

WOOD®

The World's Most Trusted Woodworking Resource

Tailor-made Tool Tower

p.46

More Great Plans

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p.62





Grizzly Industrial®

**PURVEYORS OF
FINE MACHINERY®
SINCE 1983**

Quality Machines, Great Prices!

14" X 37" WOOD LATHE W/ COPY ATTACHMENT

- Motor: ¾ HP, 110V, single-phase, 11A
- Swing over bed: 14"
- Swing over tool rest base: 12"
- Distance between centers: 37"
- Distance between centers with copy attachment: 32"
- Spindle speeds: Variable, 600-2400 RPM
- Spindle thread size: 1" x 8 TPI
- Tool rest width: 12"
- Tool rest post diameter: 20mm
- Overall dimensions: 62" L x 24" W x 48" H
- Approximate shipping weight: 164 lbs.



MADE IN AN ISO 9001 FACTORY

WARNING! †¹

G0842 ONLY \$595⁰⁰



2 HP PORTABLE CYCLONE DUST COLLECTOR

- Motor: 2 HP, 220V, 9A
- Intake hole size: 7"
- Impeller: 12¾" cast-aluminum
- Max. capacity: 20 gallons
- Airflow performance: 1023 CFM @ 1.2" SP
- Max. static pressure: 10.9"
- Footprint: 36" L x 26" W
- Approx. shipping weight: 294 lbs.



LIFT HANDLE & ROLL
DRUM EASILY FOR
SAWDUST DISPOSAL!

MADE IN
AN ISO 9001
FACTORY

WARNING! †¹

G0861 ONLY \$1095⁰⁰



14" SUPER HEAVY-DUTY RESAW BANDSAW W/ FOOT BRAKE

- Motor: 2 HP, 110V/220V (prewired 110V), single-phase, 19A/9.5A
- Max. cutting width: 13½"
- Max. cutting height: 14"
- Table size: 21¾" L x 16⅞" W
- Table tilt: 5° L, 45° R
- Floor-to-table height: 37"
- Blade size: 120" (⅞" to ¾")
- Blade speed: 2820 FPM
- Overall size: 29" W x 32½" D x 76" H
- Footprint: 24" L x 18" W
- Approx. shipping weight: 388 lbs.



14" RESAW
HEIGHT!

MADE IN
AN ISO 9001
FACTORY

WARNING! †¹

G0817 ONLY \$1395⁰⁰



12-SPEED 20" FLOOR DRILL PRESS

- Motor: 1½ HP, 120V/240V, single-phase, 15.8A/7.9A
- Prewired voltage: 120V
- Swing: 20"
- Drill chuck: JT3, ¾"-⅝"
- Drilling capacity: 1¼" steel
- Spindle taper: MT #4
- Spindle travel: 4¾"
- Spindle speeds: 12, from 180-3240 RPM
- Table size: 18¾" x 16¾"
- Table swivel: 360°; table tilt: 90°
- Footprint: 23" L x 18" W
- Overall height: 70¾"
- Approx. shipping weight: 317 lbs.



MADE IN AN ISO 9001 FACTORY

WARNING! †¹

G7948 ONLY \$795⁰⁰



8" X 72" JOINTER W/ BUILT-IN MOBILE BASE

- Motor: 3 HP, 230V, single-phase, 12A
- Table size: 9" x 72"
- Fence size: 4⅝" x 38"
- Maximum depth of cut: ⅞"
- Maximum rabbeting depth: ½"
- Minimum stock length: 10"



MADE IN
AN ISO 9001
FACTORY

- Minimum stock thickness: 1/2"
- Dust port size: 4"
- Footprint: 17" x 23-1/2"
- Approx. shipping weight: 450 lbs.



WARNING! †¹

G0855 ONLY \$1195⁰⁰



15" PLANER W/ CABINET STAND

- Motor: 3 HP, 230V, single-phase, 12A
- Max. cutting width: 15"
- Max. cutting height: 6"
- Max. cutting depth: ⅞"
- Min. stock length: 6"
- Min. stock thickness: ⅜"
- Feed rates: 16 FPM & 28 FPM
- Cutterhead speed: 5000 RPM
- Approx. shipping weight: 552 lbs.

MADE IN AN ISO 9001 FACTORY



WARNING! †¹

WITH 3-KNIFE CUTTERHEAD
G1021Z ONLY \$1625⁰⁰



OSCILLATING SPINDLE / 12" DISC SANDER

- Motor: 1 HP, 110V, single-phase, 10A
- Cast-iron 14½" x 14½" oscillating sander table tilts to 45°
- Cast-iron 17¾" x 10" disc sander table tilts to 45°
- Four spindle sizes: ¼", ⅝", 1½" and 2"
- Spindle speed: 1725 RPM
- Spindle oscillations: 60 SPM
- Stroke length: 1"
- Footprint: 21¼" L x 16½" W
- Overall height: 47"
- Approx. shipping weight: 181 lbs.

MADE IN
AN ISO 9001
FACTORY



WARNING! †¹

G0529 ONLY \$695⁰⁰



10" HYBRID TABLE SAW W/ RIVING KNIFE

- Motor: 2 HP, 115V/230V (prewired for 115V), single-phase, 16A/8A
- Rip capacity: 31½" right, 11⅜" left of blade
- Max. depth of cut @ 90°: 3⅞"
- Max. depth of cut @ 45°: 2⅞"
- Table size with extension wings: 40⅞" W x 27" D
- Distance from front of table to center of blade: 16¼"
- Floor-to-table height: 34¼"
- Dust port size: 4"
- Footprint: 20½" L x 19½" W
- Overall dimensions: 63" W x 40" D x 48" H
- Approx. shipping weight: 449 lbs.



WARNING! †¹

G0899 ONLY \$1275⁰⁰



10" SLIDING TABLE SAWS

EXTREME
SERIES

- Motor: 5 HP, 230V, single-phase, 19A (G0623X) or 7½ HP, 220V/440V*, 3-phase, 18A/9A (G0623X3)
- Max. rip capacity: 33"
- Main table size: 14⅜" x 27"
- Sliding table size: 12¼" x 63"
- Main blade arbor: ⅝"
- Main blade speed: 4000 RPM
- Scoring blade size: 3⅞"
- Scoring blade arbor: 22mm
- Depth of cut: 3⅞" @ 90°, 2¼" @ 45°
- Approx. shipping weight: 688 lbs. (G0623X), 670 lbs (G0623X3)

MADE IN
AN ISO 9001
FACTORY



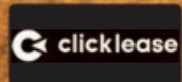
WARNING! †¹

5 HP, SINGLE-PHASE
G0623X ONLY \$3495⁰⁰

7½HP, 3-PHASE
G0623X3 ONLY \$3495⁰⁰



*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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TAKING MEASURE

Hanging out in the shop



My shop-organization philosophy might be best described as “a place for everything, and everything in its place. Eventually.” When I’m in the middle of a project, I tend to just set things down and put them away later. Following a glue-up, it’s not unusual for a cavalcade of clamps to cascade off the bench. (Can someone please come up with clamps that stack nicely?)

To make matters worse, I often have two or three unrelated projects going at one time, reducing my available workbench surface to about nil. When that happens, I have to break down and put everything away, whether I’m done with the project or not. The fresh start feels pretty good, actually.

One of the things that often disappeared on my benchtop was the remote control for my dust collector. I debated a number of options for keeping it visible, including chaining to it a big chunk of railroad tie, like the old filling-station restroom keys of yore. But I came up with a simple (and slightly more elegant) solution.

My DC came with two remotes, so I clipped one to the ceiling-fan fob that hangs directly over my bench, keeping it quite literally above the fray and within easy reach of the jointer, planer, drum sander, etc. The other I mounted on my tablesaw’s switch

box using hot-melt glue. Besides giving the remote a home, it’s easy to remember to turn the collector on and off for every cut.

If you like that idea, check out Bob Hunter’s “Dust-collection Hacks” article on *page 28*, with more tips on maximizing your system. And we’d love to see your hacks, too! Post them on our social media (@woodmagazine) with the hashtag #dustcollectionhacks, or email us at woodmail@woodmagazine.com. Let’s crowdsource more solutions!

So long, WOOD Chuck

I was saddened to learn of the recent passing of Chuck Hedlund, a true master craftsman who designed and built projects for more than 130 issues of *WOOD*® magazine. He was the meticulous kind of guy who made sure all the screwheads on the back of a project were perfectly aligned, and I owe much of what I know about woodworking to just hanging out with him in the shop.

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Precision Woodworking Square

Includes a Woodpeckers wall-mountable wooden case

12" 1281....\$119.99

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

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 $\pm .004$ ".
- Available individually or as a set.
- Available in inch or metric graduations.
- Metric scribing guides on 1mm centers.



Includes a wall-mountable Rack-It™

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

Includes a Systainer case

Saddle T-Square Set....\$369.99

Clamping Squares PLUS & CSP Clamps

- Positions stock at right angles for joinery & fastening.
- Precision milled for both inside & outside alignment.
- Works with any clamp.
- CSP Clamps add speed & convenience.
- Available individually or as a set.

Clamping Squares PLUS Rack-It Kit™....\$239.99

ULTRA·SHEAR™ by Woodpeckers®

Pen Mandrel System

- Collets on both ends perfectly center & lock the mandrel shaft.
- Tailstock can adjust to exactly the length of your pen project.
- Fits all #2 morse taper head & tail stocks.
- Drive & live centers precision turned from stainless steel.
- Works with almost all pen bushings.
- Matching precision Pro Pen Bushings available for most popular pen kits.

Pen Mandrel System....\$139.99



ULTRA·SHEAR™ by Woodpeckers®

Parting Tool-Ci

- Creates crisp, clean, narrow parting cuts.
- Sharpest, longest lasting carbide inserts on the market.
- $3/32$ " cutting width saves stock & minimizes resistance.
- Two insert profiles:
 - Fluted cutter installed
 - Square cutter optional

Parting Tool-Ci....\$79.99

Woodturning Tools

- Eliminate the drudgery of sharpening with nano-grain carbide inserts mounted to hardened alloy steel shafts.
- Sharpest, longest lasting carbide inserts on the market.
- Exclusive shaft design delivers both fast shaping & fine finishing.
- Also available in Full or Pen size.
- Square, round & detail tools available individually or as a set.

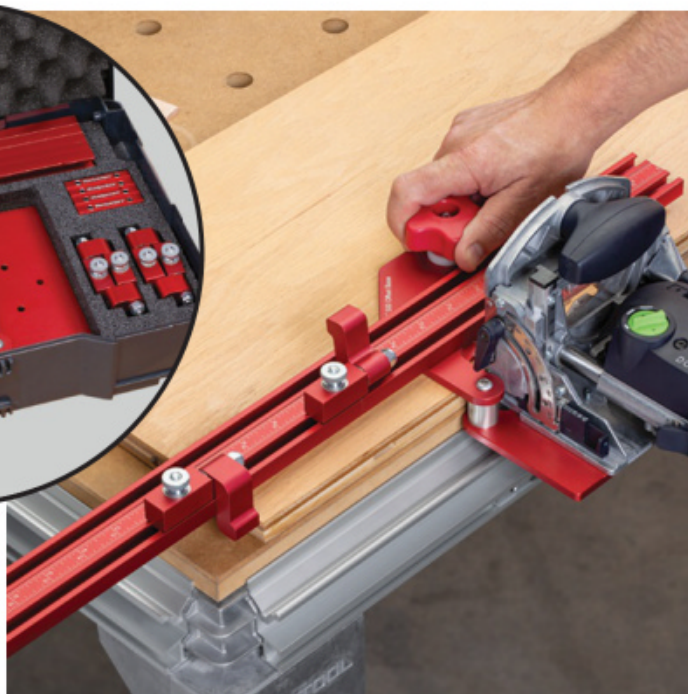
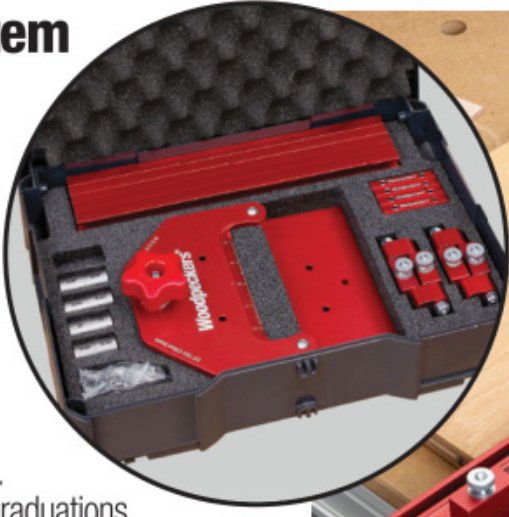
Mid-Size Woodturning Tool Set....\$269.98



Offset Base System

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.

Parallel Guide System

Made for Festool® Track Saws

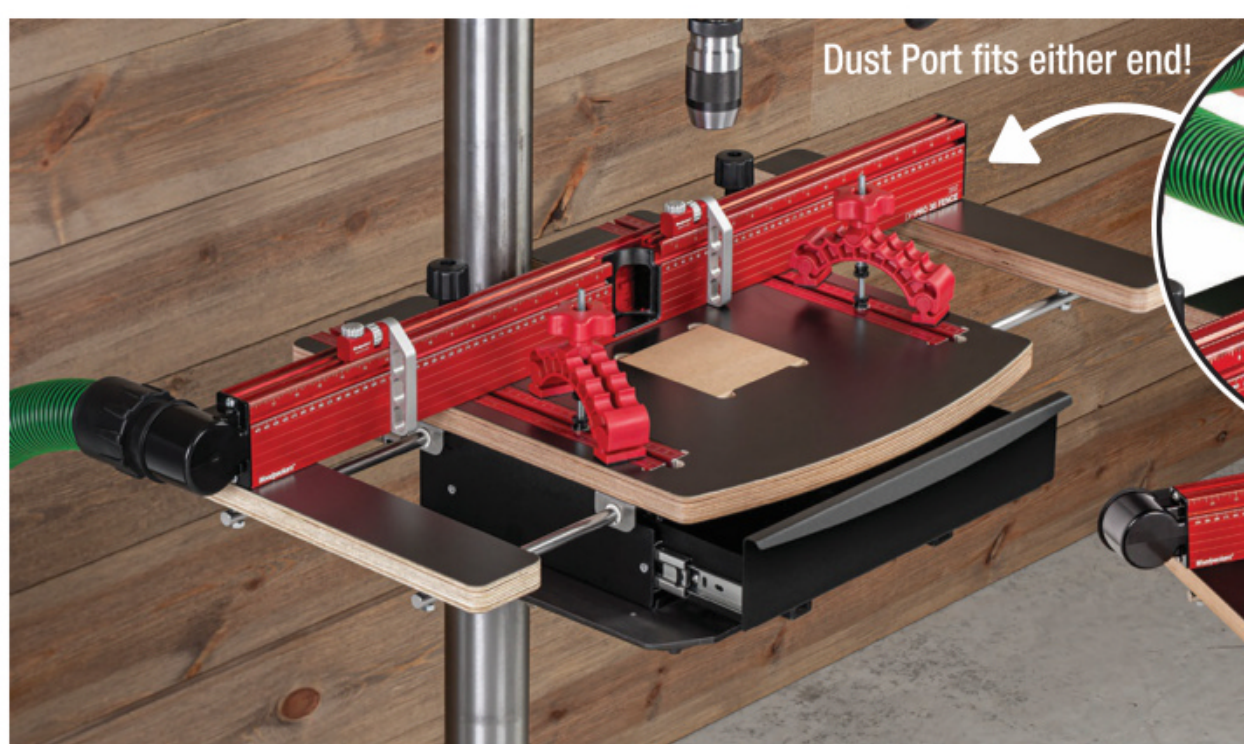
- Makes repetitive, parallel cuts with table saw accuracy.
- Maximum rip capacity of 52".
- Narrow stock guides deliver accurate results down to 1/4".



Includes a Systainer case

Parallel Guide System....\$429.99

Saw not included.



Dust Port fits either end!



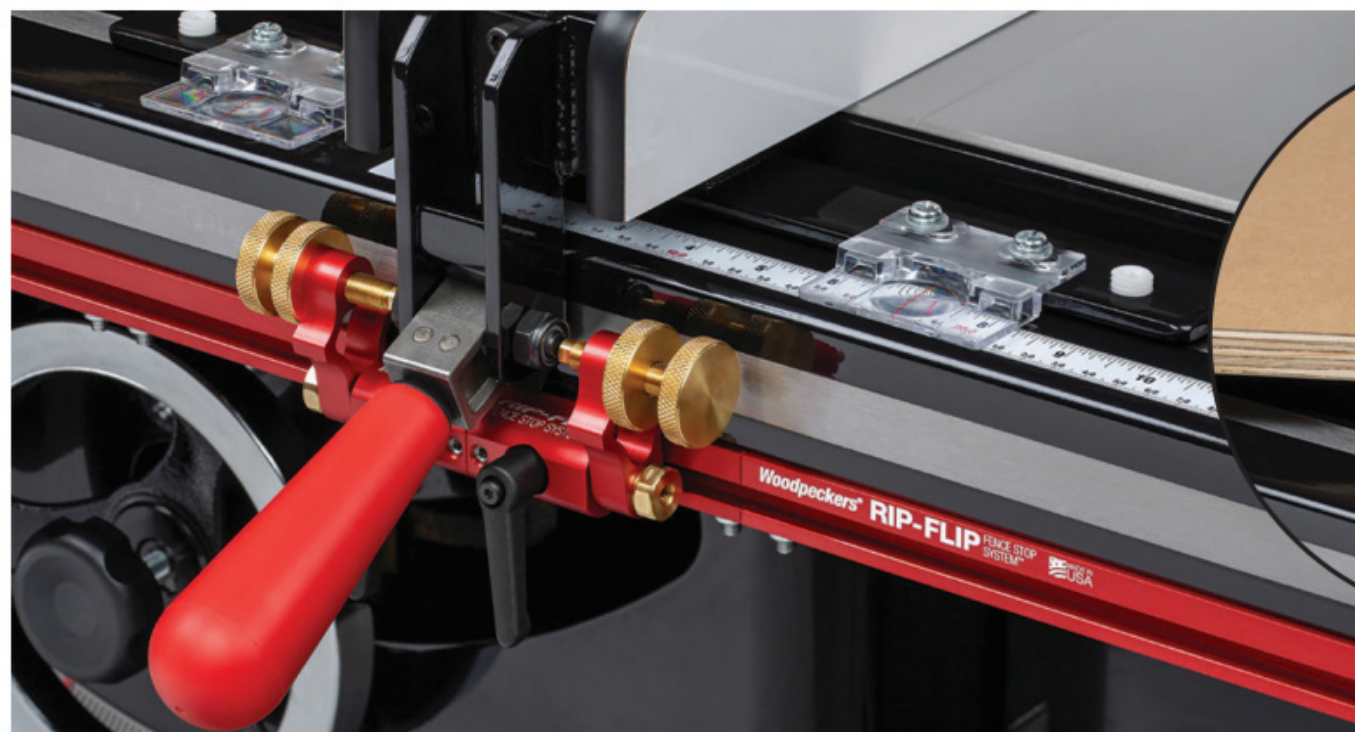
DP-PRO Drill Press Table System

- 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**

DP-PRO Drill Press Table Master System

36" Table, 24" Fence.....**\$369.99**
36" Table, 36" Fence.....**\$389.99**
48" Table, 36" Fence.....**\$419.99**
48" Table, 48" Fence.....**\$439.99**



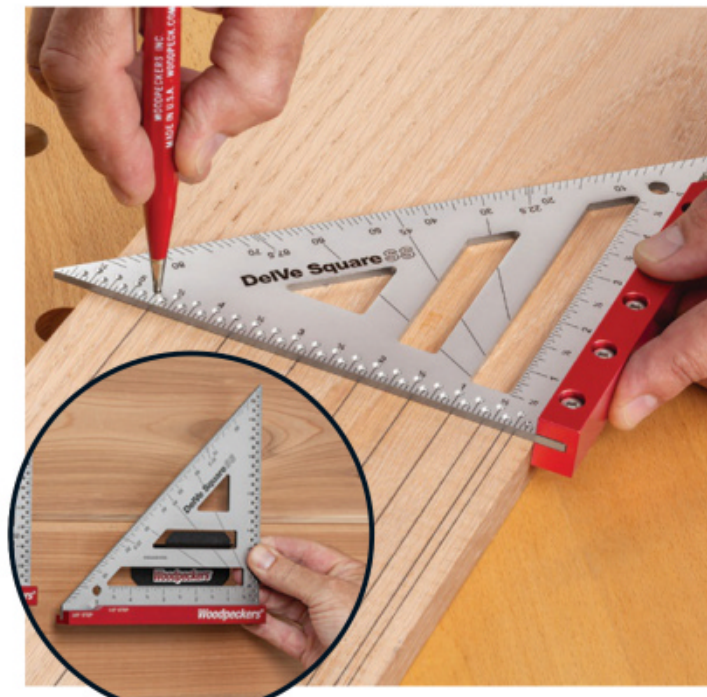
RIP-FLIP Fence Stop System™

- 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**

RIP-FLIP Fence Stop System

36" Capacity - Fits SawStop®.....**\$209.99**
30" Capacity - Fits Powermatic®.....**\$219.99**
52" Capacity - Fits SawStop®.....**\$219.99**
50" Capacity - Fits Powermatic®.....**\$229.99**



DeVe Square SS®

- 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°.

DeVe Square SS

Includes a wall-mountable Rack-It™

3-1/2".....**\$89.99**

6".....**\$119.99**

Inch Set.....**\$189.99**

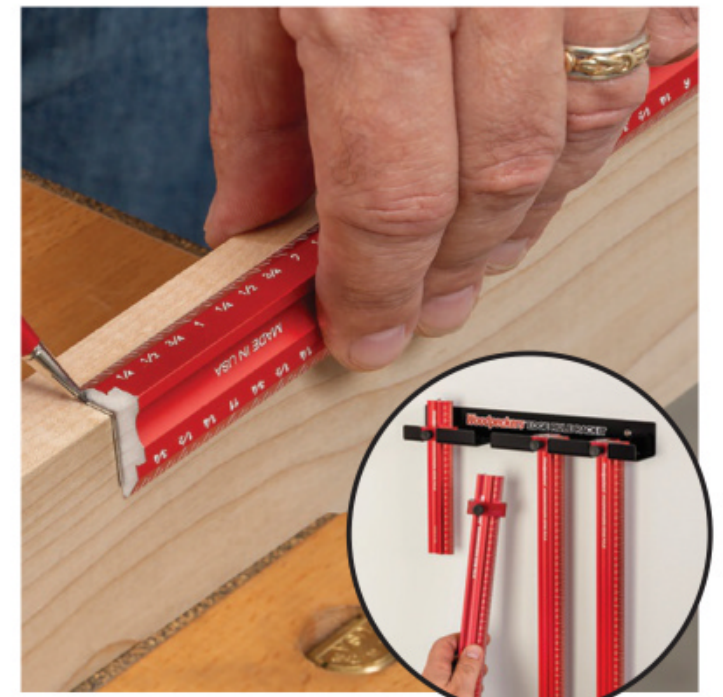
Woodworkers Edge Rules

- 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

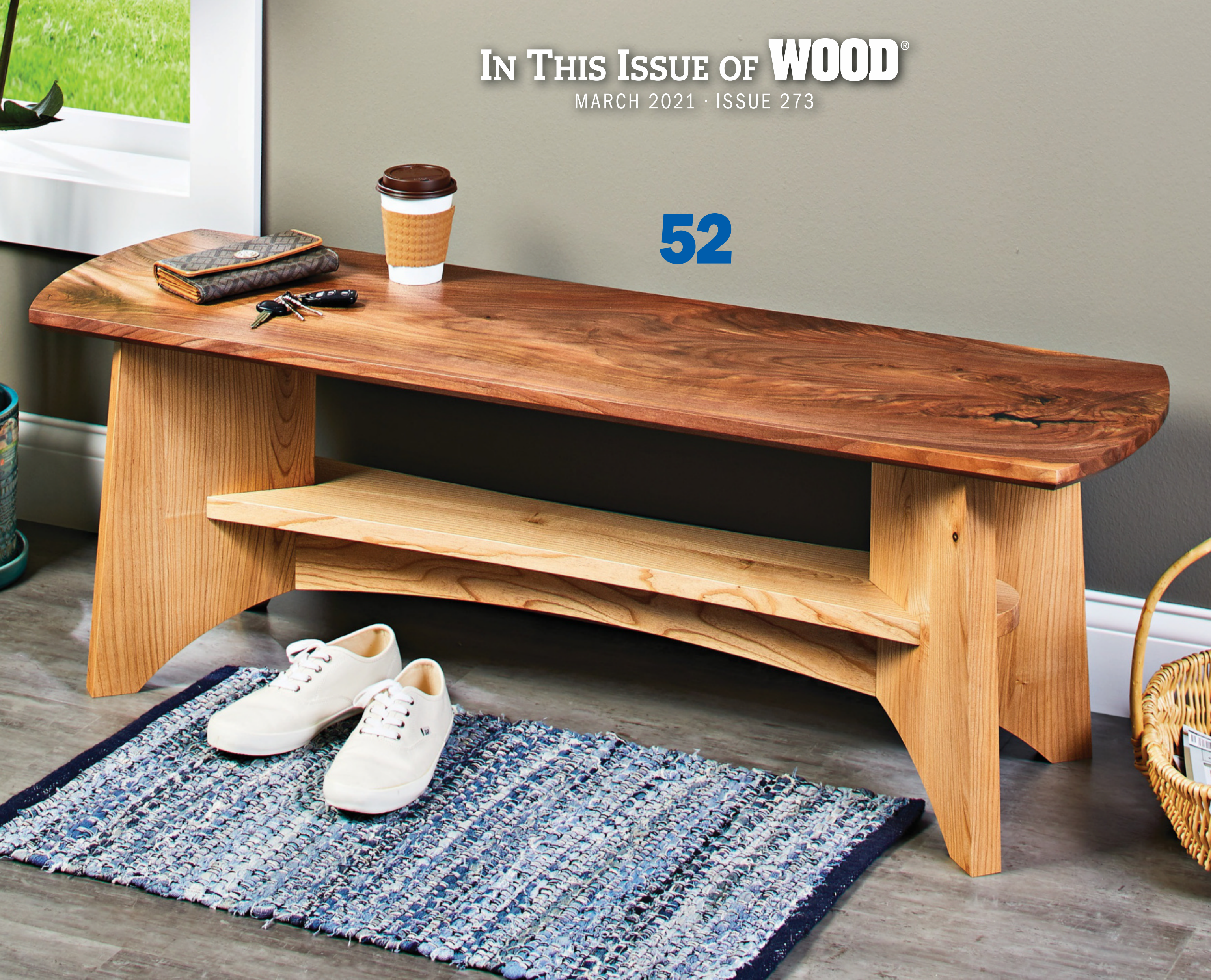
Includes wall-mountable Rack-It™.

Edge Rule Kit & 4 Stops.....\$109.99



For more sizes & ordering options for these tools plus hundreds more, visit **Woodpeck.com**

*NOTE: The Festool, DF-500, DF-700 XL, SawStop & Powermatic brand names are the registered trademarks of the respective companies and are not associated with Woodpeckers, LLC.



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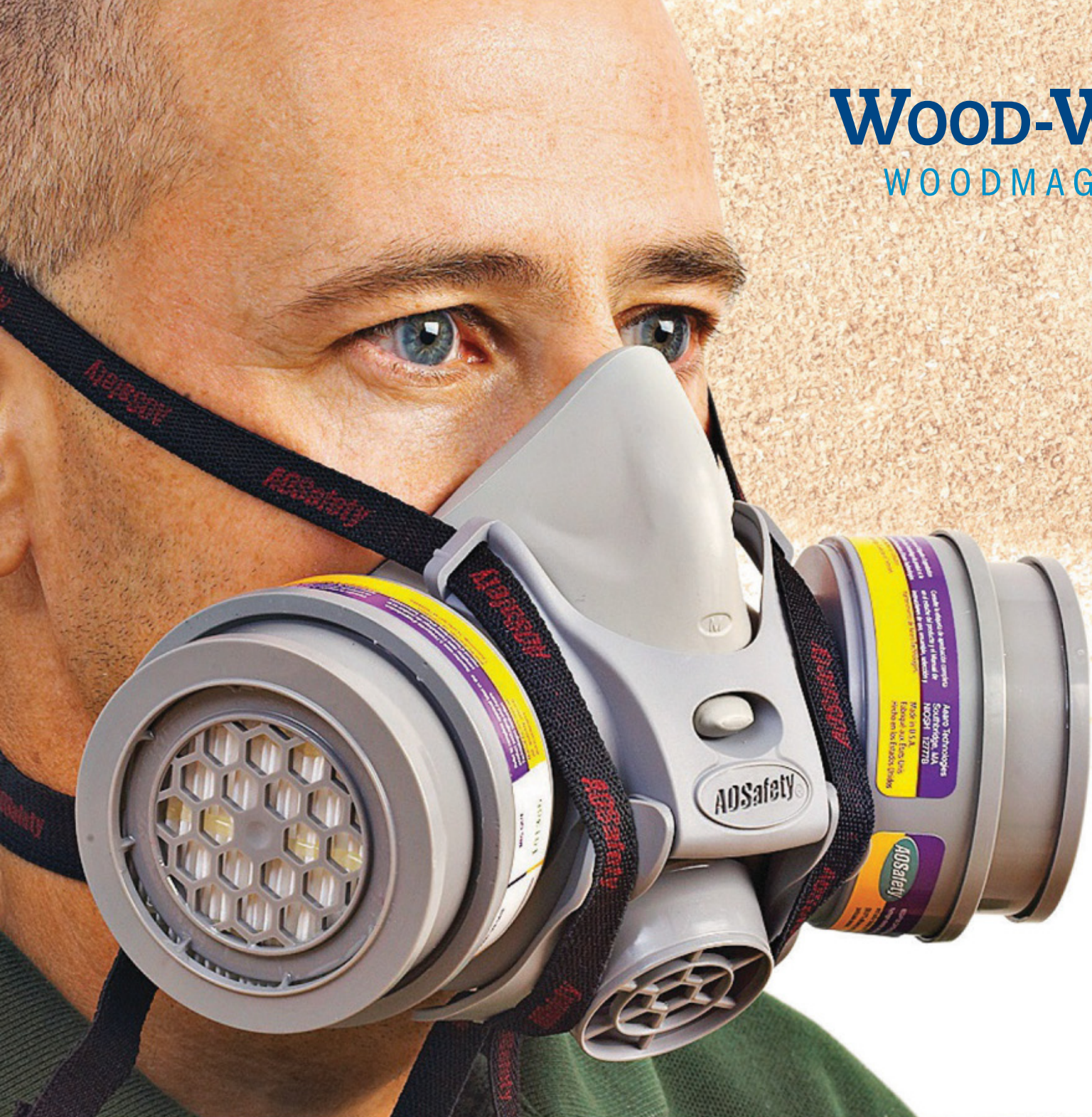
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HACK PREVENTION

Does dust collection make you think of a more phlegmy type of hacking than we discuss in the *Dust-collection Hacks* article on page 28? This is no time to blow off respiratory issues. So, we're upping your dust-collection dosage.

COUGH SUPPRESSANT

Two things Aunt Lucille always said: "Finish your Jell-O salad" and "Cover your mouth when you cough!" Well, we say cover your mouth so you won't cough. With a respirator, not Jell-O salad. Yuck. woodmagazine.com/jellosalad



VICTORY VIA VELOCITY

"The secret is velocity and airflow," was the motto of all-county, long-distance loogie champion and all-American girl, Sarah Ruth. Mind her example to keep your air and mucous membranes blue-ribbon clear with a shop-wide dust-collection strategy. woodmagazine.com/blueribbon

BOOGER BUSTERS

"Easier getting them in than getting them out," Pepaw mused around a hankie-wrapped finger. But these HEPA-rated, tool-triggered dust extractors make it a breeze to avoid the morning-after crusties. Read our review. woodmagazine.com/boogerbusters





SOUNDING BOARD

YOUR VOICE

Many like Jenny

Kudos to Jenny Boles (left) for her Scrollsawing Tips and Tricks in issue 271 (November 2020). I have been using a scrollsaw for 20 years and would like to add a couple to her excellent tips.

First, scrollsaws generate a lot of dust and can be noisy, so don't forget your PPE—a dust mask at least, and in some cases hearing protection. Also, spray adhesive can cause patterns to tear or shred; a layer of packing tape on top of the pattern keeps it intact. After removing the pattern, use mineral spirits to clean any adhesive residue off the workpiece.

—Don Bruce
Suffern, N.Y.

I don't normally write letters to magazines, but just had to thank you for featuring a woman woodworker on the cover of issue 271! As an older woman woodworker, I enthusiastically support women of all ages who are interested in woodworking.

Unlike many men, I didn't learn it from my father, although he designed and built three different homes in his lifetime. I had a professional career (in education), marriage, children... And then some 20 years ago, I took my first woodworking class. And I fell in love with it.

Except for Adirondack chairs built from a pattern, I have designed everything I have ever made: beds, dining tables, chests of drawers (including the one shown at left), blanket chests, little jewelry boxes, all kinds of smaller tables, desks, benches, and stools, plus built-in walls of drawers, cabinets, and bookcases. My aesthetic is Shaker or Arts & Crafts.

I was able to build my own shop with sliding glass doors (lovely views of the garden outside) and skylights; it also has its own wall-hung heater/air conditioner. In other words, a dream place to spend my time!

So keep the articles and photos of women woodworkers coming. I know there aren't many of us, but there should be more!

—Ann Dinsmoor
Newton, Mass.



Catchall: Winsome, lose some

I recently finished building the Entryway Catchall from issue 270 (October 2020). As you can see in the photo, above, I replaced the metal hooks with wooden pegs and added walnut inlays to the doors. When a door slides, the horizontal inlay disappears and then reappears in the hole of the other door. Great fun!

I'm a beginning woodworker and made a lot of mistakes but I'm quite happy with way it turned out. Thanks for the plans and the clear instructions.

—Bob Palmer
Sylvan Lake, Alberta

When I saw the picture of the Entryway Catchall, I thought it was a shop cabinet! There's no way I would put that in my home, made with plywood edges exposed! It looks unfinished, and I know my girlfriend would not allow it either! Especially since she knows I do a better job!

Besides, it's too easy to cover the edges, so what's the deal? I wouldn't even put it in my kitchen, much less my entryway!

—Mike Gaule
New Orleans

Aloha! Ho'omaha wale

Mahalo, WOOD® magazine, for inspiring me to hone and improve my craft. I appreciate your hard work to produce quality information, and always look forward to getting my copy of WOOD in the mail—I still like to thumb through paper issues.

Reading the comments about dream shops (Sounding Board: Your Voice, issue 270), I could

not believe people were getting upset about that. Everyone wants their shop to be clean for a photo shoot. And if you can afford the best tools, I say go for it. Quit being so envious; be inspired instead.

—Chuck Burke
Kihei, Hawaii

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SOUNDING BOARD

YOUR VOICE



All they teach in easy reach

I teach physics and chemistry at the high-school level and my wife home-schools our children, so when we purchased our house a few years ago, we designated its family room to be a library. To that end, I adapted the Stand-up Shelving plan in issue 249 (October 2017) to build this 12'-long version. I customized the vertical shelf spacing for large and small books. I know my wife will empty many boxes of books from storage to fill this!

Realizing how difficult it would be to build this on the floor and stand it up in place, as you did, I left a little extra spacing in the square holes in each shelf, so we could simply slide each shelf up the posts from a stack on the floor. Our little people even helped, inserting the shelf supports as we lifted each shelf up the posts.

I built this full-wall unit for about the same cost as your smaller hickory one by making it out of

no. 2 1x12 pine from a discount lumberyard (and lots of sanding). The stain is a custom mix I made, topped with three coats of satin spar varnish.

I have been a subscriber to WOOD® magazine for many years and have built a lot of your projects (some of which are visible in the photo). My family loves what I make for them, and credit is due to you for plans that have been valuable starting points for much of my work. Thanks!

—**Stephen Rech**
Almond, N.Y.



Hover your smartphone's camera over this code to buy plans for these shelves, or visit woodmagazine.com/standupshelves.

Dave's grammar gets nailed

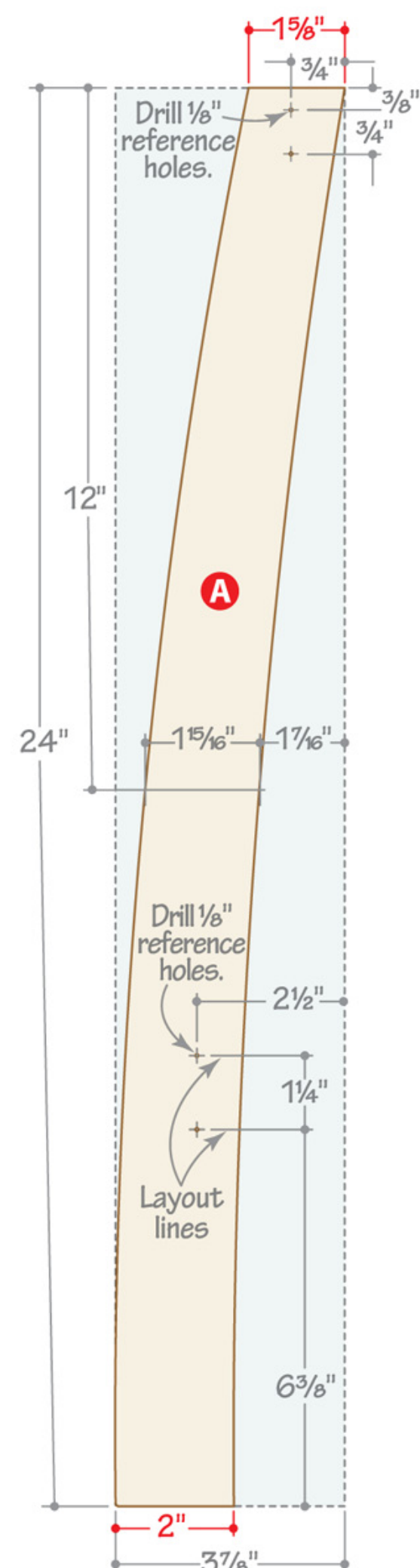
When I started reading Dave Campbell's "Taking Measure" column in issue 271 (November 2020), I immediately cringed. Please, in the name of all that is holy, stop turning nouns into verbs. You were not officing at home! You were working at home in your home office. When I go into my shop to work, I am not shopping. Shopping is when I go into a store to buy things.

I know this "verbing" of nouns thing has become popular among some hip advertising types,

but I don't think your audience appreciates it all that much.

—**Jeff Keevil**
Evans, Ga.

Clearly Dave's poor word choice impacted you, Jeff, and that column should never have been greenlighted. All kidding aside, "verbing" (the technical term is "denominalization") dates to the 16th century and some hack writer named Bill Shakespeare. You can Google it.



Missing leg dimensions

In the Stylish Stool plans in issue 271, the **Leg Template Pattern [Drawing 1]** lacks two dimensions you'll need: the widths of the leg at the top and bottom. The drawing, above, shows those measurements.

Read this, then sharpen your whistle

Randy Maxey's article on sharpening stones in issue 271 reminded me of the time I saw a carpenter friend holding an Arkansas oilstone under a water faucet before using it to sharpen his pocket knife. He thought it was okay to use water because it was a "wet stone," when in fact, all sharpening stones are called "whetstones."

So all sharpening stones are whetstones but not all sharpening stones are wet stones (i.e., water stones).

—**Art Morris**
Juneau, Alaska



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SOUNDING BOARD

YOUR PROJECTS



Ernie Miller, of Chocowinity, N.C., handcrafted this harpsichord—a replica of the 1640 Ruckers instrument—from poplar with a sapele stand. His wife, Sandra, painted the chinoiserie decoration. The instrument measures 79¾" long.



Scott Wheeler, of Evansville, Ind., built this jewelry box, made mostly of cherry and maple, as an 8th-grade graduation gift for his niece, Charlotte. Besides the colorful monoprint collage on its top (created by his wife, Brooke) the box features a hidden vertical drawer for necklaces.



This desk, built by **Keith DauSchmidt**, of Hudson, Wis., features a maple top trimmed with hickory. Keith bent the walnut strips without steam: He simply clamped them into forms for a couple of weeks in his (apparently humid) shop.



When **Samuel Jenkins**, of Bastrop, Texas, needed a collapsible easel for an upcoming art class, he couldn't find plans that incorporated all of the features he wanted, so he designed and built this French-style one. This pine "prototype" became the final project.

SOUNDING BOARD

YOUR PROJECTS



Working only from photos he takes, **Charles Thompson**, of Washington, Iowa, makes amazing scale models of tractors, trucks, and more. Details include spoked wheels, lugged tires, springs, driveshafts, and others. Charles uses no paint or stain: All colors come from the wood.

Evan Allen, of Manchester, Pa., turned an auction-bought butcher-shop counter into this coffee-table top, which still shows some of the original knife marks. He repurposed wood water pipe (purchased from the same auction) for the table's rails and legs.



As a birthday gift for his chess-loving son-in-law, **Larry Faust**, of Lynchburg, Va., built this walnut-and-maple chessboard with a Roman Colosseum theme. The pieces, which Larry purchased, store in compartments on either side of the board. 🌳



To explore and buy themed chess-piece sets, from Harry Potter and Game of Thrones to Toy Story and U.S. generals, point your smartphone's camera at this code, or visit woodmagazine.com/chessthemes.

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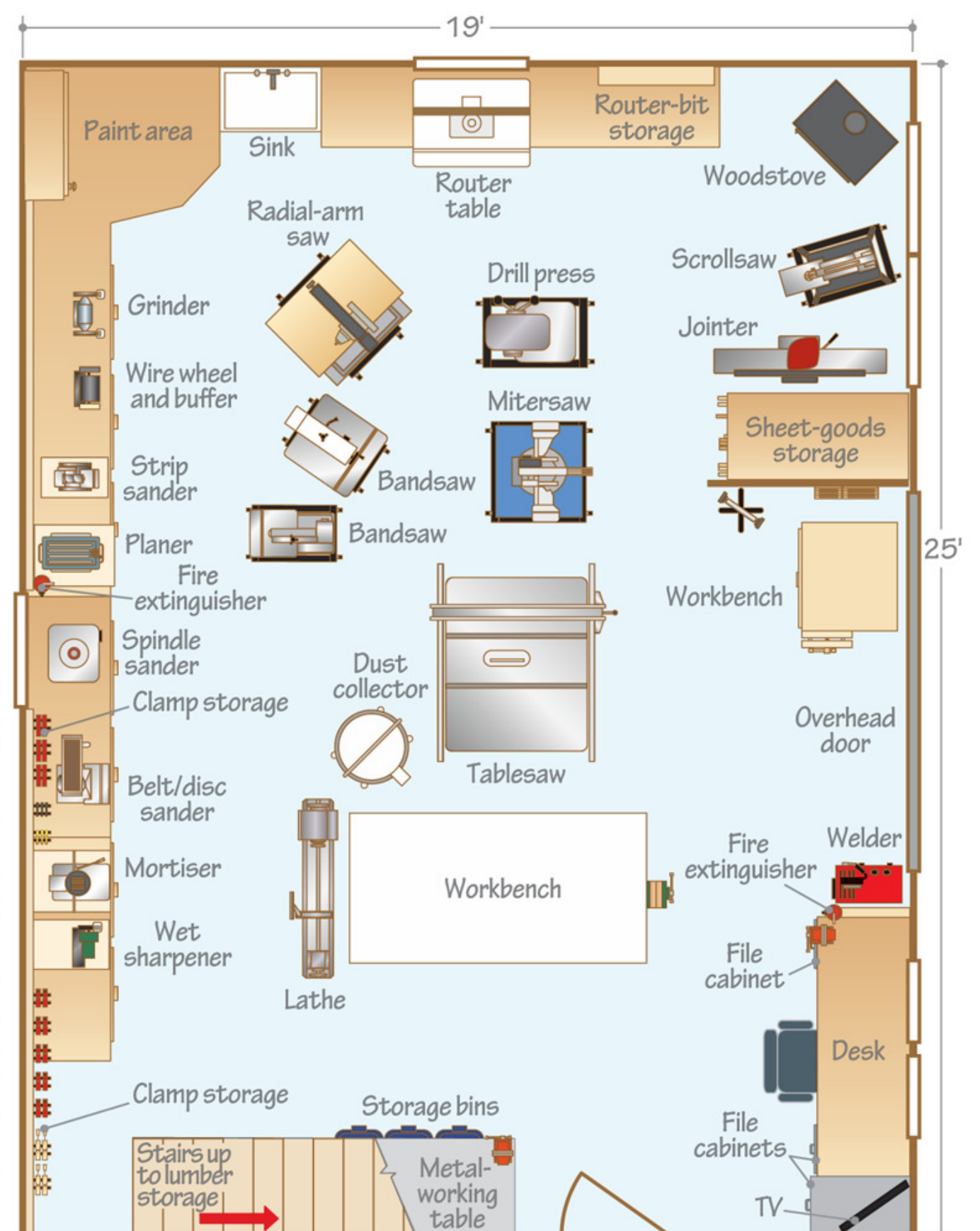
Century-old Converted Workshop

Nestled behind a 110-year old Victorian home in the Catskill Mountains, a three-story carriage house tucked into the side of a hill serves as Tom Jeffers's woodworking retreat. The bottom level stores primarily lawn and garden equipment; the second story, with an at-grade entrance, houses the woodshop; and the attic provides storage for lumber and miscellaneous items.

When Tom decided to build out his shop, he stripped the walls down to the framework and had foam insulation sprayed into the



Tom's converted and character-rich carriage house provides an idyllic setting for his workshop.





