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ISSUE 302 MAY 2025

WOOD®

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BLAST PAST YOUR CNC MACHINE'S CAPACITY p.48

STATELY STORAGE

CLASSIC FORM MEETS MODERN FUNCTION IN A HANDSOME 5-DRAWER CHEST

p.38

Build it three different ways! We show you how.

GREAT PLANS

- Roll-Around Plywood Rack p.26
- Plant-Lover's Potting Bench p.52
- Multi-tier Display Tower p.62

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640 PAGES

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NEW!

Designed to perform

- 12" Resaw capacity
- 2-Position resaw fence and miter gauge
- Precision-ground cast-iron table
- Computer-balanced cast-iron wheels
- Quick-release blade tensioner
- Footprint: 16" x 18"
- Shipping weight: ≈ 334 lbs.

MADE IN AN ISO 9001 FACTORY

G0555XH ONLY $1585

$255 FREIGHT LOWER 48 STATES

6" x 60" Jointer

NEW!

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- Two-stage cyclone separation
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G0975 ONLY $2895

$299 FREIGHT LOWER 48 STATES

10" 3 HP 240V Cabinet Table Saw

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- Built-in cast-iron router table extension
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- Digital spindle speed indicator
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- Footprint: 42½" x 16"
- Shipping weight: ≈ 388 lbs.

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G0838 ONLY $1895

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Largest table in the industry

- Saw tilts instead of table for greater functionality
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- Oversized, stationary table supports larger workpieces
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Increase efficiency with unique features

- 12-Speed spindle, 340 to 2860 RPM
- LED light increases visibility for drilling precision
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$199 FREIGHT LOWER 48 STATES

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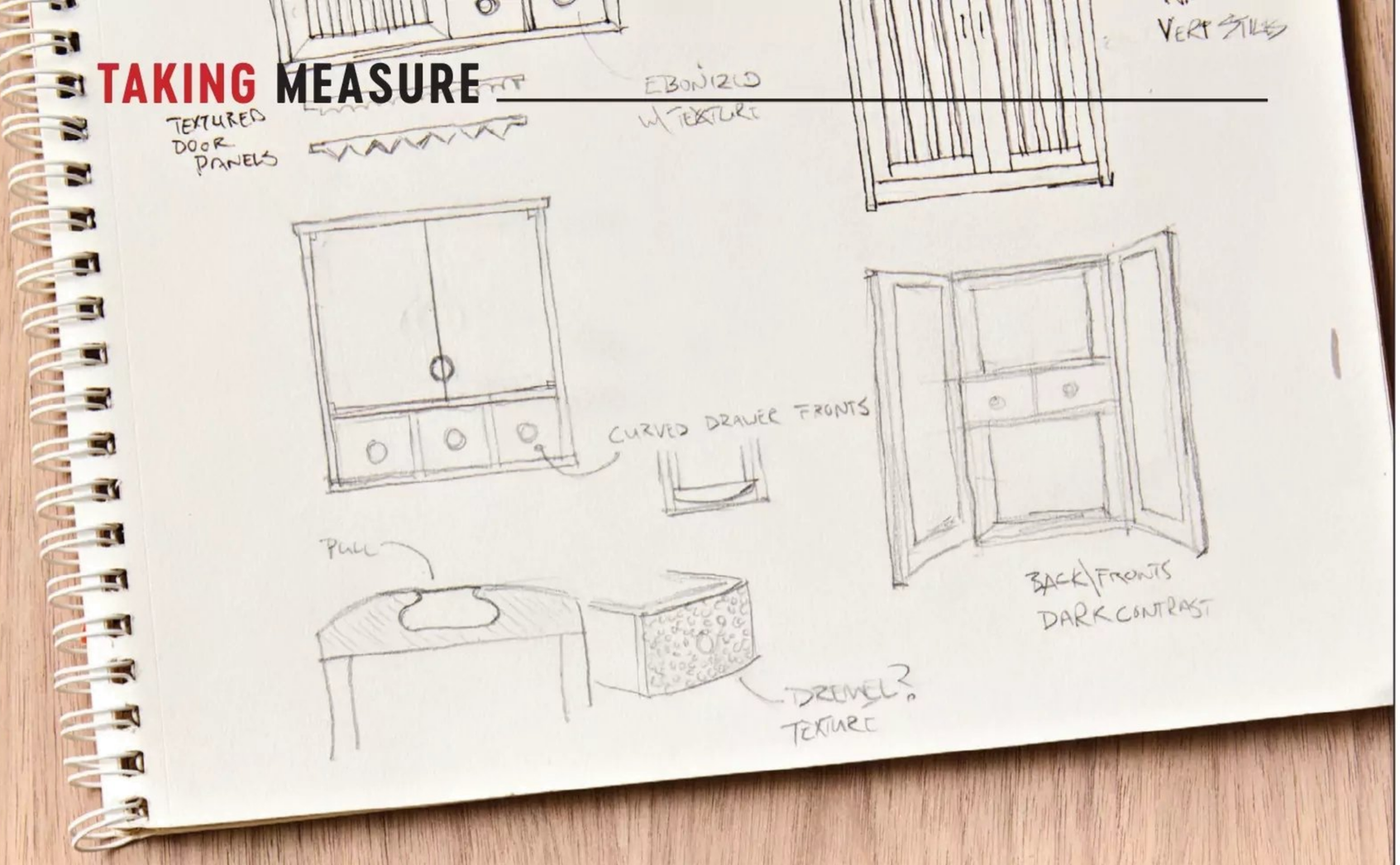
Award-winning and clean-cutting planer

- 74-indexable-carbide insert spiral cutterhead
- 42" Cast-iron table
- Two-speed automatic board feed
- Built-in mobile base
- Top-mounted return rollers
- Footprint: 47¼" x 28½"
- Shipping weight: ≈ 672 lbs.

G0453Z ONLY $2595

$349 FREIGHT LOWER 48 STATES



A DOSE OF INSPIRATION

INSPIRATION FOR WOODWORKING DESIGN IS ALL AROUND YOU. WHERE DO YOU FIND YOURS?

My favorite writing professor in college equated ideas to tiny iron filings scattered throughout the world. They were easily overlooked or invisible to most people. It was our job to develop a magnetic way of viewing life–to recognize the deep ideas that could be found in every situation–from nation-shaping global events to an overheard conversation in a coffee shop–and relay them in a meaningful way.

Inspiration, then, is a habit to be developed and regularly practiced rather than some rare lightning strike of providence to be yearned for–a honed skill, rather than lucky happenstance. The seasoned inspiration hunters know that those iron filings are, in fact, gold. And they should be hoarded like treasure.

The same is true in woodworking. Keep your phone camera ready or a sketchbook close at hand and you'll soon start gathering your own treasure hoard of design inspiration. Some find it in architecture, stopping their car for every old building and realtor's open house sign. The organic forms of nature inspire some whenever they step outdoors. Some find it in art museums.

Instead of those places, Senior Design Editor Kevin Boyle found inspiration for the Federal-style chest on table featured on the cover from ... the background of a televised pharmaceutical ad. You know the type: where the cure results in yoga in a sunny park, but the side effects read like the script of an 80s-era horror flick.

After glimpsing only a few seconds of footage, Kevin patiently waited days for the ad to play again then came to our design meeting with a freeze-frame. A few seconds of Kevin's applied skill for inspiration and a grainy, motion-blurred image turned into the beautiful and functional project you see on *page 38*.

We do our best to include a range of design styles to inspire you. If Federal is not your favorite tea party, take a look at the contemporary display shelf on *page 62* or our go-to Arts & Crafts finish on *page 34*. Even where the overall concept might not appeal, make a practice of zeroing in on the details to glean inspiration that you can hoard away for later use.

Drop me a line at **woodmail@woodmagazine.com** and let me know where you find inspiration for your woodworking.

Then get out to the shop and build something. We'll help.

Lucas

LUCAS PETERS
lucas.peters@woodmagazine.com
@peters.lucas

WOOD®
Issue No. 302 | May 2025
Vol. 42, No. 2

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woodmagazine.com/302patterns

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Precision Woodworking Squares

- One-piece central core.
- Stainless model includes scribing guides.
- Lip keeps the square flat on your work.
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- Available in inch or metric.

Precision Woodworking Square
Includes a wall-mountable Rack-It®
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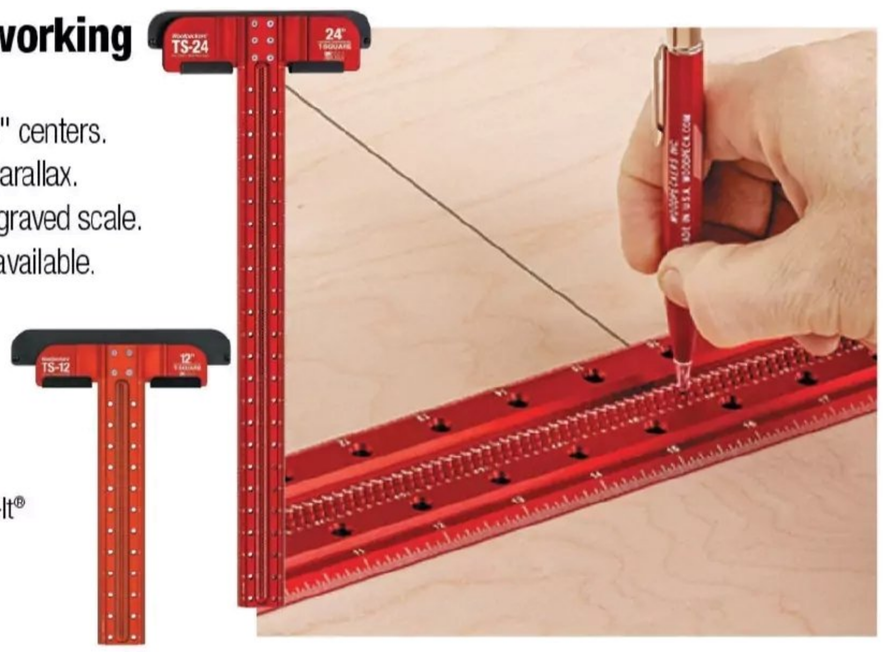
12" Stainless Steel....$149.99
Other Sizes Available on ***Woodpeck.com***

Precision Woodworking T-Squares

- Scribing guides on 1/16" centers.
- Beveled edge reduces parallax.
- Tight tolerance laser-engraved scale.
- 600mm metric version available.



Precision T-Square
Includes a wall-mountable Rack-It®
TS-12 12"....$129.99
TS-24 24"....$149.99
TS-32 32"....$179.99

in-DEXABLE® Combination & Double Squares

- Push-button index locks head at any full-inch.
- Laser-cut scribing guides for precision parallel lines.
- Retractable support keeps head aligned to your stock.
- Available in inch or metric.

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Includes a wall-mountable Rack-It®
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Other Sizes Available on ***Woodpeck.com***

Spline Jig

- Works with both table saw and router table.
- Spline grooves or dovetail keyways.
- Cut splines in projects up to 36" long.
- Stops included for repeat positioning.

Spline Jig....$159.99

Hold-down clamps sold separately.

Router not included.

Rout-N-Plane® Benchtop Board Mill

- Perfect for end grain cutting boards.
- Adjusts to work with almost any size or style router.
- Two sizes: 15" and 24" wide. Both work from 3/4" to 3" thick.
- When it won't fit your planer, plane it with Rout-N-Plane!

Rout-N-Plane Benchtop Board Mill
15"....$169.99
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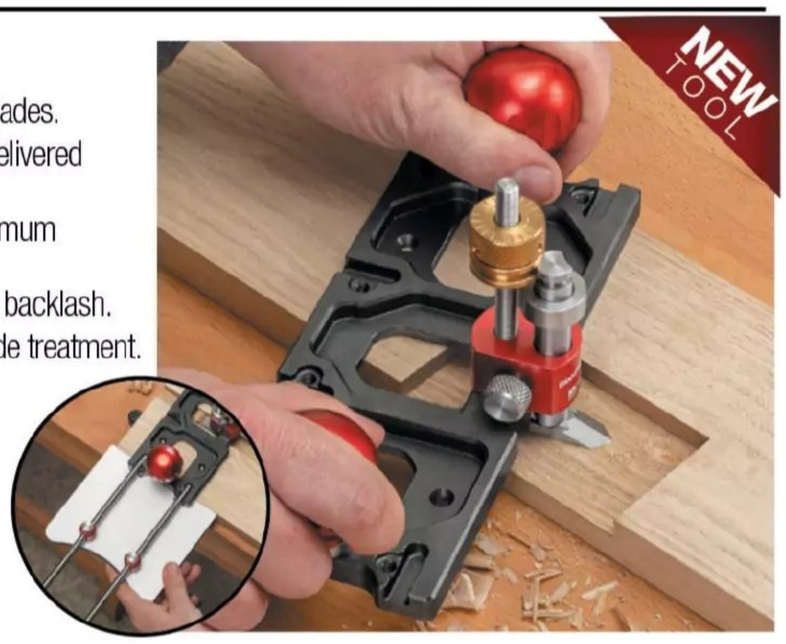
Router Plane

- Includes square & spearpoint blades.
- Blades lapped perfectly flat & delivered razor-sharp.
- 12 blade positions ensure maximum access & support.
- Fine-thread adjustment with no backlash.
- Ductile iron base with black-nitride treatment.
- Optional fence guides plane parallel to an edge.



Router Plane
...$269.99
Fence Add-On Kit....$59.99

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WOOD®

Issue No. 302 | May 2025

PLANS

ON THE COVER

Classy and compact enough for nearly any space in your home, this stylish pair stacks to add an outsized amount of storage. Or build the chest base that separates them into individual pieces.

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MIGHTY MITERS

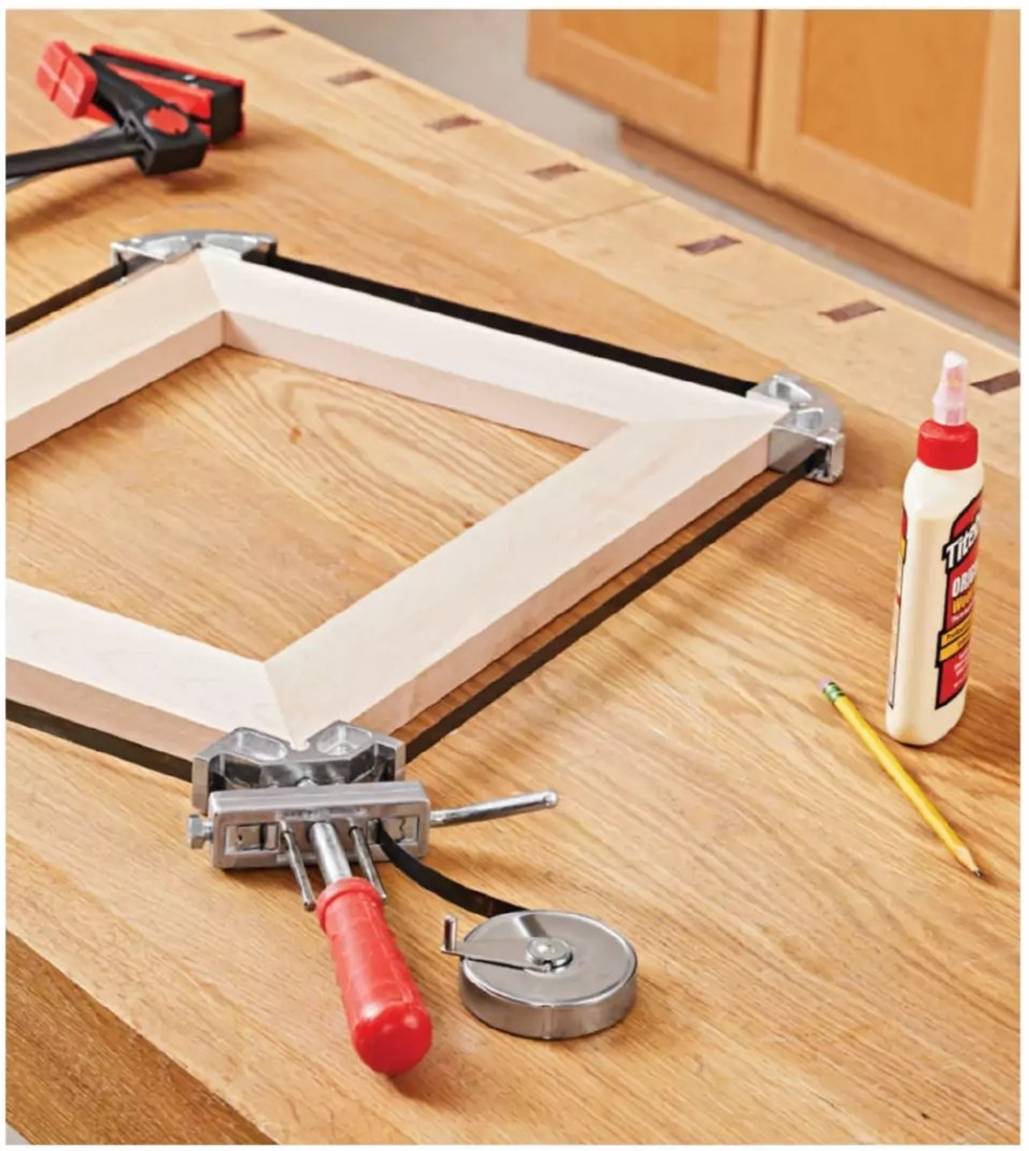
Have your miter joints gone awry? Do you struggle to eliminate gaps? Are you aiming for perfect miters? Try approaching them from these angles.

PUT IT ALL ON THE TABLE(SAW)

Set up your tablesaw for mitering success.

woodmagazine.com/mitermaster

- **Build a miter-mastering saw sled in this video**
  woodmagazine.com/sawsled
- **Tune up your miter gauge for accurate results**
  woodmagazine.com/mitertune



GET FRAMED

Mind the gaps for picture-perfect mitered frames with these tips and techniques.

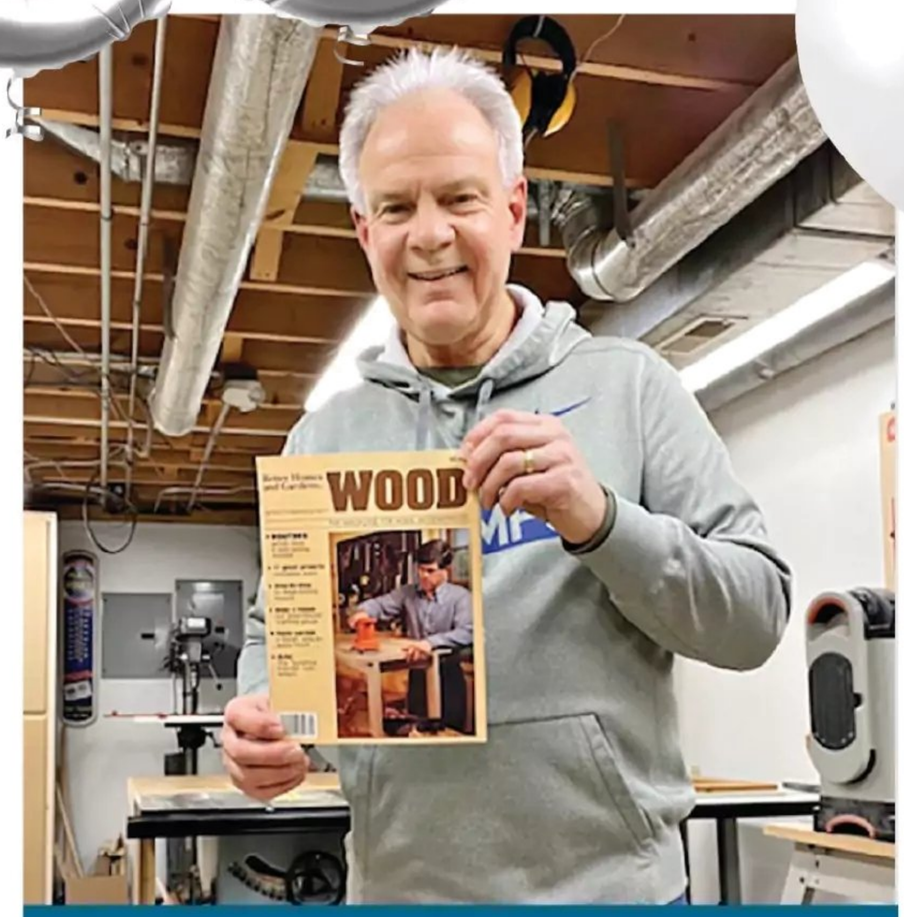
woodmagazine.com/framed

- **Cut photo frames to exact size every time.**
  woodmagazine.com/pictureperfectframes

HEY, YOU HAVE ISSUES, TOO!

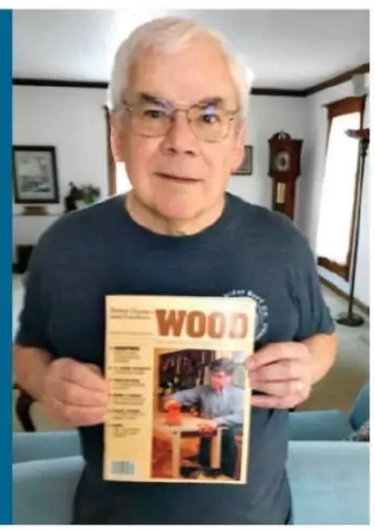
For the December 2024/January 2025 issue of *WOOD*® magazine—our 300th issue—we asked you to send a picture holding your earliest copy. Thank you, first, for proving that some people actually do read the editor's letter. More important, thanks to the many of you who have been with us for a very long time. You're why we do it. But whether you started with the first issue 40 years ago, issue 302 that you hold in your hands, or somewhere in between, we love having you along for the ride.

Lucas Peters
Editor-in-Chief



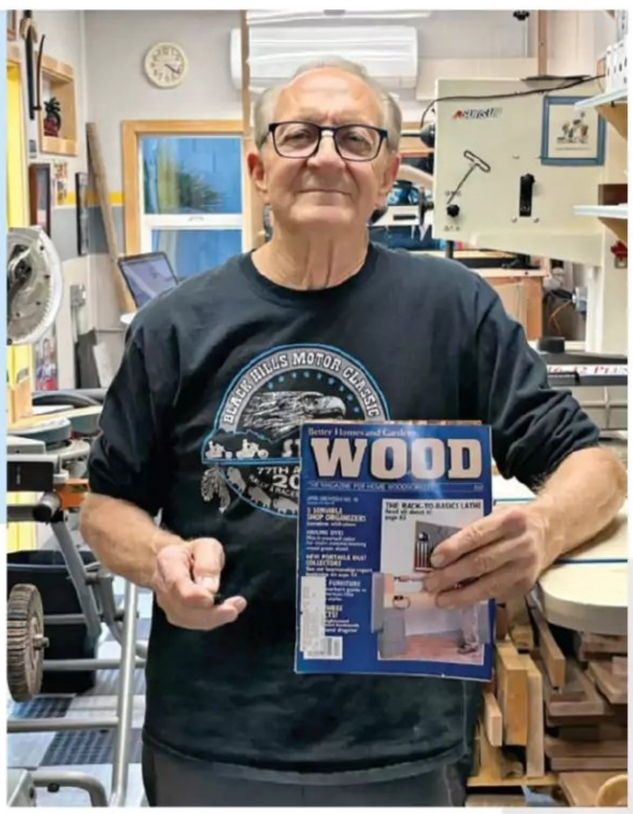
I am a charter subscriber to *WOOD* although I purchased the first couple of issues from a newsstand. That was 40 years ago when I was a young lad of 28 years and just beginning my woodworking journey. Congratulations to *WOOD* magazine and the entire staff for 300 outstanding issues. Your magazine consistently provides information and project plans for woodworkers across all skill levels.

Jack Francis
Geneva, Illinois



I saw this first issue in the grocery store and I thought that this would be something that I would actually read. I have been a subscriber ever since.

Alex Danko
Centennial, Colorado



The first publication I subscribed to was *WOOD* magazine. It helped expand my knowledge of different aspects of this amazing hobby. I have saved every copy of the magazine since the beginning.

Bill Teckenbrock
Mesa, Arizona

This is a picture of me and my *WOOD* issue #1. I have been a subscriber since issue #10. I have really enjoyed each issue and have made dozens of the plans. Thank you for a great magazine.

Bernard Ofstehage
Vermillion, South Dakota

Here's me with issue no. 7, from October 1985. It's been a long 40 years. I'm a fourth-generation wood hobbyist, who got started with my dad's tools and carried on from there.

Rod Giles
Nanoose Bay, British Columbia

continued on page 10

Oneida Air Systems

The Industry Leader in Dust Collection

Some Jobs Are Monsters All On Their Own.

Dust collection doesn't have to be one of them.

Dust Gorilla Pro SMART Boost Dust Collectors

The Last Dust Collector You'll Ever Need

Reach up to double the CFM and suction power of traditional, fixed RPM collectors with the Dust Gorilla Pro. Its unique Smart Boost technology ensures the motor is always working at full capacity, with a constant amp draw, by increasing fan speed as needed. Truly revolutionary!

Nana L. Verified Buyer

★★★★★

Worth the upgrade. I've been using the unit for about 3 months now and I can say that this is definitely a case of you get what you pay for. This unit is pulling more air through a 4" line than my previous system was pulling through a 6" line. I strongly recommend getting a unit with the SmartBoost, it makes a huge difference.

SEE HOW

MADE IN USA

Contact us today for your FREE dust collector consultation. **800.732.4065**

oneida-air.com

IT'S YOUR MOVE

I enjoyed your column in issue 289 (July 2023) about how we grade our own level of woodworking skills. After almost 50 years, I would rank my skill level at "advanced intermediate." I'm constantly learning new skills by studying the work of others. I enjoy trying challenging projects, such as this chessboard. I ended up making three of them as gifts.

Peter Hermann
Farmington, New York

CORRECTION: MOTOR MISNOMER

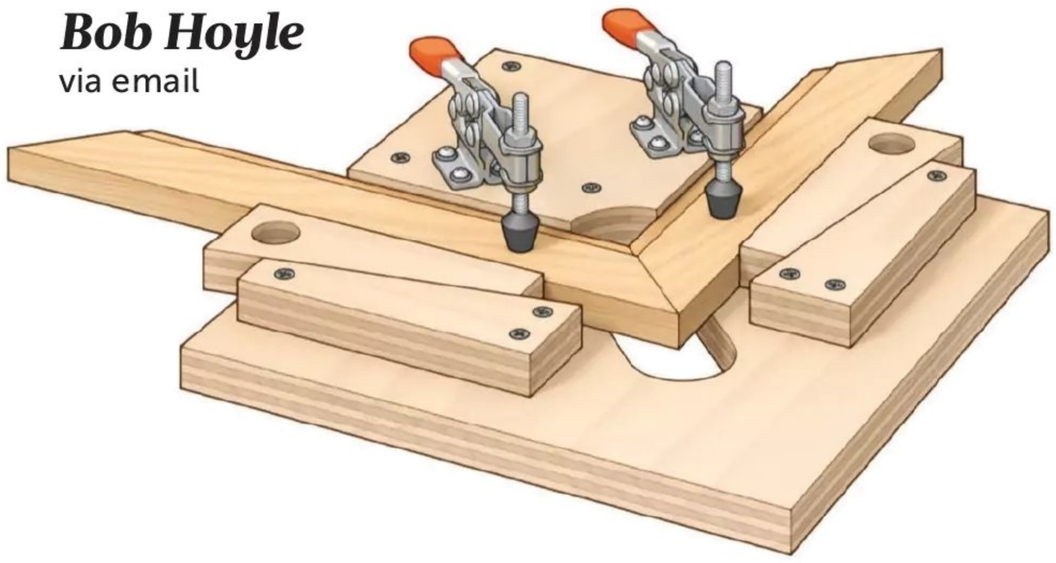
In the "2025 Innovation Awards" in issue 301 (March 2025) we mixed up manufacturers while highlighting features of the Oliver 10055 planer. We should have said "Oliver included a 2hp, 230-volt motor."

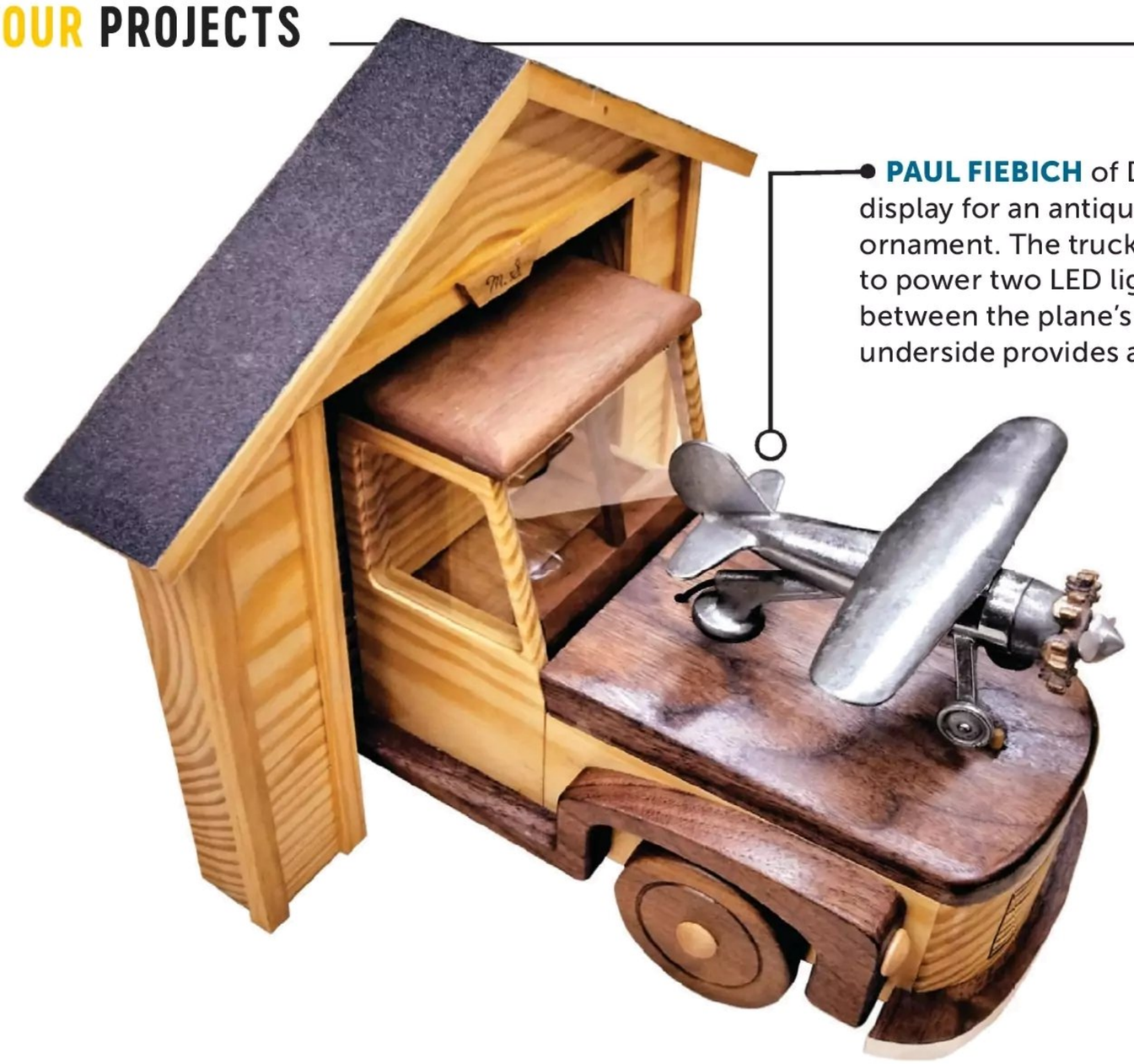
MAGNIFICENT MITERS

I read Laura Tilson's question about making frames on page 8 of issue 300 (December 2024/January 2025) and it brought to mind Tony Rush's Shop Tip in issue 298 (October 2024). Tony presented a simple jig to use when gluing miters together.

I just built Tony's design and, while I have not used it for assembling a frame, I have tested it for fitting a miter with great results. The jig is simple to build, is easy to use, and will help Laura build perfect frames.

Bob Hoyle
via email





PAUL FIEBICH of Derby, Kansas, designed and built this whimsical display for an antique airplane-shaped automobile radiator cap ornament. The truck's engine compartment houses a 9-volt battery to power two LED lights inside the airplane. Pressing a small switch between the plane's wheels turns on the lights. A trapdoor on the underside provides access to the battery.

Using curly maple, **RONALD BROWN** of Northfield, Ohio, built this corner chair and finished it with shellac. His wife added the upholstery.

JESSE NORTHUM of Benton, Arkansas, teamed up with his father to build this white oak crib for his first child. Jesse says that working with his dad brings a lot of enjoyment and they always learn a lot working together on projects.

Keep safety in mind when building a crib.
woodmagazine.com/safecrib

To display his collection of poker chips from Harley-Davidson dealers around the world, **JAMES MCDOWELL** of Cerritos, California, built these dual-sided display frames. The chips fit into through-holes in the display board, which is sandwiched between glass to show off the front and the back.

SEND US A PHOTO OF YOUR WORK

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

DANNY ZAWACKI of Madison, Wisconsin, made this mobile for his daughter. He designed it on his computer and cut out templates with a CNC router. The animals dangling from the mobile match those on the curtain pattern in the nursery.

This unique box, built by **TERRY ARDMORE** of Ocala, Florida, features curly maple for the sides, dovetail splines on the corners, and walnut trim. To cap it off, Terry designed and crafted a stained glass top with a 3D flower on the surface.

PETER TONNESEN of Henderson, Nevada, made this backgammon set for friends. All pieces except the dice were made on his CNC router, including the veneers. He learned that using paper-backed veneer with a 20° bit prevented the veneer from shattering when cut on the CNC.

For his two daughters, **DAVE ALLWEIN** of Myerstown, Pennsylvania, made this pair of red oak roll-top desks. His daughter Heather says, "I am delighted with my desk and all the other things he has been kind enough to make for me over the years."

