Standing trees and milled logs are full of it. Lumber shrinks while drying until it reaches a point of equilibrium with its surrounding environment. Even then, wood still takes on moisture and expands in the humid days of summer, then releases water and contracts as the air dries out in winter. A finish may slow the *rate* of expansion and contraction, but it will not stop it. Neither will securing wood to something seemingly unmoving, such as a plywood panel, a table base, or even a sturdy piece of steel—that only sets up a cause for wood or joint failure.

Understand how wood moves

The rate and amount of movement varies based on climate (humid or arid, indoors or outdoors), wood species, and grain orientation of the board (flatsawn, riftsawn, or quartersawn). In all cases, wood moves the most tangential to its growth rings [Photo A], and negligible amounts radial to the growth rings and along its length. Use the chart at *right* to calculate movement for several common species.

See and deal with movement

Any joint with the grain of its members running perpendicular to each other, and any element that surrounds or attaches to a solid-wood panel, needs careful scrutiny to address expansion and contraction. As a general rule, you can ignore wood movement in a cross-grain joint up to four inches wide without incident (that's why mortise-and-tenon joints work), but beyond that you need to incorporate measures to allow the wood to move. Let's look at some of these strategies.

A wide tabletop amplifies the wood movement challenge. Common approaches for

Calculating Wood Movement

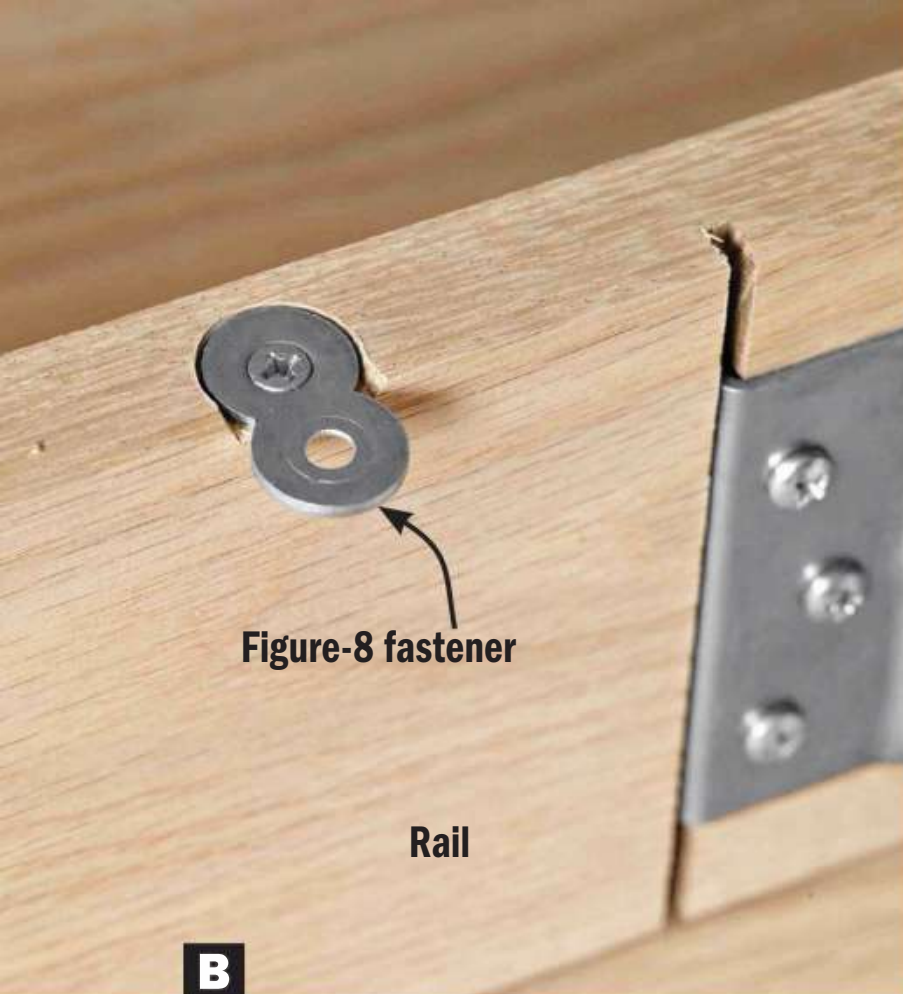
To use this chart: Multiply the width of the board by the amount in the blue-tinted column corresponding to its cut type, then by the percent change in moisture content to determine the amount of movement. For example, to calculate movement for a flatsawn red alder board 8" wide with a 6 percent change in moisture content: $8 \times .0026 \times 6 = .1248$ " (or about $\frac{1}{8}$ ").

	Dimensional change in inches per 1 percent change in moisture content		EXAMPLE: Change in 12"-wide board with 8 percent change in moisture content	
SPECIES	QS*	FS*	QS	FS
Alder, red	.0015	.0026	.144	.250
Ash, white	.0017	.0027	.163	.259
Birch, yellow	.0026	.0034	.250	.326
Cherry, black	.0013	.0025	.125	.240
Hickory, pecan	.0017	.0032	.163	.307
Lauan	.0013	.0027	.125	.259
Maple, silver	.0010	.0025	.096	.240
Maple, sugar	.0017	.0035	.163	.336
Oak, red	.0016	.0037	.154	.355
Oak, white	.0018	.0037	.173	.355
Pine, ponderosa	.0013	.0022	.125	.211
Poplar, yellow	.0016	.0029	.154	.278
Spruce, white	.0013	.0027	.125	.259
Sycamore	.0017	.0030	.163	.288
Walnut, black	.0019	.0027	.182	.259

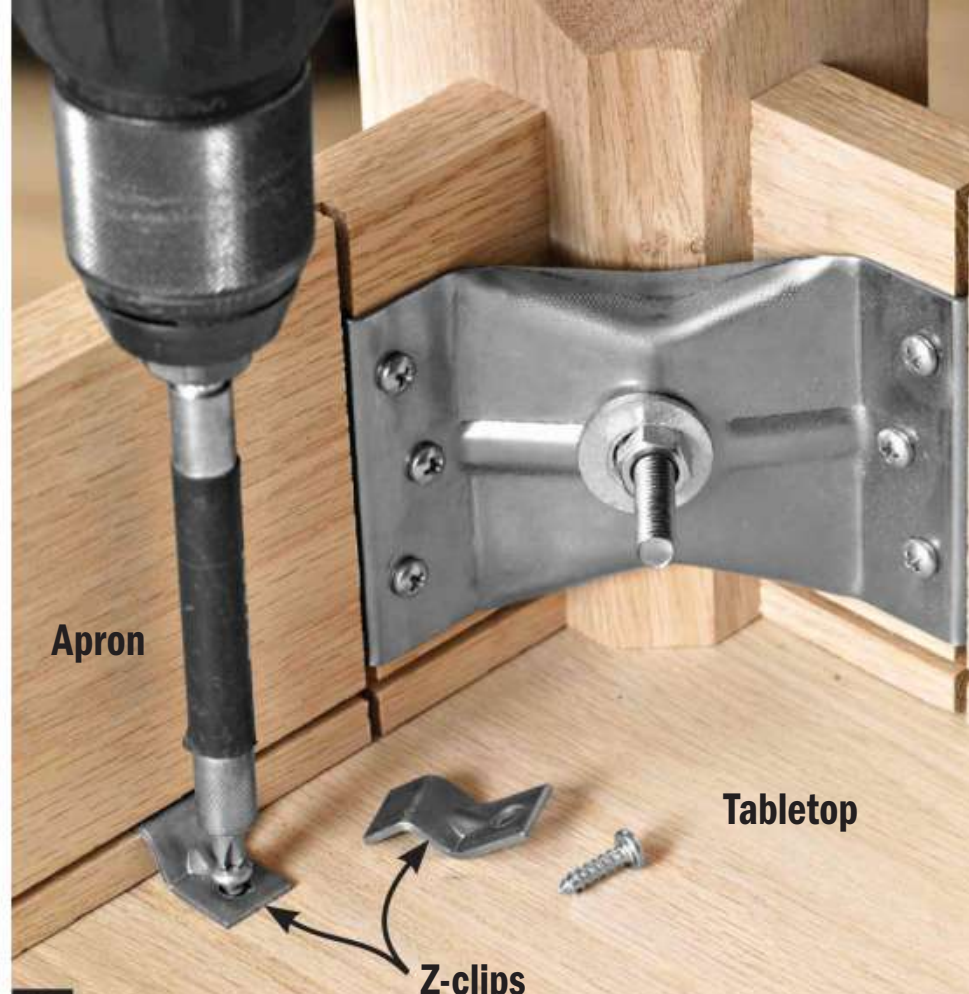
Source: U.S. Forest Service's Forest Products Laboratory. Find additional species on pages 15–17 of the document at woodmagazine.com/width.

*QS=quartersawn, FS=flatsawn

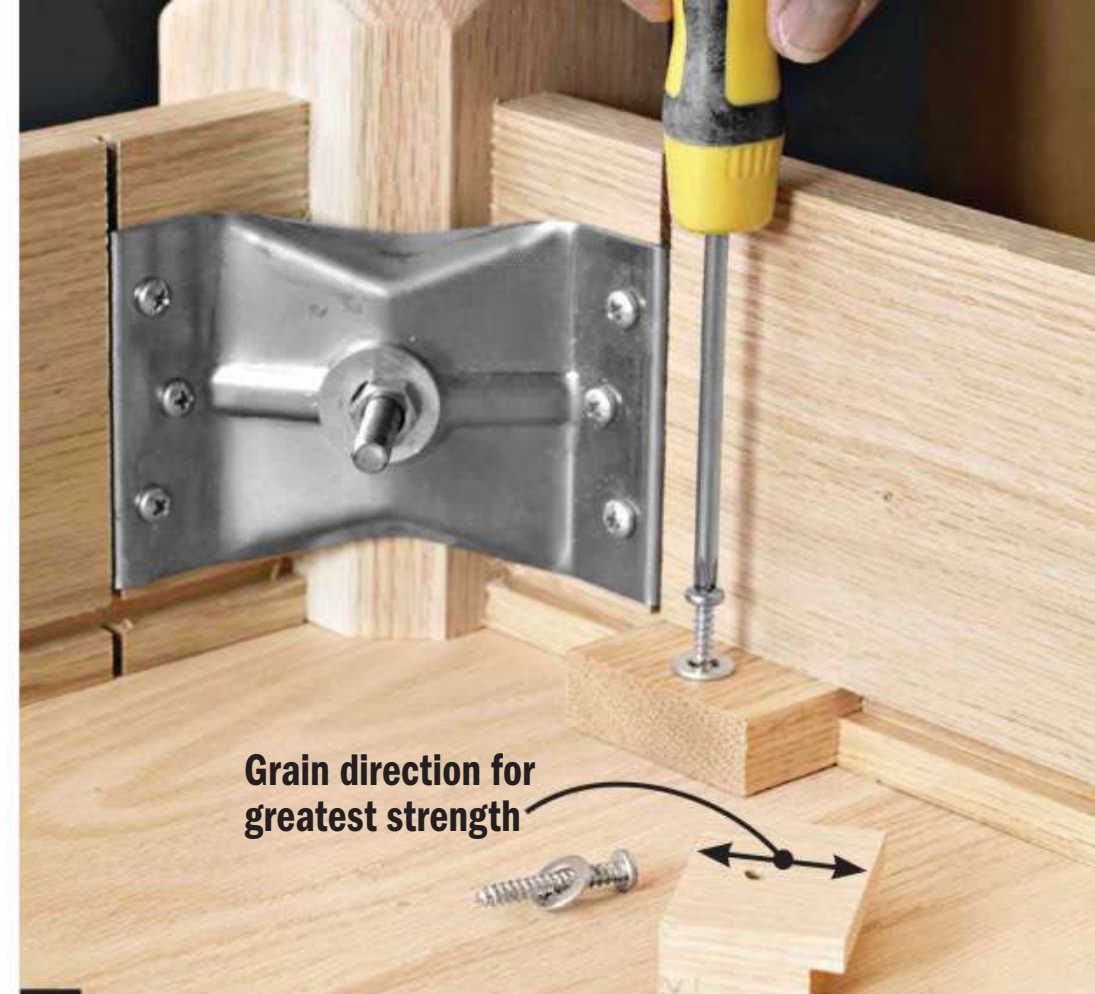
► Fresh-cut lumber may contain more water than wood by weight, resulting in a moisture content over 100%.



B Figure-8 fasteners sit flush in counterbores in the top edges of the rails. As the tabletop moves, the fasteners pivot.



C Z-clips securely attach a tabletop to the apron and slide in a groove as the top expands and contracts.



D Simple rabbeted blocks work the same way as Z-clips, but require a wider groove of at least 1/4".

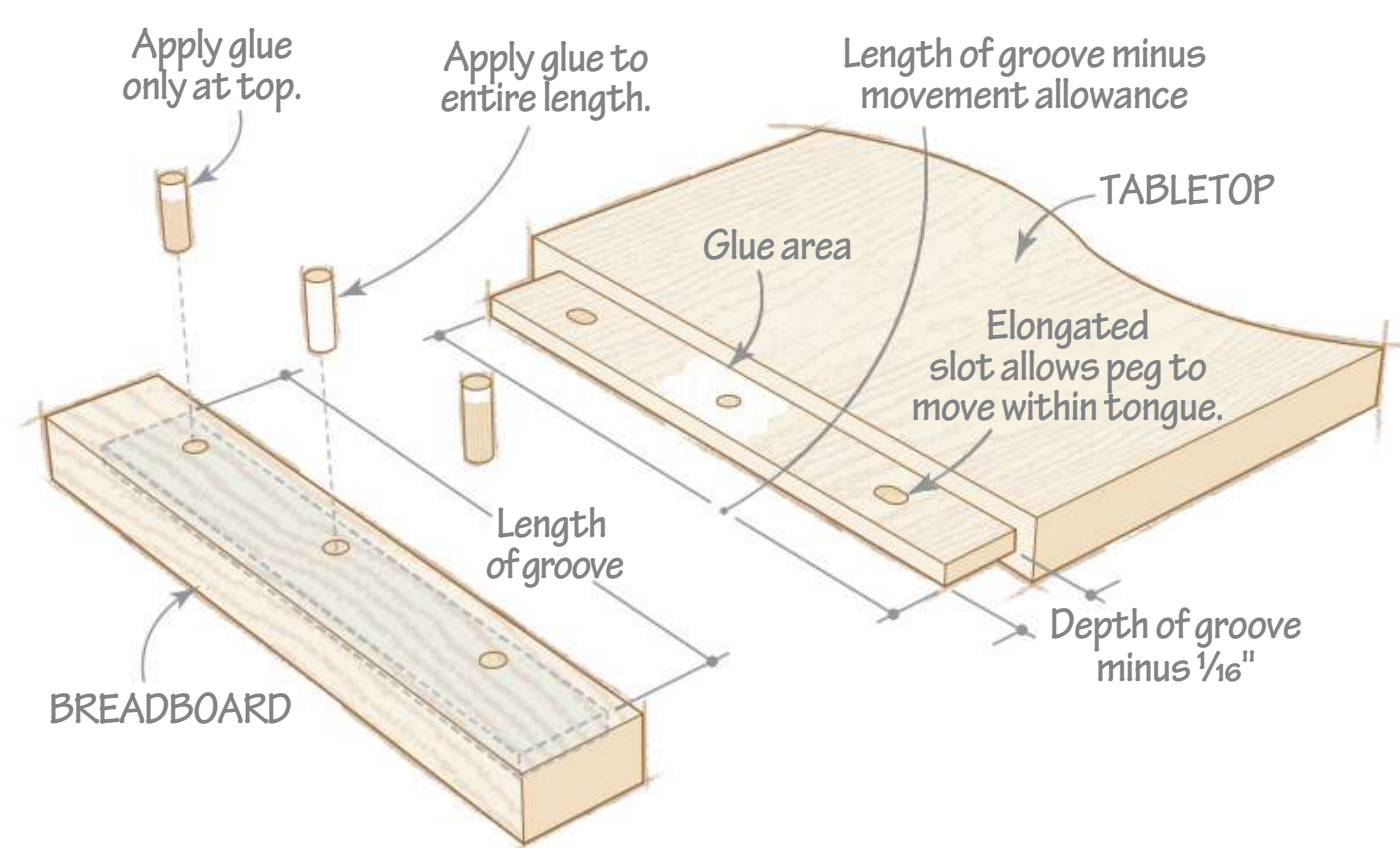
► Learn five ways to make breadboard ends. woodmagazine.com/breadboardends

securing a tabletop to a base include using commercially available figure-8 fasteners, Z-clips, or shop-made fasteners [Photos B–D].

Some tabletop designs incorporate breadboard ends to keep the panel flat [Drawing]. Although a tongue on the end of a tabletop fitting into a groove on a breadboard appears to fly in the face of avoiding cross-grain construction, securing only the center of the joint allows the tabletop to expand equally toward both edges. Pegs near each end, glued only to the breadboard, slide within slots in the tongue and keep the breadboard from popping off.

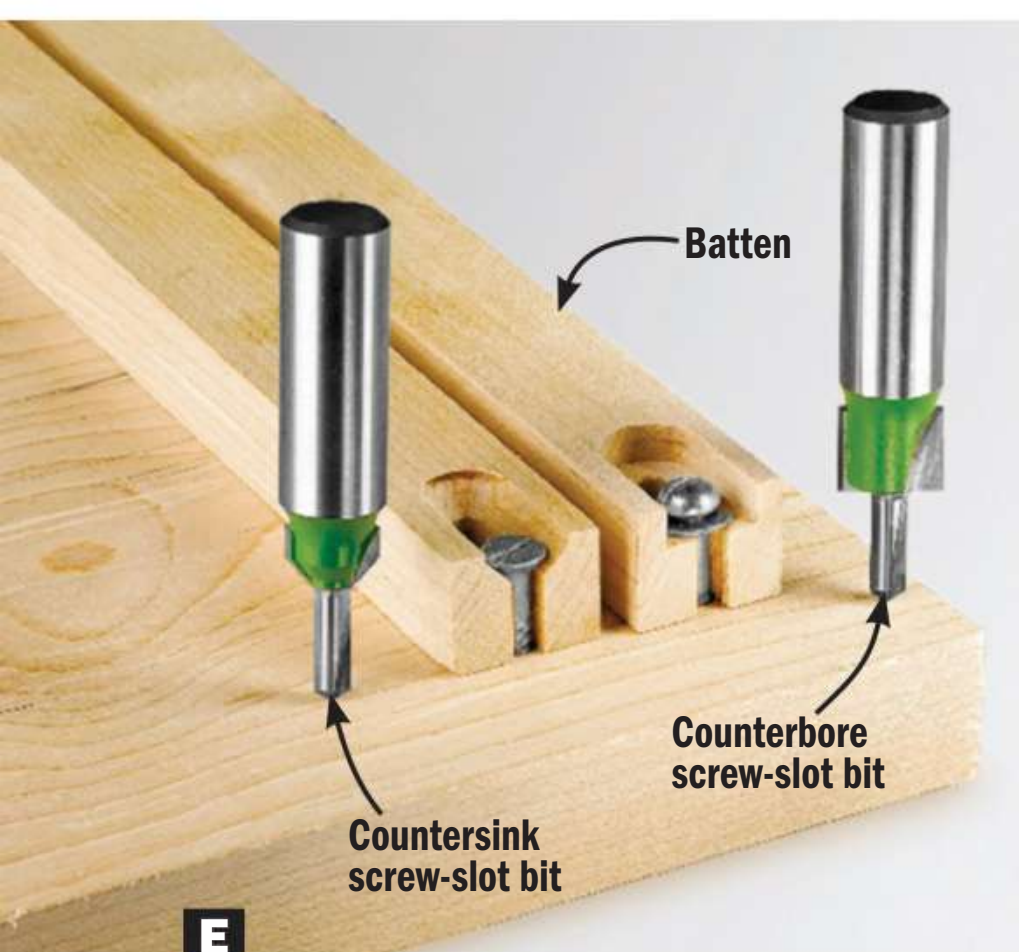
Blanket chest lids often include battens screwed (not glued) to the underside to help keep the lid flat. But the batten must allow the lid to expand and contract. A screw-slot router bit [Photo E, Source] cuts a slot with a countersink or counterbore to recess the screwhead for a more attractive appearance. Or, to leave a clean face on the batten, drill a

TYPICAL BREADBOARD END

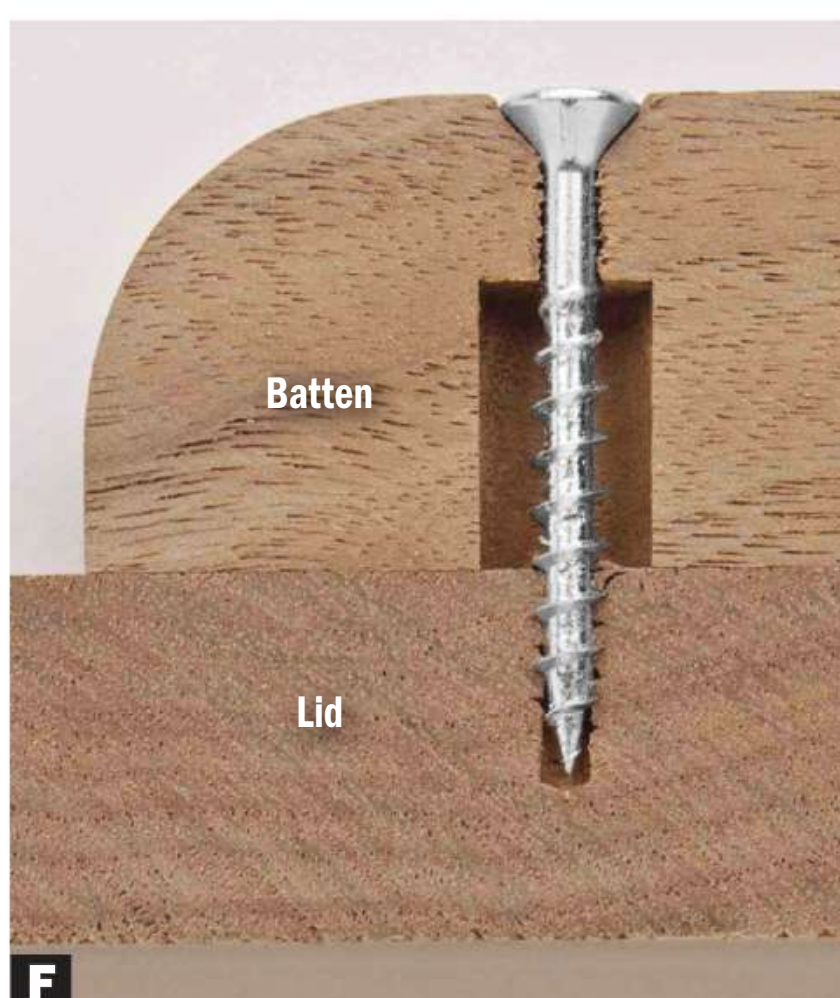


deep counterbore on the back face of the batten [Photo F]. For a hardware-free solution, use a sliding dovetail joint to secure the battens [Photo G].

► Learn to rout sliding dovetail joints. woodmagazine.com/slidingdovetail



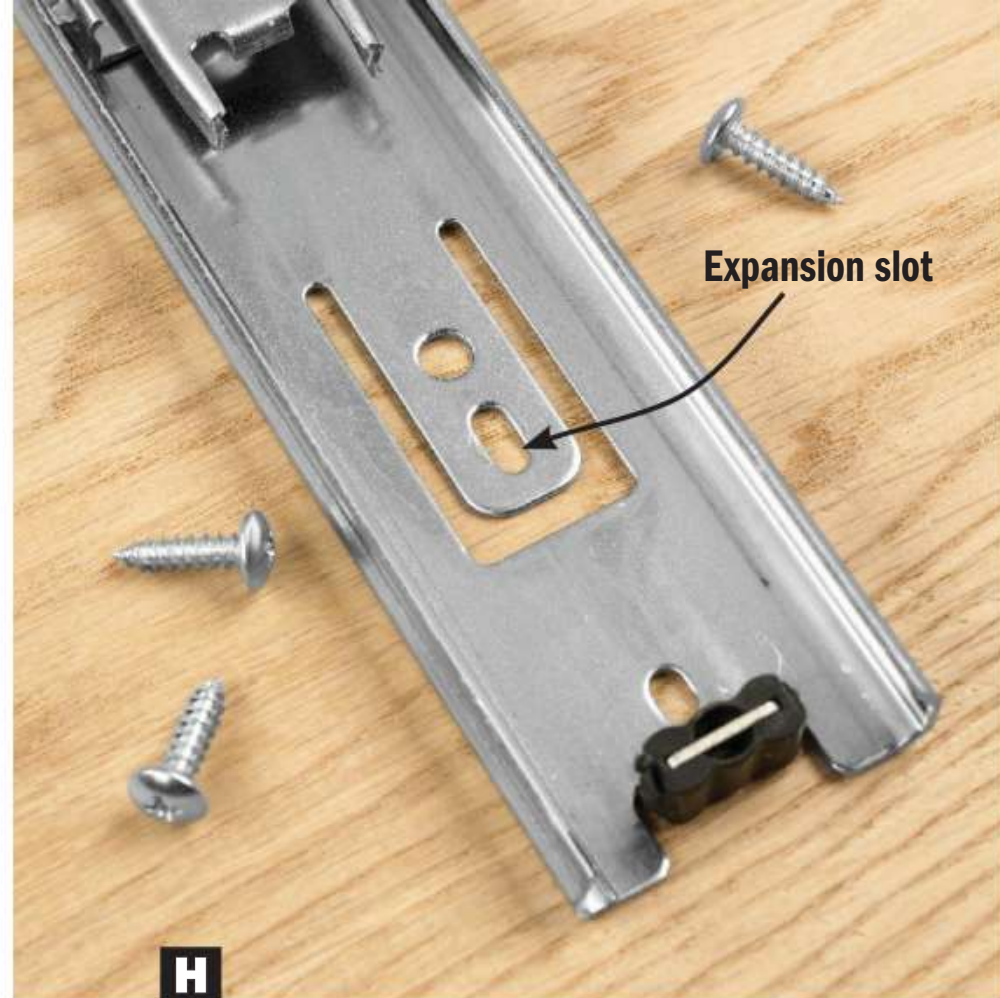
E A countersunk slot fits a standard flathead wood screw. A counterbored slot accepts a roundhead or panhead screw with or without a washer.



F An oversize counterbore provides room for the screw to flex as the panel expands and contracts.



G A sliding dovetail locks the batten to the lid. Glue only the front few inches so the lid expands to the rear.



H **Elongated screw holes** allow solid-wood panels to move when secured to a rigid metal drawer slide.



I **Shims ensure a consistent $\frac{1}{16}$ " perimeter gap** between an inset drawer front and the legs and rails of this table.



J **Glue along all of front groove.** **Orient a drawer bottom to expand front to back.** Apply glue in the groove in the drawer front, and the front 2" in the sides. Cut a slot for a screw to secure the rear to the bottom of the drawer back.

Adapt the screw-slot or sliding-dovetail strategies when securing wood drawer slides or web frames to the sides of a solid-wood carcass. Metal drawer slides provide expansion slots for fasteners [Photo H].

Drawers must slide in and out of a fixed opening without binding. Building the drawer box $\frac{1}{4}$ " shallower than the height of the drawer opening provides more than enough room for expansion. Inset solid-wood drawer fronts must allow for expansion, without creating unsightly gaps when the front contracts. A $\frac{1}{16}$ " gap all around should accommodate this [Photo I], but consider fine-tuning that amount following the adage, "Build loose in the winter and tight in the summer."

A solid-wood drawer bottom needs to float, too. Accommodate its movement by gluing it only at the front, directing expansion under the drawer back [Photo J].

Frame-and-panel construction provides a way to use solid-wood panels for carcass components and doors, without worrying about the entire assembly expanding and contracting excessively. The panel fits into grooves along the inside edges of the frame pieces [Photo K] and fits close vertically (with

the grain), but loose horizontally (across the grain). Because the panel floats (no glue), it expands and contracts within the grooves, and the frame size remains unchanged. (If desired, a dab of glue at the top and bottom center of the panel will prevent rattling.) Wide assemblies can be divided into several frames holding narrower panels [Photo L].

Sheet goods, such as plywood or veneered MDF, won't expand or contract significantly, so using these in place of solid wood eliminates concerns about movement. But the same rules apply if you join solid-wood components to sheet goods. For example, when screwing a solid-wood top to a plywood carcass, drill standard pilot holes at the front of the carcass panel, and slots toward the rear [Photo M]. This forces the panel to move toward the back, keeping reveals at the front consistent.

With these strategies in mind, ask yourself each time you approach joining two pieces of wood, "Will this joinery interfere with the wood's seasonal movement?" If the answer is yes, consider your options for creating the joint in a way that lets the wood move freely. 🌳

Source: Screw-slot router bits, counterbore no. 18J1160, countersink no. 16J 1170, \$54 each, Lee Valley, 800-871-8158, leevalley.com.

Produced by **Craig Rueggsegger** with **Paul Mayer**
Illustration: **Lorna Johnson**



K **Finishing a solid-wood panel before glue-up** prevents exposure of unfinished edges when the panel shrinks.



L **One 29"-wide panel of quartersawn white oak** for the front of this chest might change $\frac{3}{8}$ " in width. Three narrower panels move less than $\frac{1}{10}$ " each.



M **A plywood carcass won't expand**, so slots allow the screws securing the solid-wood top to move within the plywood.

Parquet Coatrack

An eye-catching chevron catchall



This wall-hanging coatrack stores your jacket, umbrella, keys, or whatever you need to grab on your way out the door. And its slim profile keeps it out of the way wherever you install it.

Create the parquetry using pieces from your scrap bin in the species we show or create your own. Either way, you'll end up with something you can hang your hat on.