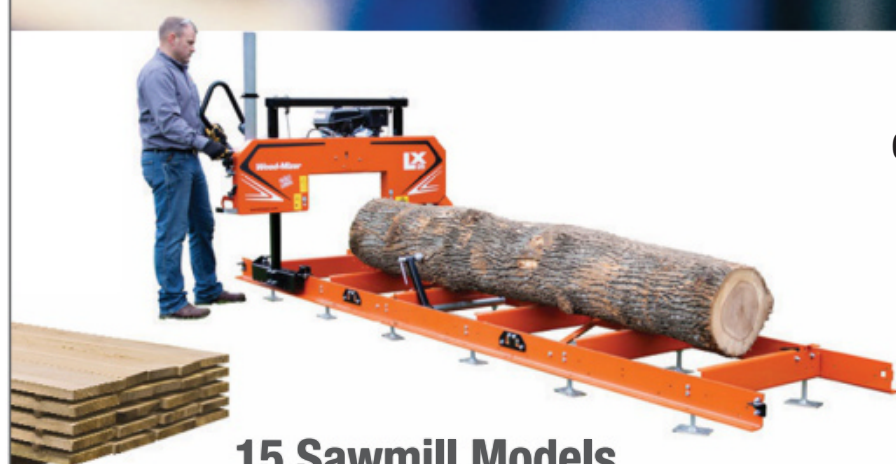
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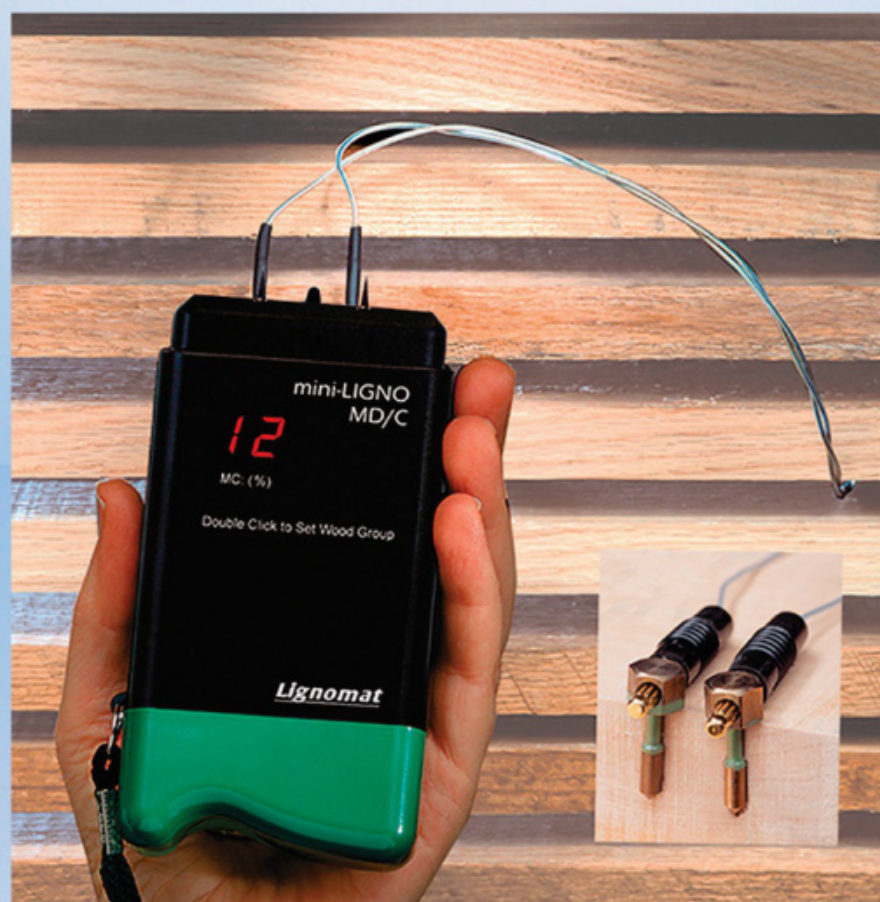


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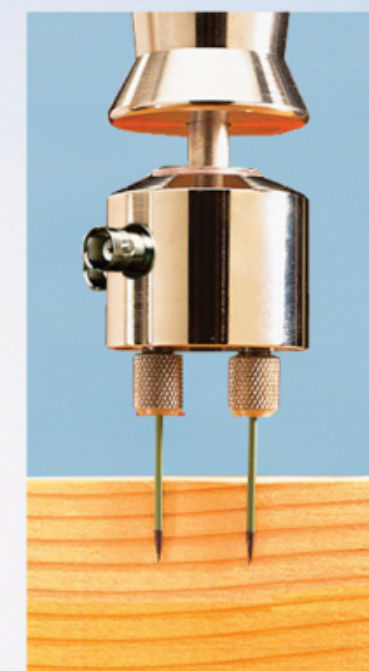
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The area beneath the attic stairs provides wall space for hanging tools. Plastic totes under the bench organize various electrical, plumbing, and hardware supplies.



Tom uses the attic for overflow storage. Lumber racks keep lumber high and dry.



To store clamps and small hand tools, Tom traced the outline of each tool on the wall. This way, he can tell in an instant which items are missing.

exterior walls. After installing oriented-strand board (OSB) sheets over the original rough-lumber floor, he topped it off with vinyl interlocking tiles for comfort.

To save space, Tom mounted his benchtop tools on full-extension, heavy-duty drawer slides (rated for 100 pounds) on top of the cabinets. To use each tool, he extends the base past the front of the bench for easy access. Tom says the slides have no problem holding the weight of the various tools, even his benchtop planer.

For power, Tom had an electrician install a 100-amp subpanel and a few electrical drops from the ceiling that provide easy access to power in the middle of the shop. He mounted to the ceiling two electric hoists that he uses for heavy lifting.

Because Tom's shop measures less than 500 square feet, he takes full advantage of wall space and under-bench storage. Lots of drawers and storage bins help him keep things organized and out of the way. He also utilizes the space under the attic stairs.



Tom built racks to hold all his tablesaw and circular-saw blades. Tablesaw accessories hang nearby.

Using a Gorilla Gripper attached to an electric hoist, Tom can easily lift and maneuver sheet goods around the shop.



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Tom has one regret and offers this advice: "If you are putting in a shop, spend the money and the time to put in your dust collection as the first item of business." He wishes he had installed his dust collector in the lower level and figured out how to run the ductwork before all his tools were in place. Moving the dust collector is a future project, Tom says. 🌱

Show us your shop

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After retirement, Tom Jeffers and his wife, Connie, moved east from California and found their little piece of heaven in New York state's Catskills.



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Q Adding a riving knife to a zero-clearance insert

I just got a new tablesaw with a riving knife, and I need to make some new zero-clearance inserts for it. But this is my first saw with a riving knife, and I don't know how to allow for that when making the inserts.

—Gary Rowe, Woodland Hills, Calif.

A A zero-clearance insert is a must-have accessory for making splinter-free cuts on the tablesaw, Gary. Creating the opening for the blade is pretty straightforward. But making the opening for a riving knife is a little more involved.

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Start by creating the zero-clearance slot for the blade. Lower the blade below the tablesaw top and fit the uncut insert into the opening. (If your blade doesn't drop low enough to clear the insert, try using a smaller-diameter blade, such as the outer blade from a dado set.) Clamp a scrap board over the insert, or position your rip fence so it just covers one edge of the insert (but isn't directly over the blade). Turn the saw on and slowly raise the blade through the insert to cut the opening.

To create the opening for the riving knife, reinstall your factory-supplied tablesaw insert. Raise the blade 1" or so and fit the zero-clearance insert over it and aligned with the factory insert, flush all around. Now butt the rip fence against the edge of the zero-clearance insert [Photo A] and lock it in place.



A Use the blade to position the zero-clearance insert, then bring up the rip fence until it just kisses the edge of the insert.

Lift the zero-clearance insert off the blade, turn the saw on, and slide the insert along the rip fence to lengthen the slot [Photo B]. The two cuts should align perfectly.

To prevent the slot from closing up around the blade and riving knife, glue a kerf-wide spacer into the end of the slot, making sure there's still adequate clearance for the riving knife [Photo C]. You now have a zero-clearance insert with a perfectly matched opening for your riving knife. 🌲

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B Guide the insert along the rip fence until you reach the previously cut opening. Turn the saw off and let the blade come to a stop before backing out of the cut.



C After gluing in an oversize spacer, use a chisel and sandpaper to bring it flush with the edge and surface of the insert.



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CREATE WITH CONFIDENCE

Four ways to clamp on the curves

I build a lot of pieces using live-edge slabs. When joining two pieces to make a wide panel, I orient the live edges to the outside. But this presents a clamping problem during glue-up. There's no flat surface to apply clamps and I don't want to damage the fragile edges. So I turn to one of these four solutions to guarantee adequate clamping pressure across the glue joint.

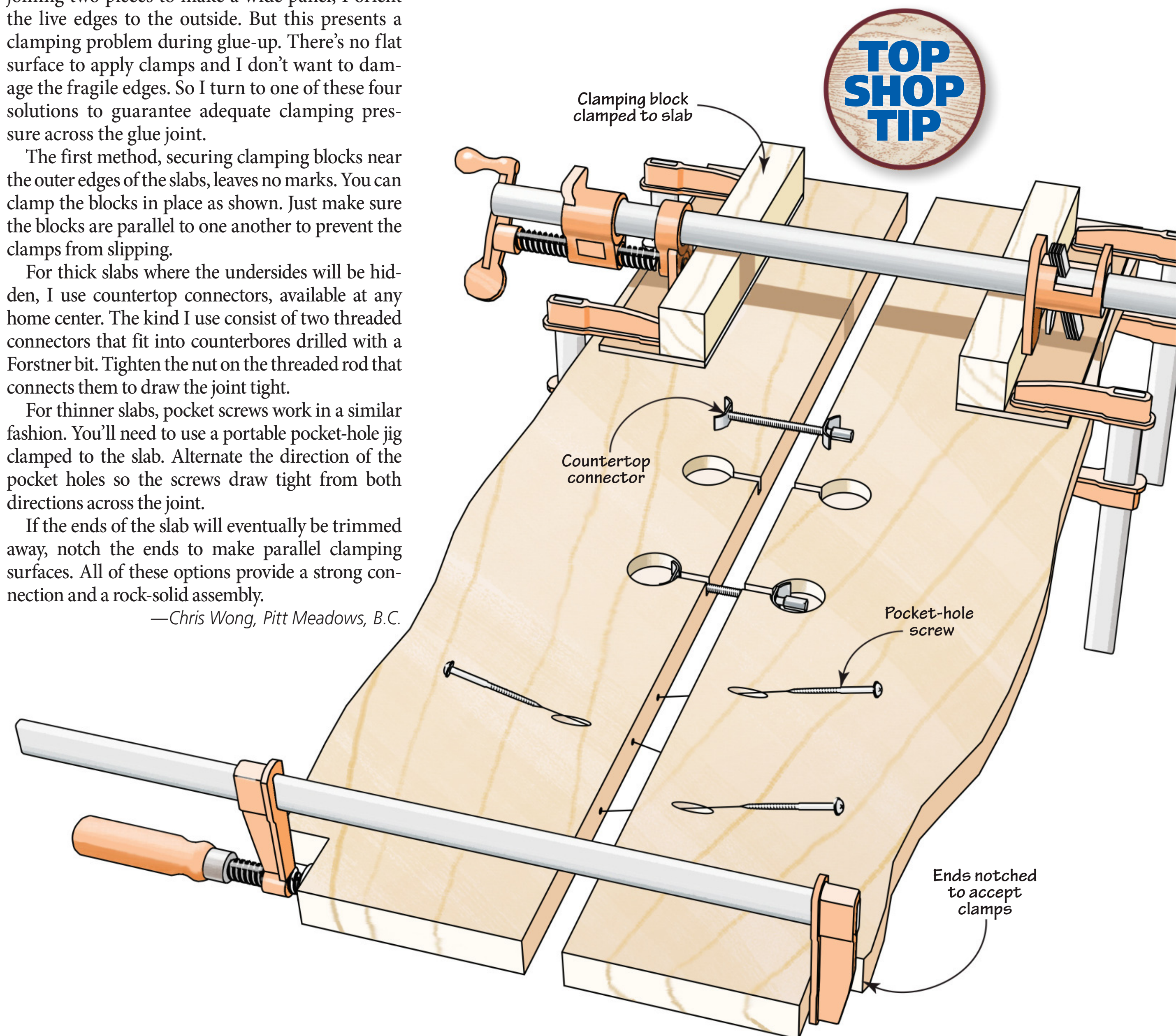
The first method, securing clamping blocks near the outer edges of the slabs, leaves no marks. You can clamp the blocks in place as shown. Just make sure the blocks are parallel to one another to prevent the clamps from slipping.

For thick slabs where the undersides will be hidden, I use countertop connectors, available at any home center. The kind I use consist of two threaded connectors that fit into counterbores drilled with a Forstner bit. Tighten the nut on the threaded rod that connects them to draw the joint tight.

For thinner slabs, pocket screws work in a similar fashion. You'll need to use a portable pocket-hole jig clamped to the slab. Alternate the direction of the pocket holes so the screws draw tight from both directions across the joint.

If the ends of the slab will eventually be trimmed away, notch the ends to make parallel clamping surfaces. All of these options provide a strong connection and a rock-solid assembly.

—Chris Wong, Pitt Meadows, B.C.

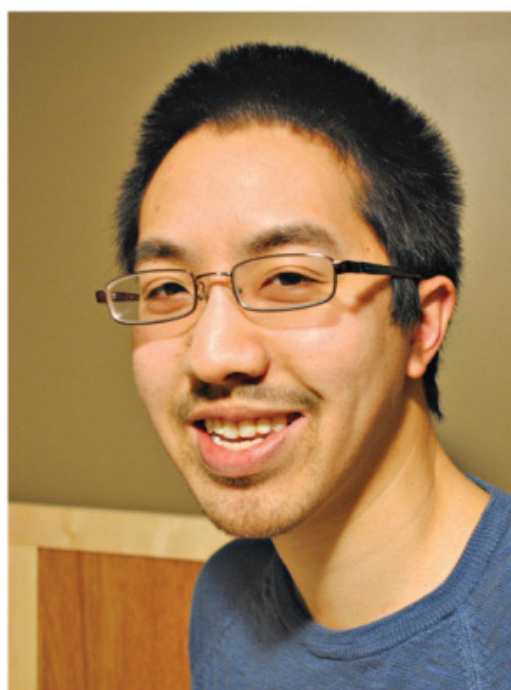


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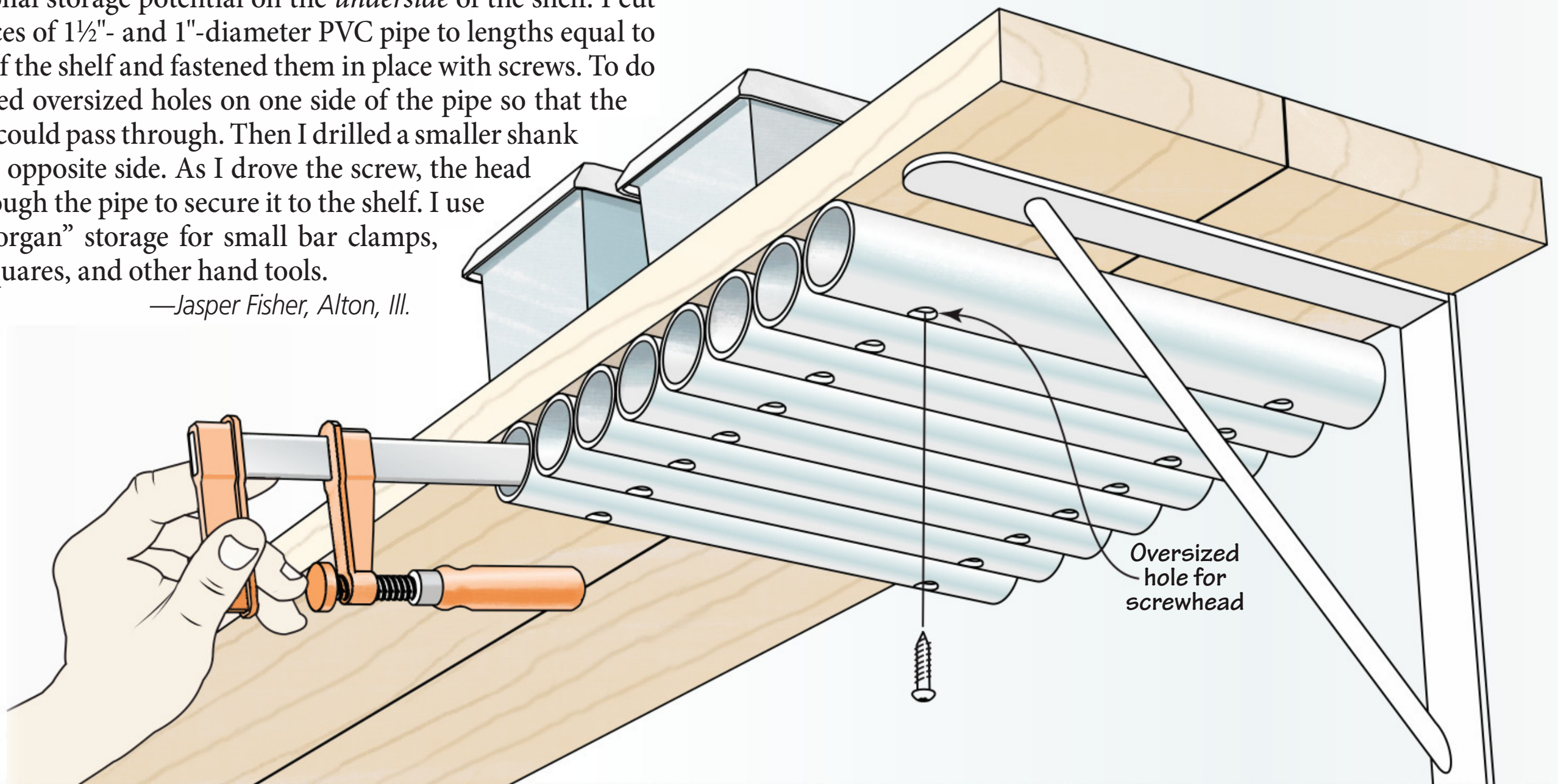
For sending this issue's **Top Shop Tip**, Chris receives an Incra Miter Express sled, including a Miter 1000HD miter gauge, valued at \$300.



A pipe dream for small-tool storage

After installing a shelf over my workbench, I quickly realized there was additional storage potential on the *underside* of the shelf. I cut several pieces of 1½"- and 1"-diameter PVC pipe to lengths equal to the depth of the shelf and fastened them in place with screws. To do this, I drilled oversized holes on one side of the pipe so that the screwhead could pass through. Then I drilled a smaller shank hole on the opposite side. As I drove the screw, the head passed through the pipe to secure it to the shelf. I use this “pipe organ” storage for small bar clamps, dividers, squares, and other hand tools.

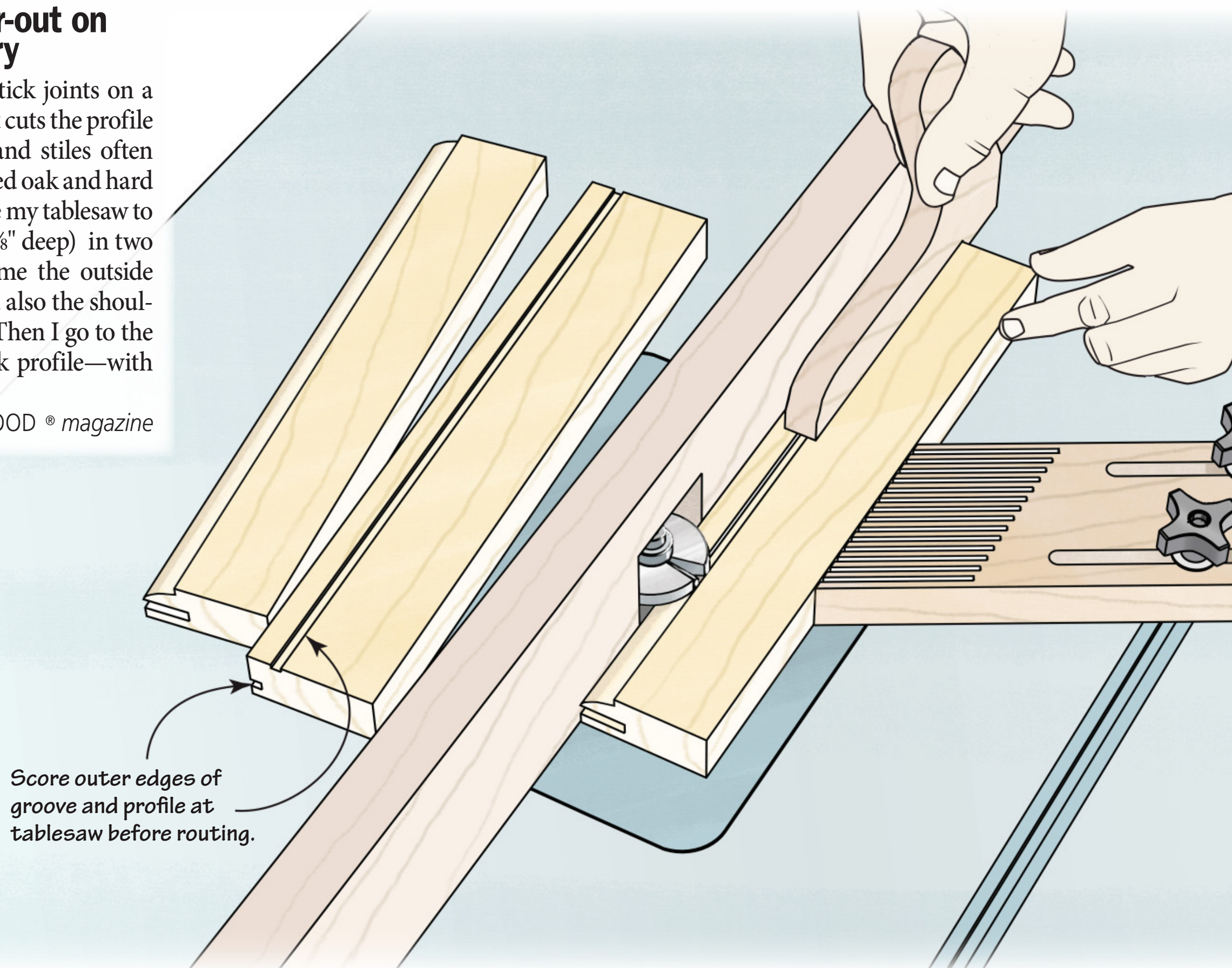
—Jasper Fisher, Alton, Ill.



Score one for no tear-out on cope-and-stick joinery

When machining cope-and-stick joints on a router table, the “stick” bit that cuts the profile along the edges of the rails and stiles often causes tear-out, especially in red oak and hard maple. To avoid that, I first use my tablesaw to score shallow rip cuts (about ⅛" deep) in two places: along what will become the outside edges of the panel groove, and also the shoulder of the profile on the face. Then I go to the router table and rout the stick profile—with zero tear-out.

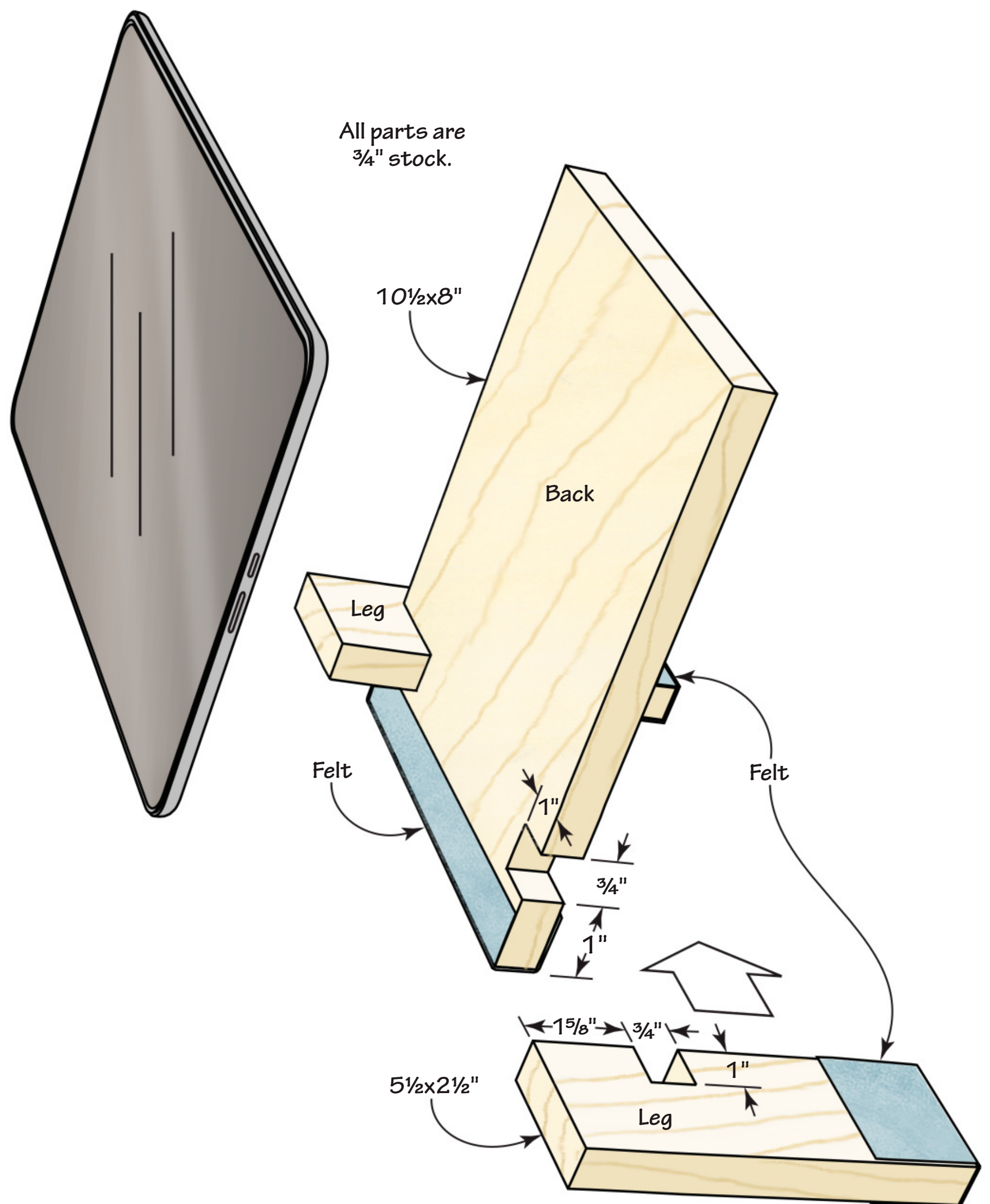
—Bob Hunter, WOOD ® magazine



Stop stacking scraps to tilt the tablet

I got tired of propping up my tablet with scrapwood to hold the screen at a good viewing angle. So I came up with this simple tablet stand. It consists of a back with two legs joined with notches, as shown in the drawing. I cut these notches using a dado blade, but you could just as easily use a coping saw. To protect fine furniture from scratches, I glued and wrapped the bottom edges of each piece with felt.

—Bill Hertwig, Plymouth, Mass.

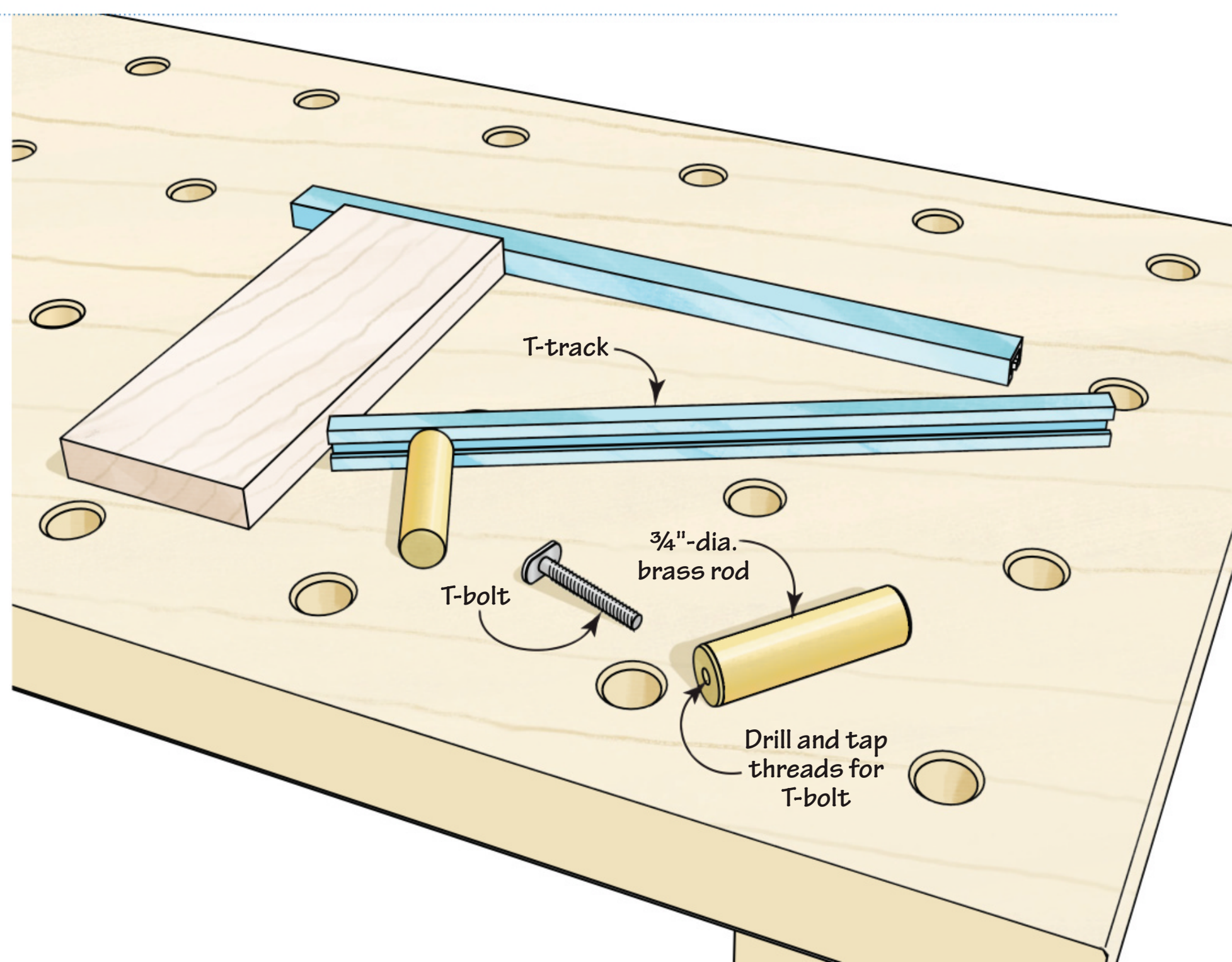


Put a stop to movement with T-track

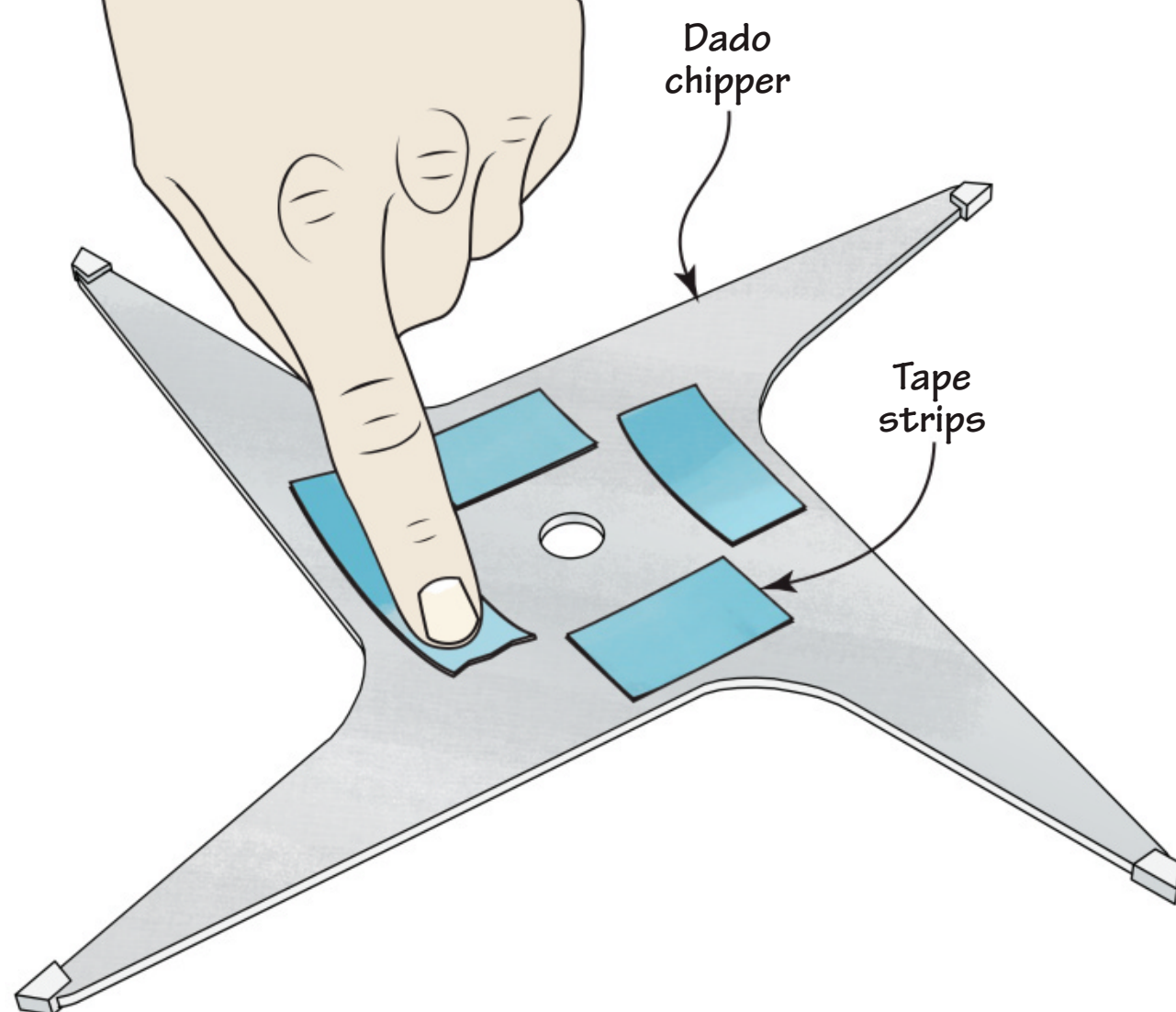
While using a hand plane to smooth a wide panel, I needed a long bench stop to keep the workpiece from moving. I made an adjustable planing stop using aluminum T-track and $\frac{3}{4}$ -diameter brass rod. I cut the rod to form posts that fit into the dogholes on my workbench. After drilling and tapping a $\frac{1}{4}$ inch hole in each rod, I threaded in a T-bolt.

The posts can be positioned anywhere along the track to fit any spacing between two dogholes, even diagonally. Once you determine the spacing, simply tighten the posts to keep them in place. The $\frac{3}{8}$ inch T-track helps when planing pieces down to about $\frac{1}{2}$ inch thick, and the tool-friendly aluminum won't nick cutting edges.

—Gary Dean, Prince George, B.C.



SHOP TIPS



A sticky solution for perfectly sized dados

Sometimes you need a fine adjustment to the overall width of a stacked dado blade. Instead of flimsy shims that can get lost and fall into the threads of the arbor, I use duct tape or painter's tape on a chipper, evenly spaced around the arbor hole. Painter's tape provides about .005" thickness, and the duct tape about .012" thickness.

—Dan Martin, Galena, Ohio

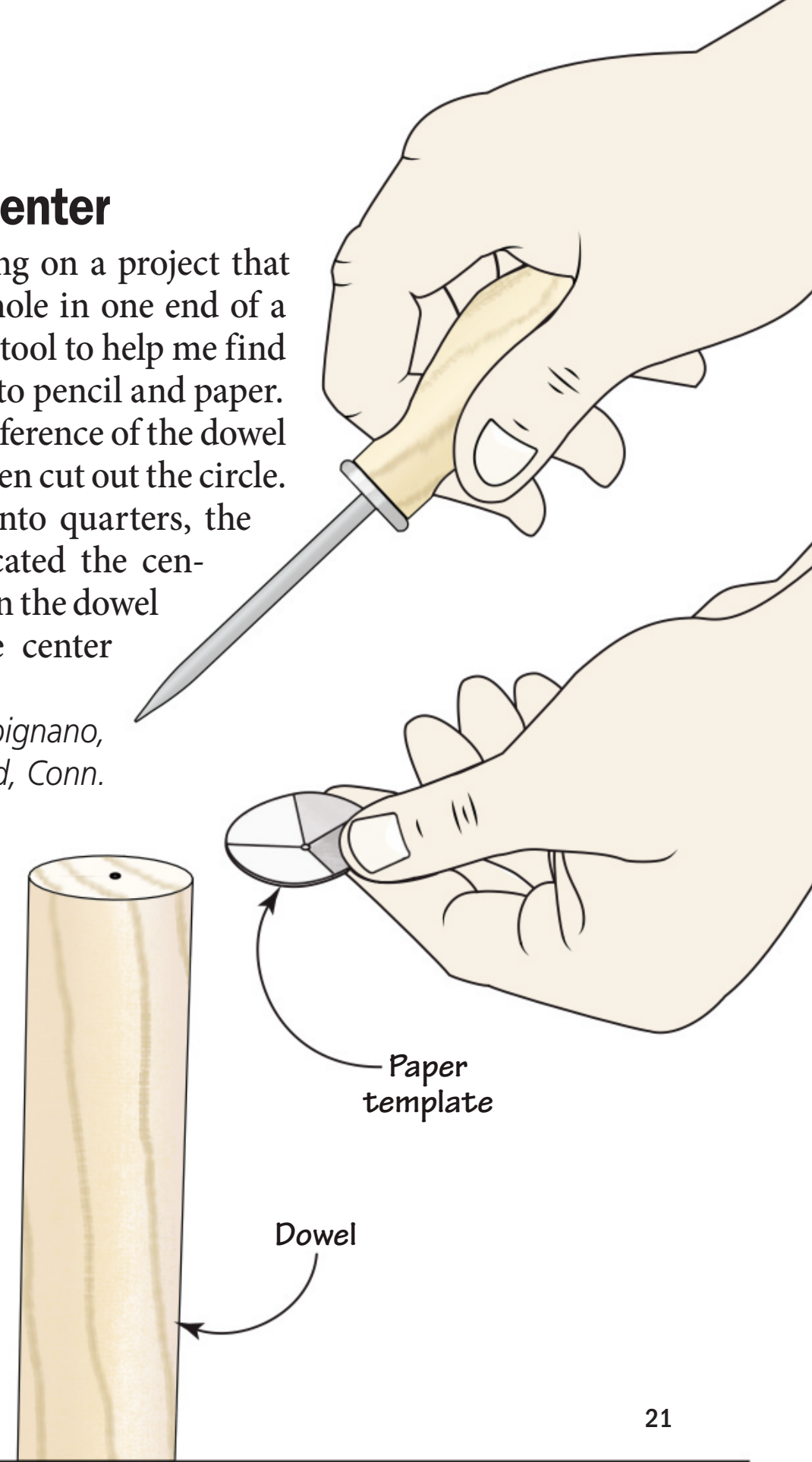
woodmagazine.com

Circular logic points to the center

I was recently working on a project that required a centered hole in one end of a 1¼" dowel. Lacking a tool to help me find the center, I resorted to pencil and paper.

I traced the circumference of the dowel on a piece of paper, then cut out the circle. By folding the disc into quarters, the intersecting folds located the center. I placed the disc on the dowel end and pierced the center with an awl.

—Rick Melpignano,
Enfield, Conn.



21

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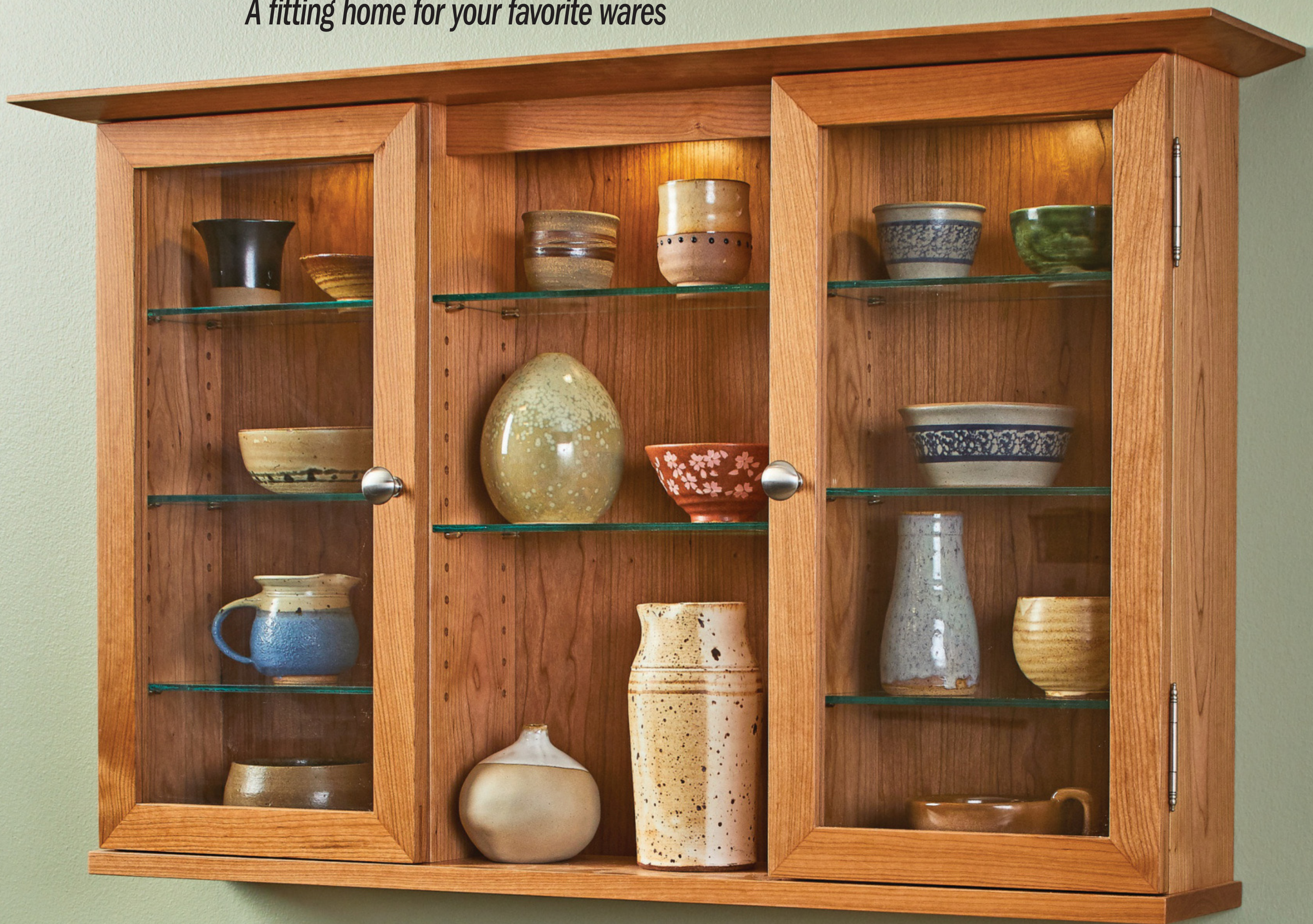


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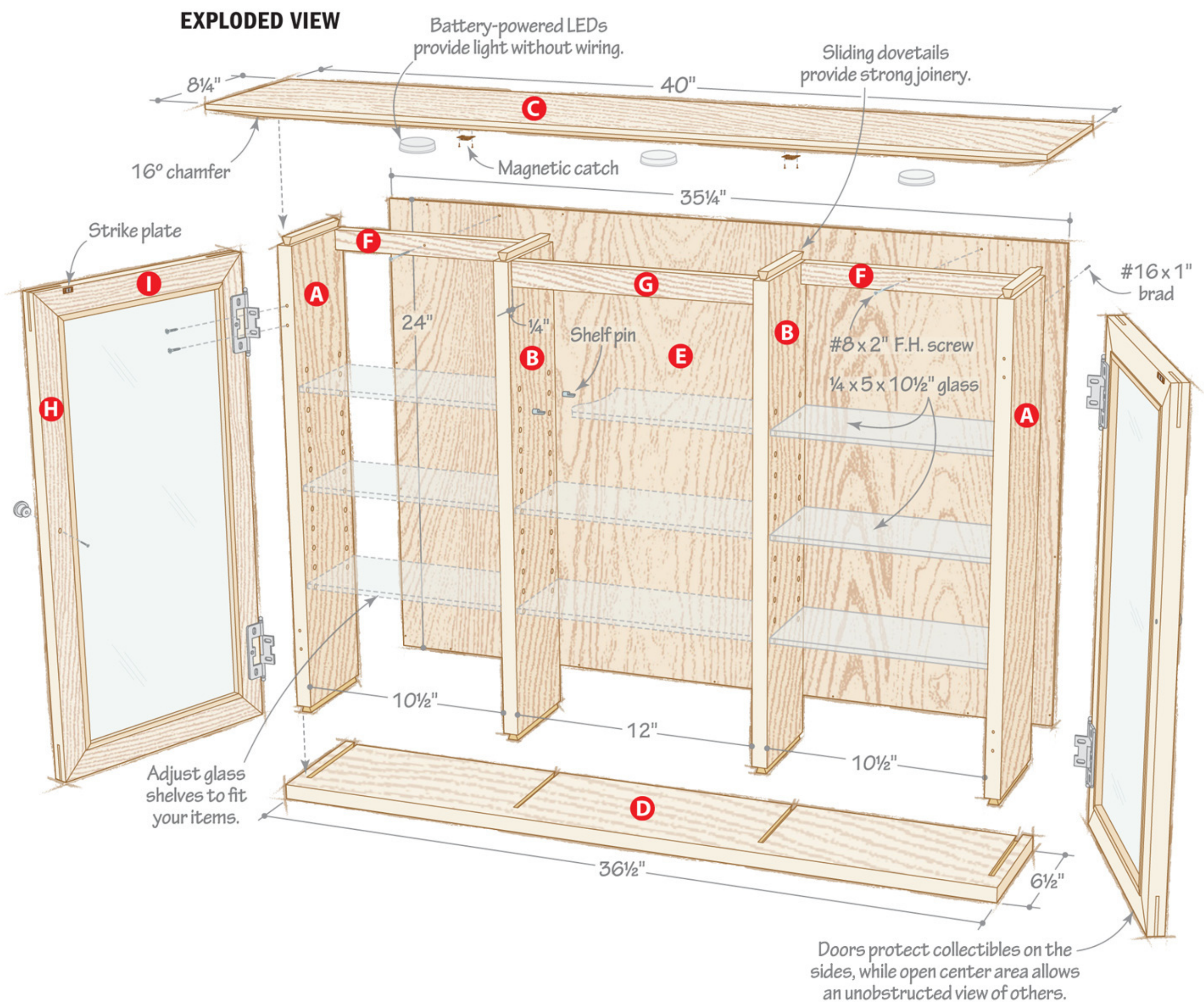
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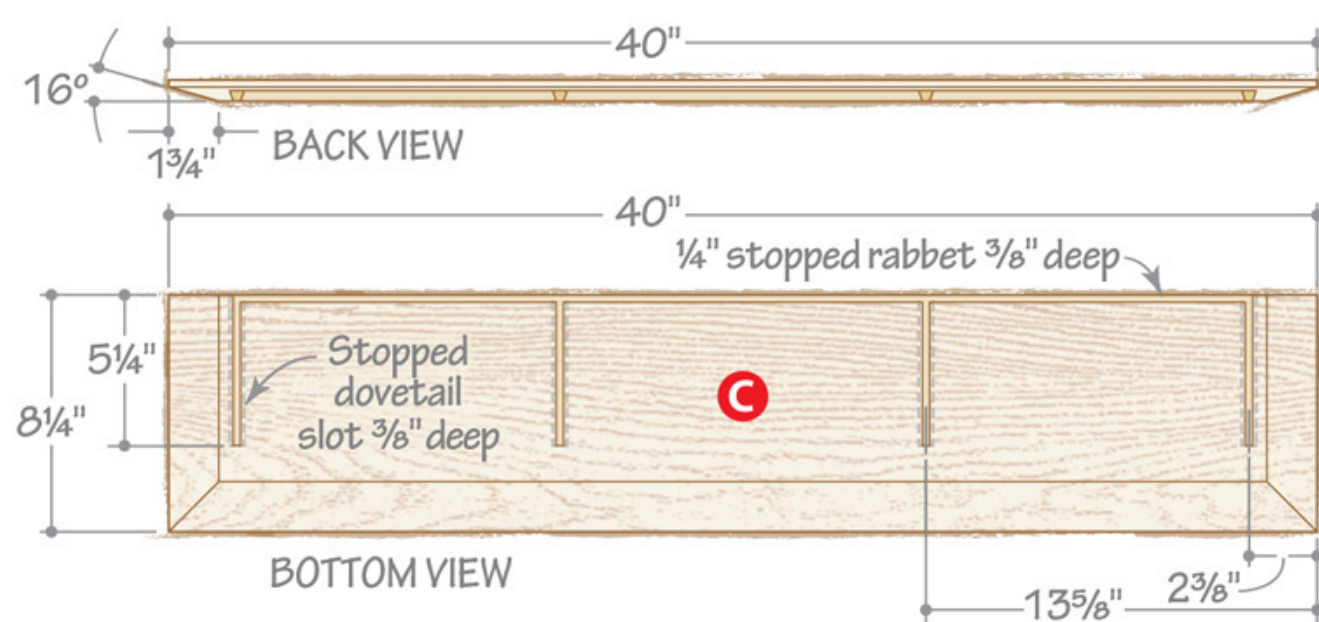


Prepare the carcass parts

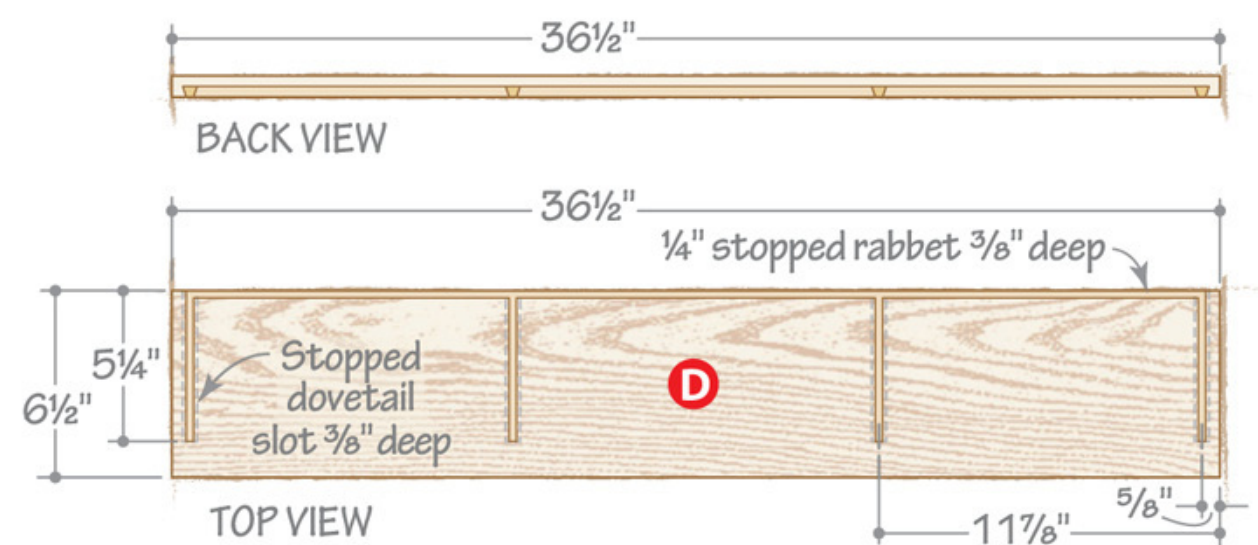
1 Cut to size the cabinet sides, dividers, top, and bottom (A-D) [Materials List]. From this stock, set aside a scrap piece for use in setting up joinery later.