Throw Yourself a Bone

*Full tang stainless steel blade with natural bone handle —now **ONLY** $79!*

The very best hunting knives possess a perfect balance of form and function. They're carefully constructed from fine materials, but also have that little something extra to connect the owner with nature.

If you're on the hunt for a knife that combines impeccable craftsmanship with a sense of wonder, the **$79 *Huntsman Blade*** is the trophy you're looking for.

The blade is full tang, meaning it doesn't stop at the handle but extends to the length of the grip for the ultimate in strength. The blade is made from 420 surgical steel, famed for its sharpness and its resistance to corrosion.

The handle is made from genuine natural bone, and features decorative wood spacers and a hand-carved motif of two overlapping feathers— a reminder for you to respect and connect with the natural world.

This fusion of substance and style can garner a high price tag out in the marketplace. In fact, we found full tang, stainless steel blades with bone handles in excess of $2,000. Well, that won't cut it around here. We have mastered the hunt for the best deal, and in turn pass the spoils on to our customers.

But we don't stop there. While supplies last, we'll include a pair of $99 8x21 power compact binoculars *and* a genuine leather sheath **FREE** when you purchase the ***Huntsman Blade***.

Your satisfaction is 100% guaranteed. Feel the knife in your hands, wear it on your hip, inspect the impeccable craftsmanship. If you don't feel like we cut you a fair deal, send it back within 30 days for a complete refund of the item price.

Limited Reserves. A deal like this won't last long. We have only 1120 ***Huntsman Blades*** for this ad only. Don't let this beauty slip through your fingers. Call today!

BONUS! Call today and you'll also receive this genuine leather sheath!

EXCLUSIVE FREE
Stauer® 8x21 Compact Binoculars
-a $99 value-
with purchase of Huntsman Blade

What Stauer Clients Are Saying About Our Knives

★★★★★
"This knife is beautiful!"
— J., La Crescent, MN

★★★★★
"The feel of this knife is unbelievable...this is an incredibly fine instrument."
— H., Arvada, CO

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**Discount is only for customers who use the offer code versus the listed original Stauer.com price.*

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- **12" overall length; 6 ½" stainless steel full tang blade • Genuine bone handle with brass hand guard & bolsters • Includes genuine leather sheath**

Stauer... *Afford the Extraordinary.*®

INTENSELY ORGANIZED

When workshop space is confined to the footprint of a one-car garage, you find ways to take advantage of every square inch with creative solutions for tool storage and layout.

WRITER: RANDY MAXEY

Open floor space, lots of natural light, and tightly organized tools turn Walt's small shop into a comfortable retreat. Cedar paneling simplifies storing and rearranging of tools.

Located just off the interstate midway between Colorado Springs and Denver, Walt Korinke's 375 square foot shop resides in the last stall of a three-car garage. Standing in the workshop is like staring at a detailed illustration that reveals more the longer you look at it. Put another way, Walt would be a master at the video game Tetris to pack a complete workshop along two walls.

Before taking over the space, Walt installed three 48×34" sliding windows and a passage door in the end wall. The windows flood the shop with natural light while the door provides easy passage to the house.

Rough cedar siding lines the walls from the floor to the 10½' ceiling. Walt prefers the wood's warmth over painted drywall. The siding provides a solid surface for anchoring tools to the wall, too. When Walt acquires a new tool, he plans its best location and creates the appropriate hanger, grouping tools by their function and giving each a specific home. The rough wall texture hides the scars of the ongoing relocation of tools. Motorcycle memorabilia and antique tools fill the walls above the cabinets, while his everyday tools stay within easy reach below.

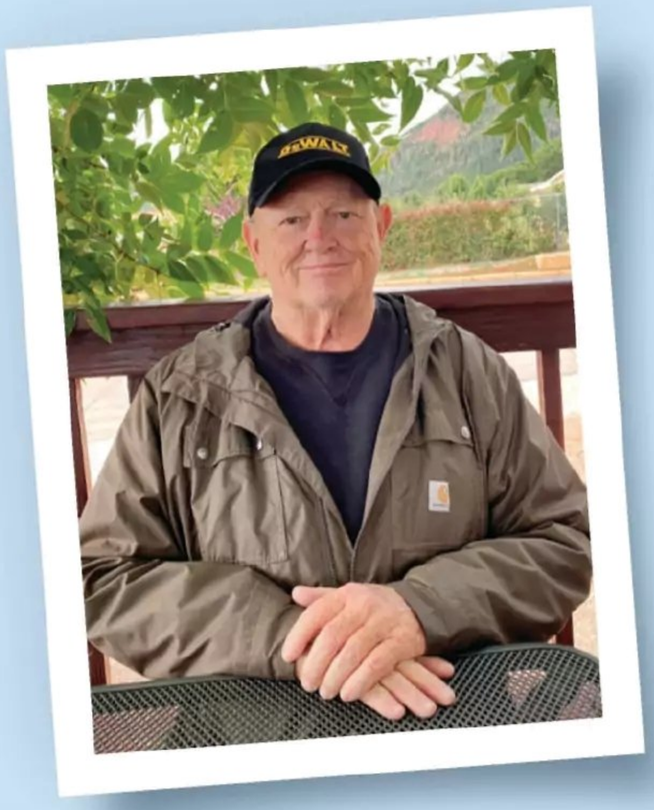
When Walt wanted to line one wall of the shop with cabinets supporting a 1½"-thick benchtop, he had to contend with the drainage slope of the floor. To counteract this slope, he made a cabinet base that's scribed and cut to match the floor on the bottom and level on top. Then he framed a 2×4 bench structure 24" deep and 40" tall. Three two-door, one-drawer cabinets support the benchtop. Spaces between the cabinets

PHOTOGRAPHER: WALT KORINKE; **ILLUSTRATORS:** ROXANNE LEMOINE, LORNA JOHNSON

SHOW US YOUR SHOP

Send high-resolution digital photos of your shop to ***woodmail@woodmagazine.com*** and we may showcase it in the magazine!

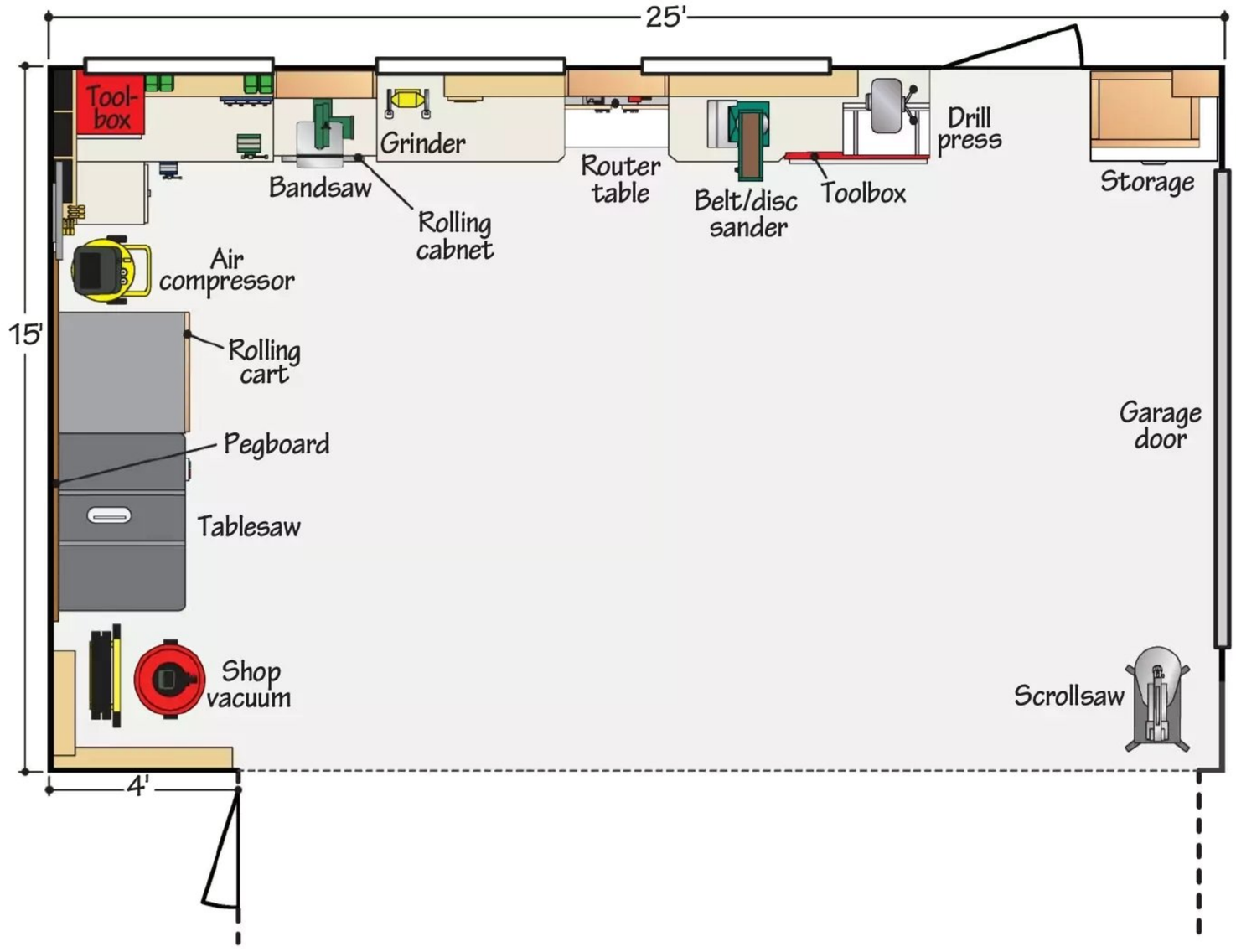
In Memoriam



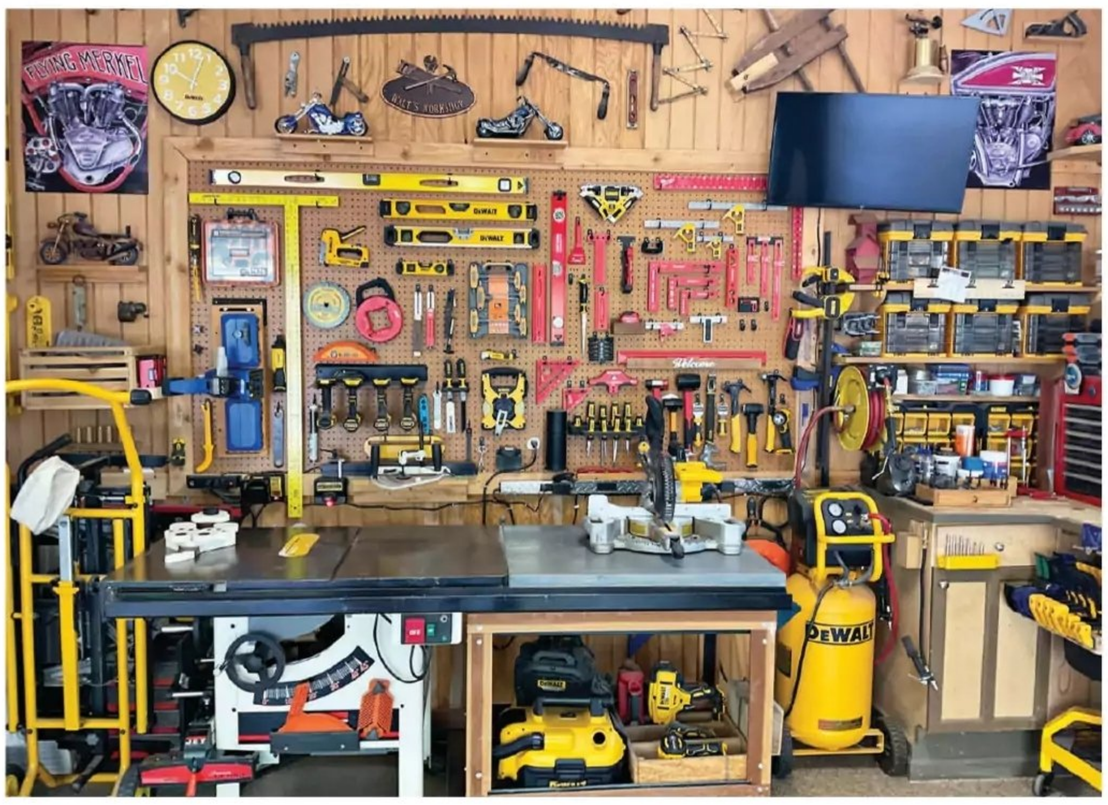
While we were working with Walt Korinke for this article, he unexpectedly passed away. He was 82 years old and died doing what he loved most: working on a wood project in his shop. The family requested that we publish the story about Walt's shop just as we would have in honor of his life and legacy. We are proud to do so and we offer our sincere condolences to Walt's loved ones and friends.

From his family:

Thanks to his handiwork, there wasn't a tree in the yard without a birdhouse, nor a neighbor without an Adirondack chair. He had a knack for finding tools that no one else would think to buy, yet, in his hands, always found a purpose. When a new tool hit the market, a new space would appear, keeping the delivery person constantly busy. If a tool didn't exist, he would create it, showcasing his boundless creativity and resourcefulness. His love for the community, his generosity, and his strength will be deeply missed by all his family and friends.



On cabinet fronts, custom tool racks keep most-used accessories like screwdrivers and drill/driver bits organized and easily accessible. A charging station on the benchtop keeps batteries at the ready.



A 4x8' pegboard panel lines the back wall, providing flexible options for storage. The tablesaw with its extension wing doubles as a worksurface when not being used for cutting.

> **MY CANADIAN MOTHER WAS THE TRUE CARPENTER IN THE FAMILY. A NATURAL, SHE IGNITED MY INTEREST IN BUILDING MOST ANYTHING IN WOOD.**
>
> ***-WALT KORINKE, SHOP OWNER***

Twenty years retired from managing real estate investments, Walt writes about commercial development for the local newspaper, though he likes nothing more than spending time in his workshop.

provide homes for a metal tool cabinet and a router table. The router table, on a sliding platform, sits flush with the benchtops on each side that provide additional support for longer workpieces. Another tool cabinet resides at the end of the benchtop near the passage door.

Walt's passion for organization is clear to see on the front of the cabinet doors. He fashioned custom holders for smaller tools and accessories that see frequent use.

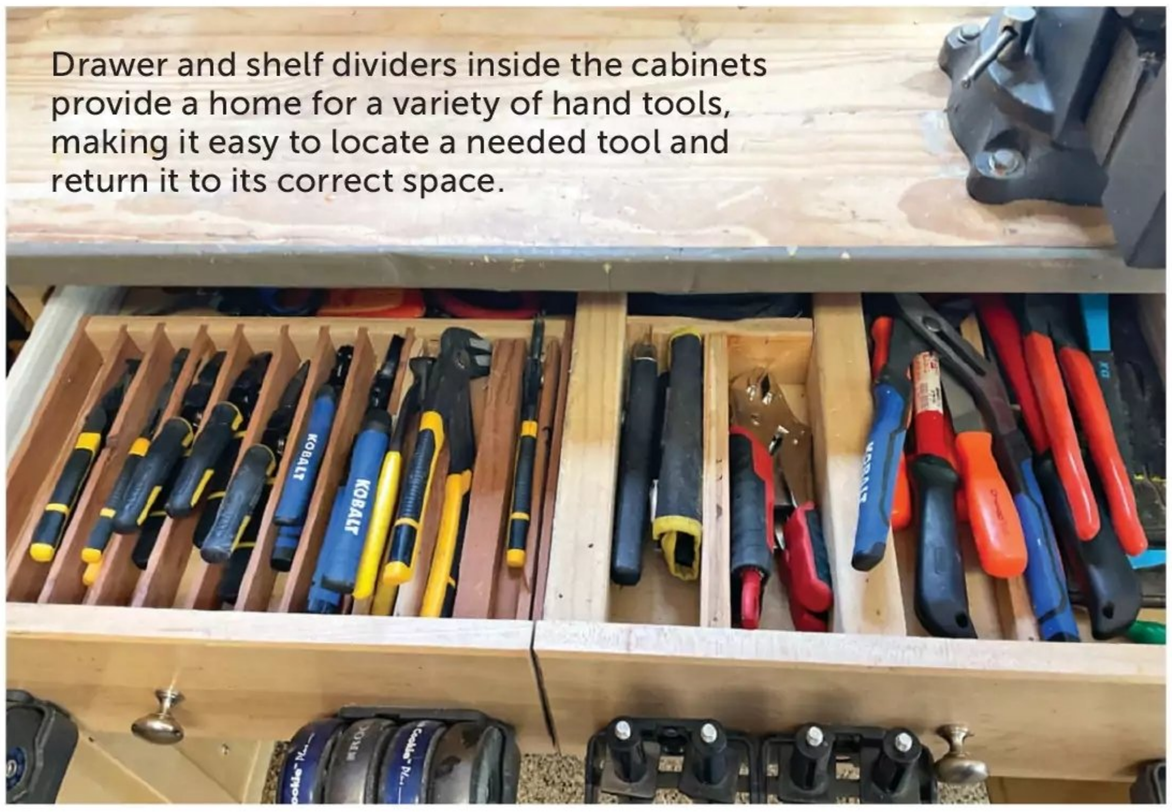
To keep dust at bay, Walt routed vacuum hoses from the rear of the sander, bandsaw, and router to the front of one of the cabinets. A port allows connecting his shop vacuum when needed.

Along the rear wall, Walt's old Jet tablesaw with sliding table and extension wing serves as an 82"-long worktable. For larger projects, he rolls it out to the center of the shop. His mitersaw sits atop the extension wing ready to use.

Walt hired professionals to apply the epoxy floor coating. He says it's much easier to keep clean and makes paint spills easy to wipe up.

For power, Walt ran heavy-duty outlet strips along the walls. A ceiling-mounted cord reel supplies power to the center of the shop. Not forgetting the amenities, Walt installed a ceiling fan for summer comfort, a small electric wall heater for winter, and a television for music and keeping up with his favorite football teams. Let's not forget the refrigerator for adult beverages. Oh...Walt also uses Amazon's Alexa for "wife access," he quips.

Regarding his shop, Walt adds, "I am insanely organized. I blame my German heritage for that. Every tool has its place, and I remember where I store it."



Drawer and shelf dividers inside the cabinets provide a home for a variety of hand tools, making it easy to locate a needed tool and return it to its correct space.

The benchtop router table sits on a sliding platform. Flanking the router table, a pair of cubbies with slide-out trays provide easy router-bit access.

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Q: DON'T GET TWISTED UP OVER DRILL BITS

I just added a drill press to my shop and wondered what kind of bits you recommend for woodworking? I have a small set of twist bits that came with my handheld drill. Are these good enough to use in a drill press?

Glenn Hensel
Battle Creek, Michigan

A: While you can certainly use twist bits to drill holes in wood, Glenn, their geometry is designed primarily for drilling in metal. Better bit options designed specifically for wood exist.

We recommend purchasing a set of brad-point bits first. These are the workhorse bits in our shop. A seven-piece set ranging from 1/8" to 1/2" in 1/16" increments will cover most everyday woodworking tasks. A small set comes at a reasonable price, so buy the best quality you can afford. They'll be more accurate and stay sharp longer than bargain-priced bits.

Brad-point bits have a spearlike tip that makes it easier to position the bit on the center of your hole location. The divot this tip leaves is especially handy for centering a screw pilot hole within a counterbore. Brad-point bits also have spurs on the edges that score the wood fibers as the bit enters the material, resulting in a cleaner entry hole. The flutes on brad-point bits eject chips more efficiently than twist bits. This allows you to feed the drill faster than with twist bits without clogging or burning.

Next, invest in a good set of Forstner bits. Again, start with a basic set ranging from 1/4" to 1" and purchase additional sizes as the need arises; they're available in diameters up to 3". Forstner bits have a self-guiding rim that cleanly scores the edge of the hole and prevents the bit from wandering as it drills. This allows you to drill overlapping holes for mortises and slots without having the bit pull sideways into the neighboring hole. You can also use them to drill angled holes.

The cutting edges of a Forstner bit (called lifters) are perpendicular to the shank of the bit, as opposed to spiraled or tapered. Consequently, Forstner bits are well-suited for drilling blind holes with flat bottoms, which you'll commonly do for joinery or hardware installation. The downside to Forstner bits is that they cut slower than brad-point bits and generate more heat.

Don't toss out those twist bits, though. They're available in a wider range of sizes, making them handy when you need to drill a hole to the nearest 1/32" or 1/64". And, even as a woodworker, you'll occasionally need to drill holes in metal, which brad-point bits and Forstner bits can't do.

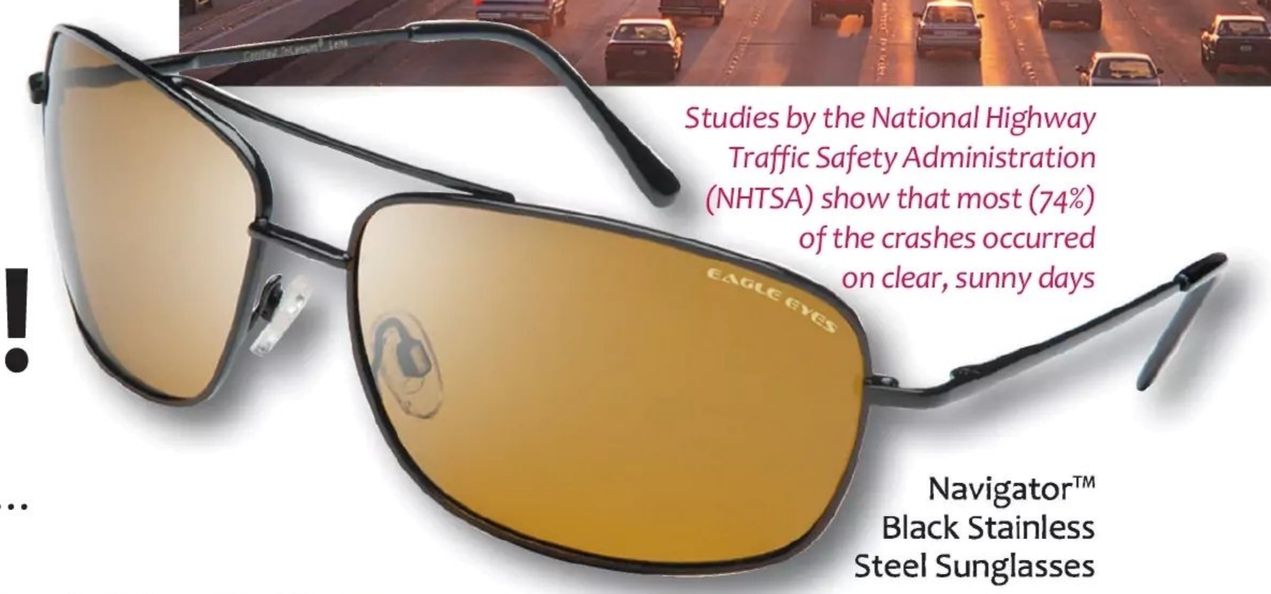
Have a question? Drop us an e-mail.
askwood@woodmagazine.com

Urgent: Special Summer Driving Notice

To some, sunglasses are a fashion accessory…

But When Driving, These Sunglasses May Save Your Life!

Studies by the National Highway Traffic Safety Administration (NHTSA) show that most (74%) of the crashes occurred on clear, sunny days



Navigator™ Black Stainless Steel Sunglasses

Drivers' Alert: Driving can expose you to more dangerous glare than any sunny day at the beach can… do you know how to protect yourself?

The sun rises and sets at peak travel periods, during the early morning and afternoon rush hours and many drivers find themselves temporarily blinded while driving directly into the glare of the sun. Deadly accidents are regularly caused by such blinding glare with danger arising from reflected light off another vehicle, the pavement, or even from waxed and oily windshields that can make matters worse. Yet, motorists struggle on despite being blinded by the sun's glare that can cause countless accidents every year.

Not all sunglasses are created equal. Protecting your eyes is serious business. With all the fancy fashion frames out there it can be easy to overlook what really matters—the lenses. So we did our research and looked to the very best in optic innovation and technology.

Sometimes it does take a rocket scientist. A NASA rocket scientist. Some ordinary sunglasses can obscure your vision by exposing your eyes to harmful UV rays, blue light, and reflective glare. They can also darken useful vision-enhancing light. But now, independent research conducted by scientists from NASA's Jet Propulsion Laboratory has brought forth ground-breaking technology to help protect human eyesight from the harmful effects of solar radiation light. This superior lens technology was first discovered when NASA scientists looked to nature for a means to superior eye protection—specifically, by studying the eyes of eagles, known for their extreme visual acuity. This discovery resulted in what is now known as Eagle Eyes®.

Slip on a pair of Eagle Eyes® and everything instantly appears more vivid and sharp. You'll immediately notice that your eyes are more comfortable and relaxed and you'll feel no need to squint. The scientifically designed sunglasses are not just fashion accessories—they are necessary to protect your eyes from those harmful rays produced by the sun during peak driving times.

The Only Sunglass Technology Certified by the Space Foundation for UV and Blue-Light Eye Protection. Eagle Eyes® features the most advanced eye protection technology ever created. The TriLenium® Lens Technology offers triple-filter polarization to block 99.9% UVA and UVB—plus the added benefit of blue-light eye protection. Eagle Eyes® is the only optic technology that has earned official recognition from the Space Certification Program for this remarkable technology.

The finest optics: And buy one, get one FREE! Eagle Eyes® has the highest customer satisfaction of any item in our 20 year history. We are so excited for you to try the Eagle Eyes® breakthrough technology that we will give you a **second pair of Eagle Eyes® Navigator™ Sunglasses FREE––a $59.95 value!**

That's two pairs to protect your eyes with the best technology available for less than the price of one pair of traditional sunglasses. You get a pair of Navigators with stainless steel black frames and the other with stainless steel gold, plus one hard zipper case and one micro-fiber drawstring cleaning pouch are included.

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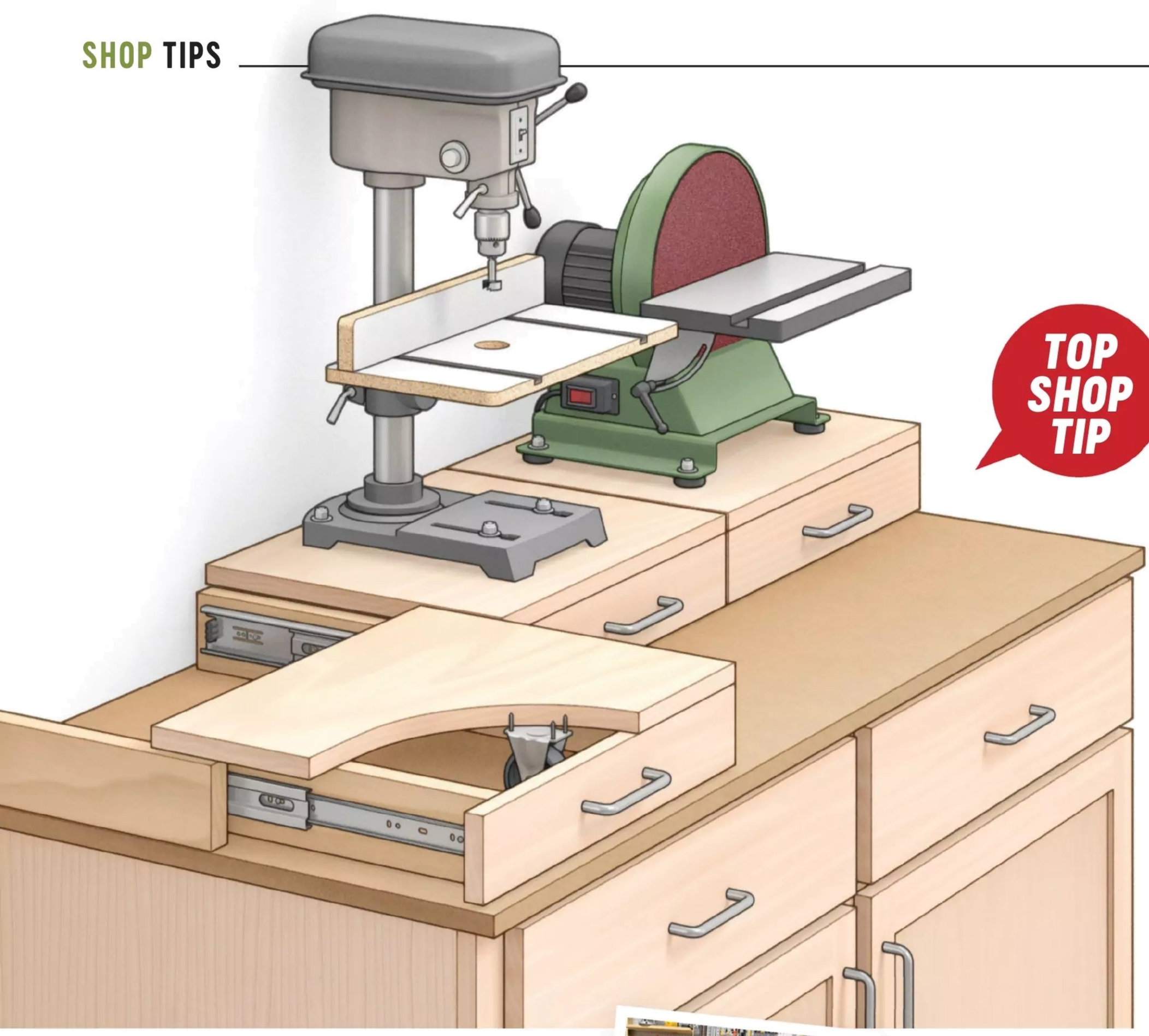

TOP SHOP TIP

OUT AND ABOUT

I have mostly benchtop tools that take up a lot of space. I devised these moving platforms to reclaim some of my worksurface when they are not in use. Each base resembles an upside-down drawer and rides on heavy-duty drawer slides. I simply pull one forward when I need to use it and slide it away when I'm finished. A caster under the top of each base provides additional stability when the tool is pulled forward.

Willy Leichter
Woodland, California

For his tip, Willy, with his dog, McCovey, wins an Adaptive Cutting System Saw + Guide Track Kit from Kreg worth $400.

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ILLUSTRATOR: CHRISTOPHER MILLS

continued on page 22

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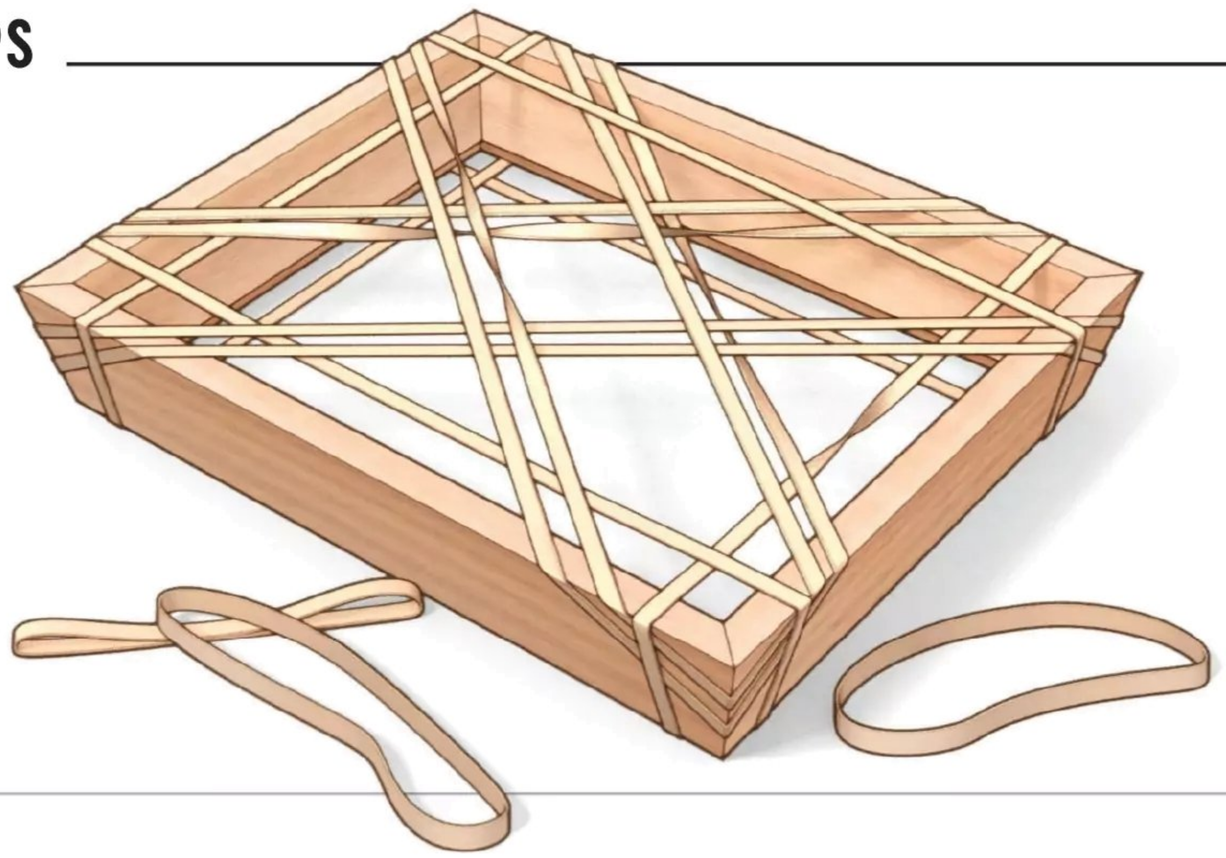


BAND IT, BANDIT!