Parquetry: *Inlaid blocks of various woods arranged in a geometric pattern.*

D I M E N S I O N S :
25" W x 2 1/2" D x 8 1/8" H

Approximate materials cost:

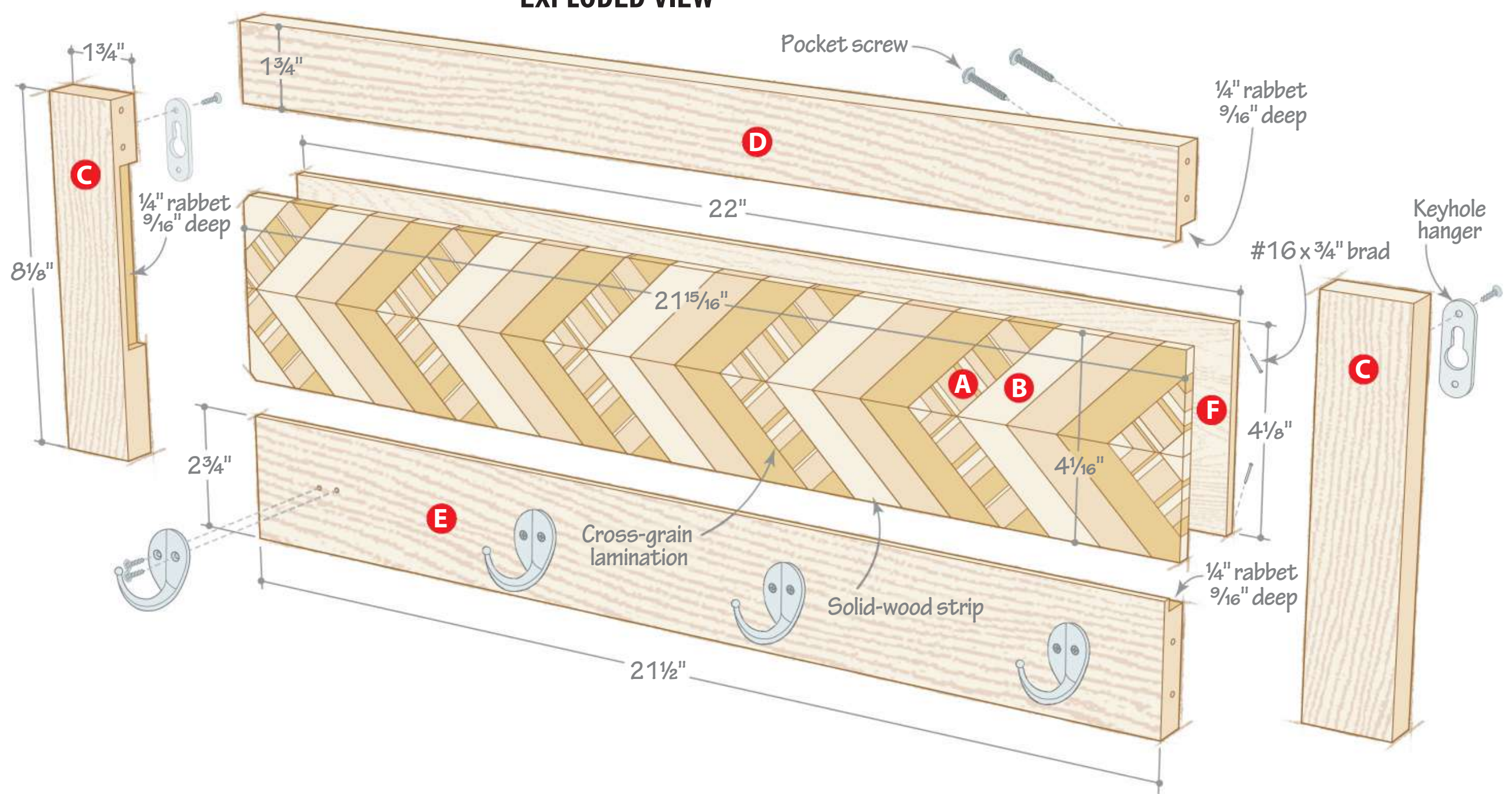
\$15

in hardware +
scraps you
already have

5

unique wood
species

EXPLODED VIEW



Shape the chevron

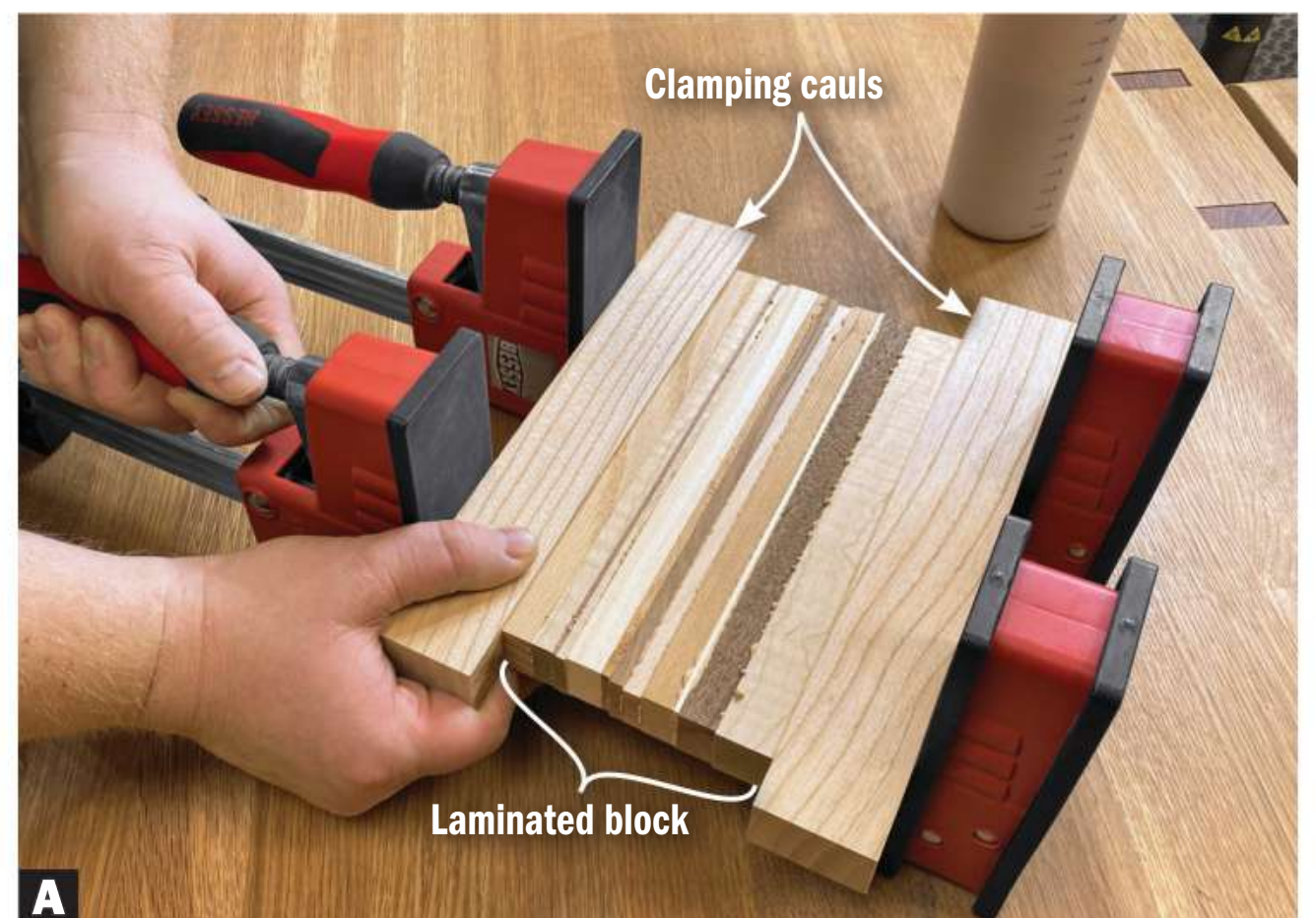
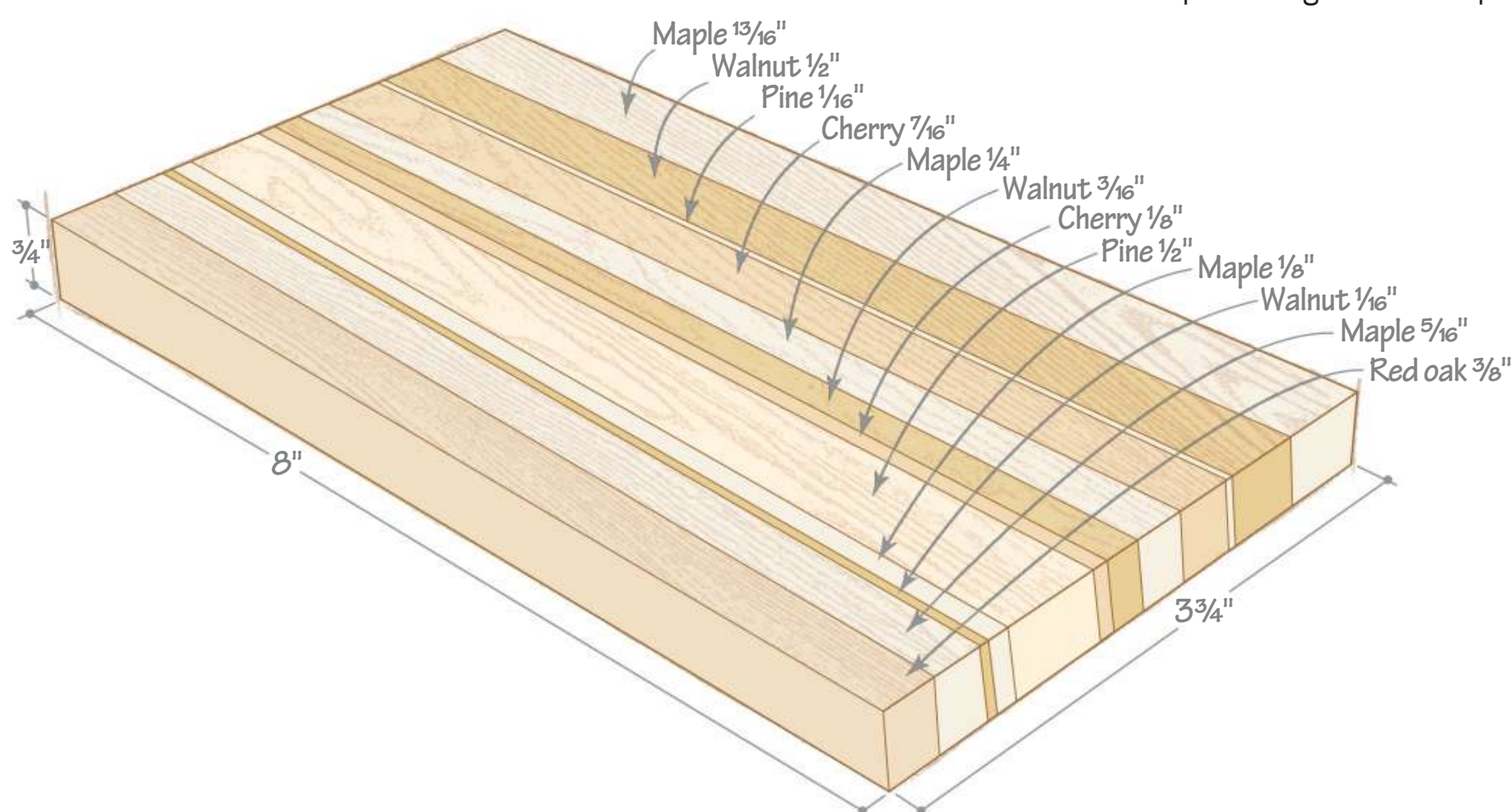
The panel consists of alternating strips of solid maple, cherry, and walnut, and laminated strips.

► Get tips on cutting thin strips on page 58, and watch a video with tips on cutting thin strips safely and accurately at the tablesaw. woodmagazine.com/thinrips

1 Rip thin strips to size [Drawing 1], then glue the strips into a laminated block [Photo A].

2 Scrape off any dried glue from the surface of the lamination and cut one end square. Cut six laminated strips (A) from the block [Photo B].

1 LAMINATED BLOCK



A Clamping cauls on both sides of the glue-up distribute clamping pressure, preventing the thin strips from bending.



B Install an 80-tooth blade in your tablesaw and crosscut the block into 3/4"-wide laminated strips (A).



C Glue a walnut strip (B) to a laminated strip (A) and a maple to a cherry, offsetting the ends by $\frac{3}{4}$ ". Repeat with the remaining laminated strips and solid-wood strips.



D Glue and clamp the walnut/laminated pairs to the maple/cherry pairs, offsetting the ends. When completed, you should have six of these assemblies.

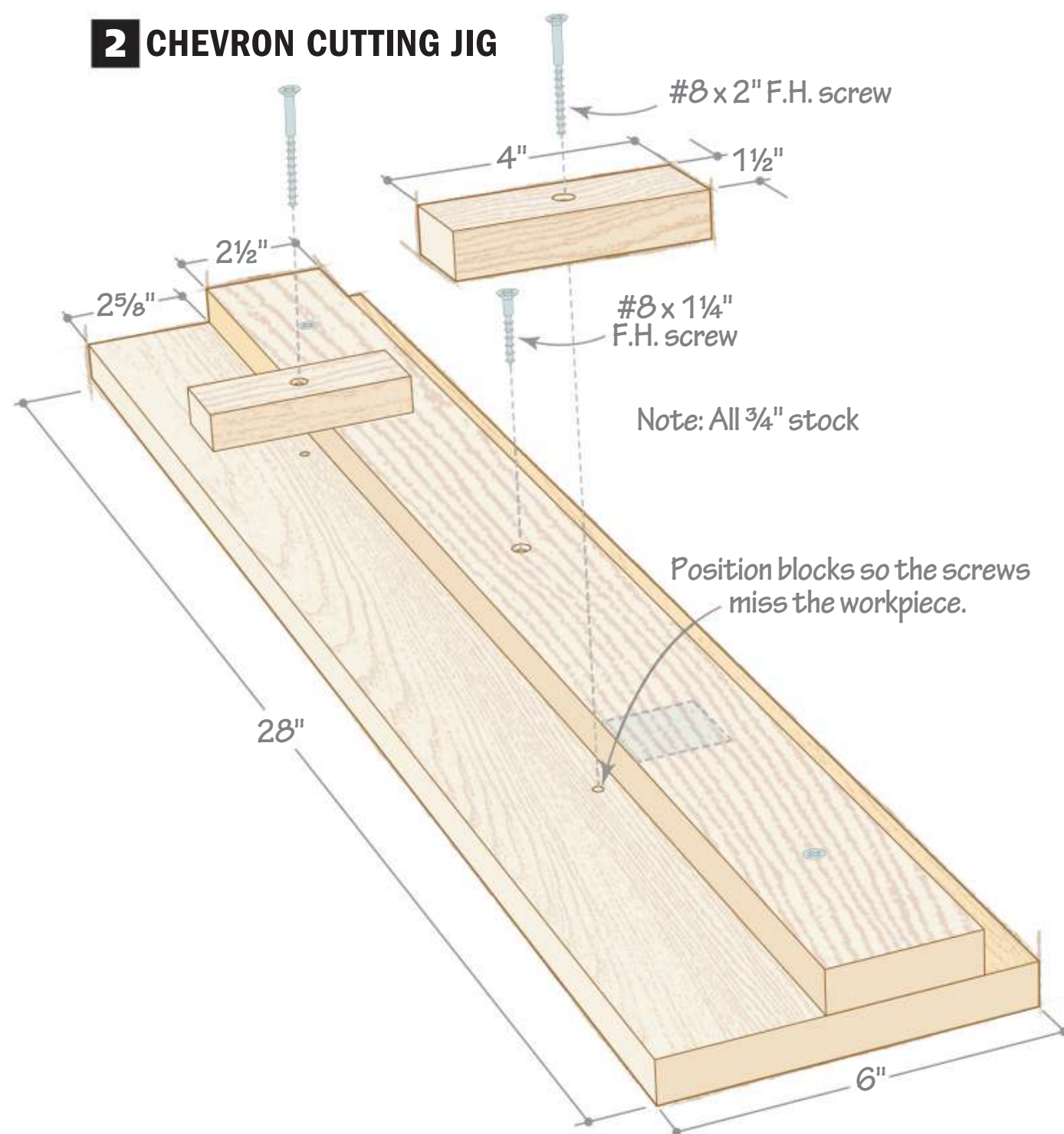
3 Cut to size the solid-wood strips (B) [Materials List]. We cut six each of maple, cherry, and walnut. Build up strip assemblies [Photos C-E].

4 Build the chevron cutting jig [Drawing 2] and trim the edges of the strip assembly [Photo F].

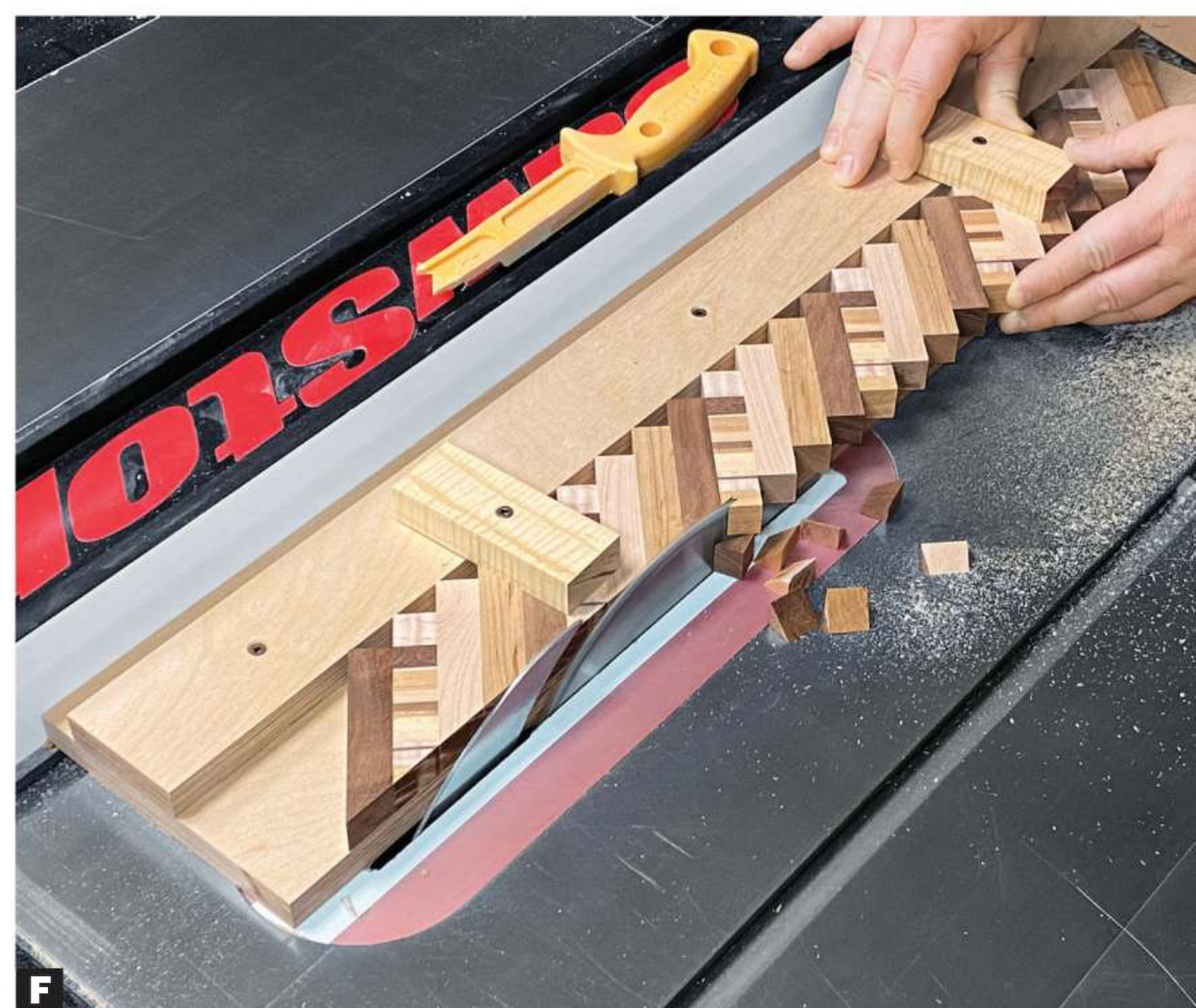
5 Cut the ends of the strip assembly square, then resaw it [Photo G] and assemble the halves into a chevron-pattern panel [Photo H].

6 Sand away the saw marks and trim to length and width [Exploded View], removing from all edges as needed for symmetry.

2 CHEVRON CUTTING JIG



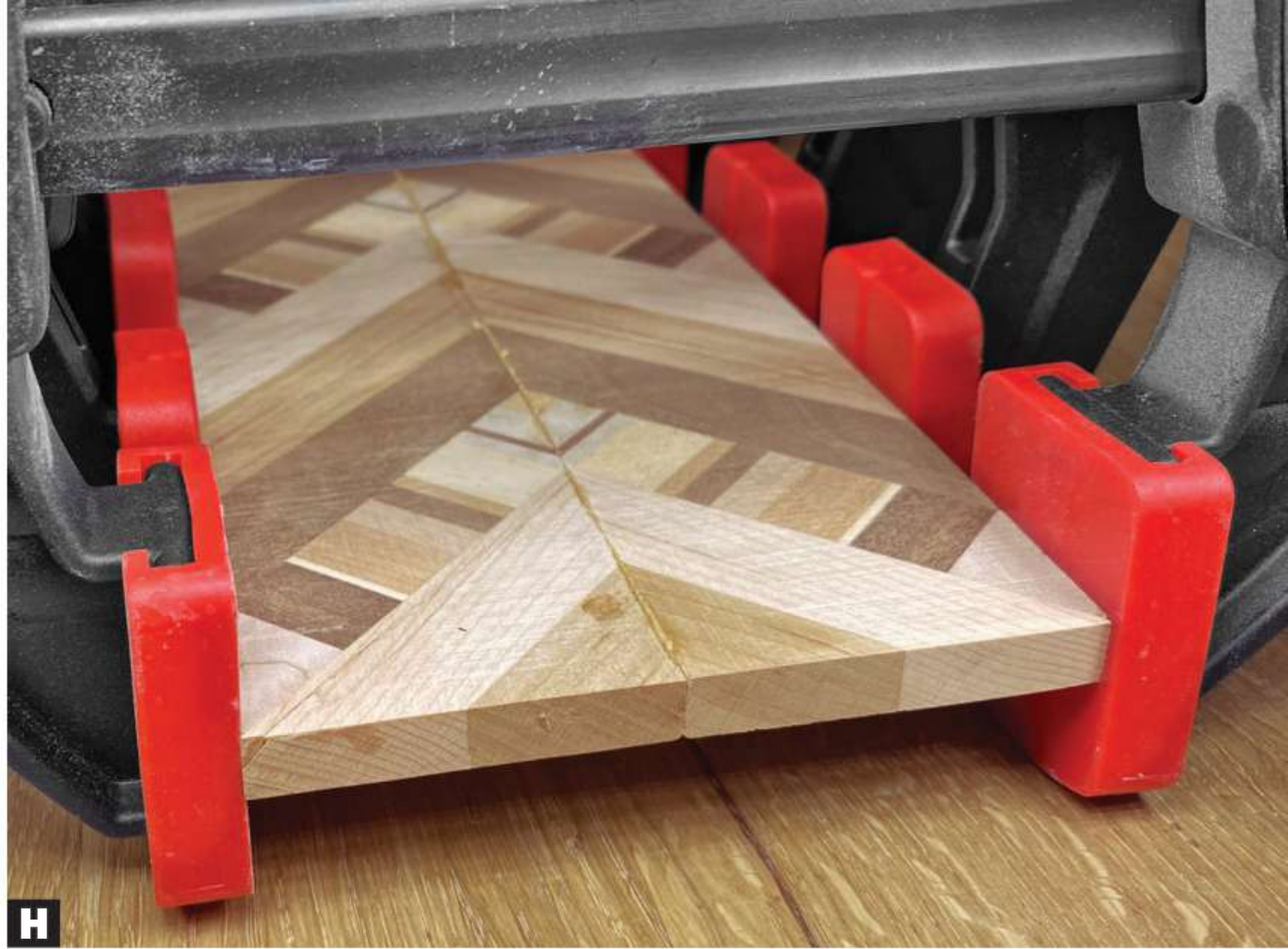
E Once the glue dries, glue and clamp the assemblies together, offsetting the ends, until you have combined them all.



F Overhang the strip assembly off the edge of the jig and cut away the corners. Remove the assembly from the jig and trim the opposite edge.



G Install a resaw blade in your bandsaw and cut on the centerline of the workpiece. You should end up with two halves about $\frac{5}{16}$ " thick.



H Glue the halves together, bandsawn faces up, using light clamping pressure. Take care to align the intersecting points at the center.



I Install a $\frac{1}{4}$ " rabbeting bit in your router table and rabbet the rear face of the frame. Use several progressively deeper passes to rout to a final depth of $\frac{3}{16}$ ".

Frame the arrows

- 1** Cut to size the frame stiles and rails (C–E). Drill pocket holes in the ends of the rails, staying clear of the inside edges where the rabbet will be cut later [Exploded View].
- 2** Glue, clamp, and screw the rails (D, E) to the stiles (C) [Exploded View].
- 3** Rout the rabbet in the back of the frame [Exploded View, Photo I]. Square up the corners of the rabbet with a chisel, then check the chevron panel for fit. Cut the back (F) to size.

Address your hang-ups

- 1** Finish-sand the frame, panel, and back (F), and apply a finish. We used a satin spray lacquer.
- 2** Insert the panel and the back (F) into the frame rabbet and secure the back with angled brads [Exploded View]. Don't glue the panel to the back or the frame so it can move with changes in humidity.

Tip! Sand the panel with a random-orbit sander to accommodate the varying grain directions in the pattern.

- 3** Install keyhole hangers on the backs of the stiles (C), 2" from the top of the frame [Exploded View].

- 4** [Exploded View]. Hang the coatrack wherever you could use a little extra support. 🌳

Materials List

Part		FINISHED SIZE			Matl.	Qty.
		T	W	L		
A	laminated strips	$\frac{3}{4}$ "	$\frac{3}{4}$ "	$3\frac{3}{4}$ "	*	6
B	solid-wood strips	$\frac{3}{4}$ "	$\frac{3}{4}$ "	$3\frac{3}{4}$ "	*	18
C	stiles	$\frac{3}{4}$ "	$1\frac{3}{4}$ "	$8\frac{1}{8}$ "	WO	2
D	top rail	$\frac{3}{4}$ "	$1\frac{3}{4}$ "	$21\frac{1}{2}$ "	WO	1
E	bottom rail	$\frac{3}{4}$ "	$2\frac{3}{4}$ "	$21\frac{1}{2}$ "	WO	1
F	back	$\frac{1}{4}$ "	$4\frac{1}{8}$ "	22"	Ply	1

Materials key: *-Wood species vary, see the instructions; WO-white oak; Ply-plywood.

Supplies: Pocket screws, #8 $\times$ 1 $\frac{1}{4}$ " flathead screws, #8 $\times$ 2" flathead screws, #16 $\times$ $\frac{3}{4}$ " brad nails.

Bit: $\frac{1}{4}$ " rabbeting router bit.

Sources: Keyhole fittings no. 28837 [pack of 2] \$2, Rockler, 800-279-4441, rockler.com. Hooks (4) no. YS05-175SN \$3.32, Hardware Resources, 800-463-0660, hardwareresources.com.

Produced by **Zach Brown** with **John Olson**
Project design: **John Olson**
Illustrations: **Roxanne LeMoine**, **Lorna Johnson**



Face-jointing Without a Jointer

Traditionally, a jointer flattens boards and a planer brings them to thickness (see [Parallel universe](#), *next page*). But if you don't own a jointer, or you need to flatten a board wider than your jointer beds, your planer or router can do the flattening when you follow these steps.



Parallel universe

The standard procedure for milling lumber starts with flattening one face of a board on the jointer, then surfacing the opposite face flat and parallel to the first at the planer. You may be tempted to skip the first step and head straight to the planer. But this approach usually yields less than satisfactory results.

With both a planer and jointer, the board travels over a bed while a spinning cutterhead shaves off material. On a jointer, you guide the workpiece by hand over the cutterhead, removing material from the bottom face. A planer's cutterhead removes material from the top face driven by pressure rollers that press the board flat to the bed. If the bottom face isn't flat, the board simply springs back to its distorted shape after clearing the rollers. So instead of a flat face, you end up with a board that is just as twisted as when you started (only thinner).



A

With the cupped surface facing down, glue and clamp runners to the edges of the workpiece.

Run along the sidelines

For a slightly cupped workpiece, attach a pair of runners to the edges of the board to support the workpiece during planing. Start by cutting a pair of runners 2" longer and thick enough so they stand $\frac{1}{8}$ " proud of the cupped board you're flattening. Place the board on your workbench or a flat surface, then attach the runners to the edges of the board with glue or double-faced tape [Photo A]. Make sure both runners rest flat on the worksurface.

With the board fully supported by the runners, feed it through the planer, taking light passes. The runners take the brunt of the force from the planer feed rollers, preventing them from distorting the workpiece during planing. With one face flat, remove the runners and flip the workpiece over to plane the opposite face.

For extra-wide or severely cupped boards, rip the board into two equal width pieces (cupped side facing up so the board doesn't bind the blade). Plane the pieces individually using runners. Then re-rip the edges at the tablesaw or joint them at the router table to ensure they're square to the now-flat faces before gluing them back together. (Mark the ends of the boards before planing so you can glue them back together in the same orientation.) This divide-and-conquer approach minimizes the amount of wood removed, yielding a thicker finished board.

► What's the difference between warp, twist, bowing, and cupping? woodmagazine.com/warptwistbowcup

Tip! Scribble lines across the face of the board to help monitor the planing progress.

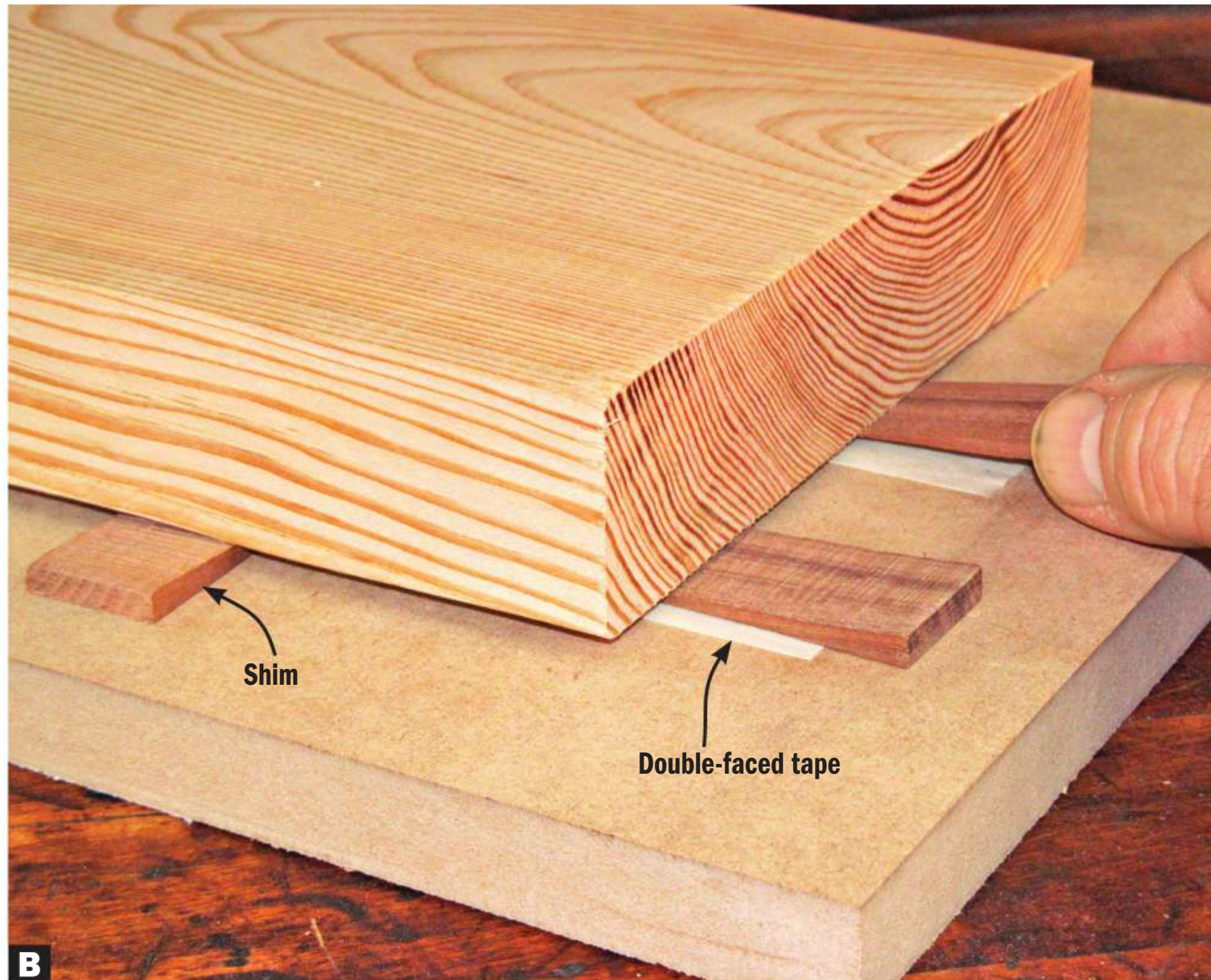
Resist the twist

A planer can also flatten one face of a twisted or warped workpiece, so long as you “fix” the workpiece in a stable position. To do this, make a sled from MDF or plywood a couple inches longer and wider than your workpiece (but not wider than your planer’s capacity). Glue to the top of the sled at the trailing end a cleat thinner than the stock you’re flattening.

Butt one end of the workpiece against the cleat and press down on the board at opposite corners to locate gaps where it doesn’t contact the sled. Insert wedges or shims under these trouble spots to remove the wobble [Photo B].

With the shims installed, feed the sled and workpiece through the planer, taking light passes until the face is flat [Photo C]. Remove the workpiece from the sled and flip it over to plane the opposite face flat.

Tip! For a severely twisted board, knock down the high spots on the bottom face with a hand plane first to reduce the amount of shimming needed.



B After shimming the board so it rests solidly on the sled, remove the shims one at a time and secure them with double-faced tape.



C Support the sled as it exits the planer to avoid snipe on the end of the workpiece.



D

Using a flat-bottom planer or dado bit [Sources], work your way back and forth along the length of the board to flatten the entire surface.

Going wide

Flattening slabs or boards wider than the width of your planer presents some additional challenges. If ripping the boards to fit through your planer isn't an option, consider skipping the planer altogether and using a router flattening jig. Start by cutting a plywood base large enough to accommodate the piece you wish to flatten [Drawing 1]. Add a pair of rails along the edges. Make a carriage to straddle the base and cut a piece of acrylic to fit inside the carriage. Remove the subbase from your router and mount the router to the acrylic plate [Drawing 2]. Attach a fitting for your shop vacuum hose [Sources] to the plate.

To use the jig, place the workpiece on the base and shim underneath to prevent rocking. Screw hardwood cleats to the base to trap the workpiece. With a shop vacuum attached, rout back and forth across the workpiece, taking no more than a $\frac{1}{8}$ "-deep cut [Photo D]. Slide the carriage along the base until you've worked the entire length of the board. If necessary, plunge the bit a little deeper and take another series of cuts, until you flatten the entire face. Then flip the board over, remove any shims, and repeat the process to flatten the second face. Sand both sides to remove the router marks. 🌳

Produced by **Vince Ancona**

Illustrations: **Roxanne LeMoine, Lorna Johnson**

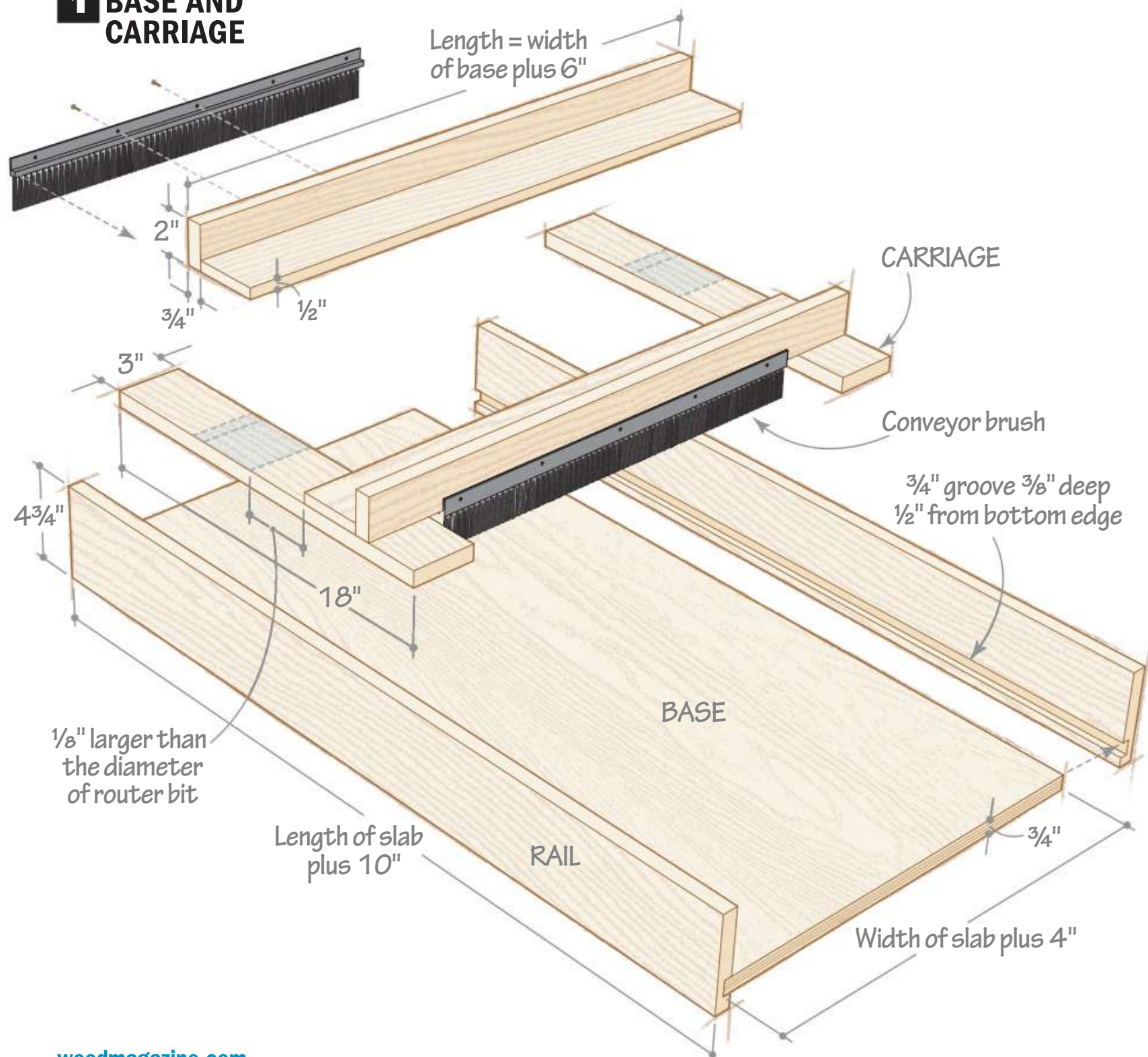
Sources:

Conveyor brush: 2" x 6' conveyor strip brush, no. 7372T11, \$75.51; $2\frac{7}{16}$ " x 3' (right-angle) conveyor strip brush, no. 7372T15, \$41.97, McMaster-Carr, 630-833-0300, mcmaster.com.