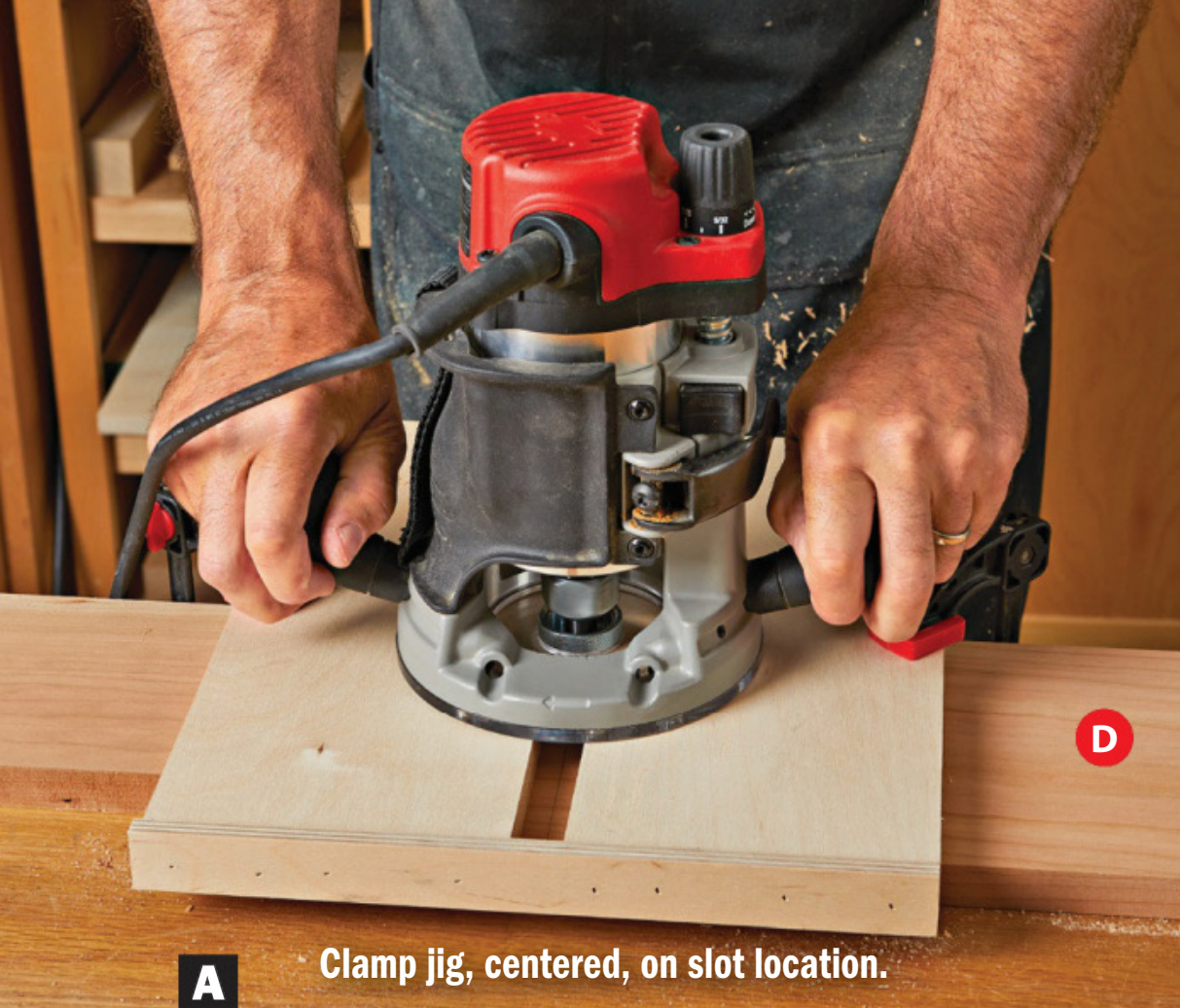
2 Finish-sand the inside faces of the top and bottom, then lay out the locations of the stopped dovetail slots [Drawings 1, 2].

1 TOP



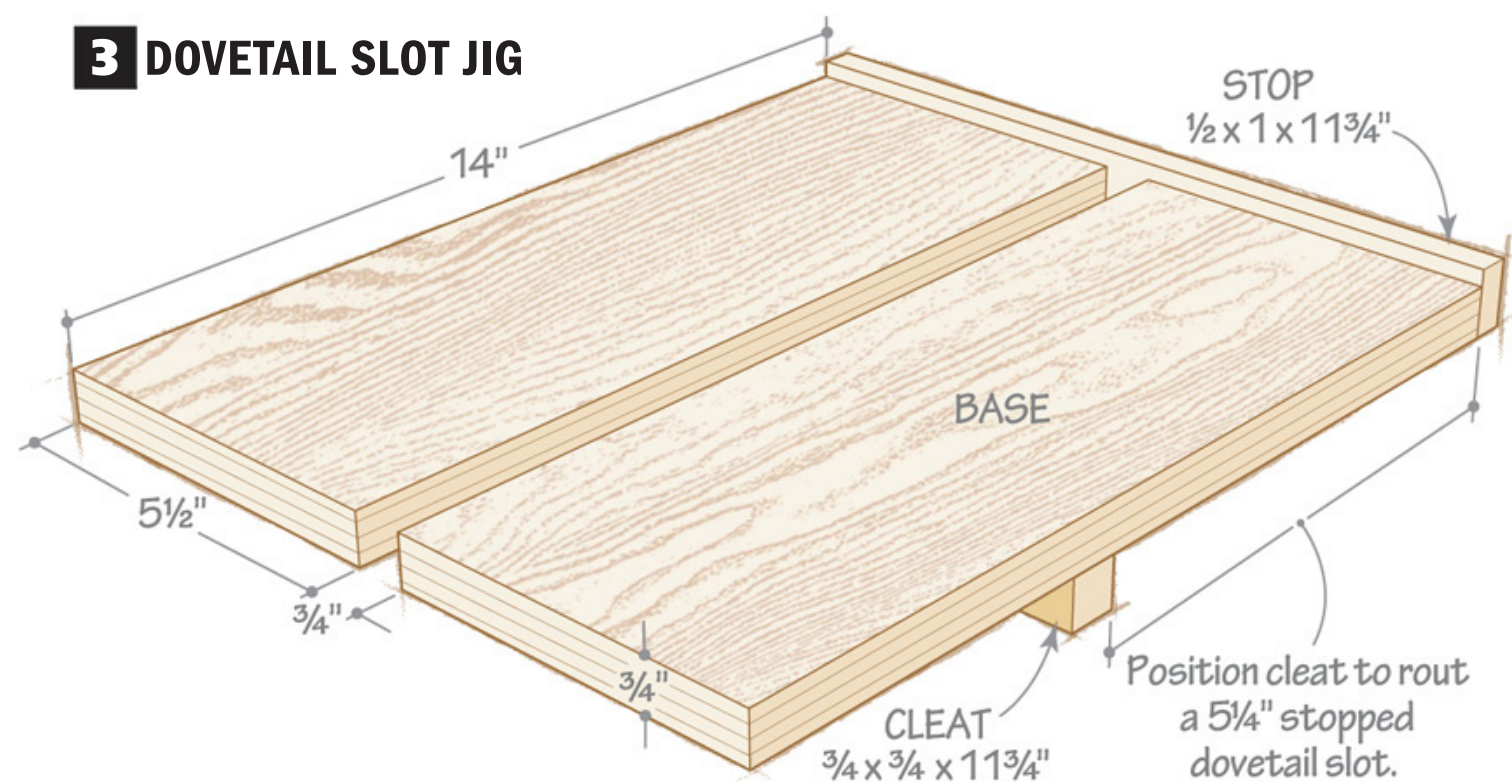
2 BOTTOM



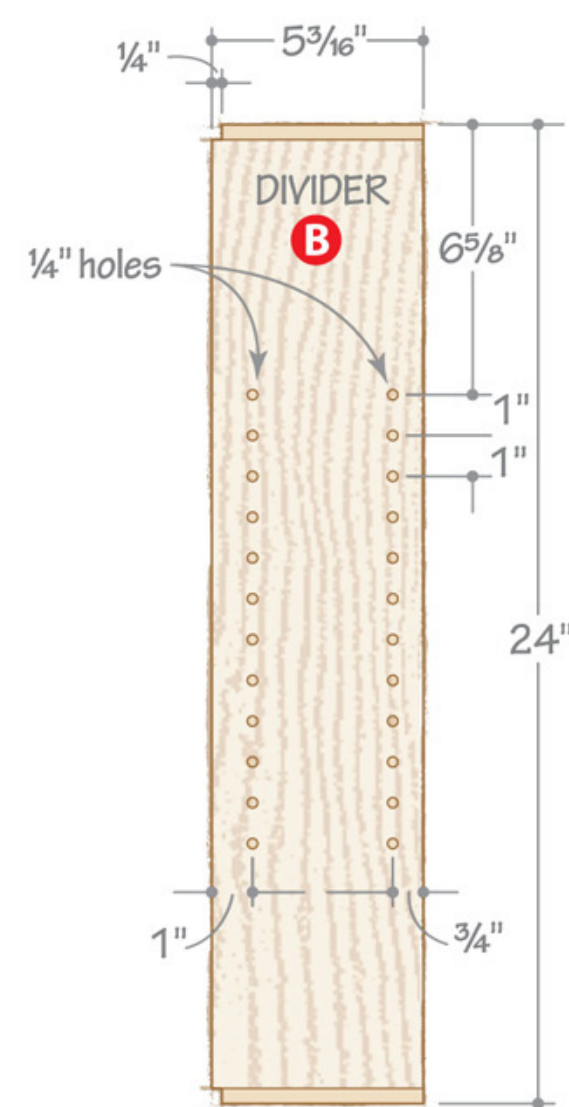
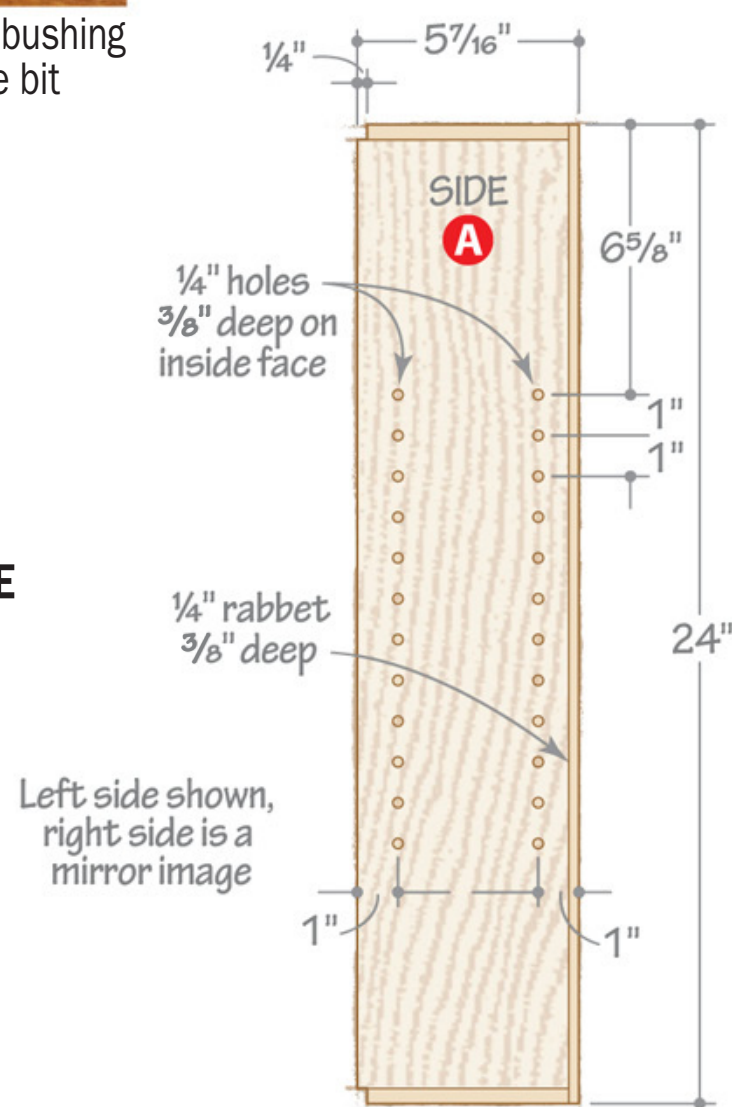


A Clamp jig, centered, on slot location.

Set up your router with a 14° dovetail bit and $\frac{3}{4}$ " guide bushing to match the width of the slot in the routing jig. Adjust the bit depth to cut $\frac{3}{8}$ " deep into the workpiece.



4 CABINET SIDE AND DIVIDER



3 Build the dovetail slot jig [Drawing 3]. Place the jig over the bottom (D), centered on the first slot [Photo A]. Rout the dovetail slots in the bottom and repeat with the top (C).

4 Rout the stopped rabbets along the back edges of the top and bottom [Drawings 1, 2] and the rabbets on the sides (A) [Drawing 4].

5 Cut the bevel on the ends and front edge of the top (C) [Drawing 1].

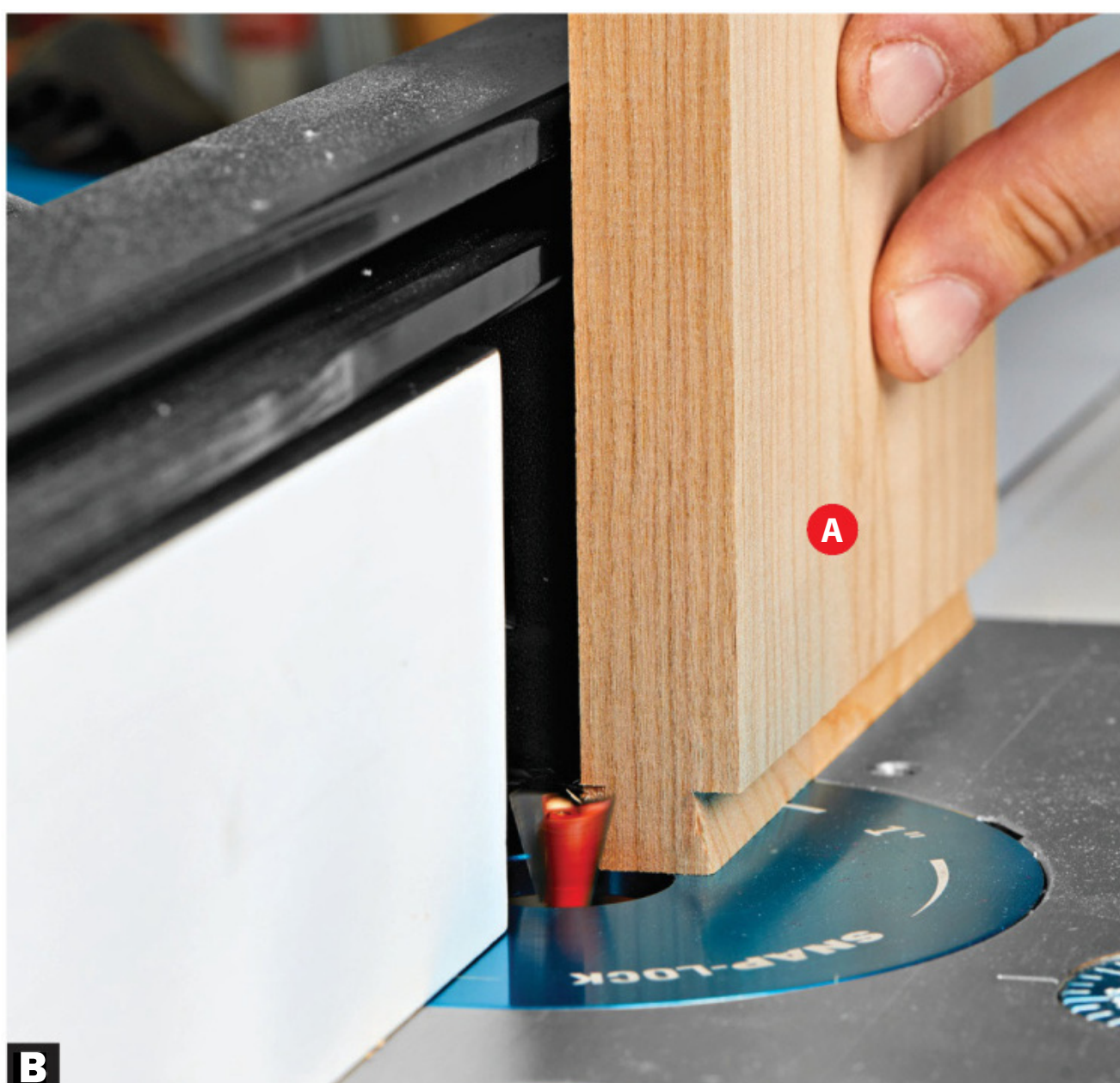
6 Set up the dovetail bit in your router table and, using the scrap set aside earlier, fine-tune the fence position until you have a good fit in the dovetail slots [Photo B]. Rout dovetails on the ends of the sides (A) and dividers (B).

7 Cut away the fronts of the dovetails [Drawing 4]. When inserted into the bottom, the sides should fit flush with the back edge, and the dividers flush with the rabbet.

8 Lay out and drill the shelf-pin holes on the sides and dividers [Drawing 4].

Sand and assemble

1 Finish-sand the sides (A), dividers (B), and remaining surfaces of the top



B Adjust the height of the dovetail bit to $\frac{3}{8}$ ", the same as the depth of the slots in the top (C) and bottom (D). Rout each face and adjust the fence back until you have a dovetail that slides into place without using excessive force.

► Build a tablesaw saddle jig to safely support tall workpieces while cutting bevels.
woodmagazine.com/ripfencesaddle

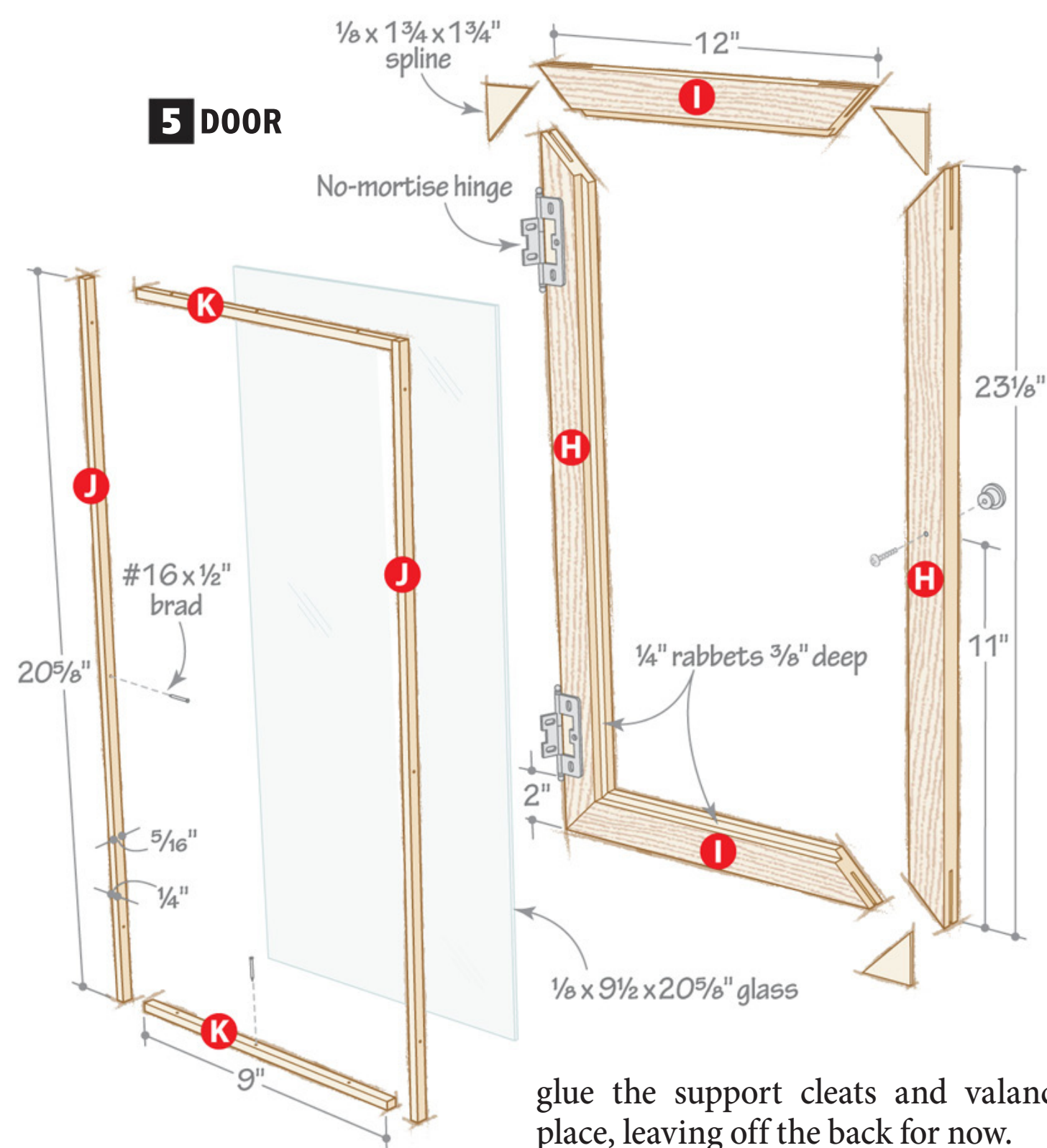
► Watch a video that shows four easy ways to drill shelf-pin holes.
woodmagazine.com/shelfpinholes



C Use clamping squares to hold the sides (A) and dividers (B) square to the bottom (D) until the glue dries.



D Use a rip blade when cutting the spline slots. The flat teeth leave a crisp, flat bottom. Adjust the blade height so that you cut about halfway through the miter.



glue the support cleats and valance into place, leaving off the back for now.

Build the doors

1 Cut the door stiles (H) and rails (I) to finished width and 1/4" overlength [Materials List]. Rabbet one edge of the back face of each part [Drawing 5].

2 Miter-cut the stiles and rails to final length, ensuring that the rabbet remains on the inside of the frame [Drawing 5]. Glue and assemble the frames using a band clamp, checking for square.

3 Cut a centered slot for a spline at each miter [Photo D, Drawing 5]. From stock that

(C) and bottom (D). If necessary, touch up the sanding on the inside faces of the top and bottom.

2 Start assembly by gluing the sides and dividers (A, B) into the dovetail slots of the bottom (D) [Photo C]. After the glue dries, lay the assembly on its back, apply glue to the dovetail grooves on the top (C), and slide it into place.

3 Measure the carcase, and cut the back, support cleats, and valance (E, F, G) to final size [Exploded View]. Finish-sand and

► Make your own clamping squares to give an extra hand during assembly.
woodmagazine.com/clampingbrace

► Build a spline-slotting jig.
woodmagazine.com/splineslotjig

fits in the slots, cut oversize splines and glue them in place. After the glue dries, cut the splines flush [Photo E].

4 Cut to size the vertical and horizontal glass stops (J, K) [Drawing 5]. Finish-sand the stops and the door frames.

Apply a finish, then finish up

1 Apply a finish of your choice to the carcass, back, door frames, and glass stops. We used a satin lacquer. Attach the back to the carcass [Exploded View].

2 Secure the glass in the door frames [Drawing 5]. Attach the hinges to the doors, and then to the cabinet [Exploded View]. Add the knobs and magnetic catches.

3 Insert the shelf pins and set the glass shelves in place. Attach battery-powered lights to the top of each cabinet section.

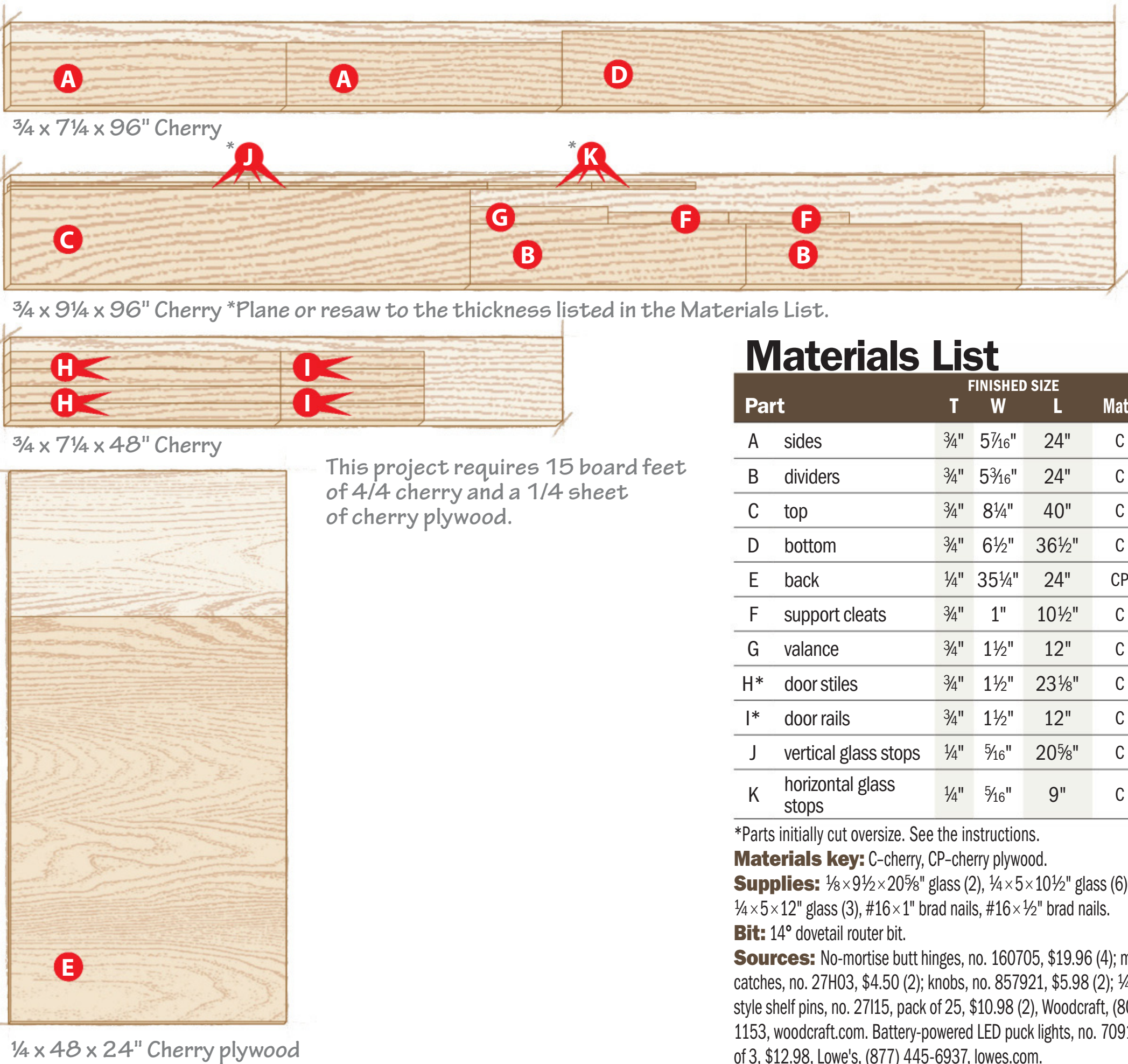
4 To hang the cabinet, drive screws through the support cleats (F) and into wall studs. Now, curate a selection of your most eye-catching wares. 🌳

► Tack in glass stop without breaking the glass.
woodmagazine.com/startingstop



E A flush-cut handsaw has no set to the teeth so you can cut next to a workpiece without marring it. Sand the splines flush.

Cutting Diagram



This project requires 15 board feet of 4/4 cherry and a 1/4 sheet of cherry plywood.

Produced by **Zachary Brown** with **Kevin Boyle**
Project design: **Kevin Boyle**
Illustrations: **Roxanne LeMoine, Lorna Johnson**

Materials List

Part		FINISHED SIZE			Matl.	Qty.
		T	W	L		
A	sides	3/4"	5 7/16"	24"	C	2
B	dividers	3/4"	5 3/16"	24"	C	2
C	top	3/4"	8 1/4"	40"	C	1
D	bottom	3/4"	6 1/2"	36 1/2"	C	1
E	back	1/4"	35 1/4"	24"	CP	1
F	support cleats	3/4"	1"	10 1/2"	C	2
G	valance	3/4"	1 1/2"	12"	C	1
H*	door stiles	3/4"	1 1/2"	23 1/8"	C	4
I*	door rails	3/4"	1 1/2"	12"	C	4
J	vertical glass stops	1/4"	5 1/16"	20 5/8"	C	4
K	horizontal glass stops	1/4"	5 1/16"	9"	C	4

*Parts initially cut oversize. See the instructions.
Materials key: C=cherry, CP=cherry plywood.
Supplies: 1/8 x 9 1/2 x 20 5/8" glass (2), 1/4 x 5 x 10 1/2" glass (6), 1/4 x 5 x 12" glass (3), #16 x 1" brad nails, #16 x 1/2" brad nails.
Bit: 14° dovetail router bit.
Sources: No-mortise butt hinges, no. 160705, \$19.96 (4); magnetic catches, no. 27H03, \$4.50 (2); knobs, no. 857921, \$5.98 (2); 1/4" bracket style shelf pins, no. 27115, pack of 25, \$10.98 (2), Woodcraft, (800) 225-1153, woodcraft.com. Battery-powered LED puck lights, no. 709192, pack of 3, \$12.98, Lowe's, (877) 445-6937, lowes.com.

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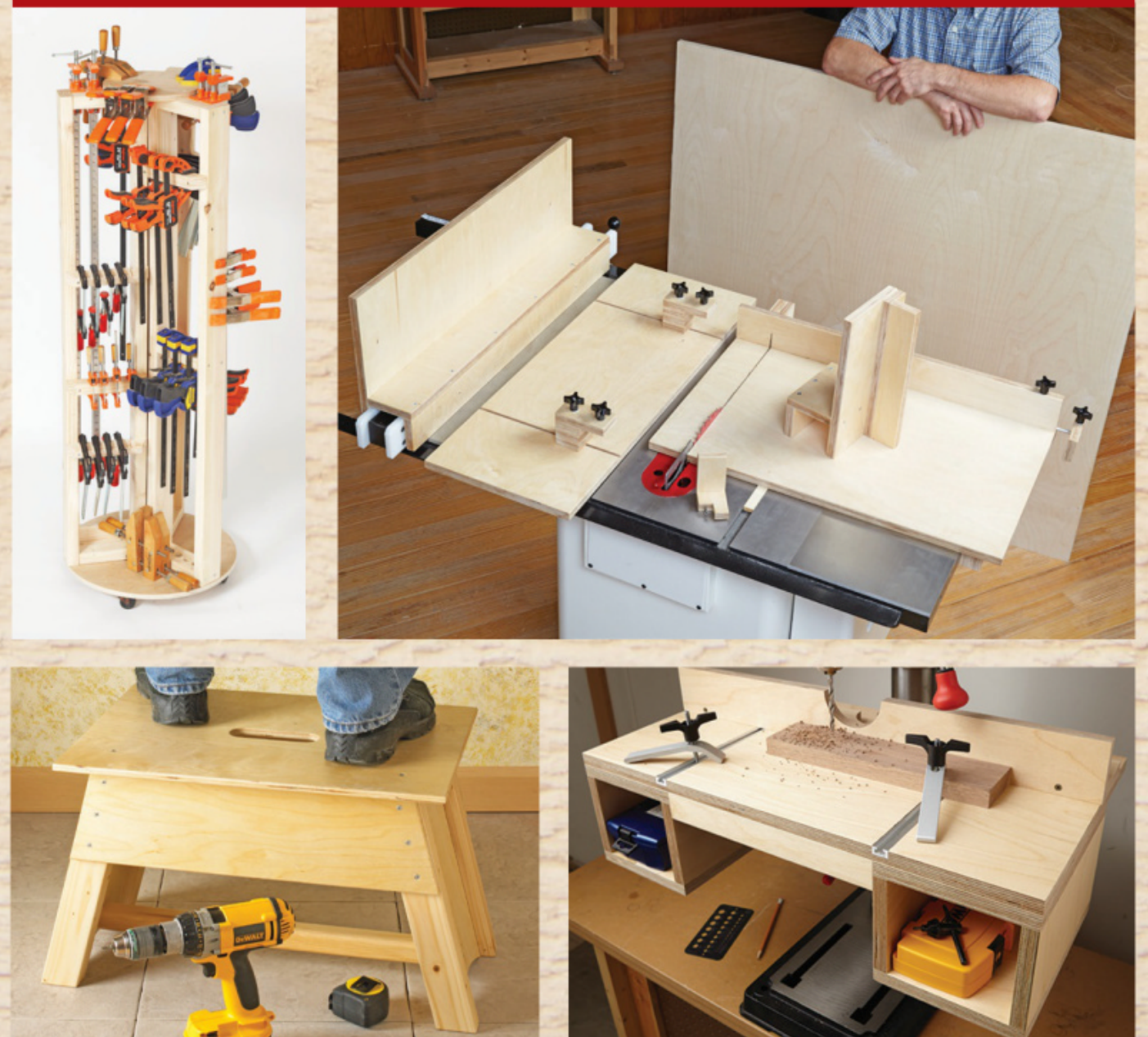
Shop Project Plans



Jig Plans



Shop Gadget Plans



woodstore.net/bundlebundle

15 Low-dough Dust-collection Hacks

Improve your shop's air quality by using these helpful tips to gather dust before it becomes airborne.

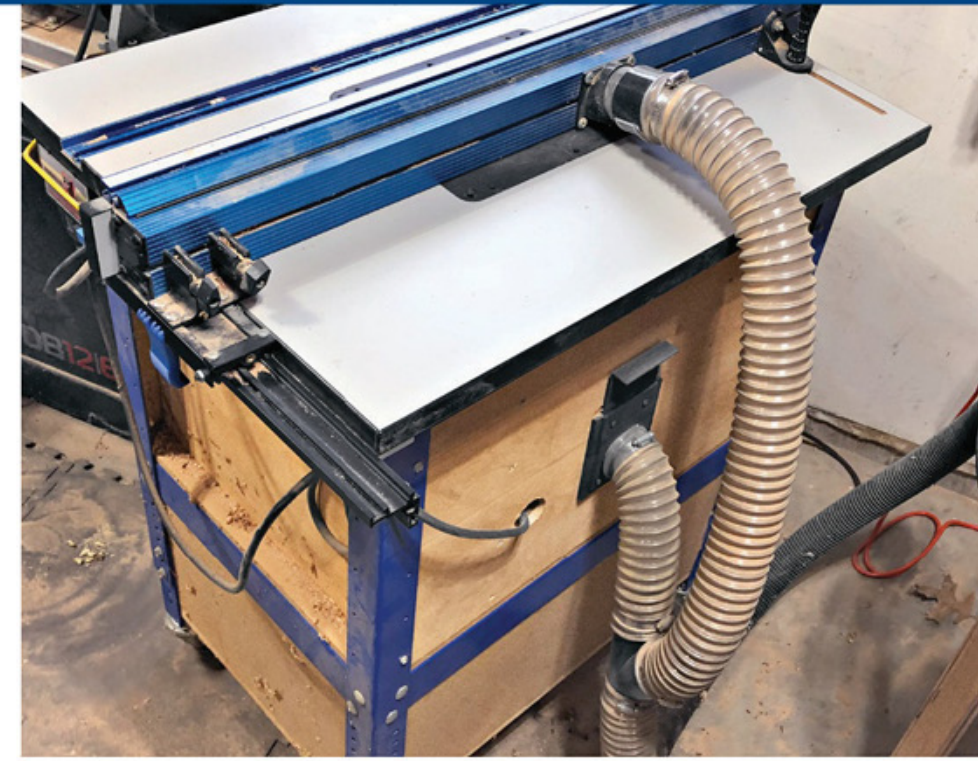
Even if you have a dust collector and an air-filtration unit in your shop, you can always do more to collect dust at the source. And very often, cheap shop-made fixes, using everyday items found at hardware stores and home centers, prove more helpful than just about any specialty jig or gizmo you can buy.

- 1** Like a router table, a spindle sander benefits from above- and below-the-table dust collection. This dust hood, made from a gutter downspout adapter with a rare-earth magnet glued to its bottom, gobbles up dust spray coming off the spindle. A wye below the table directs a second hose to the built-in dust port on the sander.

Taming Problematic Tools



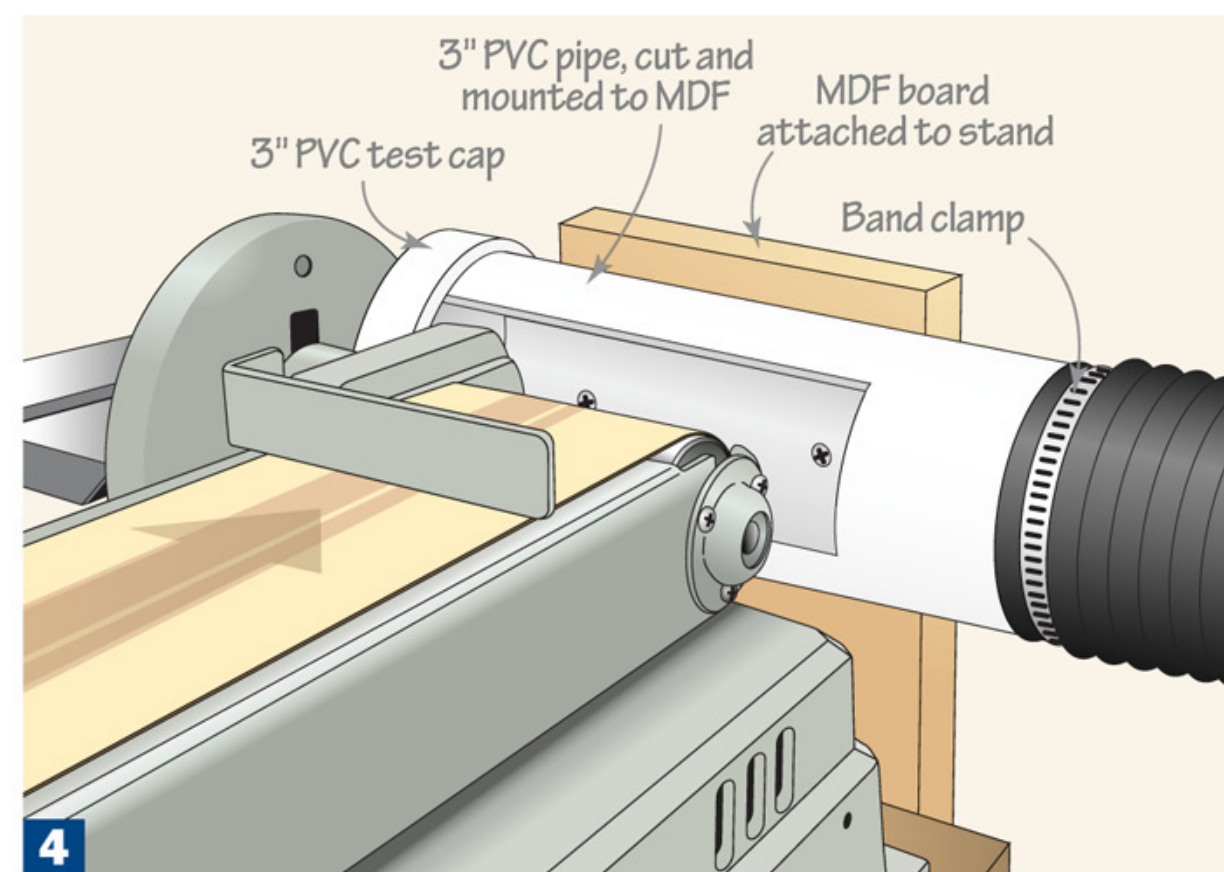
Clean air inlet



The dust port in a router-table fence misses a lot of debris that drops below the table. By enclosing the router beneath the table, you capture the chips and dust that escape through the bit opening. Cut a hole in the back, bottom, or a side of the enclosure to attach a dust hose that's connected by a wye to the fence port. You can simply build a housing around the router (left), or enclose the entire table (center and right), adding storage drawers to each side of the motor cavity. Whichever you choose, provide sufficient openings to ensure adequate airflow, allowing clean air in to move dust out and help cool the router.



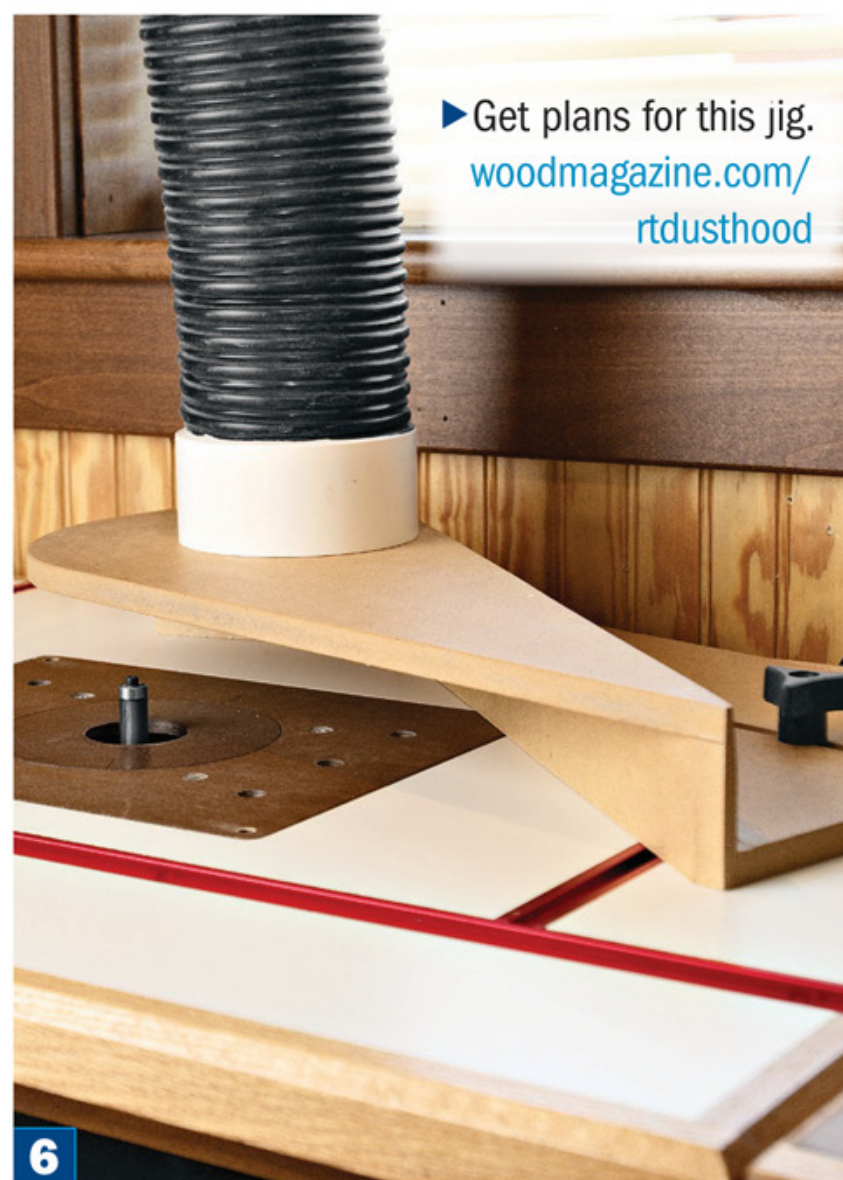
Galvanized-metal flashing



Belt sanders provide notoriously poor dust collection. Overcome this by mounting a short length of PVC drainpipe, with a cutout, at the outboard end of the belt.



► Get plans for this jig.
woodmagazine.com/dpdust



► Get plans for this jig.
woodmagazine.com/rtdusthood



► Get plans for this jig.
woodmagazine.com/flatteningjig

¼" acrylic base

Conveyor brush

Flattening a wood slab with a router and jig sprays chips and dust everywhere. Contain the debris where the vacuum can evacuate it by attaching conveyor brush strips to the carriage and to the router's subbase.