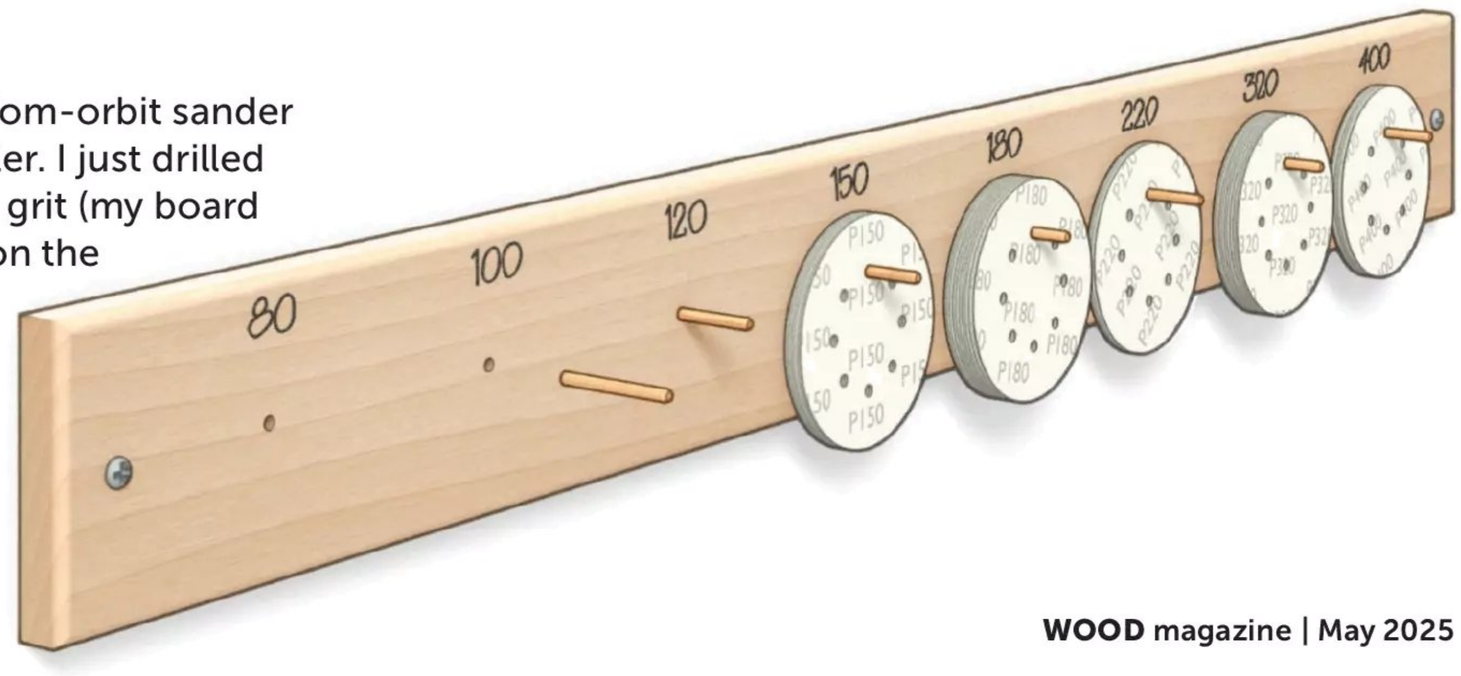
I build a lot of small trays and boxes, and I used to struggle with keeping the mitered corners aligned during glue-up—until I gave up on clamps in favor of rubber bands. I stretch a pair of bands diagonally and others parallel to the tray sides. The combination draws the joints nice and tight.

David Gleason
Houston, Pennsylvania

SANDING DISC SANITY

This rack keeps the sanding discs for my random-orbit sander organized and accessible. It couldn't be simpler. I just drilled holes in a board, inserted one dowel for each grit (my board has eight), and added labels. The discs hang on the dowels using the dust-collection holes.

Allen Torkelson
Jackson, Ohio



COLOR MY WORLD

When I need a small quantity of paint for a project in a custom color, I walk up to the paint counter and select the color I need from their hundreds of paint chips. Then I ask them to mix a sample. For around $5, I get enough paint at a reasonable price and in the exact color I need.

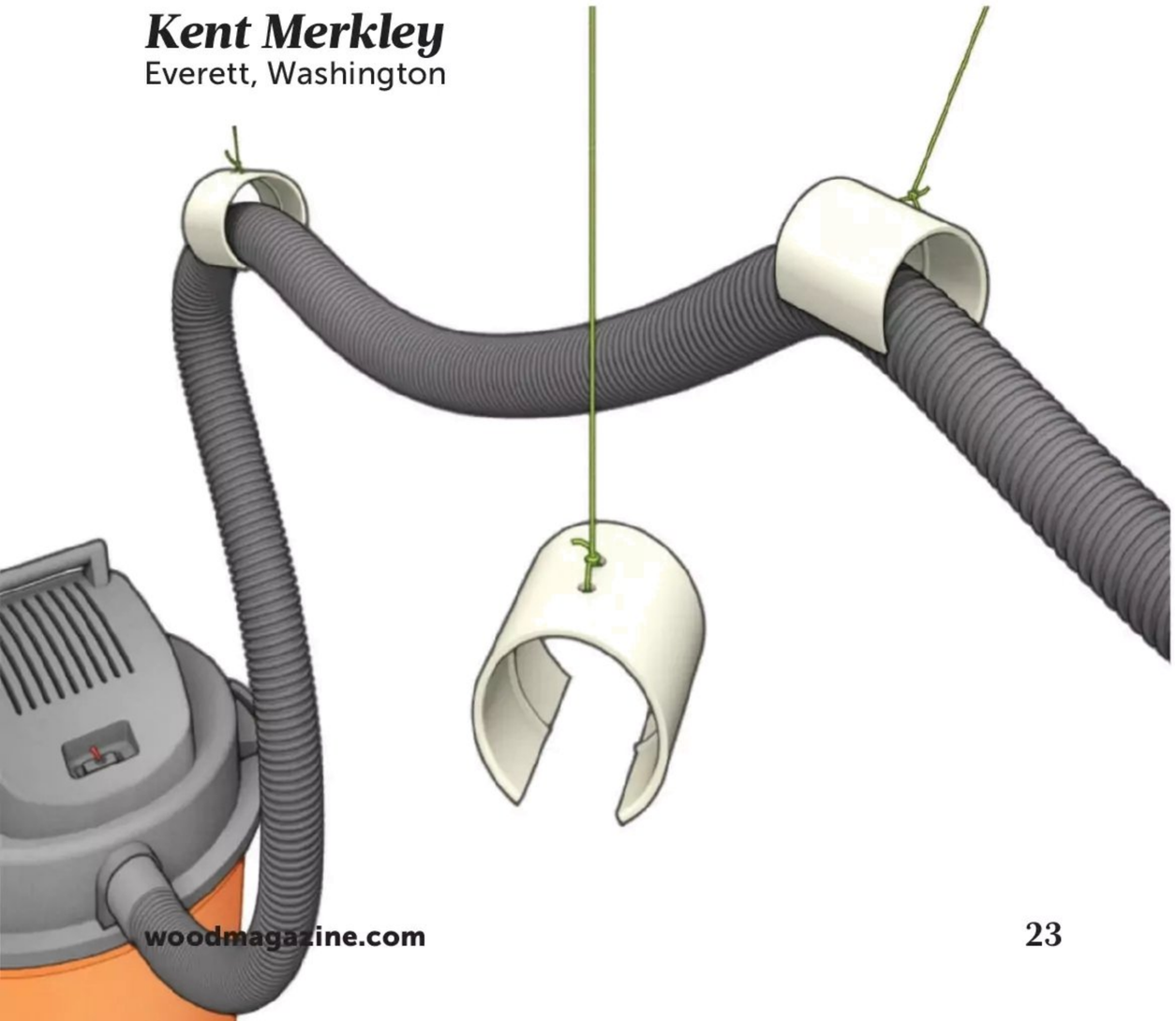
Roland Weisser
Evans, Georgia

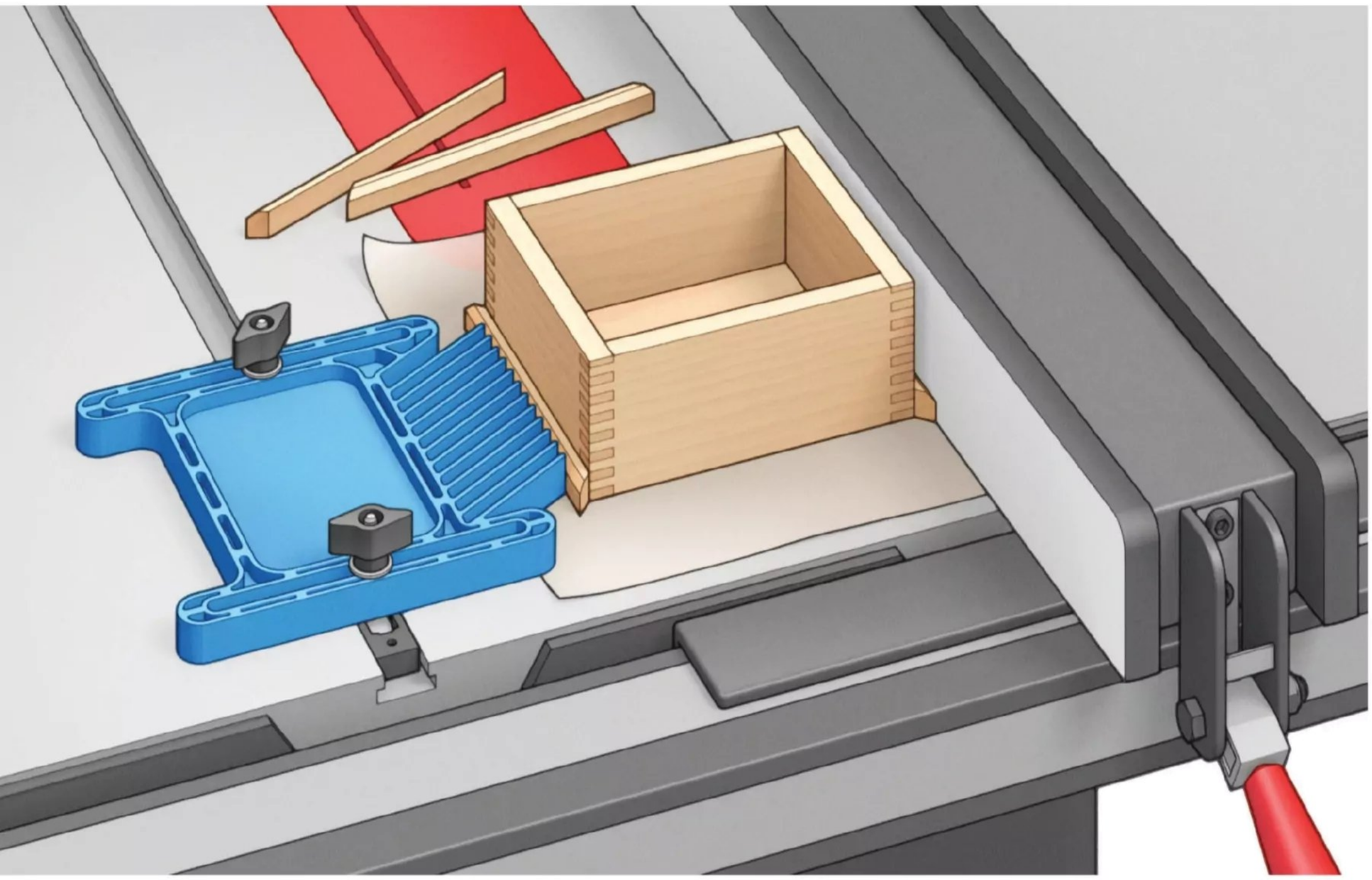
HANDY HOSE HANGERS

I use a shop vacuum as the primary dust collector in my shop, and I grew tired of battling with the long hose. So I devised these simple hangers to suspend the hose overhead.

I made each hanger from a 3"-diameter PVC pipe coupler with a 2"-wide section cut out of it. A couple of holes drilled in the side allow me to attach a cord for mounting to the ceiling. The hangers flex enough to easily insert and remove the vacuum hose with an outside diameter of about 2½", while still keeping it secure and out of the way.

Kent Merkley
Everett, Washington





FEATHERBOARD FORCE

While gluing molding to a small box, I found it difficult to clamp. So, I turned to an unusual helper: my tablesaw. I laid down a bit of waxed paper to keep glue off the saw table. Positioning the box between a featherboard and the rip fence allows the featherboard to apply gentle, consistent pressure to hold the molding in place.

Michael Speck
Attica, New York

OVERALL DIMENSIONS
56"W × 32"D × 49½"H

PHOTOGRAPHER: CARSON DOWNING; ILLUSTRATORS: ROXANNE LEMOINE, LORNA JOHNSON

RACK 'EM UP & LET 'EM ROLL

Corral lumber shorts on one side and partial sheet goods on the other. A slide-out shelf supports full sheets for layout tasks.

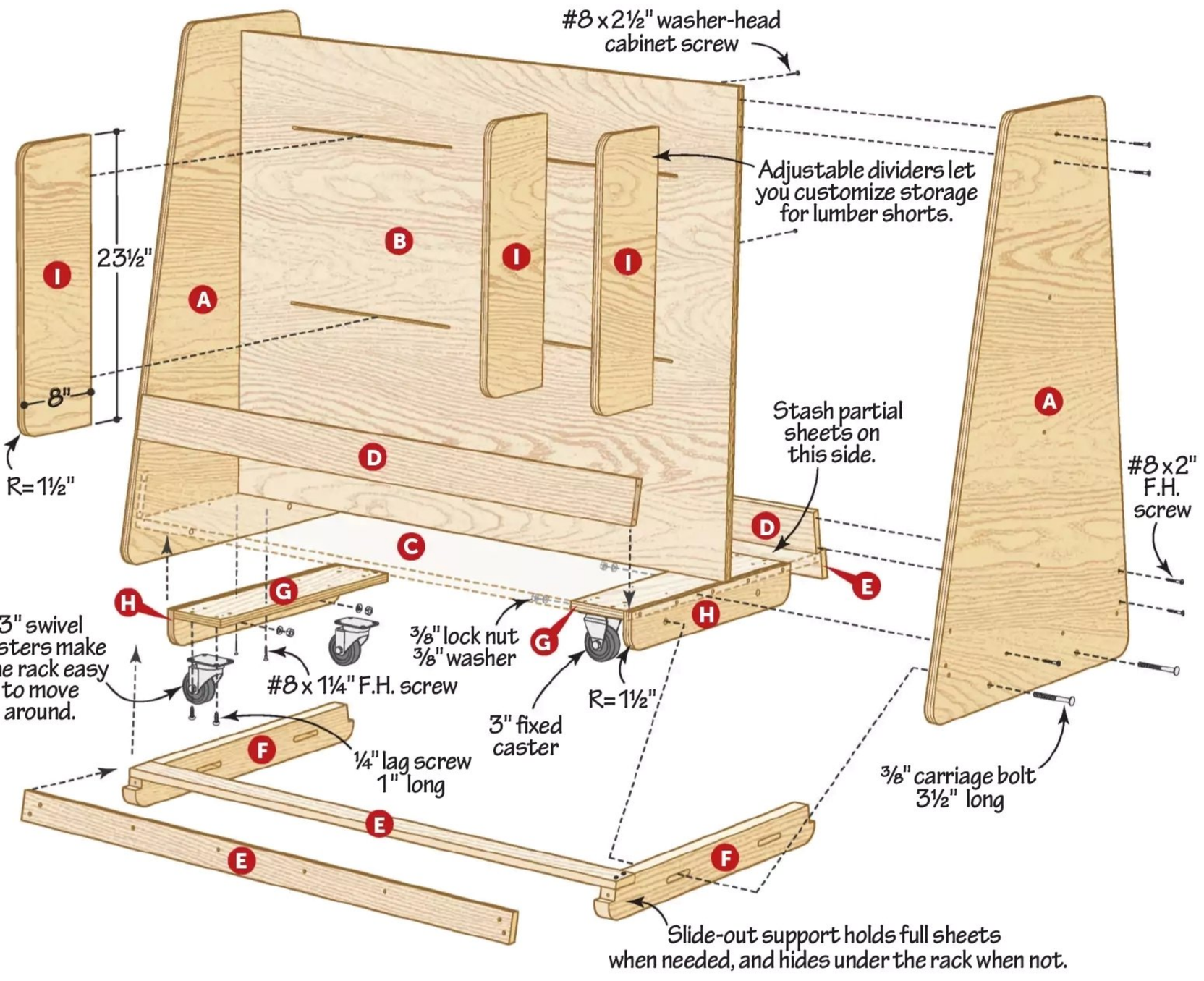
WRITER: CRAIG RUEGSEGGER
DESIGNER: JOHN OLSON
BUILDER: BRIAN BERGSTROM

We all have cutoffs and partial plywood sheets stashed in our shops. This cart provides the place to organize them efficiently. One side sports movable partitions to organize cutoffs and short boards stored on end. The opposite side provides space for leaning leftover sheet goods.

Casters make it easy to access both sides of the cart, even if you store it against a wall. And when you need to lay out parts on a full sheet of plywood, pull out the sliding support and rest the sheet on edge where you can easily access it.

Get all this from just two sheets of ¾" plywood and a few maple boards. Here's how.

EXPLODED VIEW



START WITH THE PLATFORM

The bulk of the cart consists of four parts cut from ¾" plywood: a bottom that supports a divider sandwiched between the two sides **[Exploded View]**.

TIP!

Make fewer cuts and ensure identical parts by stacking two plywood sheets and cutting both sides (A) at once.

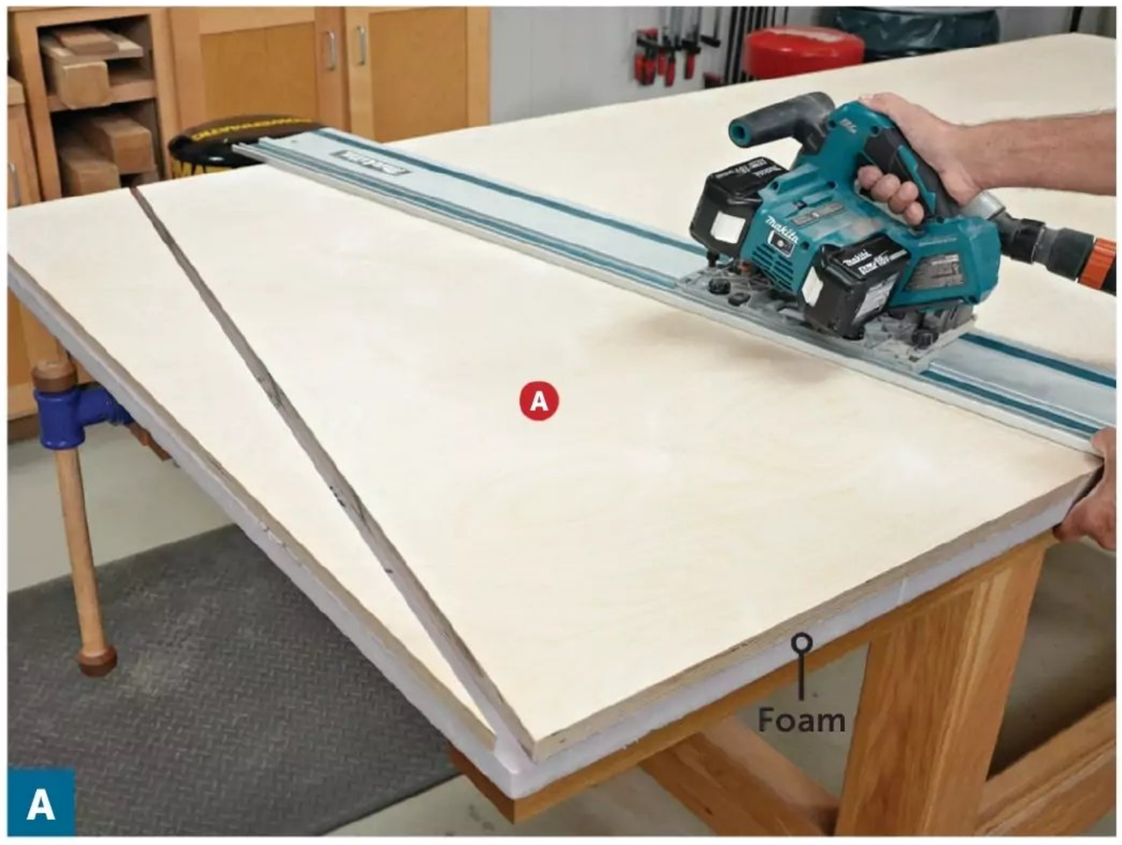
1 On a sheet of ¾" plywood, mark the angles for a side (A) **[Drawing 1]**. Cut the sides **[Photo A]**.

2 Radius the corners of each side (A) **[Photo B]** and drill the ⅜" holes near the bottom **[Photo C]**.

3 Cut the divider (B) to size **[Drawing 2]**. To rout the stopped slots, make a guide from scrap plywood the same length as the divider **[Photo D]**. Rout one set of slots, then flip the guide over and rout the two remaining slots.

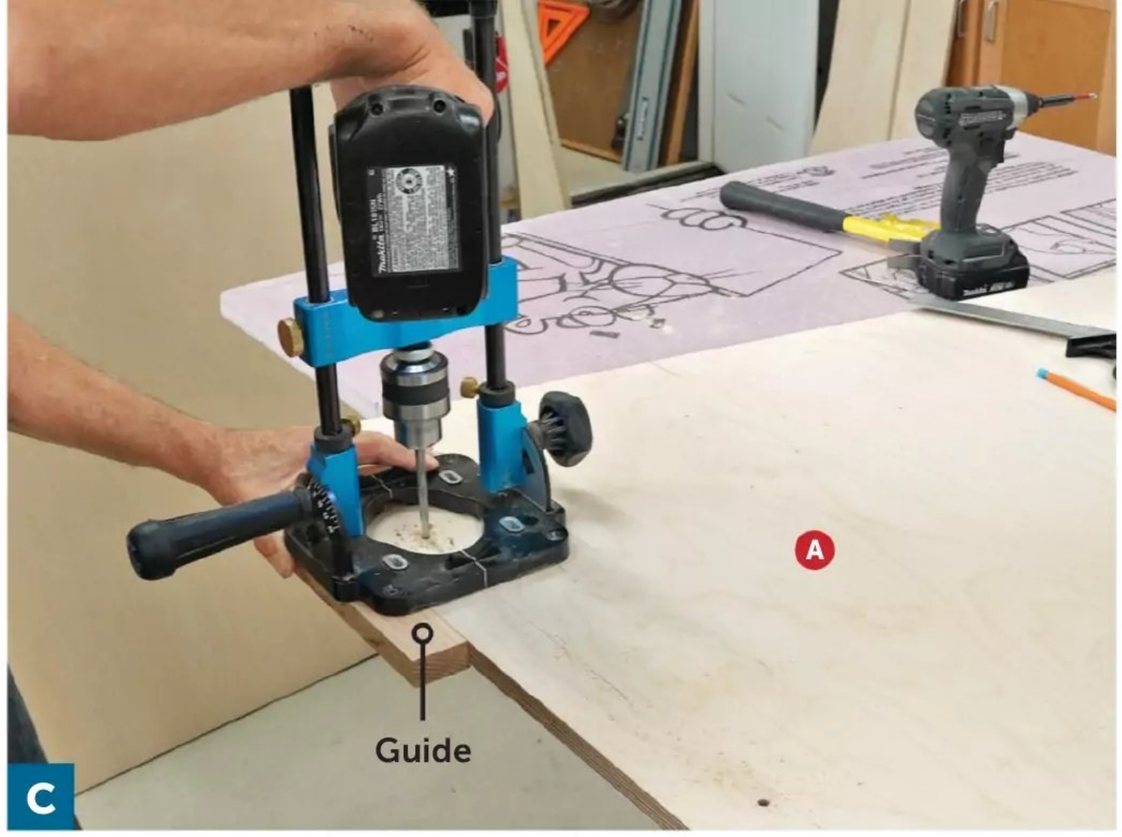
4 Cut the bottom (C) to size from ¾" plywood **[Materials List]**. Then, from ¾" maple, cut the stops (D) and rails (E) to size.

Washer-head screws bridge the slots in the divider. Loosen the screws to reposition the partitions (I).

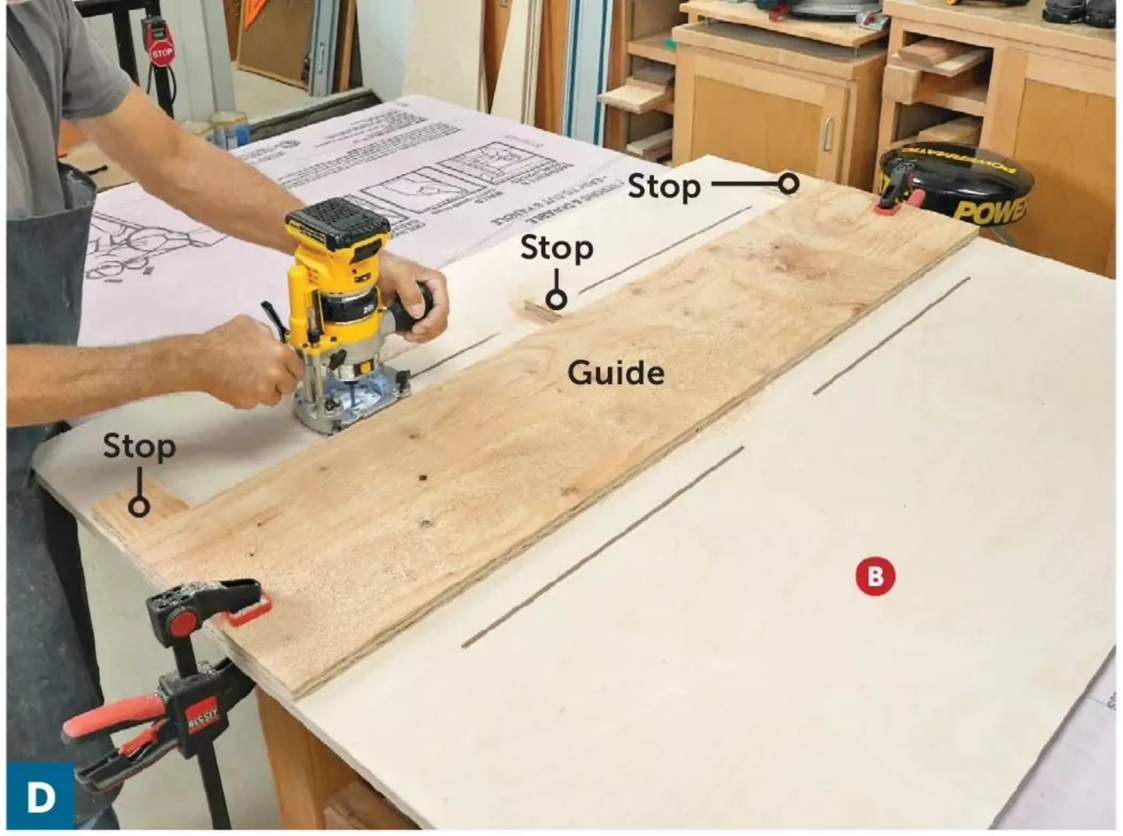


With the plywood resting on a sheet of extruded foam to protect the bench, set a tracksaw along the line and cut each side (A) to size. You can also use a circular saw guided by a straightedge.

The core of a roll of painter's tape is about 3", making it a convenient template for tracing the 1½"-radius curve on each corner of the sides (A). Cut the radii with a jigsaw and sand them smooth.

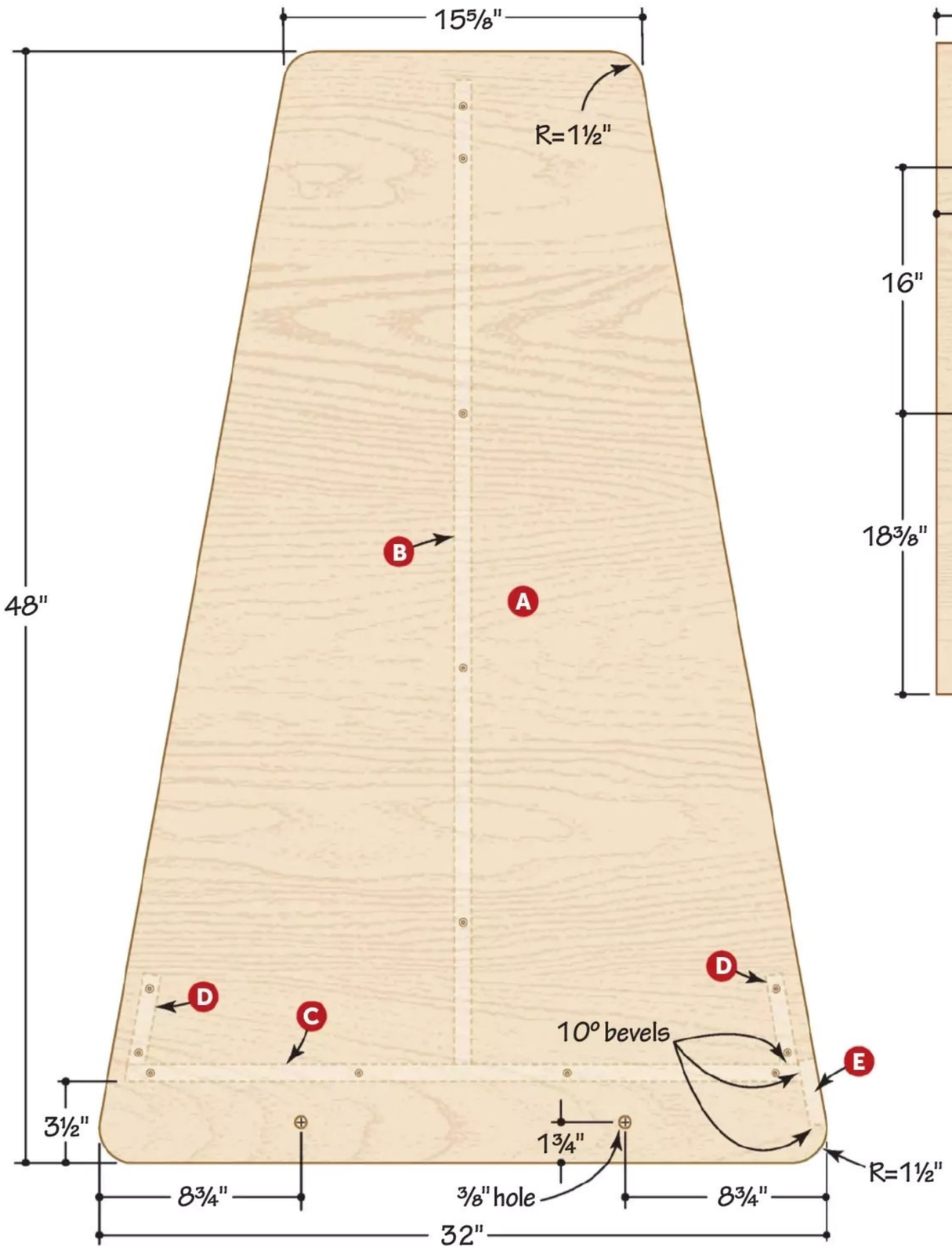


Screwing a scrap guide to the base of a vertical drill guide simplifies aligning the holes in the sides (A) so the sliders (F) (added later) won't bind when sliding in and out.

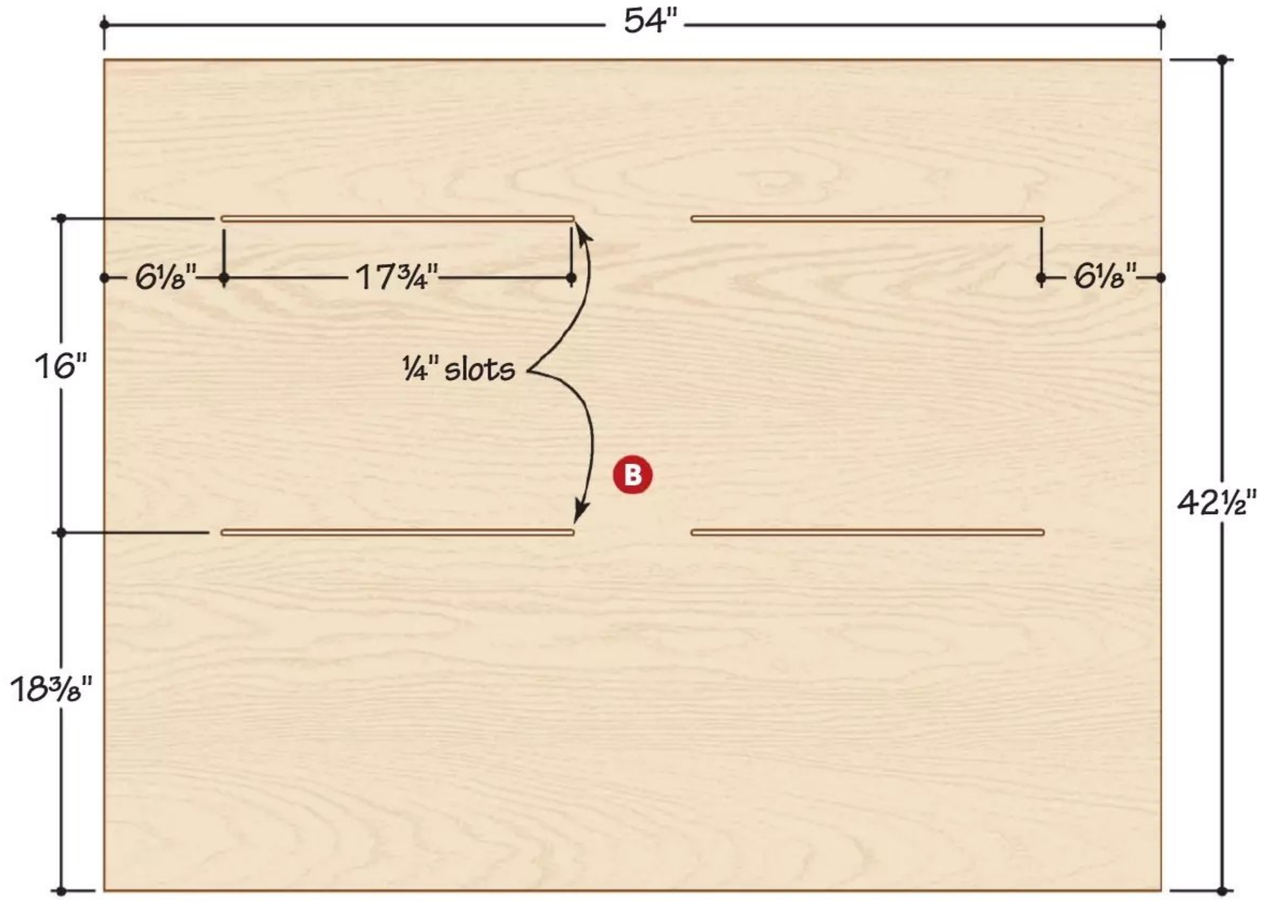


Build a guide with stops pocket-screwed to the body to help you cut straight slots in the divider (B). Use a ¼" spiral upcut bit and rout successively deeper passes to form the slots.