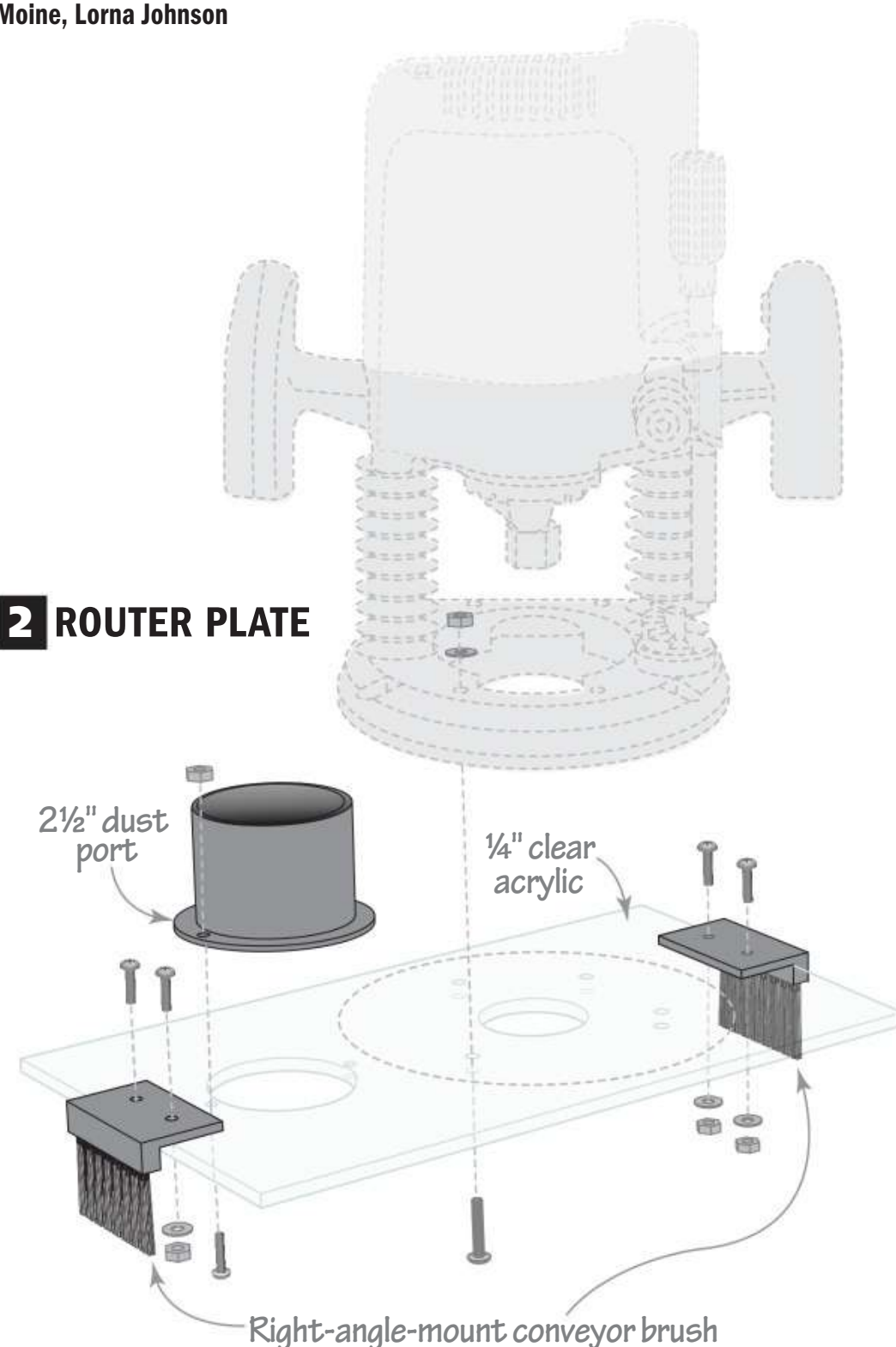
Dust port: $2\frac{1}{2}$ " dust port, no. 42137, \$5.99, Rockler, 800-279-4441, rockler.com.

Bits: 2" dado and planer bit, no. 52-506, \$99.90; $1\frac{1}{2}$ " dado bit, no. 52-504, \$49.90, Infinity Cutting Tools, 877-872-2487, infinitytools.com.

1 BASE AND CARRIAGE



2 ROUTER PLATE



SHOP TEST

Deluxe 14" Bandsaws

These saws deliver big resaw capacity and excel as precision curve-cutters.

How we chose the field

To be included in our test group, each bandsaw had to meet the following criteria:

- ◆ a 1¼-hp or larger 110-volt motor;
- ◆ at least 12" of resaw capacity;
- ◆ cost between \$1,300 and \$1,850.

► Due to pandemic-related supply issues, we could not test either of Laguna's saws that fit this category.

If you can own only one bandsaw—and that's the reality for most home woodworkers—one of these models fills that sweet spot between bare-bones entry-level models and powerful and pricey 17"-and-up resaw kings. Compared to lesser-priced 14" saws, this class typically features quick-release blade-tension levers, larger tables, rack-and-pinion table-tilt and blade-guard mechanisms, more powerful motors, and about double the resaw capacity. (The Powermatic PWBS-14CS comes with a riser block; you must disassemble the saw and add this extension.)

Of the seven models we tested head-to-head in the *WOOD*® magazine shop, three are of the traditional cast-iron C-frame style; the other four use a steel-frame cabinet design. While at first, frame type might not seem like a major buying decision, some factors tend to be common in similarly designed saws. Here's what you need to know.



► **Resawing:** ripping a board standing on its edge (as shown on *previous page*). Learn how: woodmagazine.com/bandsawresaw

Big capacity requires big power

It takes a lot of muscle to rip through 12" and wider hardwoods. To see if these saws were up to the task, we outfitted each with a $\frac{3}{4}$ " 3-tpi blade, then resawed 24"-long pieces of red oak $\frac{1}{8}$ " narrower than each model's maximum resaw capacity, feeding them as fast as the saw could handle. We were impressed with the performance of both the steel-frame Grizzly G0817 and Shop Fox W1849 that managed 14"-wide cuts—the widest in the test—without bogging down. Conversely, we could easily stall the C-frame Jet JWBS-14DXPRO and Powermatic; however, they cut just fine when we sawed at a more realistic rate.

Power is great, but not at the expense of accuracy, so next, we resawed $\frac{1}{8}$ " slices at a more deliberate feed rate and measured each test piece for deviation in thickness top to bottom and end to end. Again, the Grizzly G0817 and Shop Fox, as well as the Grizzly G0555XH, excelled, with deviations of less than .010"—impressive. Workpieces cut on the Jet DXPRO deviated no more than .030" (less than $\frac{1}{32}$ "). We found the biggest deviation (.125", $\frac{1}{8}$ ") in pieces cut with the Powermatic.

These saws handle curves well

Cutting curves—a bandsaw's other primary function—relies more on finesse than power, so, with a $\frac{1}{4}$ " 10-tpi blade on each

machine, we cut circles of $1\frac{1}{4}$ ", $1\frac{3}{4}$ ", $2\frac{1}{4}$ ", $2\frac{3}{4}$ ", and $3\frac{1}{4}$ " diameters. Next, we cut out a 6"-tall block-letter "S" from $\frac{3}{4}$ "-thick poplar, to test each saw's ability to make curved cuts without backing up.

All of the saws performed well in these tests. The blades never popped out of the guides, and our tester had no trouble following the pattern lines.

Guides keep a blade on track

Let's be honest: Nobody *likes* tinkering with their saw's blade guides after a blade change to get them spot-on. If it were an easy task, we'd all change blades to suit each cut, rather than making do with the blade already installed.

So, to make this chore as painless as possible, choose a saw with guides that adjust easily and accurately. Blade guides (*below*) limit blade deflection both side-to-side (side guides) and front-to-back (thrust bearing) when cutting, and we found two basic types on these saws—ball bearings and steel discs. Although both proved equally effective, we prefer ball bearing guides, especially those with cam-style adjusters for fast and easy adjustments.

Most of the tested saws use cam-mounted bearings for both the upper and lower guides—we found the Grizzly G0817 easiest to adjust overall—but the Jet JWBS-14SFX uses a difficult-to-access sliding system on

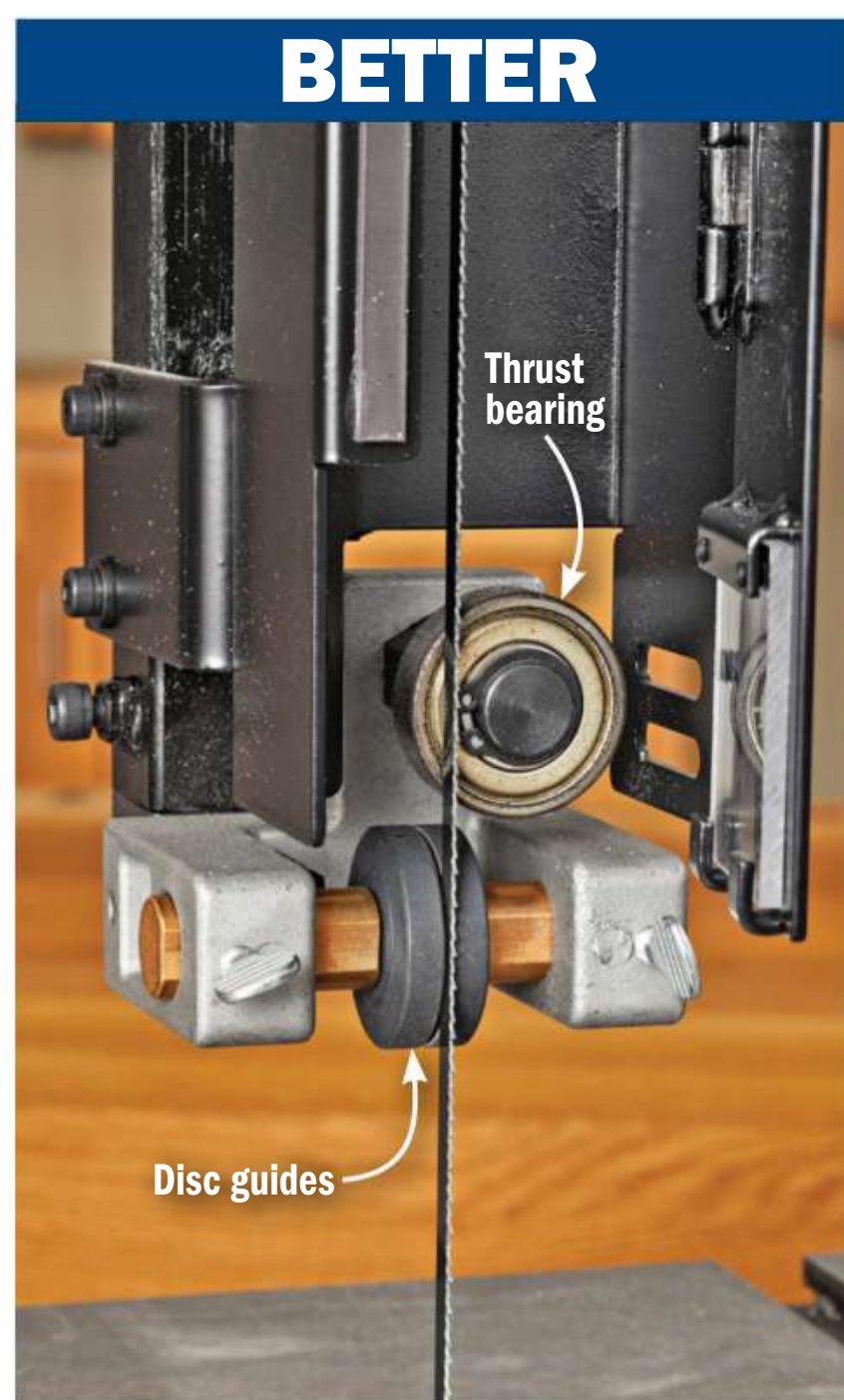


► We used new Carter AccuRight blades on each bandsaw during testing. All blades were tensioned using the $\frac{1}{4}$ " deflection method with all guides retracted. Learn to do this and set up your bandsaw for best performance. woodmagazine.com/bstuneup

► Learn to coil a bandsaw blade for storage. woodmagazine.com/coilblade



Stacked-bearing side guides (shown on the Grizzly G0555XH) provide single-bearing support for narrow blades, while both support wide blades. The in-line thrust bearing prevents the blade from moving backward during cuts.



Large fixed-disc side guides (on the Shop Fox W1849) effectively trap the blade to prevent side-to-side deflection, and the perpendicular-mounted thrust bearing works well as the blade rubs against its face.



Large stacked-bearing side guides (on the Grizzly G0817), about one-third larger than those on other saws, provide better surface contact with the blade. The perpendicular-mounted thrust bearing works well.



Blade guards below the table hide or impede access to the lower blade guides. These (on the Jet SFX) have hex-wrench access holes.

► **Backlash:** a brief lack of movement when reversing adjuster-screw rotation.

the lower guides that sometimes fell out of alignment when releasing tension on the blade. Instead of cam adjusters, Rikon's spring-loaded side guides press into place and secure without tools, but the spring tension makes fine adjustments difficult.

Some saws provide knurled-knob micro-adjusters for setting the side guides fore and aft on the blade. We found them handy, but with as much as $\frac{3}{4}$ -turn backlash, not terribly precise.

Each saw wraps a blade guard around the lower guides (shown *above*) that makes adjustments to those guides difficult. Some guards could be removed, but with others we had to set the guides by feel rather than by sight.

The upper guide posts on most saws came from the factory adjusted to maintain alignment with the blade throughout their vertical travel. We found it easy to realign the Jet DXPRO, but the Rikon proved more difficult. All models except the Powermatic have a rack-and-pinion guide-post assembly height adjustment—a nice feature that allows one-handed operation. Upper blade guards on the C-frame saws proved more cumbersome than those on the steel-frame saws.

Set the blade for success

All saws but one successfully tensioned and tracked $\frac{1}{4}$ " and $\frac{3}{4}$ " blades as set up from the factory. We had trouble initially getting a $\frac{3}{4}$ " blade to tension fully on the Rikon. After talking with Rikon's technical support, we made an adjustment to extend the jam nuts at the top of the tension bolt, which worked, but is not covered in the owner's manual.

All seven saws incorporate a blade-tension quick-release lever, but none of those on the



Powermatic's tension-release lever often hangs up on the upper guide post, blade guard, or task light. We had to reposition these at times to release blade tension.

C-frame saws released enough tension so we could remove the blade. As a result, we had to release additional tension with the adjustment knob. Powermatic's mechanism, shown *above*, proved irksome.

Also, the steel-frame saws have large, easily grasped tension-adjustment knobs (good) or handwheels (better). The Grizzly G0817 and Shop Fox mount the handwheel below the upper wheel housing, where it's easy to reach. Small, top-mounted knobs on the C-frame machines proved more difficult to operate.

We found adjusting and securing the blade tracking on all the saws easy enough, but prefer the large knobs and wing nuts on the steel-frame saws to the tiny thumb-screws and wing nuts on the C-frame machines.

We timed how long it took to change from a $\frac{3}{4}$ " blade setup to $\frac{1}{4}$ " on each saw, including resetting all guides and thrust bearings. The Grizzly G0555XH proved quickest, requiring only 11 minutes; the Jet SFX took more than twice as long. (See grades on *page 44*.)

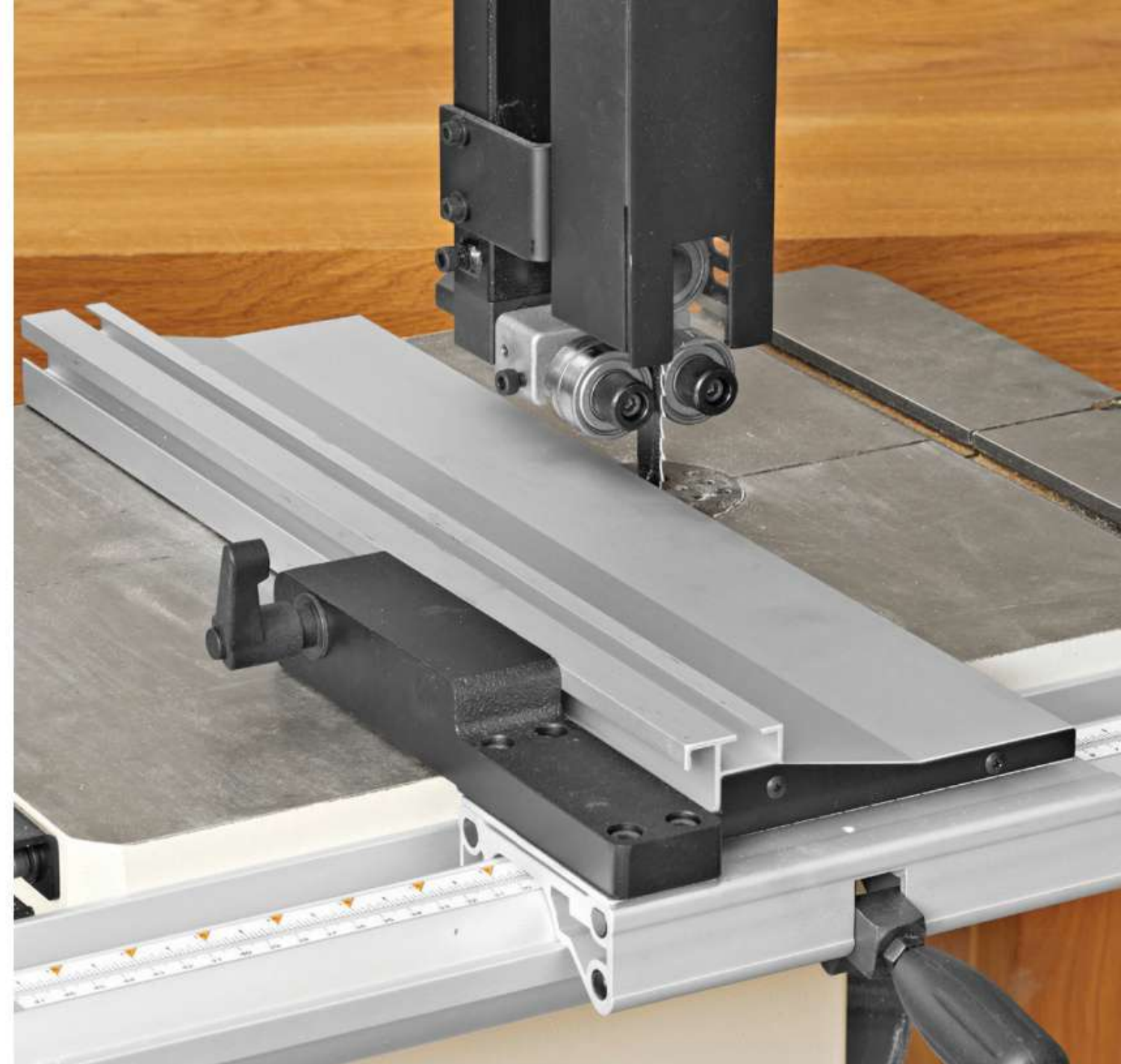
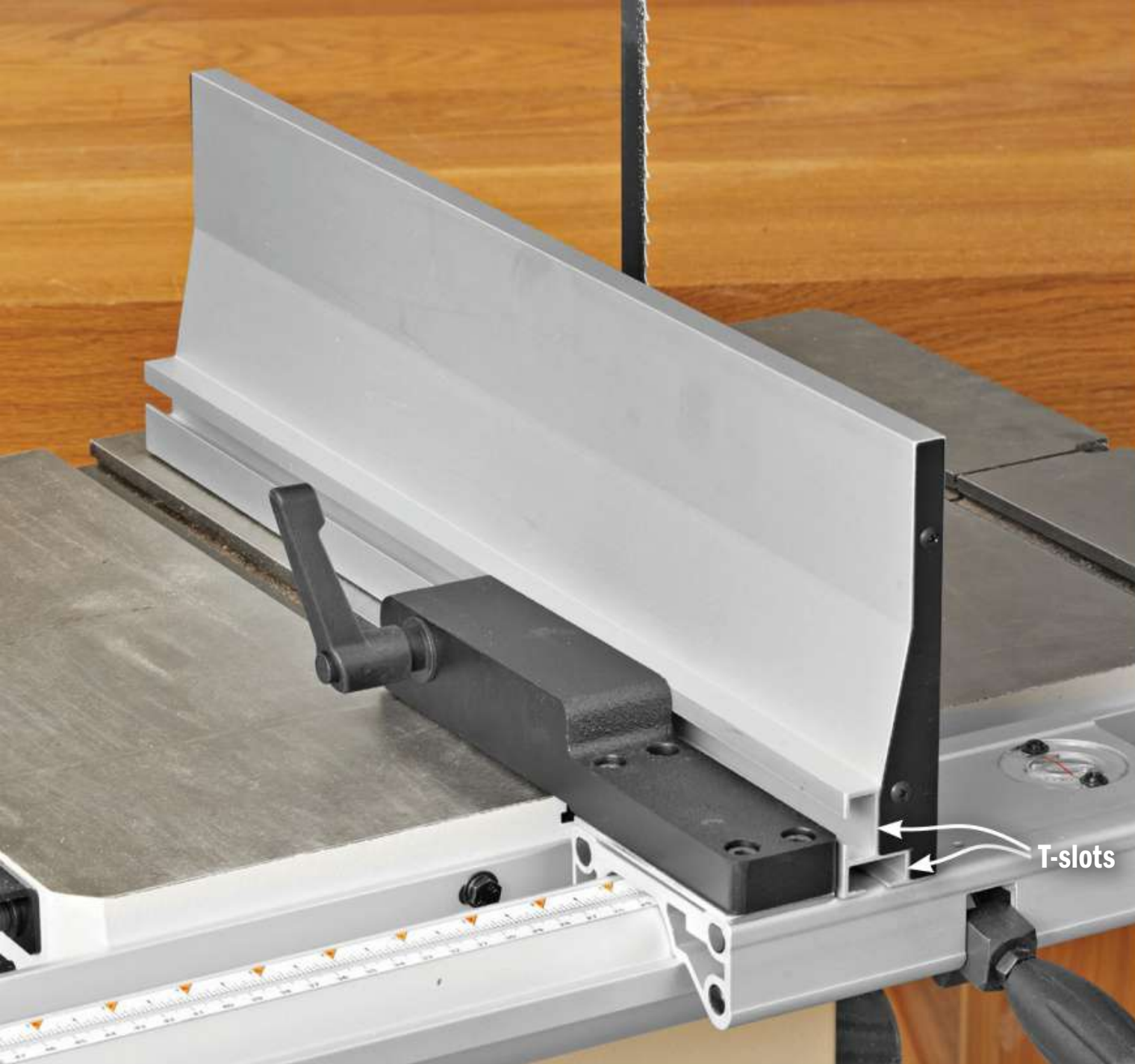
The blade-exit slot in the front of Rikon's table eases blade removal on any width of blade, even saw-maximum $\frac{3}{4}$ " blades that commonly scraped the table center cutout of side-slot machines as you rotate them to line up for installation.

The highs and lows of fences

Each saw except the Jet DXPRO comes with a rip fence. The fences on all but the Powermatic offer you high or low orientation (6" high, $\frac{1}{2}$ " low), shown on the *next page*. Powermatic's fence stands just 2" high, and although it comes with a removable resaw pivot post, it lacks the height needed to pro-

► Choose the right blade for each bandsaw task. woodmagazine.com/bsblades

► Amp up your ordinary bandsaw with deluxe accessories. woodmagazine.com/topbsacc



Two-position fences stand upright for resawing, or lie flat, extending beneath the guides for narrow ripcuts. These fences connect to the fence head by a T-slot.

vide good support for workpieces standing more than 5" high when resawing.

Rikon's fence features an adjustment mechanism for aligning the fence face parallel to the blade. But we had to shim the locking knob to tighten the fence face against the base. And, because the base of this fence (and that on the Jet SFX) wraps around the steel guide rod, it requires some multistep maneuvering to remove it.

► We used a Carter Products MagFence with 5"-tall face on the Jet DXPRO for all power and resaw tests.

We love large, easy-tilt tables

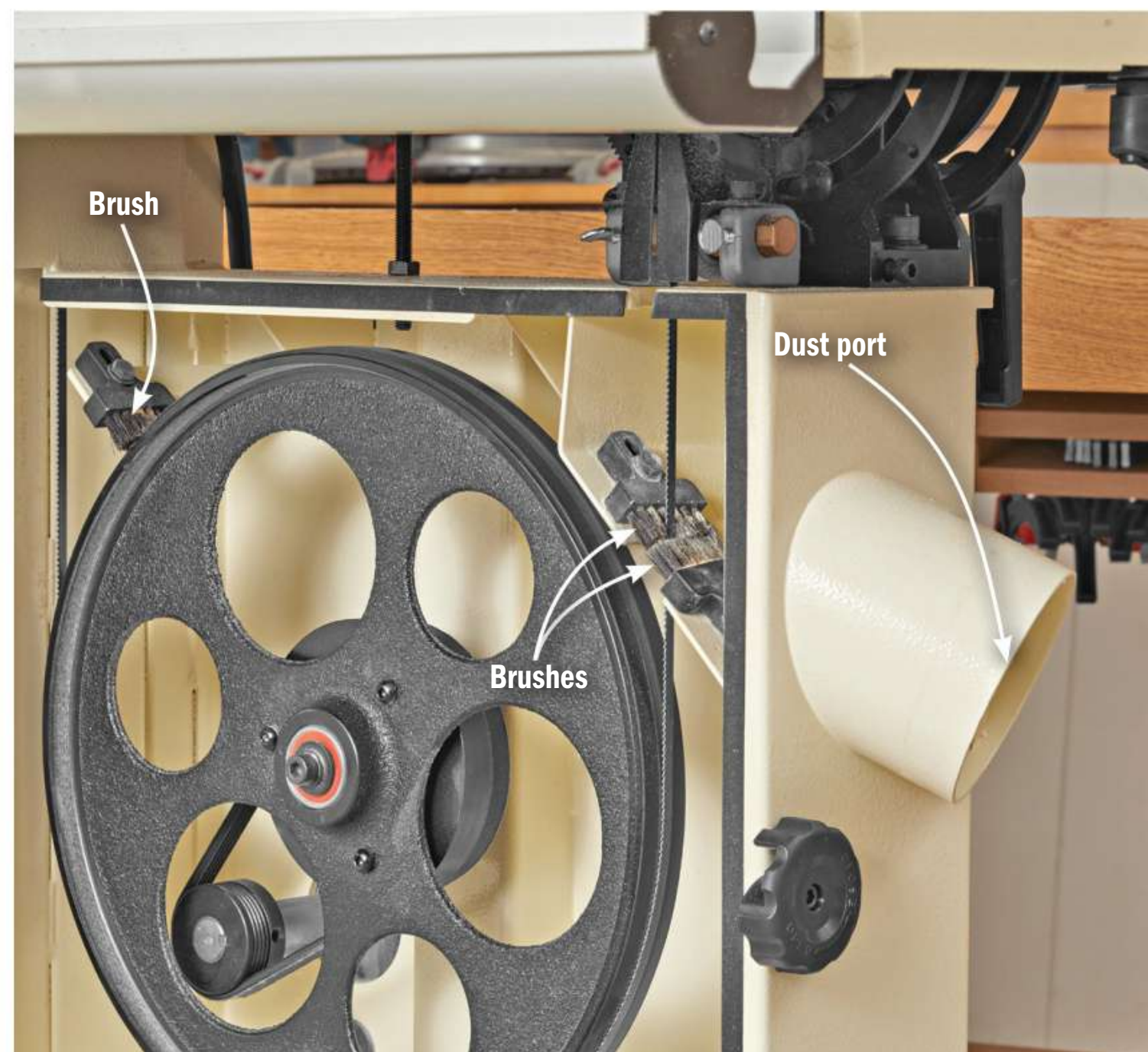
All saws except the Jet DXPRO provide cast-iron tables significantly larger than those on lower-priced 14" bandsaws. This Jet and the Powermatic have one miter slot; the other tables have two slots, providing more options.

Table heights range from 37" to 44" above the floor. When you consider table height, think about the kind of work you'll do most on this bandsaw. Low tables prove more ergonomic for resawing, but you might be more comfortable sitting on a stool when cutting curves or doing other close work. High tables allow you to work comfortably when standing, but can make resawing large pieces awkward.

Each saw's table tilts at least 45° to the right and at least 5° left. The Grizzly G0817, Rikon, and Shop Fox use a single-trunnion, rack-and-pinion mechanism to tilt their tables, which makes fine adjustments easy. The C-frame saws have two trunnions, which partially block the front view of the lower blade guides and impede access to the trunnion bolts, making squaring the table to the blade difficult.

Dust collection: More is better

Each saw incorporates a 4" dust-collection port at the bottom of the lower-wheel cabinet, and the Grizzly G0817, Jet SFX, and Shop Fox add a second port just below the lower guides, as shown *below*. A brush on each saw helps to reduce debris from building up on the lower tire. All these brushes proved effective except on the Jet DXPRO and Powermatic.



The Grizzly G0817 and Shop Fox (shown) use two additional brushes to remove debris from the blade just below the table and funnel it into a side dust port.

Tricked-out 14" bandsaws deliver the goods

MODEL	PERFORMANCE RATINGS (1)											BODY STYLE (2)	BLADE SPEEDS, FEET PER MINUTE	RATED MOTOR HORSEPOWER	BLADE, INCHES		CUT CAPACITIES, INCHES	
	PRIMARY					SECONDARY									LENGTH	WIDTH (MIN., MAX.)	MAXIMUM RESAW HEIGHT	MAXIMUM CUT LEFT OF BLADE
	OBSERVED POWER	CURVE-CUTTING ACCURACY	ABSENCE OF BLADE DEFLECTION	EASE OF ADJUSTING BLADE GUIDES	EASE OF CHANGING BLADES	EASE OF ADJUSTING BLADE TENSION	EASE OF ADJUSTING BLADE TRACKING	EASE OF TILTING AND LOCKING TABLE	RIP-FENCE EFFECTIVENESS	MITER-GAUGE EFFECTIVENESS	DUST-COLLECTION EFFECTIVENESS							
GRIZZLY G0555XH	B+	A	A	B+	A	C	B-	B	A	B	B	C	3,000	1¾	105	⅛—¾	12¼	13⅝
GRIZZLY G0817	A	A	A	A	A	A	A	A	A	B	A	S	2,820	2	120	⅛—¾	14¼	13⅝
JET JWBS-14SFX	A	A	B	B-	B-	A-	A	B	A	N/A	A	S	3,000	1¾	116	⅛—¾	13⅜	13½
JET JWBS-14DXPRO	B-	A	B+	B+	B	B	B-	B	N/A	N/A	C	C	1,500/3,000	1¼	105	⅛—¾	12¼	13⅝
POWERMATIC PWBS-14CS	B-	A	C	B+	A-	B-	B-	B	C	B	C	C	3,000	1½	105	⅛—¾	12¼	12¾
RIKON 10-326	B	A	B	B-	B+	A	A	A	A-	N/A	A	S	1,445/2,950	1¾	111	⅛—¾	13¼	13⅝
SHOP FOX W1849	A	A	A	A-	A	A	A	B+	A	N/A	A	S	2,820	2	120	⅛—¾	14½	13⅝

Bandsaw bits and pieces

■ **Hit the lights.** Two saws incorporate a task light that works with a standard screw-in bulb, and activates with a separate switch. The Grizzly G0555XH's light has its own power cord to plug in, but the Powermatic's light is wired directly to the saw, saving a space at the wall outlet. The Jet SFX and Rikon include built-in outlets for an after-market light, but neither includes one.

■ **Onboard storage.** Five saws have a storage compartment in their bases for blades and accessories. The Grizzly G0555XH, Jet DXPRO, and Rikon have large cabinets; the Grizzly G0817 and Shop Fox have 4"-deep cabinets. Powermatic's cabinet contains its motor (no room for storage), but provides surface-mount holders for the rip fence and miter gauge.

■ **No miter, no matter.** Both Grizzlies and the Powermatic come with a miter gauge, but because we seldom use a miter gauge on a bandsaw, we don't consider this a vital buying point.

■ **Quick stop.** Only the Grizzly G0817 incorporates a foot-pedal blade brake for faster stops. The other saws need 20–40 seconds to coast to a stop.

■ **Details, details.** A chart inside the Rikon's upper door contains lots of helpful

quick references, such as blade length and widths, as well as tips for choosing blades.

■ **Clear the way.** Powermatic's blower clears dust from the cutline in front of the blade, but we found its mounting bracket flimsy and easy to bend.

■ **Get amped.** Power cords on the Grizzly G0817 and Shop Fox come with a 20-amp plug, requiring a matching 20-amp outlet. The other saws use a 15-amp plug.

■ **Two speeds.** The Jet DXPRO and Rikon have two blade speeds: the faster for cutting wood, and the slower for cutting nonferrous metals and plastics.



Lean on me. Outriggers on the Jet DXPRO base cabinet add stability, but also increase its overall footprint.