Get Connected



MagJig

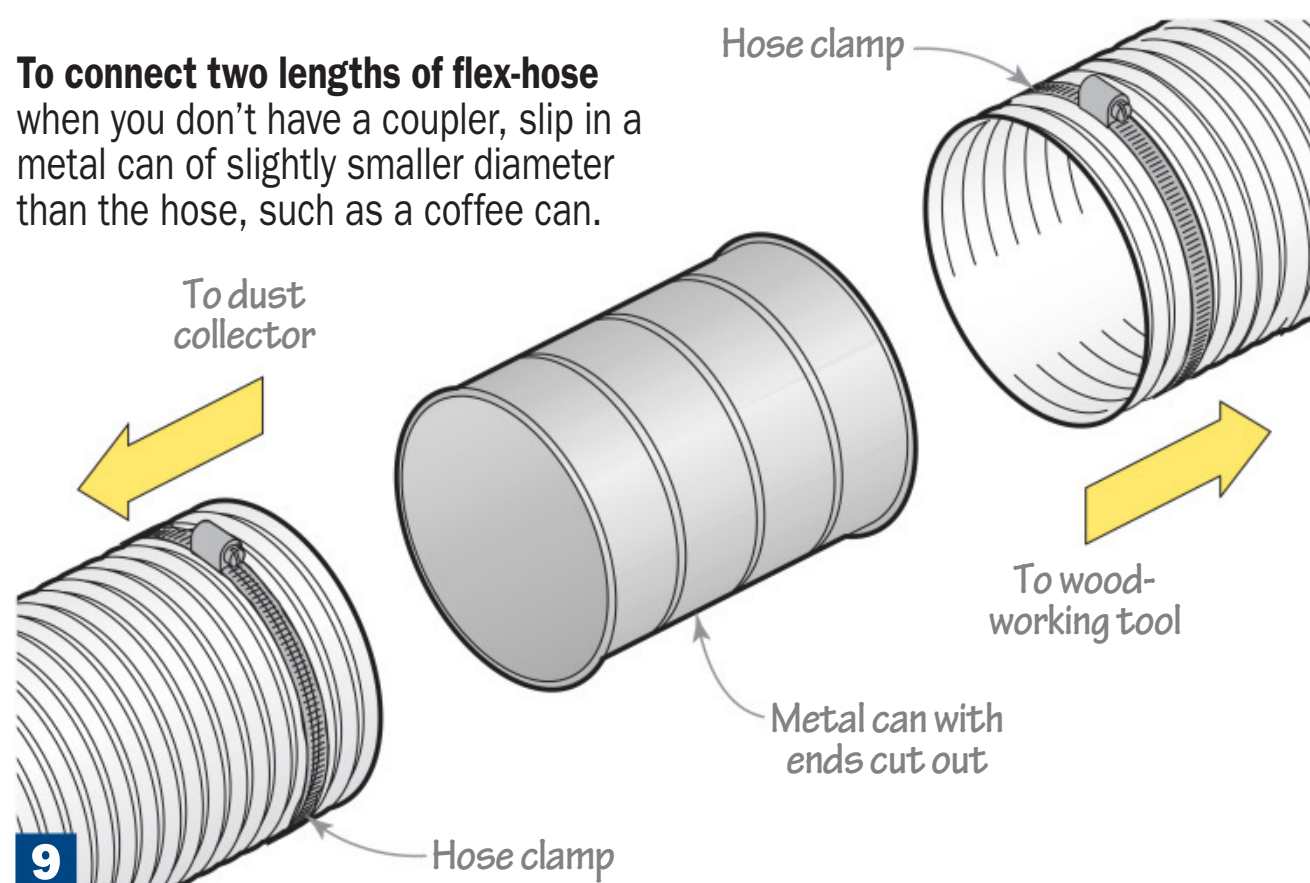


► Buy a MagJig 150.
woodmagazine.com/magjig



8

A lot of dust generated by a bandsaw piles up around the lower blade guides before it ever reaches the dust port at the bottom of the cabinet. Add a collection point just below the table with a simple jig such as this, secured to the bandsaw by a Magswitch twist-on/off MagJig.



9

To connect two lengths of flex-hose when you don't have a coupler, slip in a metal can of slightly smaller diameter than the hose, such as a coffee can.

Hose clamp

To dust collector

To wood-working tool

Metal can with ends cut out

Hose clamp



10

Matching your dust-collection hose to a tool port on a benchtop machine or portable tool can be frustrating because there are no industry-standard sizes for these tools. Bridge a bad fit with a rubber plumbing boot that clamps to both the port and hose. These boots come in several sizes, including reducers.



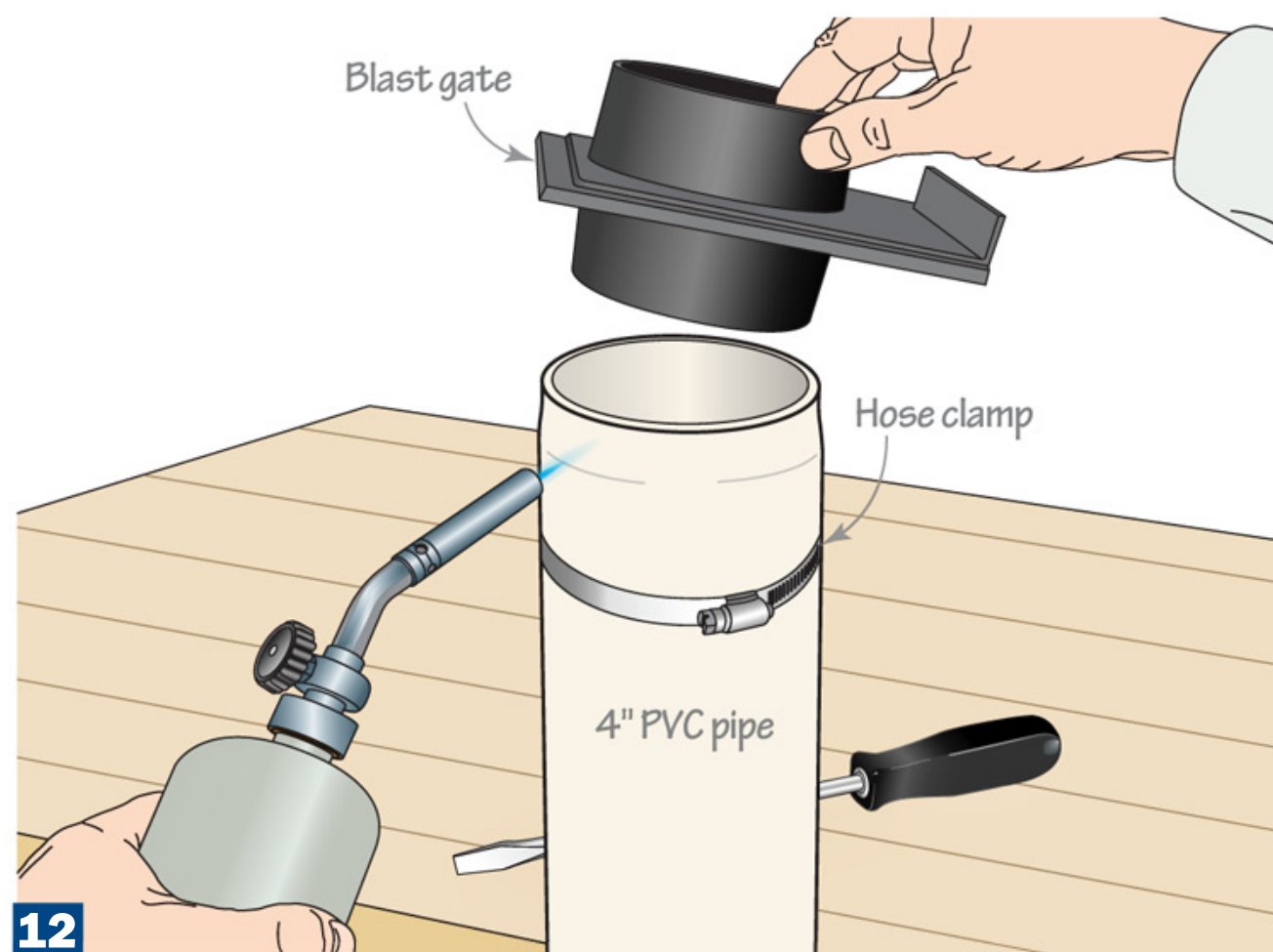
11

The 90° transition on a factory dust port can disrupt airflow, reducing dust-collection efficiency. Replace it with your own dust port with a large-radius round-over (the bigger, the better) to improve airflow.

Rounded edge

Port with plastic flange cut away

90°



12

If you're having trouble fitting a dust-collection port, blast gate, or coupler to PVC pipe (which is usually slightly larger in diameter than dust-collection fittings), heat the PVC slightly with a small propane torch. This will soften the PVC, allowing it to conform to the blast gate when you clamp it in place. Take care to not burn or deform the PVC.

Blast gate

Hose clamp

4" PVC pipe

Capture and Contain

Here's a stacking hack: Save valuable floor real estate by building this tower for your inline dust separator and the vac that powers it. We prefer to put the vacuum on top to allow for easier emptying of the separator bucket.

► Learn more about dust separators.
woodmagazine.com/separators



13



Foam insulation

14

Get a close-up assist for your air-filtration unit by installing it on a shop cart, such as this sanding station. The unit will be closer to where you create the dust, increasing its effectiveness. The foam insulation board reduces vibration.



Foam weather stripping

15

To eliminate dust leaks where the bag fits around the rim of a dust collector, install self-adhesive foam weather stripping to the rim. Clamping the bag securely compresses the foam to make a tight seal. 🌱

Potting Shed

Combining storage with a compact greenhouse, this backyard shed is a gardener's dream.



D I M E N S I O N S :
170" W x 141" D x 132" H

Approximate
materials cost:

\$2800

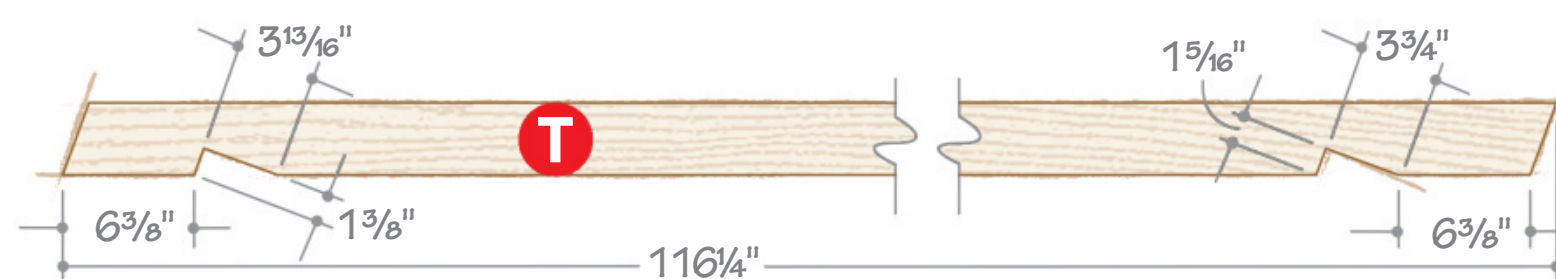
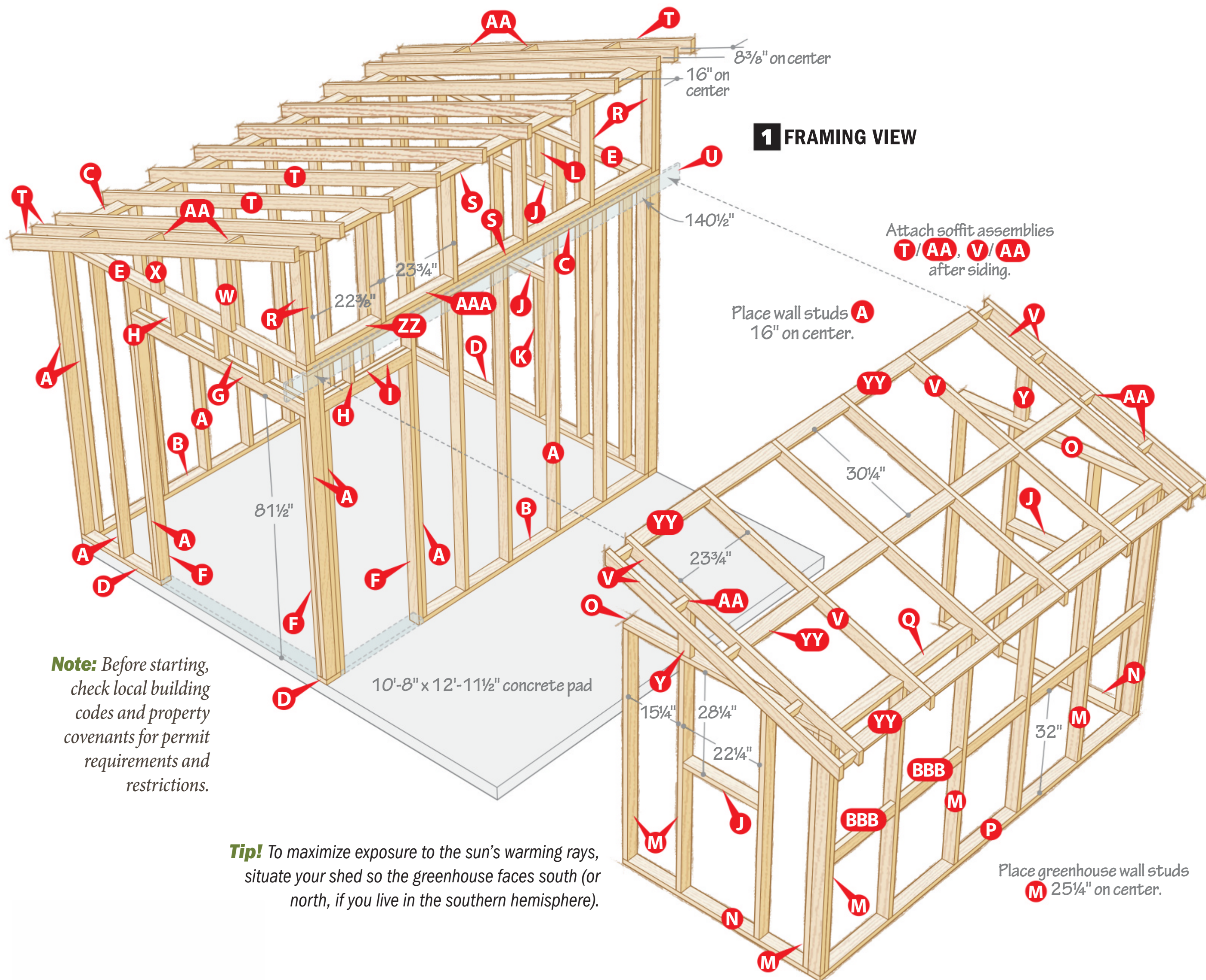
including
concrete pad

122

sq. ft. of
floor space
inside

Whether you're a master gardener or just a weekend grass cutter, this shed has you covered. One side provides ample space for garden tools and lawn equipment. A smaller side room with a clear, polycarbonate roof and wall serves as

a greenhouse for starting seedlings. (If you don't have much of a green thumb, consider converting the greenhouse into a lumber-drying room [[Setting Up a Solar Kiln](#), page 38].) You'll find just about everything you need to build this project at your local home center.



1a RAFTER DETAILS



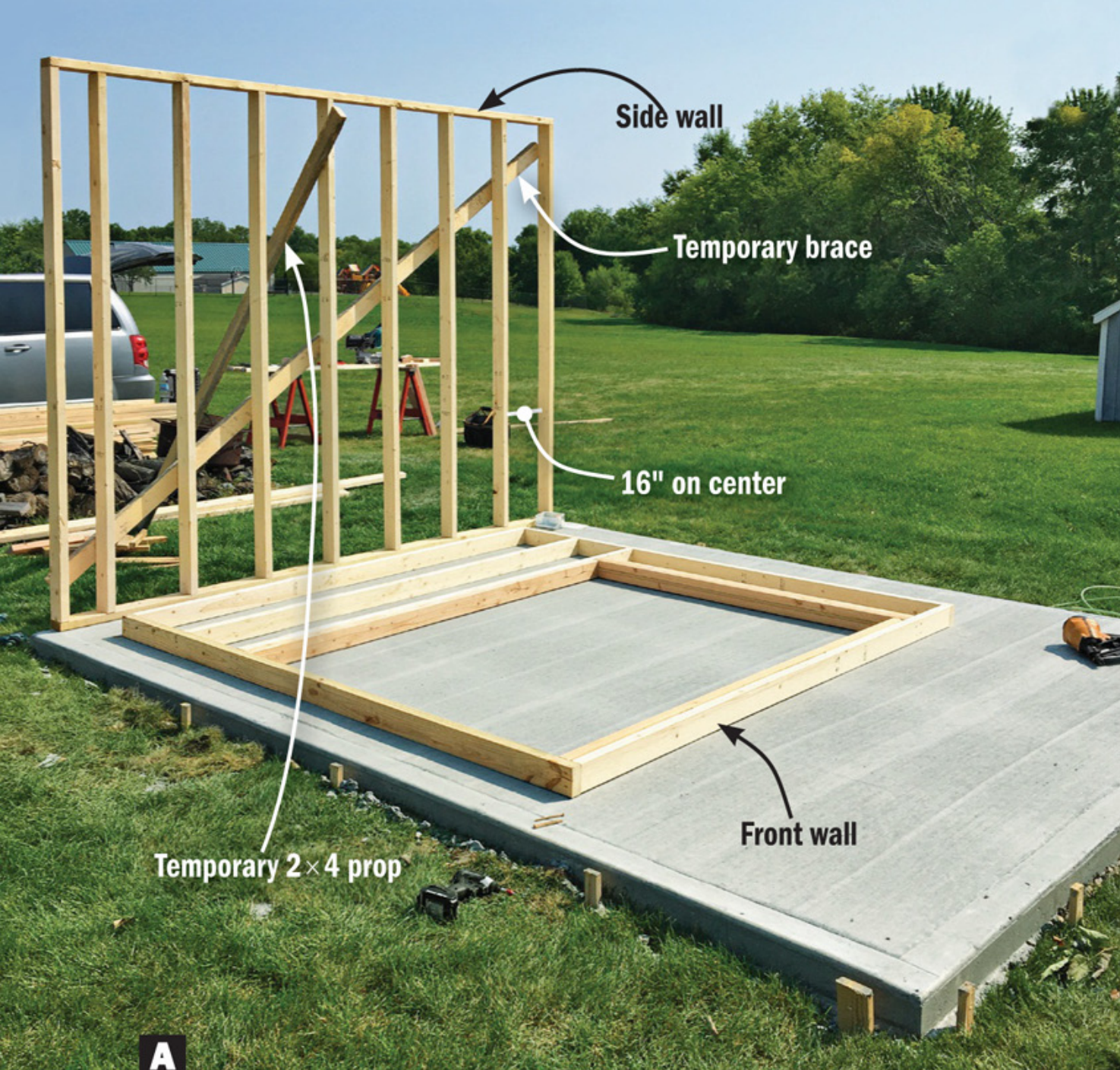
Frame-up job

We used pressure-treated 2×4s for the sill plates of the walls and regular framing lumber for everything else.

1 Set forms and pour a 4"-thick concrete pad for the shed [Drawing 1]. (Our pad

required just a little under two cubic yards of concrete.)

2 Cut the wall studs (A), sill and top plates (B–E), and the door and window framing (F–L) for the four main walls of the shed [Drawing 1]. Using the concrete pad as a work-



A Add temporary diagonal bracing to each wall to hold it square. Then after raising the wall into position, prop it up with a 2×4.



B Brace walls as you stand them up. After screwing all four walls together, fasten them to the pad with concrete anchor screws.



C Clamp the side wall of the greenhouse to the ends of the front and back walls to hold it in place while driving the screws.

Note: Build the headers by nailing ½" spacers between the door headers (G and I).

Note: The spacing of greenhouse wall studs differs from the spacing of the studs in the main part of the shed.

surface, assemble the walls one at a time, checking for square as you go [Photo A].

3 As you stand each wall, plumb it and square it to the adjoining wall. Then screw the walls together [Photo B].

4 Cut the greenhouse wall studs (M), sill and top plates (N–Q), and window sill plates (J) [Drawing 1]. Assemble the walls one at a time.

5 Attach the front and back walls of the greenhouse to the side of the main shed, checking for plumb and square. Then stand the long side wall up and secure it to the front and back walls of the greenhouse [Photo C].



D Assemble the clerestory wall on the ground, then enlist the help of an assistant to lift the wall up and set it into place.

6 Cut the clerestory wall studs (R) and top and bottom plates (S) [Drawing 1]. Assemble the clerestory wall and nail it to the top of the inside wall [Photo D].

7 Starting with an extra-long piece, lay out and cut the bird's-mouth notches for one of the roof rafters (T) [Drawing 1a]. After testing the fit of the notches on the shed, mark the ends of the rafter and angle-cut it to length.

8 Angle-cut the remaining roof rafters (T) to identical length. Using the notched rafter as a pattern, make a template for the bird's-mouth notches in a piece of scrap and



► To watch a time-lapse video of the shed being built, hover your smartphone's camera over this code—no app required—or visit woodmagazine.com/shedbuild.

3 Cut all the fascia parts (BB–EE) and attach them to the roof [Drawing 2]. From $\frac{1}{2}$ " plywood, cut to fit the soffit panels (FF) and attach them to the underside of the rafter tails and rake rafters.

4 Add the roof sheathing (GG) to the main shed and attach the bottom drip edge [Drawing 2]. Nail down 15-lb. roof felt and then add the side drip edge over the felt. Nail on the shingles with 1" aluminum roofing nails, working from the bottom up. Complete the roof by adding a piece of drip edge over the shingles at the top of the roof.

Trim it out

1 Cut the corner trims (HH–JJ) and nail them in place [Drawing 2].

2 Cut the window sills (KK) and window frame rails (LL) to fit the openings [Drawing 3]. At the bandsaw, bevel-rip the sills and notch the ends [Drawing 3a]. Attach the sills and rails to the window openings.

3 Angle-cut to length the window frame stiles (MM) and nail them to the openings between the sills and rails [Drawing 3].

4 Cut to size the window trim (NN, OO) [Drawing 3], and nail it around the three window openings.

5 From 2×4 stock, cut the door stiles (PP) and rails (QQ) [Drawing 4]. Bandsaw a 15° bevel on one face of the door-meeting stiles [Drawing 4a]. Assemble the door frames, checking for square.

Note: Install parts (LL) and (MM) with the front edges and the outer surface of the siding flush.



G

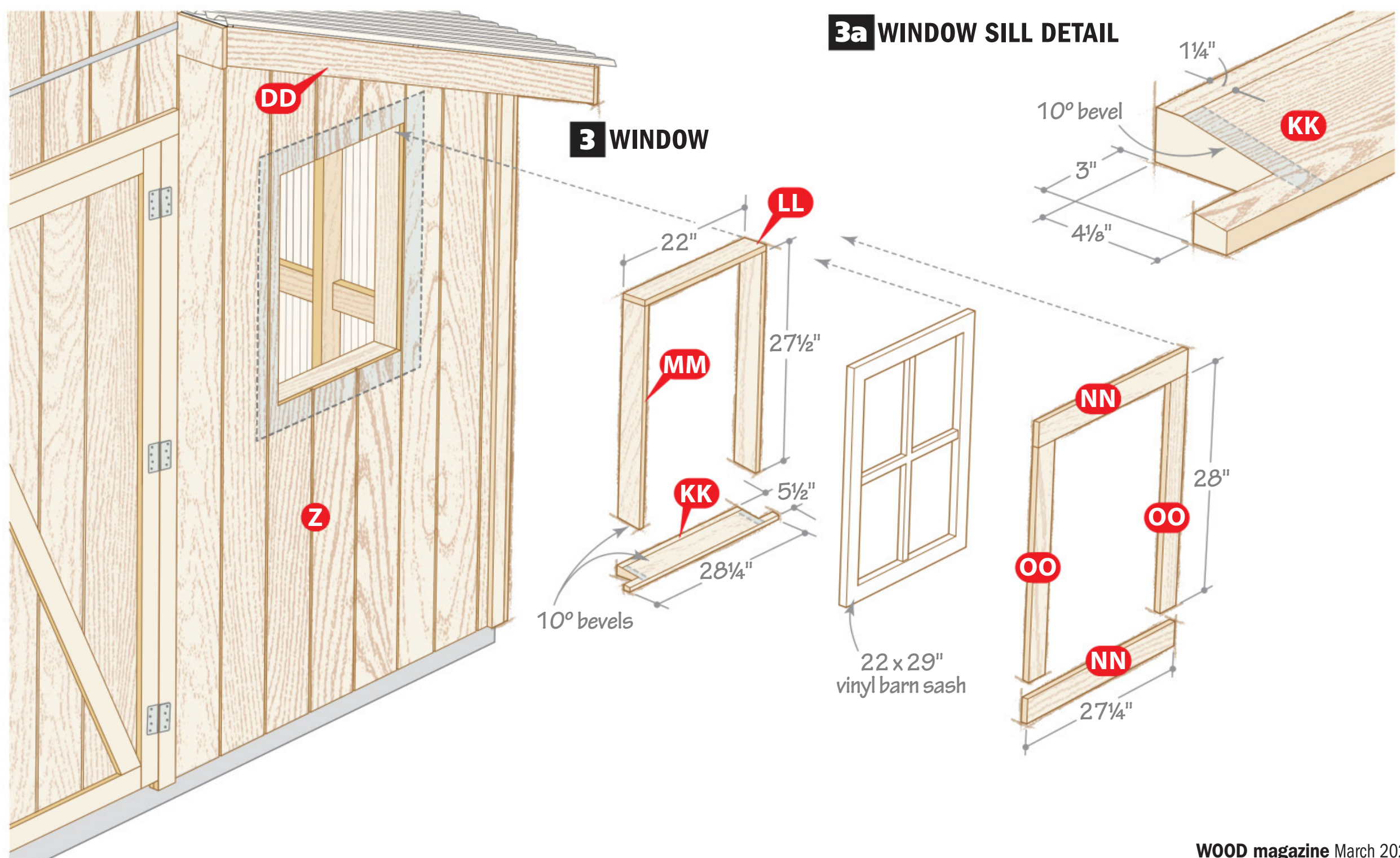
Lay out and cut the door panels, making sure the vertical grooves line up with those on the shed. Then nail the panels in place to square the door frames.

6 Cut the door panels (RR) from T1-11 plywood and nail them to the frames [Photo G]. Angle-cut to length the diagonal door braces (SS) and attach them to the doors [Drawing 4, Photo H].

7 Cut the door trims (TT–VV) [Drawing 4] and attach them to the front of the doors. Cut the door frame trims (WW, XX) and attach them to the shed [Drawing 2].

8 Screw the hinges to the doors and attach the doors to the shed. Add a barrel bolt to the inside of one of the doors [Photo I]. Install a hasp on the outside of the doors.

Tip! For each door hinge, replace one of the screws with a 3"-long screw driven into the framing of the opening.





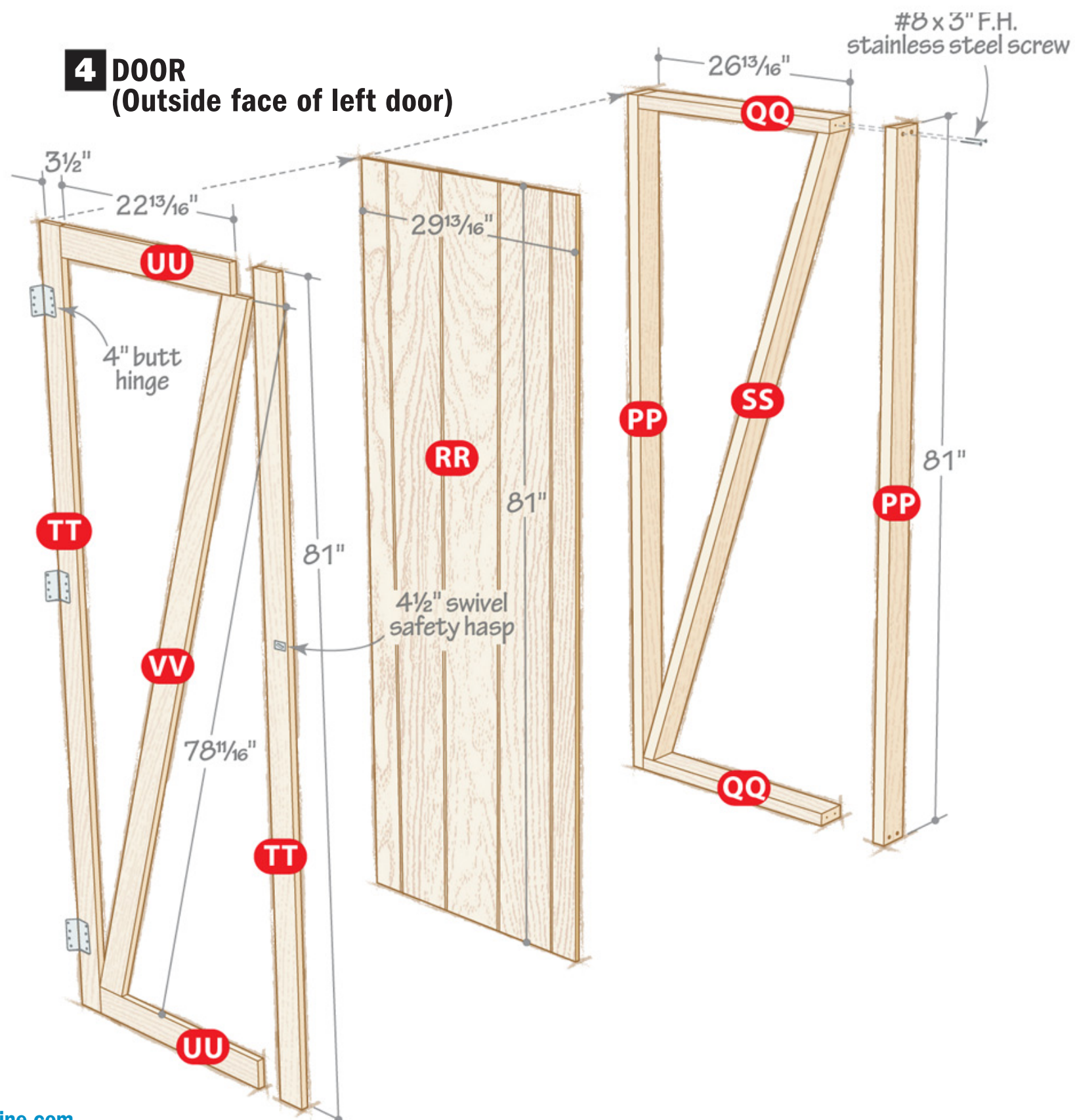
H

Use a scrap of wood to support the diagonal brace (SS) while transferring the cut angle from the door frame to the ends of the brace.

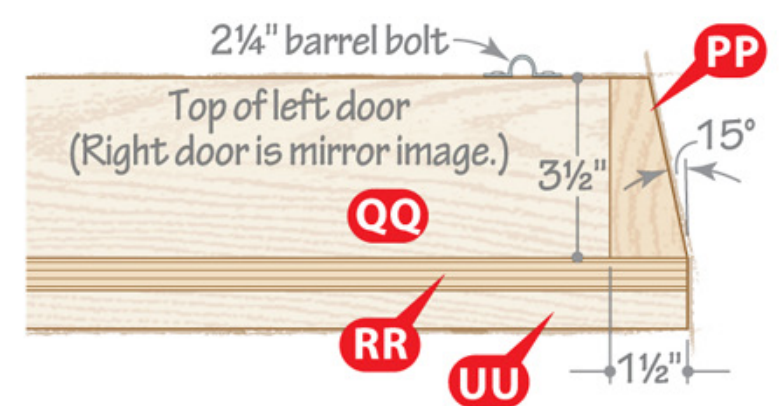


I

Bevels on the inner door stiles provide clearance for the doors to open and close. A barrel bolt secures the door from inside the shed.



4a DOOR BEVEL DETAIL
(Top view)





J Install the windows flush with the inside edges of the wall studs.

Let there be light

1 Install the windows [Sources] in the openings using 3" hinges and barrel bolts as latches [Photo J].

2 Cut the purlins (YY), clerestory wall blocking (ZZ, AAA), and greenhouse wall blocking (BBB) [Drawing 1] and nail them between the studs and rafters of the clerestory wall and the greenhouse roof and side wall [Photo K].

3 Prime and paint the shed with an exterior latex paint of your choice.

4 Screw the vertical and horizontal closing strips and wall connector flashing (CCC) in place [Drawings 2 and 5].

Tip! When cutting the roofing panels, stack several panels together and cut them with a laminate-cutting blade in your circular saw.



K Purlins (YY) and blocking (ZZ, AAA, BBB) provide support for the polycarbonate roofing panels.

5 From polycarbonate roofing panels, cut to size the clerestory panels (DDD) and attach them to the clerestory wall over the wall connector flashing [Drawing 5].

6 Cut to size the greenhouse roof panels (EEE). Slide the panels underneath the wall connector flashing (CCC) and screw them in place [Drawing 5]. Cut to size the greenhouse wall panels (FFF) and screw them in place [Drawing 2].

7 Cut to size the clerestory trim (GGG) and greenhouse side corner trim (HHH) [Drawing 2]. Prime and paint the trims and attach them to the shed. 🌿

Note: Avoid over-driving the screws to prevent distorting or cracking the polycarbonate panels.

► Watch a video on installing a polycarbonate panel roof.

woodmagazine.com/polycarbonateroof

Setting up a solar kiln

With a few modifications, you can convert the greenhouse into a solar kiln for drying lumber. Solar kilns use the sun's heat to warm the air inside the kiln. A fan circulates the warm air over the wood, helping the moisture evaporate as it escapes. Because warm air holds more moisture than cold air, the lumber dries faster than if it were simply left outside. At night, the temperature falls and the evaporation process slows down or stops. This warm air/cold air cycle prevents the wood from drying out too quickly and developing stress cracks.

In order to maximize the efficiency of the kiln, you'll need to make some modifications as you build the shed. For starters, substitute T1-11 siding for the polycarbonate panels on the side wall of the kiln. This allows sunlight to enter through the roof, while minimizing the heat loss through the walls.

Similarly, adding rigid foam insulation to the inside of the greenhouse walls helps hold in the heat. Fit the insulation between the wall studs and then staple black plastic sheeting to the wall studs to serve as a vapor barrier. Paint the interior wall of the kiln black to absorb more heat from the sun's rays. You'll also need to block off the doorway into the main part of the shed, with either a door or some additional black plastic sheeting.

To circulate the air inside the kiln, install a box fan in one of the window openings. Mount the fan so that it blows into the kiln.

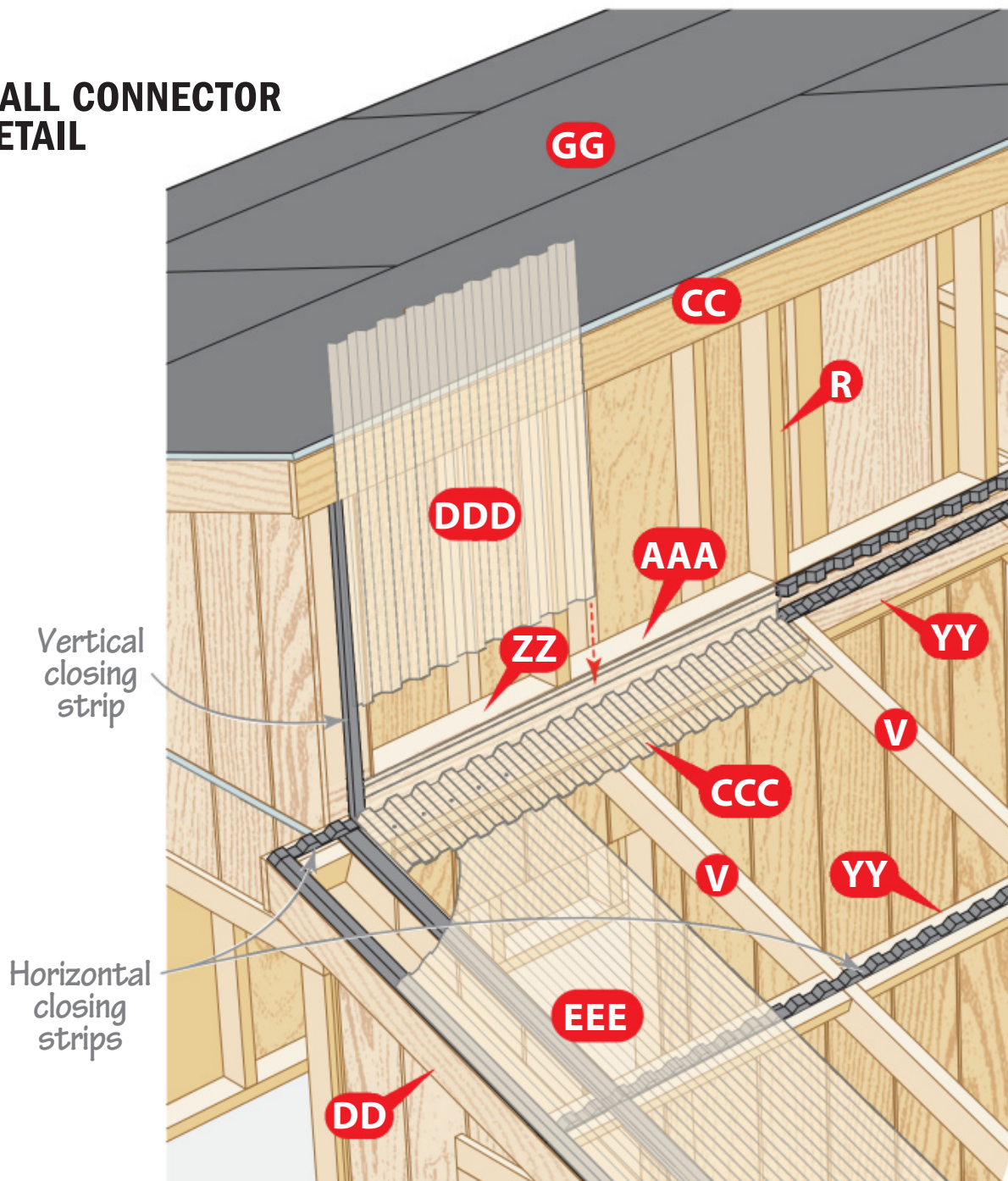
To use the kiln, stack your green lumber in the center of the kiln, placing stickers in between the boards. During the day, when the temperature inside the kiln starts to increase, turn on the fan on high and slightly open the window at the opposite end of the kiln to allow

the moist air to exit. After the sun goes down and the temperature inside the kiln drops, turn off the fan. (Install a timer or humidistat control on the fan to automatically regulate when it turns on and off.)

The secret to drying lumber is controlling the rate of drying. Use a moisture meter to check the moisture content of the wood every few days. If the wood is drying too fast, run the fan for a shorter period each day. If it dries too slowly, try running a small dehumidifier inside the kiln to help draw moisture out of the air. Depending on the thickness and species of wood you're drying, your lumber can be ready to use in as little as four to six weeks.

► Learn how to stack green lumber for drying.
woodmagazine.com/dryinglumber

5 WALL CONNECTOR
DETAIL



Produced by **Vincent Ancona** with **Kevin Boyle**
Project design: **Kevin Boyle**
Illustrations: **Roxanne LeMoine, Lorna Johnson**

Materials List

Part		FINISHED SIZE			Matl.	Qty.
		T	W	L		
Wall and roof framing						
A	wall studs	1½"	3½"	92⅝"	P	27
B	side sill plates	1½"	3½"	121"	PT	2
C	side top plates	1½"	3½"	121"	P	2
D	front/back sill plates	1½"	3½"	96"	PT	2
E	front/back top plates	1½"	3½"	96"	P	2
F	door jacks	1½"	3½"	80"	P	4
G	exterior door headers	1½"	3½"	63½"	P	2
H	door cripple studs	1½"	3½"	9⅞"	P	4
I	interior door headers	1½"	3½"	30"	P	2
J	window sill plates	1½"	3½"	22¼"	P	4
K	lower window cripple stud	1½"	3½"	46½"	P	1
L	upper window cripple stud	1½"	3½"	13⅞"	P	1
M	greenhouse wall studs	1½"	3½"	69"	P	16
N	greenhouse front/back sill plates	1½"	3½"	56"	PT	2
O	greenhouse front/back top plates	1½"	3½"	56"	P	2
P	greenhouse side sill plate	1½"	3½"	128"	PT	1
Q	greenhouse side top plate	1½"	3½"	128"	P	1
R	clerestory wall studs	1½"	3½"	30½"	P	8
S	clerestory wall plates	1½"	3½"	128"	P	2
T*	rafters	1½"	3½"	116¼"	P	12
U	ledger	¾"	5"	140½"	P	1
V	greenhouse rafters	1½"	3½"	72⅝ ¹⁶ "	P	8
W	long gable studs	1½"	3½"	24"	P	2
X	short gable studs	1½"	3½"	14½"	P	2
Y	greenhouse gable studs	1½"	3½"	14½"	P	2

Siding and trim						
Z*	siding	⅝"	*	*	T	*
AA	soffit blocking	1½"	3½"	4"	P	16
BB	front/back fascia	¾"	5½"	120"	P	2
CC	side fascia	¾"	5½"	140½"	P	2
DD	greenhouse front/back fascia	¾"	5½"	72⅝"	P	2
EE	greenhouse side fascia	¾"	5½"	140½"	P	1
FF*	soffit panels	½"	*	*	Ply	*
GG*	roof sheathing	⅝"	*	*	OSB	*
HH	front/back corner trim	¾"	2¾"	95⅜"	P	2
II	side corner trim	¾"	3½"	94⅜"	P	2
JJ	greenhouse frt./bk. corner trim	¾"	2¾"	71⅜"	P	2

Windows and doors						
KK	window sills	1½"	5½"	28¼"	P	3
LL	window frame rails	¾"	2⅞"	22"	P	3
MM	window frame stiles	¾"	2⅞"	27½"	P	6
NN	horizontal window trim	¾"	3"	27¼"	P	6
OO	vertical window trim	¾"	3"	28"	P	6
PP	door frame stiles	1½"	3½"	81"	P	4
QQ	door frame rails	1½"	3½"	26⅜"	P	4
RR	door panels	⅝"	29⅜"	81"	T	2
SS	door diagonal braces	1½"	3½"	82½"	P	2
TT	door vertical trim	¾"	3½"	81"	P	4
UU	door horizontal trim	¾"	3½"	22⅜"	P	4
VV*	door diagonal trim	¾"	3½"	78⅜"	P	2
WW	door frame vertical trim	¾"	3½"	81"	P	2
XX	door frame horizontal trim	¾"	3½"	66"	P	1

Greenhouse panels						
YY	purlins	1½"	3½"	23¾"	P	15
ZZ	short clerestory blocking	1½"	3½"	22⅞"	P	2
AAA	long clerestory blocking	1½"	3½"	23¾"	P	3
BBB	greenhouse blocking	1½"	3½"	23¾"	P	5
CCC	wall connector flashing	⅝"	8"	48"	PRP	3
DDD	clerestory panels	⅝"	26"	31"	PRP	5
EEE	greenhouse roof panels	⅝"	26"	75½"	PRP	5
FFF	greenhouse wall panels	⅝"	26"	70¾"	PRP	5
GGG	clerestory corner trim	¾"	2⅞"	33"	P	2
HHH	greenhouse side corner trim	¾"	2¾"	70¾"	P	2

*Parts cut to fit. See the instructions.

Materials key: P-pine, PT-pressure-treated lumber, T-T1-11 plywood siding, Ply-exterior-grade plywood, OSB-exterior-grade oriented-strand board, PRP-polycarbonate roofing panels.

Supplies: Concrete (2 cu. yds.), 2" and 3½" nails, #8×3" F.H. stainless steel screws, 3¼" concrete anchor screws, 4" butt hinges (3 pr.), 3" butt hinges (3 pr.), 2¼" barrel bolts (4), 4½" swivel safety hasp (1), 10' drip edge (2), 12' drip edge (2), 12' Z-flashing (2), 15-lb. roof felt (1 roll), 3-tab shingles (4 bundles), 1" aluminum roofing nails, exterior primer (3 gallons), exterior latex paint, main color (2 gallons), exterior latex paint, trim color (1 gallon and 1 quart).

Sources: 22×29" vinyl barn sash, white (3), no. BS2229, \$24.02, Menards, menards.com. Suntuf 26"×8' polycarbonate roof panels, clear (7), no. 101697, \$19.98, Suntuf 26"×12' polycarbonate roof panels, clear (5), no. 101699, \$29.97, Suntuf 4' polycarbonate wall connector flashing, clear (3), no. 108657, \$14.47, Suntuf 24" horizontal plastic closure strips (8 packs), no. 92770, \$5.47, Suntuf 24" universal plastic closure strips (3 packs), no. 92772, \$5.98, Woodtite 2" fasteners (5 packs), no. 92523, \$5.98, Home Depot, homedepot.com.

Blade: Laminate-cutting circular-saw blade.

►Download a shopping list for this project at woodmagazine.com/pottingshed.

Router 101

Get a handle on using a handheld router.



by Jim Heavey

Often thought of only for its ability to add a decorative edge to any surface, a router can also easily create strong and attractive joinery or eye-catching inlays. Once you know the basics of its operation, you open up a world of uses.



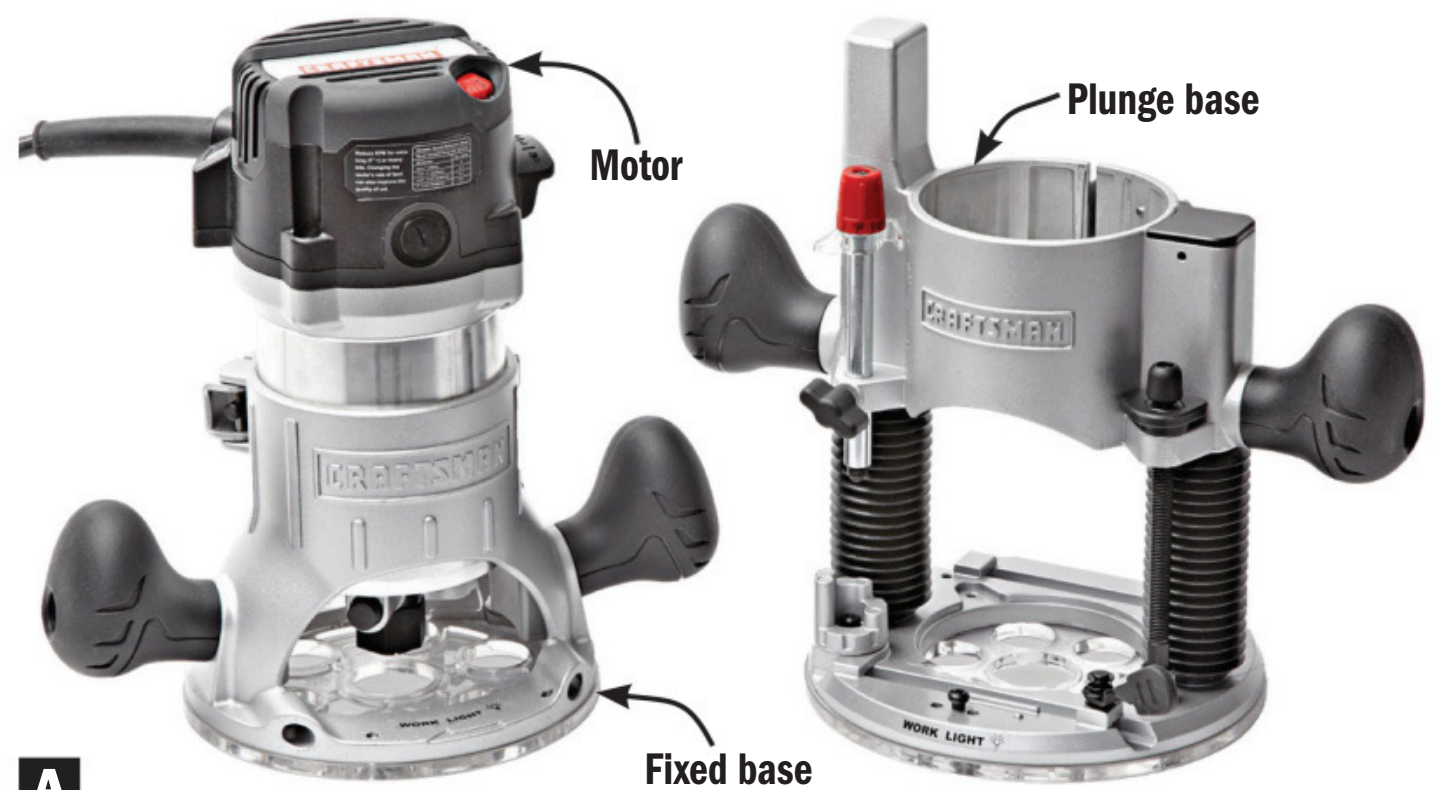
A map of the router

In a router, a motor spins a collet that grips the shank of a router bit. We'll talk more about collets and bits...in a bit.