1 CART END VIEW



2 DIVIDER



IF YOU WORK ON A PROJECT-BY-PROJECT BASIS, YOU MAY NEVER NEED LONG-TERM STORAGE FOR A FULL SHEET. THIS COMPACT CART RECLAIMS 40" OF WALL.

–JOHN OLSON, DESIGN EDITOR

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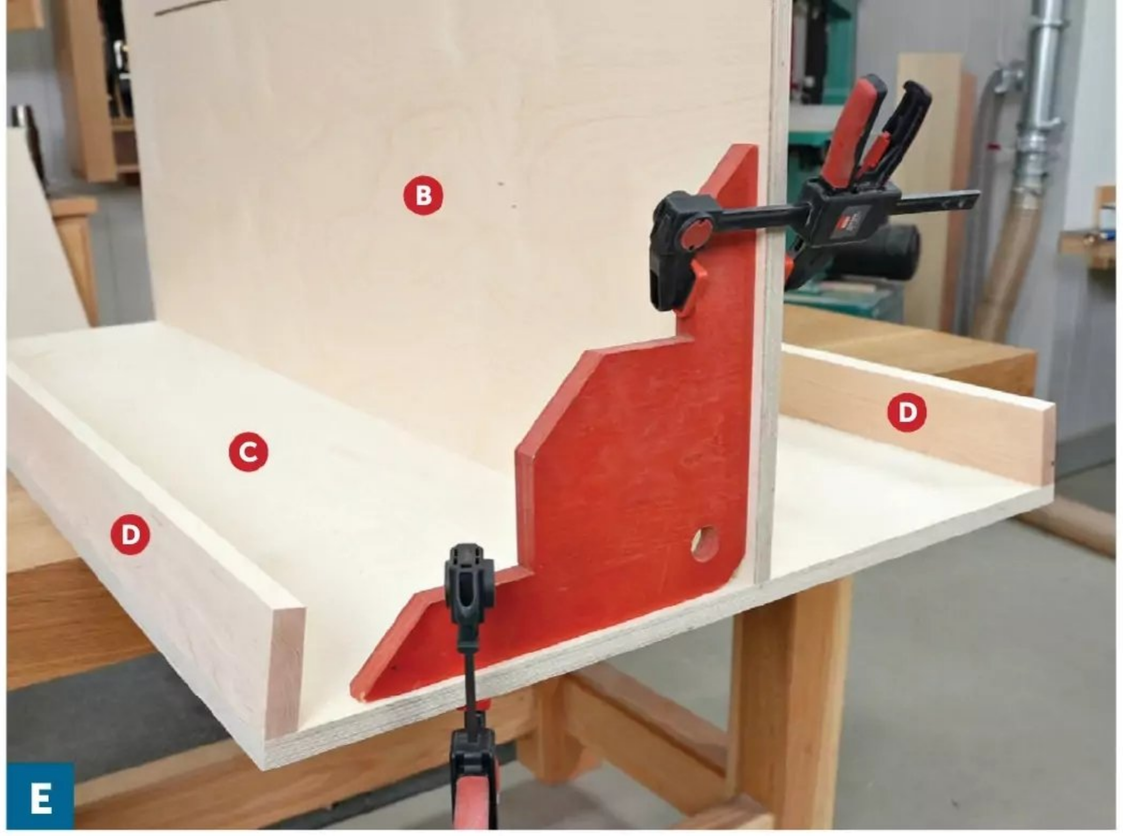
woodmagazine.com/squaringbrace

5 Tilt your tablesaw blade to 10° and set the rip fence to bevel-cut both long edges of the bottom (C) and one edge of each stop and rail (D, E) without reducing their widths **[Drawing 1]**. Set the rails aside for now.

6 Place the bottom (C) on your bench with the bevels facing up. Glue and screw the beveled edge of a stop (D) flush with each edge of the bottom. Then add the divider (B) **[Photo E]**.



Dry-fit the divider (B) and bottom (C) and mark the divider's location. Apply glue to the divider's edge, then hold it in position with a squaring brace while you drill and drive screws from below.

BUILD THE UNDERCARRIAGE

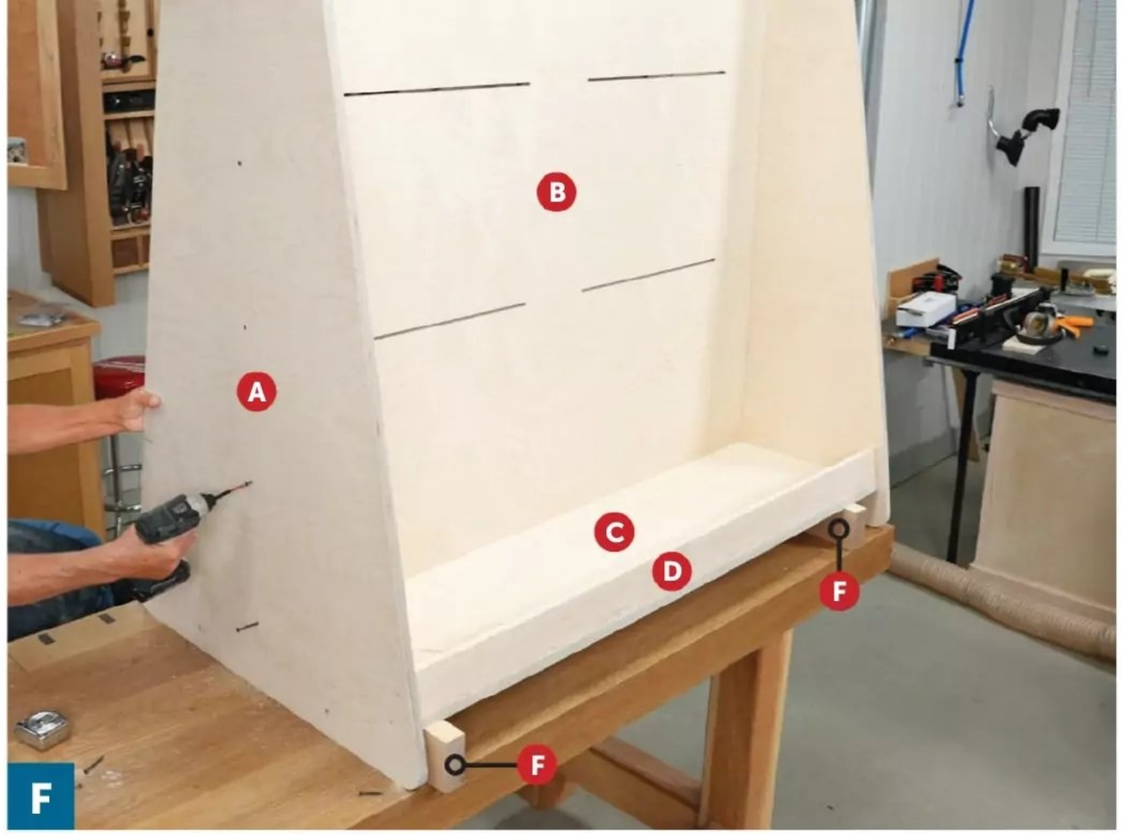
A sliding platform stores below the bottom, providing an on-demand rest for temporarily holding full sheets. The platform moves in and out on two sliders captured between the sides and braces.

1 Cut two 3½×32" blanks for the sliders (F) from 1½"-thick maple. Rest the bottom/divider assembly on the blanks and attach the sides (A) to the divider and bottom **[Photo F]**. Before removing the sliders, scribe their ends to the assembly **[Photo G]**.

2 Bandsaw and sand the ends of the sliders to the lines. Then use a rail (E) to scribe the angled notch at each end of the sliders, and mark the horizontal notch at one end for the rail **[Drawings 3, 4]**. Bandsaw the notches.

3 Turn the divider assembly upside down and align the sliders (F) next to the sides (A). Using a drill bit, mark the start and stop points for the slots in the sliders **[Photo H]** and rout the slots **[Photo I]**.

> **EVEN WITH YOUR HANDS FULL, YOU CAN MOVE THE SLIDING PLATFORM IN OR OUT WITH A LIFT FROM YOUR FOOT.**
>
> ***–JOHN OLSON, DESIGN EDITOR***

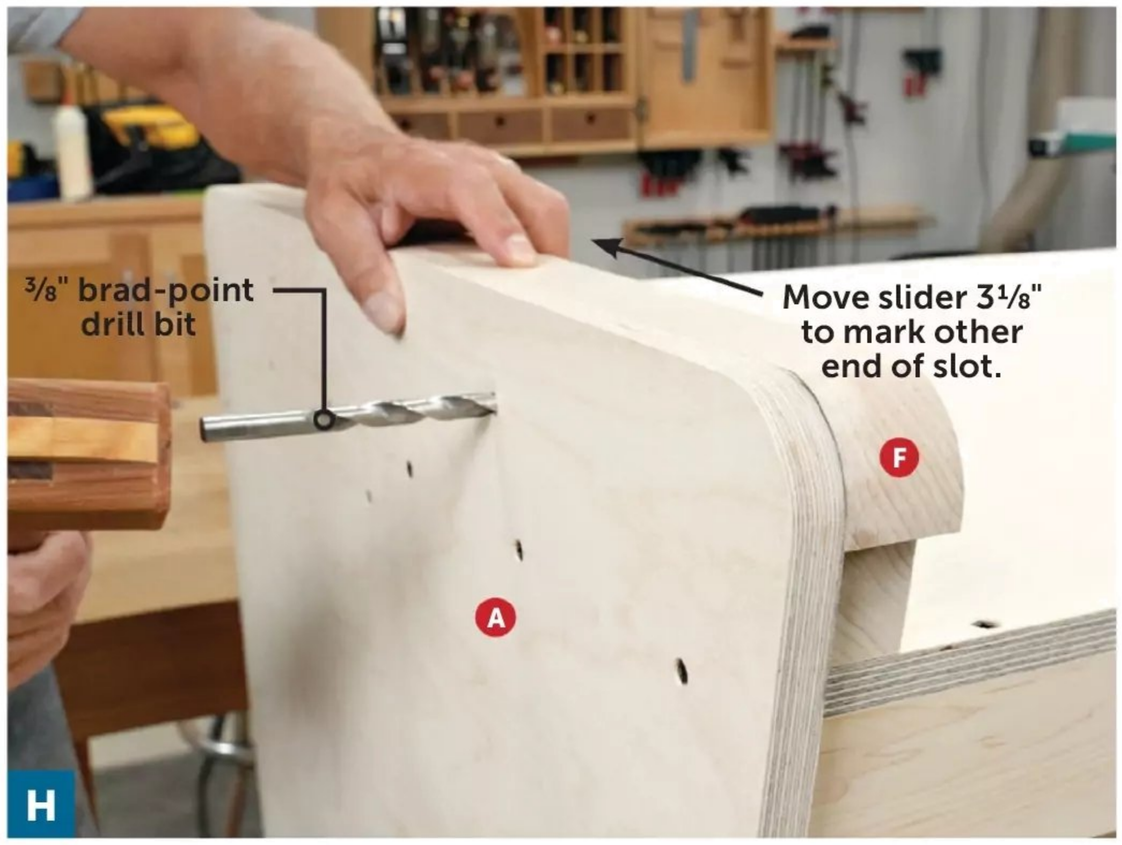


F

Rest the divider assembly (B/C/D/D) on the slider blanks (F). Apply glue to the edges of the divider and bottom, align a side (A) with the stops (D), and screw the side to the bottom and divider.

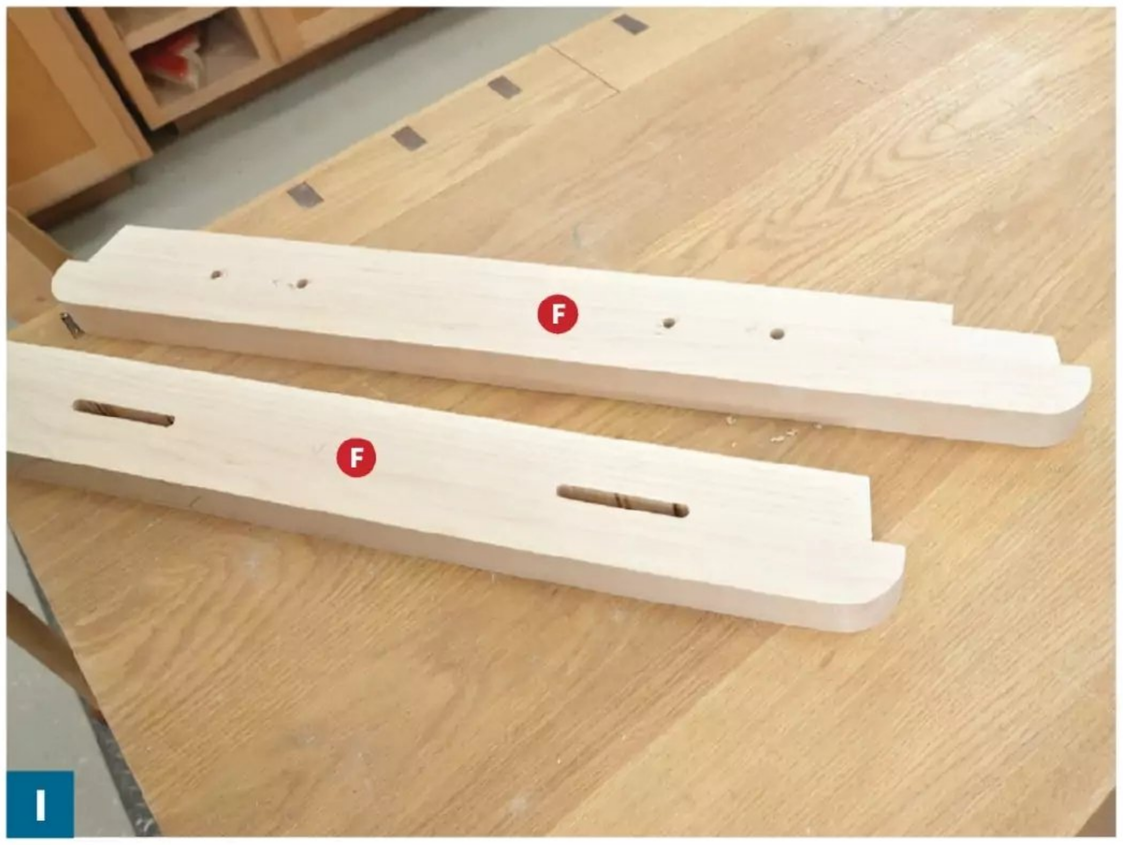
G

Center the sliders (F) on the width of the sides (A). Then, trace the shape of the side's bottom corner and the location of the stop (D) onto each end of each slider.



H

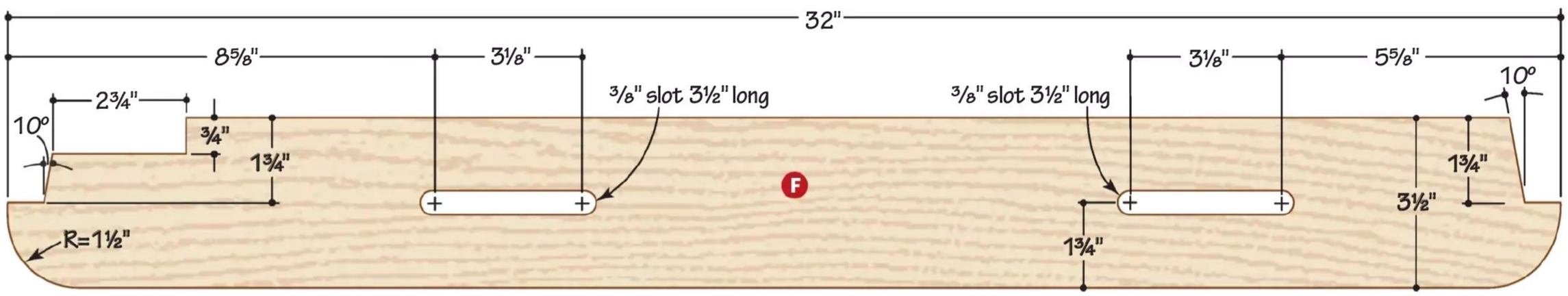
Tap a 3/8" brad-point bit through each hole in the side (A) to mark one end of each slot onto the sliders (F). Move the sliders 3 1/8" toward their double-notched end and repeat to mark the slots' other end.

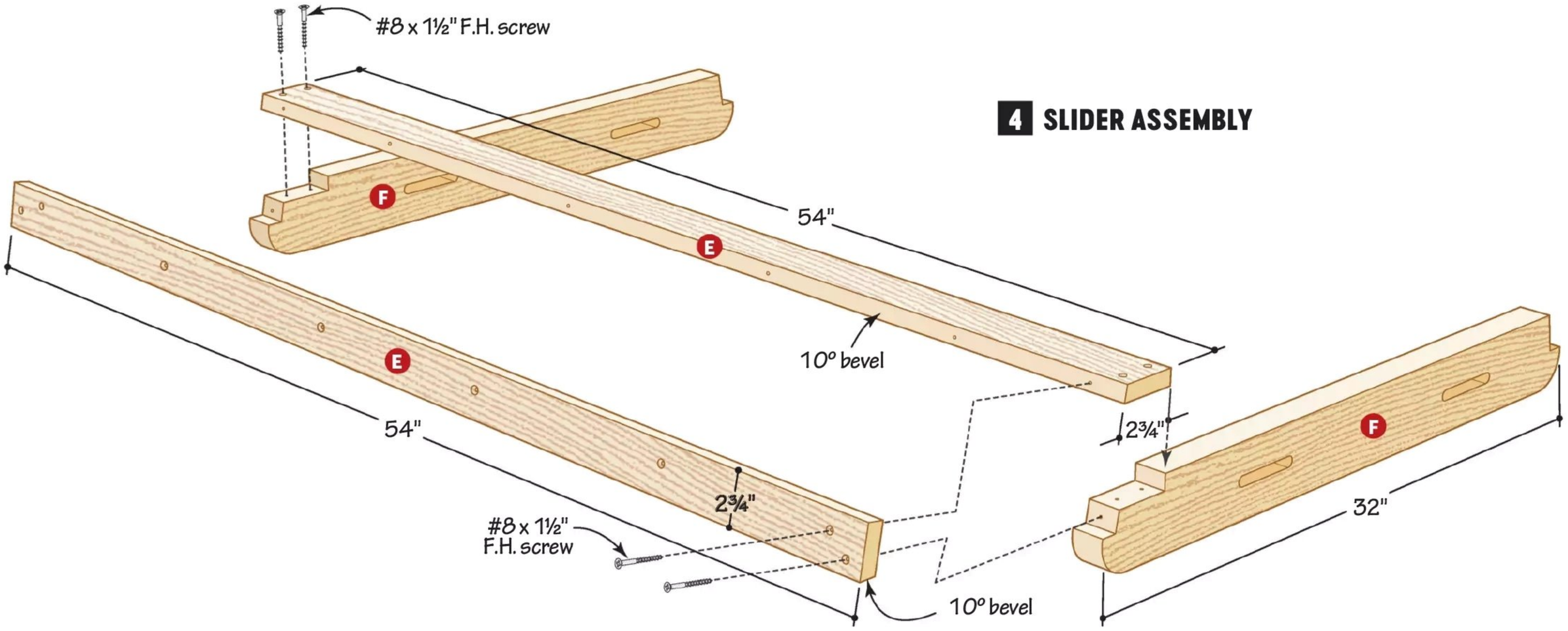


I

Drill 3/8" holes centered on the marked points (top). Rout the slot between the holes (bottom). We did this in several passes with a 3/8" straight bit in a handheld router equipped with an edge guide.

3 SLIDER





4 SLIDER ASSEMBLY

4 Temporarily join the sliders (F) by screwing a rail (E) into each of the notches at the front of the sliders **[Drawing 4]**. Check that the slider assembly moves in and out of the bottom of the cart assembly without binding. If it slides satisfactorily, remove the rails, then reattach them with glue and screws.

5 Cut the caster mounts (G) and braces (H) to size **[Materials List]**. Shape the 1½" radius on each end of the braces **[Exploded View]**. Glue and screw a brace to the edge of each caster mount.

6 Glue and screw the caster mount assemblies (G/H) to the bottom (C), using the slider assembly (E/E/F/F) to position the caster mounts. Allow just enough space so the sliders move freely. Then, extend the holes in the sides (A) through the braces **[Photo J]**. Install the ⅜" bolts, washers, and lock nuts **[Exploded View]**.

7 Glue and screw the remaining rail (E) to the rear edge of the bottom (C) **[Drawing 1]**, making sure the rail's bottom edge clears the notch in the sliders (F).

8 Screw the casters to the caster mounts (G), making sure they clear the braces (H) **[Exploded View]**. Set the cart upright.

MATERIALS LIST

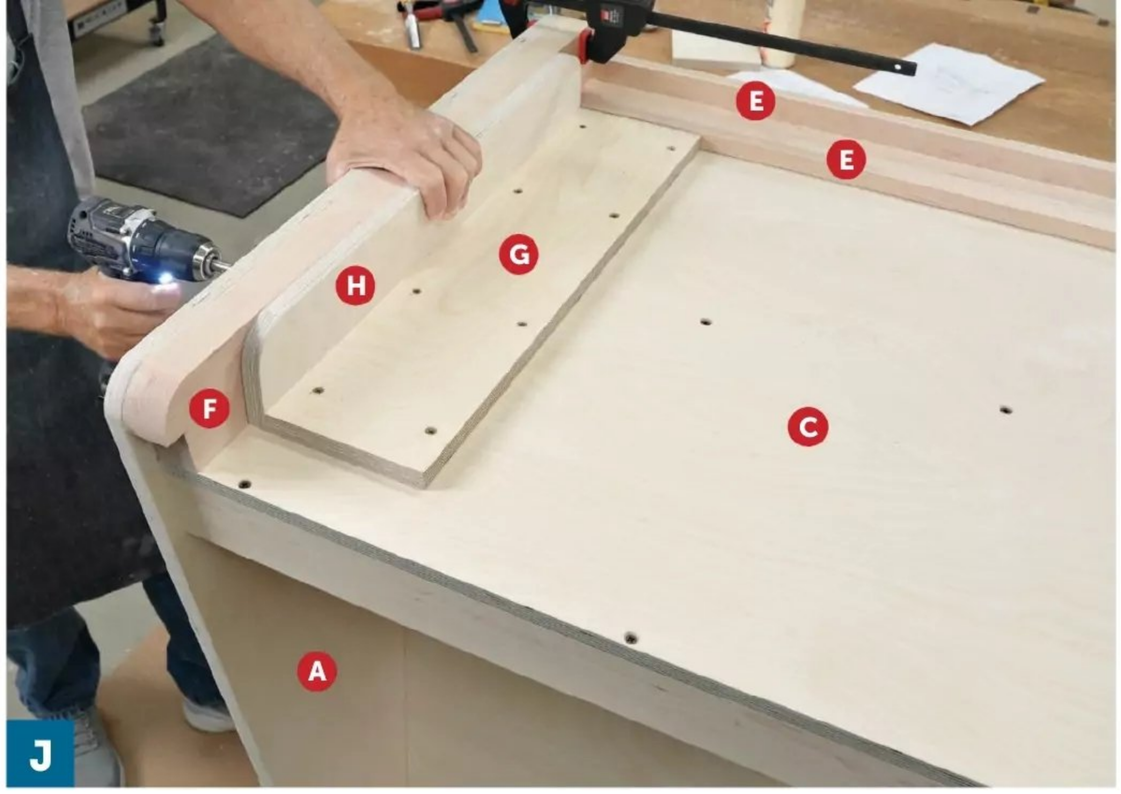
PART		FINISHED SIZE T	W	L	Matl.	Qty.
A	SIDES	¾"	48"	32"	Ply	2
B	DIVIDER	¾"	42½"	54"	Ply	1
C	BOTTOM	¾"	29¼"	54"	Ply	1
D	STOPS	¾"	3"	54"	M	2
E	RAILS	¾"	2¾"	54"	M	3
F*	SLIDERS	1½"	3½"	31⅜"	M	2
G	CASTER MOUNTS	¾"	5¼"	24"	Ply	2
H	BRACES	¾"	3½"	24"	Ply	2
I	PARTITIONS	¾"	8"	23½"	Ply	3

*Parts initially cut oversize. See the instructions.

MATERIALS KEY: Ply–Birch plywood, M–maple.
SUPPLIES: #8×1¼", #8×1½", #8×2" F.H. screws, #8×2½" washer-head cabinet-mounting screws, ⅜×3½" carriage bolts (4), ⅜" lock nuts (4), ⅜" washers (4), ¼×1" lag screws (16).
BITS: ¼" spiral upcut bit, ⅜" straight bit.
SOURCE: 3" rigid casters no. 2835T17 (2) $11 each, 3" swivel casters no. 2835T11 (2) $14 each, mcmaster.com.
PROJECT COST: It cost us about $325 to build this project. Your cost will vary by region and source.

9 Cut the partitions (I) to size and radius the two outside corners of each one **[Exploded View]**. Finish-sand the cart and dividers, easing any sharp edges. Apply a finish, such as brush-on polyurethane.

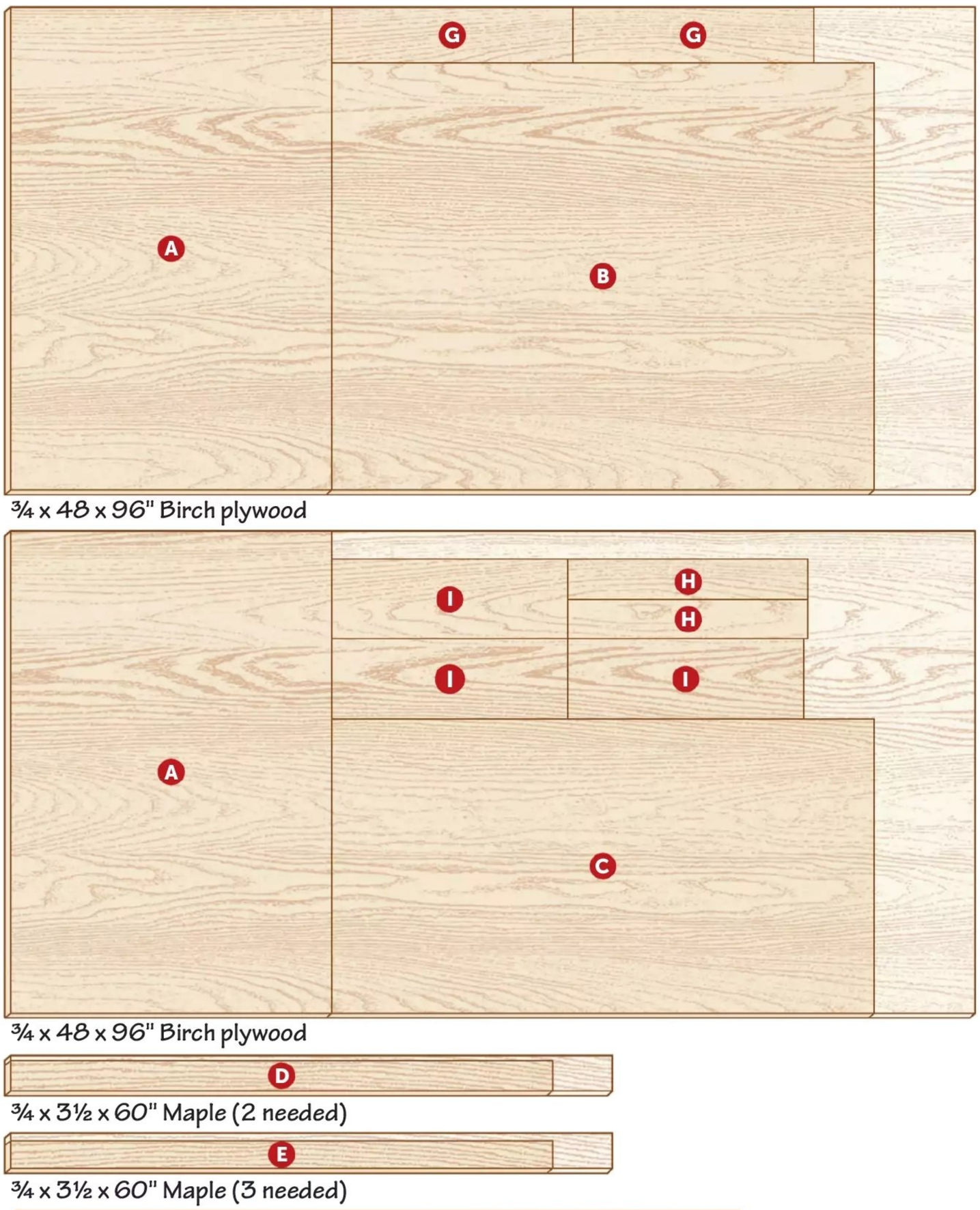
10 Place each partition (I) against the divider (B) and mark the slot locations, centered on one edge of each partition. Drill pilot holes at these points and secure the partitions to the divider with 2½" washer-head cabinet-mounting screws. Then start organizing those piles of cutoffs in their new home.



Clamp the slider assembly (E/E/F/F) flush with the sides (A). Drill through the holes in the sides and slots in the sliders to extend the holes through the braces (H).

CUTTING DIAGRAM

We purchased 10 board feet of 4/4 maple and 4 board feet of 8/4 maple. Before cutting parts to size, we planed them to the thicknesses shown in these example boards.

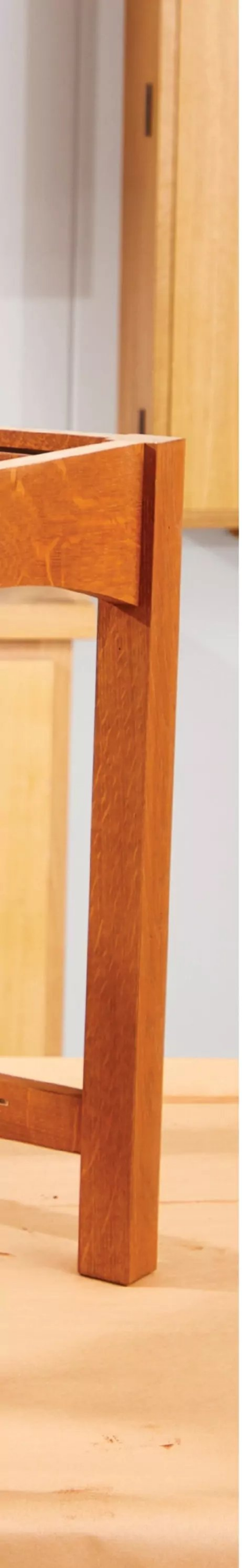


ARTS & CRAFTS FINISH

Highlight the craftsmanship of your Craftsman-style projects with our three-step finish that imparts the perfect, classic look.

WRITER: VINCE ANCONA with KEVIN BOYLE

PHOTOGRAPHER: BRIE GOLDMAN



Over the years, we've built a number of Arts & Crafts pieces from quartersawn white oak. And we've tried different finishes in a quest to easily re-create the warm, mellow brown color with subtle red and orange undertones that is a hallmark of this furniture style. The technique we've come up with isn't overly complicated, but it doesn't come straight out of a can, either.

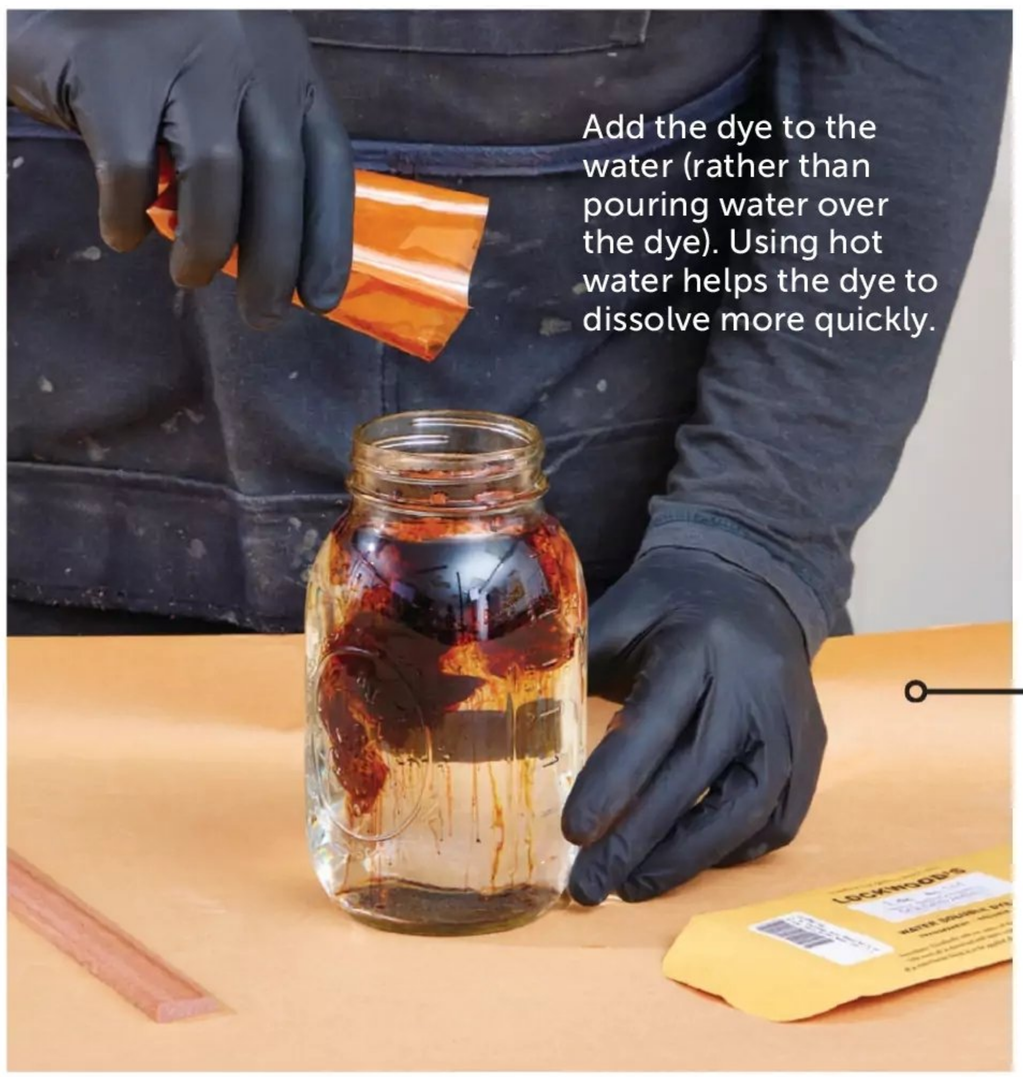
Our finishing method involves applying a water-based dye, followed by an oil stain, and then a topcoat. The dye adds depth and makes the flecking of the quartersawn oak pop while the stain tones down the bold color of the dye. The result easily re-creates the classic "fumed" look of period Arts & Crafts furniture without the noxious ammonia used to achieve it. We'll share our secret formula, including the specific dye and stain combination we use **[Sources]**, and walk you through the application process so you end up with a great-looking finish worthy of any Arts & Crafts piece.