TABLE				BLADE GUIDES		ACCESSORIES (5)		OVERALL DIMENSIONS, INCHES (W x D x H)	DUST-COLLECTION PORT(S) DIAMETER, INCHES	WEIGHT, POUNDS	POWER CORD LENGTH, INCHES	WARRANTY, YEARS	COUNTRY OF ASSEMBLY (6)	SELLING PRICE (7)	CONTACT INFORMATION
WIDTH x DEPTH, INCHES	HEIGHT FROM FLOOR, INCHES	TILT RANGE, DEGREES (RIGHT, LEFT)	NUMBER OF TRUNNIONS	SIDE GUIDES (3)	THRUST BEARINGS (4)	STANDARD	OPTIONAL								
21¾x16½	44	50/5	2	B	C	C, F, L, M		26x31x74	1@4"	276	68	1	T	\$1,475	800-523-4777, grizzly.com
21¾x16	37	45/10	1	B	F	C, F, M	L	29x32½x76	2@4"	319	76	1	T	\$1,695	800-523-4777, grizzly.com
21½x17¼	40½	48/6	1	B	C	F	L, M, P	37x27½x75¾	2@4"	272	95	5	C	\$1,300	800-274-6848, jettools.com
15x15	43¾	45/10	2	B	C	C	F, M	26¾x29x72¾	1@4"	247	70	5	T	\$1,300	800-274-6848, jettools.com
20¾x15	44	50/14	2	B	C	F, L, M		30x20x74½	1@4"	250	72	5	T	\$1,400	800-274-6848, powermatic.com
21½x15¾	40¾	45/6	1	B	C	C, F, P	M	29x25¾x75	1@4"	285	79	5	C	\$1,500	877-884-5167, rikontools.com
21¾x16½	37	45/10	1	D	F	C, F	B, M, P	27½x32x76	2@4"	347	95	2	T	\$1,827	800-840-8420, shopfox.biz

1.

A

B

C

D

N/A

Excellent
Good
Fair
Poor
Not applicable
2.

(C) Cast-iron C-frame
(S) Steel-framed cabinet
3.

(B) Bearings
(D) Discs
4.

(C) Blade contacts circumference of bearing
(F) Blade contacts face of bearing
5.

(B) Bearing blade-guide kit
(C) Storage cabinet in base
(F) Rip fence
(L) Task light
(M) Miter gauge
(P) Pushstick
6.

(C) China
(T) Taiwan
7.

Prices current at time of article production and do not include shipping, where applicable.

Put your deluxe dough here

Two similar saws rose to the top of this deluxe field: the Grizzly G0817 and Shop Fox W1849. Their blade guides differ and the Grizzly offers a foot brake. Both performed at or near the top of every test we performed, and they have useful features we appreciate, so they share Top Tool status. You can't go wrong with either. 🌲

Produced by Bob Hunter with Jan Svec



Grizzly G0817



Shop Fox W1849



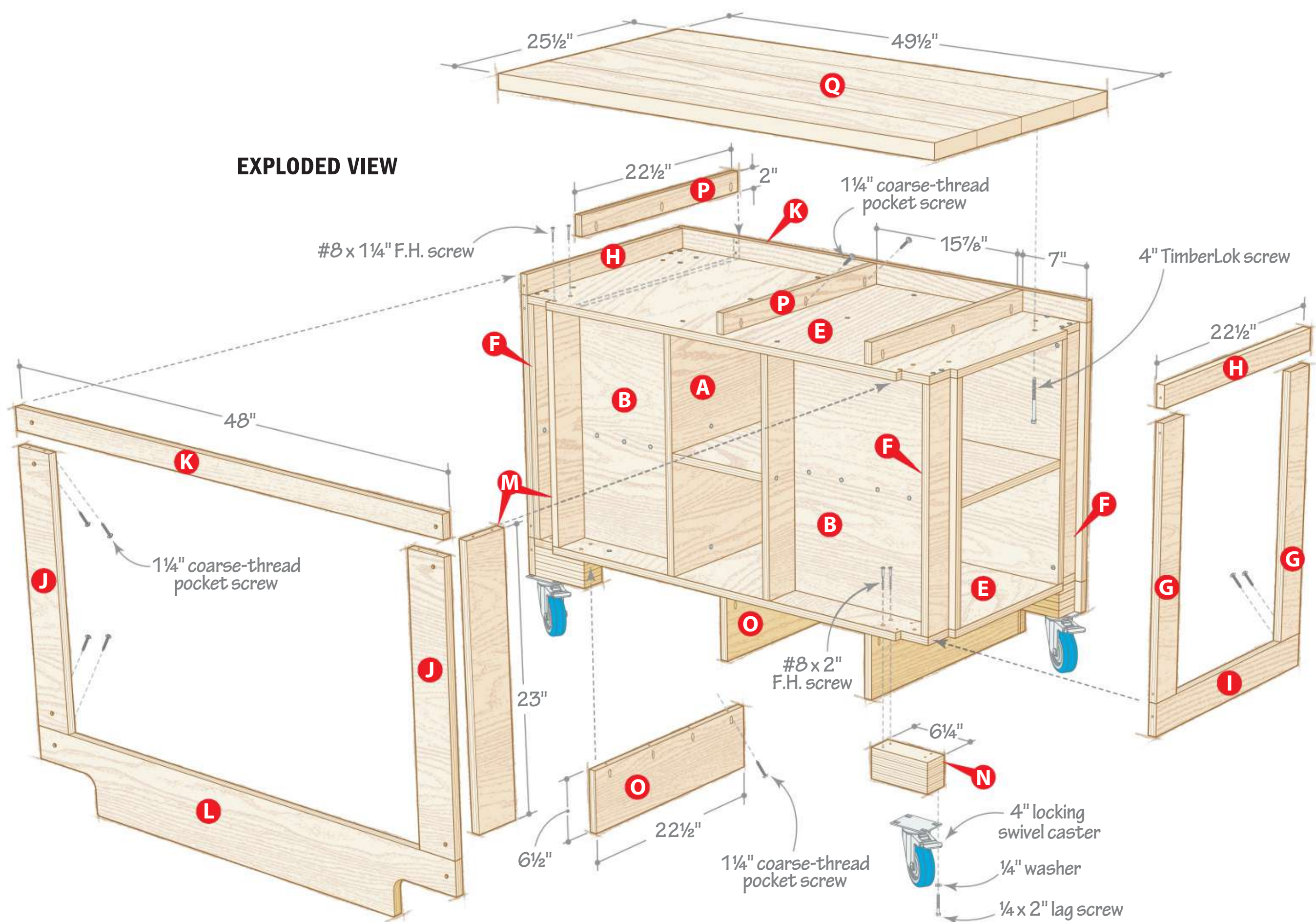
Everyday DIY Workbench

*Save your
woodworking bench
for working
with wood.*

D I M E N S I O N S :
49½" W x 25½" D x 36" H

Approximate
materials cost:
\$350

6
Shelves
for
storage



Few of us have the luxury of a second workshop for messy DIY projects, such as sharpening a lawn mower blade or cutting and grinding angle iron. Those kinds of projects can leave a woodworking bench in tatters, with bolt threads impressed in maple vise jaws and metal filings just waiting to rust beneath your next water-based finish.

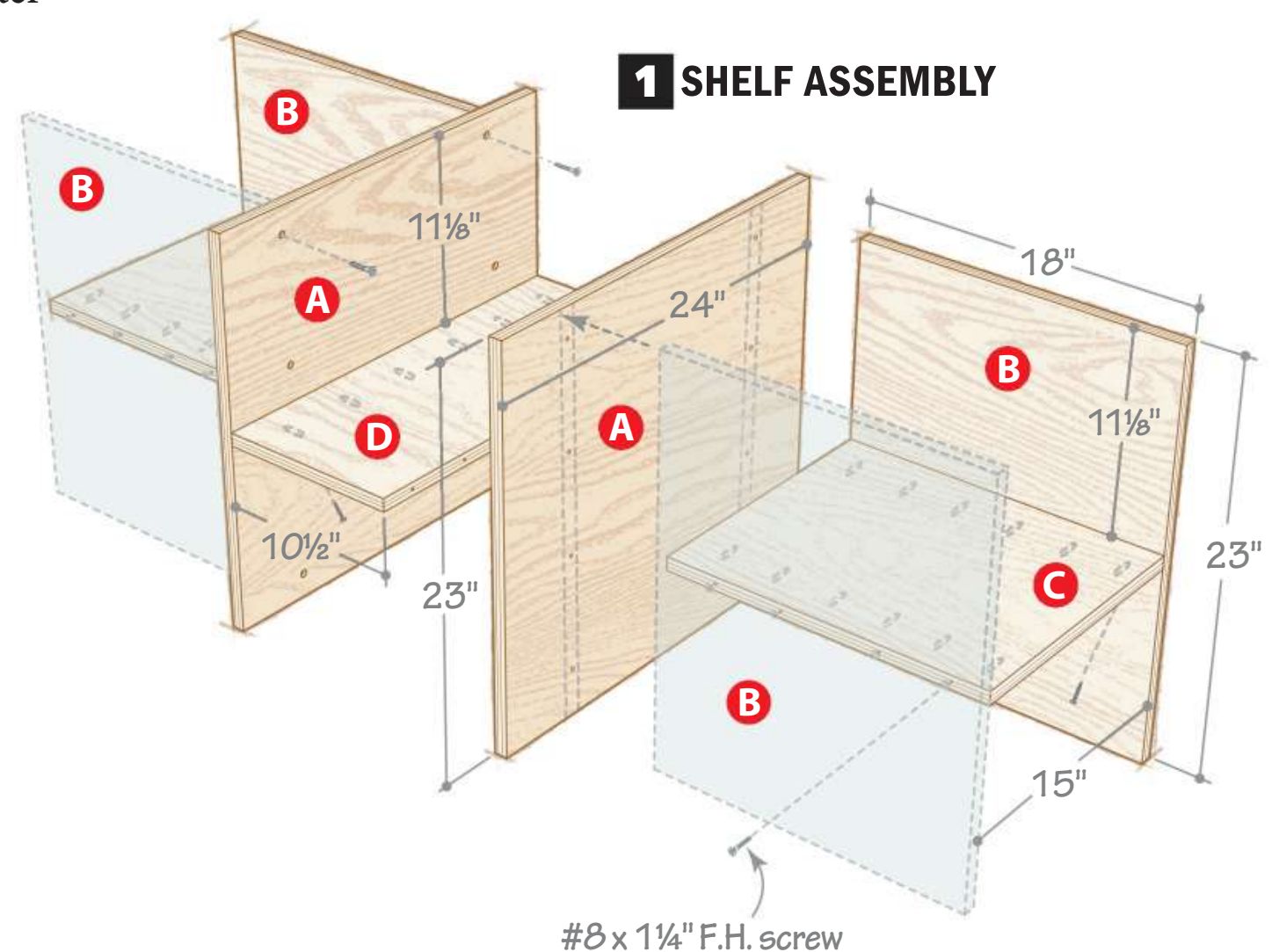
This mobile bench provides DIY jobs a durable worksurface, metal-jaw mechanic's vise, and storage for tools like hacksaws and mill files. Got a really messy job? Wheel the bench out onto the driveway.

Start at the heart of the bench

The nominal $\frac{3}{4}$ " Baltic birch plywood we used for this project actually measures 18mm, or closer to $\frac{11}{16}$ ". Although not a huge difference, it adds up as you assemble parts or laminate two or more layers together. For this reason, read the instructions carefully to learn when to cut the individual parts to fit as you go, rather than all at once.

1 Three H-shape assemblies make up the core of the workbench [Drawing 1]. To build them, cut parts A–D to the sizes on the Materials List.

2 Drill pocket holes in the end and center shelves (C, D) [Drawing 1]. Glue and screw





A For extra strength, reinforce the pocket-screw joinery with glue and flathead screws driven from the opposite side, avoiding the pocket holes.

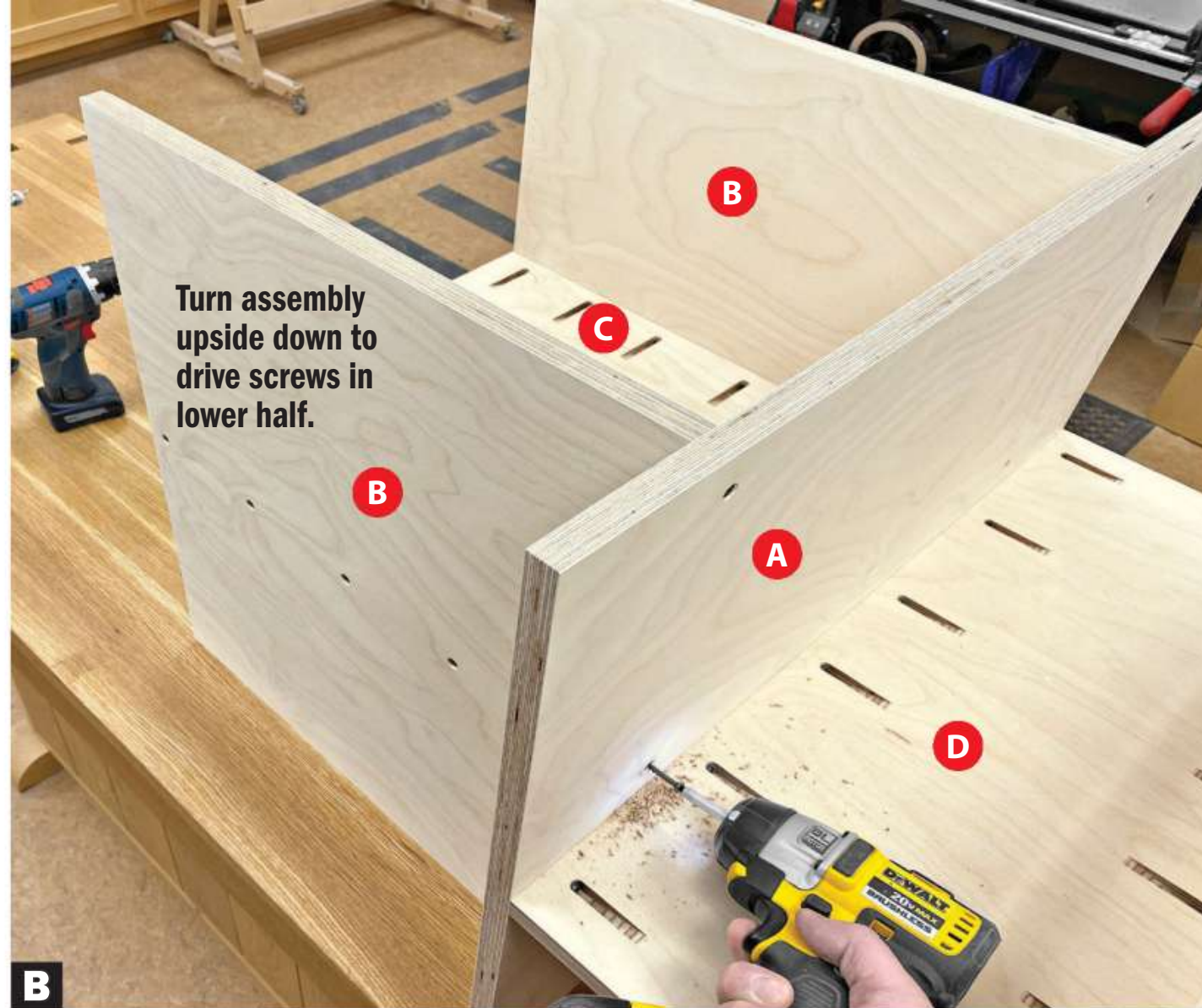
Tip! Drill $\frac{1}{8}$ " countersunk pilot holes for the #8 screws.

together the end assemblies (B/C) [Photo A] and the center assembly (A/D). Then glue and screw the end assemblies to the center assembly [Photo B].

3 Measure the length and width of the core (A-D) and cut the top and bottom plates (E) to those dimensions, noting the grain direction [Materials List].

4 Center the core on each plate (E) and lay out the notch locations, taking into account the thickness of the plywood [Drawings 2, 2a]. Jigsaw the notches and glue and clamp the plates (E) to the core.

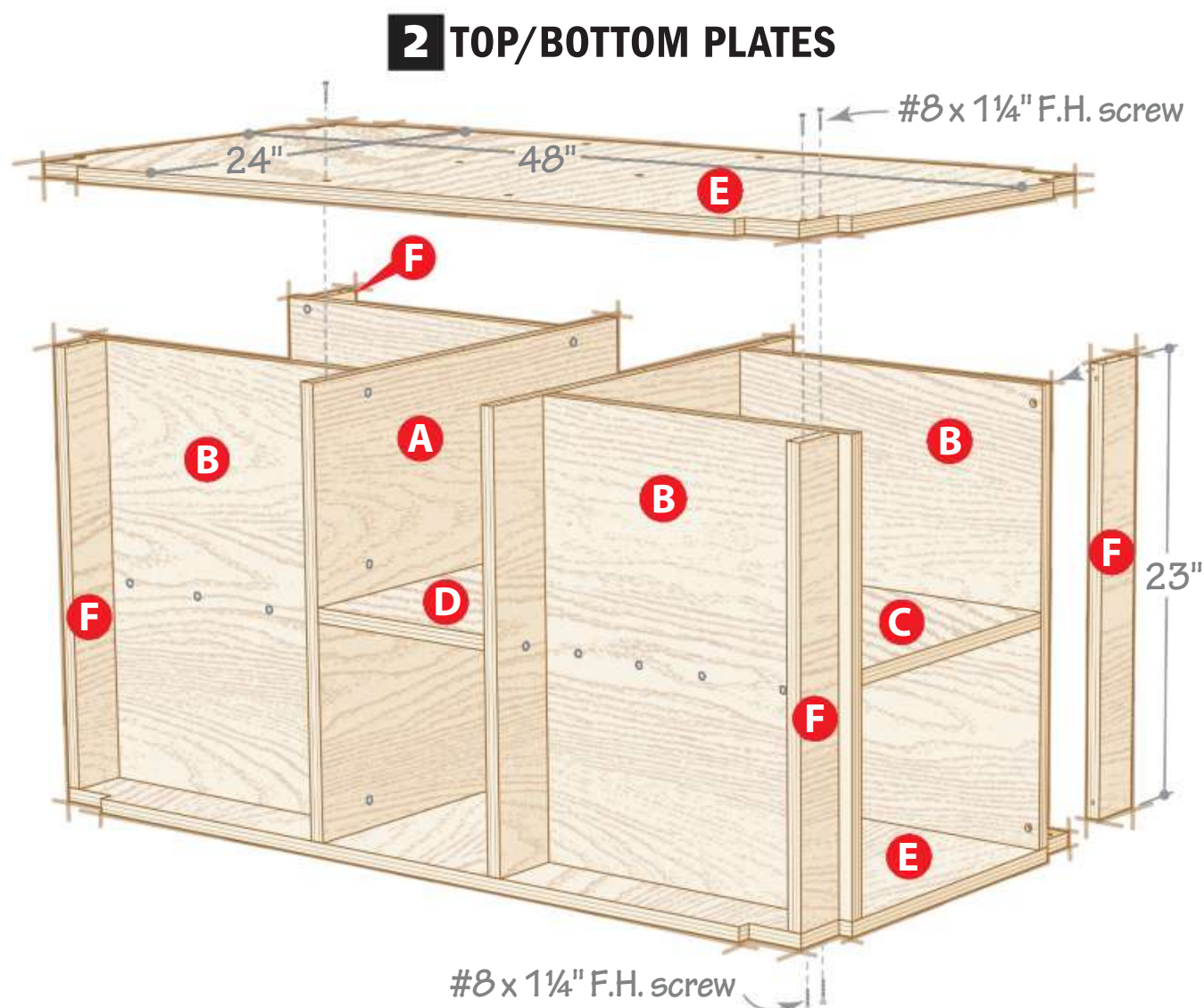
5 Noting the grain direction, measure for the width and length of the corner supports (F) and cut them to size [Drawing 2, Photo C]. Glue and screw the supports between the top and bottom plates (E) [Photo D].



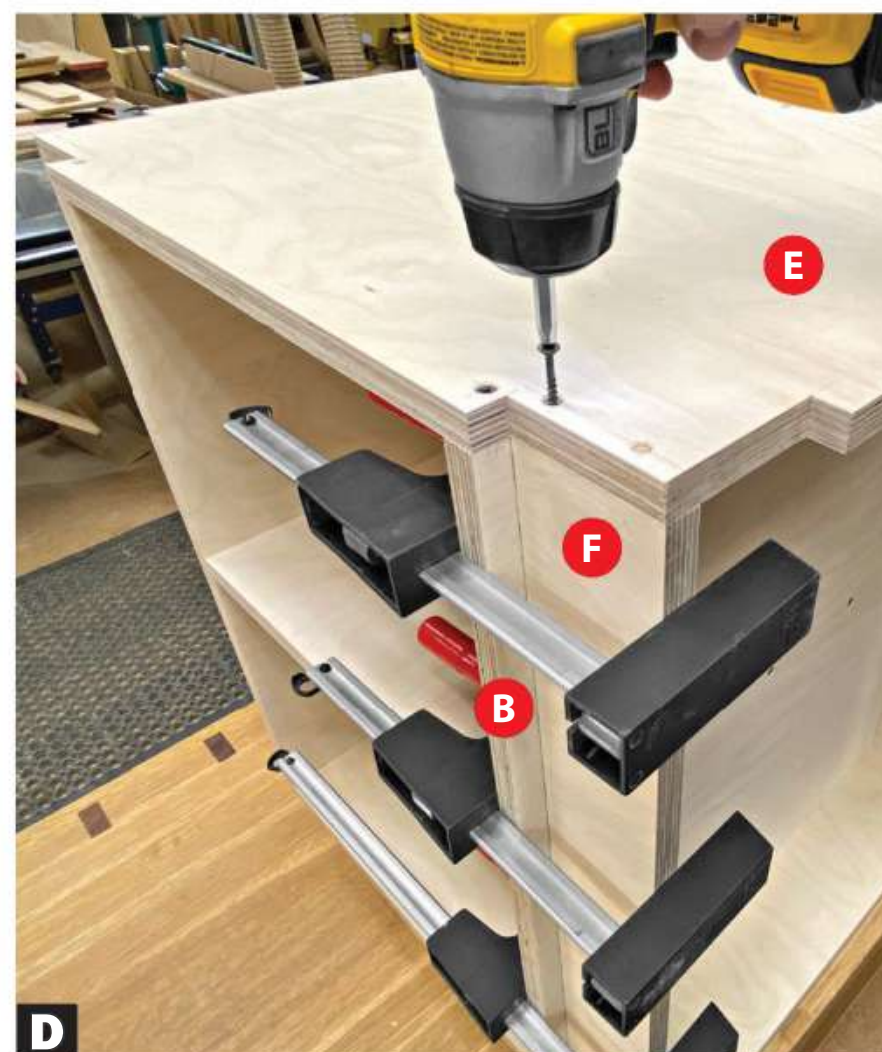
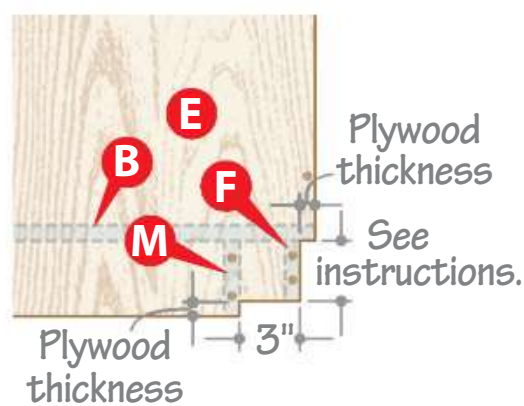
B Turn assembly upside down to drive screws in lower half. Center an end assembly (B/C) on a center partition (A). With the end partitions parallel, drill pilot holes and drive screws.



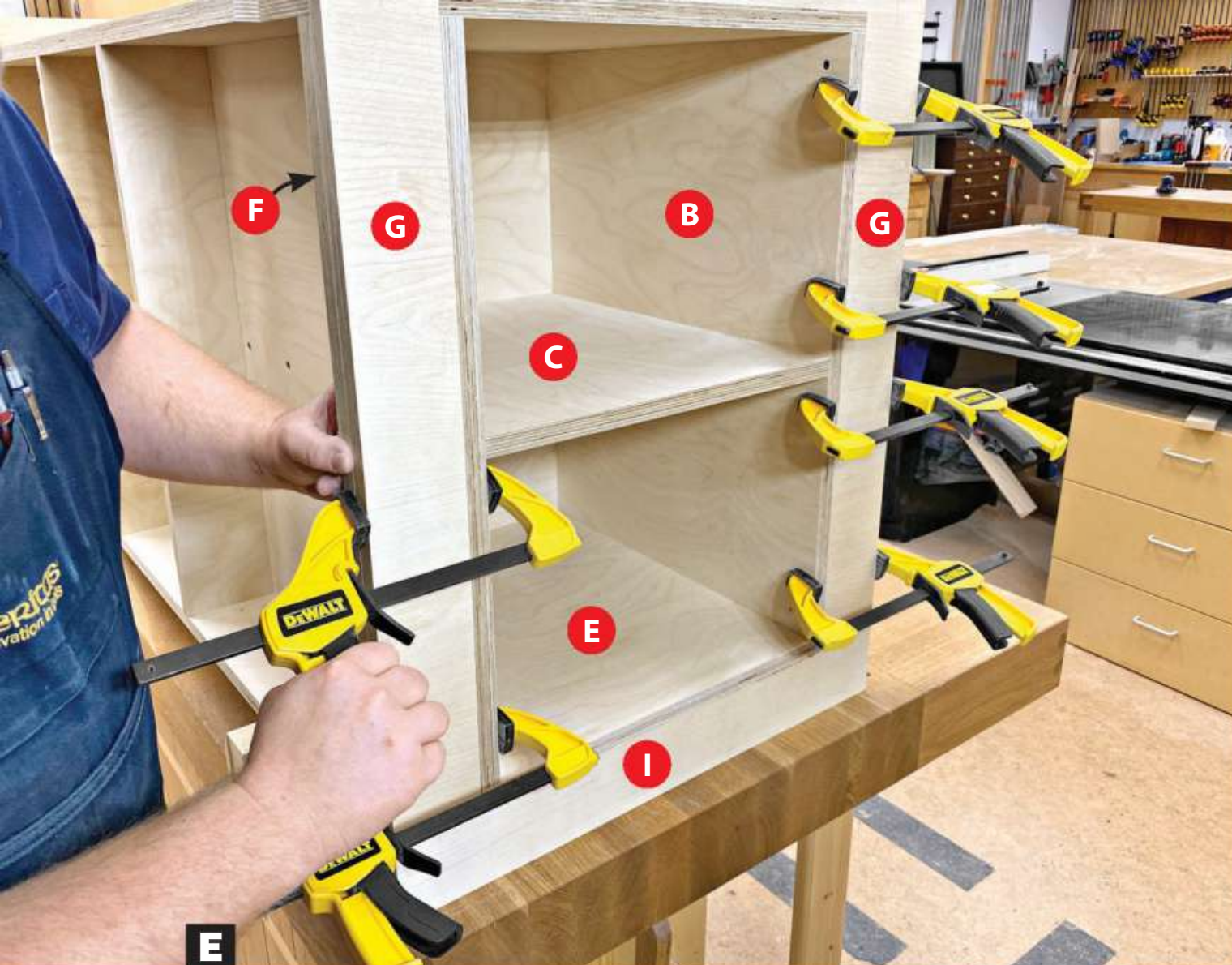
C Measure from the end partition (B) to the edge of the plate (E) notches to find the accurate length of the corner supports (F).



2a NOTCH DETAIL

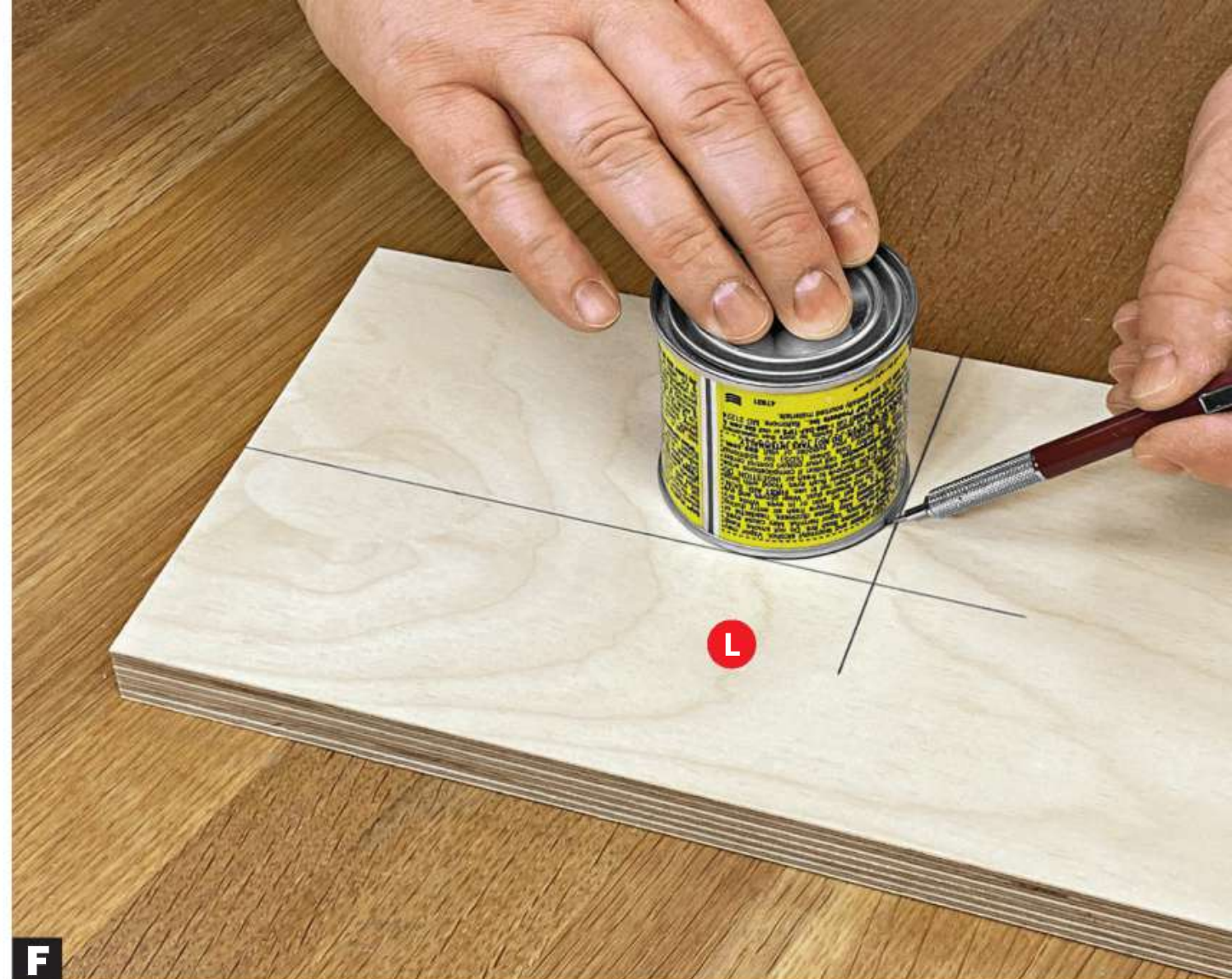


D Glue and clamp a corner support (F) to the end partition (B) and plates (E). Drill pilot holes through the plates and drive screws.



E

Clamp the end frame (G-I) to the end partitions (B) and corner supports (F), flush with the partitions and top and bottom plates (E).



F

Quickly draw a 1 1/4" radius on the lower rails (L) using common objects around your shop, in this case a can of wood putty.

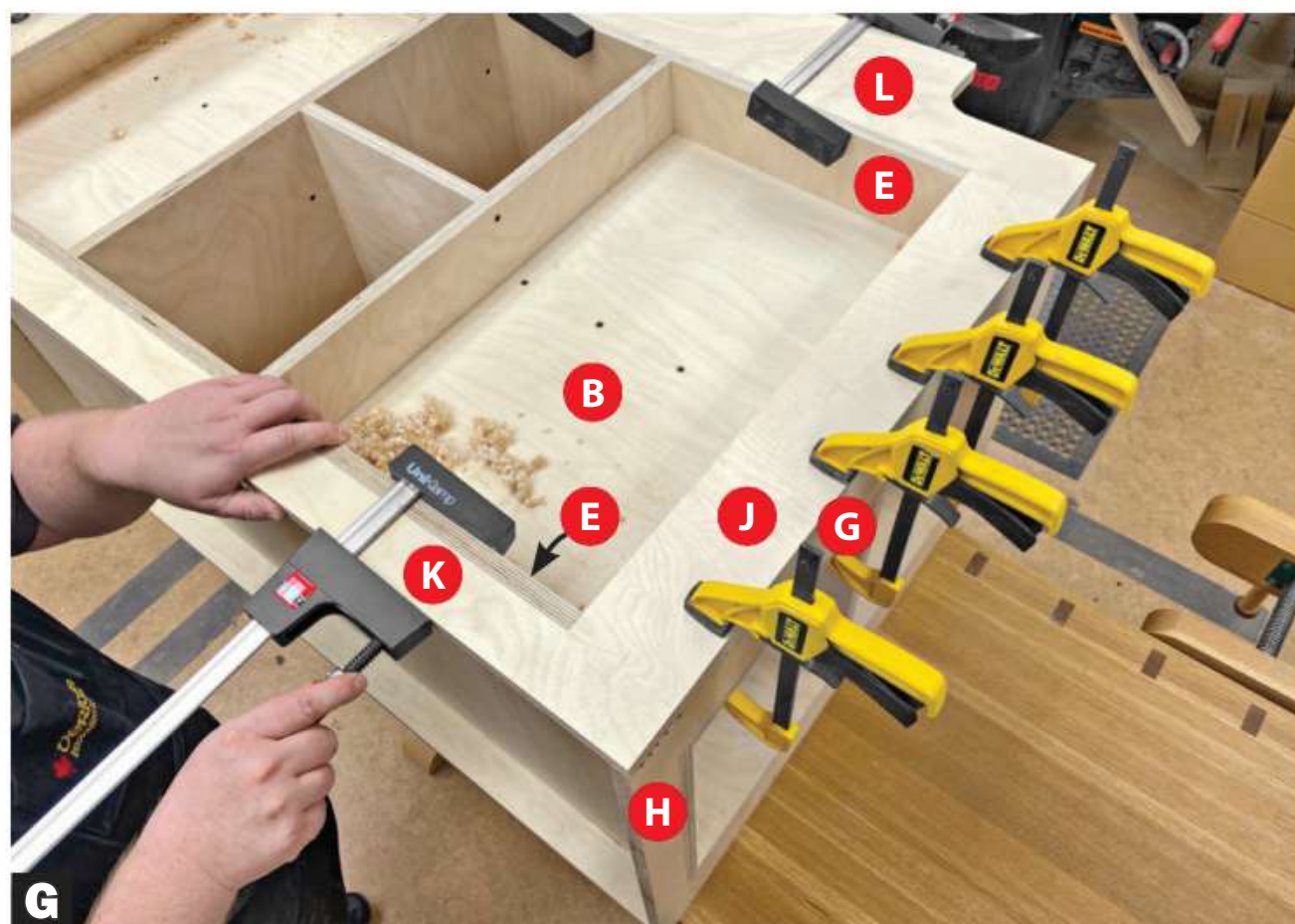
Tame some frames

1 Measure and cut the end stiles (G) to fit the notches in the ends of the bench and clamp them in place [Exploded View]. Measure across the stiles for the lengths of the end rails (H, I) and cut those to size.