Routers come in one of two base styles: *fixed*, where you set the cutting depth once and lock it in for the task; and *plunge*, where two spring-loaded rods support the motor and allow for lowering and raising the spinning bit into and out of a workpiece. This plunging action makes it easier to start a cut in the middle of a field, such as for a stopped dado. Many manufacturers offer both bases in a kit with a single router motor that swaps between them [Photo A].

Routers range in power from 1-hp trim routers to 2- and 2¼-hp midsize routers, and powerful 3-plus-hp machines. To further add to the variety available, many manufacturers now offer battery-powered models [Photo B]. This gives you a truly portable tool for use in the shop or on a job site.

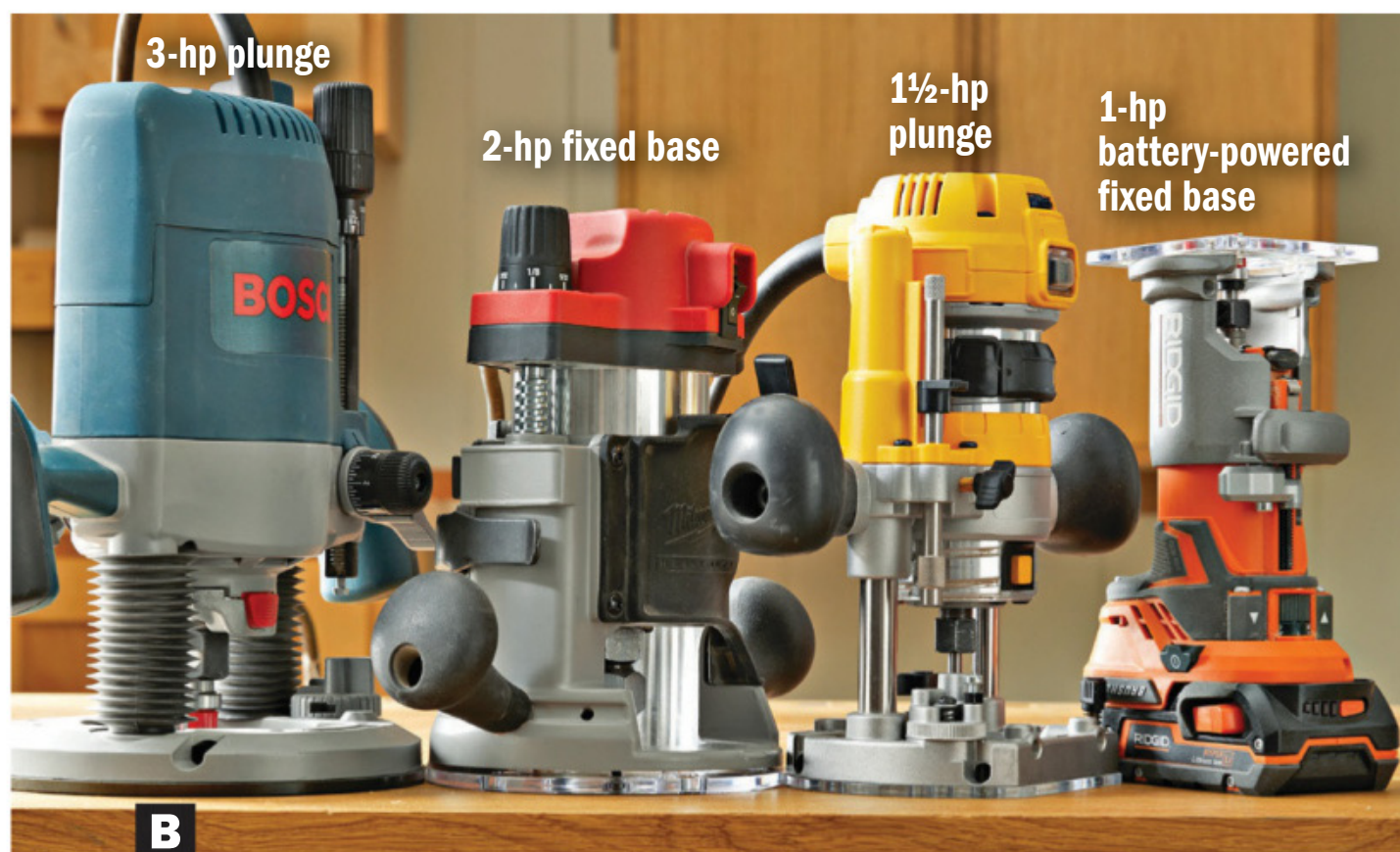
► Watch much of the info from this article in action.
woodmagazine.com/routerbasics
woodmagazine.com/routertuneup



A Kits provide a less expensive option than purchasing two separate routers. Swap the motor between the fixed base and the plunge base depending on the job.

In all routers, a collet, tightened by a wrench, compresses around the bit shank to hold it in place [Photo C]. To secure a bit in the collet, insert it until it bottoms out, then raise it to expose about ⅛" of the shaft above the collet. Then tighten the collet [Photos D, E].

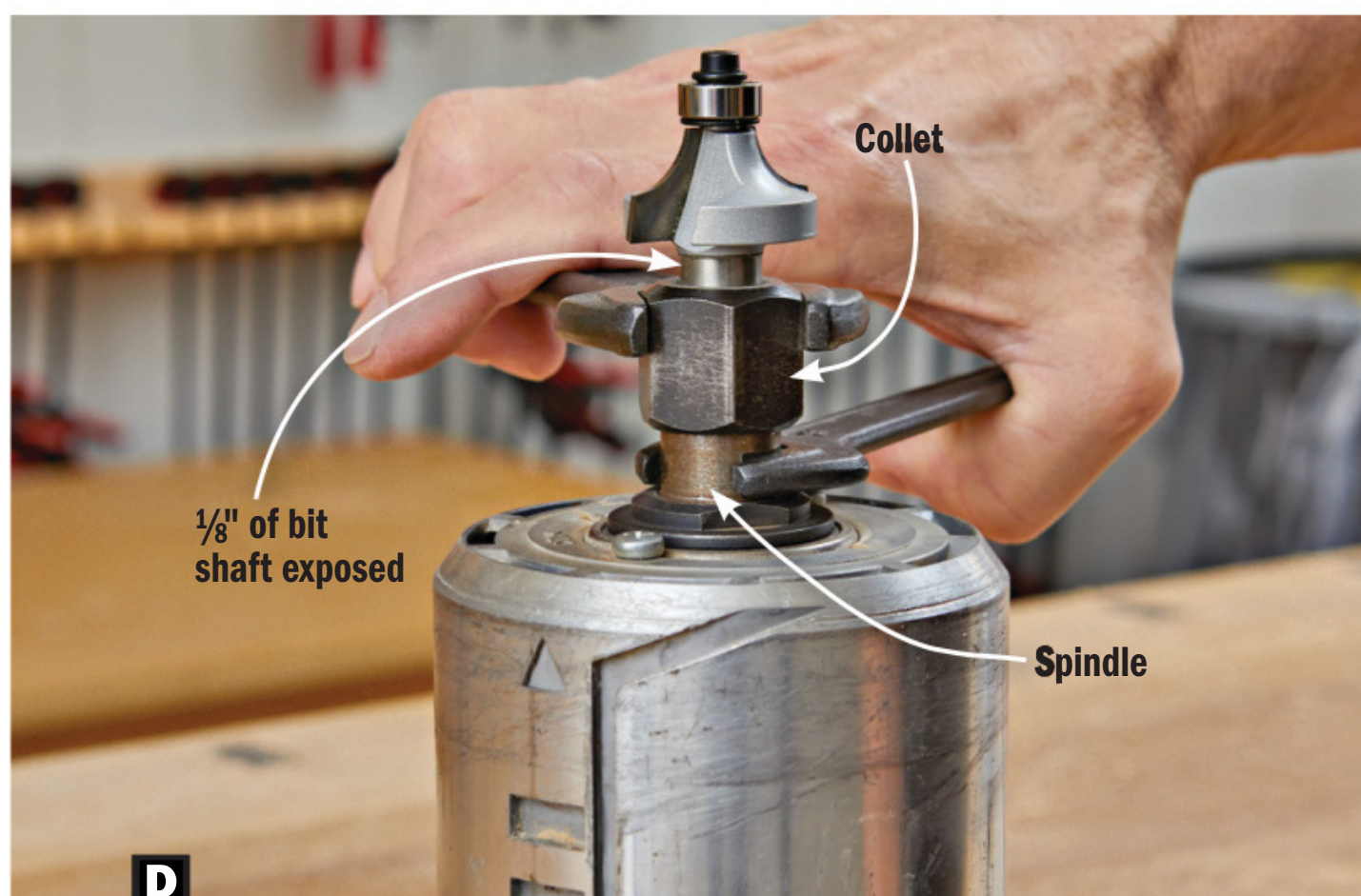
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woodmagazine.com/chooserrouter



B Big routers have the power to spin large bits through a cut. Smaller models can be operated one-handed.



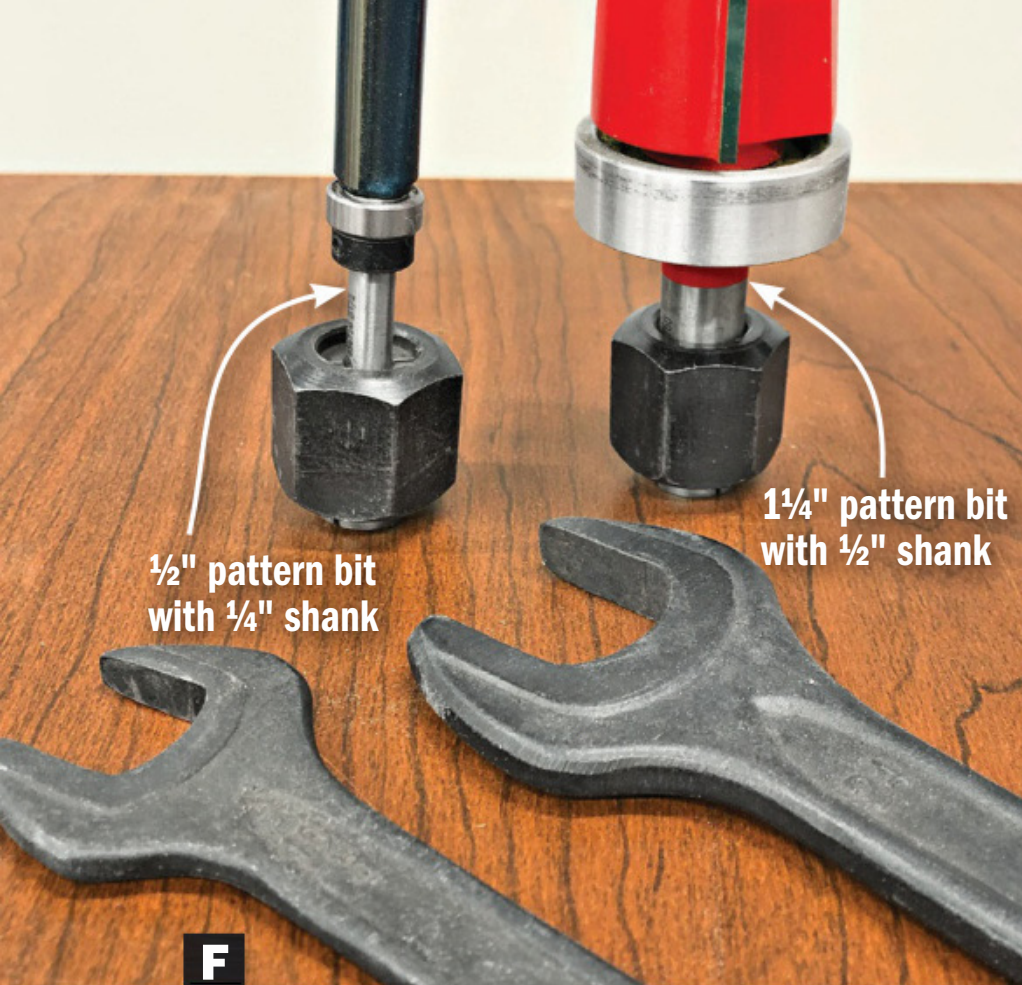
C Collets match bit-shank diameters, the most common being ¼" and ½". Not all routers accept ½" bits, and some use a reducer to fit ¼" bits in a ½" collet.



D Some routers require one wrench to grip the spindle and a second wrench to tighten the collet. Squeezing the wrenches with one hand allows steadying the motor with the other.



E A collet lock prevents the spindle from turning so you can tighten the collet using only one wrench.



F In general, smaller-diameter bits have 1/4" shanks. A 1/2" shank adds cost to the bit but provides increased strength and stability—critical when using large-diameter bits.

A bit about bits

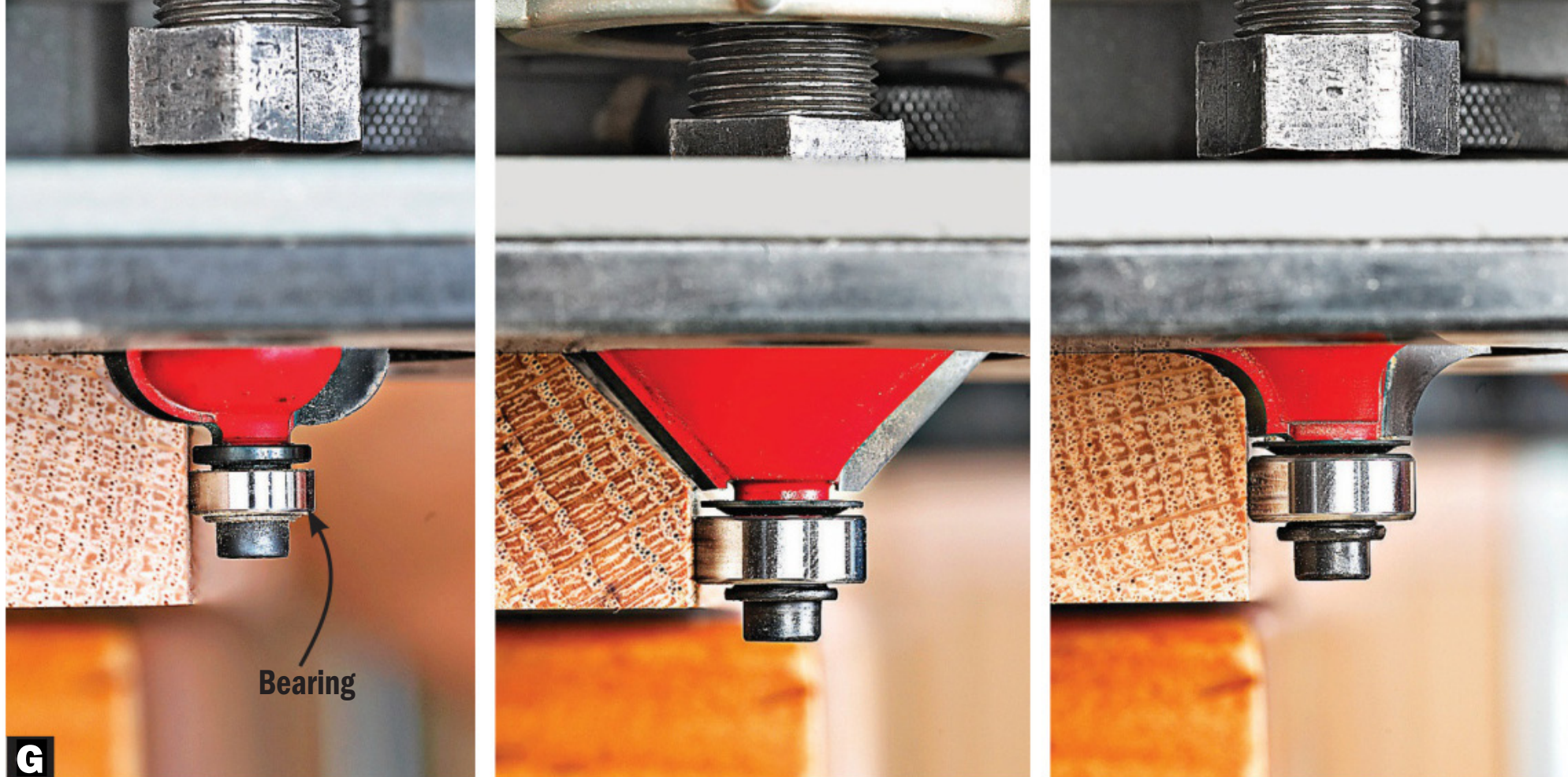
At the heart of routing is the bit [Photo F], with cutters of either high-speed steel or carbide. High-speed steel bits cost less but dull quicker than carbide bits.

A bit for shaping a workpiece edge [Photo G] or following a template secured to the workpiece has a bearing at the end. The bit spins inside the bearing reducing friction, which causes burn marks.

Setting up for a cut

After securing the bit in the router, follow these steps before hitting the “on” switch. Though early routers ran at fixed speeds around 25,000 rpm, most newer models come with variable-speed motors [Photo H]. Run small-diameter bits at high speeds; use slower speeds for large-diameter bits.

► Find the proper speed for any bit.
woodmagazine.com/bitspeed



G As the bearing rides along the edge of the workpiece, the bit cuts a consistent-width profile. Profiles from left to right: 1/8" cove, 45° chamfer, 1/8" round-over.



H Variable speed allows matching the motor speed to the bit diameter for safe operation and the best results.

Next, set the cutting depth. A good rule of thumb is to remove no more than 3/16" in any one cut. This reduces strain on the bit and motor, and reduces chip-out on the workpiece [Stop chip-out, below].

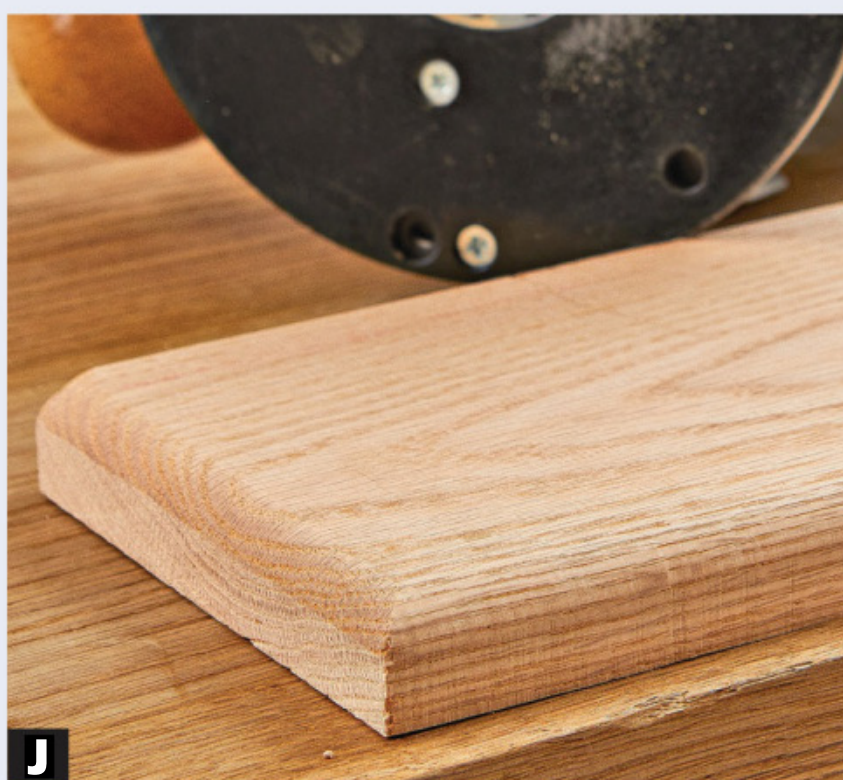
Stop chip-out

Routing across end grain can cause chip-out at the end of the cut [Photo I]. A pass along the adjacent edge removes minor chip-out [Photo J].

To prevent chip-out from happening in the first place, back up the cut [Photo K]. Use this technique if you won't be routing a profile on the adjacent edge.



I As the bit rotates out of the workpiece, it tears unsupported wood fibers along the adjacent edge. Stringy woods, such as oak, prove especially prone to chip-out.

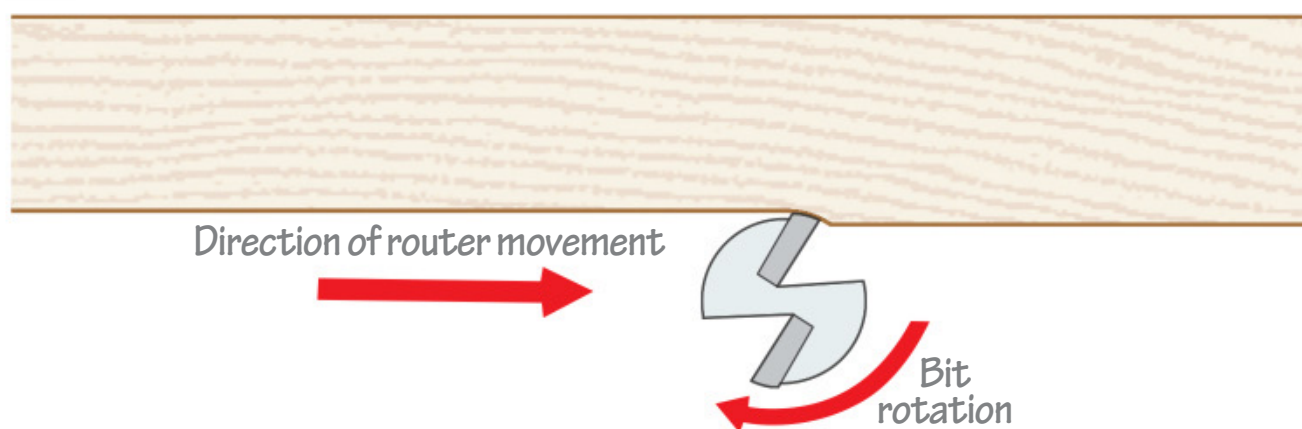


J Routing the edge cuts away the torn fibers, leaving a smooth profile on the edge and end. So for edge treatments, rout end grain first, and edge grain last.

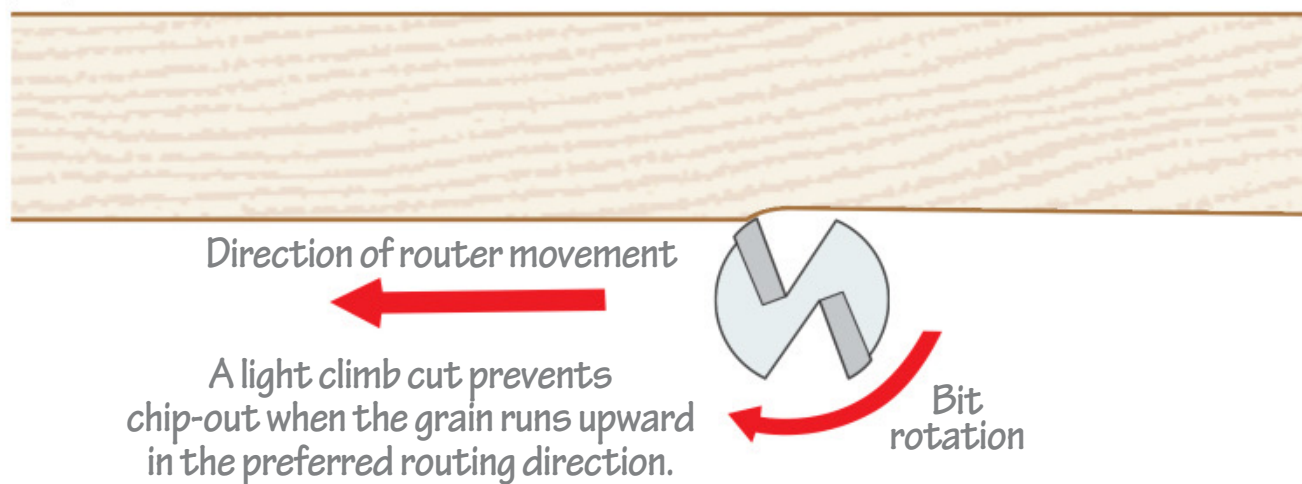


K Clamp a scrap the same thickness as the workpiece flush with the end of the board. This supports the fibers along the edge, resulting in a clean corner.

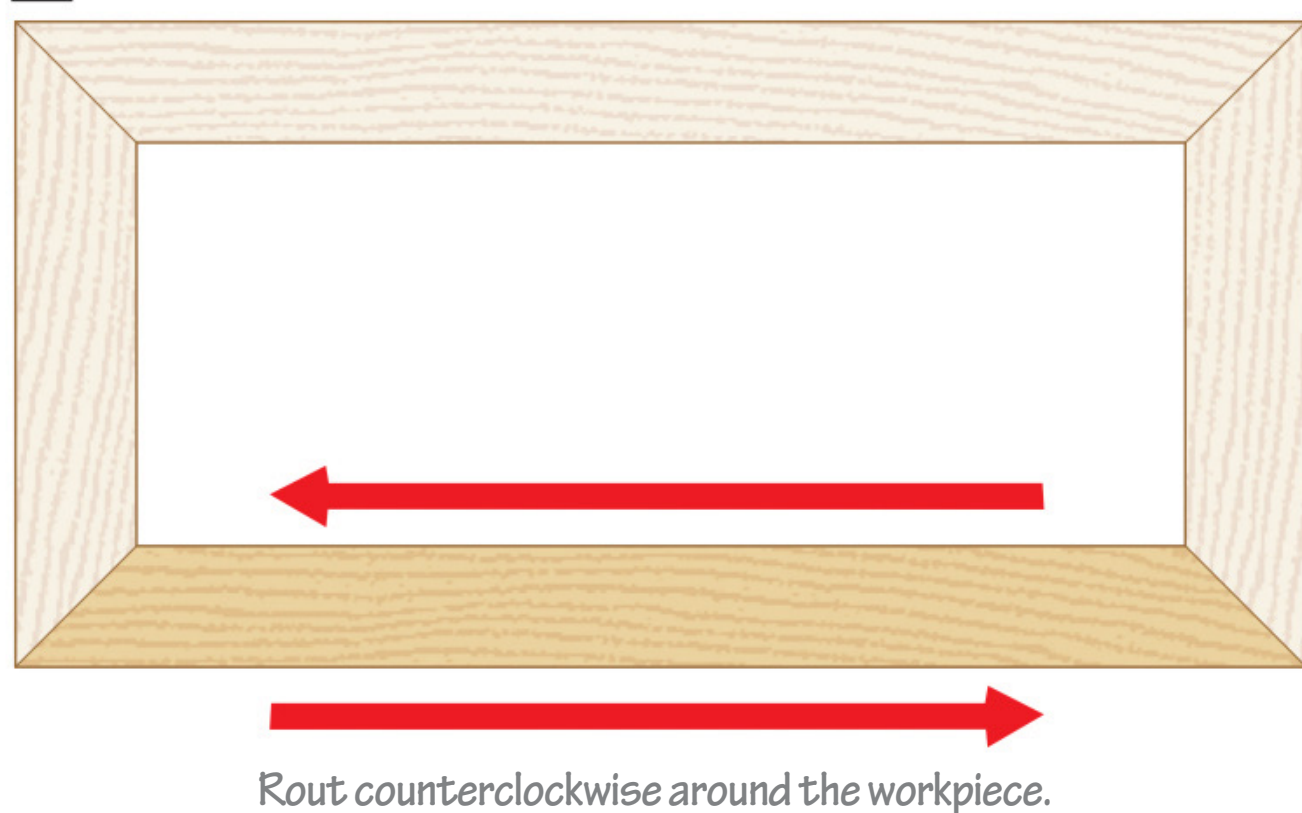
1 PREFERRED ROUTING DIRECTION



2 CLIMB CUTTING



3 ROUTING AROUND A FRAME



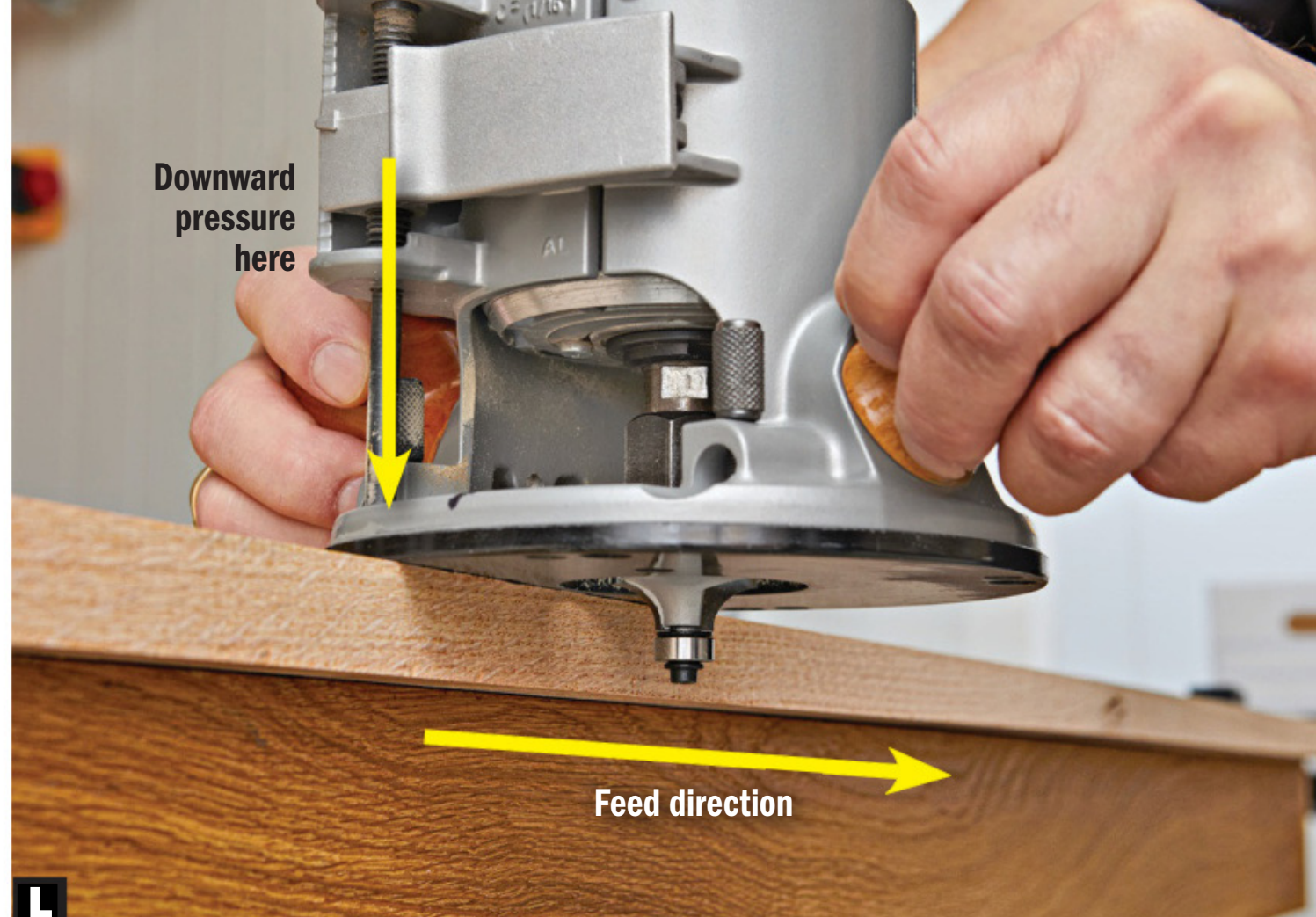
Before touching the bit to wood, you need to understand how bit rotation affects the direction you move the router. In a hand-held router, the bit spins clockwise when viewed from above. When routing an edge, moving the router counterclockwise around the workpiece helps keep the bit bearing against the wood edge as you push the router along [Drawing 1].

When routing clockwise—called climb cutting—the bit bites into the edge and pulls the router along, like a car tire when you mash the gas pedal. Because deep cuts increase this tendency, resulting in ragged cuts, only climb cut with very shallow depth, and only when necessary [Drawing 2].

Routing direction confuses even experienced users, especially when it comes to routing the inside edges of a frame. A simple way to think of it: Look at each member of the frame as a single workpiece, and begin routing counterclockwise around it [Drawing 3]. You'll automatically start off in the correct direction.

Now that you know which way to move, follow the steps in Photos L–N to rout an edge.

Note: Routers are loud. Wear hearing protection.



L Start with the router base on the workpiece, and the bit away from the wood. Turn the router on, grip both handles, and push the bit into the wood until the bearing makes contact as you also begin moving the router along the edge. You should hear the motor's pitch change slightly as it works. That's just what you want.



M Keep the router base pressed against the top of the workpiece. Don't worry if the bearing drifts away from the edge at times (above); you can clean up inconsistencies with another pass (below).



Tip! Remove just a "whisper" of material on the last pass to reduce friction and remove burn marks. If you've already routed to finished depth, lightly trim the burned edge with a hand plane, jointer, or tablesaw and rout the last pass again.

Proper feed speed is something you develop with experience, and it varies with wood species, so practice on scrap for your first passes. Too fast, and you increase chances of chip-out. Too slow, and you may burn the edge [Photo O]. Slowing as you prepare to turn a corner is a common cause of burn marks.

If you need to rout deeper than $\frac{3}{16}$ " using a fixed-base router, take several passes, lowering the bit no more than $\frac{3}{16}$ " between each pass to reach the final depth [Photo P]. A

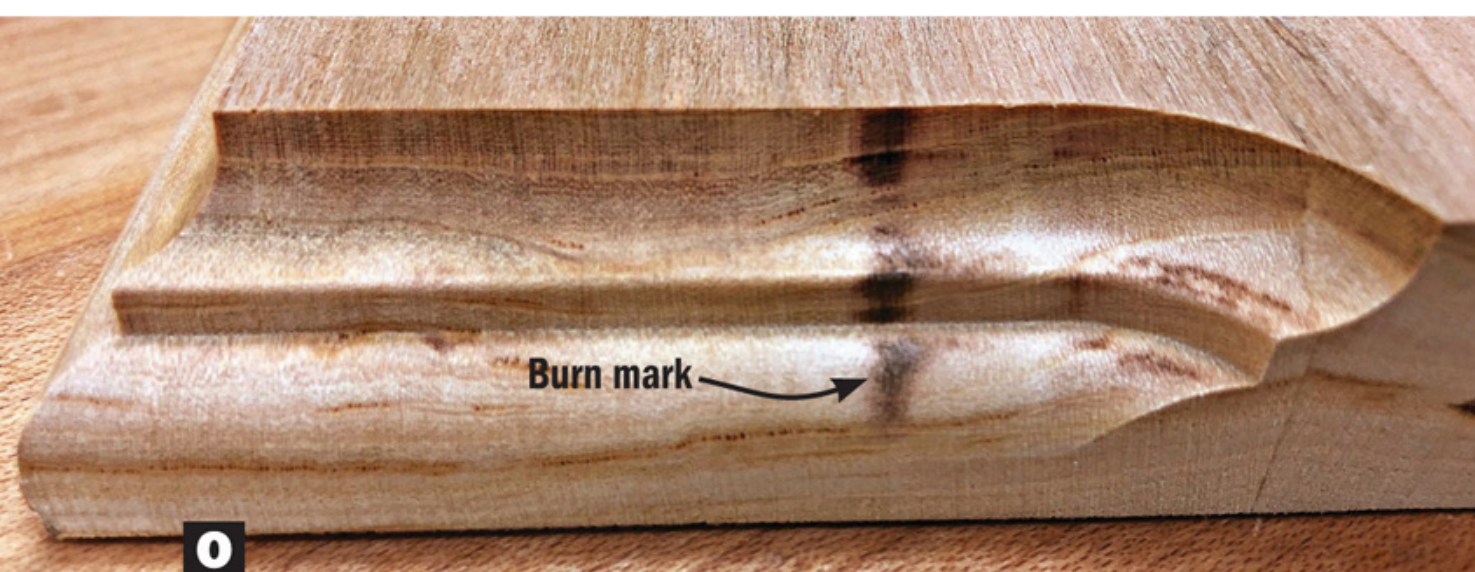
plunge router offers an easier way, using the depth-stop turret [Photos Q, R].

Get guidance

Using a bit without a bearing requires some method of guiding the router. Mount an edge guide to the router base [Photo S], or clamp a straightedge to the workpiece [Photo T].

Mastering the use of a router opens up a world of decorative project possibilities as well as time-tested and functional joinery solutions. 🌲

► Get a plan for a shop-made edge guide.
woodmagazine.com/edgeguide



O Burn marks can be difficult to remove. Changing your stance or grip as you rout can cause a pause, resulting in a burn.



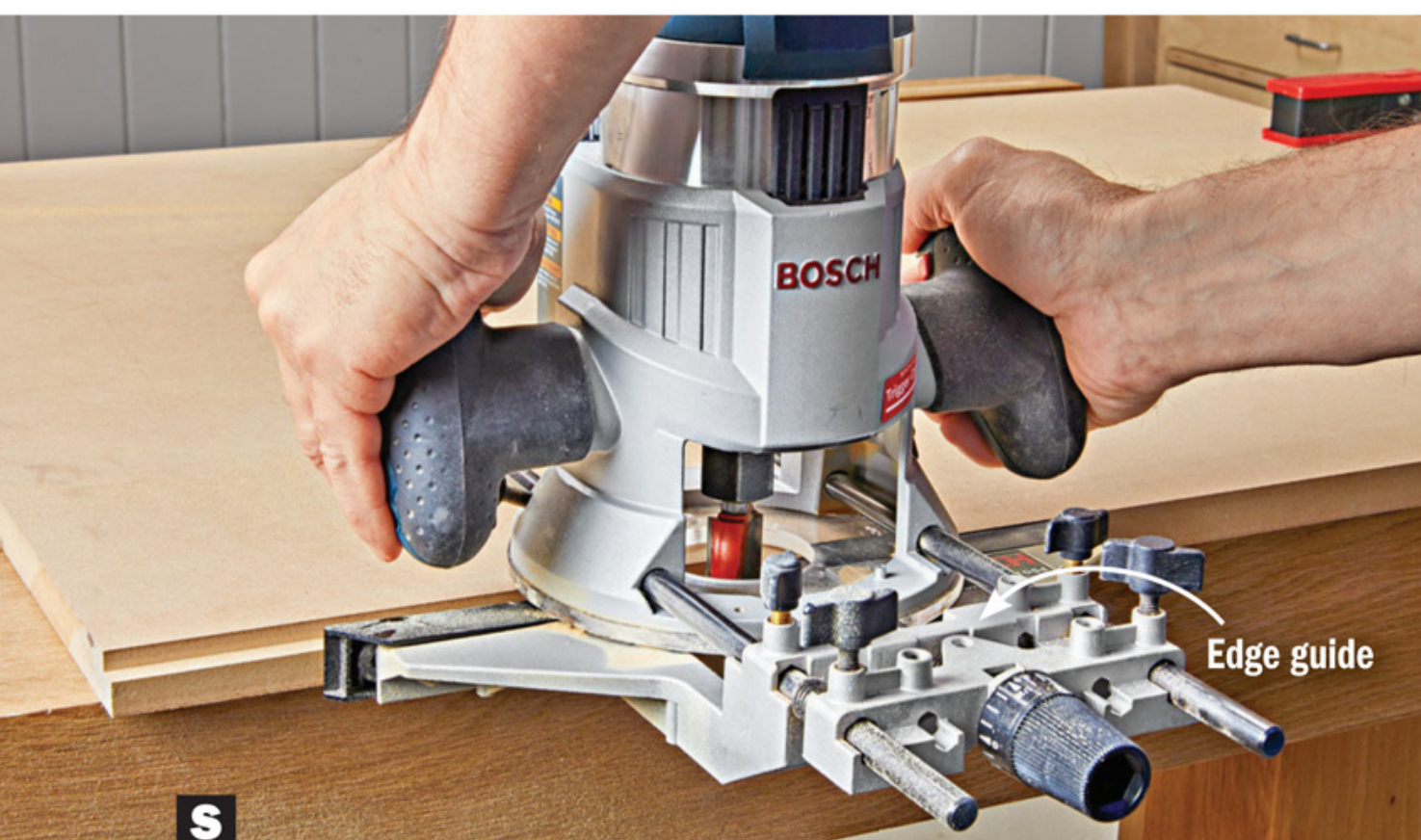
Q For a three-step cut, first plunge the bit to the final depth. Rotate the turret to one of its lower steps and adjust the depth-stop rod to contact it.



P Routing this deep profile in three progressively deeper passes resulted in a smooth edge with no burning or chip-out.



R Rotate the turret two steps to a higher step, and make the first cut. Then, rotate the turret and make a deeper pass. One more pass at the original turret step will complete the profile.



S An edge guide indexes the bit a set distance from the workpiece edge, creating a cut parallel to the edge.



T Ride the router base against a straightedge to cut a dado or groove in a workpiece.

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Tailored Tool Tower

Organizing your tools can be a tall order. Build a caddy that's up to the challenge.

Without a place to call home, tools can end up heaped on a shelf or shoved into a shop corner. The simple but sturdy drawers of this organizer tackle your tool troubles while taking up only 3½ square feet of floor space. We designed this tower to hold six full-extension drawers—the two bottom ones for your largest, heaviest tools. If that's not what you need, simply vary the spacing and number of drawers to suit your needs.

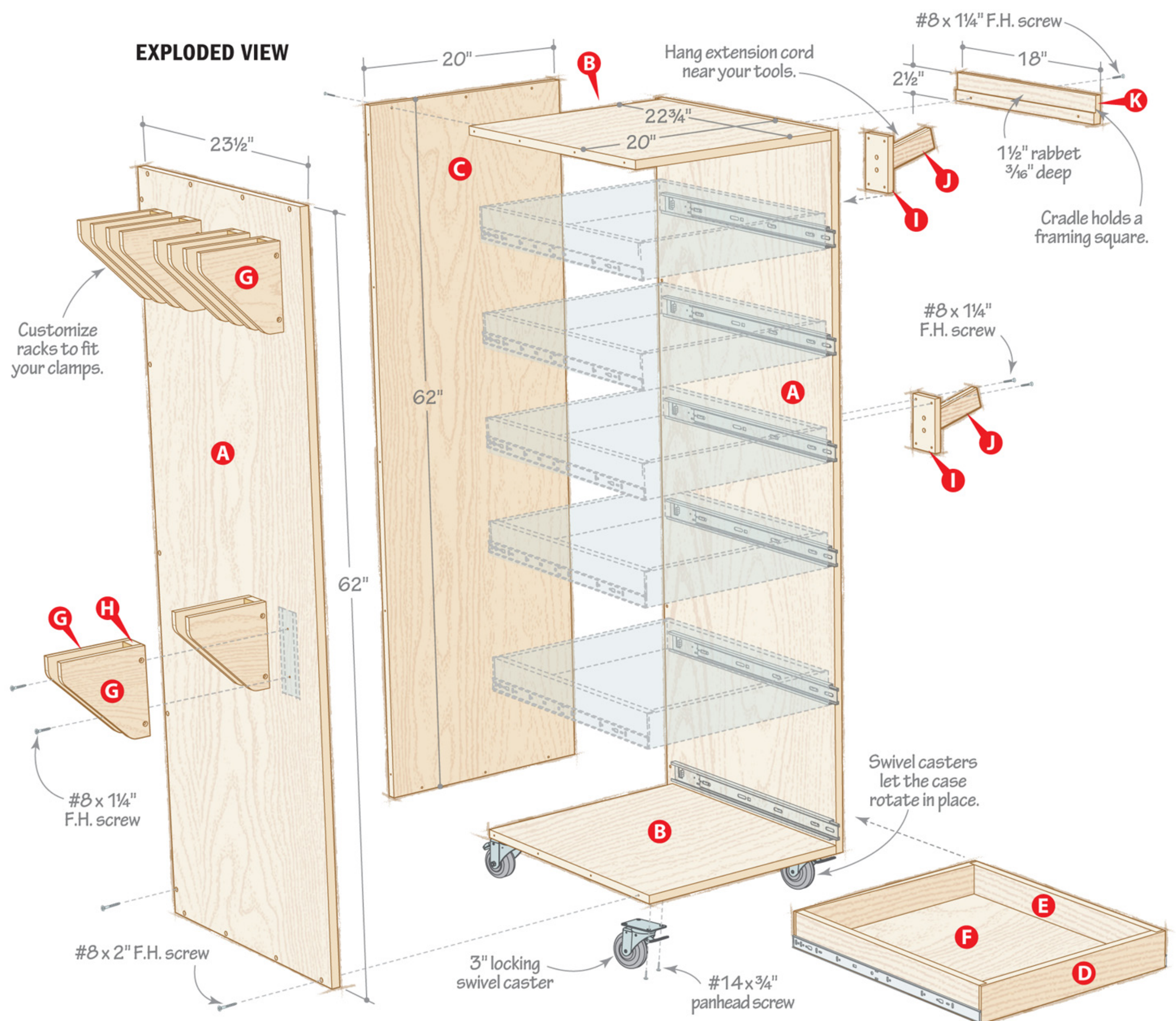
Build a first-place case

1 Cut the sides (A), top and bottom (B), and back (C) [Materials List]. Glue and screw the sides to the top and bottom, flush at the front [Exploded View].