PREP FIRST

Achieving a great-looking finish always starts with surface preparation. To make this easier, disassemble the project as much as possible by removing drawers, doors, shelves, or anything that attaches with fasteners. Sand all parts of your project up to 150 grit.

Water-based dyes (like the one we use in this process) have a tendency to raise the grain of the wood. To counteract this effect, dampen all surfaces with clean water to raise the grain, *right*. Allow the wood to dry, then sand the raised grain. Avoid sanding too aggressively; the goal is to knock down the raised grain so it's level with the surface and then stop. Use a tack cloth or vacuum to remove the sanding dust.

Use a damp cloth to wipe down the surface of the wood to raise the grain. After the wood dries, sand off the raised grain with a 180-grit sanding sponge or sandpaper and a sanding block.



Add the dye to the water (rather than pouring water over the dye). Using hot water helps the dye to dissolve more quickly.

DYEING TO GET STARTED

With the surface prepped, you're ready to mix and apply the dye. Wearing nitrile gloves to prevent getting dye on your hands, thoroughly mix 1 oz. of the dye powder with 1 quart of hot tap water, *left*. Stir the solution frequently until the water completely dissolves all of the dye powder (about 15 minutes).

TIP!

Mix dye in a clear glass container. A canning jar works great and is easy to reseal.

TIP!

When wiping away the excess dye, use lint-free rags to prevent leaving residue on the wood.

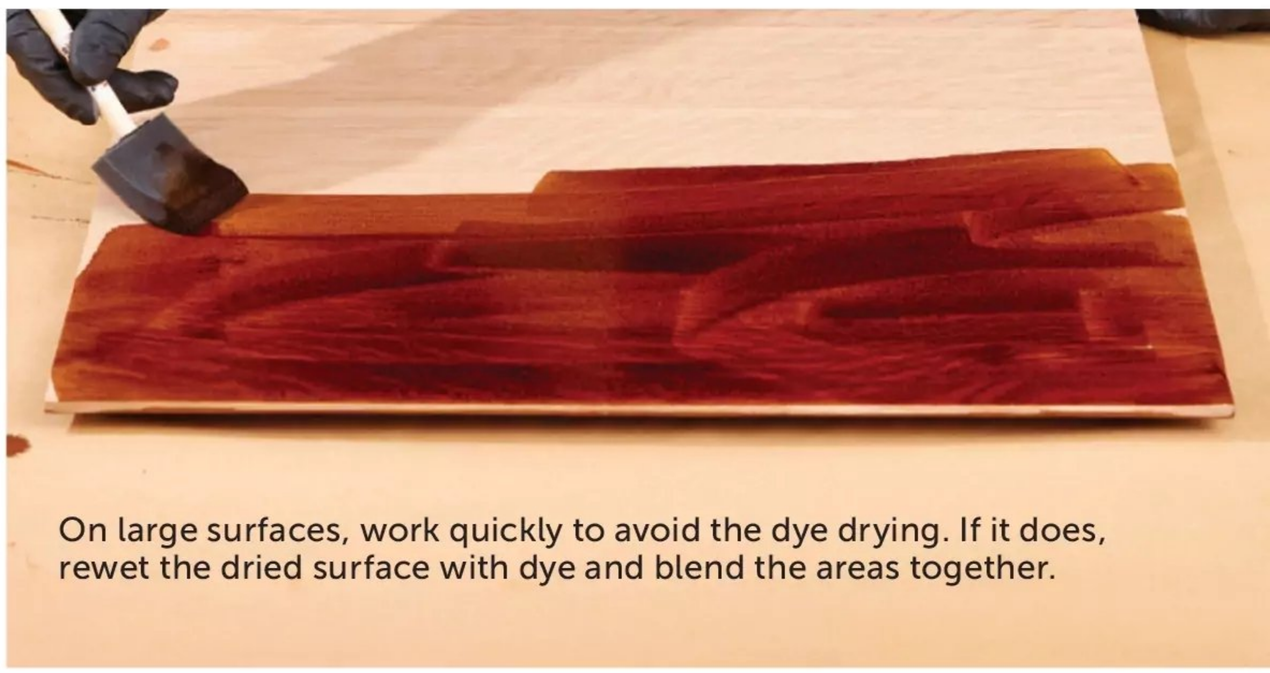
Apply the dye liberally with a foam brush to saturate the surface, *right*. Porous woods such as oak often require working the dye around with the brush to force it into the pores. To avoid lap marks, work in sections, applying the dye to one complete face or part and wiping off the excess before it starts to dry, using a clean rag, *below left*.

When covering large surfaces, divide the area into sections, starting at one edge and working across the surface, *below right*. Maintain a wet edge as you work. If you do get lap marks, apply more dye to blend the areas together and then rewipe with the cloth.

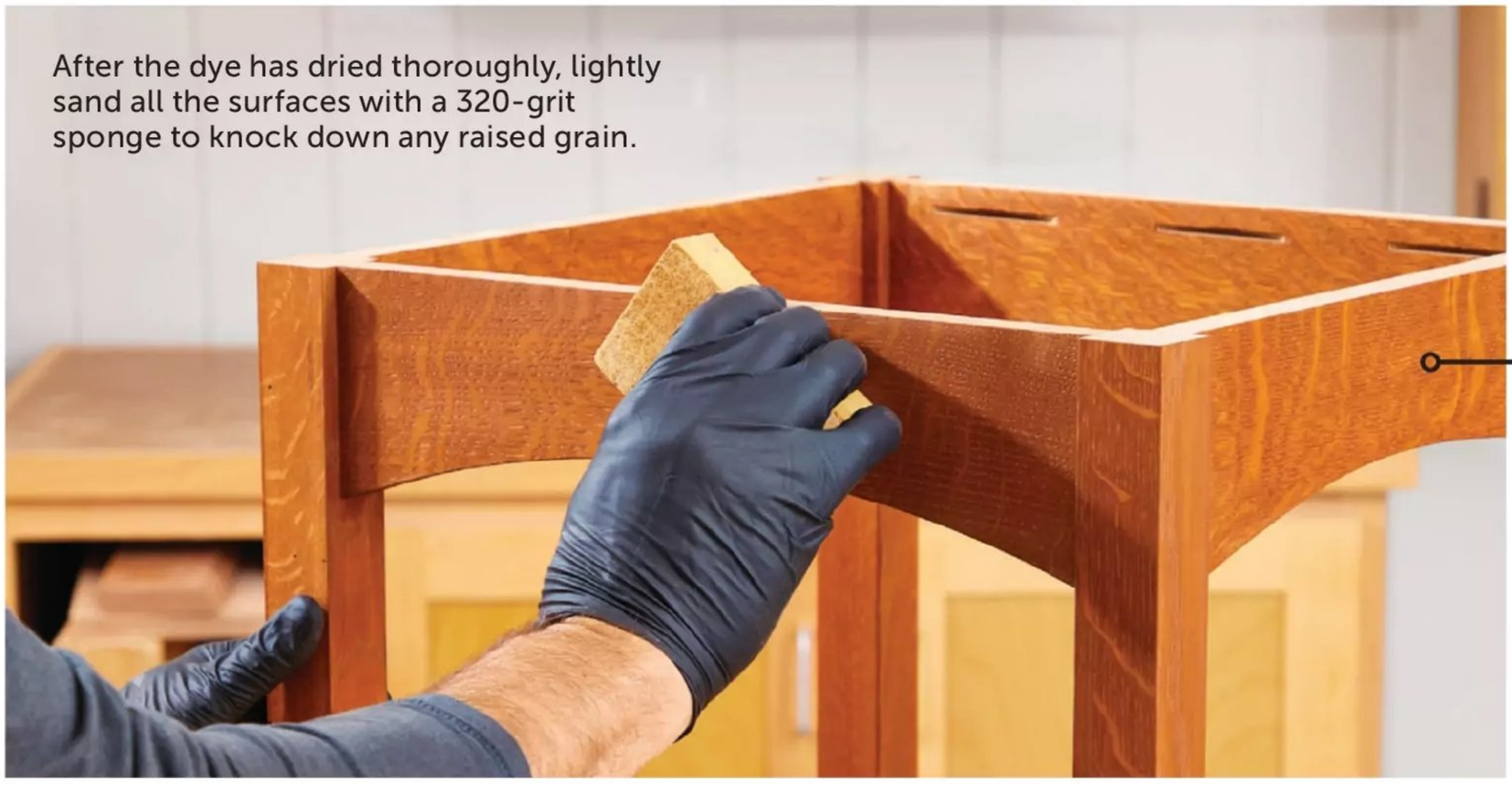
Allow the dye to dry completely (several hours or overnight). If the dye has raised any more grain, knock it down with a 320-grit sanding sponge, *below center*. Remove any sanding dust.

Using a foam brush, sponge the dye onto the wood, allowing it to soak in. Brush the dye in different directions to work it into the pores of the wood.

Wipe off the excess dye while it's still wet, before moving on to the next section.



On large surfaces, work quickly to avoid the dye drying. If it does, rewet the dried surface with dye and blend the areas together.



After the dye has dried thoroughly, lightly sand all the surfaces with a 320-grit sponge to knock down any raised grain.

TIP!

Don't sand aggressively; you want to remove the raised fibers without sanding through the dye.

Using a foam brush, apply a liberal coat of stain, making sure to cover all areas. Work in sections again. The stain doesn't dry as quickly as the dye, so you have more time to work.

Remove the excess stain with a clean rag. Even out color variations by increasing the wiping pressure or applying additional stain where needed.

ADD TONE WITH STAIN

When dry, the dye looks dull and lifeless and has a slight orange tint. But don't worry. The stain you'll add next equalizes the color and warms the tone. As with the dye, apply the stain with a foam brush, *above left*, and wipe off the excess with a lint-free rag, *above right*. Lap marks aren't as much of a concern because the stain doesn't dry as quickly as the dye, so you can work in larger sections. Allow the stain to dry completely (overnight).

WRAP IT UP WITH A TOPCOAT

Adding a topcoat completes this three-step finishing process. We use spray lacquer, but polyurethane also works fine. Whether you use a water- or solvent-based topcoat, choose one that is crystal clear. Some oil finishes have a slightly yellow or amber hue that will alter the color of the dye and stain that you worked so hard to achieve. For Arts & Crafts furniture, avoid high-gloss finishes and choose matte or satin sheen. Apply two or three coats of finish, sanding lightly between coats.

After the final coat dries completely, you may want to lightly rub out the surface with a 400-grit sanding sponge to smooth the surface and knock down the sheen according to your preference. The result is an attractive, long-lasting stain and finish that looks at home on any Arts & Crafts project.

SOURCES:

- Lockwood water-soluble dye, Early American Maple Golden Amber no. 144, 1 oz, $11, toolsforworkingwood.com.
- Varathane Premium oil-based interior wood stain, Gunstock, no. 211728H, 1 qt, $16, amazon.com.

STATELY STACKED TABLE & CHEST

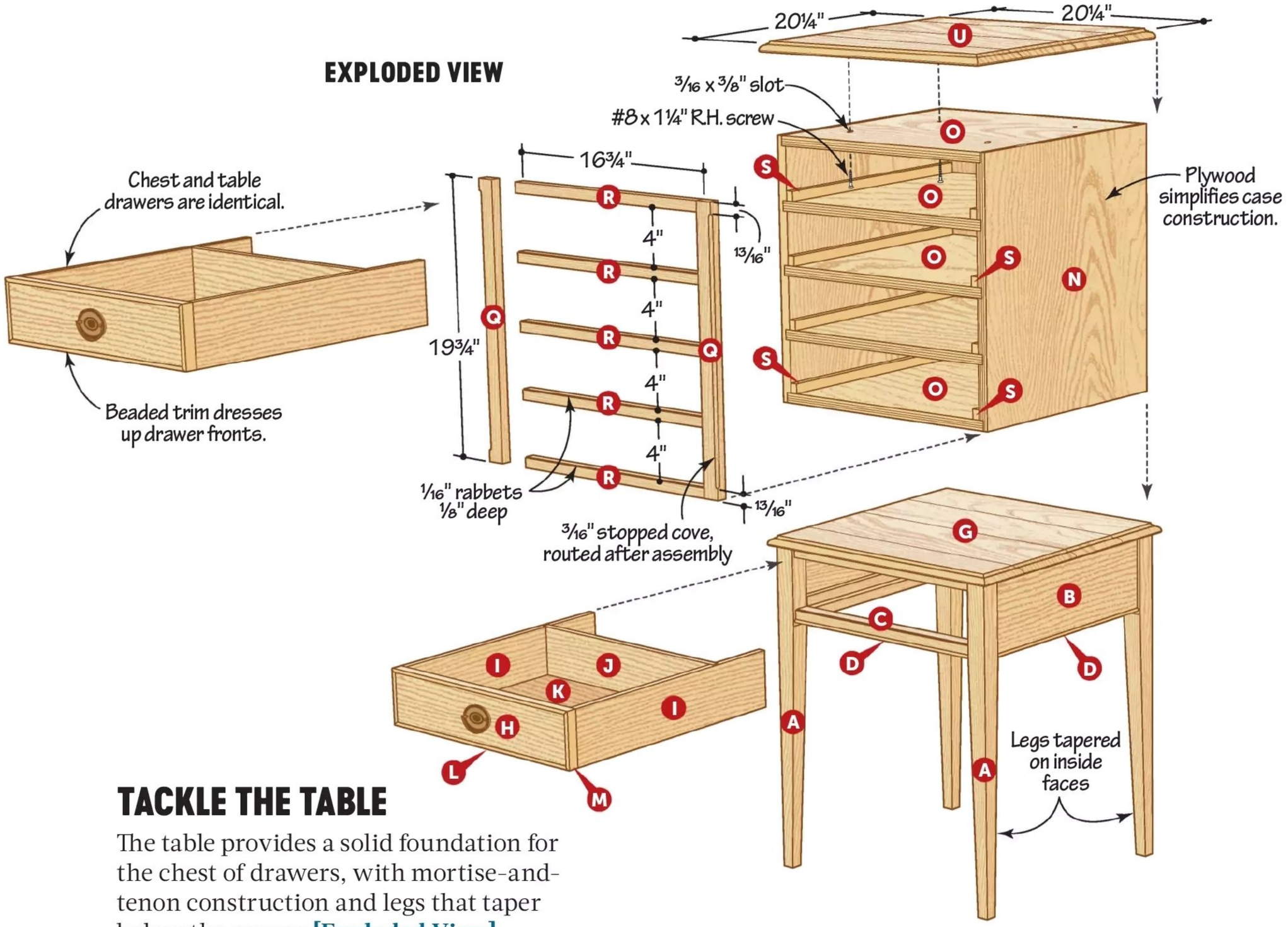
Used together or separately, this pair packs traditional style and a lot of storage in a small footprint.

WRITER: ZACH BROWN
DESIGNER/BUILDER: KEVIN BOYLE

This handsome project draws inspiration from Federal-period silverware cabinets. The petite table supports a chest of drawers to create a surprising amount of storage in a compact footprint. Build them as a unit to add period style to any space, or build the optional chest base that turns them into two separate and equally stunning pieces.

OVERALL DIMENSIONS
20¾"W x 20¾"D x 46¼"H

PHOTOGRAPHER: CARSON DOWNING;
ILLUSTRATORS: ROXANNE LEMOINE, LORNA JOHNSON

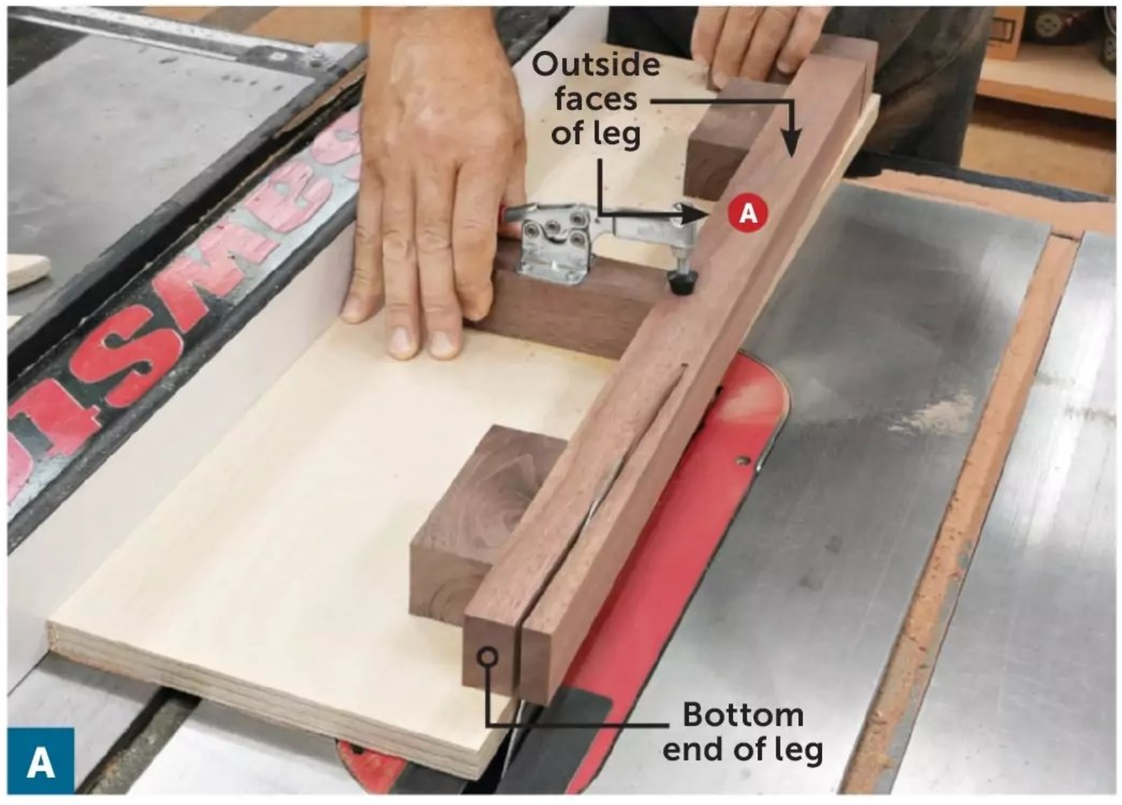


TACKLE THE TABLE

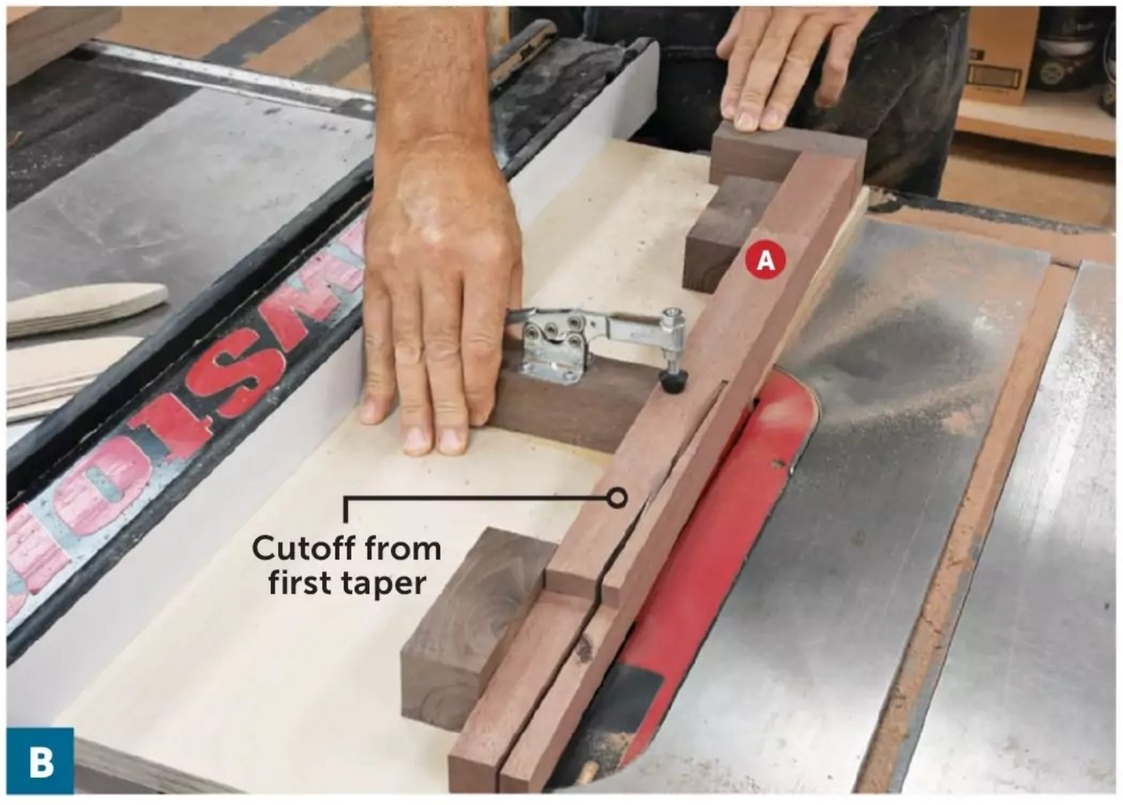
The table provides a solid foundation for the chest of drawers, with mortise-and-tenon construction and legs that taper below the aprons **[Exploded View]**.

1 Cut the legs (A) to size **[Materials List]**. Lay out the orientation of each leg on its top end, designating the front and rear legs and selecting the best-looking grain for the outside faces.

2 Mark the taper's starting and ending points on the end and face of one leg **[Drawing 2]**. Build the taper jig **[Drawing 1]** by butting the leg against the end block, aligning the marks with the jig's edge, and affixing the remaining blocks against the leg. Use the jig to taper the inside faces of each leg **[Photos A & B]**.

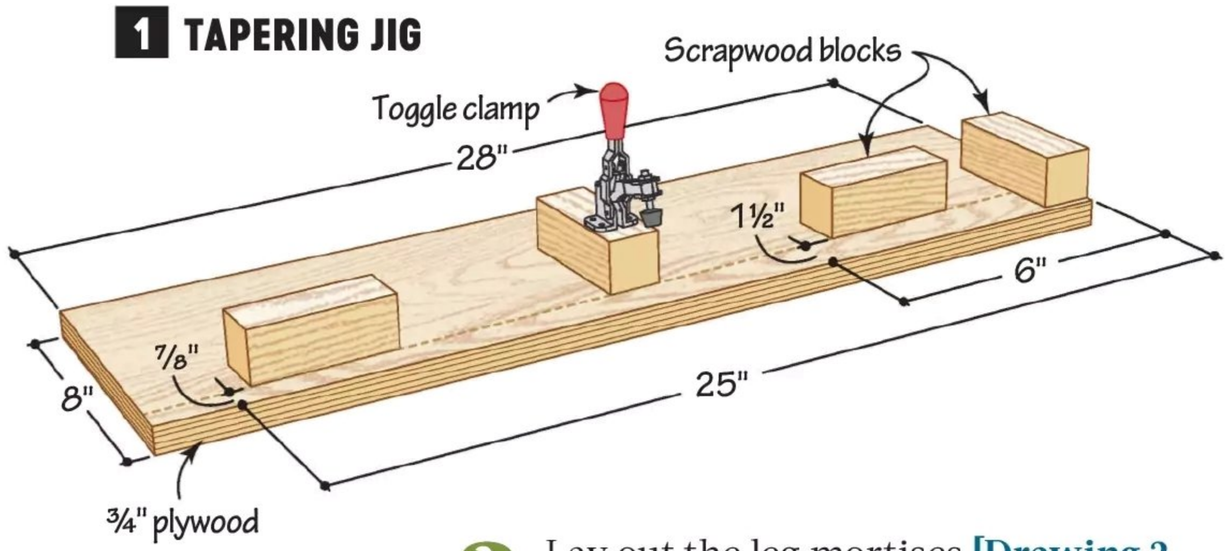


Set the fence so the blade just touches the jig's edge. Clamp a leg (A) in the jig with the faces and ends oriented as shown. Then cut the first taper. Repeat for the other legs.



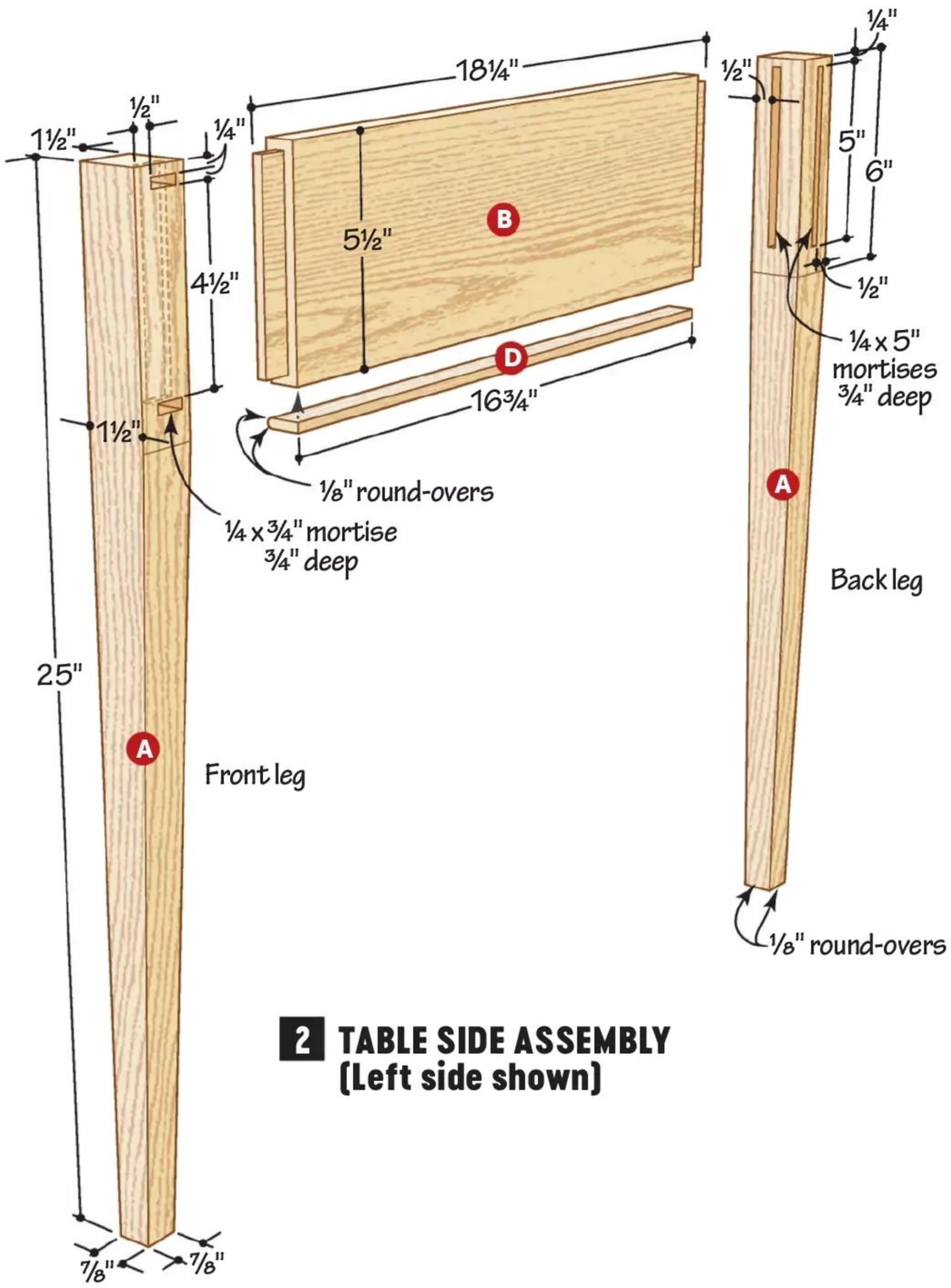
Rotate the leg (A) so the newly tapered face points up. Clamp the leg using the first cutoff as a clamping block, then cut the second taper. Repeat for the other legs.

1 TAPERING JIG



3 Lay out the leg mortises **[Drawing 2, Photo C]**. Install a ¼" chisel in your mortiser and use a stopblock and spacers to form the horizontal mortises on one front leg **[Photo D]**. Reposition the stopblock on the opposite side of the bit to mortise the second leg. Then form the vertical mortises on the front and back legs. Sand a slight round-over on the bottom of each leg, then finish-sand the tapered and mortised faces.

4 Cut the table aprons (B) and rails (C) to size **[Drawings 2, 3, Materials List]** and cut tenons on both ends **[Drawing 3a]**. Cut a shallow rabbet in the lower front rail. The rabbet creates a reveal below the drawer to match the gap at the sides and top. Finish-sand all the pieces.



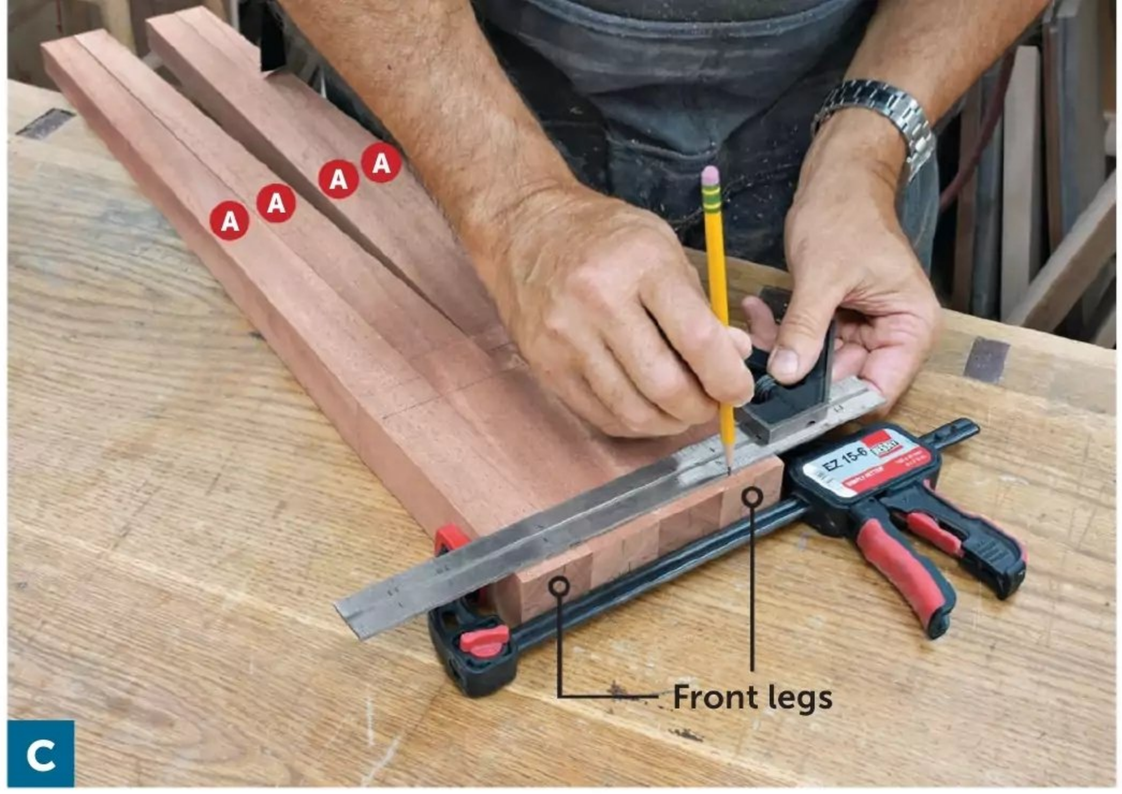
2 TABLE SIDE ASSEMBLY (Left side shown)

5 Glue and clamp each side apron (B) between a front and back leg (A), to create two side assemblies **[Drawing 2]**.

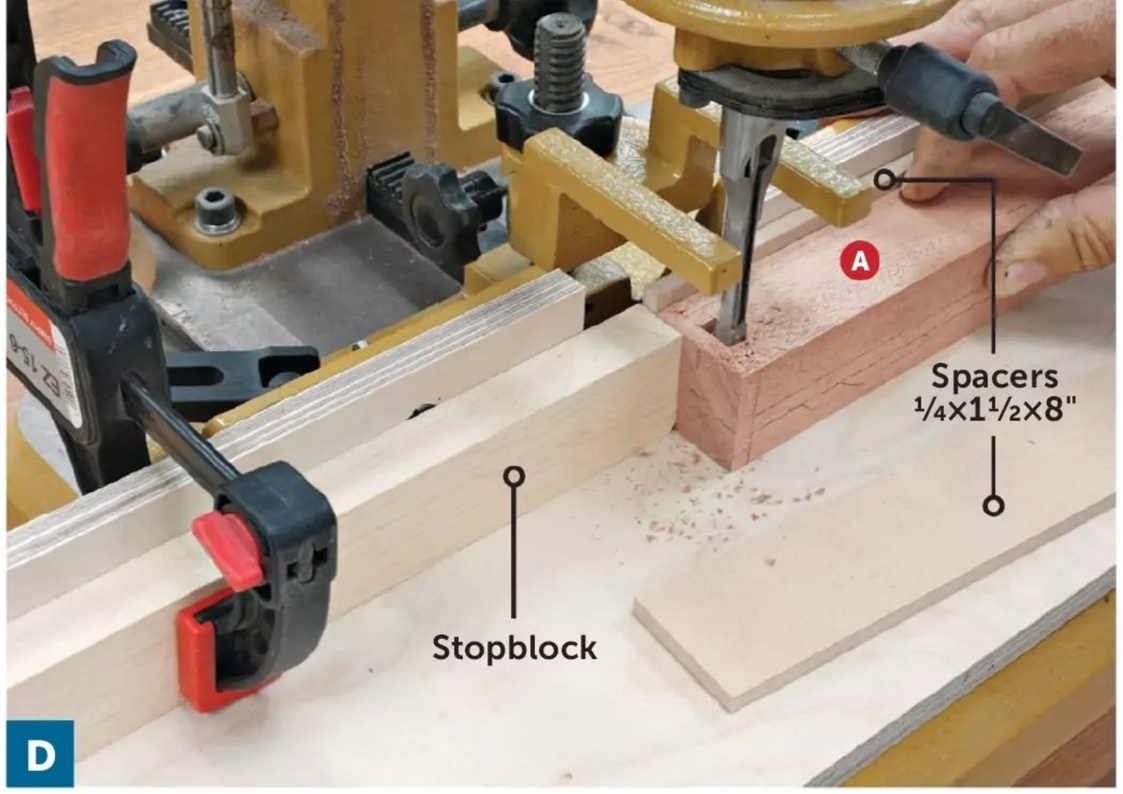
6 From ¼" stock, cut 18 workpieces ⅞×18" for the apron trim (D) as well as for the drawer trim (L, M) that will be used later. Use a router table with a ⅛" round-over bit to form the bullnose profile on one edge of each workpiece **[Drawing 2]**. Finish-sand the pieces, then set all but three aside for now.