2 Drill pocket holes in the end stiles (G) [Exploded View], then glue and screw them to the end rails (H, I). Glue the assembled frames to the partitions (B) and corner supports (F) [Photo E].

3 As you did with the end frames, measure and cut the front and back stiles and rails (J-L) to size [Exploded View].

3 FRONT/BACK LOWER RAIL



G

Glue the front and back frames (J-L) to the corner supports (F), end frames (G-I), and plates (E).

4 Mark and notch the lower rails (L) [Drawing 3, Photo F]. Drill pocket holes and assemble the front and back frames (J-L).

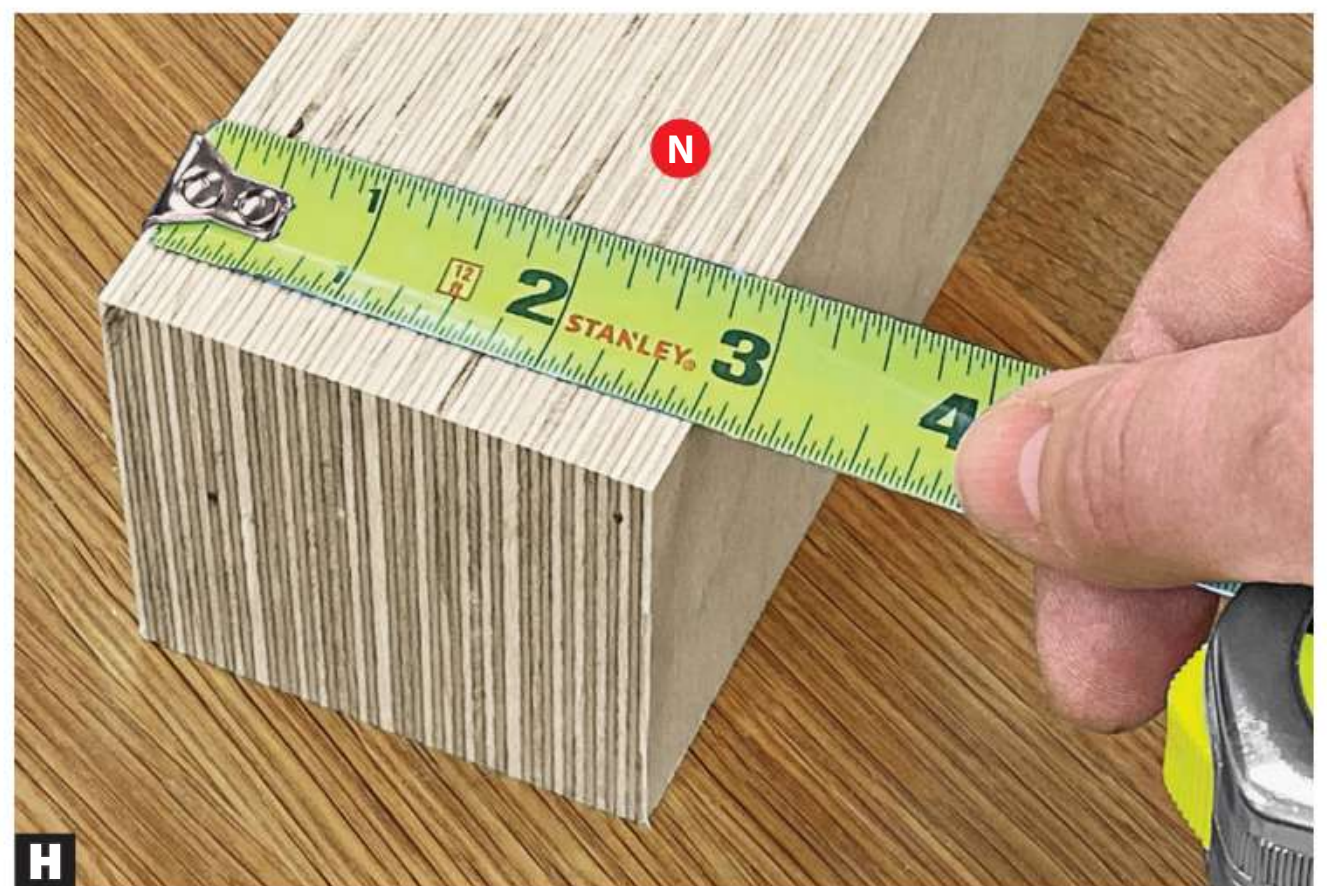
5 Glue the front and back frames (J-L) to the base assembly [Photo G].

Install the remaining parts

1 Cut the inside corner fillers (M) to fit their openings. Glue and screw the fillers in place [Exploded View].

2 Laminate 3x26" plywood strips to make a blank for the caster blocks (N) [Photo H], then cut the blocks to size. Drill mounting-screw pilot holes in the blocks for each caster [Sources]. Glue and screw the blocks to the bottom plate (E) and frame rails (I, L).

3 Cut the lower plate braces (O) to fit between the lower front/back rails (L) [Exploded View]. Glue and pocket-screw the braces to the bottom plate (E). Repeat for the upper plate braces (P).



H

Because the plywood measures less than 3/4" thick, stacking four pieces still leaves this caster block (N) blank nearly 1/4" thinner than needed. Add a shim to make up the difference.

Don't stop—add a top
You can make the top (Q) from a variety of materials, depending on your budget and how you'll use the bench. Some options include two laminated layers of plywood or MDF, a solid-core interior door, or edge-glued hardwood. The top shown was made from edge-glued hardwood scraps.

1 Apply a finish of your choice to the top (Q). (We used Varathane stain in Carbon Gray topped with three coats of General Finishes Enduro-Var II water-based satin polyurethane.) With the top unattached but resting on the base, mark and drill mounting holes for your vise.

2 Apply the finish of your choice to the base. (We used dewaxed shellac, followed by three coats of satin Enduro-Var II.)

3 Screw the casters to the caster blocks (N). Bolt the vise to the top (Q) and screw the top to the base. Add hanging hooks and brackets for the tools and supplies you'll store on the finished workbench. Now you're ready to dig out that to-do list and go to work. 🌲

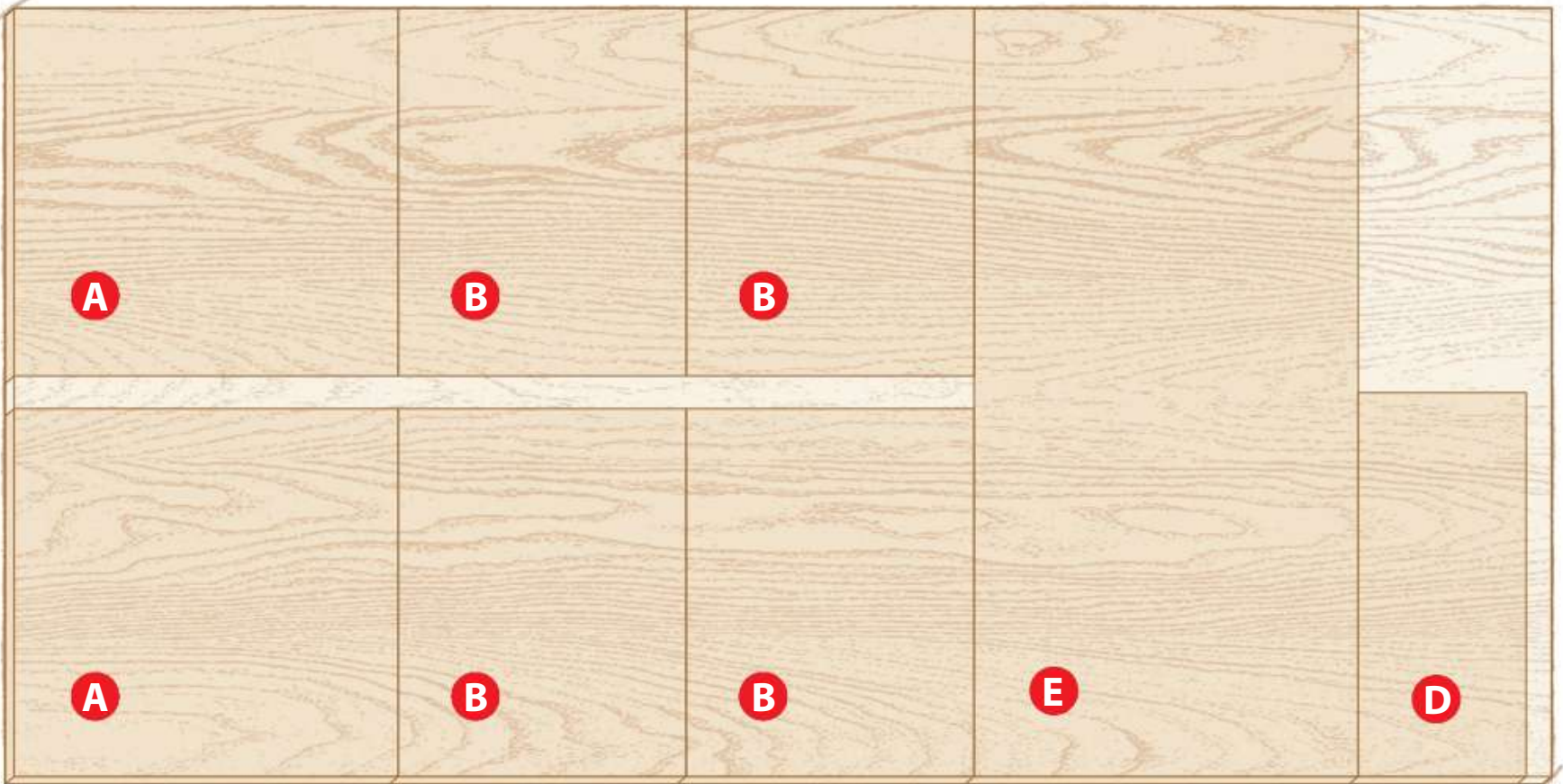
Produced by **Robert Wilson** with **John Olson** and **Vince Ancona**
Project design: **John Olson**
Illustrations: **Roxanne LeMoine, Lorna Johnson**

Materials List

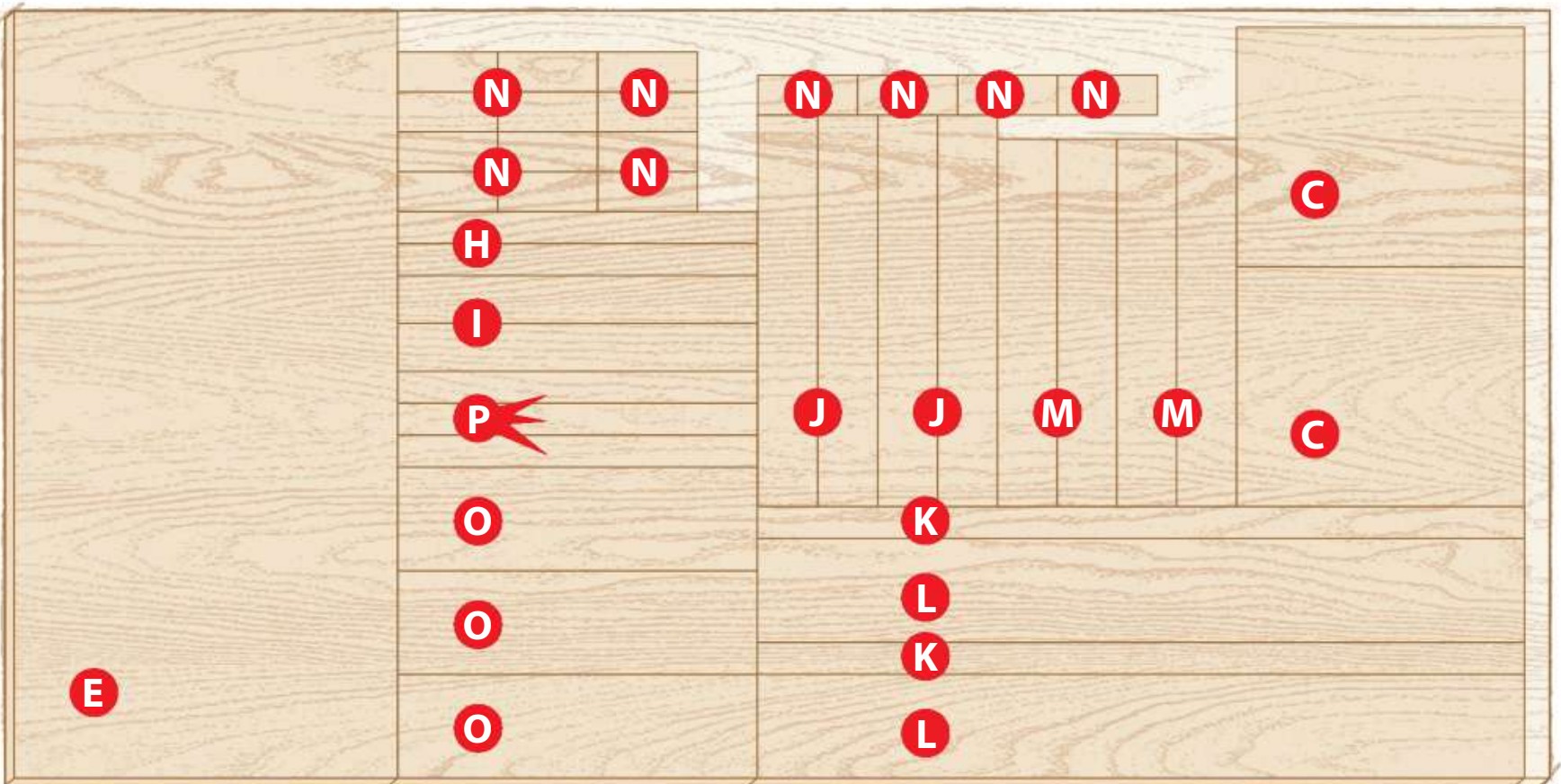
Part	FINISHED SIZE			Matl.	Qty.
	T	W	L		
A center partitions	¾"	23"	24"	Ply	2
B end partitions	¾"	23"	18"	Ply	4
C end shelves	¾"	15"	18"	Ply	2
D center shelf	¾"	24"	10½"	Ply	1
E top/bottom plates	¾"	*48"	*24"	Ply	2
F corner supports	¾"	23"	*3"	Ply	4
G end stiles	¾"	*24½"	*3"	Ply	4
H upper end rails	¾"	2"	*22½"	Ply	2
I lower end rails	¾"	3"	*22½"	Ply	2
J front/back stiles	¾"	*24½"	*3¾"	Ply	4
K upper front/back rails	¾"	2"	*48"	Ply	2
L lower front/back rails	¾"	6½"	*48"	Ply	2
M inside corner fillers	¾"	23"	*3¾"	Ply	4
N caster blocks	3"	2½"	6¼"	LP	4
O lower plate braces	¾"	6½"	22½"	Ply	3
P upper plate braces	¾"	2"	22½"	Ply	3
Q top	1½"	25½"	49½"	M	1

*Measure from the assembly to determine actual size. See the instructions.
Materials key: Ply-Baltic birch plywood, LP-laminated plywood, M-maple.
Supplies: #8×1¼" flathead screws, #8×2" flathead screws, ¼×2" lag screws, 4" TimberLok screws, 1¼" coarse-thread pocket screws, ¼" washers.
Sources: 4" locking swivel casters (4), no. 00K2141, \$17.90, Lee Valley, 800-871-8158, leevalley.com; Pony 29055 5" cast iron bench vise, no. 1319119, \$95, Lowe's, lowes.com.

Cutting Diagram



¾ x 48 x 96" Baltic birch plywood



¾ x 48 x 96" Baltic birch plywood



¾ x 48 x 48" Baltic birch plywood

1½ x 7¼ x 60" Maple (4 needed)

This project requires 25 board feet of 8/4 maple.

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Pleated Table

*Tablesaw-cut cohes and
tapers will have friends
asking, "How'd you do that?"*

D I M E N S I O N S :
46" W x 17" D x 31" H

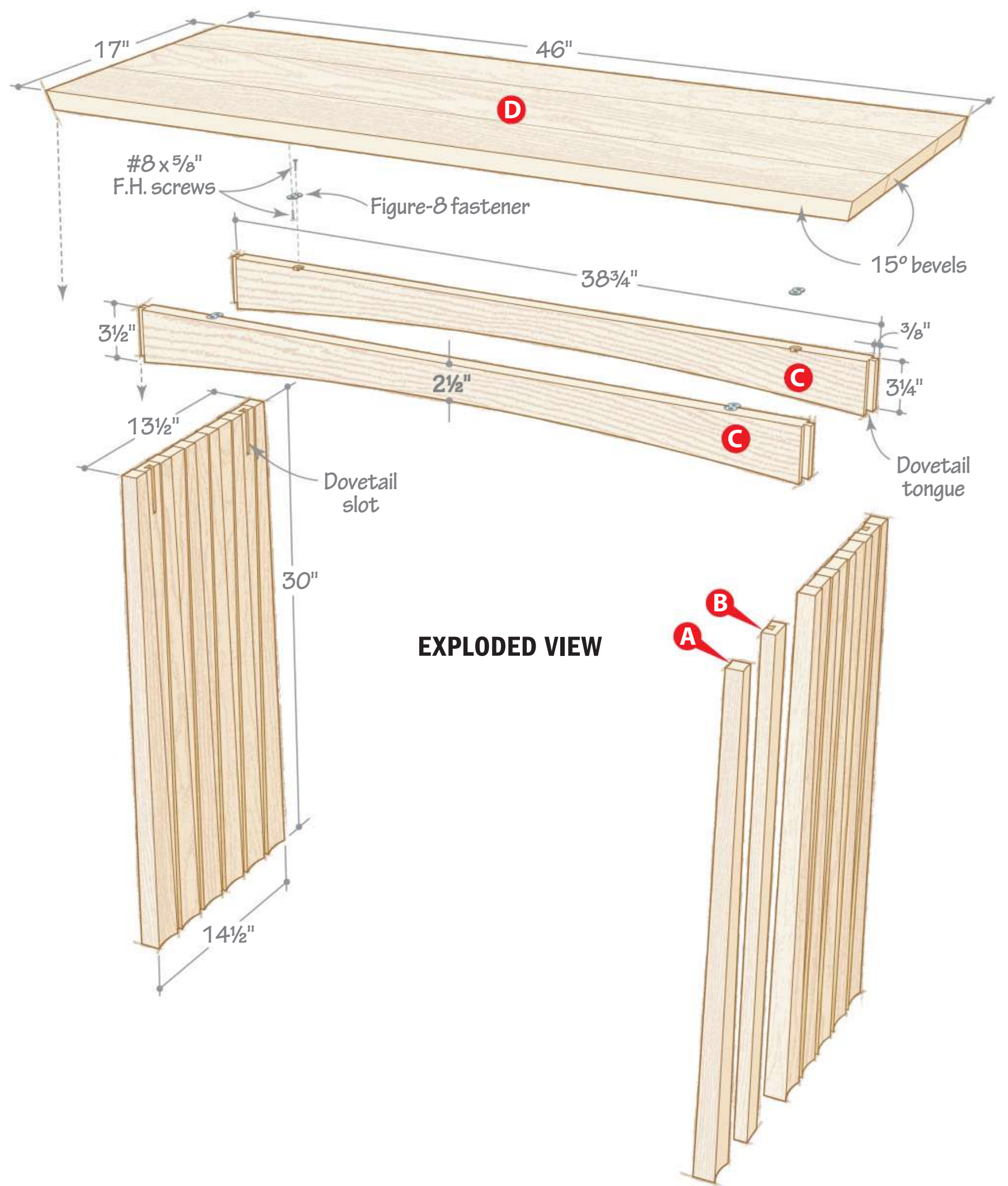
Approximate
materials cost:

\$175

Including
hardware

0%

chance you
can iron out
these pleats



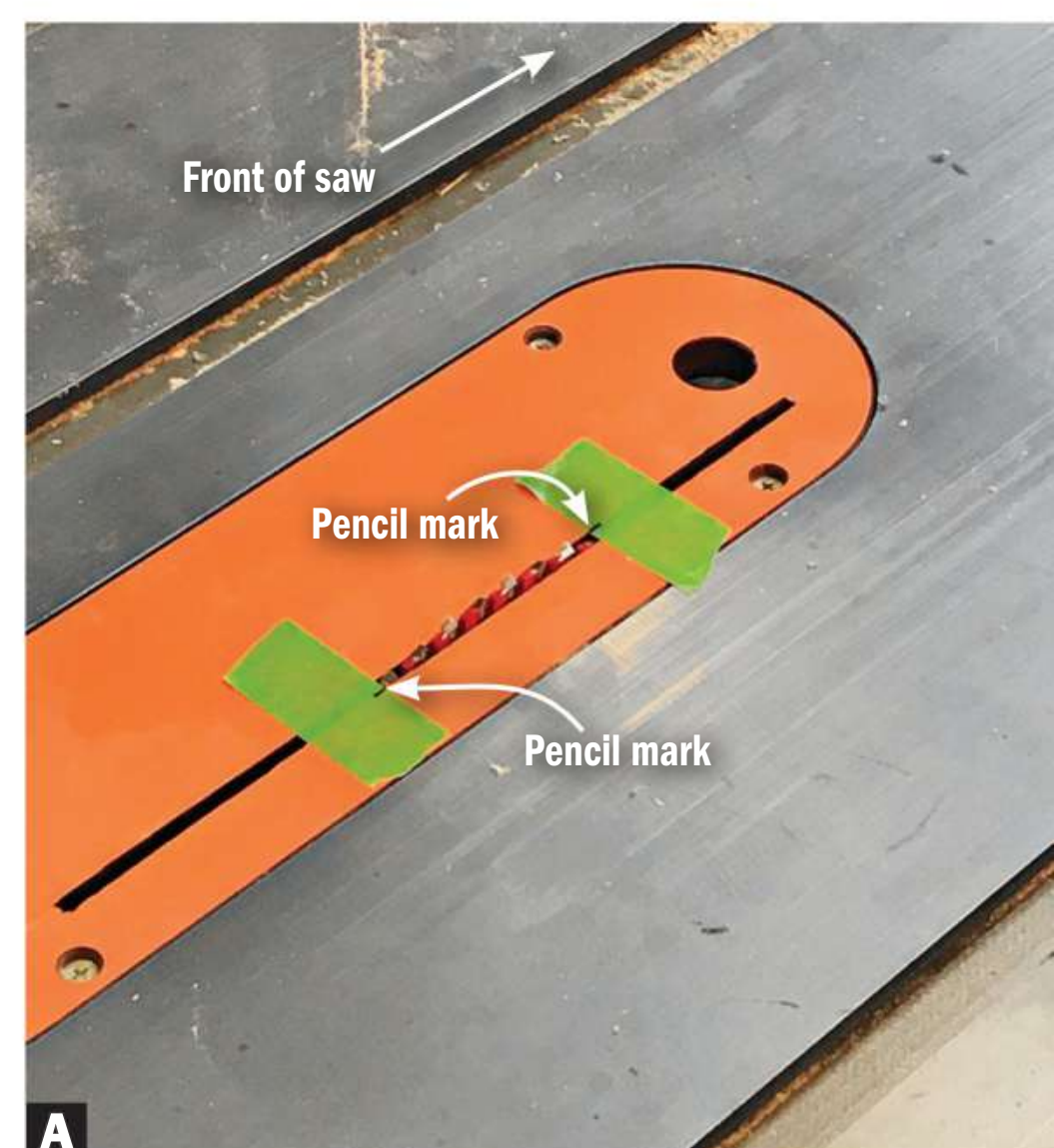
Modern lines and classic details make for a table that would look good in almost any room. The table ends consist of tapered pieces, alternating coved and flat, that create a pleated, fabric-like texture across the surface.

And cutting the coves is easier than you think. We'll show you how.

Let's cut some coves

1 Cut to size the cove pieces (A) and flat pieces (B) [Materials List], but don't taper them yet.

2 Install an 80-tooth blade in your table-saw, raise it to $\frac{3}{16}$ ", and mark the position of the blade on the table [Photo A].



A Use masking tape to indicate where the blade teeth enter and exit the table surface. Mark the right side of the blade at the front and the left side at the back.

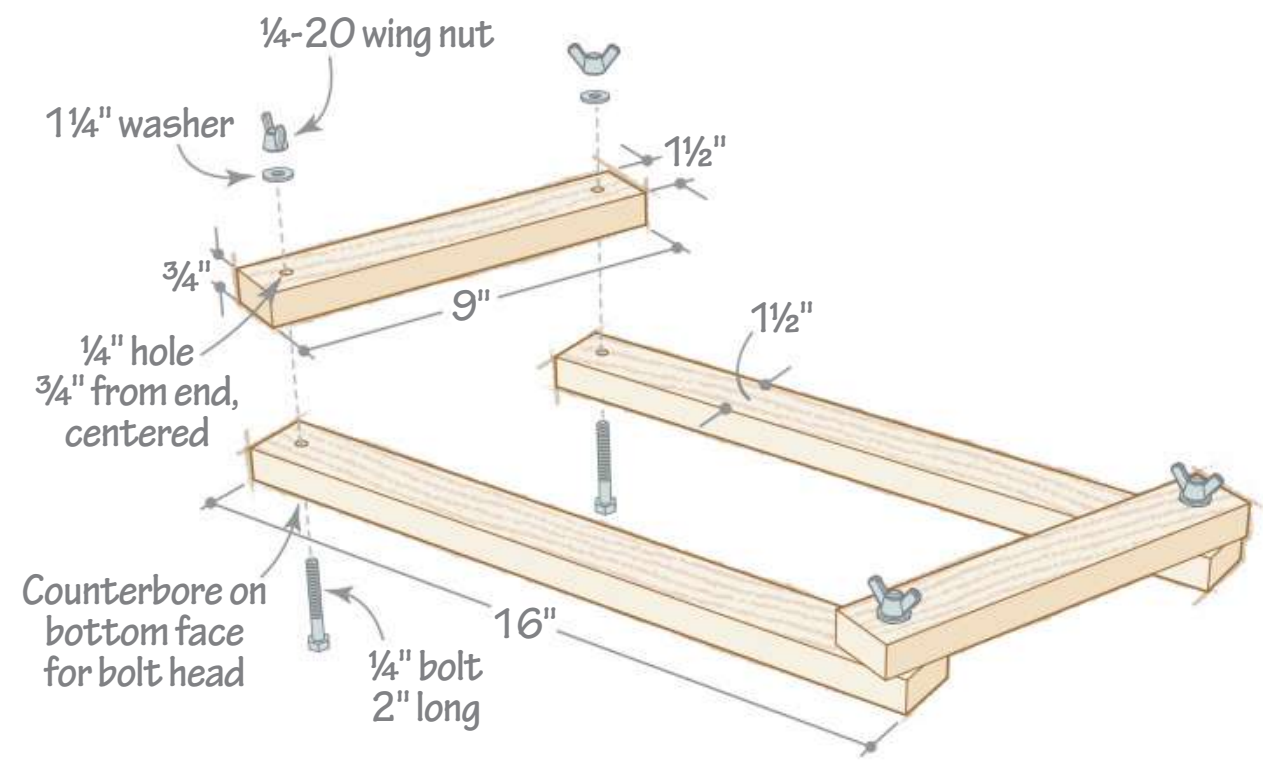
3 Build the parallelogram jig [Drawing 1], then mark the feed angle on your table-saw surface [Photo B].

4 Build the cove-cutting jig [Drawing 2] and clamp it to your table-saw [Photo C].

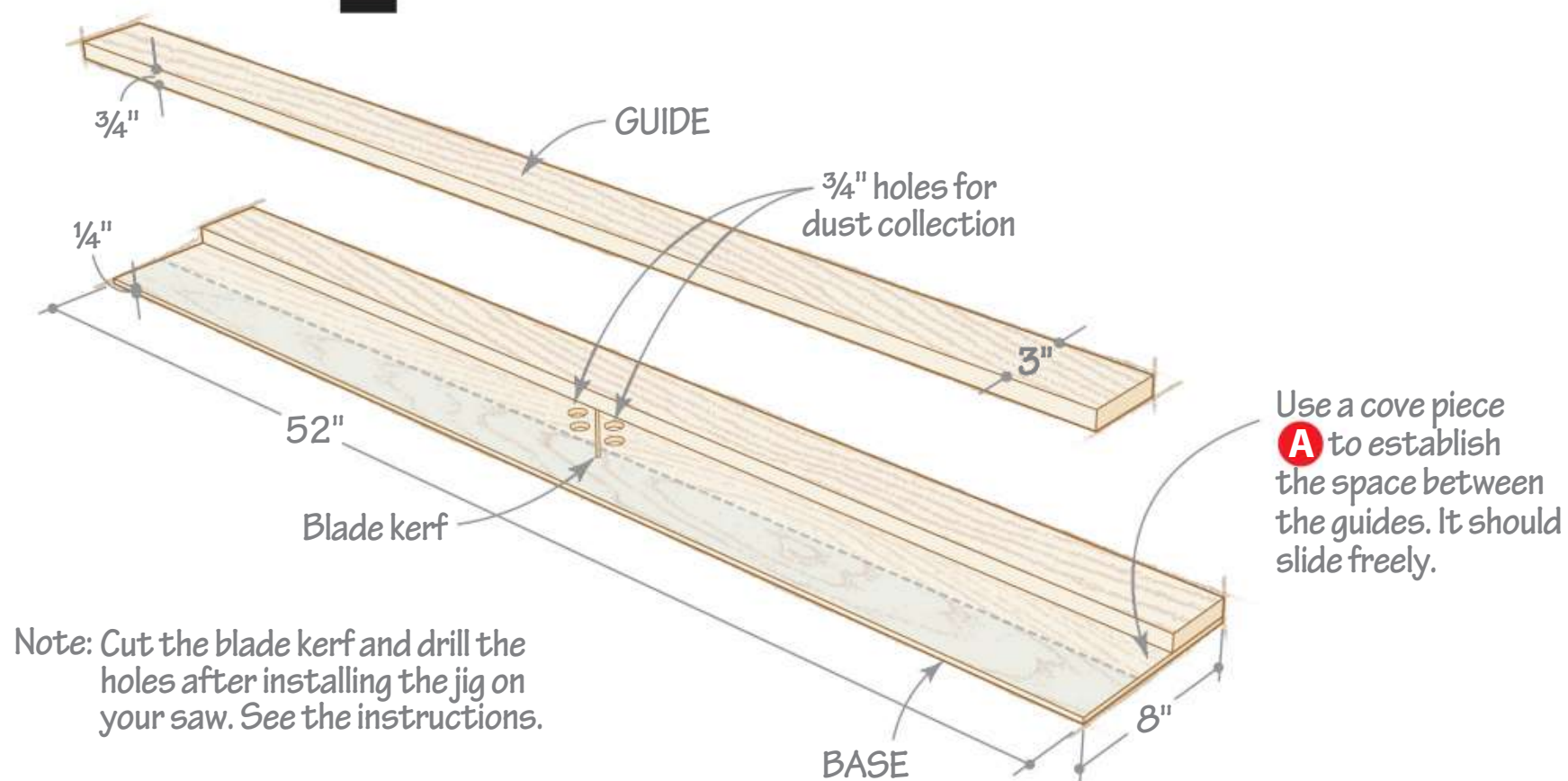
5 Set the blade height $\frac{1}{16}$ " above the base of the jig, and slowly feed each cove piece (A) across the blade, making a pass on each face. Cut the coves to final depth [Drawing 3], raising the blade $\frac{1}{16}$ " per pass. Sand the coves to remove the saw marks.