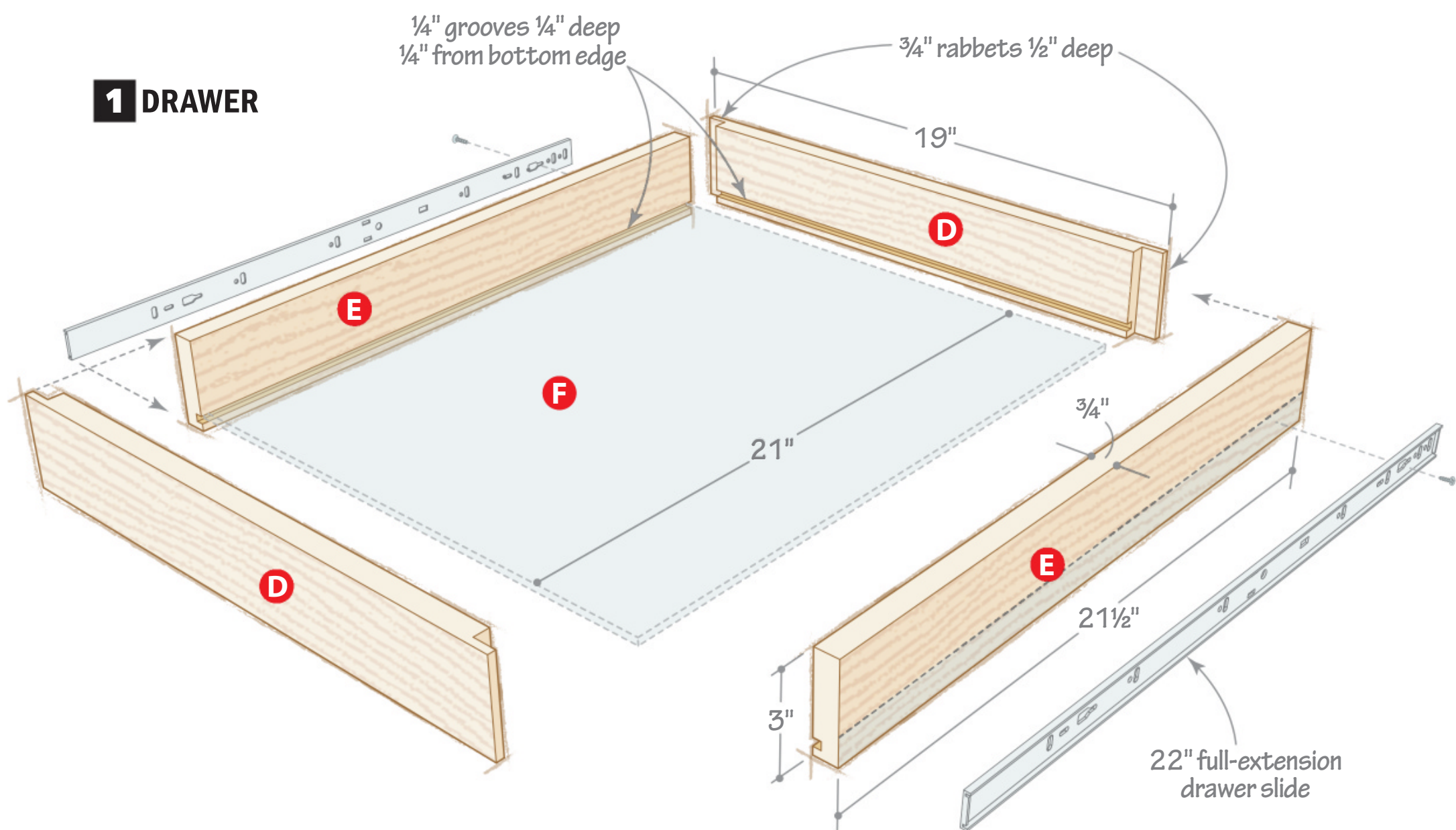
2 Check the case for square and glue and screw the back (C) to the top and bottom (B). Then drive screws through the sides (A) and into the back.

► There's more than one way to square an assembly.

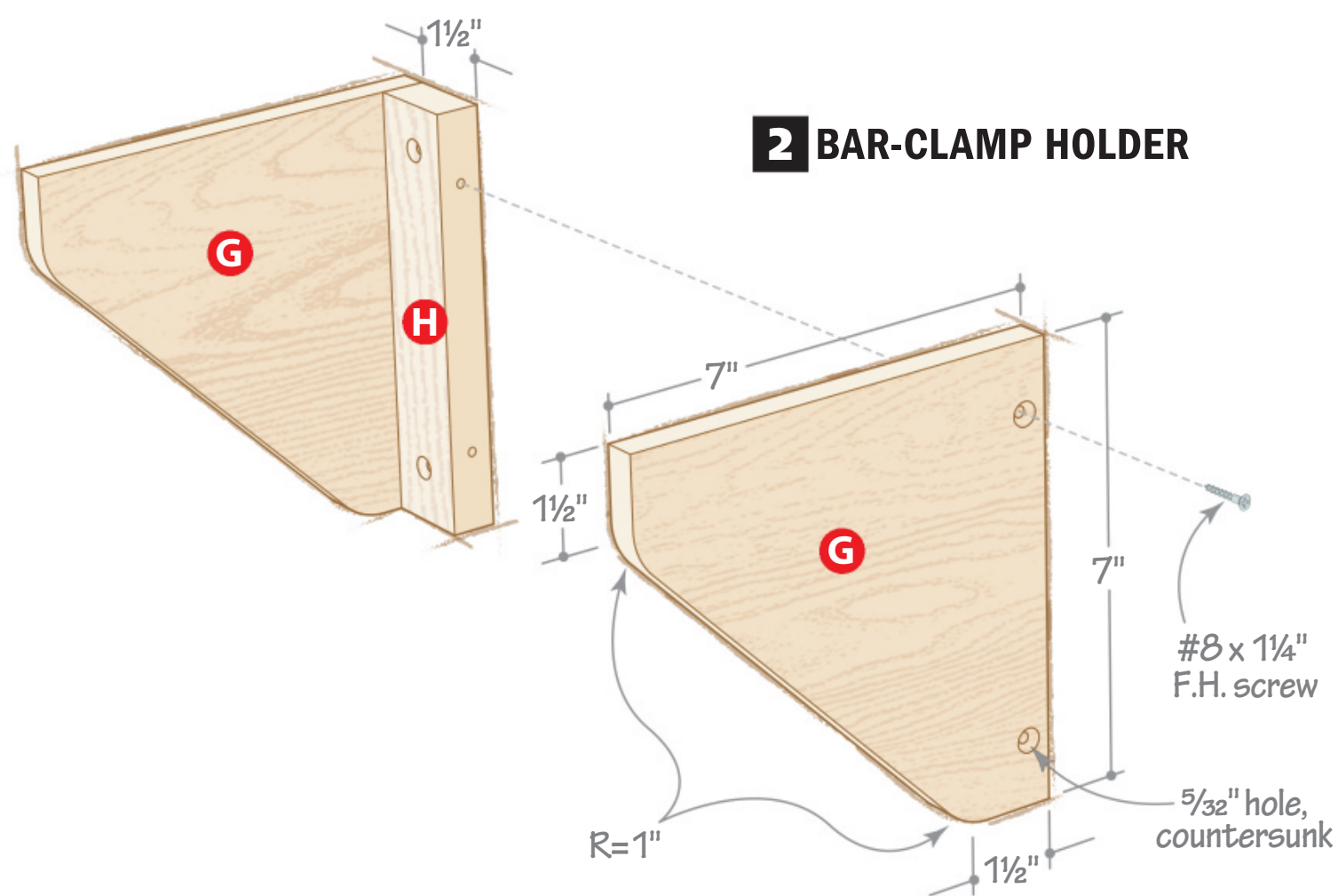
woodmagazine.com/square



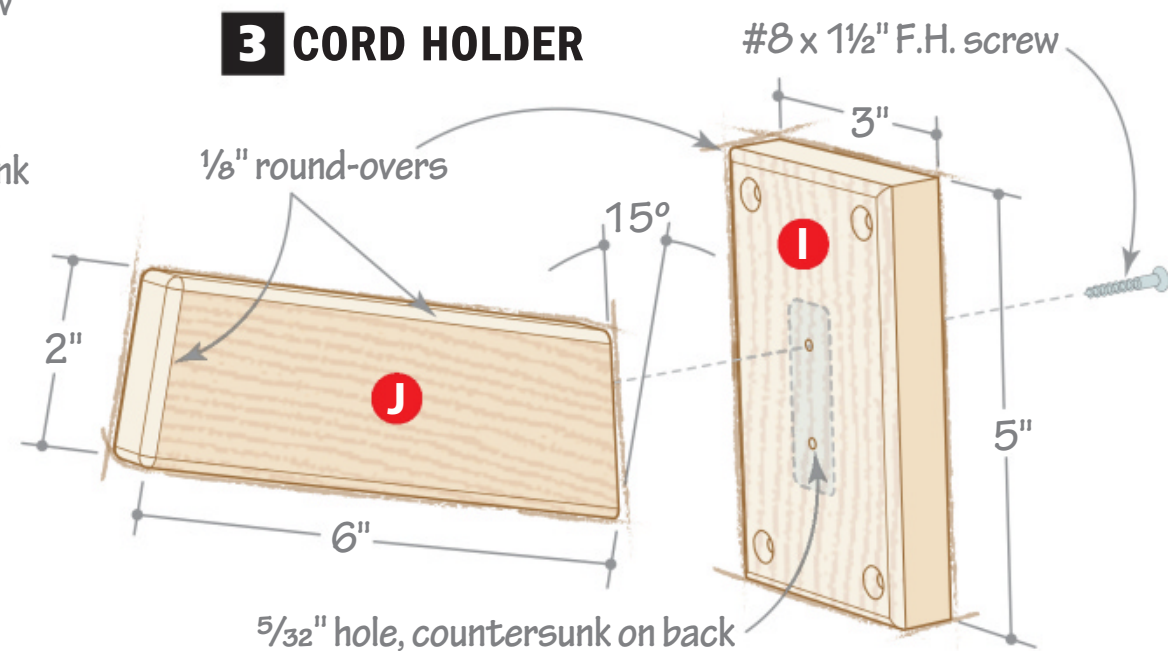
1 DRAWER



2 BAR-CLAMP HOLDER



3 CORD HOLDER



► Rabbet with a router.
woodmagazine.com/routerrabbet

3 Cut the drawer parts (D, E, F), rabbet the fronts and backs (D) [Drawing 1], then cut the 1/4" drawer-bottom grooves in the fronts, backs, and sides.

4 Glue and clamp the drawers together with the bottoms (F) glued in place, making sure they are square. Stack them on a flat surface to dry.

5 Cut as many clamp-holder sides (G) and plates (H) as you require [Drawing 2]. (We made six holders.) Drill countersunk

mounting holes in the plates. Sand the corners round and glue and screw the sides to the plates.

6 Cut the cord-holder plates (I) to size and drill the mounting holes. Cut the pegs (J) to length with one mitered end, then round over the edges and end [Drawing 3]. Glue and screw the pegs to the plates.

7 Cut the square cradle (K) to size, rabbet one face as shown [Exploded View], and drill countersunk mounting screw holes.

Tip! Instead of rabbeting the square cradle (K), make one by gluing 1/2x2 1/2x18" and 1/2x1x18" boards with the bottom edges flush.



A Rest the drawer slide on a 1/2" spacer with the front end 1/2" from the front edge of the side (A). Then screw the slide in place.



B Rest the drawer spacer and drawer slide on the bottom drawer side (E) while you screw the inset slides to both sides (A).



► Learn the fine points of installing drawer slides.

woodmagazine.com/drawerslidevid

Make a handy slide guide

1 Finish-sand the case, drawers, and accessories, and apply a finish. (We used three coats of waterborne satin polyurethane.)

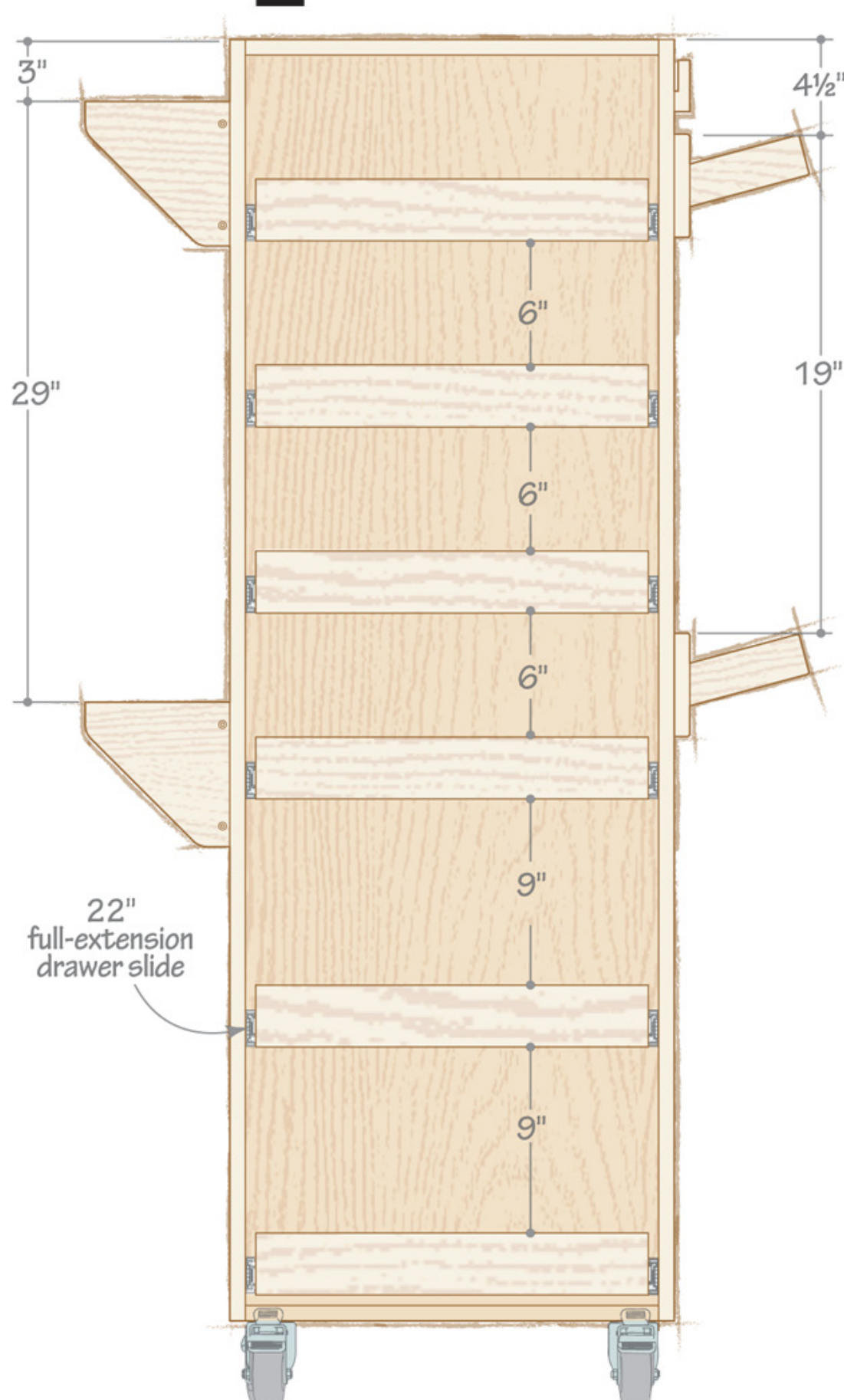
2 Separate the drawer slides and mount the drawer members to the drawer sides (E) flush with the drawer side bottom edges and the front faces of the drawer fronts (D).

3 Cut a 1/2"-thick spacer to support the bottom drawer-slide case members as you hold them against the case sides (A) [Photo A]. After securing the slides, install the bottom drawer.

4 Cut a 9"-tall spacer long enough to support a drawer slide and use it to position the second-drawer slides [Drawing 4, Photo B]. Insert the drawer and repeat to install slides for the third drawer.

5 Rip the spacer to 6" and repeat the previous step three more times to install the remaining drawer slides, inserting drawers as you go.

4 DRAWER LOCATIONS



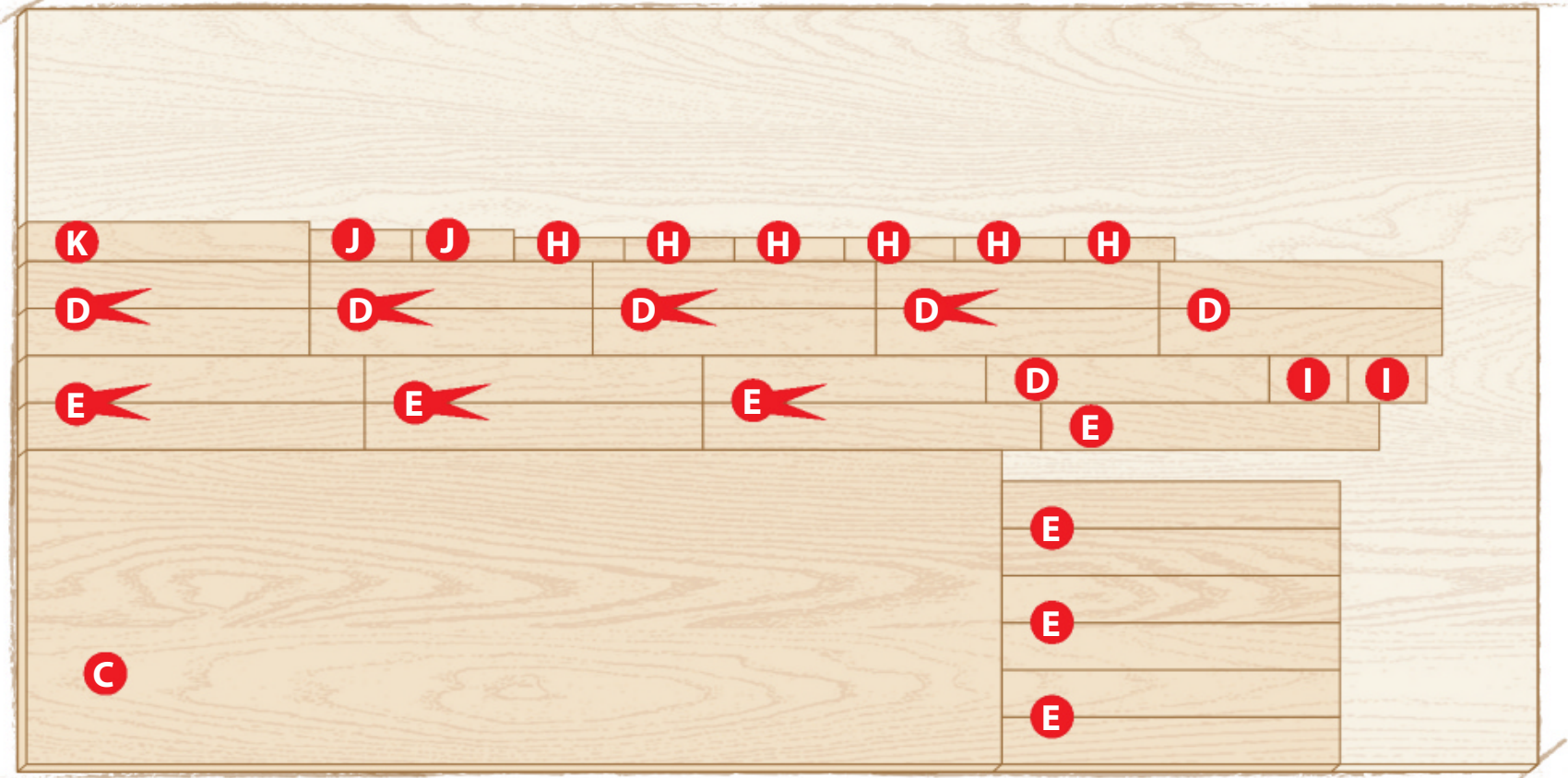
6 Turn the tower on its back and fasten the casters at the corners of the bottom (B). With the case upright, screw the clamp holders (G/H), cord holders (I/J), and square holder (K) where needed. Now untangle that clutter of tools and give your shop a tower of power. 🌲

Produced by **Robert Wilson** with **Kevin Boyle**
Project design: **Kevin Boyle**
Illustrations: **Roxanne LeMoine, Lorna Johnson**

Cutting Diagram



3/4 x 48 x 96" Plywood



3/4 x 48 x 96" Plywood



1/2 x 24 x 48" Plywood



1/4 x 48 x 60" Plywood

Materials List

Part	FINISHED SIZE			Matl.	Qty.
	T	W	L		
A cabinet sides	3/4"	23 1/2"	62"	Ply	2
B cabinet top/bottom	3/4"	22 3/4"	20"	Ply	2
C cabinet back	3/4"	20"	62"	Ply	1
D drawer front/back	3/4"	3"	19"	Ply	12
E drawer sides	3/4"	3"	21 1/2"	Ply	12
F drawer bottoms	1/4"	21"	18"	Ply	6
G clamp-holder sides	1/2"	7"	7"	Ply	12
H clamp-holder plates	3/4"	1 1/2"	7"	Ply	6
I cord-holder plates	3/4"	3"	5"	Ply	2
J* cord-holder pegs	3/4"	2"	6"	Ply	2
K square cradle	3/4"	2 1/2"	18"	Ply	1

*Part initially cut oversize. See the instructions.

Materials key: Ply-plywood.

Supplies: #8 x 1 1/4" flathead screws, #8 x 1 1/2" flathead screws, #8 x 2" flathead screws, #14 x 3/4" panhead screws.

Blade and bit: Dado set; 1/8" round-over router bit.

Source: 3" locking swivel casters, no. 25985, \$30 per pair (2 pairs); 22" Accuride 100-lb, full-extension drawer slides, no. 66935, \$14.49 per pair (6 pairs), Rockler, 800-279-4441, rockler.com.

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Beefy and Beautiful Bench

Turning the legs 45° inward adds visual interest—without complicated joinery.

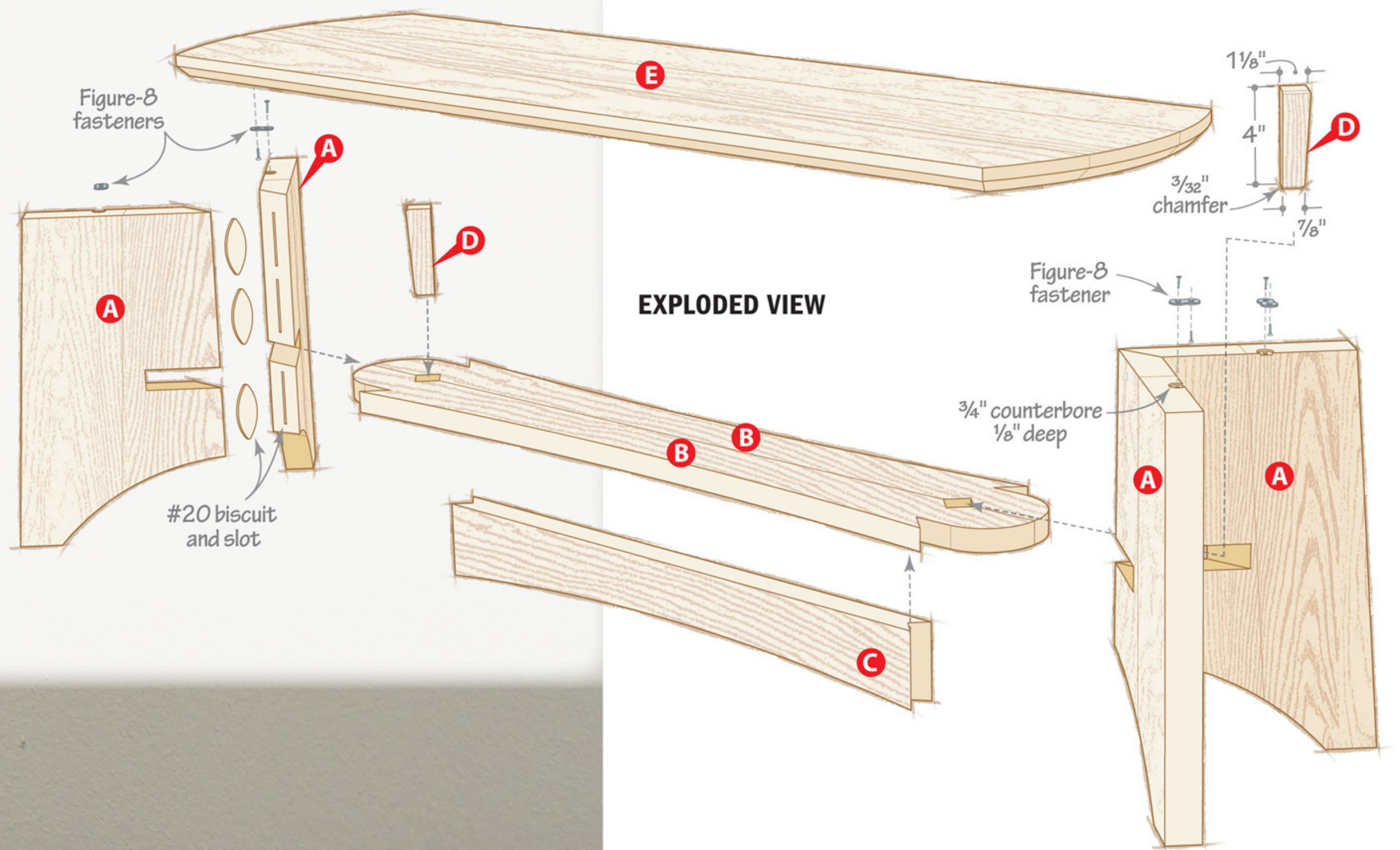
This bench punches (or rather, seats) well above its weight, thanks to hefty legs angled to extend support inward. The arched stretcher ties those sturdy legs together with wedged through tenons, and the curve of the leg arches continues along the beam below the stretcher, lightening the appearance of the bench.

D I M E N S I O N S :
50" W × 14½" D × 17" H

Approximate materials cost:

\$150

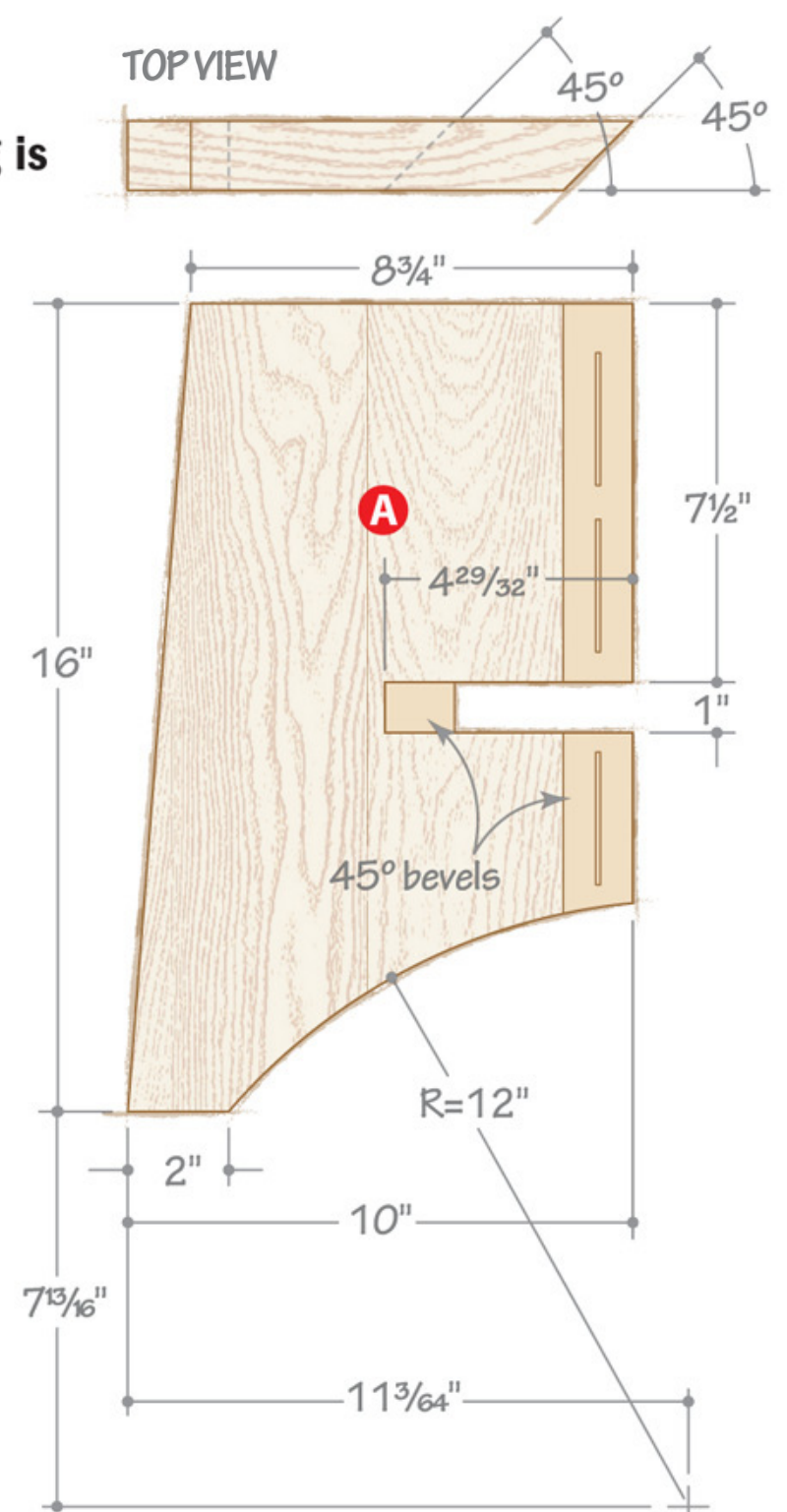
Just
10
parts



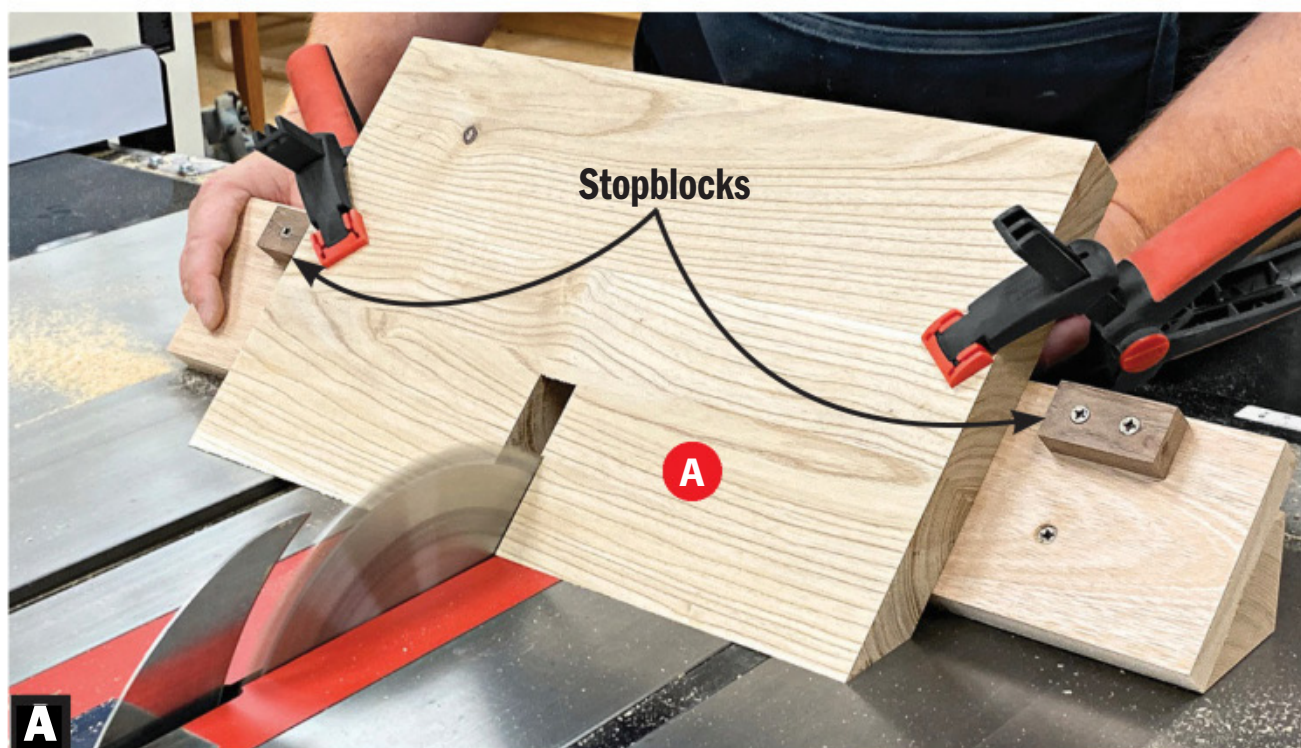
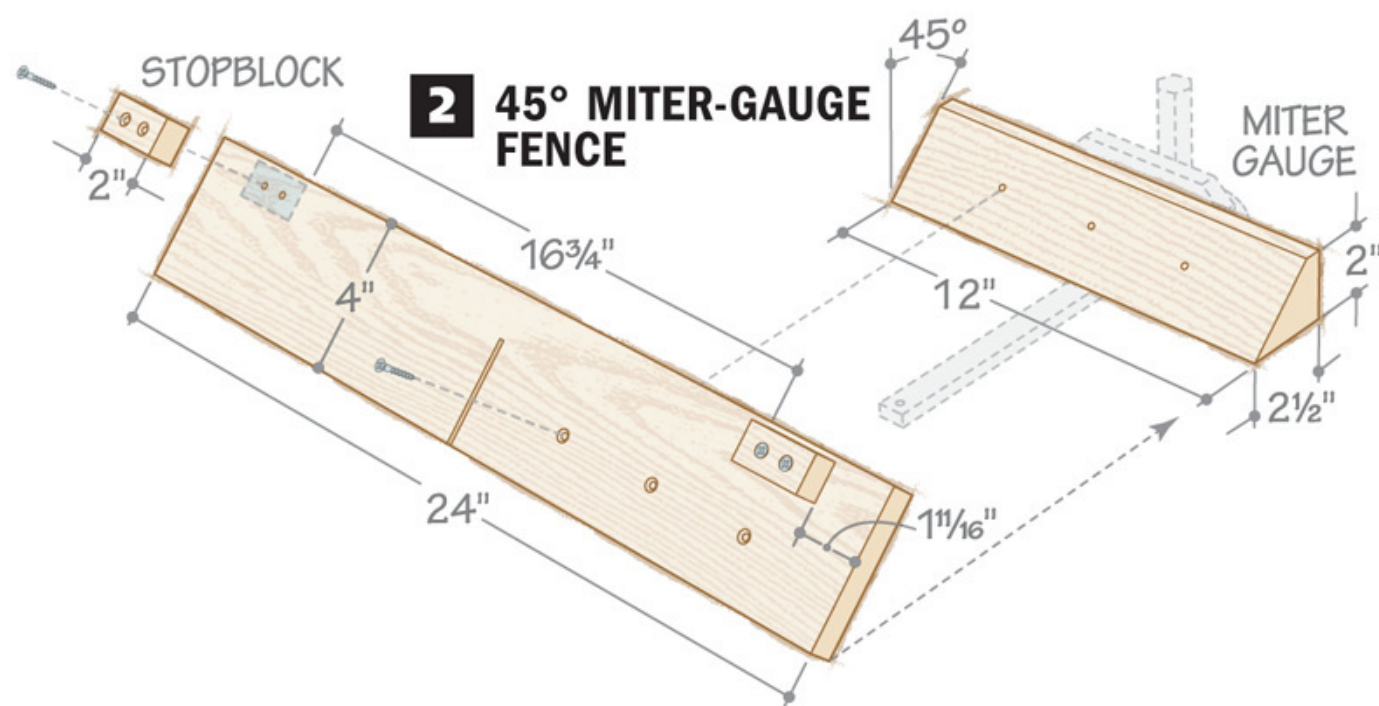
Start with the legs

1 Glue up and cut to size blanks for each leg (A). Pair up the legs and bevel-rip the mating edges at 45° [Drawing 1].

1 LEG (Adjoining leg is a mirror image)



2 Lay out the notch on one leg [Drawing 1]. Make a 45° miter-gauge fence [Drawing 2] and attach stopblocks to it to align the lay-out marks with the blade. Notch each leg [Photo A].



A Make a 2½"-deep cut with the leg against one stopblock, then make additional cuts widening the notch until the leg contacts the other stopblock.

3 Lay out the arch on each leg. Then, mark and cut the biscuit slots [Drawing 1, Photo B]. Jigsaw or bandsaw the arches, and sand them smooth.

4 Glue up the legs into L-shape assemblies [Photo C].

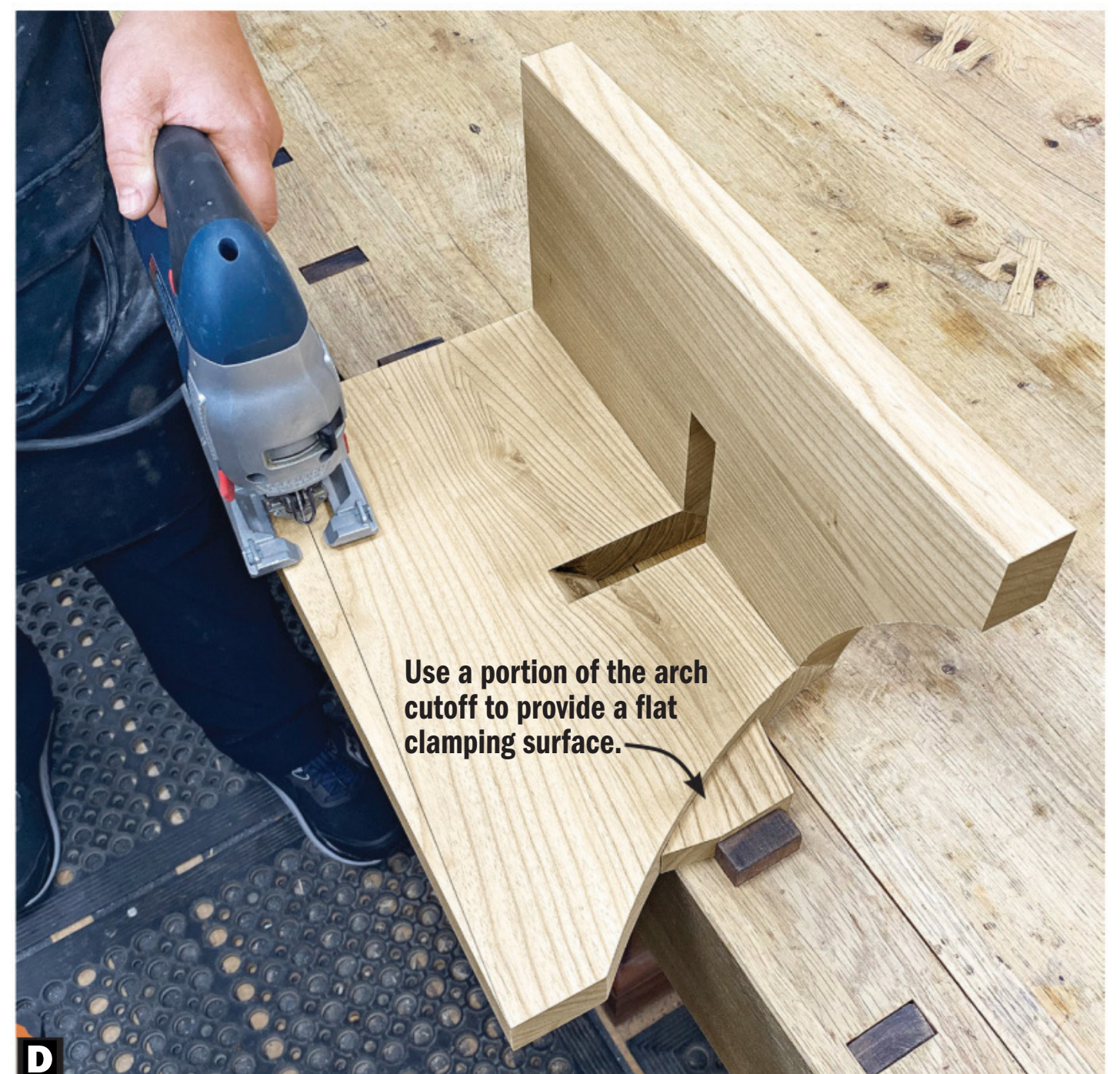
5 After the glue dries, taper the outside edges of the legs [Drawing 1, Photo D].



B Cut two slots above the notch and one below making sure you stay clear of the arch that will be cut in each leg.

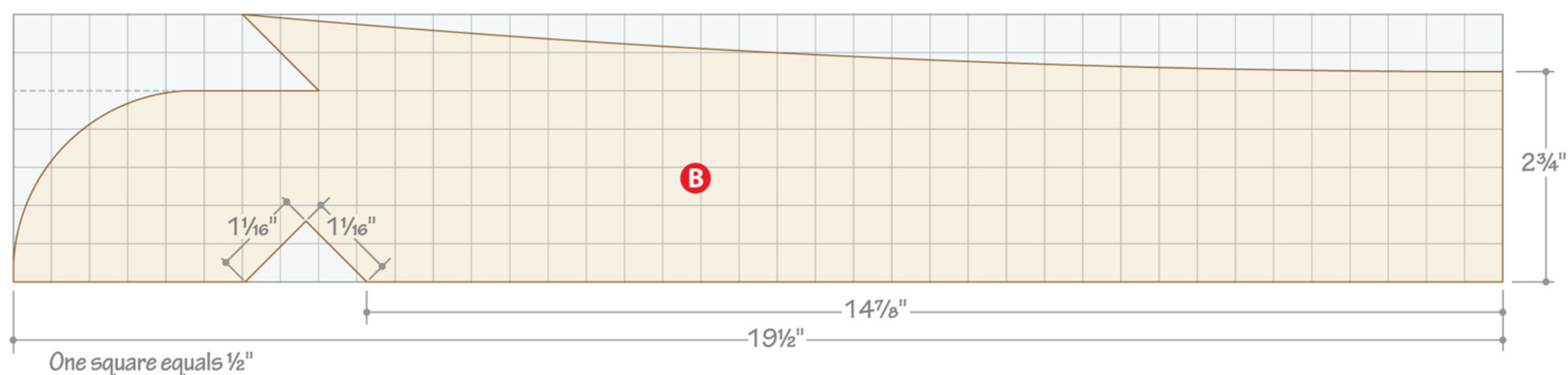


C Clamp the paired legs from both directions, aligning the notches. Biscuits help keep the miters aligned.



D Jigsaw or bandsaw the tapers, then plane and sand them smooth. Lightly sand the tapered edges and the arch to ease the sharp corners.

3 STRETCHER GRIDDED HALF-PATTERN



Tie your legs together

1 Cut the stretcher halves (B) to size [Materials List]. Lay out the notches on each end and edge [Drawing 3], but ignore the curves for the time being.

2 Cut the stretcher tenons, and notches for the wedges [Photos E–G].

3 Glue the stretcher halves together, aligning the notches and keeping the faces flush. After the glue dries, lay out and cut the curves on each end and along the edges [Drawing 3].

4 Retrieve the legs and dry-fit the stretcher between them. Fine-tune the fit as needed and lightly mark the stretcher on both sides of each leg. Remove the stretcher, apply glue to the angled shoulders of the tenons and between the marks, and clamp the legs to the stretcher.

► Lay out curves easily with a fairing stick.
woodmagazine.com/fairingstick



E Make the tenon shoulder cut with the miter-gauge fence at 45°. A stopblock on the fence ensures uniform cuts at each end.



F To rip the tenon to width, set the fence for a 2 1/2"-wide cut. Don't cut past the intersection with the shoulder cut.



G To form the notch for the wedge, make one cut at each end of each stretcher half, then reset the miter gauge and stop, and make the intersecting cut.

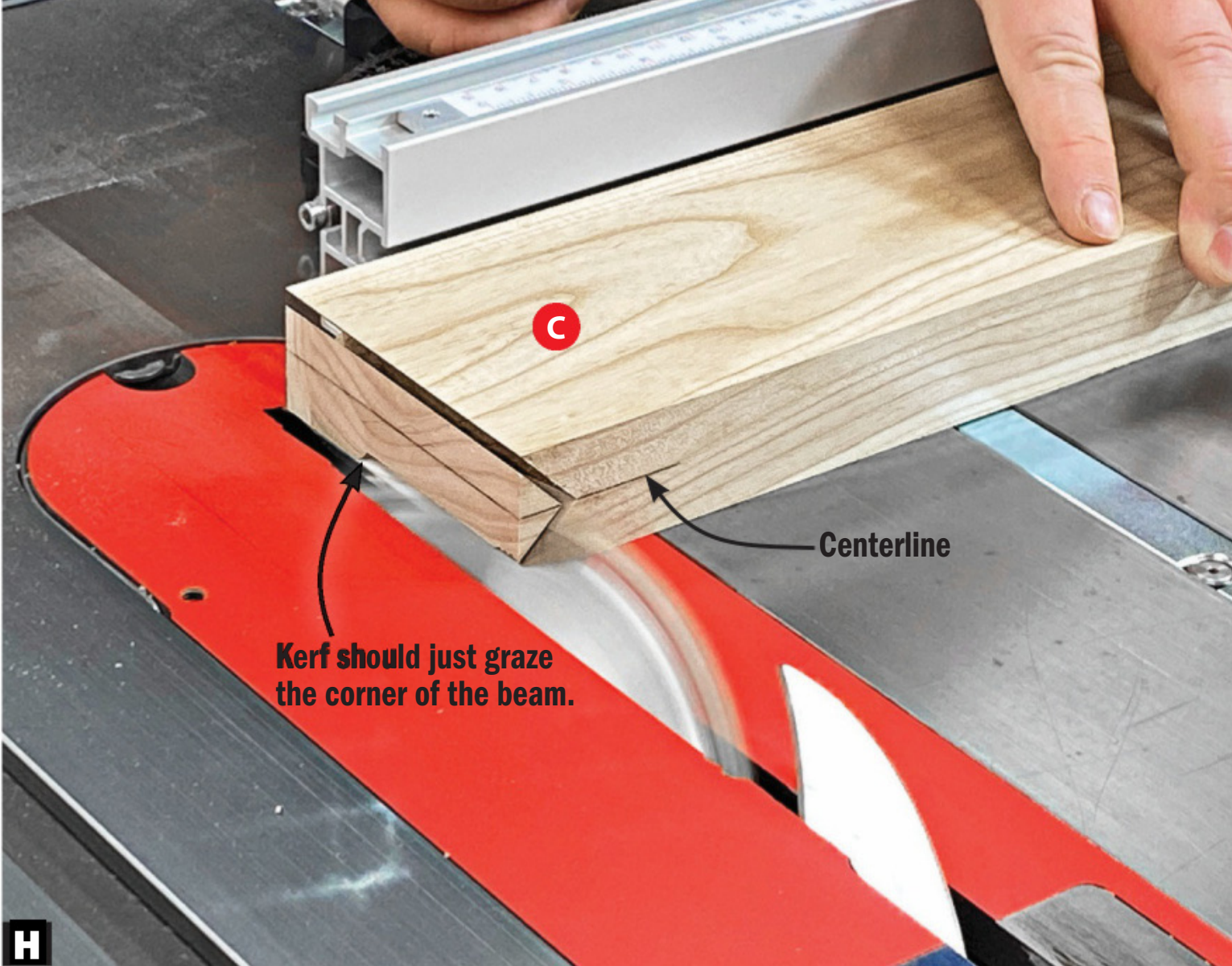
Time for reinforcements

- 1 Cut to size the beam (C) [Drawing 4] and cut the birdsmouth on each end [Photo H].
- 2 Cut and sand the arch on the bottom edge of the beam. Glue the beam to the stretcher and legs.
- 3 Cut the wedges (D) to shape and chamfer the ends [Exploded View]. Finish-sand the wedges and set them aside.