7 Mark and cut to length the apron trim (D) for the side assemblies **[Drawing 2, Photo E]**. Glue and clamp the trim to the side aprons with the profiled edge facing out and the square edge flush with the inside face of the apron.

8 Glue and clamp the back apron (B) and front rails (C) between the side assemblies, making sure the rabbet faces up on the lower front rail **[Drawing 3]**. Check for square. Once the glue dries, fit and glue one piece of apron trim (D) to the back apron and one piece of trim to the lower front rail, positioning it so the front edge of the trim sits ⅛" proud of the front edge of the lower rail.



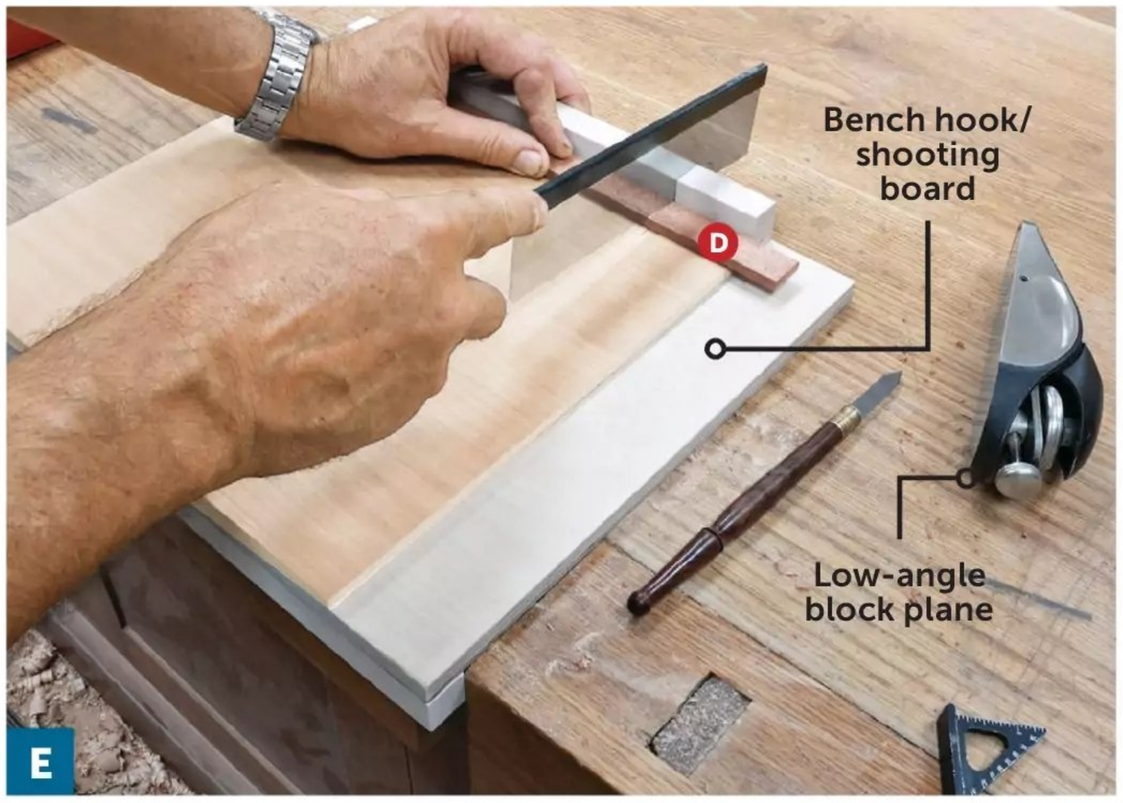
Clamp the legs (A) together with the ends flush and lay out multiple mortises at once. Each front leg receives one vertical and two horizontal mortises, while the back legs have only vertical mortises.



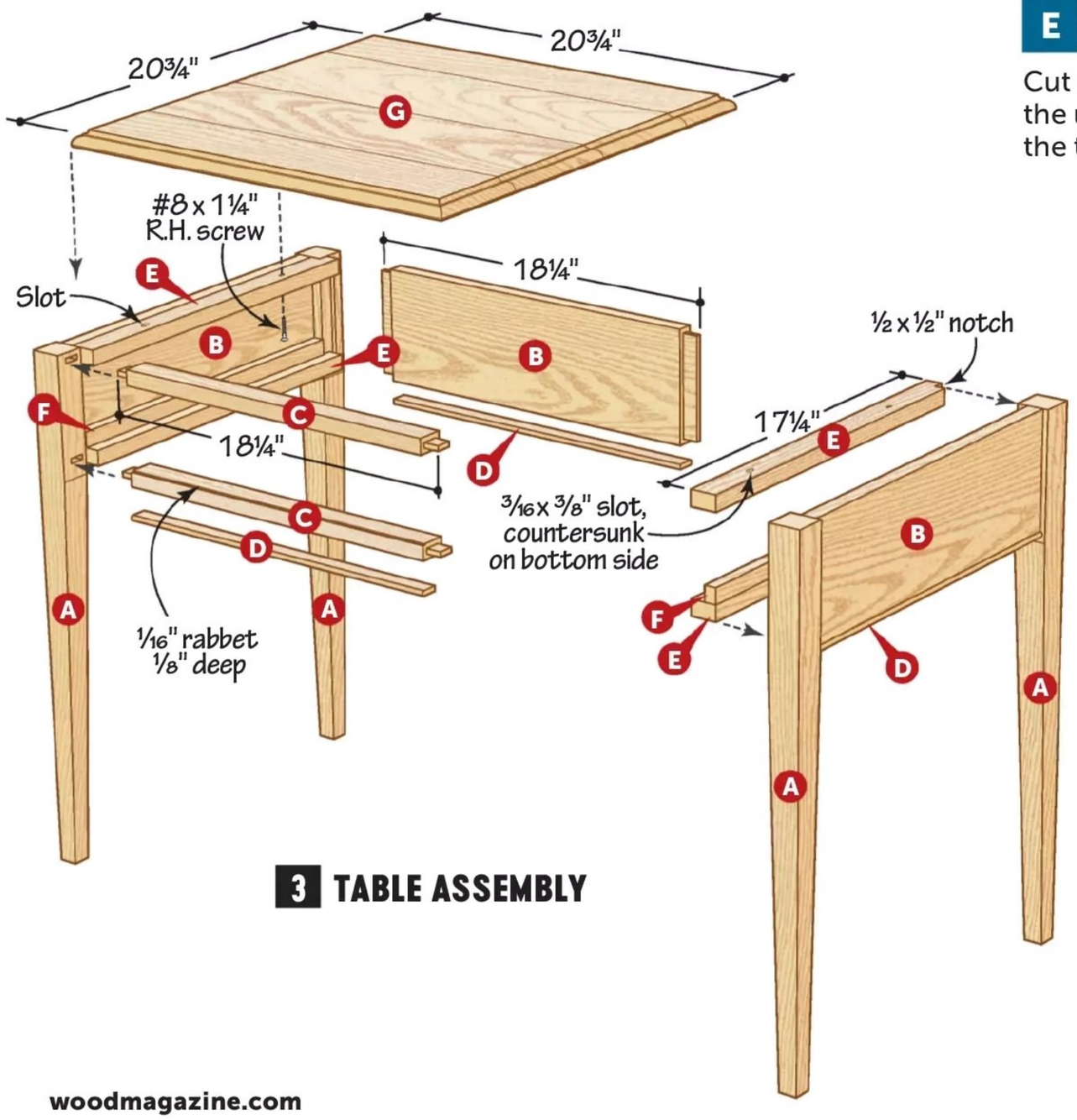
Use a pair of ¼" spacers to cut the horizontal mortises in the front legs, removing them as you work across the mortise. Reposition the stopblock to cut the lower mortise.

9 Cut the drawer guides (E) and drawer spacers (F) to size. Set the drawer spacers aside. Notch the back corner of the drawer guides, then glue and clamp them to the inside of the table assembly, flush with the interior face of the table rails (C) **[Drawing 3]**.

10 Glue up a panel for the top (G). Once the glue dries, trim the panel to size and rout the edge profile **[Drawings 3, 3b]**. We used a specialty bit from Freud **[Sources]** to rout the top section of the profile, followed by a ⅛" round-over bit on the bottom edge.

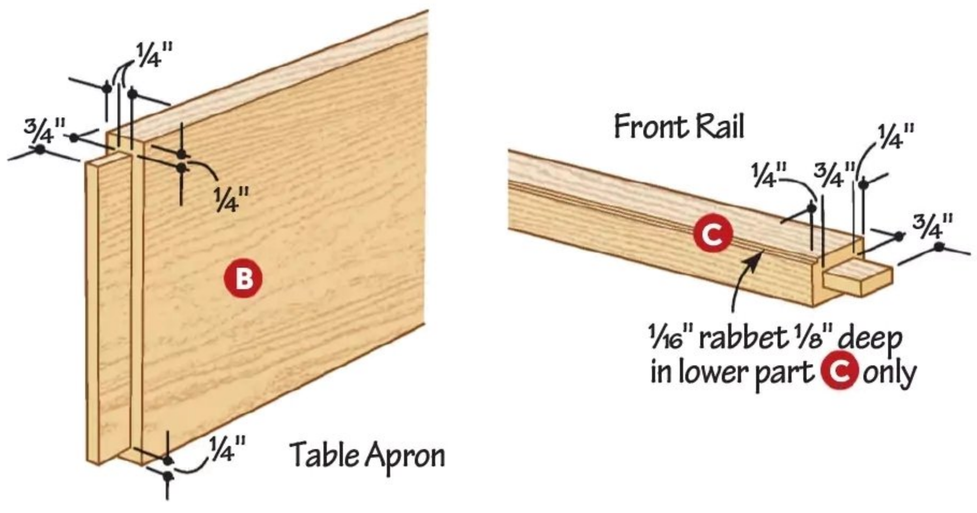


Cut one end of the apron trim (D) square. Use the distance between the untapered portions of the legs of the side assembly (A/B) to mark the trim length. Cut the trim slightly long and plane it to final length.

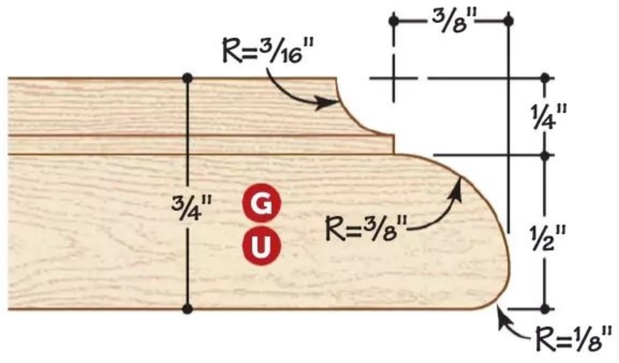


3 TABLE ASSEMBLY

3a TABLE TENON DETAILS



3b TABLE/CHEST TOP PROFILE



DIG THROUGH THE DRAWERS

The drawers in the table and chest are the same size. Make all five drawers at the same time, or just one if you're making only the table.

1 From ¾" stock, cut the drawer fronts (H) to size **[Materials List]**. From ½" stock, cut the drawer sides (I) and backs (J).

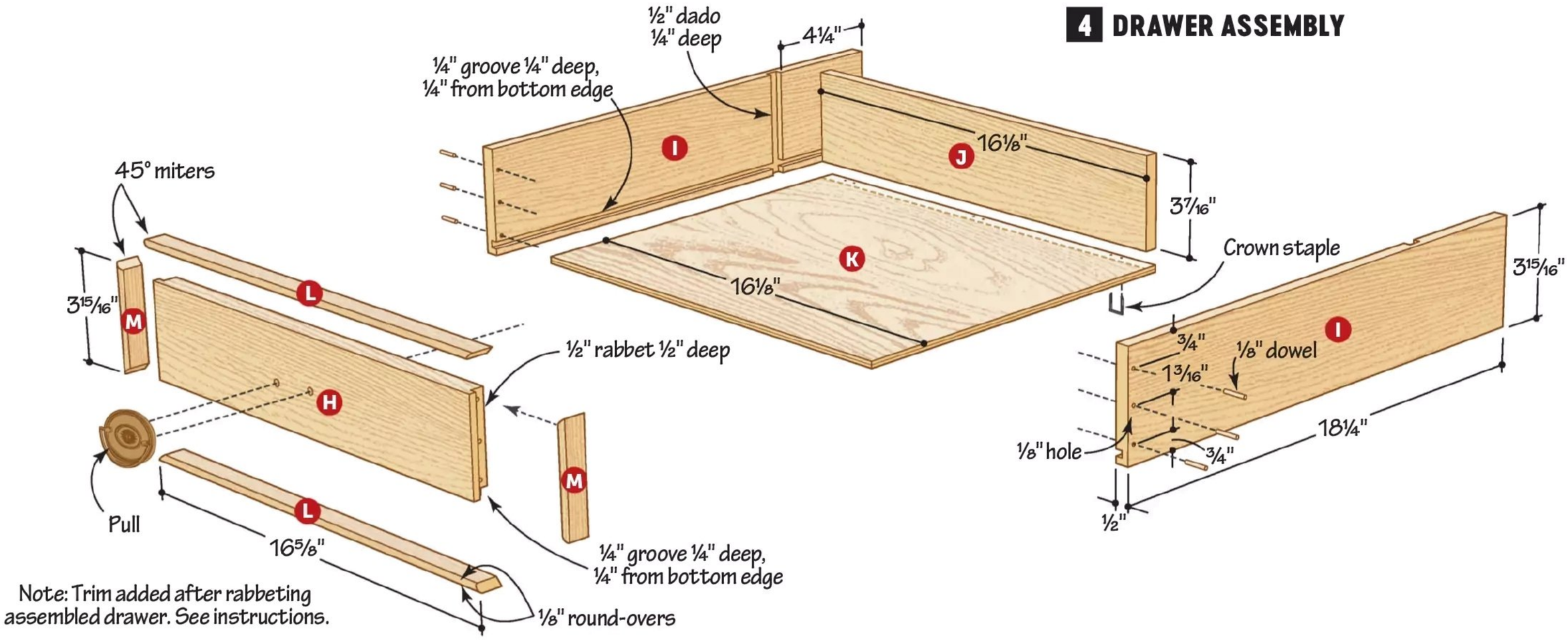
2 Install a ½" dado-blade set in the tablesaw. Attach an auxiliary fence to the rip fence and adjust it to just touch the blade. Set the blade for a ½"-deep cut and rabbet both ends of the drawer fronts (H) **[Drawing 4]**.

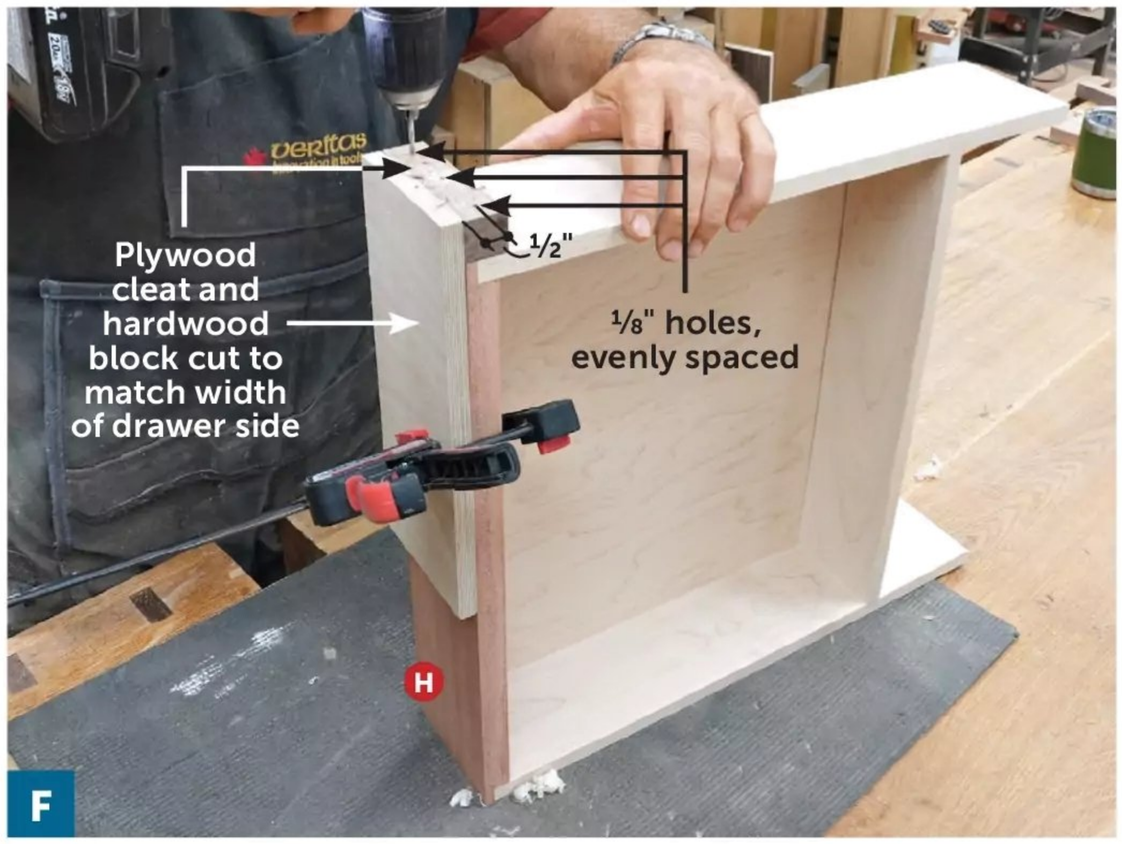
3 Remove the auxiliary fence, lower the blade to ¼", and cut the ½" dado in the drawer sides (I) for the back **[Drawing 4]**. Replace the ½" dado blade with a ¼" dado blade and use it to cut the groove for the bottom in the drawer sides and fronts.

4 Dry-assemble a drawer, measure for the drawer bottoms (K), and cut them to size. Finish-sand the inside face of the drawer parts (H-K). Glue and clamp together the drawer front, sides, and back (H-J), checking each assembly for square. Slide a bottom into each drawer and attach it to the bottom of the drawer back (J) with a few narrow-crown staples or brads.

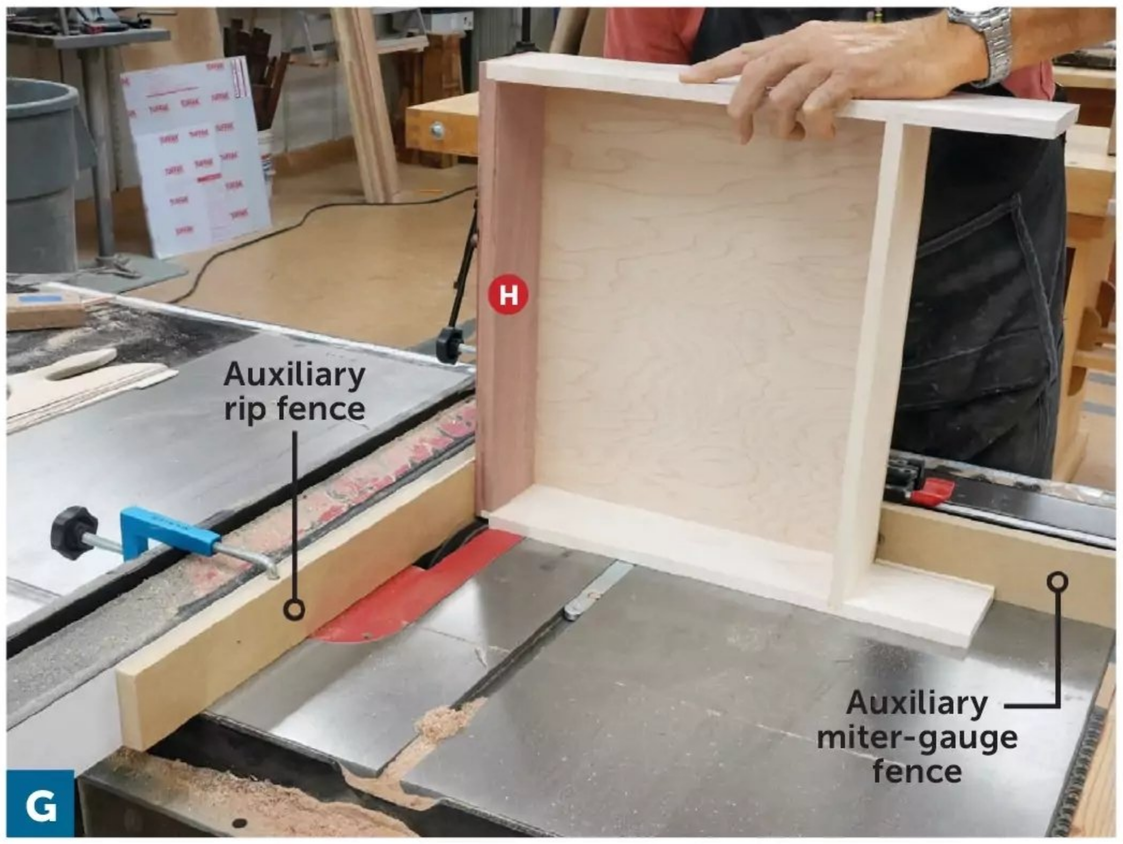
5 Wooden pins reinforce the joints between the drawer front and sides. To drill the pin holes consistently, make a simple jig by drilling holes, where shown in **[Drawing 4]**, in a 1×1×3 15/16" block. Glue the block to a plywood cleat and use the jig to create pin holes **[Photo F]**. Cut 1 1/4"-long pins from ⅛" dowel and glue them into the holes. Once the glue dries, cut and sand the pins flush.

6 To rabbet the drawers for the trim (L, M), set up the tablesaw with a ¾" dado-blade set and auxiliary rip fence just touching the blade. Adjust the blade height to match the thickness of the trim (D) you cut earlier. Then rabbet the front of the drawers **[Drawing 4a, Photo G]**. Finish-sand the drawer fronts.





Clamp the jig to the drawer front (H), flush with the top and bottom. Install a ⅛" bit in your drill and use the chuck as a depth stop to drill 1"-deep holes in the drawer. Repeat on both sides of each drawer.

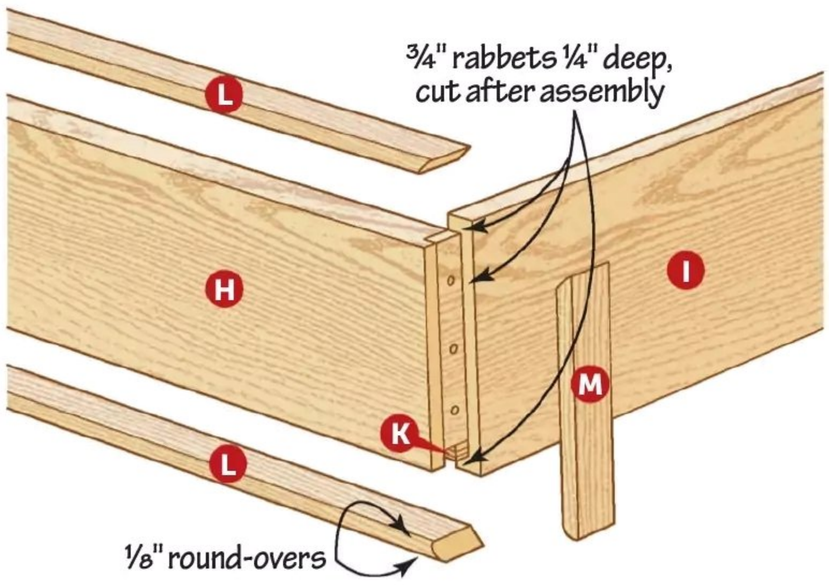


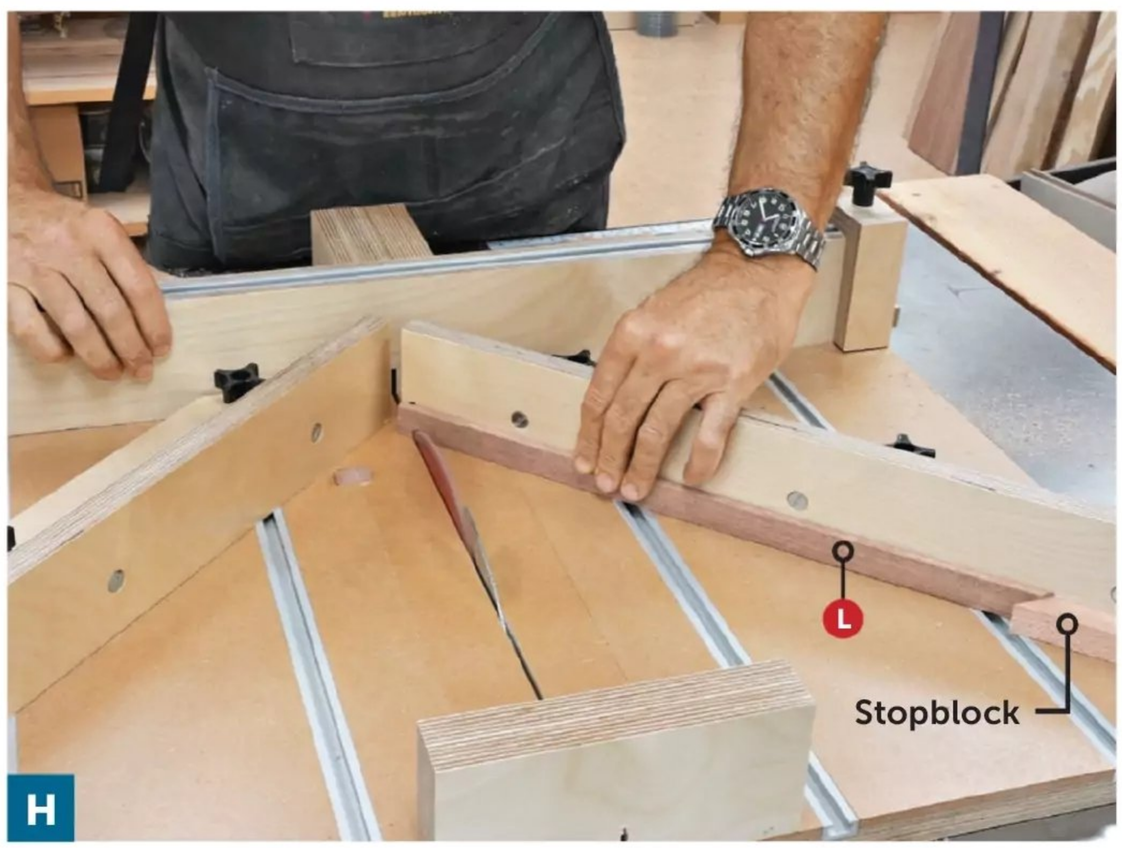
Carefully rabbet all four edges of the drawer fronts (H). Use a miter gauge with an auxiliary fence to support the drawer when rabbeting the short side.

7 Bevel-cut one end of 10 of the trim blanks to start the drawer front trim (L). From the remaining blanks, cut 10 pieces 4½" long, and then bevel-cut one end of each of these to start the drawer side trim (M). Bevel-cut each trim piece to fit **[Photo H]** and glue and clamp them to the drawers **[Drawing 4a, Photo I]**.

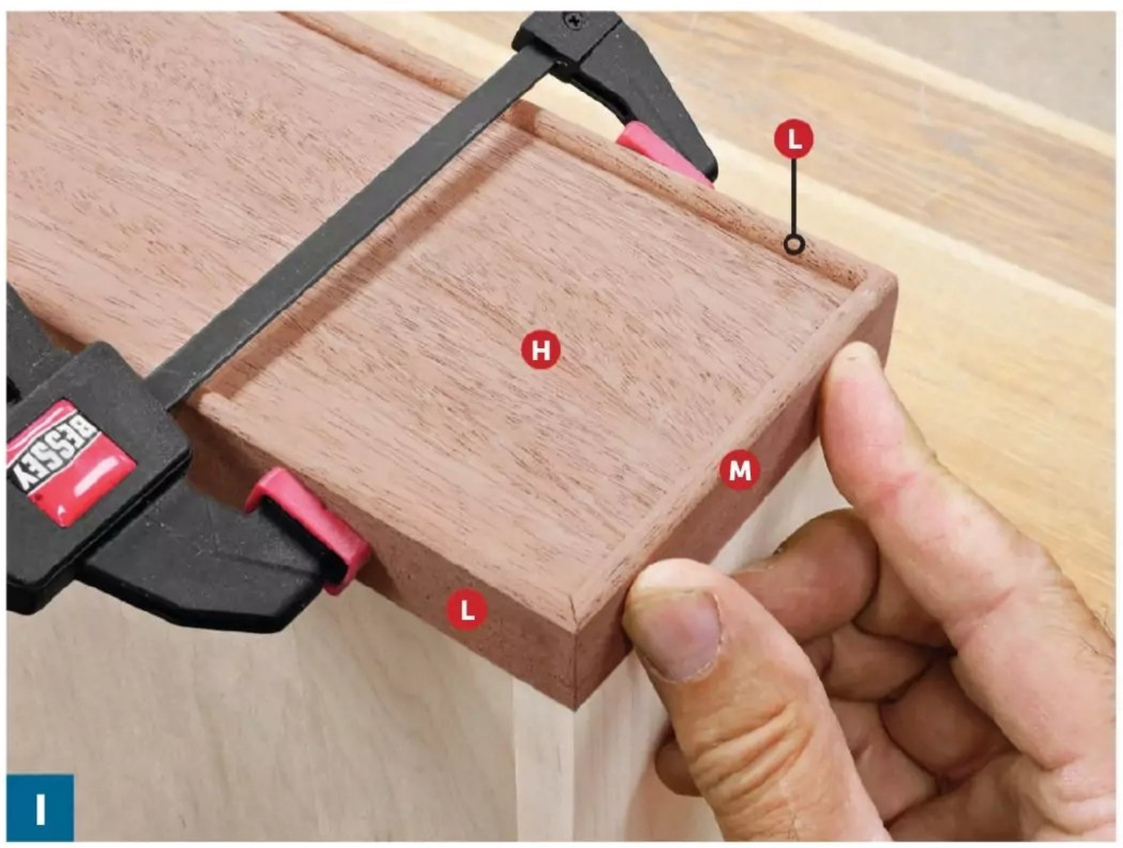
8 Finish-sand the drawers and check the fit of a drawer in the table with the spacers (F) in place **[Drawing 3]**. Sand the spacers as needed until you have a good fit, then glue them to the side aprons.

4a DRAWER-TRIM DETAIL





We used a tablesaw sled and auxiliary fence set to 45° to bevel-cut the drawer trim to final length. Set a stopblock to cut the top/bottom trim (L) to length. Then reset the stopblock for the side trim (M).



Hold each trim piece in place to check the miter before gluing and clamping it to the drawer. Work around each drawer face one piece at a time.

CHANGE OVER TO THE CHEST

TIP!

Rabbet both ends of each side before changing fence setups, then move the fence and cut all of the dadoes.

1 Cut the chest sides (N) and dividers (O) to size **[Drawing 5]**. With a dado stack sized to match your plywood's thickness, cut the rabbets and dadoes in the sides for the dividers, then partially bury the dado blade and cut a rabbet in each side for the back.