► Watch a video with great tips on cutting coves, from setting up your saw to sanding away the saw marks. woodmagazine.com/coves

1 PARALLELOGRAM JIG



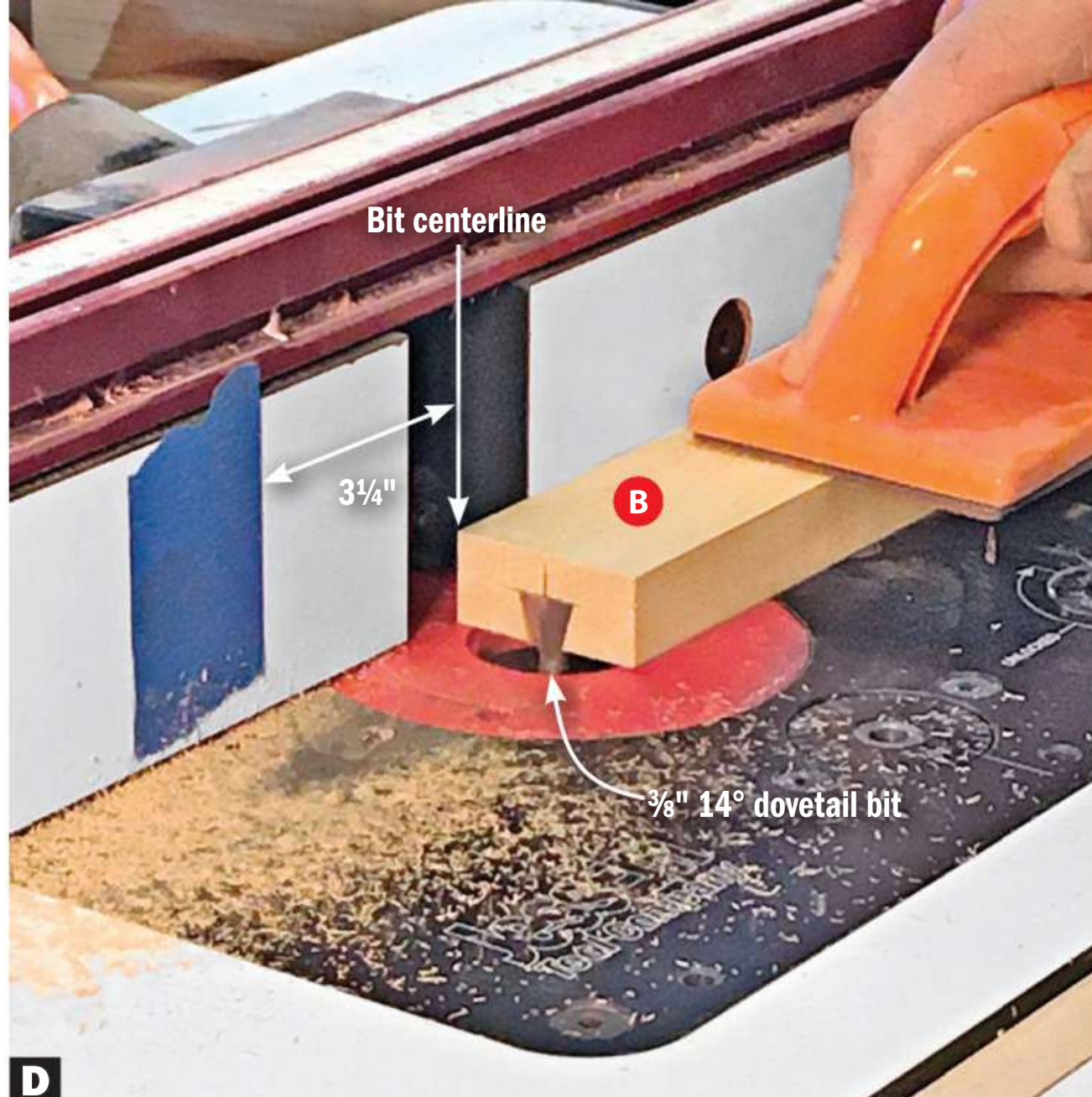
2 COVE-CUTTING JIG



B Set the parallelogram jig to 2" and position it on the saw, touching the inside points of your pencil marks. Install a long fence on your miter gauge and set it parallel to and $1\frac{1}{2}$ " from the jig. Mark a line on the table along the fence.



C Remove the throat plate from your saw and clamp the jig over the opening, aligned with your pencil mark. Turn on the saw and raise the blade $\frac{1}{16}$ " above the jig base. Drill the dust-collection holes, staying clear of the blade and the table surface.



D

Raise the dovetail bit $\frac{3}{8}$ " above the table, and position the fence to center the bit on the end of a flat piece (B). Use a stopblock or a piece of masking tape to establish the cut length.

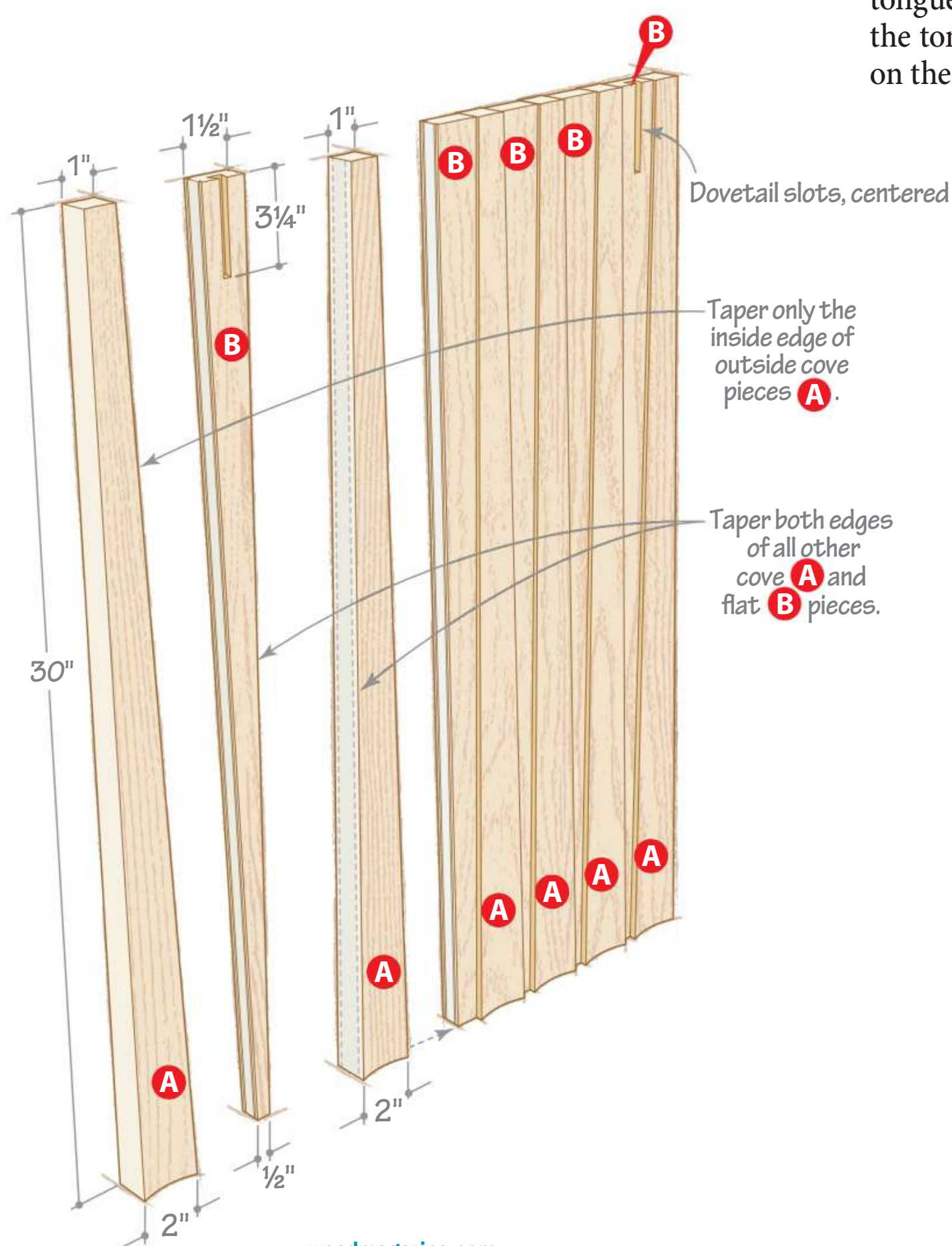


E

Without changing the bit height, reposition the fence to remove just a bit from each face of your test piece. Keep moving the fence away from the bit, working both faces each time, until you have a tight fit in your dovetail slot.

One-way ticket to taper town

1 Rout centered dovetail slots in the top ends of four flat pieces (B) [Drawing 3, Photo D].

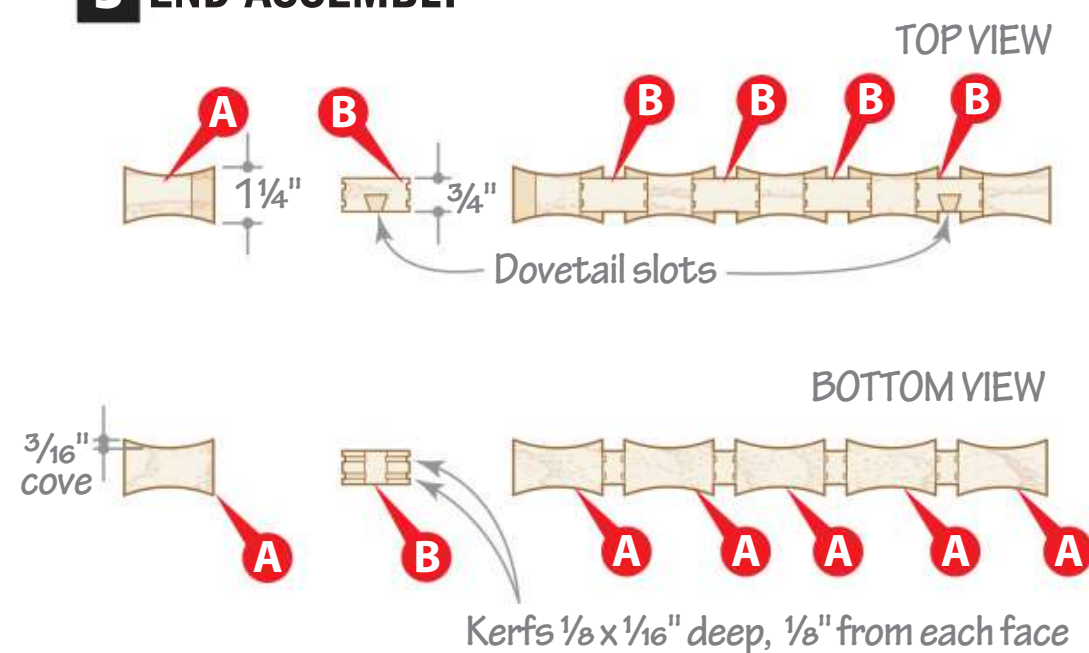


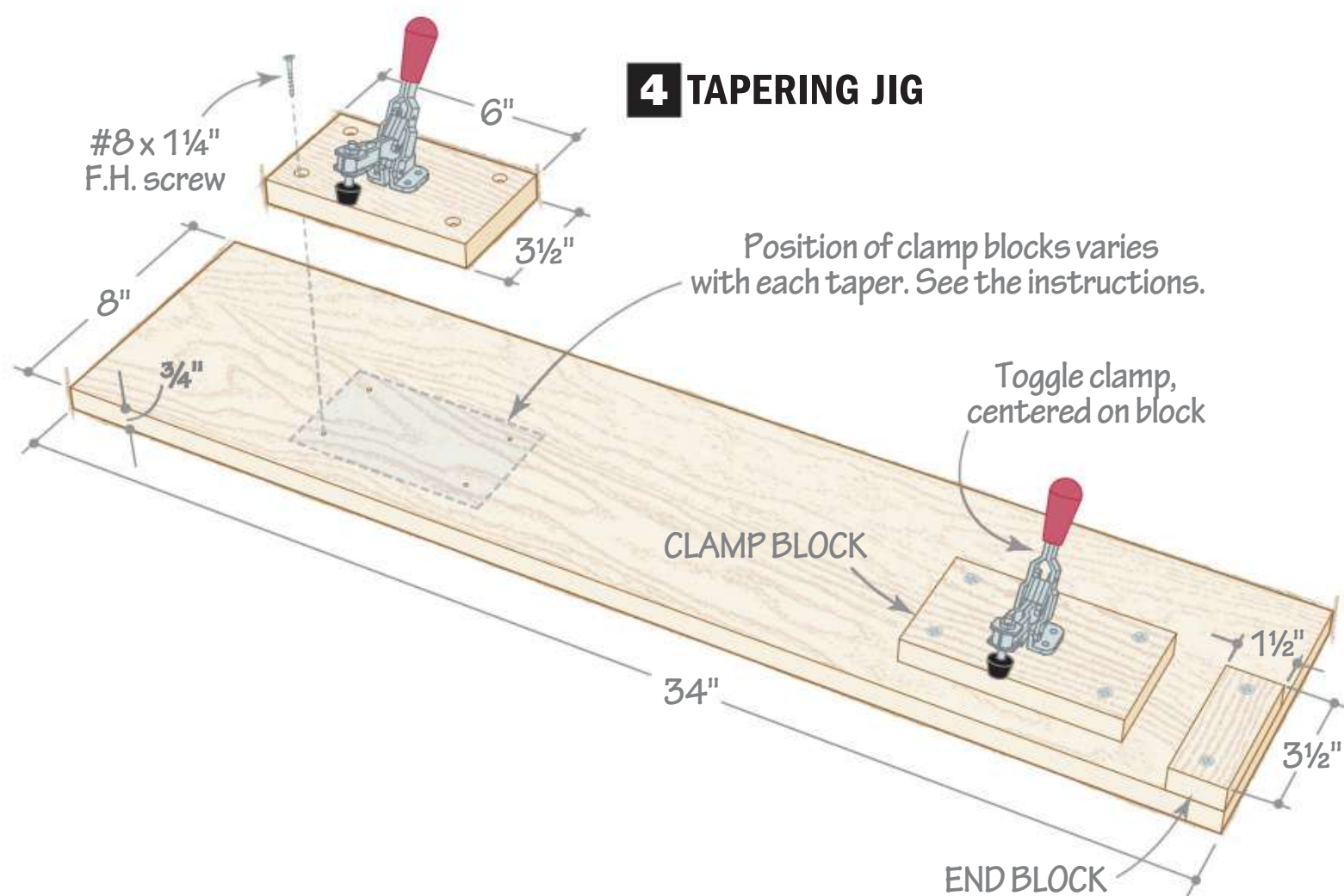
woodmagazine.com

2 Cut the stretchers (C) to size [Exploded View], including an extra 12"-long piece for router setup. Rout a tongue on the test piece [Photo E]. When it fits well, rout dovetail tongues on the ends of the stretchers. Trim the tongues to length, then shape the curve on the stretchers [Exploded View].

► Learn how to use fairing sticks to lay out arcs, and how to build your own. woodmagazine.com/fairing

3 END ASSEMBLY



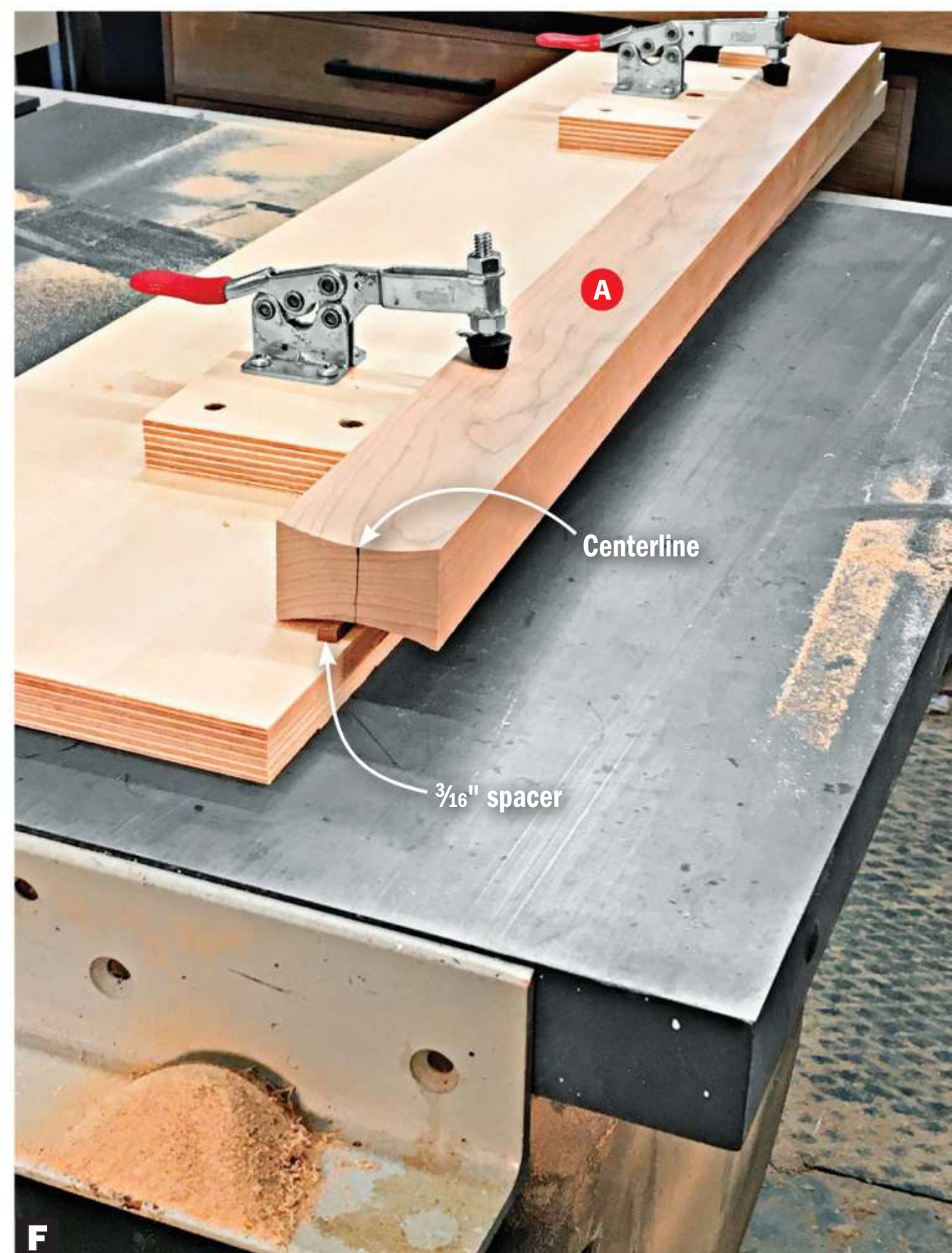


3 Build the tapering jig [Drawing 4], and taper the inside edges of four cove pieces (A) [Drawing 3, Photo F]. Taper both edges of the remaining eight cove pieces [Photos G, H].

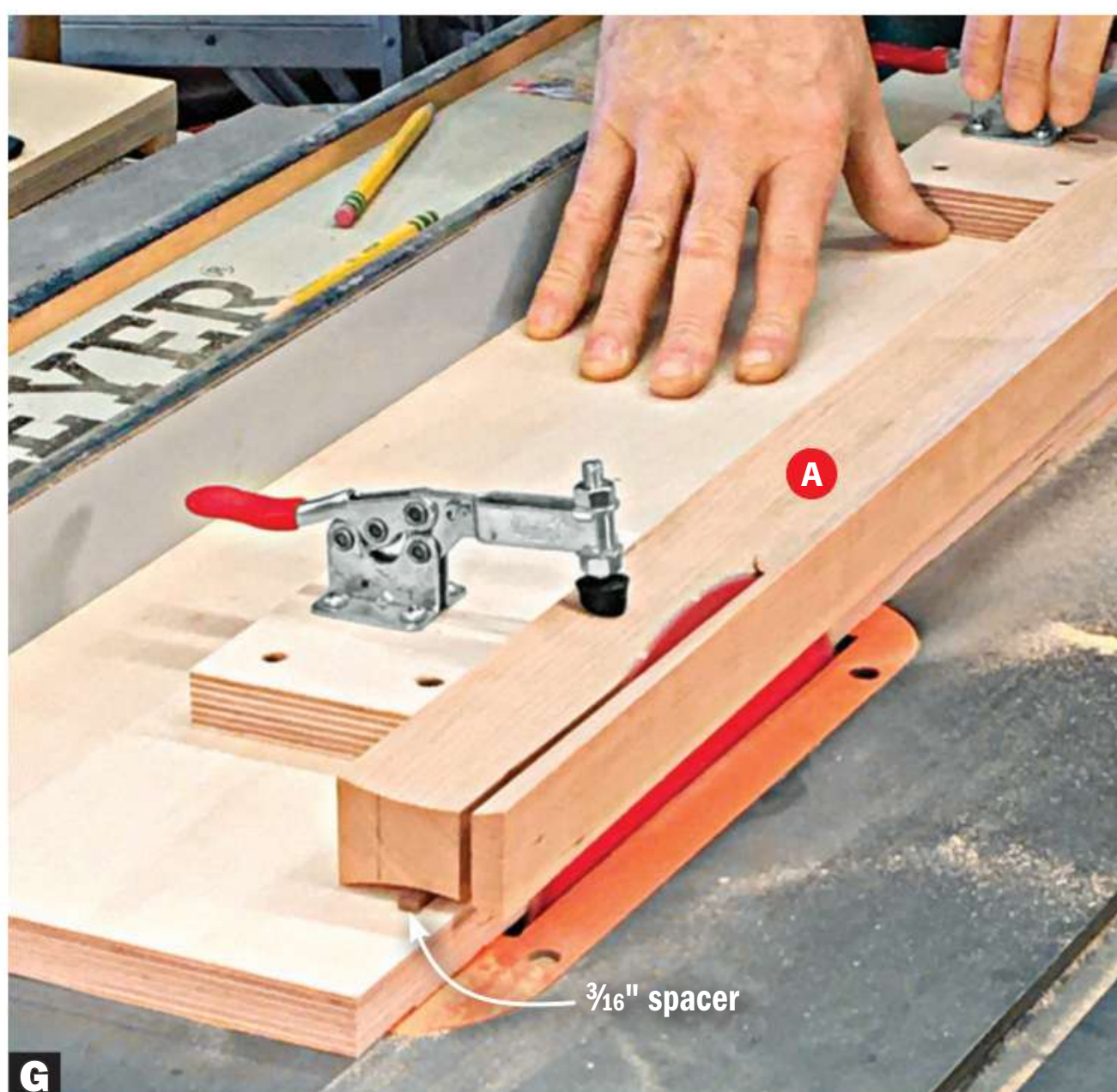
4 Reposition the clamp blocks and taper one edge of the flat pieces (B) [Drawing 3]. Reset the clamp blocks again to taper the remaining edge of each. Finish-sand the cove and flat pieces (A, B).

5 Cut or rout shallow grooves in the edges of the flat pieces (B) [Drawing 3], then assemble three As and two Bs at a time [Photo I]. Glue and clamp the two halves together with the center flat piece (B).

Tip! Use a thin-kerf blade or 1/16" router bit to maximize glue surface.



F Set your tablesaw fence to the width of the jig, then set a cove piece (A) against the end block of the jig. Position the back edge flush with the edge of the jig and the front end centered, using a spacer for support. Move the clamp blocks up against the workpiece and screw them in place.



G Mark two lines on the top end of each remaining cove piece (A), 1/2" from each edge. Align one of the marks with the edge of the jig and reposition the clamp blocks against the workpiece. Taper the first edge of the remaining eight cove pieces.



H Flip the cove pieces (A) face for face and align the other end mark with the edge of the jig. Reposition the clamp blocks and taper the other edges.



I Glue and clamp the end pieces (A, B), using spacers to keep everything centered. Apply glue only between the kerfs—they trap and prevent squeeze-out.

Top it off

1 Glue up a panel for the top (D). After the glue dries, bevel the edges and ends [Exploded View]. Finish-sand the top.

2 Finish-sand the stretchers (C) and glue them into the dovetail slots on the ends [Exploded View]. Touch up any sanding and apply a finish to the base and the top (D). We used General Finishes Satin Arm-R-Seal.

3 Once the finish dries, drill counterbores in the stretchers (C) to accept the figure-8 fasteners, and attach the top (D) to the frame, centered [Exploded View]. Place your table in its new home and listen for the compliments to unfold before you. 🌳

Materials List

Part	FINISHED SIZE			Matl.	Qty.
	T	W	L		
A cove pieces	1 1/4"	2"	30"	C	12
B flat pieces	3/4"	1 1/2"	30"	C	10
C stretchers	1"	3 1/2"	38 3/4"	C	2
D top	1"	17"	46"	EC	1

Materials key: C—cherry, EC—edge-glued cherry.

Supplies: Figure-8 fasteners (4), #8x5/8" flathead screws (8), #8x1 1/4" flathead screws (10), 1/4x2" bolts (4), 1 1/4" washers (4), 1/4-20 wing nuts (4).

Bit: 3/8" 14° dovetail router bit.

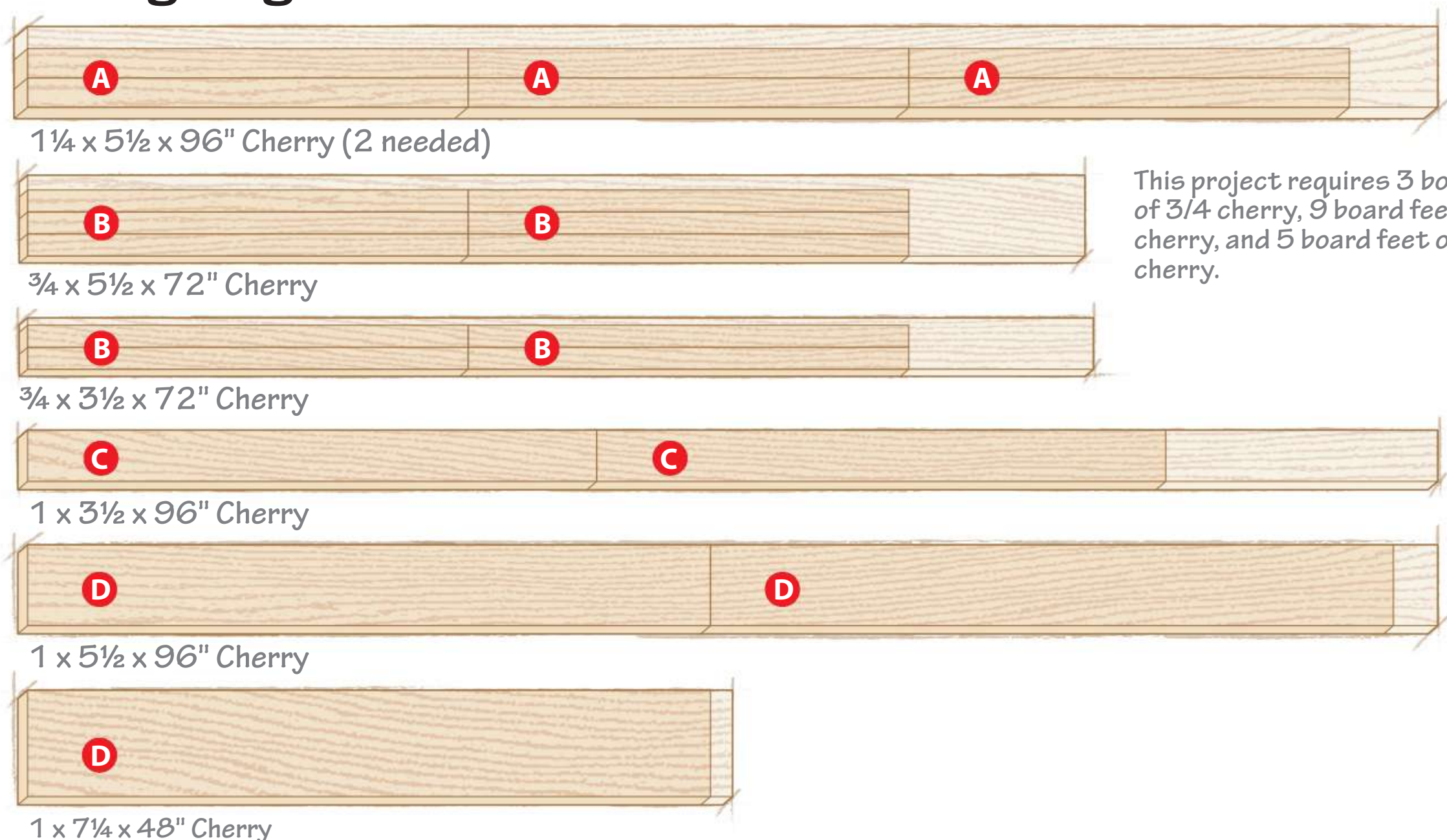
Source: Toggle clamps (2) no. 143938, \$17, Woodcraft, 800-225-1153, woodcraft.com.

Produced by **Zach Brown** with **Kevin Boyle**

Project design: **Kevin Boyle**

Illustrations: **Roxanne LeMoine, Lorna Johnson**

Cutting Diagram



The Skinny on Cutting Thin Parts

Safely rip pieces for bent laminations, edging, inlays, and more.



Tip! A strip of painter's tape serves as a temporary zero-clearance insert—but keep an eye on the tape. Repeat passes may peel up the leading edge.

Note: Ripping strips from the edge of a board yields workpieces with a thickness (face-to-face dimension) greater than the width (the dimension across the grain)—the opposite of many typical workpieces.

If your first inclination for cutting a thin strip involves crowding the tablesaw rip fence next to the blade, take a moment to review these methods. Although the tablesaw serves well in many cases, for some jobs a bandsaw or handsaw may work better. And even at the tablesaw, the options shown here can make the task safer, and give you better results. Whichever method you choose, plan on a pass with a hand plane, or some light sanding, to remove blade marks.

Quick, clean tablesaw cuts

► Make your own zero-clearance inserts.
woodmagazine.com/zeroclearance

The tablesaw excels at cutting multiple strips of consistent thickness, and the cut surfaces require the least cleanup. Outfit your saw with a zero-clearance insert around the blade to prevent strips from diving into the saw cabinet, and install a riving knife or splitter. If the splitter has anti-kickback pawls, you may need to remove them or secure them up out of the way to avoid trapping strips between them and the splitter.

The first two methods let you set the rip fence once to cut multiple strips of identical width, plus they work with blanks with only one straight edge. Don't rip strips narrower than $\frac{1}{4}$ " with these techniques, or blanks with knots or cracks that bisect the edge—you risk the workpiece shattering and kicking back.

For strips less than 12–18" long, depending on your saw's table depth, make a lay-flat pushblock from sheet goods or solid stock [Photo A], and attach a heel to one end,

Tip! A thin-kerf blade may yield eight strips from a blank where a standard blade yields only seven.

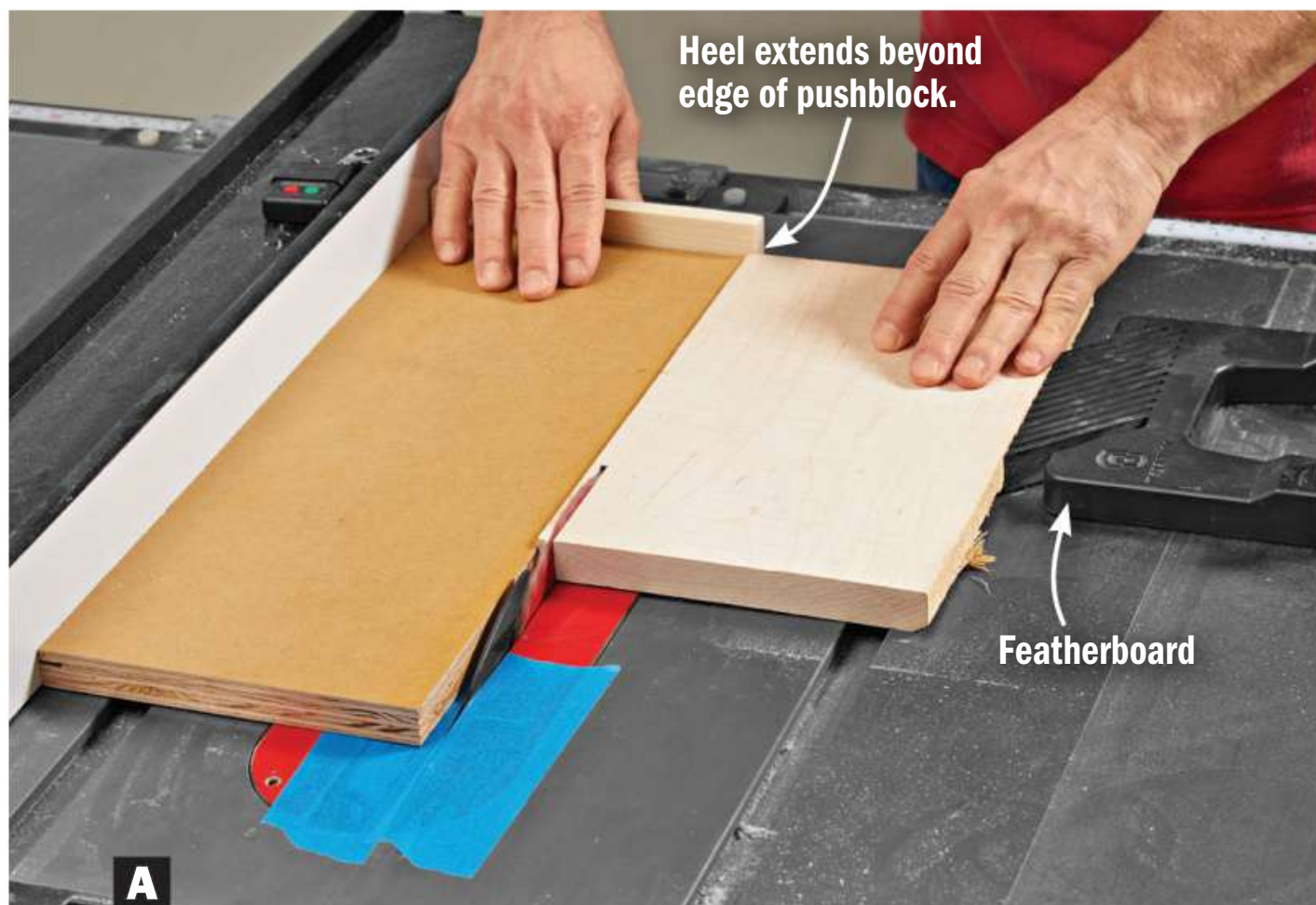
extending about $\frac{1}{4}$ " beyond the left edge. Set the fence to the pushblock width plus the desired strip width. Move the pushblock and a blank past the blade.

To cut strips of any manageable length, rip the strip between the blade and fence [Photo B]. Because you use a heeled pushblock that passes over the blade, this works with a riving knife installed, but not a splitter.

Cut strips narrower than $\frac{1}{4}$ " to the outside of the blade, allowing them to fall free [Opening photo]. You can cut strips of any length this way, but the blank must have parallel edges. Make the jig from $\frac{3}{4}$ " plywood, installing a threaded insert in the edge [Photo C]. Thread a roundhead machine screw into the insert, then set up the jig [Photo D]. Rip a strip; then nudge the fence to again butt the blank against the screwhead, and repeat. You can rip strips until the blank becomes too narrow to safely feed between the fence and blade.