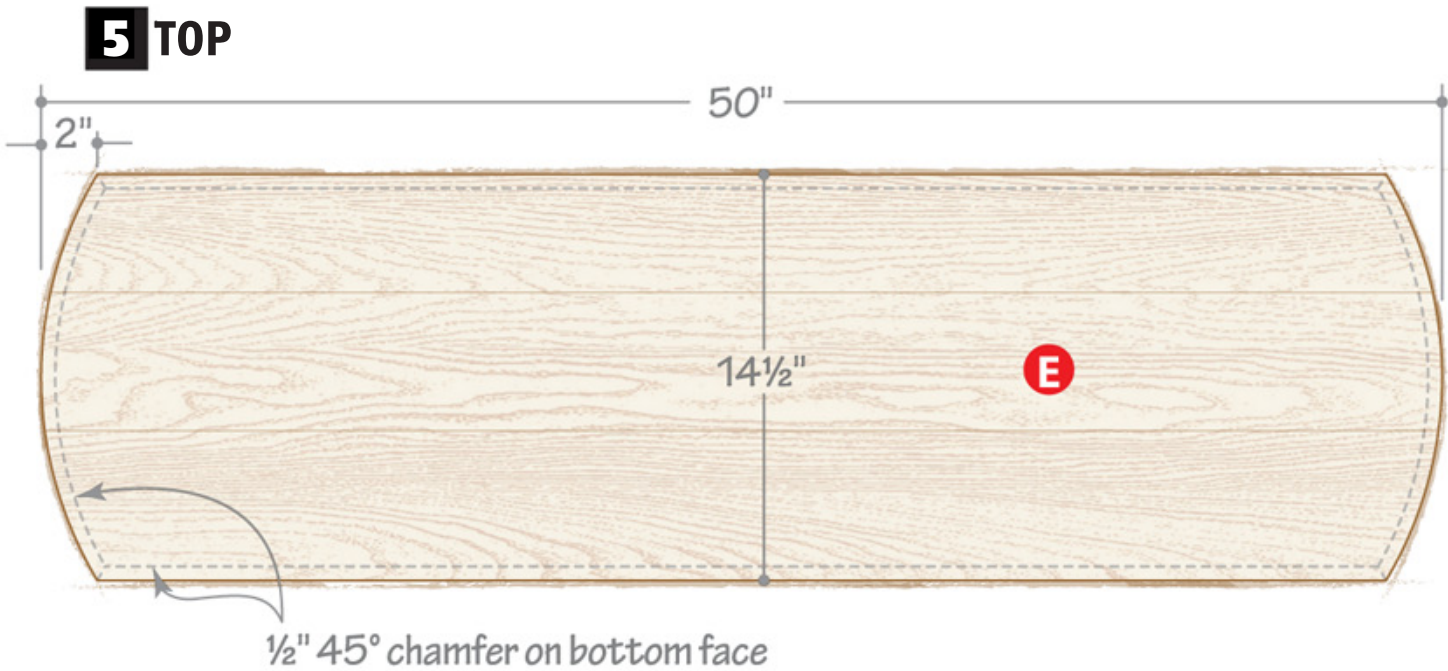
Top it off

- 1 Glue up a panel for the top (E) and cut it to size and shape [Drawing 5]. Chamfer the bottom face and finish-sand the panel.
- 2 Drill counterbores for figure-8 fasteners centered on the width of each leg [Exploded View]. Drill pilot holes and screw the fasteners to the legs.
- 3 Turn the top (E) over and center the base assembly on it. Drill pilot holes through the fasteners, but don't secure the top to the base yet.
- 4 Apply a finish to all pieces. (We sprayed on three coats of satin lacquer, with a fourth coat on the top [E]).
- 5 After the finish dries, tap the wedges in place, screw the top to the base, and park your new bench wherever you like. 🌳

Produced by **Craig Ruegsegger** with **John Olson**
Project design: **John Olson**
Illustrations: **Roxanne LeMoine, Lorna Johnson**



H Tilt the blade to 45° and make successive cuts, raising the blade slightly each time until the low side of the kerf hits the centerline of the beam. Attach a stopblock to the auxiliary fence and make the remaining cuts.



Cutting Diagram



1½ x 5½ x 96" Ash *Plane or resaw to the thicknesses listed in the Materials List.



1½ x 5½ x 72" Ash



1½ x 7¼ x 48" Ash



1½ x 5½ x 60" Walnut (3 needed)

This project requires approximately 14 board feet of 6/4 ash and 11 board feet of 6/4 walnut.

Materials List

Part	FINISHED SIZE			Matl.	Qty.
	T	W	L		
A legs	1 3/8"	10"	16"	A	4
B stretcher halves	1"	3 1/2"	39"	A	2
C beam	1 3/8"	3 1/2"	27 3/8"	A	1
D wedges	1 1/8"	1 1/8"	4"	W	2
E top	1"	14 1/2"	50"	W	1

Materials key: A-ash, W-walnut.
Supplies: #20 biscuits, figure-8 fasteners (4), #8 x 3/4" flathead screws.

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- Nancy V.



GO Features!

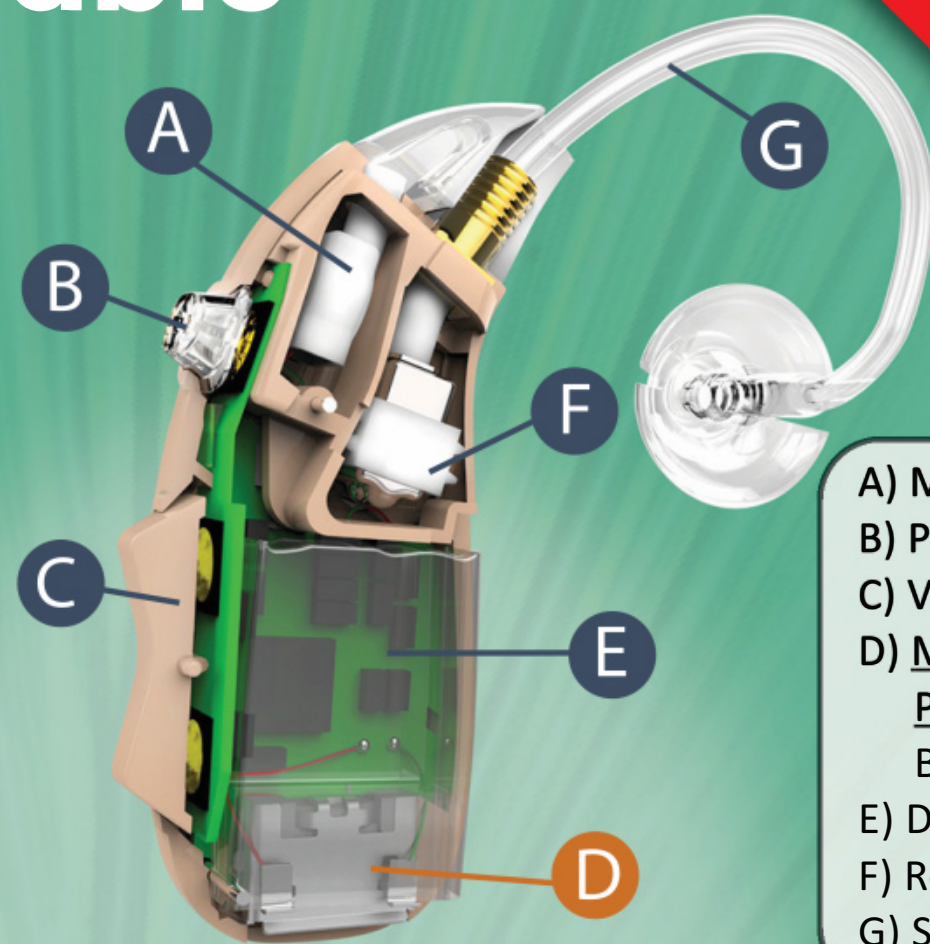
- ✓ Digital sound processing chip provides **crystal clear sound and makes speech easier to understand** with less feedback than old analog technology
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- G) Sound Tube

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Prepping Stock with Hand Tools

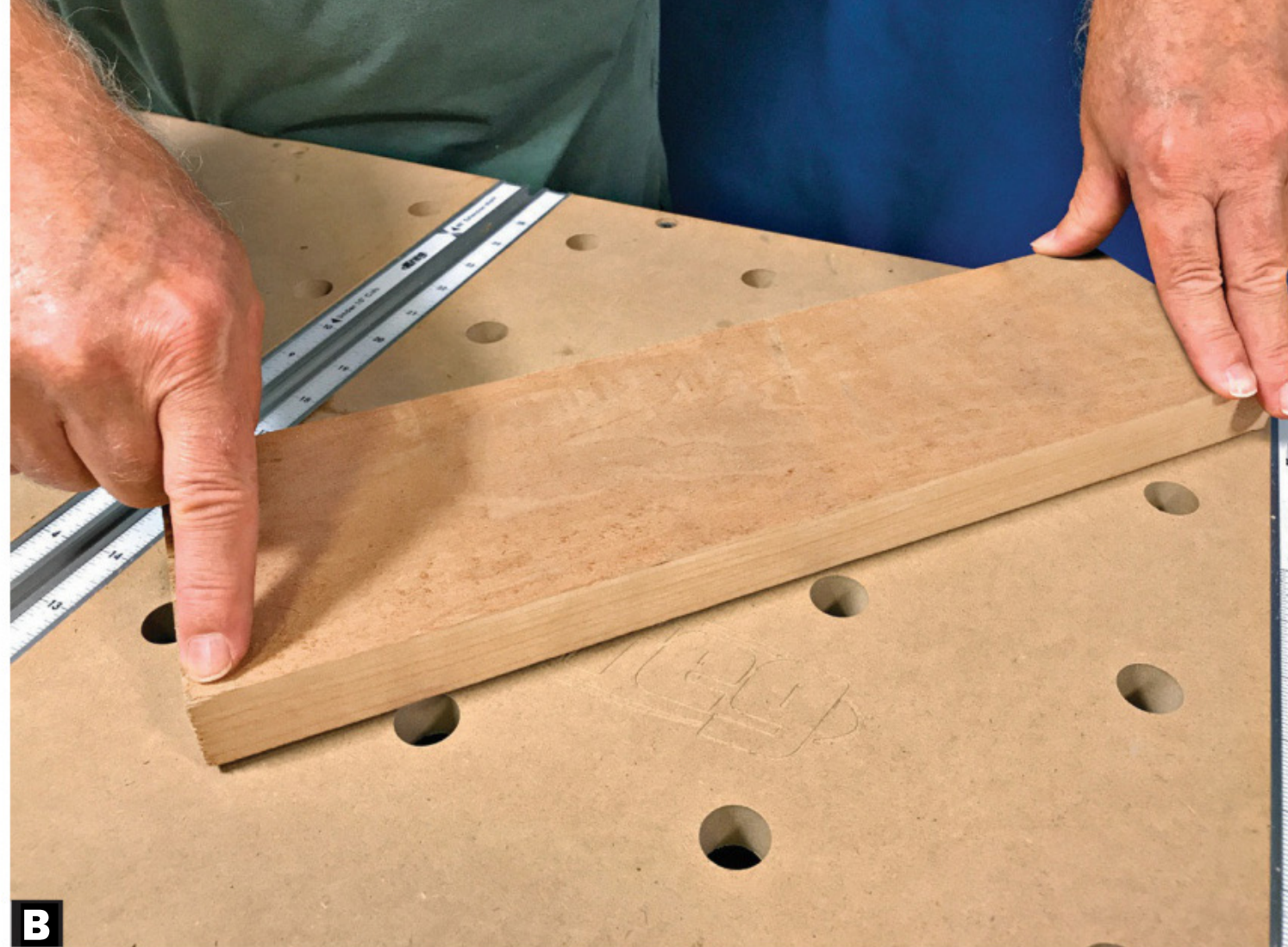
Even in a shop full of power tools, preparing stock using hand tools proves a valuable skill. For a workpiece too small to run through the planer or jointer, hand tools can get the job done. All you need is a solid workbench, a few common hand planes, a saw, and a shooting board or shop-

made bench hook. With these simple tools, you can true up a workpiece in no time. This process takes some practice, so hone your skills on scrap woods easy to plane, such as walnut, mahogany, clear pine, or poplar, before tackling woods with wild grain, such as maple.



A

Cut the piece to length guiding the saw on a shooting board or bench hook. The end of the cleat keeps the saw square and aligned with the cutline, which means less work when shooting the ends later.



B

This slightly twisted workpiece rocks on diagonal corners. A cupped board will show a gap in the center or rock on a high point somewhere between the ends of the board.

► Get plans for a bench hook.
woodmagazine.com/benchhook

Rough it, then flatten one face

Start by cutting your workpiece about $\frac{1}{8}$ " oversize in width and length [Photo A]. You'll trim to final dimensions as you plane the piece later.

Check the rough-cut workpiece for cup or twist by placing it on a flat surface and looking for gaps [Photo B]. Contact points indicate high spots on the face where material needs to be removed. Mark the general location of the high spots on the bottom face to provide a visual guide when shaving them down with a plane.

Before you begin planing, make note of the grain direction along the edge of the board. Orient the workpiece so the grain runs "uphill" with regard to the direction of the plane to eliminate tear-out that can occur when planing into the grain.

Secure the workpiece, marked side up, using bench dogs that act as a planing stop [Photo C]. For narrow pieces, a thin strip of wood between the workpiece and the dogs provides more bearing surface. Or clamp the workpiece using a tail vise.

Using a sharp hand plane, begin paring down the high spots. A no. 3 or no. 4 smoothing plane proves ideal for this job. Its smaller size makes it easy to concentrate short strokes in just the high areas. Check your progress periodically with a straight-edge or by sighting along the corner of the plane's sole [Photo D].

When the face nears flatness, switch to a hand plane with a longer body, such as a no. 5 jack plane. The longer sole contacts more of the board's surface, acting like the bed of a power jointer to ensure a flat face. As a

Tip! Put a bit of wax on the sole of the plane to help the plane move more smoothly.

► Learn how to tune and set up a hand plane.
woodmagazine.com/tuneplane

► Ensure your planes are SHARP.
woodmagazine.com/waterstones



C

Focus first on the high spots, taking note of the grain orientation in relation to the direction of the hand plane.



D

Tilt the plane on its edge to use the sole as a straightedge. Sight underneath to look for gaps, mark the high spots, and keep working on those spots.

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general rule, the longer the plane, the flatter the surface will be.

As you make overlapping strokes with the grain, working your way across the width of the board, you'll eventually see the shavings becoming longer and wider until you create full-width shavings the entire length of the board. At this point, you have flattened the face of the workpiece. Mark this face [Photo E] to identify it as the reference surface for squaring the edges and planing the opposite face smooth, parallel, and to final thickness.

Square up one edge

To smooth and square the edge to the reference face, choose a no. 5 or longer plane. Make a couple of passes with the plane until you generate a full-width shaving down the entire edge, using your hand to keep the plane square to the reference face [Photo F]. Periodically check for square [Photo G]. Make additional passes if needed, checking your progress, and either tilt the plane or cant the blade to compensate for any error. As before, mark this edge [Photo H].

Tip! Place a good light source behind the square to more easily see the light as it passes between the square and the board.

Parallel edges at final width

Next, plane the opposite edge parallel as you trim the workpiece to final width. Start by marking the width with a line down the reference face [Photo I].

Planing this edge follows the same process as squaring up the first edge, with one notable exception: Keep your eye on the layout line and make passes parallel to it. If you start to see a taper, concentrate more of the planing on the wider portion, making a longer stroke with each pass until the edge becomes parallel to the layout line.

As before, check your progress with a square, making sure you reference off of the original flat face. Work your way down until the plane just splits the line.



E Make a mark on the face near one edge to help you remember that this surface is now flat.



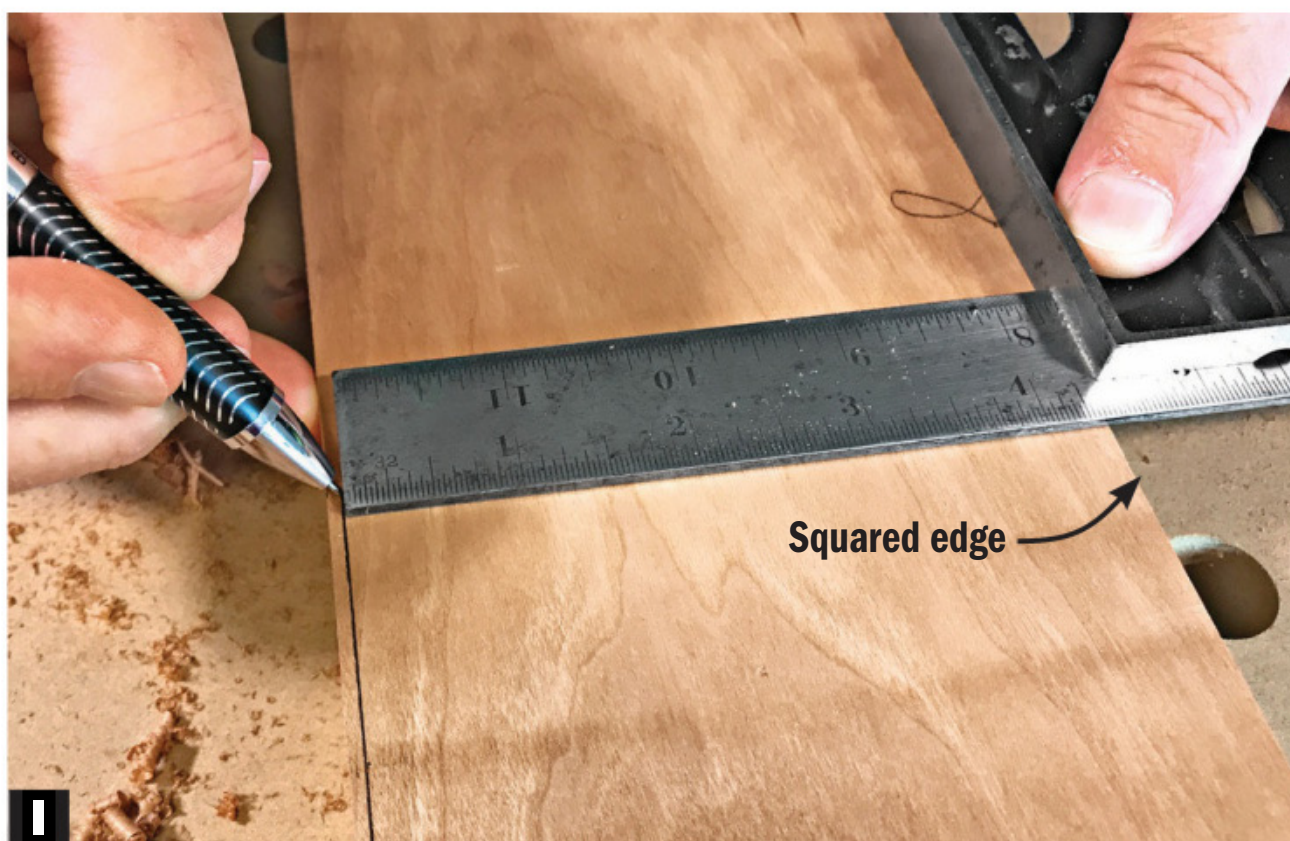
F Use your fingers as a fence. With the thumb of your leading hand on the top of the toe of the plane, your index finger acts as a guide when planing an edge.



G Tilting the plane created an edge out of square to the original reference face. Compensate by tilting the plane to remove the high edge, working your way down.



H Mark the squared edge adjacent to the face mark. This face and edge serve as references when trimming to final width and thickness.



I Use a combination square or marking gauge to strike the final width, making sure you reference from the squared edge.

► Square edges easily with a shop-made edge guide for your plane.
woodmagazine.com/planeedgeguide

SKILL BUILDER

Your bench gives you an edge

To help ensure a square edge, use your bench as a planing aid. This works well for a workpiece too long for a shooting board or bench hook.

With the reference face down, place a ¼" spacer under the workpiece. Press the end of the workpiece against bench dogs. With your plane lying on its side on the benchtop, trim the edge square.



With the workpiece elevated slightly, the full thickness of the workpiece contacts the plane blade.

Tip! When using a marking gauge along the grain, be careful the grain does not “push” your gauge. Avoid this by making several light passes to ensure the fibers are scored true to the reference face.

Let's face it

With one face flat and two edges square to it, plane the remaining face parallel to the first and bring the workpiece to uniform thickness. Mark the final thickness along both edges and both ends [Photo J].

For this task, start with a no. 5 plane. Depending on the amount of material to be removed, you may want to set the plane to take a thicker shaving. As you did on the reference face, check for high spots and flatten them first, being mindful of the grain direction. Gradually take longer strokes, eventually working across the width of the board. Watch the scribed lines and adjust accordingly to keep the face parallel to them.

For the last few passes, switch to a no. 3 or no. 4 smoothing plane set for a thin shaving. Make overlapping strokes with the grain to create a glass-smooth surface. Take this

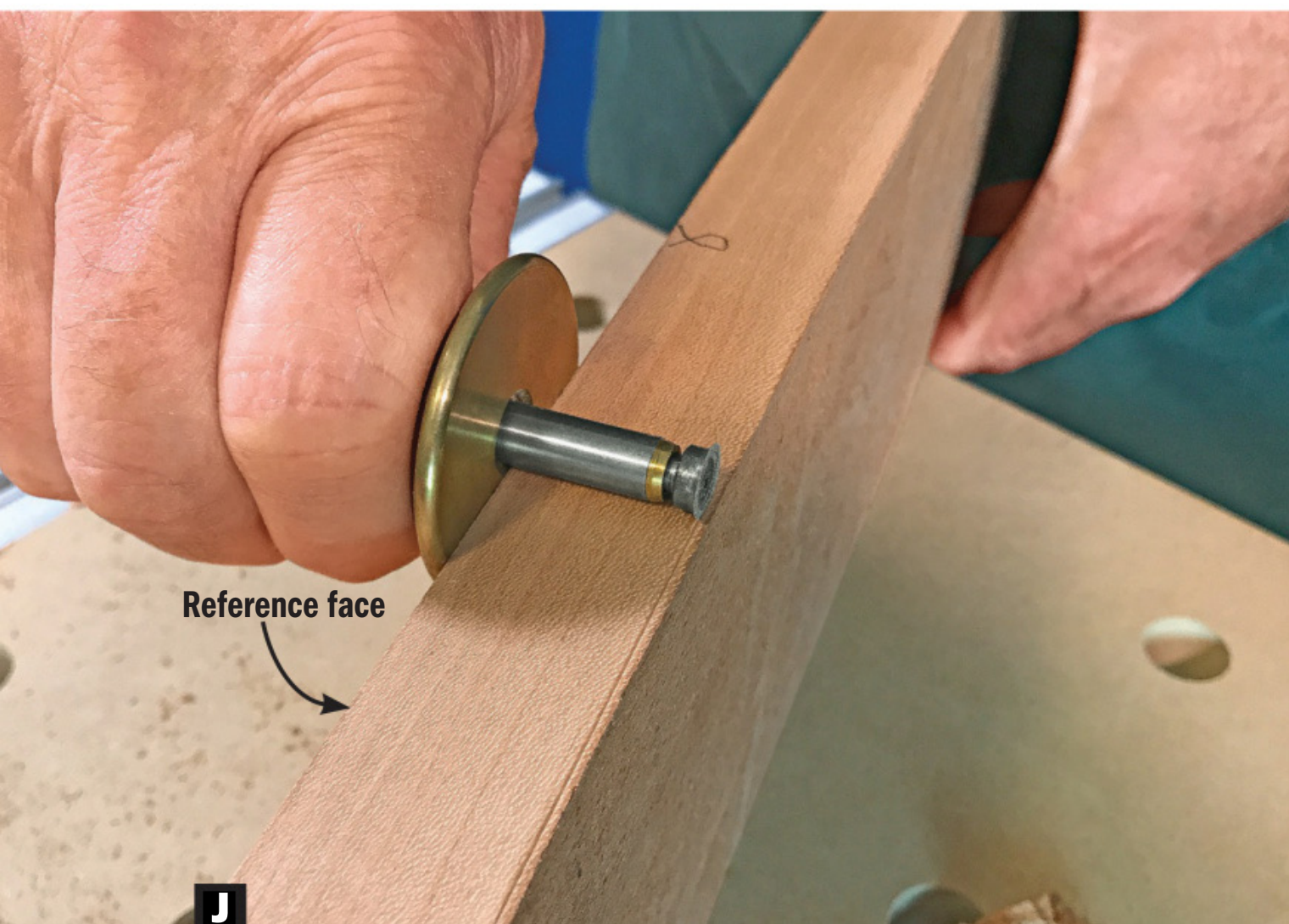
opportunity to also dress the other surfaces with the smoother if needed.

The means to the ends

With the faces and edges flat and square, it's time to square up the ends. As when cutting the board to rough length, a shooting board makes this job simple and precise. If you don't have a shooting board, a bench hook works just as well if the cleat is square to the edge where the plane will be used. The cleat of the shooting board holds the workpiece square to the sole of the handplane as it shaves the end grain [Photo K]. With a sharp hand plane, it doesn't take long to square up the ends and leave a smooth finish.

Squaring up a workpiece using hand tools can be quite a rewarding experience—it just takes a little practice. And it eliminates the noise and dust that power tools generate. 🌳

Produced by **Randy Maxey**



Reference face

J

A wheel marking gauge leaves a crisp, scribed line that serves as a visual stopping point when planing.



Shooting board

Cleat

K

A shooting board guarantees clean, square cuts along the end grain. The cleat backs up the workpiece preventing tear-out.

Big-spin Wood Lathes

When you're ready to step up from a benchtop lathe, these full-size machines have all the power, capacity, and features you'll likely ever need.

How we chose the field

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

- Stand on its own legs or base;
- 16–20" of swing (bowl diameter);
- At least 24" between centers (spindle length);
- Cost less than \$4,600.

A mini- or midi-lathe makes a great starter tool for new woodturners, and may be all the casual turner ever needs. But if you want to turn projects of larger diameters, such as bowls, platters, and hollow vessels, or simply need more power, step up to a full-size, floor-standing lathe.

We tested six big lathes to find the best of what turned out to be a good crop. Brian Simmons, *WOOD*® magazine's turning expert, put these machines through extensive testing. Here's what he found.

They've got the power

All but one lathe run on 220-volt motors rated at 2 hp. The Nova Galaxi DVR uses a 110-volt, 1¾-hp direct-drive motor—no pulleys and belt to transfer power to the spindle. To test each lathe's torque, we turned green maple bowl blanks, as large in diameter as would fit each model, making deep, aggressive cuts using a ½" bowl gouge. No matter how hard we tried, we could not bog down the Oneway 1640 or Powermatic 3520C. Three others slowed a little but never stalled. We were able to stall the Nova, but by backing off slightly to a more reasonable cut, it maintained speed much better.

It's all about that swing

For most turners, swing capacity—the maximum diameter workpiece you can turn over the bed—proves the most enticing feature with lathes of this size. The Powermatic provides a test-best 20" of swing, and all the models accommodate outboard turning for larger diameters, using one of three methods. On the Jet 1840EVS, Laguna Revo 18/36, and Powermatic, you slide the headstock to the tailstock end of the bed. The headstocks on the Grizzly G0733 and Nova both slide and rotate, so you can turn outboard on either end. The Oneway headstock doesn't slide or rotate, but you can do outboard turning on the spindle on the left side of the headstock, shown *above right*. All three methods of outboard turning require accessory bed extensions or tool rests, sold separately.

The Nova has the longest spindle-turning capacity in the test at 46½", with the Grizzly close behind at 45½". The Powermatic comes up shortest at 26". If you need more length, you can buy optional bed extensions for each model except Grizzly.

Ideally, the lathe's spindle should be centered at the same height as your elbows when your arms hang down. To accommodate different-height turners, each lathe has feet that not only level and steady the machine, but also add height if needed. The Oneway provides the most range with 6" of adjust-



Instead of a handwheel, Oneway's spindle has bare threads, so you can mount a chuck or faceplate for outboard turning. (You can buy an optional hub from Oneway and turn a wooden handwheel to fit onto it if you want one.) An optional bed extension mounts to the body where shown to hold the banjo and tool rest.

ment built into its legs, and the leveling feet add another ½". The Jet, Laguna, and Powermatic have 1½" of adjustment, but the Jet and Powermatic come with a pair of 4" riser blocks you can install to add more height. Laguna offers riser blocks as an optional accessory. For the Grizzly and Nova lathes, you'd have to add your own shop-made riser blocks to adjust the height more than ¾".

The headstock rules

Except for the the direct-drive Nova, all of the lathes use two sets of pulleys to transfer rotation and torque from the motor to the spindle, in two speed ranges. Each lathe has electronic, infinitely variable speed within each range. Changing belt position and dialing in a precise speed proved easy enough,

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woodmagazine.com/review



Position Powermatic's magnetic-mounted on/off switch anywhere on the machine you want—helpful if you prefer the switch nearer your dominant hand, and for outboard turning.



Oneway's pedestal-mounted controls swing easily from the headstock to the tailstock ends of the machine, or anywhere between.



Place Jet's magnet-mounted emergency stop anywhere on the lathe. Restarting after an emergency stop requires using the primary on/off switch.

especially thanks to digital readout on all but the Oneway (which has an intuitive dial and scales).

We especially like the controls on the Jet, Oneway, and Powermatic, shown *above*. But we found Grizzly's on/off switches, housed inside a plastic cover with an emergency stop switch on the hinged lid, a nuisance. If you push the emergency stop rather than lifting the lid and pushing the tiny off button, you have to change the direction dial to neutral and then back to forward or reverse before you can restart the machine. Laguna's

three red buttons—regular stop, emergency stop, and spindle lock—look similar, making it easy to accidentally hit the wrong button until you get used to it.

All of the headstocks have at least 24 indexing stops for repeatable and, if desired, equidistant spacing of flats, flutes, and dovetails on furniture legs, for example. All proved accurate and reliable, but some worked better than others (*below*). We found Grizzly's indexing system confusing and tedious, but with help from Grizzly customer service, got it to work.



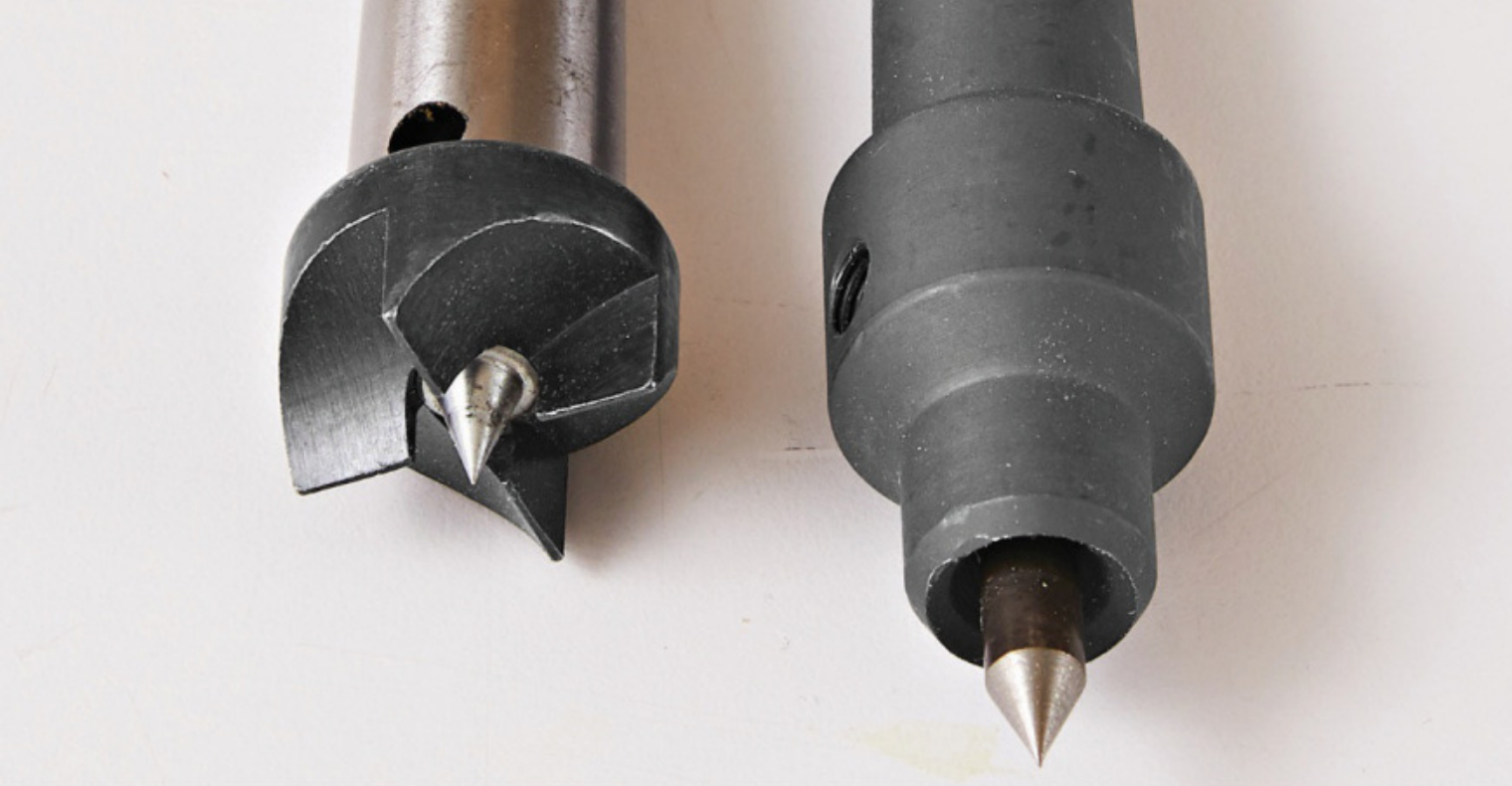
To set Powermatic's indexing stops, turn the handwheel until the stop number appears on the digital readout. Then engage the spindle lock.



We found Jet's indexing positions difficult to see on the drive pulley. Turn the spindle until the stop you want aligns with the spindle lock, then engage it.



A small view window inhibits spotting the Nova's indexing stops. Once engaged, the stops tested accurate.



Five of the six lathes come with a spur drive center (left). Oneway's factory-supplied safe-drive center (right), lacks spurs that could catch on a tool.

► Need something to turn? Check our turning projects. woodstore.net/turning

Each lathe comes with a drive center (*above*) and faceplate, and most accept accessories with a 1¼"×8tpi spindle with a no. 2 Morse taper. The Oneway uses a metric M33×3.5 spindle with a no. 2 taper. So if you're upgrading from another lathe and have drive centers with the same taper, they'll fit perfectly to all six machines. But for accessories that thread onto a smaller spindle, such as faceplates and four-jaw chucks, you'll likely need to buy adapters to use ones you already own.

Tailstock: the perfect mate

A tailstock, equipped with a threaded quill, serves two primary purposes. First, it holds the "tail" end of a workpiece securely. Second, you use it to hold a drill chuck to bore a perfectly centered hole into a chuck-mounted workpiece.

Each tailstock slides and locks anywhere along the bed, and the centers on the headstock and tailstock should align perfectly. The tailstocks on three lathes (Grizzly, Jet, shown *above right*, and Nova) did not align precisely, which means a hole will be bored at a slight angle. If it's a thin-walled project, or very deep hole, the bore could break through. The Powermatic has an arm on the rear of its tailstock and headstock to hold a spindle for copying, as shown *below*.

Each lathe provides at least 2½" of quill travel, with Powermatic leading the way at 4⅜". The more travel, the deeper you can bore holes without having to back out and reposition the tailstock. And the best models (Laguna, Oneway, and Powermatic) use

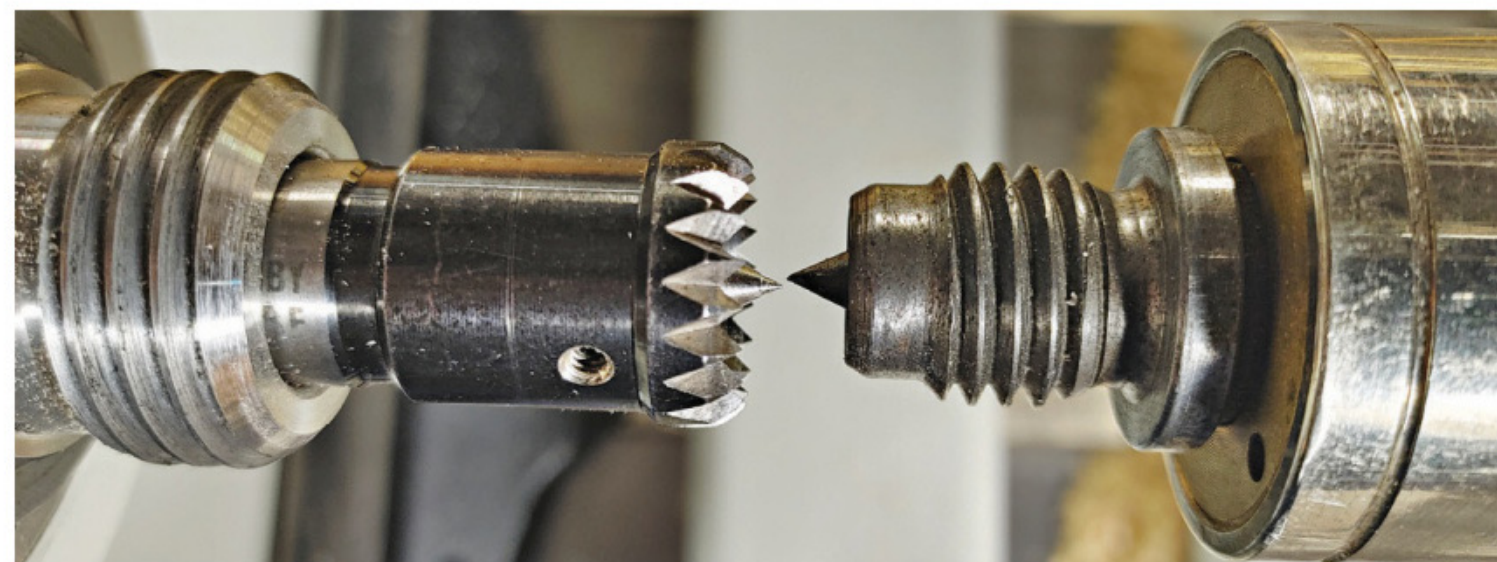


The Powermatic comes with a comparator, a pair of arms with adjustable pointed holders. This allows you to better copy a spindle by having it right in front of you.

woodmagazine.com



Grizzly and Nova supply a standard live center (left), but Jet, Laguna, Oneway, and Powermatic up the ante with a heavy-duty live center (right) that features more bearings for smoother operation.

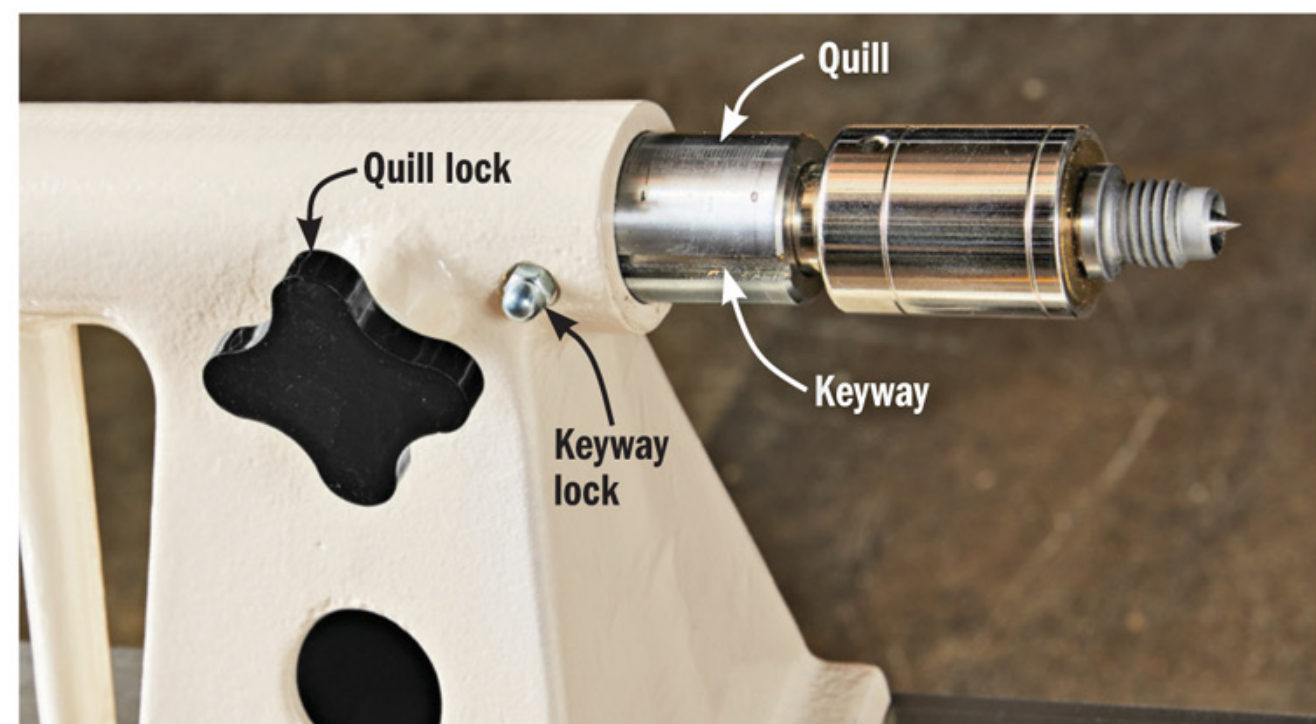


The drive and tail centers on the Jet were out of alignment with each other, with no adjustment to correct for this.

Acme threads rather than V-shaped threads for quill movement. (See an illustration of this on the *next page*.)

Each quill, *below*, has a keyway that accepts a key or pin that prevents the quill from spinning as you turn a workpiece. We prefer quills with stopped keyways that prevent them from simply sliding off the tailstock's threaded rod when fully extended. (All six quills self-eject, meaning they release the center when retracted.) We prefer the quills on the Laguna and Oneway lathes. We like Powermatic's quill almost as much, although it does not have a stopped keyway. All but one test model have no. 2 Morse tapers for their quills; the Oneway uses a no. 3 taper.

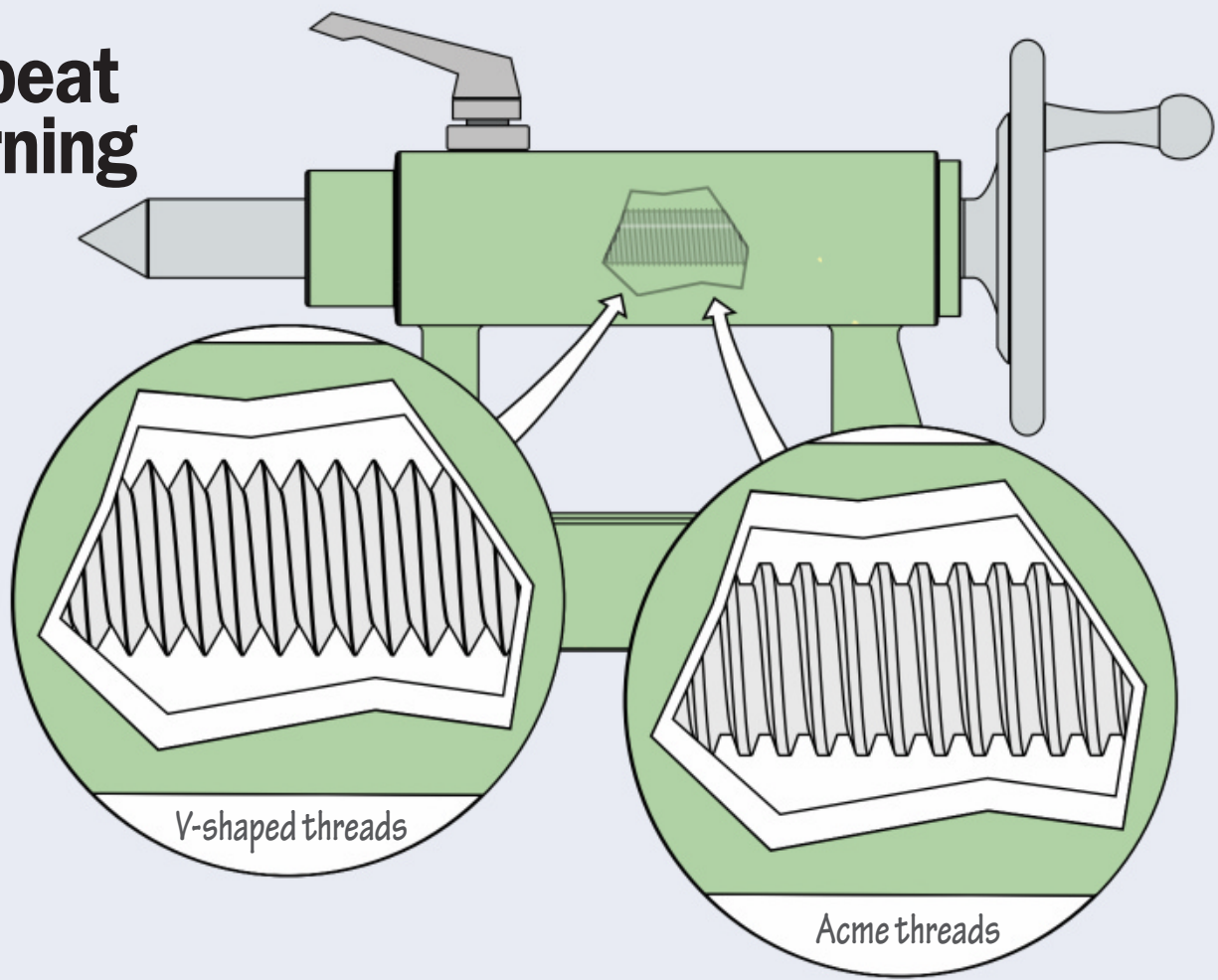
Removing the tailstock can be challenging with some of the test lathes. We found it easiest on the Jet and Oneway lathes.



All the tailstock quills have a key channel, and the best ones (all but the Grizzly) use a lock that secures the quill from moving forward and back, but is separate from the keyway lock, which prevents the quill from spinning within the tailstock.

Acme threads beat V-threads in turning

Trapezoid-shaped Acme threads provide stronger contact and wear less over time than V-shaped threads when it comes to moving a quill back and forth within a tailstock, especially when boring holes with a drill chuck.



Give your tools a good rest

The banjo holds the tool rest so you can put your chisel exactly where you want it. So it should slide smoothly, lock securely, and be as out of the way as possible when in use. The Grizzly banjo required greater force than the others to lock securely, and sometimes it vibrated loose. Three models (Grizzly, Jet, and Powermatic) use a tool-rest lock that can be mounted on either the right or left sides, letting you put it where it suits you best. But with some turnings, such as deep bowls, a tool-rest lock on the front of the banjo works best without being in the way. The Laguna, Nova, and Oneway lathes use this system.

Full-size lathes provide big swing, big power

MODEL	PERFORMANCE RATINGS (1)									MOTOR				HEADSTOCK		TAILSTOCK			
	TORQUE	ABSENCE OF VIBRATION	EASE OF USING BANJO	EASE OF USING TOOL REST	EASE OF USING TAILSTOCK	EASE OF USING QUILL	EASE OF USING CONTROLS	EASE OF INDEXING SPINDLE	CENTER-TO-CENTER ALIGNMENT	VOLTAGE	REVERSIBLE? (YES, NO)	SPEED RANGE(S), RPM	DIGITAL READOUT? (YES, NO)	SPINDLE SIZE, INCHES OR MILLIMETERS ×TPI	NUMBER OF INDEXING STOPS	QUILL TRAVEL, INCHES (2)	QUILL TAPER (MORSE TAPER)	QUILL THREAD TYPE (3)	TAILSTOCK WEIGHT, POUNDS
GRIZZLY G0733	A-	A-	C-	B	C-	C	D	D	B	220	Y	100–1,200 330–3,200	Y	1¼×8	24	3⅝	2	V	29
JET 1840EVS	A-	A	B	B	A-	B	A-	A-	D	220	Y	40–1,200 100–3,200	Y	1¼×8	36	3½	2	V	24
LAGUNA REVO 18/36	B	A	A-	B	B	A	B-	A-	A	220	Y	52–1,369 135–3,485	Y	1¼×8	14/36/48	4⅞	2	A	34
NOVA GALAXI DVR	C	A-	B	C	C	C	B	B	C	110	Y	100–5,000	Y	1¼×8	24	2⅞	2	V	32
ONEWAY 1640	A	A	A	A	A	A	A-	A-	A	220	Y	25–700 30–2,585	N	M33×3.5	48	3¼	3	A	30
POWERMATIC 3520C	A	A	A	B	B-	A-	A	A	A	220	Y	15–1,200 40–3,200	Y	1¼×8	48	4⅞	2	A	61

1.