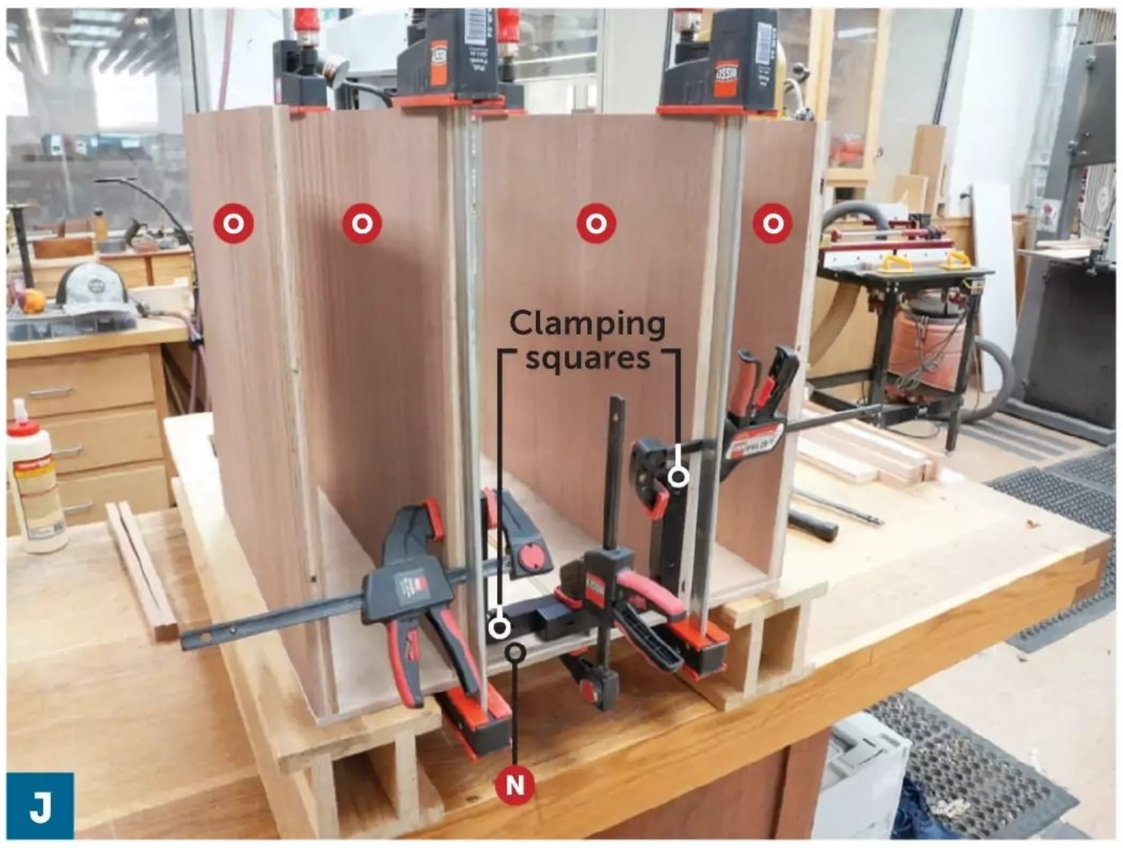
2 Finish-sand the sides and dividers and assemble the chest **[Photo J]**. Cut the back (P) to size, finish-sand it, and set it aside.

3 Cut the chest stiles (Q) to size and glue one to the front of the chest assembly, flush with a side (N) **[Exploded View]**. Cut the chest rails (R) to size, using a stopblock to ensure consistent length. Rabbet one edge of each rail except the top piece.

4 Glue and clamp the rails to the front of the dividers (O) and tight to the attached stile, making sure the rabbets face up. Glue and clamp the remaining stile to the face of the chest, tight to the ends of the divider trim and flush with the side (N). Rout the stopped cove on the stiles **[Exploded View]** and finish-sand the face frame.

5 Cut the drawer spacers (S) and stops (T) to size **[Materials List]**, then test-fit the drawers in the chest with the spacers in place **[Exploded View]**. Sand the spacers if necessary to allow the drawers to slide freely, then glue them to the chest sides (N). Glue the drawer stops to the dividers (O) **[Drawing 5]**. The drawer fronts should sit flush with the face frame so the drawer trim sits proud.

6 Glue up a panel for the chest top (U), then trim it to final size **[Exploded View]**. Rout the profile **[Drawing 3b]**, then finish-sand the chest top.



First, glue and clamp the top and bottom dividers (O) to one side (N). Once the glue dries, add two more dividers (*above*). Finally, add the middle divider and remaining side.

5 CHEST ASSEMBLY

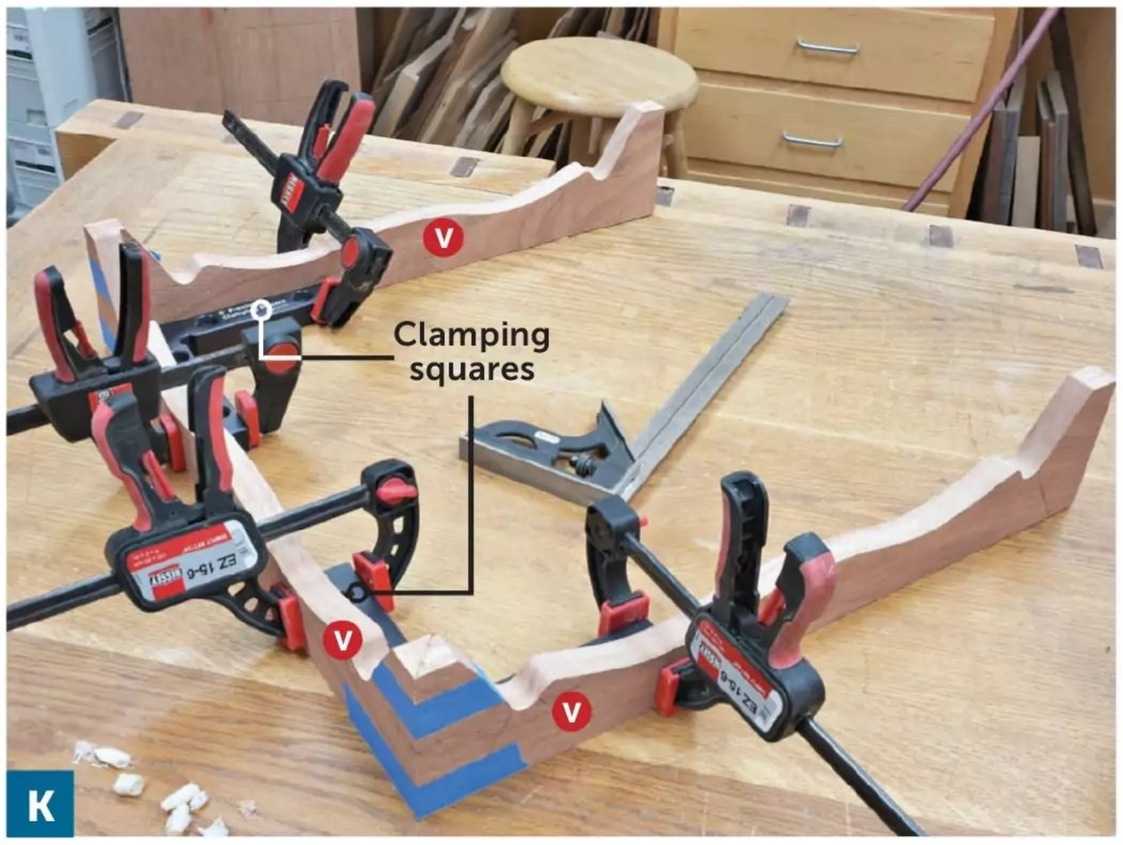
OPTIONAL CHEST BASE

Make this simple mitered base if you plan to use the chest on its own. Otherwise, skip ahead to the finishing touches.

1 Cut the base front and sides (V) to size, bevel-cutting one end of each side and both ends of the front **[Drawing 6]**. Rout the cove and cut the biscuit slots in the mitered ends.

2 Use the gridded pattern **[Drawing 7]** to lay out the base half-shape on a piece of cardboard or thin plywood. Cut out the template, sand it smooth, and use it to trace the base shape on each half of the sides and front. Cut and sand the base parts to your layout line.

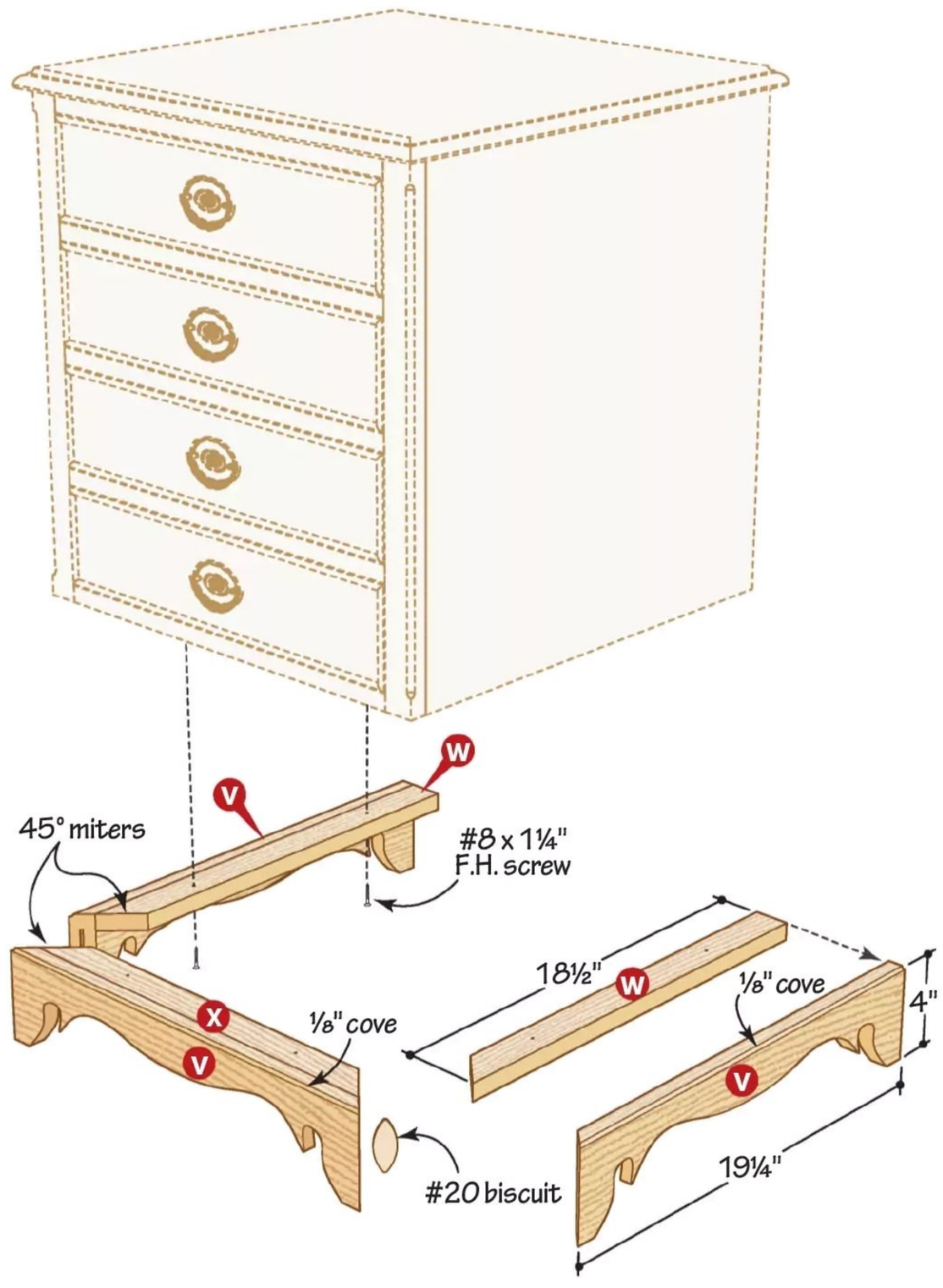
3 Apply glue and biscuits to the miters and assemble the base **[Drawing 6, Photo K]**. Once the glue dries, measure the inside of the base and cut the side and front cleats (W, X) to fit, miter-cutting both ends of the front and one end of the sides. Glue and clamp the cleats to the inside of the base.



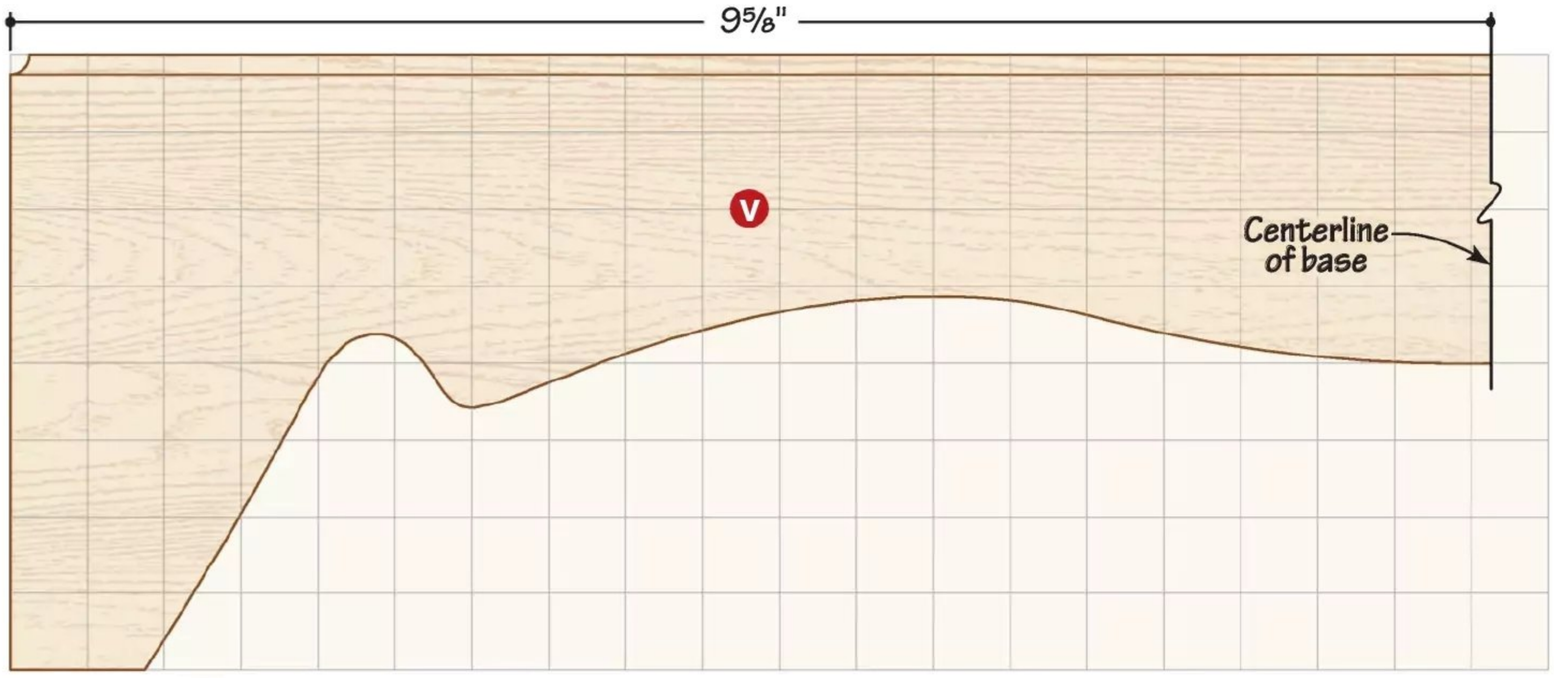
K

Lay out the base parts (V) flat on the workbench and apply tape across the miters. Then, clamp the base together using clamping squares to hold the parts in position.

6 OPTIONAL BASE



7 OPTIONAL BASE GRIDDED HALF PATTERN



One square = ½"

FINISHING TOUCHES

Note: On the drawers, we applied dye and stain to only the mahogany parts, but topcoated the entire drawer.

1 Drill holes in the drawers for pulls **[Photo L]**. Complete any remaining finish-sanding.

2 Stain and finish the table, chest, drawers, tops (G, U), and chest back (P). We wiped on a coat of W.D. Lockwood Maple Golden Amber (#144) dye, followed by a coat of Golden Oak stain from Old Masters. We then sprayed on three coats of satin lacquer.

3 Once the finish cures, attach the table and chest tops, using slots in place of shank holes for the front screws. **[Drawing 3, Exploded View]**. Add drawer pulls and attach the back **[Drawing 5]**. If you built the base for the chest, screw it, centered, to the underside. Otherwise, place the chest on the table. Then install the drawers and fill them with anything you want to keep close at hand but out of sight.

Determine the hole size and spacing for your pulls, then use a piece of ¼" plywood to make a drilling template. Clamp it, centered, on the drawer front (H), then drill the holes.

MATERIALS LIST

PART		FINISHED SIZE T	W	L	Matl.	Qty.
TABLE						
A	LEGS	1½"	1½"	25"	M	4
B	APRONS	¾"	5½"	18¼"	M	3
C	TABLE RAILS	¾"	1¼"	18¼"	M	2
D*	APRON TRIM	¼"	⅞"	16¾"	M	4
E	DRAWER GUIDES	¾"	1¼"	17¼"	M	4
F	DRAWER SPACERS	¾"	9/16"	16¾"	M	2
G	TOP	¾"	20¾"	20¾"	EGM	1
DRAWERS						
H	FRONTS	¾"	3 15/16"	16⅝"	M	5
I	SIDES	½"	3 15/16"	18¼"	MAP	10
J	BACKS	½"	3 7/16"	16⅛"	MAP	5
K	BOTTOMS	¼"	13¾"	16⅛"	MPP	5
L*	TOP/BOTTOM TRIM	¼"	⅞"	16⅝"	M	10
M*	SIDE TRIM	¼"	⅞"	3 15/16"	M	10
CHEST						
N	SIDES	¾"	18½"	19¾"	MP	2
O	DIVIDERS	¾"	18¼"	18½"	MP	5
P	BACK	¼"	18½"	19¾"	MPP	1
Q	CHEST STILES	¾"	1¼"	19¾"	M	2
R	CHEST RAILS	¾"	¾"	16¾"	M	5
S	DRAWER SPACERS	¾"	9/16"	18¼"	M	8
T	DRAWER STOPS	¾"	¾"	3"	M	4
U	TOP	¾"	20¼"	20¼"	EGM	1
V	BASE FRONT AND SIDES	¾"	4"	19¼"	M	3
W	BASE SIDE CLEATS	¾"	1½"	18½"	M	2
X	BASE FRONT CLEAT	¾"	1½"	17¾"	M	1

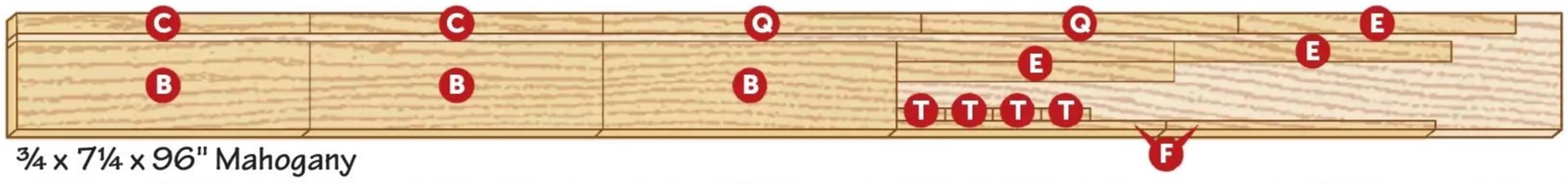
*Parts initially cut oversize. See the instructions.

MATERIALS KEY: M–mahogany, EGM–edge-glued mahogany, MAP–maple, MPP–maple plywood, MP–mahogany plywood.
SUPPLIES: ⅛" dowel, #20 biscuits, #16x¾" brad nails, #18x½ staples, #8x1¼" flathead screws, #8x1¼" roundhead screws.
BLADE AND BITS: Dado-blade set, ¼" hollow mortise chisel, ⅛" round-over, ⅛" and ¼" cove, and 45° chamfer router bits.
SOURCES: Freud #99-010 1½" table top edge classical bit no. 837611, $75, woodcraft.com; oval brass drawer pulls (5) no. 7007, $11 each, Ansaldi Furniture Hardware, ansaldi.com.
PROJECT COST: It cost us about $490 to build this project. Your cost will vary by region and source.

CUTTING DIAGRAM

We purchased 3 board feet of 8/4 mahogany, 25 board feet of 4/4 mahogany, and 12 board feet of 4/4 maple. Before cutting parts to size, we planed them to the thicknesses shown in these example boards.

1½ x 1½ x 120" Mahogany



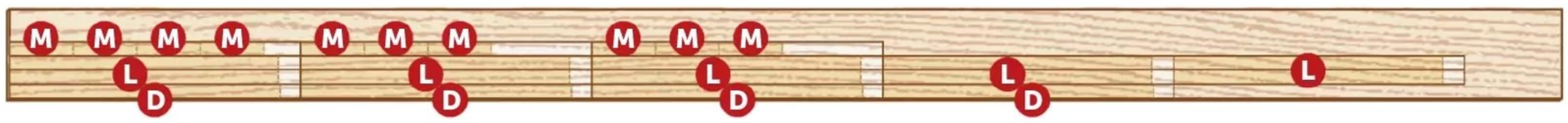
¾ x 7¼ x 96" Mahogany

¾ x 5½ x 96" Mahogany

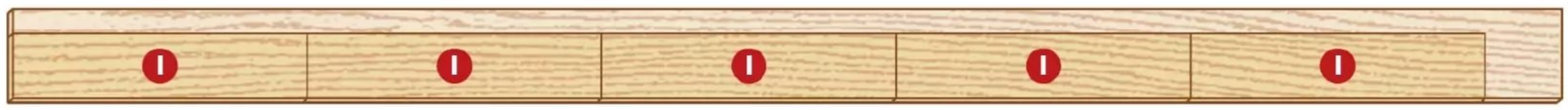
¾ x 5½ x 96" Mahogany

¾ x 5½ x 96" Mahogany

¾ x 5½ x 96" Mahogany

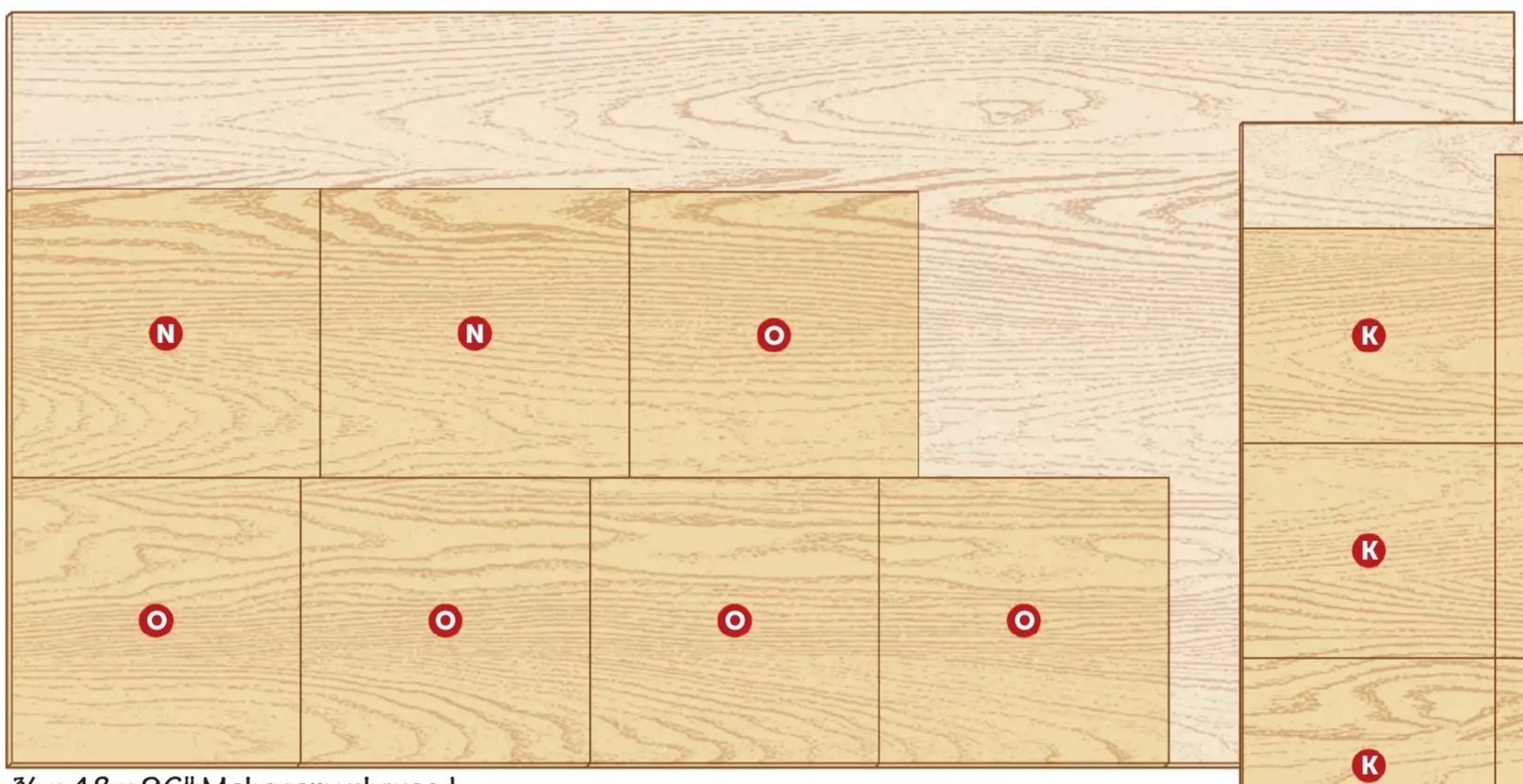


¼ x 5½ x 96" Mahogany

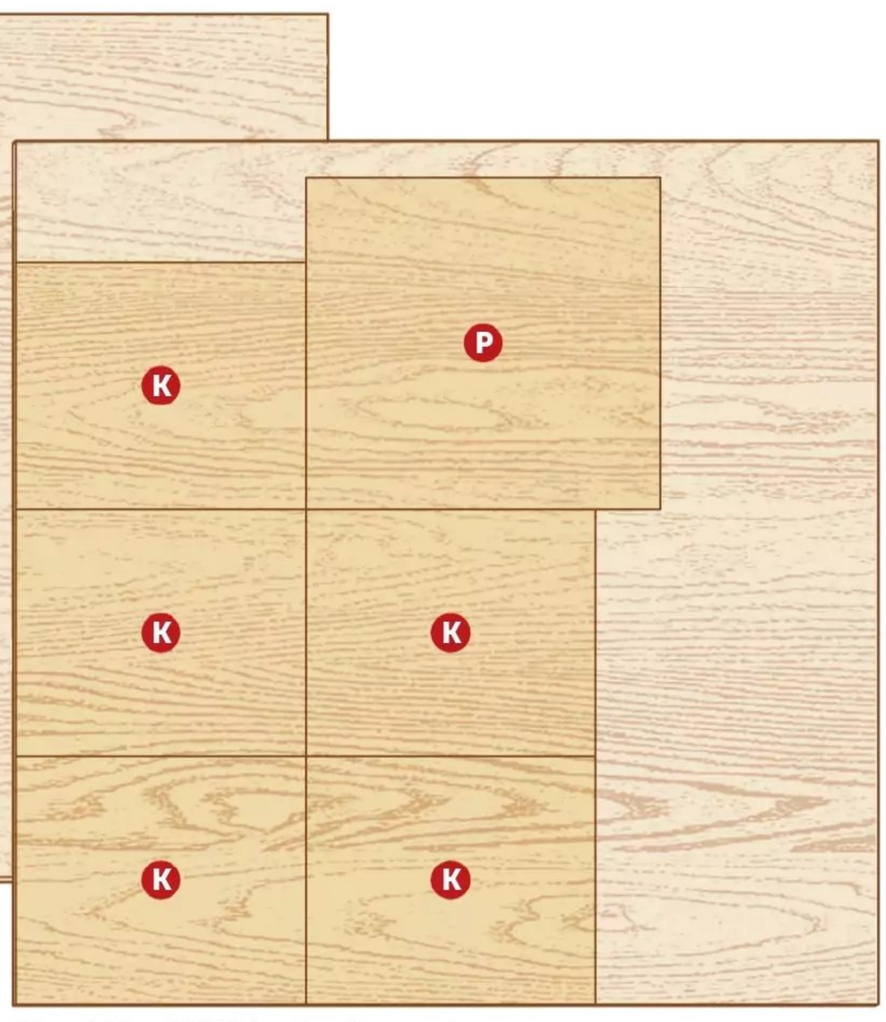


½ x 5½ x 96" Maple (2 needed)

½ x 5½ x 96" Maple



¾ x 48 x 96" Mahogany plywood



¼ x 48 x 48" Maple plywood

TILE YOUR WAY TO OVERSIZE CNC PROJECTS

Work beyond your CNC router's capacity by breaking your project down into smaller sections. Software does most of the work.

WRITER: KEN BURTON

PHOTOGRAPHER: KEN BURTON

Unless you have a large shop and an equally big budget, you probably can't accommodate an industrial-size CNC router. But a machine with a small bed doesn't have to limit you to creating only small CNC projects.

Most CNC design programs, such as Vectric's VCarve or Aspire, include a feature that allows you to take on oversized jobs by breaking them down into smaller sections known as tiles.

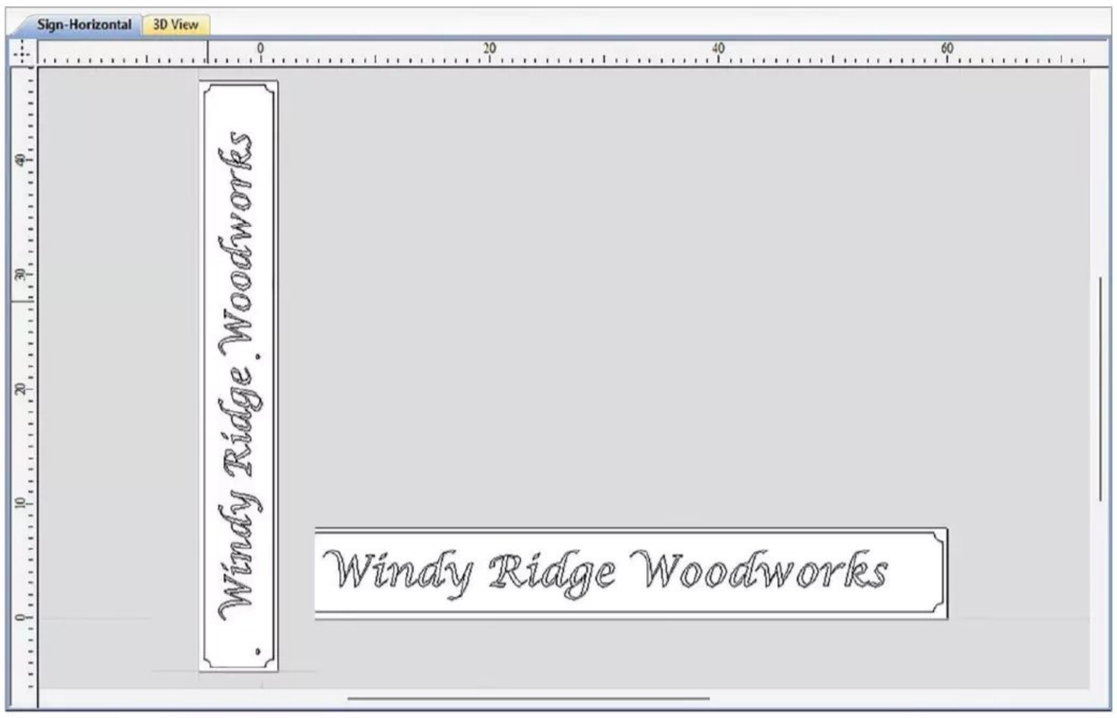
MEET TWO TYPES OF TILES

Note: A CNC's "envelope" is the volume within which it is capable of cutting. While the overall size of the machine as well as the machine's bed will be larger, manufacturers generally label and sell a machine based on its envelope size.

The size of the workpiece relative to your CNC machine's envelope size determines how the design software creates tiles. If your workpiece is longer than the machine bed but its width fits, the software creates tiles that each contain toolpaths for a portion of the length. This allows you to carve the job in sections, sliding the workpiece to reposition it from one to the next (*previous page*).

If your workpiece is too long and too wide, tiling allows you to break your project down into smaller workpieces that will fit onto your machine, carve each individual tile, then join them together in a seamless design after.

In both cases, you can create complete, full-scale designs in your CNC software and let the tiling feature do the work of breaking it into multiple toolpath files for you.



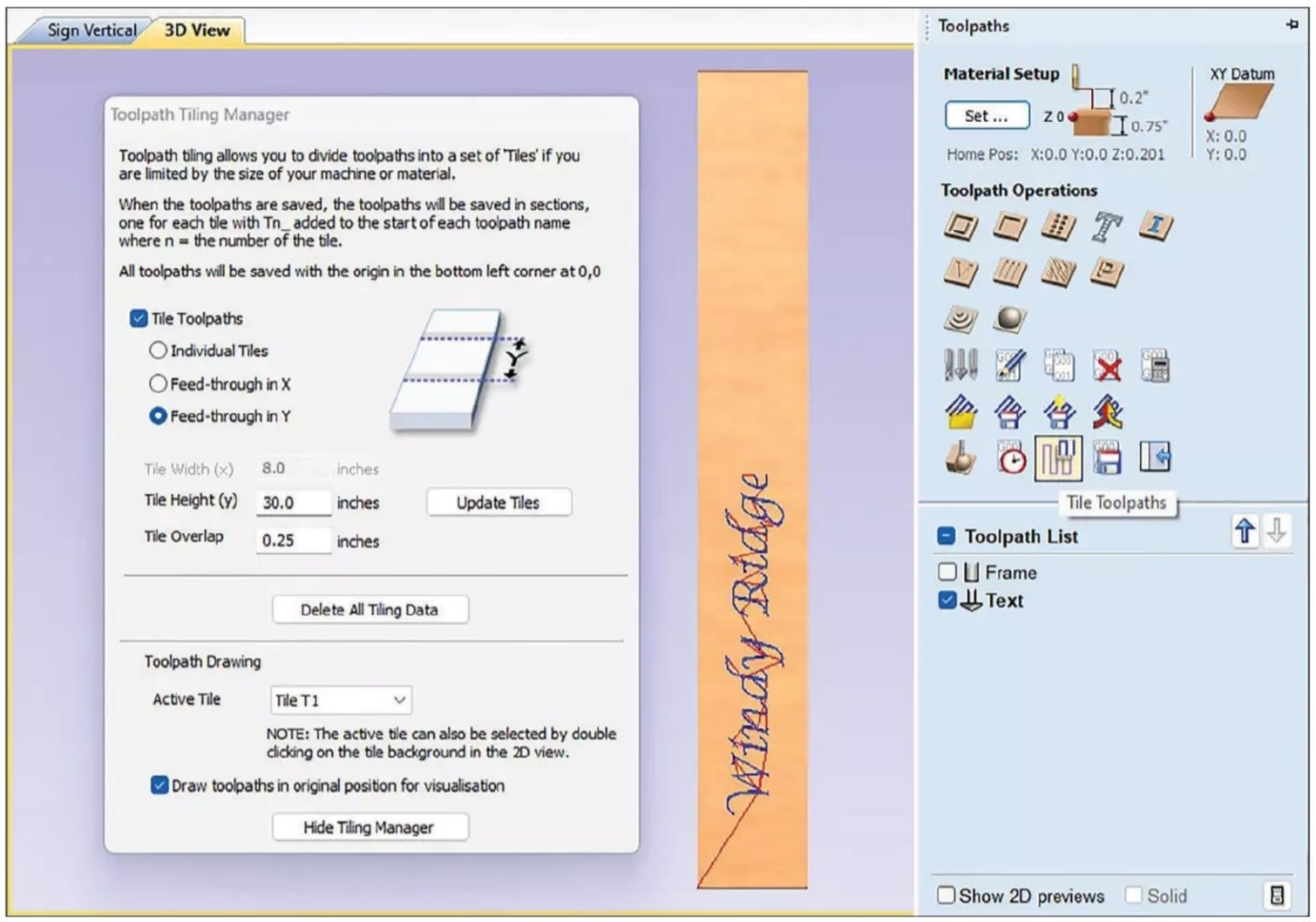
Even if you intend to tile along the Y-axis, designing in a horizontal format often proves easier. Once you have the drawing done, rotate it 90° counterclockwise and set the origin to the lower left corner.