► What's the difference between a splitter and a riving knife?
woodmagazine.com/splitter

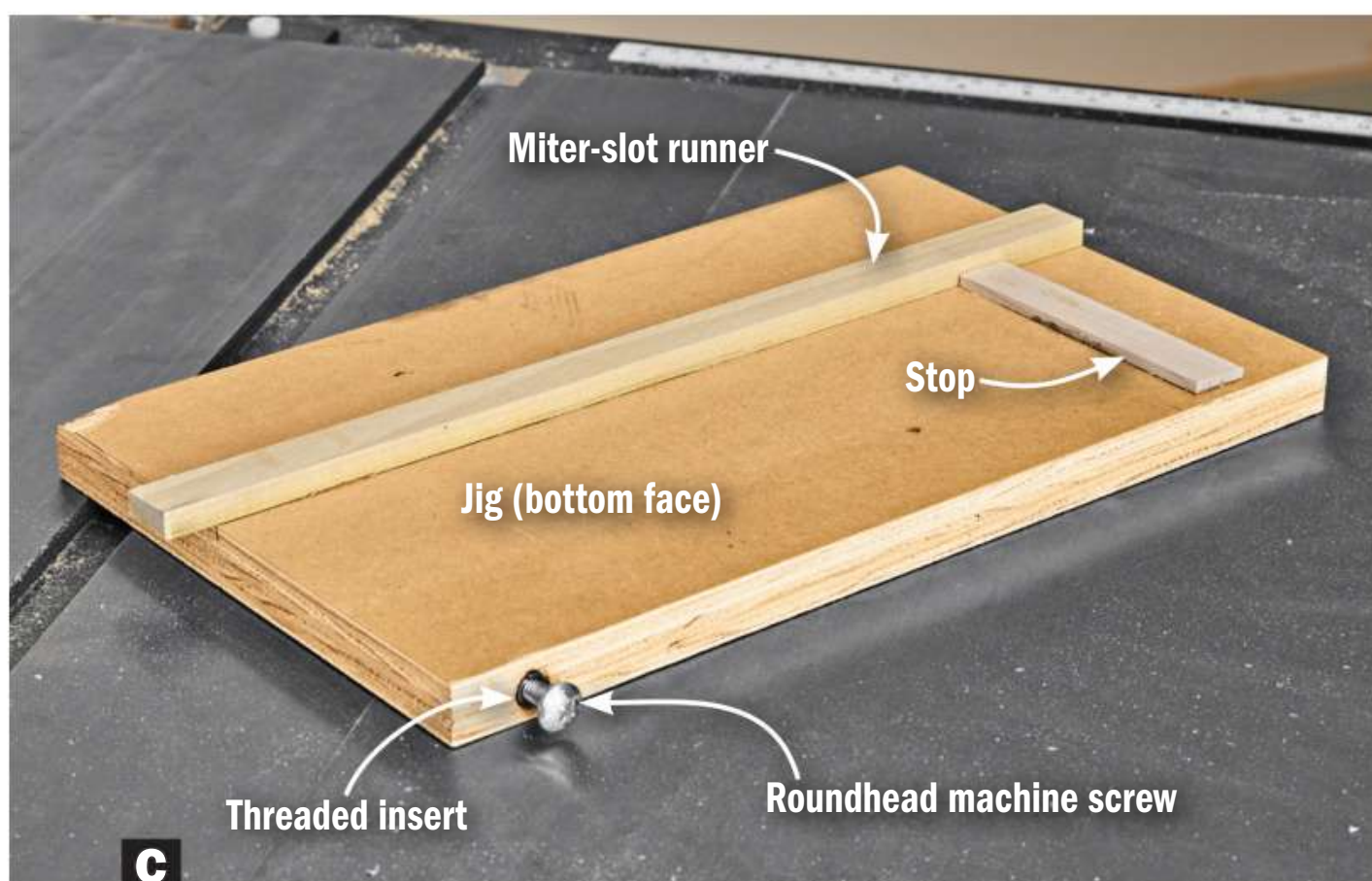
► Install threaded inserts easily with this simple jig.
woodmagazine.com/threadinsert



A Use a featherboard to prevent the blank from drifting away from the carrier. The heel pushes the cut strip past the blade.



B A pushblock glued up from 2-by lumber provides ample thickness to allow the blade to cut into the pushblock without weakening it. Screw a replaceable heel to the rear to push the strip and blank past the blade.



C Attach a miter-slot runner so the right edge of the plywood rests about 1" from the tablesaw blade. The stop catches the saw-table front edge, positioning the jig in front of the blade and preventing the jig from moving forward when in use.



D Anchor the jig in the miter slot, then place your strip blank against the rip fence and the blade, with the desired strip thickness to the outside of the blade. Adjust the screw to just kiss the blank.

Bandsaw wide work

The cutting capacity of a tablesaw limits strip thickness to about 3¼", and at the upper end of the range, all that exposed blade can be unnerving. So for cutting thin pieces, such as for veneers, head to the bandsaw, where kick-back isn't a concern. You'll need to allow a bit of extra thickness (about ⅛") for planing away blade marks. Tune your saw to eliminate blade drift so that guiding the workpiece against the rip fence achieves consistent thickness. For a workpiece more than twice as high as your fence, add a tall auxiliary fence to increase stability [Photo E].

Prepare your blank with a jointed face and one edge square to that face. Place the squared edge down and the jointed face against the fence. Between passes, joint the just-sawn face of the blank to provide a true reference surface for the next cut, and to eliminate blade marks on one face.

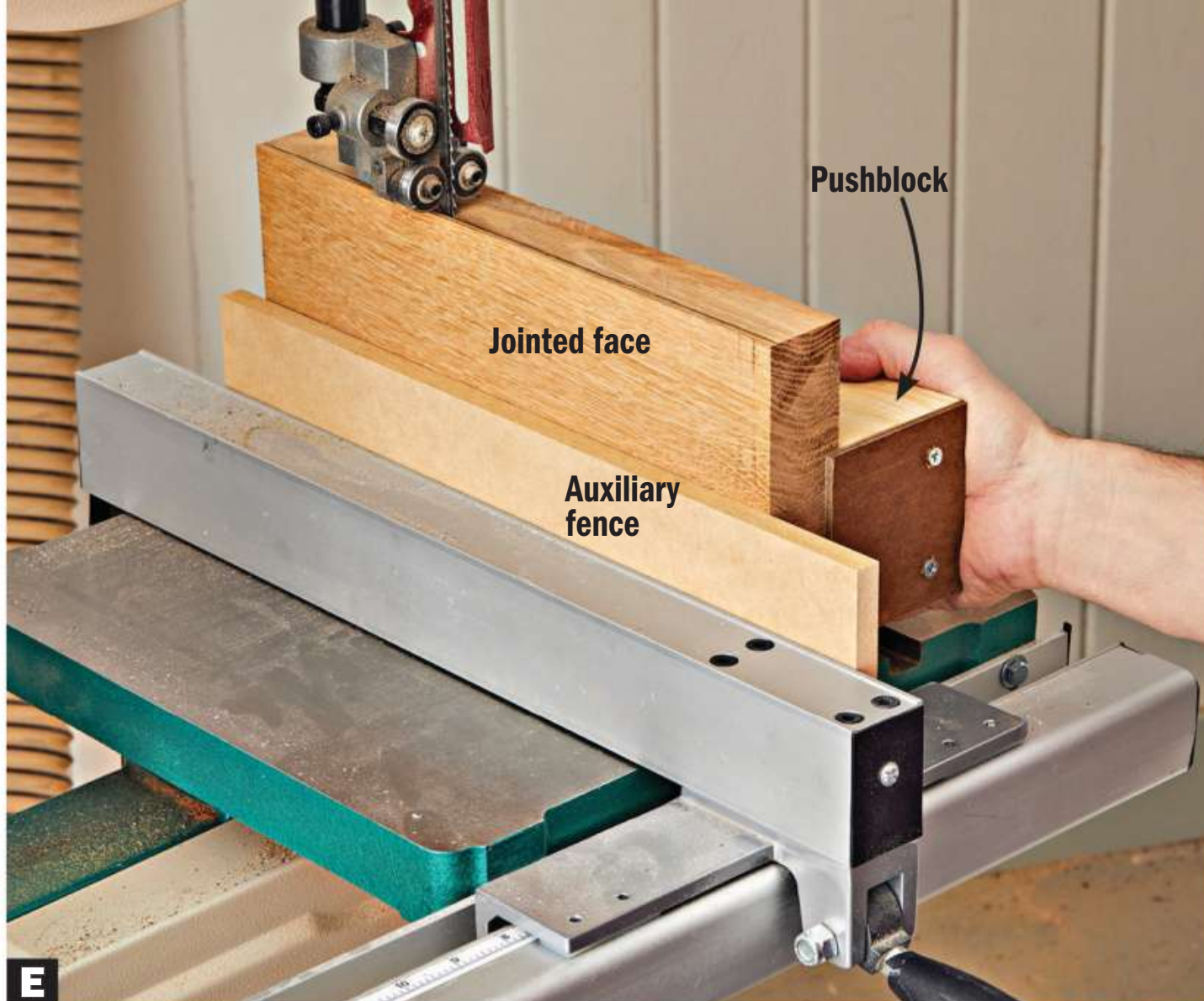
We're all pulling for ya

A handsaw, whether western or Japanese, also serves well for cutting thin strips. We prefer the thin kerf cut by a Japanese ryoba because it wastes less wood. With a bit of practice, you can cut strips of any length that need just a light planing or sanding to bring them to final thickness.

Mark the strip width on both faces of the board and across one end. Because Japanese saws work on the pull stroke, cutting with

► Get more detail on setting up your bandsaw for resawing. woodmagazine.com/bandsawresaw

► Buy a ryoba saw. woodmagazine.com/ryoba



E Make an auxiliary fence face only as tall as needed to steady the blank. Secure the auxiliary face with double-faced tape.

the handle below the blade lets gravity help you. This may mean kneeling or sitting on the floor as you work. So, for a board shorter than your height, clamp it vertically in a vise; clamp longer workpieces horizontally on sawhorses. Start the cut with the saw at a 45° angle [Photo F], then grip the saw with both hands after establishing the kerf [Photo G]. Check both faces frequently to make sure you saw along the marks. 🌲

Produced by Craig Rueggsegger



F Sight along the blade and the marks on the face and end. Take light initial strokes, guiding the blade with your thumb knuckle.



G Cut at a shallow angle to the board—more blade in the cut reduces chatter and wandering. Do not apply heavy pressure, but rather let the weight of the saw do the work as you draw the tool down.

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BONUS: Now includes all 52 issues of the classic Weekend Woodworking Projects magazine!



Beginner's Guide to Clamps

Get a grip without spending a bundle.

Woodworkers need clamps for an endless variety of tasks: securing project parts to the bench as they work on them, serving as a third hand, coaxing reluctant parts together, holding assemblies in place during a dry-fit and while glue dries...well, again, the list is endless.

That's why you find such a large variety of clamp styles and sizes available. Don't fret; you don't need them all (yet). Start with our recommendations for building up an initial clamp collection. You'll discover which ones you use most often, and which types you wish you had, so you can expand your selections accordingly.

Squeeze the big jobs

These clamps have feet or flat bottoms so they stand in place on a bench as you place project parts on them, such as when gluing up a panel.

Note: Prices listed are approximate and provided for comparison.

Pipe clamps (\$22 including 36" pipe)

With pipe clamps, you really only purchase the fixtures that fit onto $\frac{1}{2}$ " or $\frac{3}{4}$ " pipes that you buy separately. Even so, the combined cost remains the cheapest option for clamps with a long reach. Buying your own pipe means you can make clamps any length you like. (Have the ends threaded, if they aren't already.) The fixed jaw of the clamp fixture threads on one end, and the movable jaw slides along the pipe. With couplers, you can join pipes to make even longer clamps [Photo A].

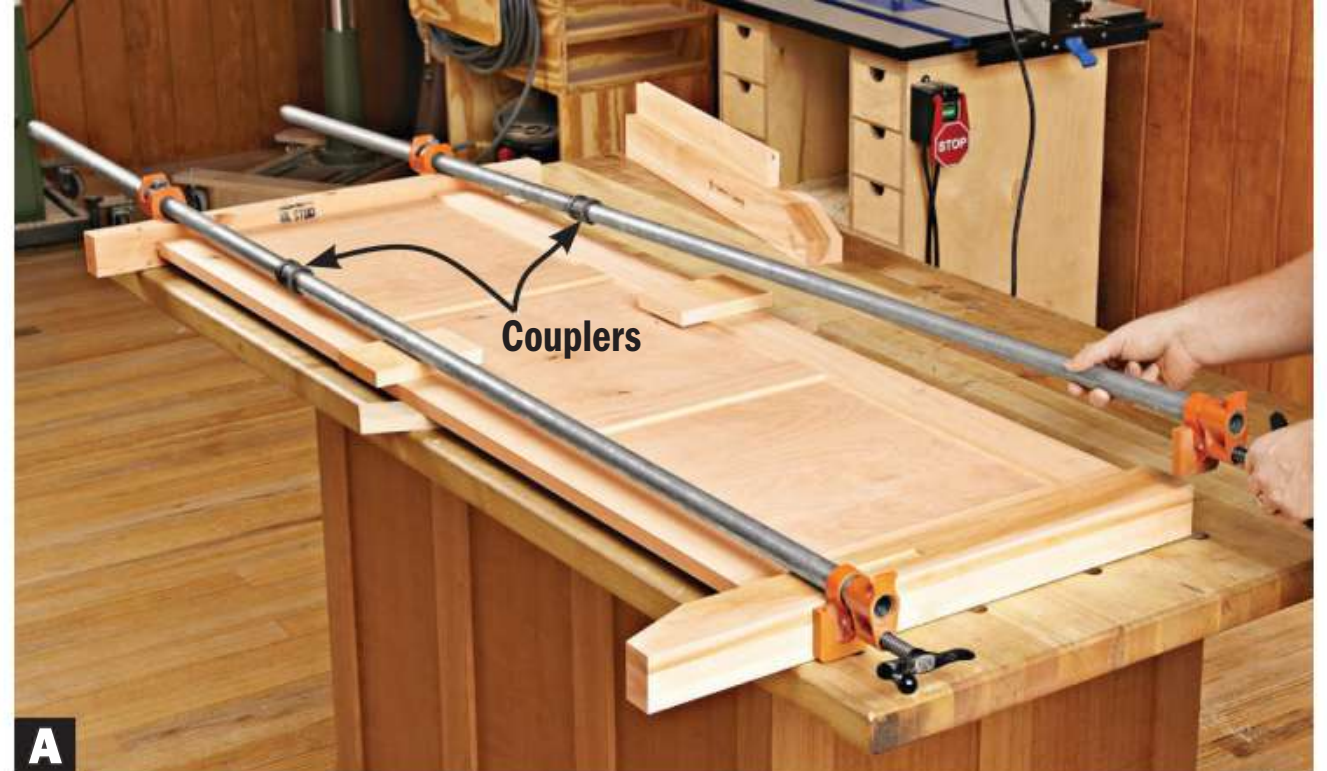
The shallow jaws work well for panel glue-ups and carcass assembly, but limit the reach on thick workpieces or into the interior of a wide assembly. The beefy Acme threads of the fixed jaw apply lots of pressure, but even $\frac{3}{4}$ " pipe can flex after too many twists of the handle. On the downside, long clamps weigh a lot, and wet glue can react with the pipe and wood, leaving black marks on your assembly.

Our recommendation: Start with four sets of clamp fixtures, four 2' pipes, two 4' pipes, and three couplers.

Aluminum bar clamps (\$30 for 36")

With a jaw depth about the same as that of pipe clamps, the biggest advantages of aluminum bar clamps are their light weight—about half of comparable pipe clamps—and that glue contact won't discolor the wood. They provide sufficient pressure for most panel glue-ups and carcass assemblies [Photo B], but will flex under heavy pressure.

Our recommendation: Consider buying a few in longer lengths if you find similar-length pipe clamps cumbersome.



A A pipe coupler joins two shorter pipe clamps for wide glue-ups, so you need not buy and store long pipes.



B A pawl in an aluminum bar clamp's movable jaw (inset) holds the jaw in place as you tighten the stationary jaw.

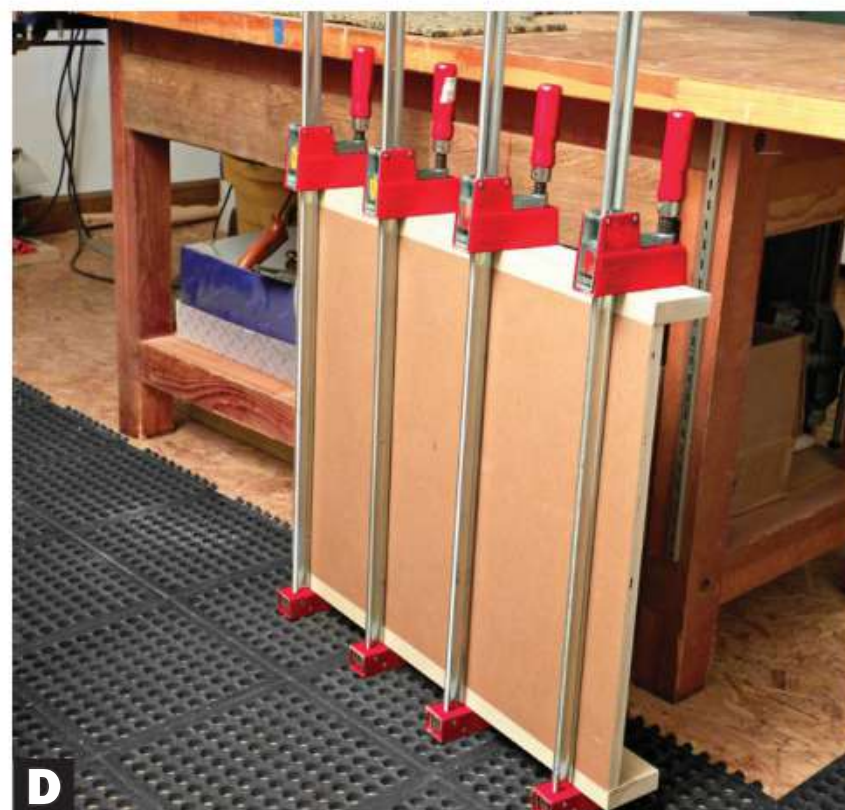
Parallel-jaw clamps (\$45 for 36")

Deep jaws reach farther, and even provide enough capacity for crossing clamps perpendicular to each other [Photo C]. The jaws stay parallel under heavy pressure, and the beefy bars resist bowing, keeping panels flat and pressure even. If you need to move a clamped assembly out of the way, simply stand the clamps on end [Photo D]. On some models, reversing one jaw creates a spreader for pushing pieces apart [Photo E]. As with pipe clamps, the heavy-duty performance reflect in their weight (and price).

Our recommendation: Step up to these after you determine if they'll be useful to your style of work.



C Long jaws reach far enough to apply pressure even with one set of clamps resting on top of the others.



D Clear your benchtop for further work without sacrificing floor space by standing a glue-up on end.



E Reversing the movable jaw of a parallel-jaw clamp creates a spreader, useful for disassembly.

The utility players

Woodworking involves more than gluing up panels and cabinets. For the everyday tasks that require temporarily securing something to something else, these clamps come through in the clutch.

F-clamps (\$15-\$25 for 6-36")

These workhorses prove indispensable for securing items to your bench [Photo F], clamping drawer and box glue-ups [Photo G], and countless other jobs. The typical 4" jaw depth works for most applications, but available deeper jaws prove useful, too. The twisting action of the handle and the swivel head can shift parts out of position as you tighten the clamp, so when possible, place the movable jaw against the stationary part of an assembly.

Our recommendation: Start with four each in 6" and 18" lengths. You'll soon be adding more in various sizes, and the moderate price makes it easy to do so.

One-hand (\$18-\$25 for 6-18")

When you have only one hand free, use it on the squeeze trigger that advances the jaw of a one-hand clamp [Photo H]. Your grip strength limits pressure (our tests show about 180 psi on average), but with lighter-weight bars than F-clamps, you won't use these for your most pressing jobs (sorry). Some sport a reversible jaw to create a spreader; others link together to make two clamps function as a longer one [Photo I].

Our recommendation: Buy a couple of 6" and a couple of 12".



F Short F-clamps prove ideal for securing a workpiece to your bench, such as when laminating pieces as shown here, or to hold it for sanding or other work.



G Hold together glue-ups too small for bar clamps with a few F-clamps.



H One-hand clamps free your other hand to align parts as you clamp. If the job requires more pressure, add an F-clamp or pipe clamp after getting parts aligned.



I The fixed jaws of these clamps interlock, combining two clamps into one. Positioning the linked jaws below the bar provides clearance above.

For small and odd jobs

Kind of like the last kid called for sides in PE class, these clamps don't take center stage, but often surprise you with their usefulness.

Spring clamps (\$1-\$8)

These apply a fixed amount of light pressure concentrated at the pads at the tips of their jaws. A squeeze opens them for positioning. Spring strength varies among types, sizes, and manufacturers, so give them a test squeeze to evaluate clamping pressure before buying. Use one to secure a stopblock to a fence [Photo J], hold a protective paper covering to your bench, or keep a ruler in position while you make marks along it.

Our recommendation: No need to overdo these; two each in 2", 4", and 6" will take care of most jobs.

Handscrews (\$8-\$25)

The deep reach and the ability to cant the jaws out of parallel make handscrews a valuable part of a clamp collection. Because the dual screws turn independently, you can twist just one, using the other as a fulcrum to multiply pressure at the ends of the clamp. And you can grip items in either end [Photo K]. The wood jaws are less likely to mar workpieces, and you can easily modify them to hold non-square items [Photo L].

Our recommendation: Get one each in 6", 8", and 12" sizes.

Tip! A light coat of wax on the jaws prevents glue from adhering.



J A spring clamp temporarily holds a stopblock in place on this simple jig, and allows for quick and easy adjustments to its position.

► Organize a growing clamp collection.
woodmagazine.com/clamprackplans



K

To machine small or odd-shaped workpieces, grip them in a handscrew. The flat jaw sides ride smoothly on a tabletop, and the wood jaws won't damage cutters.



L

Secure a handscrew to a flat surface, lying down or standing on end, to create a vise. Notch or shape the wood jaws to hold cylinders or other items without parallel faces.

The specialists

Wait to buy these clamps until you have a specific need for them.

Band (or strap) clamp (\$20–\$35 for 6–23')

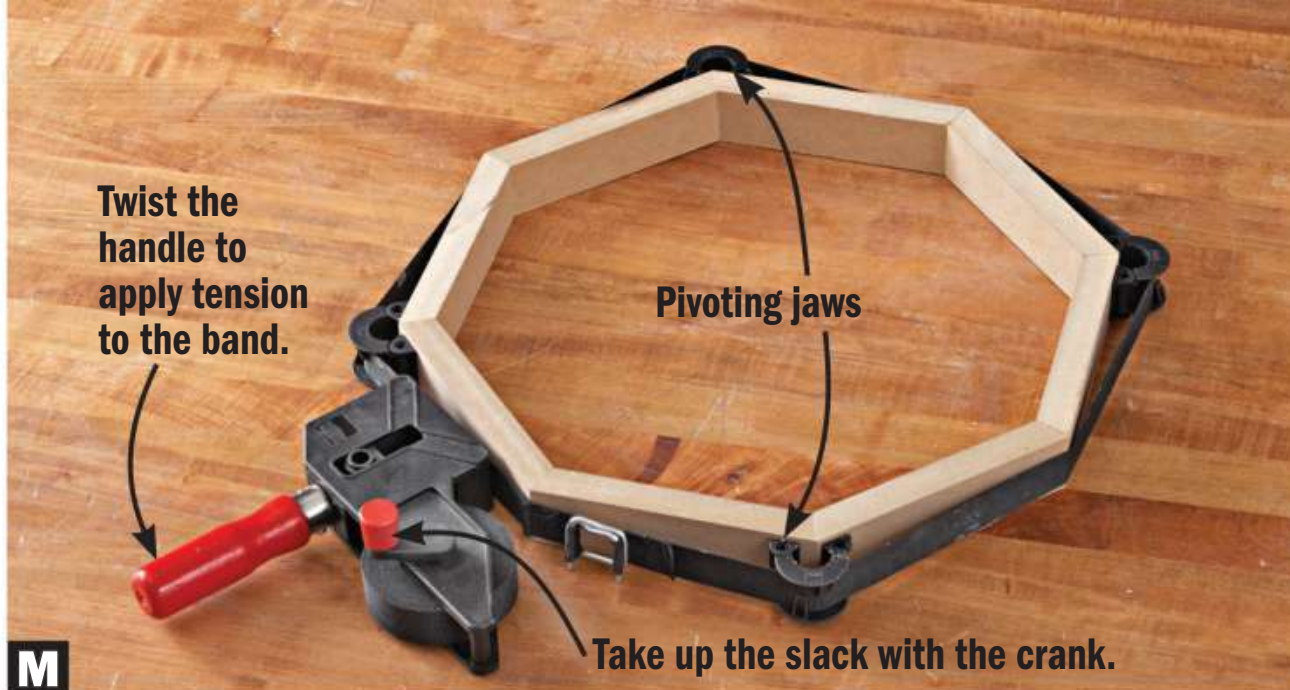
Wrap its webbed strap around a glue-up to hold corners together, such as when assembling a box or drawer. Some have blocks with pivoting jaws that protect delicate mitered corners and can accommodate corners other than 90° [Photo M]. The blocks also lift the strap off the workpiece so the strap doesn't get glued in place or fouled by squeeze-out. Tighten a screw or a ratcheting mechanism to apply pressure.

Corner clamps (\$15)

These often serve as a much-needed third hand, aligning perpendicular pieces as you twist the handle to apply clamping pressure. If you see frame making in your future, a set of four makes life much easier [Photo N].



Use a corner clamp to hold mitered pieces in position while the glue dries. These clamps hold the corner of a drawer or carcass as well.



A band clamp conforms to non-square shapes, applying even pressure all around. Pivoting jaws concentrate clamping pressure near each joint.

C-clamps (\$5–\$20)

For the money, nothing beats C-clamps for applying pressure [Photo O]. The crossbar in the screw handle, the hefty threads, and the beefy iron body make these clamps overkill for most jobs. However, the long threaded rod provides a large capacity (after much spinning of the screw).



C-clamps provide plenty of pressure for keeping a bandsaw tire in place while stretching it onto the wheel.

Produced by **Craig Ruegsegger**

Dealing with pressure

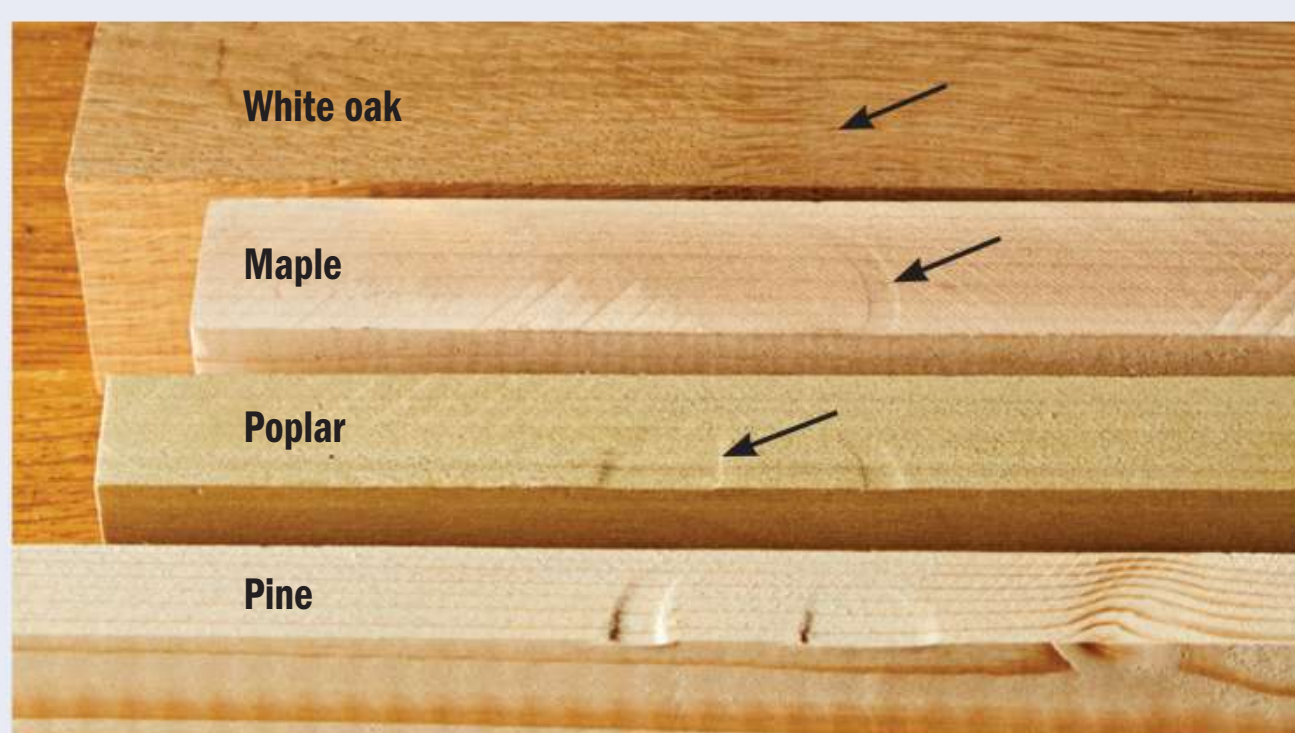
Sometimes, such as when bending thin strips around a form to make a curved part, you need a lot of clamping force; but most times you don't. For example, to glue up a panel from several boards with properly jointed edges that come together with no gaps, you need about 100–150 pounds per square inch (psi) for soft woods, and 175–250 psi for hardwoods. Almost any bar-type clamp can easily apply that much pressure—over one square inch.

But the force generated by a clamp spreads over the surface area of the joint. A panel glue-up of 1"-thick boards 25" long has a surface area of 25 square inches. To achieve 150 psi over 25 square inches, you need 3,750 pounds of clamping force. If you apply 420 psi per clamp, nine clamps achieve that pressure over the entire joint. With a bit more pressure per clamp, about 470 psi, you can use only eight clamps.

So how can you know what 420 psi or more feels like? To give an idea, we clamped a hydraulic pressure gauge against scraps of four different wood species to see how much pressure it took to dent the edge, *above, right*.

Because those forces can dent soft woods, either use a clamping caul of harder wood between the clamps and the workpiece, or plan on trimming the panel edges to remove any dents. Or, rather than twist clamps harder, add more clamps. 🌲

► Learn about clamping pressure.
woodmagazine.com/clamppress



In this unscientific test, 380 psi created a significant dent in a pine board. 420 psi made a shallower dent in poplar. 1,000 psi made a barely visible dent in hard maple. And 1,200 psi had no visible effect on white oak, but it did twist the C-clamp, *right*.



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Tablet Holder

Steady a tablet or book at the optimal reading height.

Is reading or working on your tablet or smartphone a pain in the neck? If so, you could be suffering from a condition known as “tech neck.” This quick project helps eliminate that discomfort by elevating the device to a more comfortable viewing level. The holder’s long base lets it rest on the arms of a chair.

What the heck is “tech neck?”

Medical studies have shown that spending too much time looking down at a digital device compresses the muscles and ligaments in the front of your neck while overstretching those in the back of your neck. This can lead to pain and stiffness in the short term, with possible long-term effect to your spine and nervous system.

DIMENSIONS:
32" W x 5½" D x 12" H

Approximate materials cost:

\$40

Skills learned:

- Sliding dovetail joinery
- Stopped rabbets

Diagram illustrating the construction of a wooden tablet stand, showing the assembly of various components labeled A through F.

Components and Dimensions:

- Component A:** The base, measuring 32" in length, 21 1/8" in width, and 5 1/2" in height. It features a 10° bevel on the right side.
- Component B:** Two uprights, each measuring 4 3/8" in width and 10 7/8" in height. They are attached to the base via 3/8"-deep dovetail slots.
- Component C:** The central tablet, measuring 10 1/4" in width and 7" in height.
- Component D:** A top rail, measuring 7" in width.
- Component E:** A base rail, measuring 5 1/4" in width.
- Component F:** Two side rails, each measuring 3/4" in width and 5 1/4" in height.

Assembly Notes:

- Notched base provides room for tablet cords.
- 3/8"-deep dovetail slots lock the uprights in place.

- 1 Cut the base (A) to size [Materials List, Exploded View]. Lay out the locations for the dovetail slots, then bevel the back edge.
- 2 From ½" stock, build the dovetail-slot jig to fit your router [Drawing 1]. Clamp the jig to the base and rout the slots [Photo A].

Position stop so you can rout a $4\frac{3}{8}$ "-long slot.

STOP $\frac{1}{2} \times 1"$

Equal to your router's subbase diameter

GUIDE RAIL $\frac{1}{2} \times 1\frac{1}{2}"$

CLEAT $\frac{1}{2} \times 1"$

Rout $\frac{3}{8}$ "-deep dovetail slot after assembling jig.



69



B Rout along one end on both faces. Test the fit in the slots. Raise or lower the bit and move the fence to adjust until the dovetail tongue fits snugly in the base.



C Touch the right upright (B) to the mark on the fence and pivot the blank into the spinning bit. Rout the rabbet as shown. For the mirrored left upright, start at the narrow end and rout to the rabbet-end mark (no pivot entry needed).

3 From $\frac{3}{4}$ " stock, cut two $4\frac{3}{8} \times 13$ " blanks for the uprights (B), along with a test piece about 4×6 ". Lay out the shape of the upright [Drawing 2], and miter-cut the bottom of each piece. (Cutting the back angle later makes it easier to rout the dovetails and rabbets in the next steps.)

4 Install the dovetail bit in your router table, set for a $\frac{3}{8}$ "-deep cut. Set the fence to reveal about $\frac{1}{8}$ " of the bit. Using your test piece, rout a dovetail along one end [Photo B]. When you have a good fit, rout both uprights (B).