A

B

Excellent
Good

C

D

Fair
Poor
2. Measured with factory live center installed

3. (A) Acme thread
(V) V-thread

4. With headstock and tailstock fully on bed and factory centers installed.

5. (*) With riser block installed
6. (3) 3" faceplate
(4) 4" faceplate
(6) 6" faceplate
(20) 20" bed extension
(24) 24" bed extension
(A) Spindle adapter/reducer
(B) Curved bowl tool rest
(C) Comparator

(F) Floor-standing tool rest
(G) Workpiece guard
(H) Heavy-duty live center
(I) Task light
(K) Knockout bar
(L) Standard live center
(M) Mobility casters
(O) Outrigger tool-rest bracket

(P) 4-prong drive center
(R) Leg risers
(S) Safe-drive center
(X) Tailstock swing-away bed extension
(Y) Outboard turning stand
(Z) Tailstock riser block
7. * 2 years on electrical parts
** Excludes parts not manufactured by Oneway

8. (A) Canada
(C) China
(T) Taiwan

► Check out our turning project and technique videos. woodmagazine.com/turning

Each tool rest uses a 1"-diameter post to provide stability. The Laguna and Nova lathes come with a 12"-long tool rest, while the Grizzly, Jet, and Powermatic rests measure 14". We like Oneway's 14½" rest, shown *right*, best among the test group.



The curved shape of Oneway's tool rest fits nicely into the rounded sides of bowls, giving you better placement and control.

Produced by **Bob Hunter** with **Brian Simmons**
Illustration: **David Kallemyn**

DIMENSIONS, INCHES					ACCESSORIES (6)		OVERALL LENGTH X DEPTH X HEIGHT, INCHES	WEIGHT, POUNDS	CORD LENGTH, INCHES	WARRANTY, YEARS (7)	COUNTRY OF ASSEMBLY (8)	SELLING PRICE	CONTACT INFORMATION
MAXIMUM LENGTH BETWEEN CENTERS (4)	MAXIMUM SWING OVER BED	MAXIMUM SWING OVER BANJO	TOOL REST LENGTH	SPINDLE HEIGHT FROM FLOOR (MIN.-MAX.) (5)	STANDARD	OPTIONAL							
45½	18	13¾	14	45⅝ - 46	6, K, L, P	B	83×28×49	419	86	1	C	\$1,975	800-523-4777, grizzly.com
35	18½	14¼	14	40½ - 42 * 44½ - 46	3, H, K, H, L, P, R, U	20, C, G, O, T	72×29×55	418	76	5	T	\$2,600	800-274-6848, jettools.com
32½	18	13½	12	42 - 43½	3, K, H, P	20, C, G, I, M, R, X, Z	74×29×49	427	69	2	T	\$2,750	800-234-1976, lagunatools.com
46½	16	11½	12	44⅝ - 45	6, K, L, P	3, 20, A, B, I, O, S, X	74×25×50	400	72	5*	C	\$2,500	866-748-3025, teknatool.com
35½	16	11½	14½	42½ - 48½	4, H, K, S	3, 6, 24, B, M, T, U, Z	68×35×53	574	132	5**	A	\$4,510	800-565-7288, oneway.ca
26	20	15¾	14	41½ - 43 * 45½ - 47	3, C, H, K, P, R, U	20, B, F, G, I, L, T, Y	70×36×52	726	74	5	T	\$4,500	800-274-6848, powermatic.com

Buy a Oneway ticket to turning paradise

Although the Powermatic made it close, the Oneway 1640 wins Top Tool honors. This lathe has power in spades, a silky-smooth spindle, easy-to-use controls, and tailstock, banjo, and tool rest that work sublimely. Yes, it's a sizable investment at \$4,510, but we know you'll appreciate it once you use it.

For \$1,760 less, the Laguna Revo 18/36 proved to be a feature-laden lathe that won't break the bank. It's our Top Value. 🌳





Craftsman Raised Dog Dishes

Fit for a king, but going to the dogs.

Pets today get treated like family members. And this riser certainly pampers your pooch, providing them with their own “dining table” while showing off your woodworking. You can practice on a small scale skills such as cutting and fitting bridle joints and mortises and tenons.

Elevated dishes can benefit pets (and humans) who have trouble reaching dishes resting on the floor. However, such a feeder may not suit larger breeds. Check with your veterinarian to find out if this project would be suitable for your pet, and at what height. Adjust the leg (A) length accordingly.

D I M E N S I O N S :
26 7/8" W × 14 3/4" D × 18" H

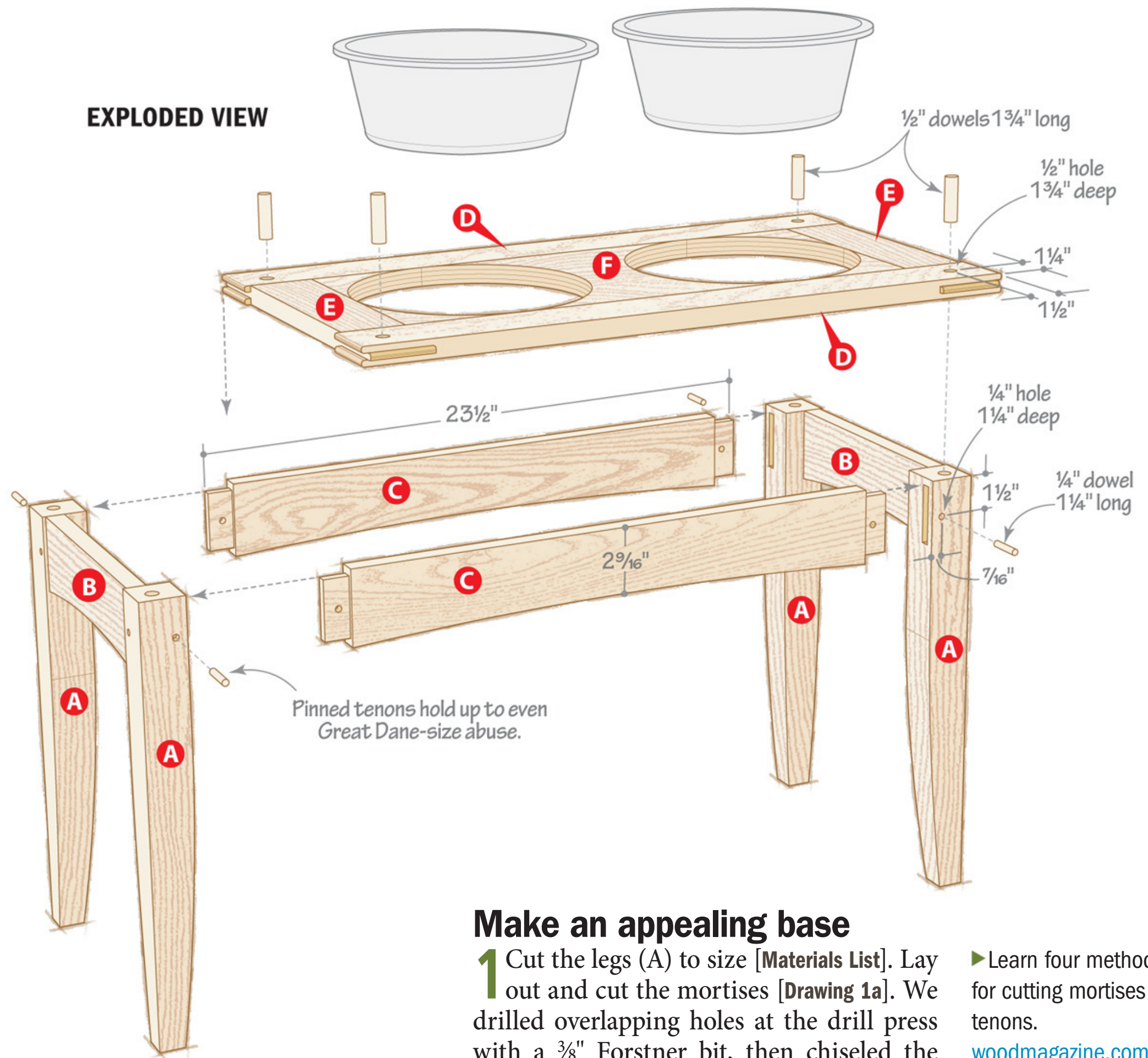
Approximate materials cost:

\$87

Including
2
dishes

1
Spoiled pet!

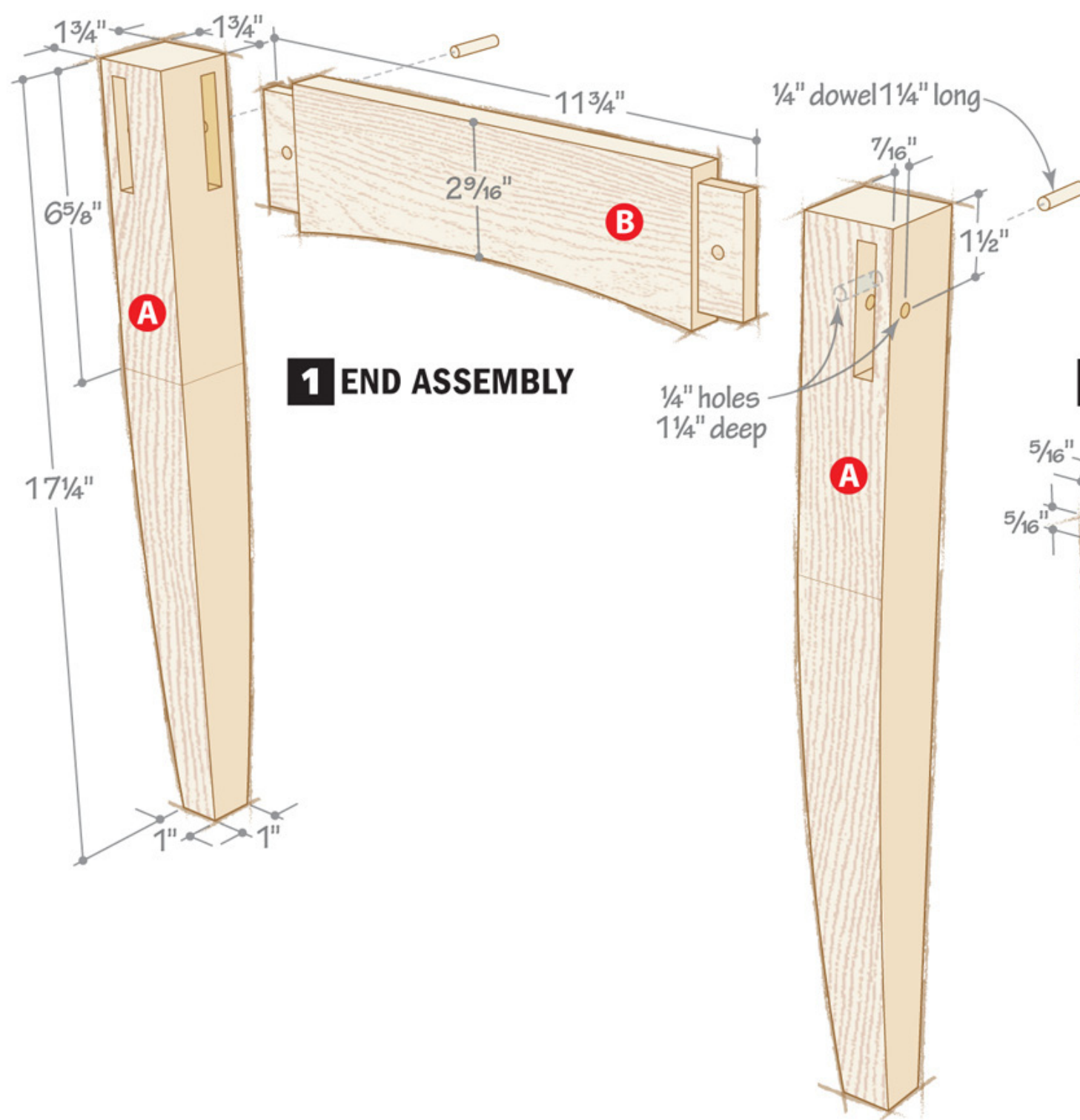
EXPLODED VIEW



Make an appealing base

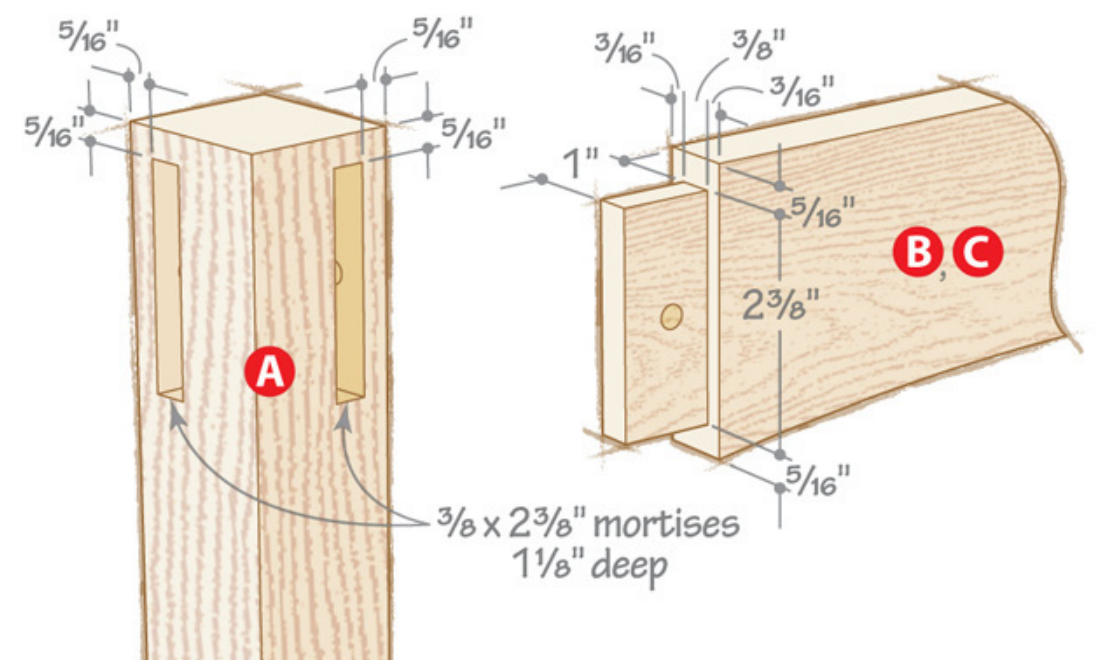
1 Cut the legs (A) to size [Materials List]. Lay out and cut the mortises [Drawing 1a]. We drilled overlapping holes at the drill press with a 3/8" Forstner bit, then chiseled the walls straight and the ends square.

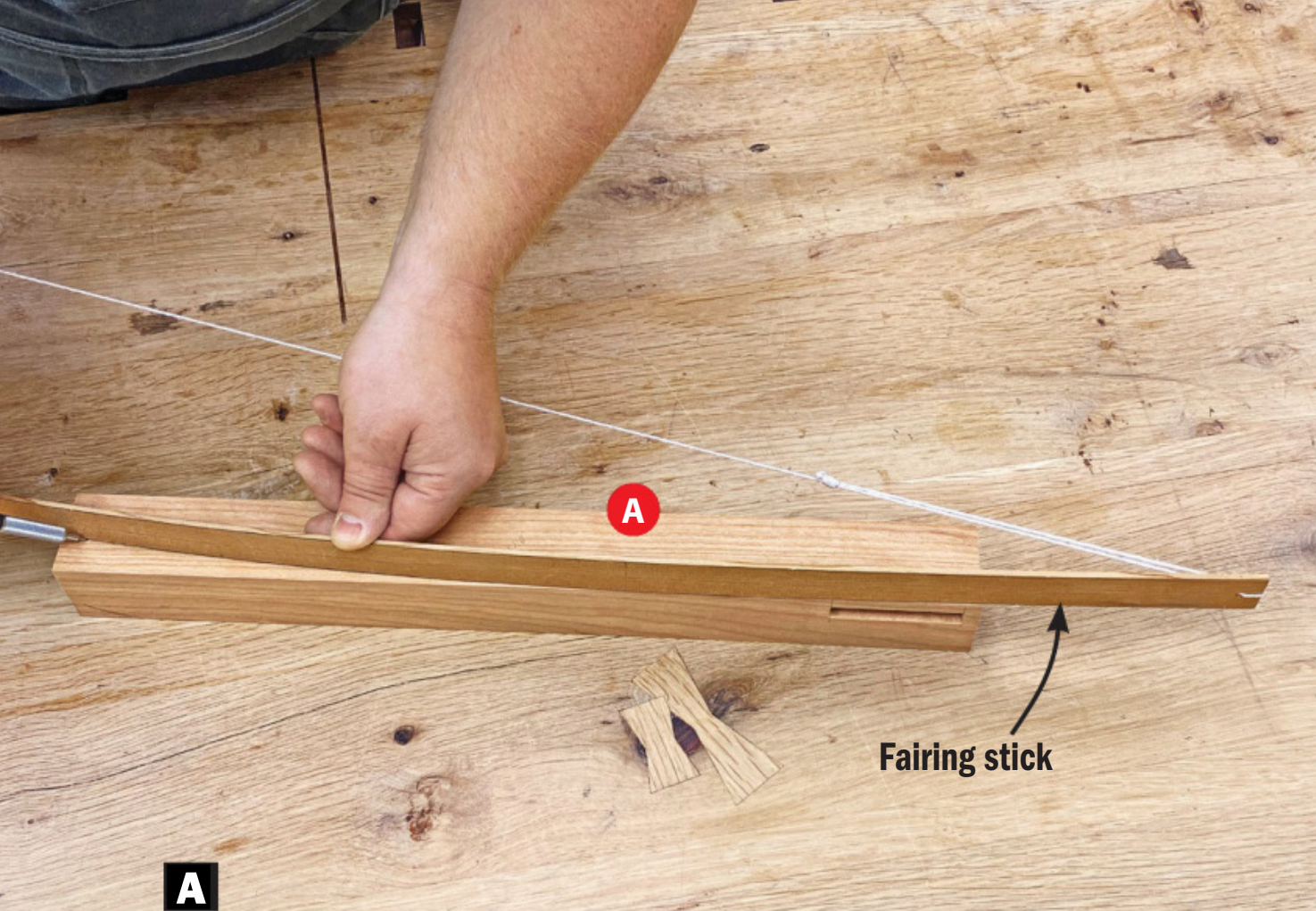
► Learn four methods for cutting mortises and tenons.
woodmagazine.com/mt4ways



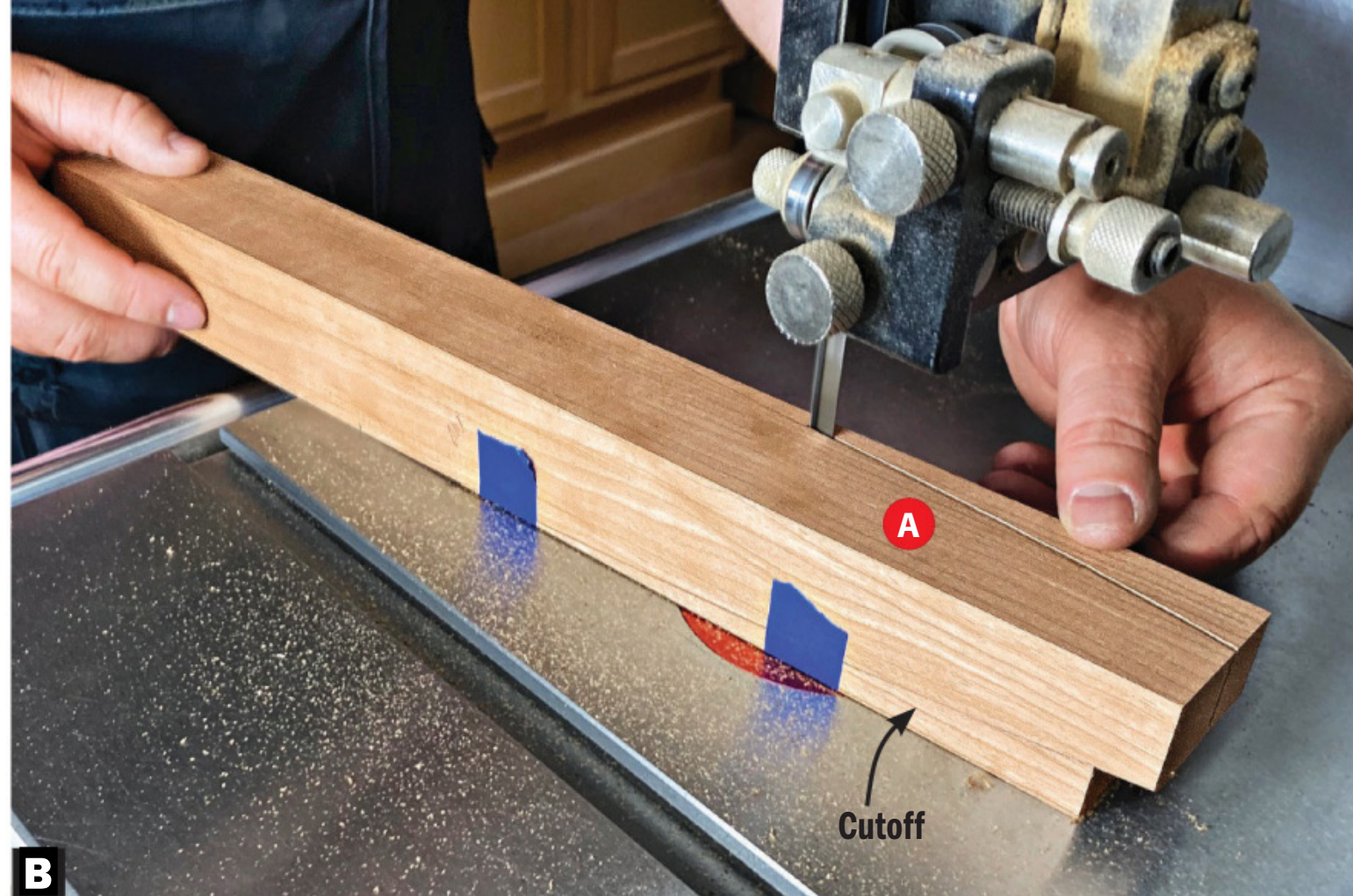
1 END ASSEMBLY

1a MORTISE AND TENON DETAIL





A Flex a fairing stick between the bottom of the leg and the top point of the curve. Trace along the fairing stick.



B After cutting the first curve, tape the cutoff back in place so the leg rests level, and cut the second curve. Because of material removed in the first cut, the cutoff won't fit flush with the end of the leg.



C Set the rip fence 1" from the outside of the blade, and make a pass on each face. Sneak up on the blade height, testing the tenon's fit in the mortise until the tenon slips in.



D Raise the blade to $\frac{5}{16}$ " above the table and cut the tenon shoulders.

► Here's how to make and use a fairing stick.
woodmagazine.com/fairing

2 Mark the curves on the outer face of each leg [Drawing 1, Photo A], and bandsaw just outside the lines [Photo B]. Sand the curves smooth; then, finish-sand the legs to 220 grit.

3 Cut to size the short and long rails (B, C) [Exploded View, Drawing 1]. Install a dado blade in your tablesaw, and form tenons on each end of the rails to fit the mortises in the legs [Drawing 1a, Photos C, D].

4 Lay out and cut the arcs on the bottom edge of each rail (B, C) [Exploded View, Drawing 1, Photo E]. Finish-sand the curves and the rail faces.

5 Begin assembling the base by gluing the short rails (B) between pairs of legs, making a mirrored set. After the glue dries, join these assemblies with the long rails (C).

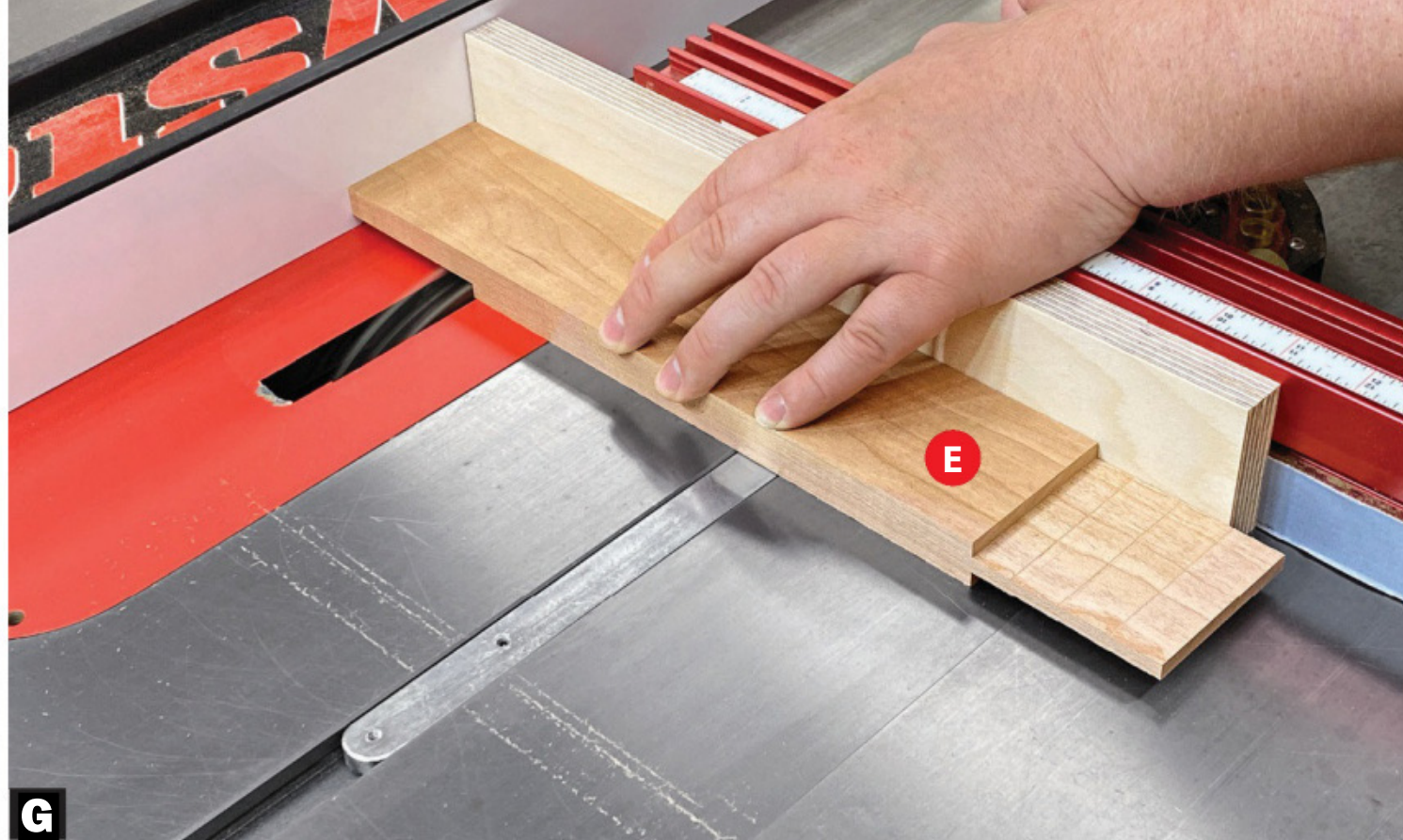
6 Drill holes through each joint and glue in walnut dowels [Exploded View]. Trim and sand the dowels flush.



E Flex a fairing stick to touch the corners of the rail and the high point of the arc, then trace the curve.



F Position the rip fence to roughly center the blade on the trim. Make a pass on each face, then adjust the rip fence to cut the mortise to finished width.



G Set the rip fence to establish the tenon length. Sneak up on the blade height until the tenon slides easily into a mortise in a long trim (D).

► Build a saddle jig for your tablesaw fence.
woodmagazine.com/saddlejig

Top it off

1 Cut the trim (D, E) to size [Drawing 2]. Clamp each long trim (D) on end to a saddle jig and cut the open mortise for the bridle joints [Photo F].

2 As you did with the rails, cut tenons on the ends of the short trim (E) [Drawing 2, Photo G]. Note that these tenons have no shoulder cuts.

3 Dry-assemble the trim (D, E), and cut the top (F) to fit the opening. Cut biscuit slots in the trim and top [Drawing 2].

4 Glue and clamp the short trim to the top [Photo H]. After the glue dries, glue the long trim to this assembly.

5 Locate and cut holes to match the diameter of the dog dishes [Source] as measured under the top lip [Drawing 2]. Sand the openings smooth, rounding the edges slightly.

6 Glue the top assembly to the base, centered. After the glue dries, drill holes through the top into the legs and glue in dowels [Exploded View].

No dessert until you finish

1 Finish-sand all surfaces, easing any sharp corners and edges. Apply a finish. We wiped on a coat of linseed oil to add some



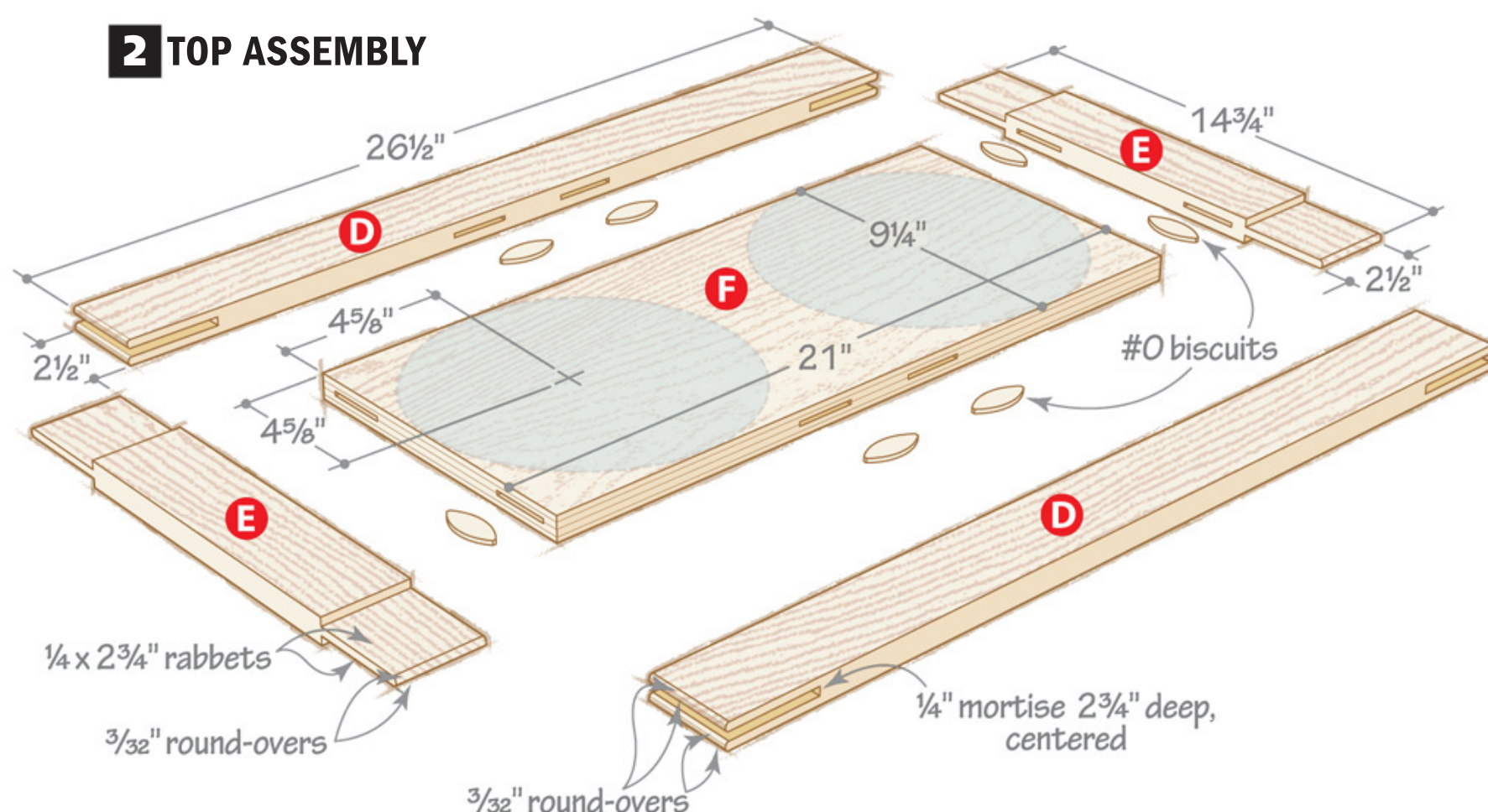
H Align the shoulders of the short trim (E) with the edges of the top (F). Ensure the parts stay aligned as you apply clamping pressure.

color. Then, after letting it cure 48 hours, we rubbed on wax using 0000 steel wool.

2 Place the bowls in the openings, and let the dog out to admire their new treat. 🐕

Produced by **Craig Ruegsegger** with **John Olson**
Project design: **John Olson**
Illustrations: **Roxanne LeMoine, Lorna Johnson**

2 TOP ASSEMBLY



Materials List

Part		FINISHED SIZE			Matl.	Qty.
		T	W	L		
A	legs	1 3/4"	1 3/4"	17 1/4"*	C	4
B	short rails	3/4"	3"	11 3/4"	C	2
C	long rails	3/4"	3"	23 1/2"	C	2
D	long trim	3/4"	2 1/2"	26 1/2"	C	2
E	short trim	3/4"	2 1/2"	14 3/4"	C	2
F	top	3/4"	9 1/4"	21"	CP	1

*Adjust length to suit your pet. See the instructions.

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

Supplies: #0 biscuits, 1/4×12" and 1/2×12" walnut dowels.

Blade: Dado set.

Source: Harmony nonskid brushed stainless steel dog bowl (2), medium, \$15 each, petco.com.

Cordless Cleaners

For quick cleanups around the shop without having to drag out the big vac, nothing beats these battery-powered vacuums. They run on (but most don't come with) the same rechargeable lithium-ion batteries that many of your tools use, and battery runtime exceeded our expectations. Granted, they don't have as much suction and airflow as comparable corded vacs, but they're still impressive as *detail* vacuums. Each comes with a short hose, a nozzle or two, a cartridge-style filter (HEPA-rated on all but the Ryobi), and 1½–3-gallon collection bins. Here are five of our favorites.



Milwaukee M18 Fuel 0970-20, \$200

18 volts, 2.5 gallons

This vac works well and carries easily, and it connects to Milwaukee's Packout modular tool-storage system units via built-in latches and hooks.

800-729-3878, milwaukeetool.com



Bosch GAS18V-3N, \$140

18 volts, 2.6 gallons

This model's supple 5'-long hose stores on the vac with a built-in bungee strap. The unit offers great suction and filtration, and easy waste dumping. It comes with three hose extensions, a detail (crevice) nozzle, and a wide sweep.

877-267-2499, boschtools.com



Ryobi P3240, \$80

18 volts, 3 gallons

With the largest collection bin, this vac takes longer to fill up, and still balances and handles nicely despite its size.

800-525-2579, ryobitools.com



Milwaukee M12 Fuel 0960-20, \$130

12 volts, 1.6 gallons

Its smaller bin size means more frequent dumping, but it's ideal for small cleanups.

800-729-3878, milwaukeetool.com



Craftsman CMCV002B, \$88

20 volts, 2 gallons

Although its tiny power switch can be difficult to trigger, this vac performs nicely.

888-331-4569, craftsman.com

Plan for Growth

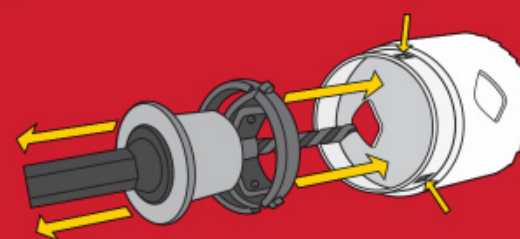
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Next-gen miter gauge sheds weight

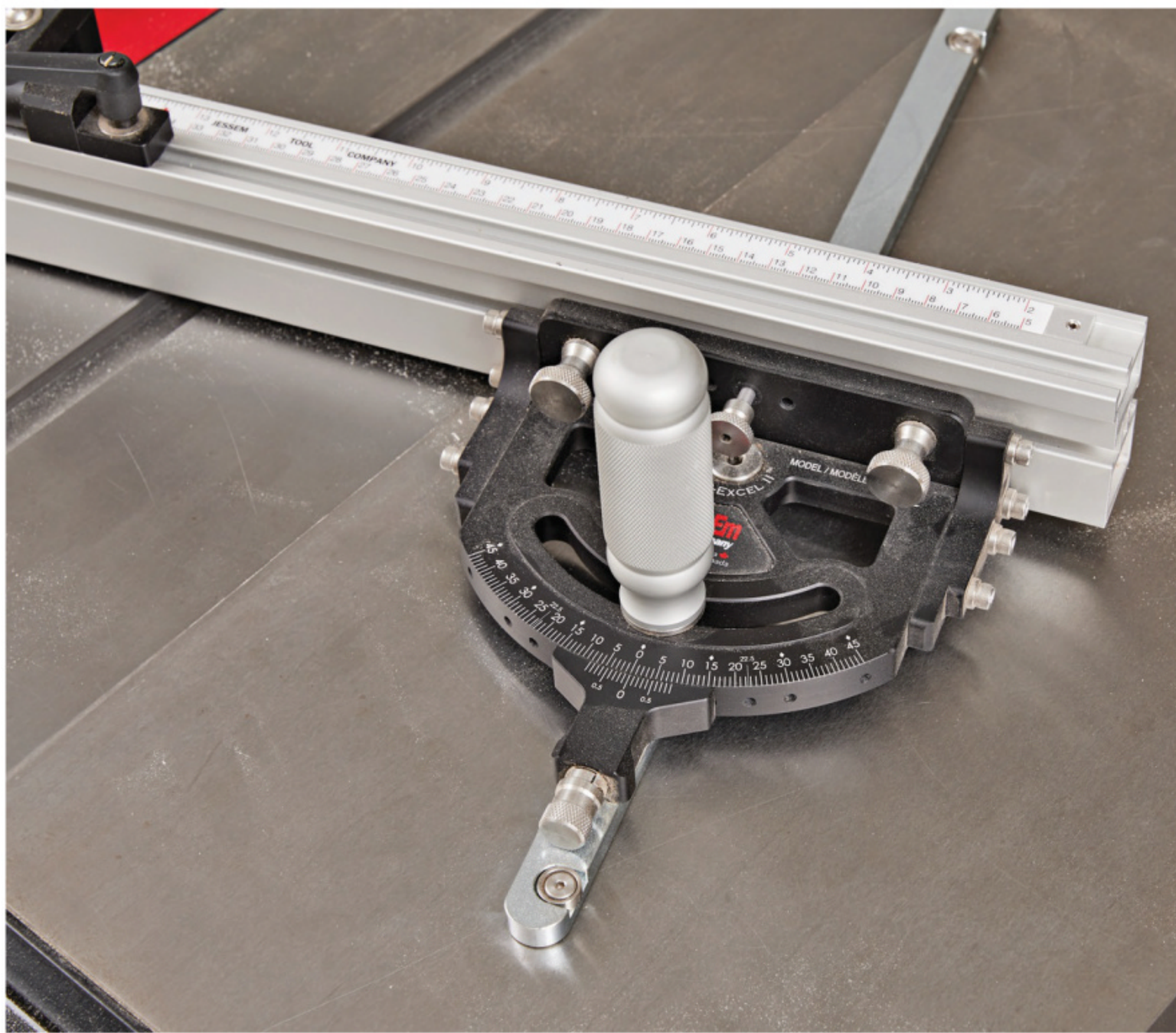
Mite-R-Excel II miter gauge, no. 07150, \$300

I've used JessEm's original miter gauge for years with great results, but it's heavy and cumbersome. This new version, the Mite-R-Excel II, delivers all the accuracy of the original model and weighs a couple of pounds less. Besides stops at 0°, 15°, 22½°, 30°, and 45° on each side, the miter head also provides a Vernier scale to dial in angles to .1° resolution. The beefy aluminum handle locks the head solidly with a twist, and adjusters on the miter bar snug up the fit in the miter slot.

The bright-white fence scale measures in easy-to-read ⅛" increments, and calibrating the fence scale to the blade proves simple. You can set the flip-stop on the fence up to 20" from the blade, and a telescoping arm lets you extend it up to 36". The flip stop is my favorite improvement: It adjusts forward and backward from the fence face, giving you multiple options for attaching auxiliary faces up to ¾" thick. The old model didn't have this feature.

—Tested by John Olson, Design Editor

JessEm
800-436-6799, jessem.com



Drive fasteners almost anywhere

FlexTorq 4-in-1 modular right-angle driving system, no. DWAMRASETFT, \$40

There's nothing more frustrating than trying to drive a screw in a tight spot a drill/driver can't get into. DeWalt's FlexTorq right-angle accessory kit—rated to withstand the torque of an impact driver—makes these situations a snap to overcome. I used each piece with a drill/driver and impact driver with great success.

The kit contains four components, which work in different configurations. The compact right-angle driver head can be used by itself or attached to the handle, short body, or flex-shaft. A magnet holds the driver bits securely in place, and that magnetism holds fasteners on the driver bit for truly one-handed situations. You can use a driver bit directly in the flex-shaft when you don't



need the right-angle head. Overall, this system works superbly for driving fasteners in tight spaces.

—Tested by Bob Hunter, Tools Editor

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800-433-9258, dewalt.com



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Wood-Mizer rolls out low-dough entry mill

Portable bandsaw mill, no. LX25, \$3,295

If you've wanted to mill your own lumber but couldn't justify spending \$5,000 or more for a bandsaw mill, Wood-Mizer's newest model cuts the cost of entry way down. The LX25 cuts logs up to 26" in diameter and 12½' long. The LX25 comes with a 7-hp Kohler gas engine, but if you want to more power, you can upgrade to a 9½-hp engine for \$300 more.

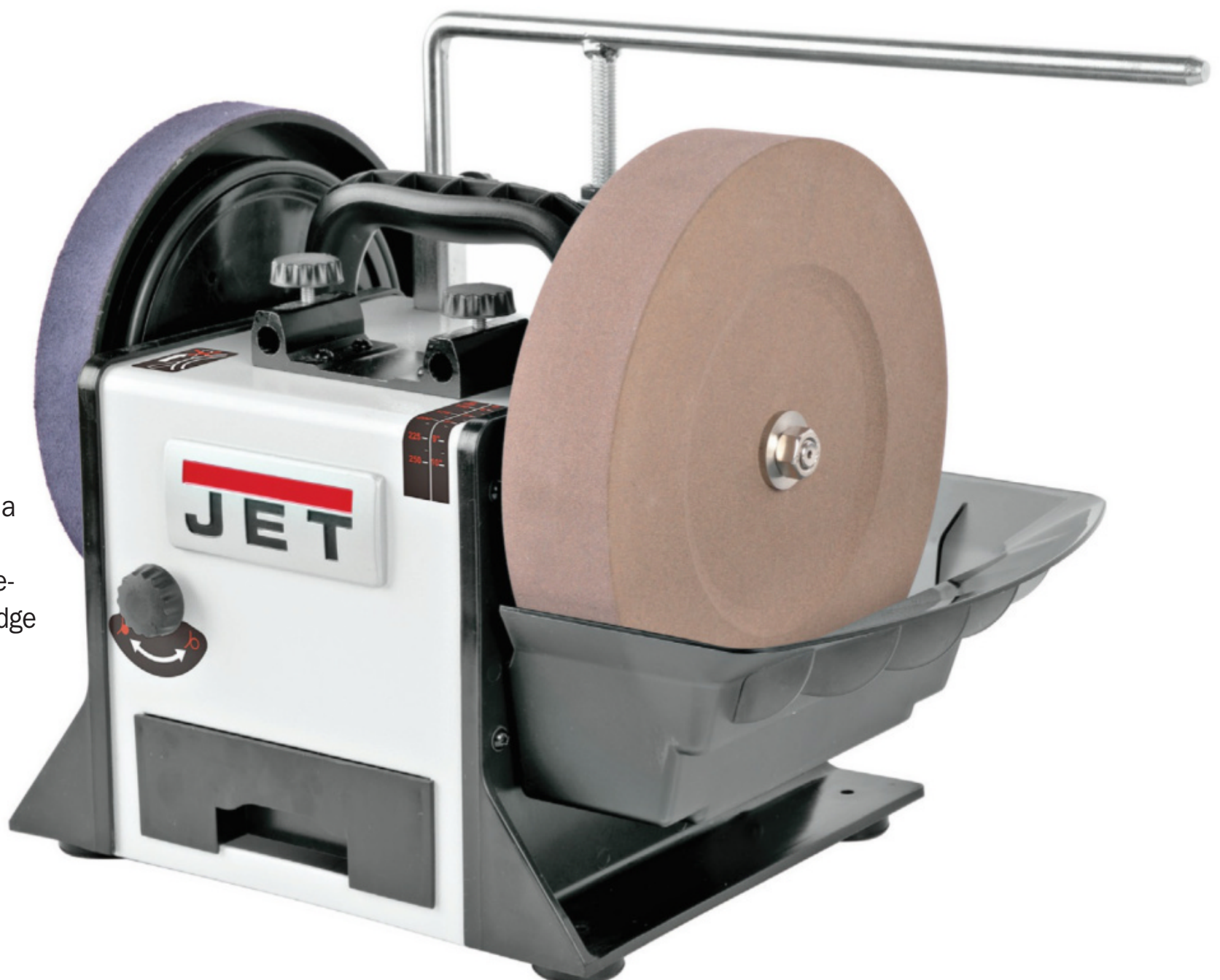
Wood-Mizer
800-553-0182, woodmizer.com

Jet adds wet-wheel sharpener

10" wet-wheel sharpener, no. JWS-10, \$450

Jet's JWS-10 sharpener uses a 2×10" 220-grit aluminum-oxide wheel with a ½" arbor, as well as a 1×9" leather strop wheel for honing the tool edge after sharpening. Besides its 90–150 rpm variable-speed motor, the machine comes with a straightedge jig for sharpening planer and jointer knives and a variable-angle jig for sharpening chisels.

Jet
800-274-6848, jettools.com



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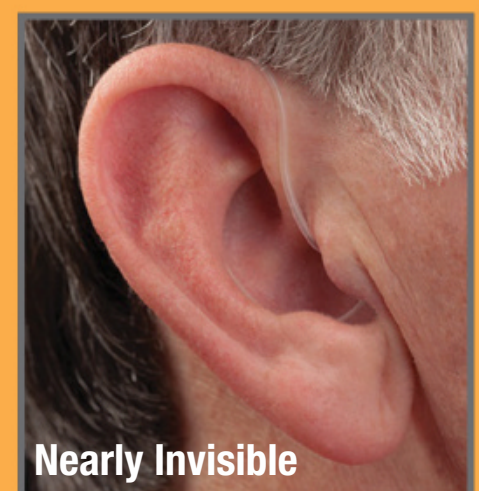
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Shop test: Top router trick-outs

We put dozens of router accessories through their paces to ensure you get the right ones for your money.

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