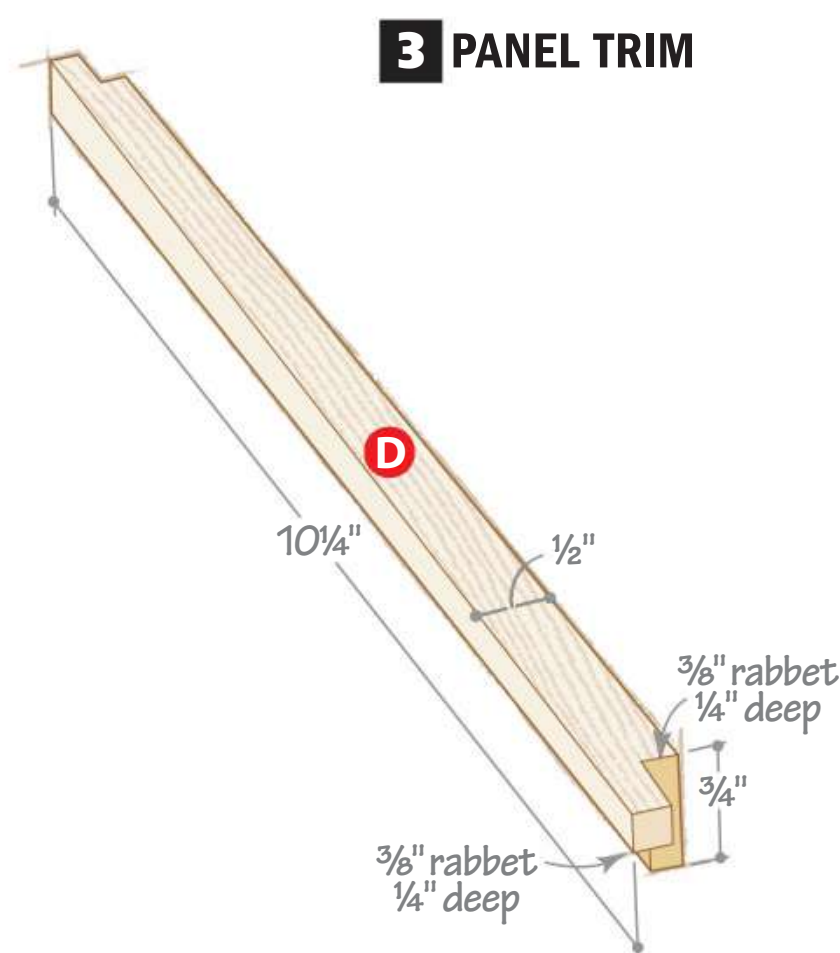
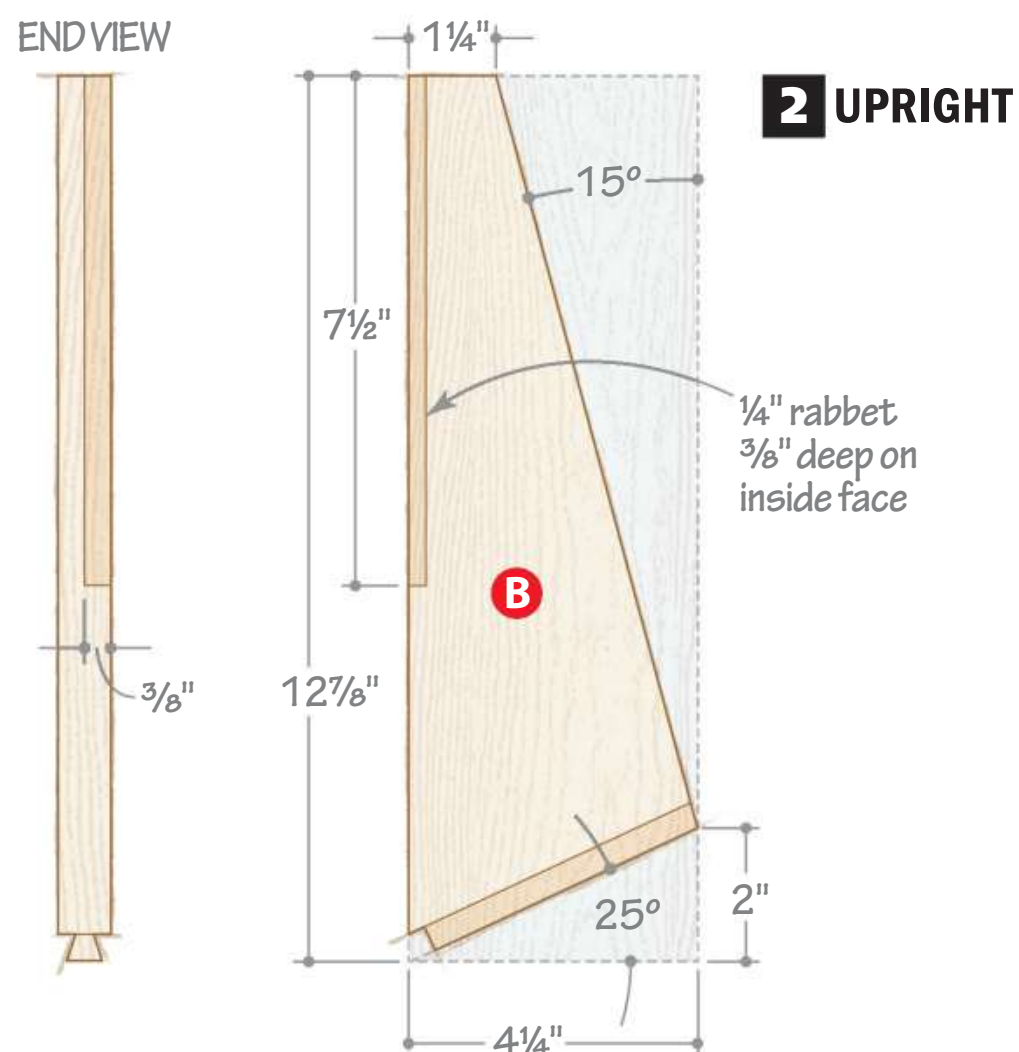
5 Install a $\frac{1}{4}$ " straight or spiral bit in the router table, raised to make a $\frac{3}{8}$ "-deep cut. Use a scrap of the $\frac{1}{4}$ " plywood to posi-

tion the fence, exposing the bit equal to the plywood thickness. Rout a rabbet in the test piece, and check the fit of the plywood; adjust as needed.

6 Lay out the end of the stopped rabbet on the *outside* face of each upright (B) [Drawing 2]. Make a mark on the left (outfeed) fence $5\frac{3}{8}$ " from the near side of the bit. Rout the rabbet in each upright [Photo C], and square up the corners with a chisel. Cut the back angle of each upright and sand smooth.

7 Cut the panel (C) and panel trim (D) to size [Drawing 3, Exploded View]. Rabbet the ends and the bottom front edge of the panel trim, and glue it to the panel.

► Mark the outside faces of each upright (B) so the marks are visible when routing.





D Using the rip fence as a stop, cut one side of the shallow notch. Flip the board and repeat for the other side of the notch. Move the fence aside and nibble away the remaining material between the kerfs.



E Reposition the fence, and as you did for the shallow notch, cut the sides of the upper notch, and then nibble away the waste.

Add the shelf

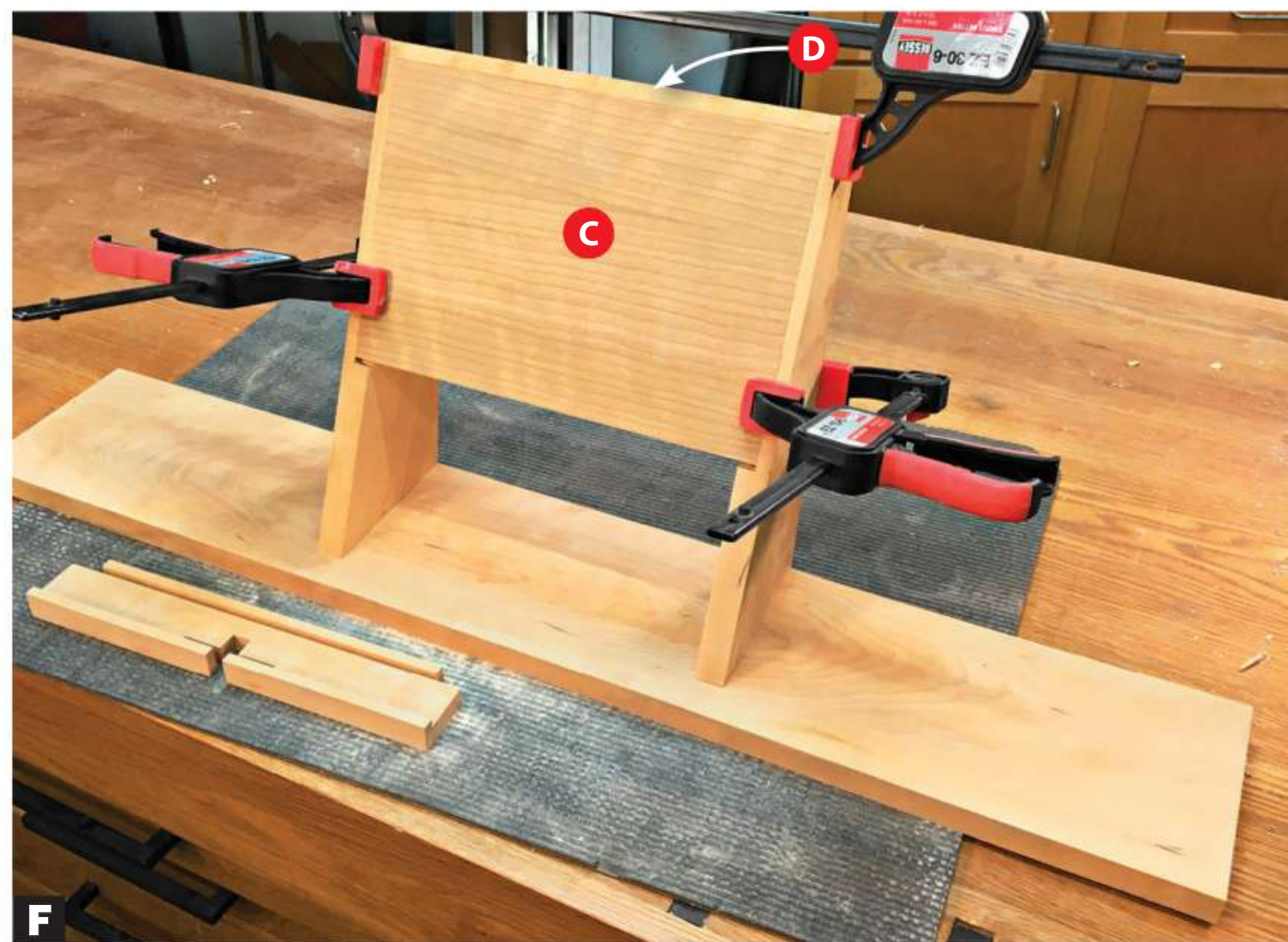
1 Cut the shelf (E) [Drawing 4] to size, notch the ends, and cut the groove for the panel. Then, notch the front face [Photos D and E]. Clean up the notches with a chisel and sand smooth.

2 Cut the shelf edges (F) [Exploded View] and glue them to the shelf, flush at the bottom and ends.

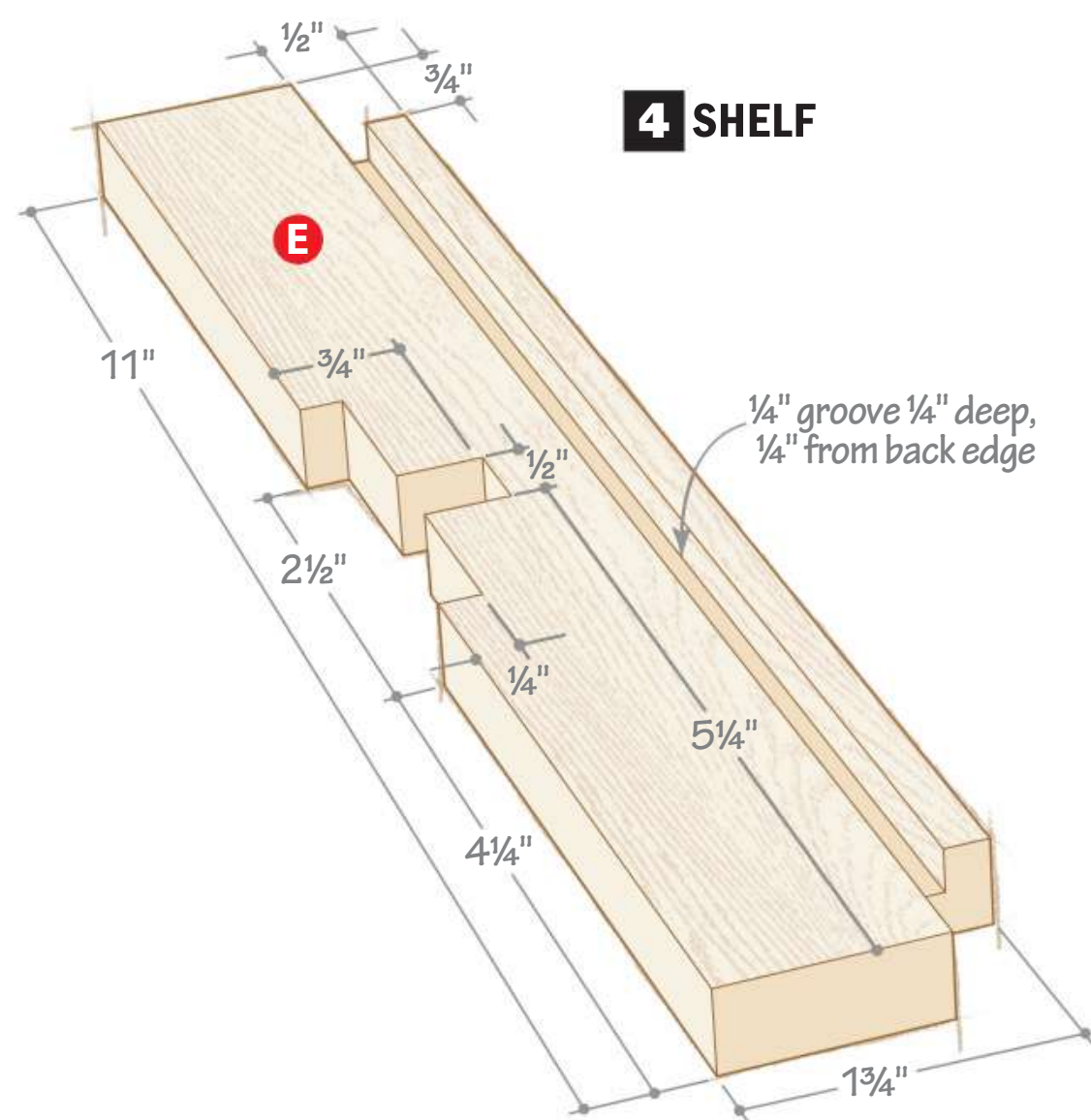
3 Begin assembly by sliding the two uprights into their grooves—unglued—and then glue the panel (C/D) in place [Photo F].

4 Glue the shelf assembly to the uprights and panel. After the glue dries, remove the upright assembly from the base and do any touch-up sanding as needed. Glue the uprights into the dovetail slots in the base flush with the back edge of the base.

5 Apply finish. We wiped on two coats of Walrus Oil cutting board oil. 🌲



F Glue the panel (C) into the rabbets on the uprights so the panel trim (D) rests flush with the top of the uprights. Clamp and let dry.



Materials List

Part	FINISHED SIZE			Matl.	Qty.
	T	W	L		
A base	3/4"	5 1/2"	32"	C	1
*B uprights	3/4"	4 1/4"	12 7/8"	C	2
C panel	1/4"	7"	10 1/4"	P	1
D panel trim	1/2"	3/4"	10 1/4"	C	1
E shelf	1/2"	1 3/4"	11"	C	1
F shelf edges	1/4"	3/4"	5 1/4"	C	2

*Parts initially cut oversize. See the instructions.

Materials key: C—cherry, P—cherry plywood.

Bits: 1/4" straight or spiral and 14° dovetail bits.

Produced by **Bob Hunter** with **Kevin Boyle**

Project design: **Harold Pinder**, Key Largo, Fla.

Illustrations: **Roxanne LeMoine**, **Lorna Johnson**

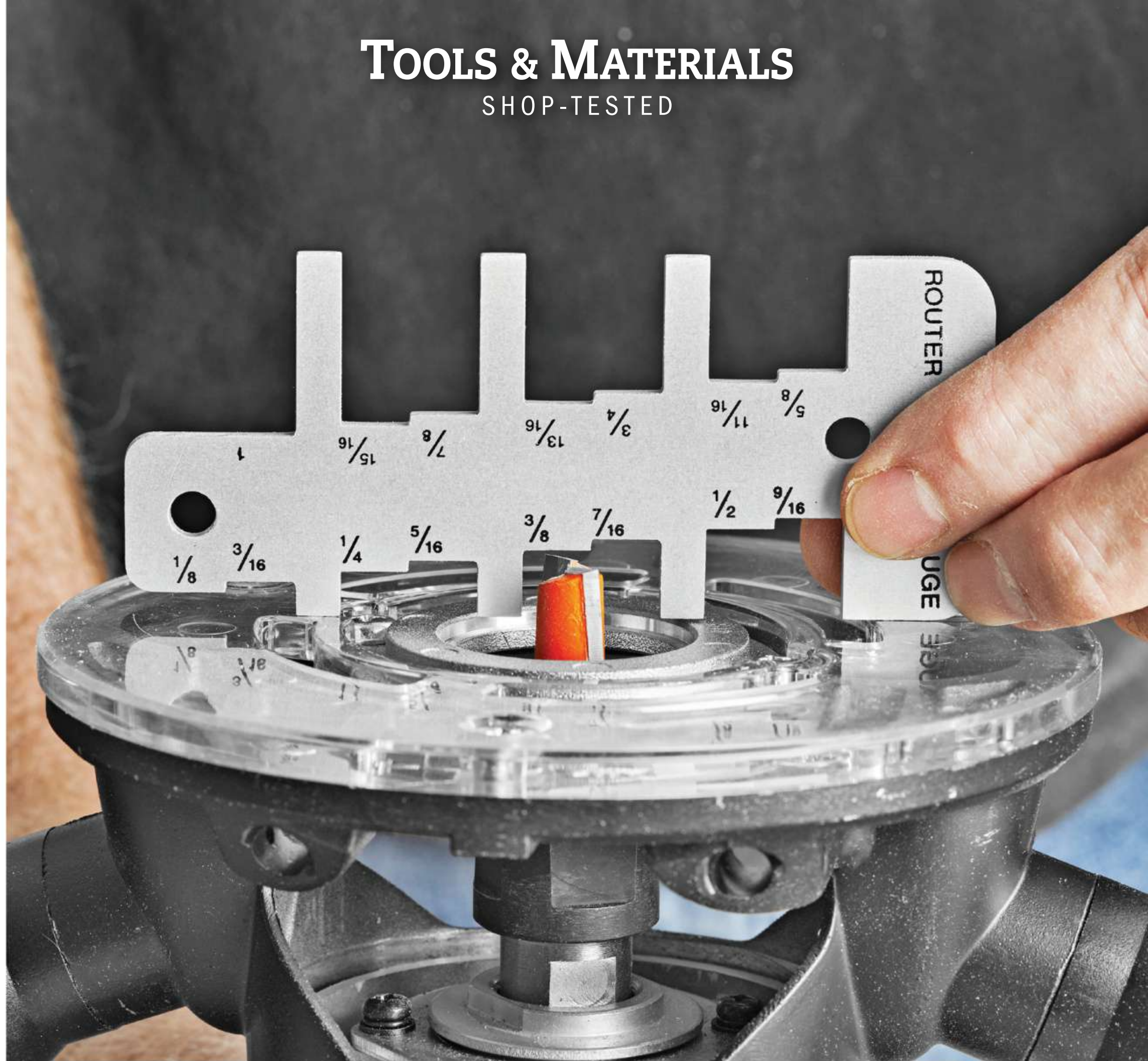
Height Done Right

When you need to set a router bit or saw blade to a precise cutting depth, use one of these handy accessories for can't-miss measurements.

Peachtree Woodworking depth gauge, no. 1058, \$9

You can spend more for bells and whistles, but this gauge simply delivers 15 accurate measurements from $\frac{1}{8}$ " to 1" in $\frac{1}{16}$ " increments without fuss or extravagance.

888-512-9069, ptreeusa.com



Infinity Cutting Tools combo gauge, no. 100-251, \$10

This aluminum gauge shows depth settings along its edges from $\frac{1}{8}$ " to 1" in $\frac{1}{16}$ " increments. The stepped increments on the pictured face help you set stacked-dado blade widths, with labels on the opposite face for setting blade heights up to 2" in $\frac{1}{8}$ " increments.

877-872-2487, infinitytools.com



Kreg Tool precision setup bars, no. PRS3400, \$70

For the woodworker who demands both style and substance, these seven aluminum gauges store in a convenient plastic case and feature three places to measure specific increments. The downside: They can't help beyond $\frac{1}{2}$ " of depth/height.

800-447-8638, kregtool.com



Milescraft depth gauge, no. 8601, \$8

A 5"-long rule with inch markings on one side and metric on the other fits into the plastic saddle that straddles the blade or bit. We like the large brass knob that locks the rule securely.

224-227-6930, milescraft.com



Rockler bit center/depth gauge, no. 55010, \$20

This multifunction gauge features a 12" rule marked in easy-to-read inches and metric increments, but we found the angled edge of the cursor tricky to line up precisely. (We darkened the underside edge with a black marker to improve readability.) The gauge also works well for setting a router-table fence a precise distance from the center of $\frac{1}{4}$ "- and $\frac{1}{2}$ "-shank bits.

800-279-4441, rockler.com



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Dust collection gets up-close and personal

Benchtop Dust Collector, no. XBZ000100, \$600; replacement filters, no. FCS000100, \$100

For tools that don't connect easily (or at all) to a vacuum or collector, you can place Oneida's Benchtop Dust Collector close by, where it effectively draws away airborne dust. It's really more of an air-filtration system than a traditional dust collector because it captures dust particles in its two-filter system. The coarse outer filter catches the large particles, while the inner filter—rated at MERV 15 (equivalent to about .03 micron) traps even finer dust. I measured the baseline air quality in my shop with a particulate meter, then hand-sanded red oak until I could see a good volume of dust in the air. Then I fired up the collector and let it run. Within 20 minutes it had gobbled up about 85 percent of dust particles smaller than 5 microns.

This machine creates airflow using six small fans with variable-speed control. Running it at top speed, I measured airflow at 525 cubic feet per minute (within 10 cfm of Oneida's stated specification). In use, the machine sucked up dust and light chips better than I expected, even when I used it while sanding bowls on my lathe.

—Tested by Bob Hunter, Tools Editor

Oneida Air Systems
800-732-4065, oneida-air.com



Affordable combo kit helps set the speed

2½-hp router combo kit, no. RT1322-00, \$140

If you're looking for a good router kit at a value price, look no further than this one from Skil. But don't think the low price means a compromise on performance. The router showed great power, even during heavy cuts, and the built-in electronic feedback maintained bit speed nicely.

A digital readout on top of the motor displays bit speed, and will even help you choose the right one from 11 preset speeds based on bit diameter and the type of material you're routing (hardwood, softwood, or plastic). I also like the three LEDs that light up the cutting area well.

I found the handles on both bases comfortable and easy to grip. The motor slips easily into each base and locks solidly. The fixed base's height adjuster works smoothly with very little backlash, and

the plunge base operated smoothly. I'd prefer that the plunge lever default to locked position when not engaged; instead, it defaults to free plunge, and you must depress it to lock.

I said the RT1322-00 is good, but not perfect. Both plastic subbases accept standard two-piece guide bushings, so you can't use a bit larger than 1¼" in diameter without making a new subbase. (Skil says it plans to make optional subbases in the near future.) The plunge-base turret stops step down in ¼" increments; I'd prefer ⅛" increments for better control of plunge depth. And a grid in the fixed base's dust port creates a choke point for chips to block airflow.

—Tested by John Olson, Design Editor

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Lee Valley's newest hand plane gives you the functionality of a block plane in a smoothing plane body, with the leverage of a tall tote and, if you need it, a front knob to grip. This no. 1 uses a bevel-up $1\frac{7}{32}$ "-wide blade made from PM-V11 hardened tool steel. The blade has a 25° bevel angle and beds at a 15° angle. The $1\frac{25}{32} \times 5\frac{13}{16}$ " cast body provides an adjustable mouth, and uses a Norris-type blade adjuster. (You can also buy this plane with a carbon-steel blade, no. 05P5751, for \$189.)

Lee Valley

800-871-8158, leevalley.com

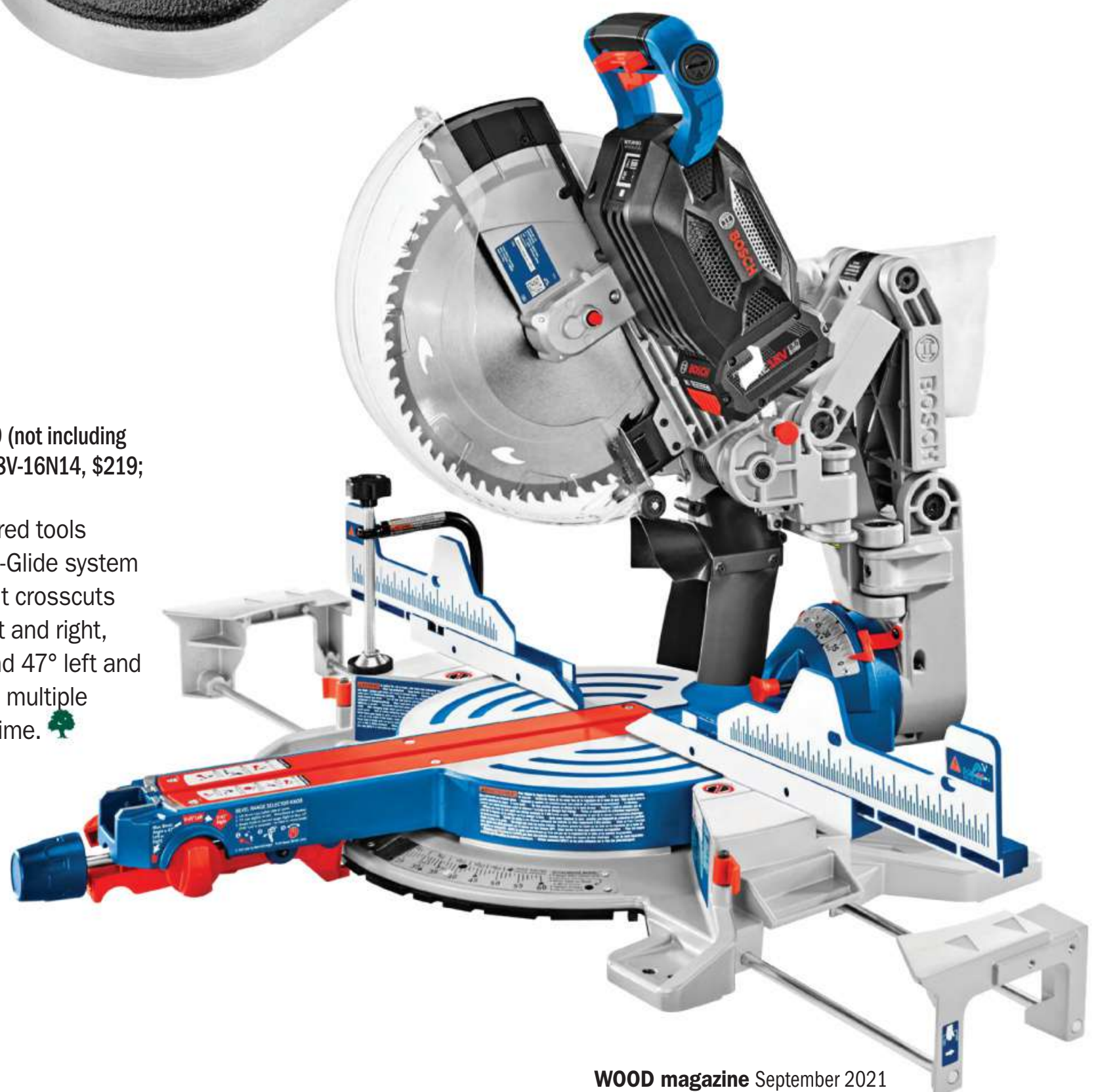


Bosch brings battery power to its Glide mitersaw

ProFactor 18-volt, 12" Surgeon Glide mitersaw, no. GCM18V-12GDCN, \$749 (not including battery or charger); 18-volt 8-amp-hour battery pack and charger, no. GXS18V-16N14, \$219; 12-amp-hour battery pack, no. GBA18V120, \$199

As one of several tools in a new platform of 18-volt battery-powered tools (called ProFactor), this dual-bevel saw incorporates Bosch's Axial-Glide system rather than the tubular rails common to most sliding mitersaws. It crosscuts up to $13\frac{1}{2}$ ", with miter stops at 0° and 15°, 22.5°, 31.6°, 45° left and right, and 60° right. The saw provides bevel stops at 0°, 33.9°, 45°, and 47° left and right. It also features a laser cutline indicator, LED task light, and multiple electronic speed settings that Bosch says optimizes battery runtime. 🌲

877-267-2499, boschtools.com



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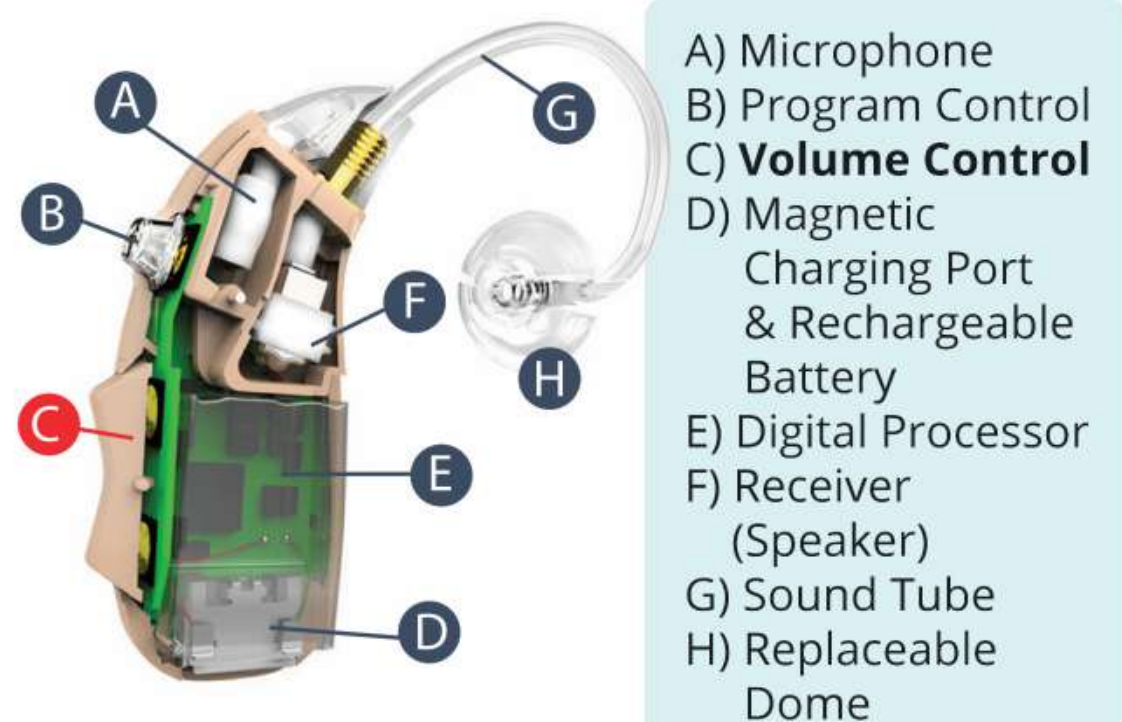
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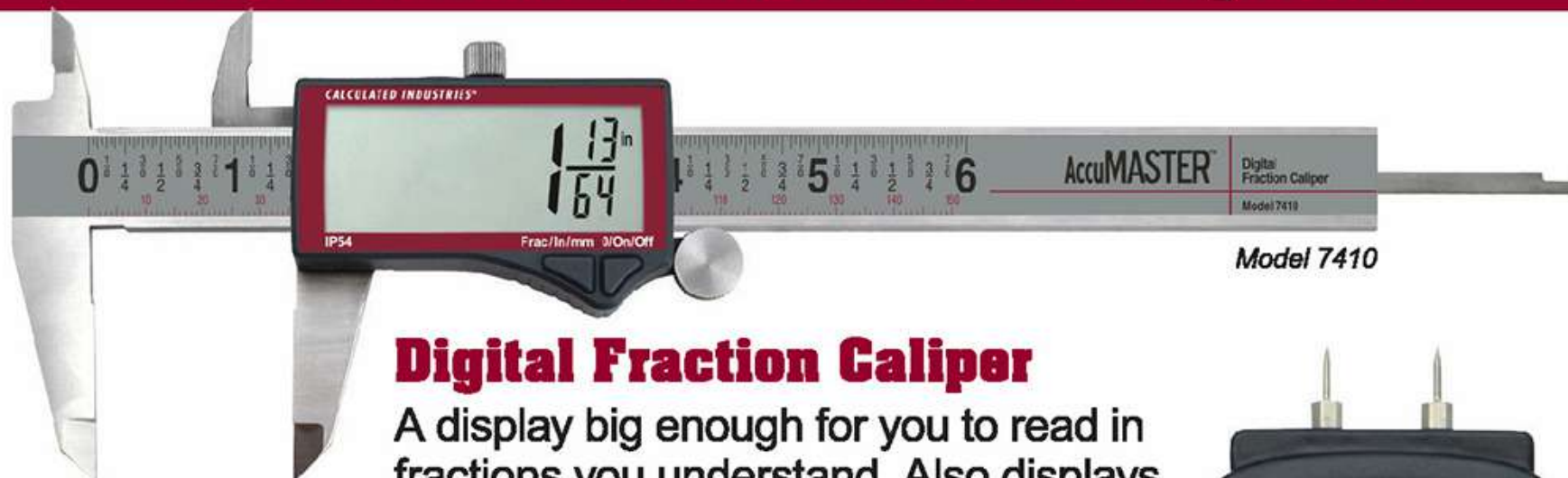
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WHAT'S AHEAD

A GLIMPSE INSIDE THE OCTOBER ISSUE (ON SALE AUGUST 20)



Art display case

Build this airy cabinet to display your projects or favorite *objets d'art*. Or make just the case or table separately.

Woodcarvings created and provided by Randy Hansen



Intro to Japanese hand planes

Learn how these ancient hand tools, which cut on the pull stroke, vary from Western planes.



Best-bang-for-your-buck tools

Why spend more than necessary to fuel your woodworking passion? With these top-performing bargains, you won't cry when you buy or use them.



Labyrinth bar-top game

Buddies won't play any game that doesn't involve a joystick? They'll love our hack of this classic game of balls and walls.



Midcentury nightstand and headboard

Matching the midcentury dresser project on *page 22*, a pair of nightstands and headboard complete the sweet suite.

THERE'S A REASON WE'RE TIGHT WITH WOODWORKERS.



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