CREATE YOUR FILES

Set up your drawing file as you normally would (*above*), entering the actual size of the entire workpiece. If you're using VCarve and have specified your machine's dimensions, the software may warn you that the piece is too big and that you'll have to use the tiling feature.

After you finish the design, assign the desired toolpaths, such as pockets, profiles, and V-cuts. Then open the tiling menu and set up the parameters of the job (*below*). These include whether you're making individual tiles or extending one of the axes.

Note: On most CNC machines, the X-axis runs side to side, while the Y-axis runs front to back. Rotate text and images accordingly on overlength workpieces. If you'll precut an oversize workpiece into smaller tiles, set up the X and Y axes to best suit the design and your machine.

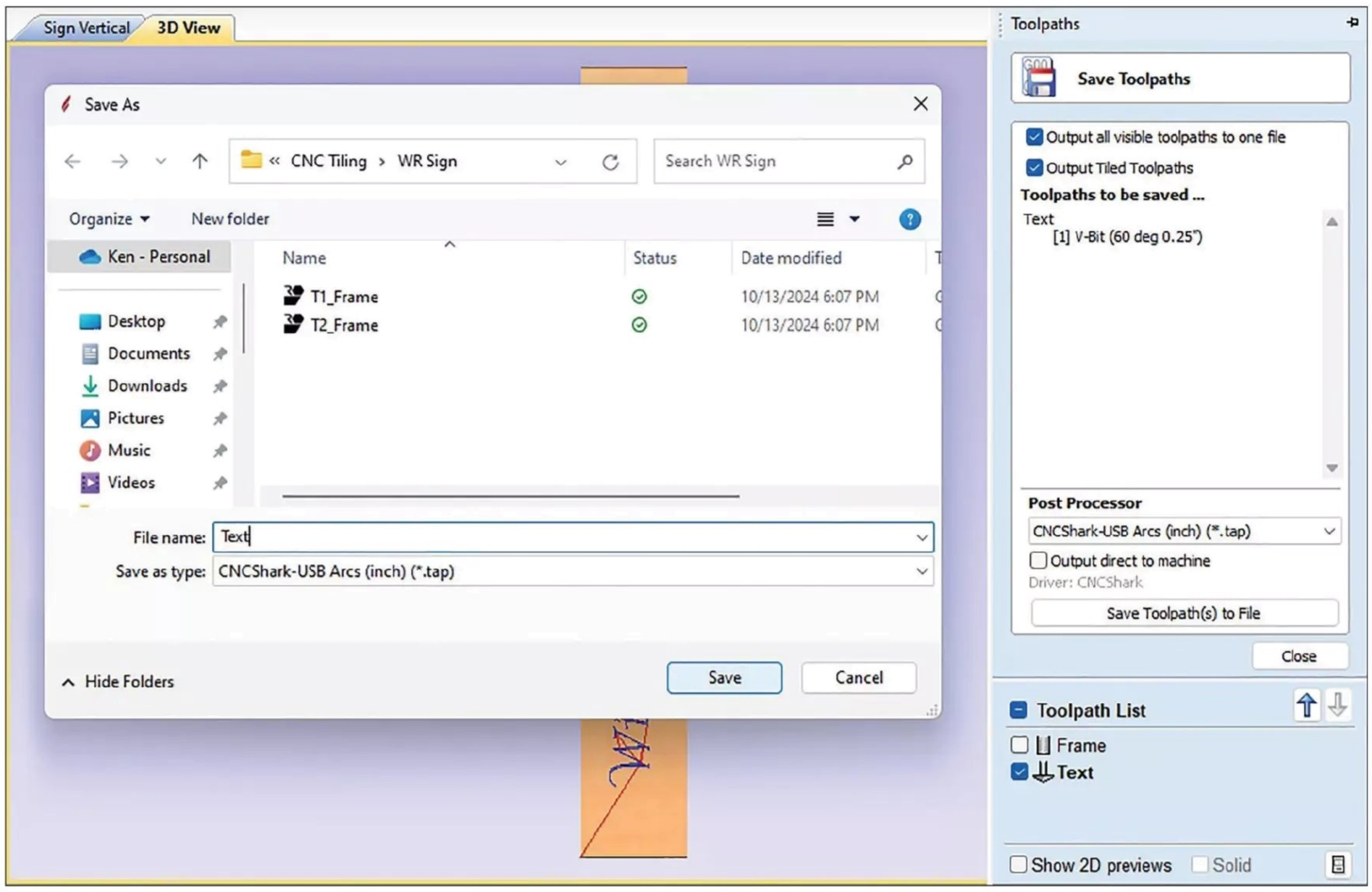


After assigning toolpaths to all parts of your design, open the tiling menu (under the toolpaths tab in VCarve). Select the type of tiling you want and define the tile size along with the amount of overlap.

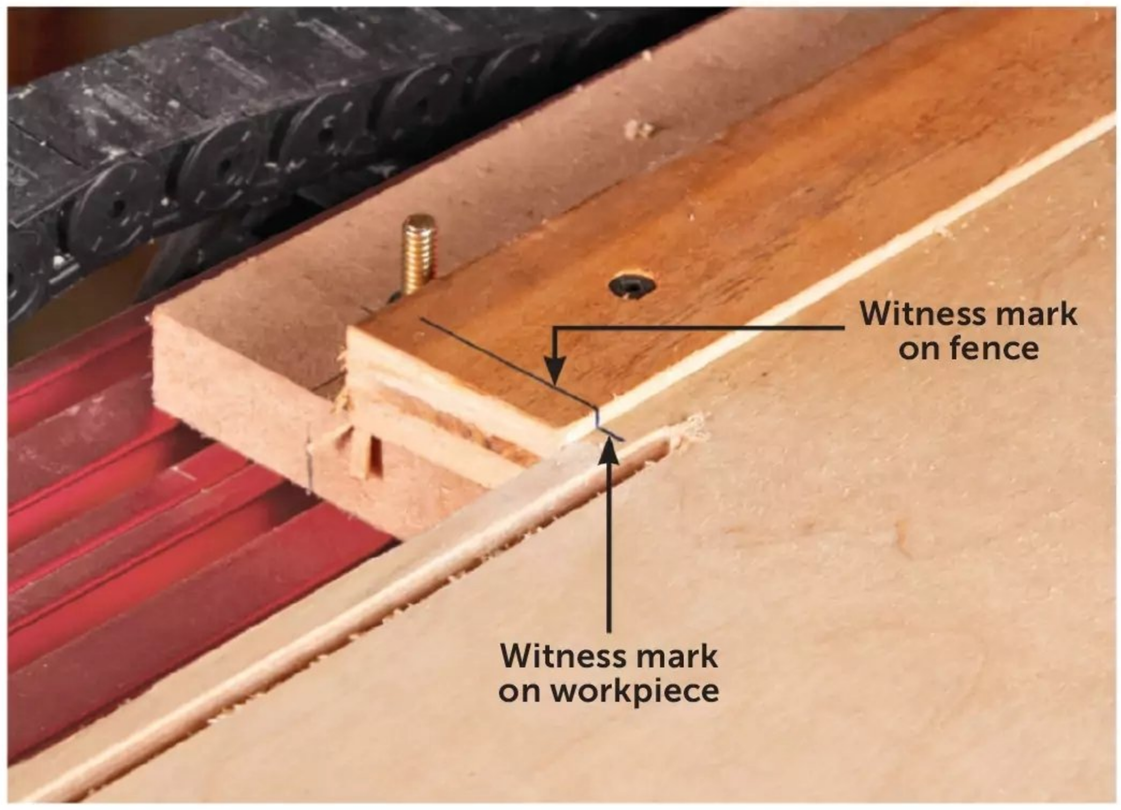
Additionally, you can specify the amount of overlap between tiles. A small overlap (1/4" is usually enough) helps eliminate cleanup at the borders between tiles, ensuring that the carving does not stop short of the edge.

When setting up tile size and overlap, be cognizant of your machine's maximum cutting travel. If you're making a 50"-long sign, for example, and your machine travels a maximum of 25", set the tile size to about 23 1/2" or less to ensure you have capacity for the needed overlap. You'll also need extra margin for bit travel if you choose to use indexing pins for alignment (See "Seek Out a Witness," *bottom*).

With your design work complete, save your toolpaths (*below*). Then create a way to register your tiles.



Saving a tiled toolpath generates multiple files: one for each tile. If you're using different bits, be sure to save each bit's toolpath(s) separately, as well.

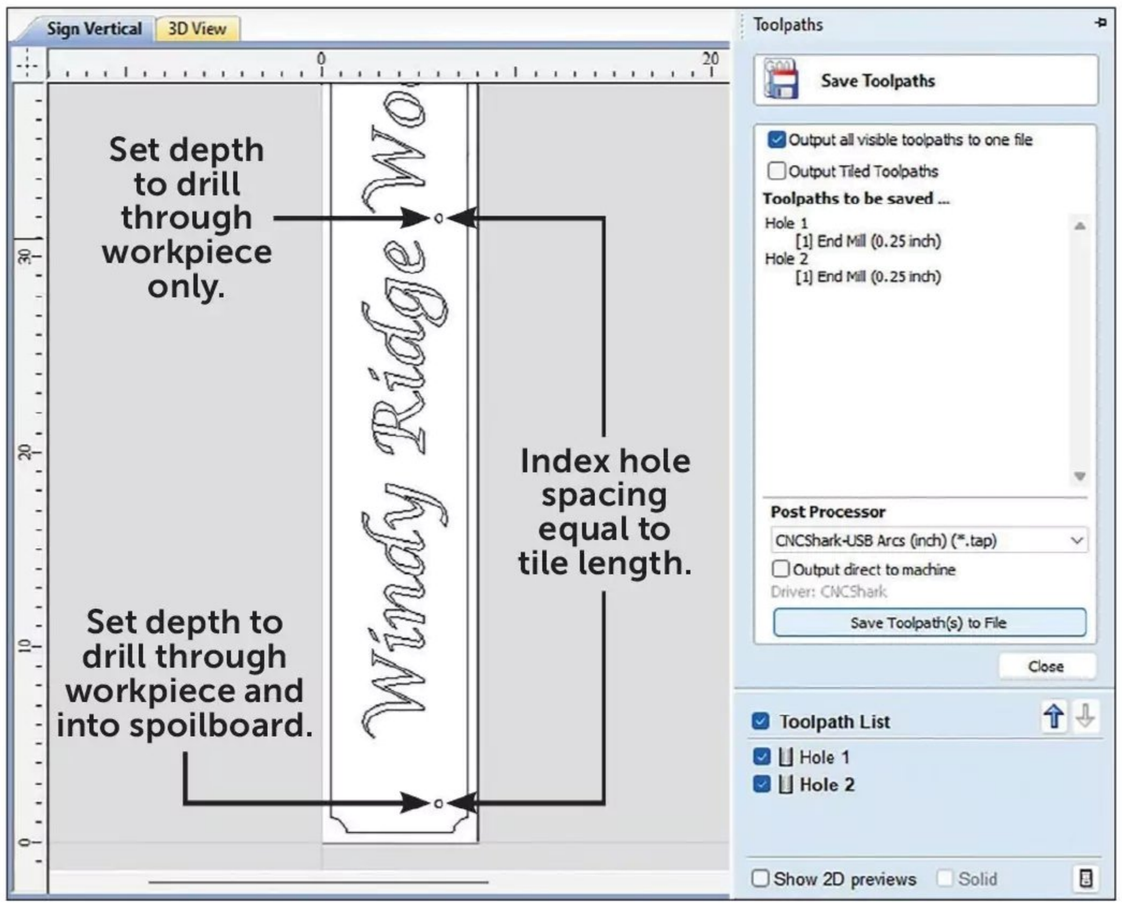


When absolute precision isn't necessary, mark the tile's border with a witness mark along the edge of the workpiece and align it with a mark indicating the origin point on a fence attached to the CNC bed.

SEEK OUT A WITNESS

To accurately reposition the workpiece between cuts, add witness marks on the workpiece and your machine. For a simple, one-off job, it may be enough to draw lines on the workpiece to indicate where each tile begins, then align these marks with a corresponding line on the machine that indicates the job's origin point (*left*).

For more complex jobs, or those that you'll run multiple times, design your project with indexing holes in the workpiece along with a corresponding hole in your spoilboard (*right*). You can include the index holes within the carving and plug them afterward, or you can make the workpiece extra wide, add the indexing holes to the excess, and trim it away later.



The design requires two index holes, sized to fit a dowel, each with its own toolpath. Locate the first hole just inside the first tile, and the second one tile length away, aligned with the axis you're tiling on.

LINE UP FOR TILING SUCCESS

The tiling function makes it easy to create your toolpaths, but accurately carving them requires outfitting your CNC to precisely position your workpiece. This requires aligning the workpiece to the machine's axis and making sure the spoilboard supporting it is coplanar with the bit's horizontal travel.

First, attach a spoilboard that is shorter than the maximum cutting travel of your machine. Then attach a fence in line with the axis you'll be tiling along. Run a flattening pass with a spiral upcut bit that travels beyond the spoilboard's ends and simultaneously trims the fence edge to ensure it aligns perfectly with the bit's travel (*below left*).

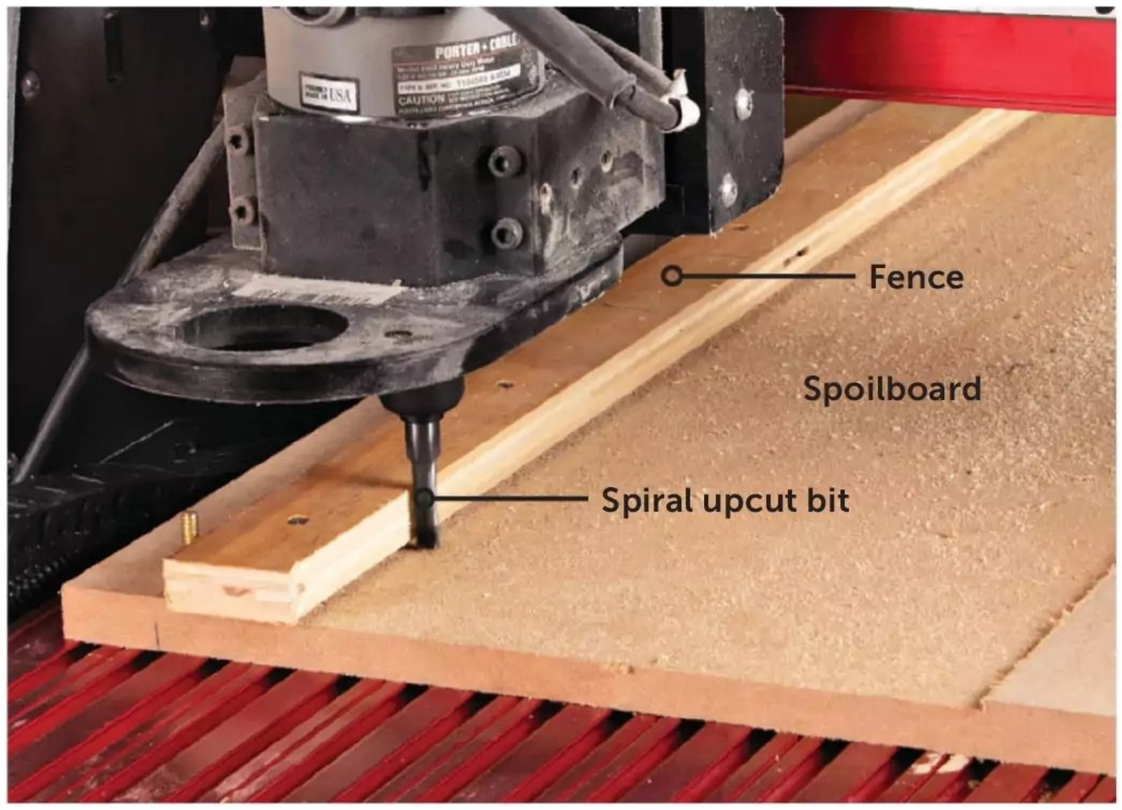
TIP!

Keep long workpieces sitting flat with infeed and outfeed supports.

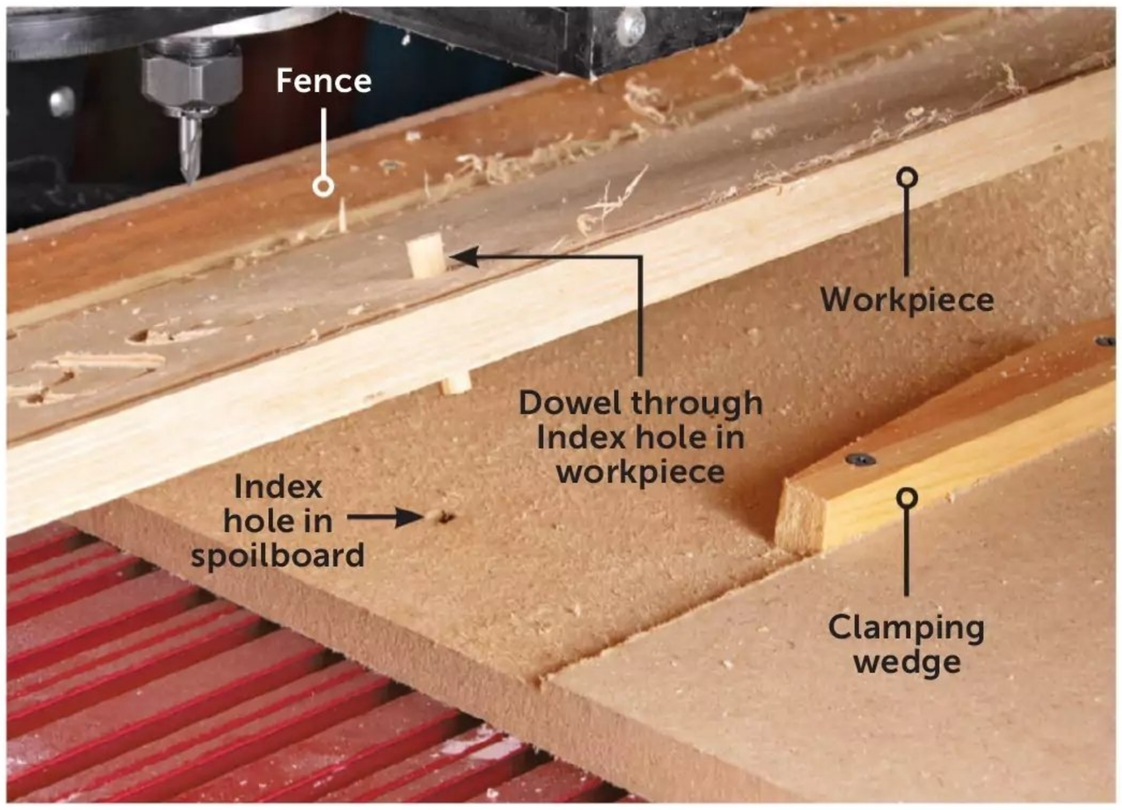
If you've chosen to use witness marks, add them to your fence and workpiece. Align the workpiece to the mark on the fence and secure it before running each tiling file (or set of files).

If you're using index holes, first run the initial tiling toolpath file (or set of files). Without shifting the workpiece, run the first index hole file to drill through the workpiece into the spoilboard. Then run the second index hole file. It should drill through only the workpiece in a location on the second tile's area corresponding to that on the first.

Clean away sawdust and debris, use a short length of dowel to pin the index hole to the spoilboard, and run the next tiling path (*below right*). This time (and for subsequent tiles), you need to run only the second index hole toolpath after carving. Then simply step and repeat to complete your oversized creation.



Your flattening toolpath should travel beyond the spoilboard ends to allow the workpiece to overhang. Make it wide enough to fit the workpiece as well as to trim the fence edge to align with the tiling axis.



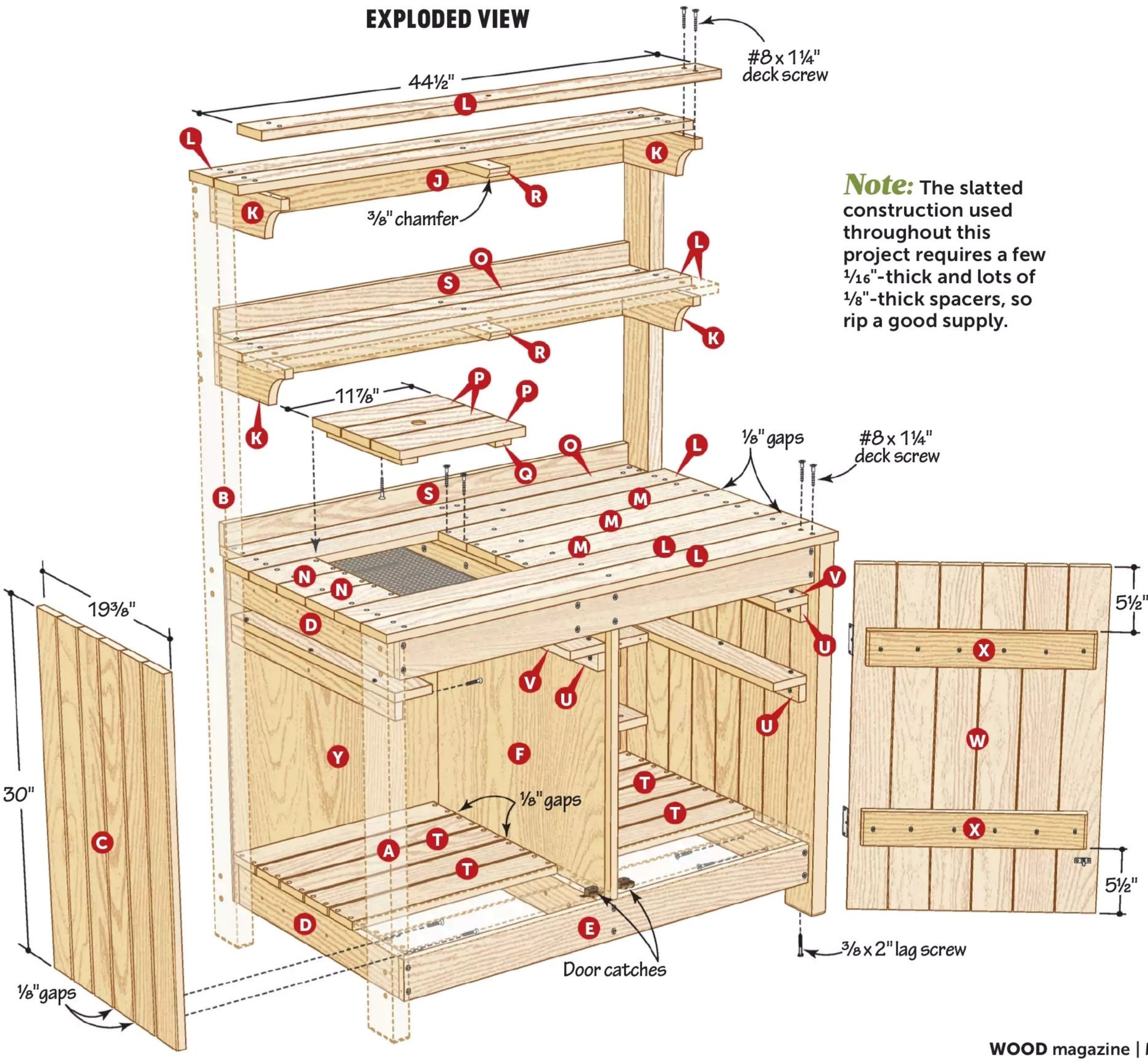
Create toolpaths to cut one index hole ½" into your spoilboard and a corresponding hole a tile's length away through only the workpiece. A snug-fitting dowel aligns the workpiece for the next tiling toolpath.

SIMPLY PERFECT
POTTING BENCH

Simple construction and loads of handy features make this potting bench a must-have for green-thumb gardeners.

WRITER: KERRY GIBSON
DESIGNER: KEVIN BOYLE
BUILDER: BRIAN BERGSTROM

Any plant aficionado worth their weight in potting soil would love a dedicated workspace like this potting bench to pursue their herbaceous hobby. The spacious top offers plenty of worksurface for plants and pots, while shelves and an enclosed base offer storage for planting tools and supplies. Helpful features make this bench blossom into a plant-lover's paradise. Construction is strong and simple, so you can go from project to potting in no time.



Note: The slatted construction used throughout this project requires a few 1/16"-thick and lots of 1/8"-thick spacers, so rip a good supply.

PHOTOGRAPHER: JASON DONNELLY; **ILLUSTRATORS:** ROXANNE LEMOINE, LORNA JOHNSON

OVERALL DIMENSIONS
44½"W × 26⅝"D × 65"H

START WITH THE SIDES

TIP!

To remove mill marks and clean up the pine for this project, start with 100-grit discs on a random-orbit sander, then move to 120 grit.

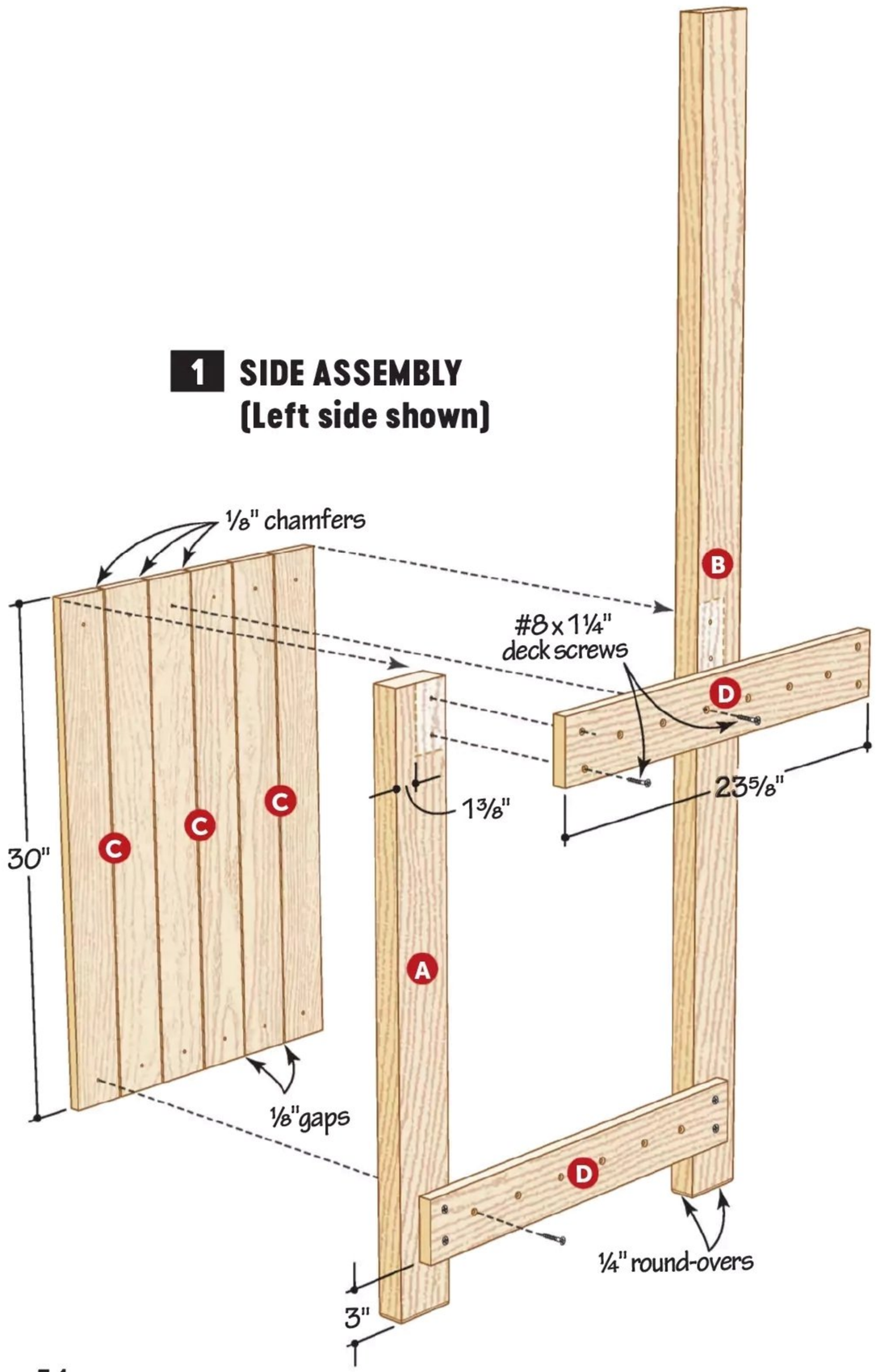
1 Cut the front legs (A) and back legs (B) to length from 2×4 stock, then sand or rout 1/4" round-overs on one end of each leg **[Drawing 1]**. Finish-sand the legs.

2 Cut the side slats (C) and bench rails (D) to length from 3/4" stock **[Materials List, Exploded View]**. Set four of the rails aside for now. Rout 1/8" chamfers on the outer edges of each side slat.

3 Place a front leg (A) and a back leg (B) on a flat surface, such as your workbench, with the best face down. This will become the outside face. Then place side slats (C), chamfers facing down, between the legs, raising them on blocks so the slats sit flush with the inner face of the legs. Insert spacers between the slats, check the assembly for alignment and square, then clamp the assembly together. Glue and screw two bench rails (D) to the legs and slats **[Photo A]**.

4 Repeat the process to assemble the other side, making it a mirror image of the first side.

1 SIDE ASSEMBLY (Left side shown)



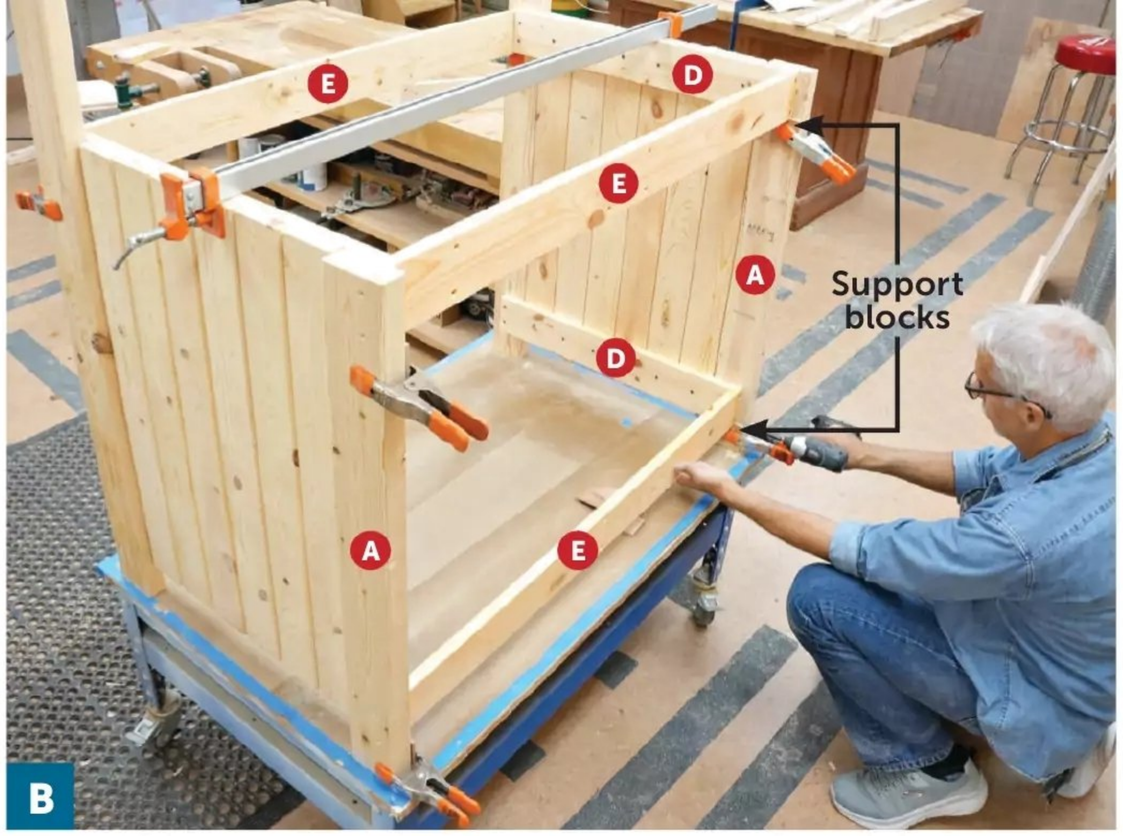
Place six side slats (C) between a front and back leg, insert 1/8" spacers between the slats and 1/16" spacers between the legs and outer slats. Align the assembly, then glue and screw the bench rails (D) into place.

CREATE THE CABINET

Note: **Make sure the screws that attach the front and back stretchers (E) will miss the screws holding the bench rails (D) to the legs.**

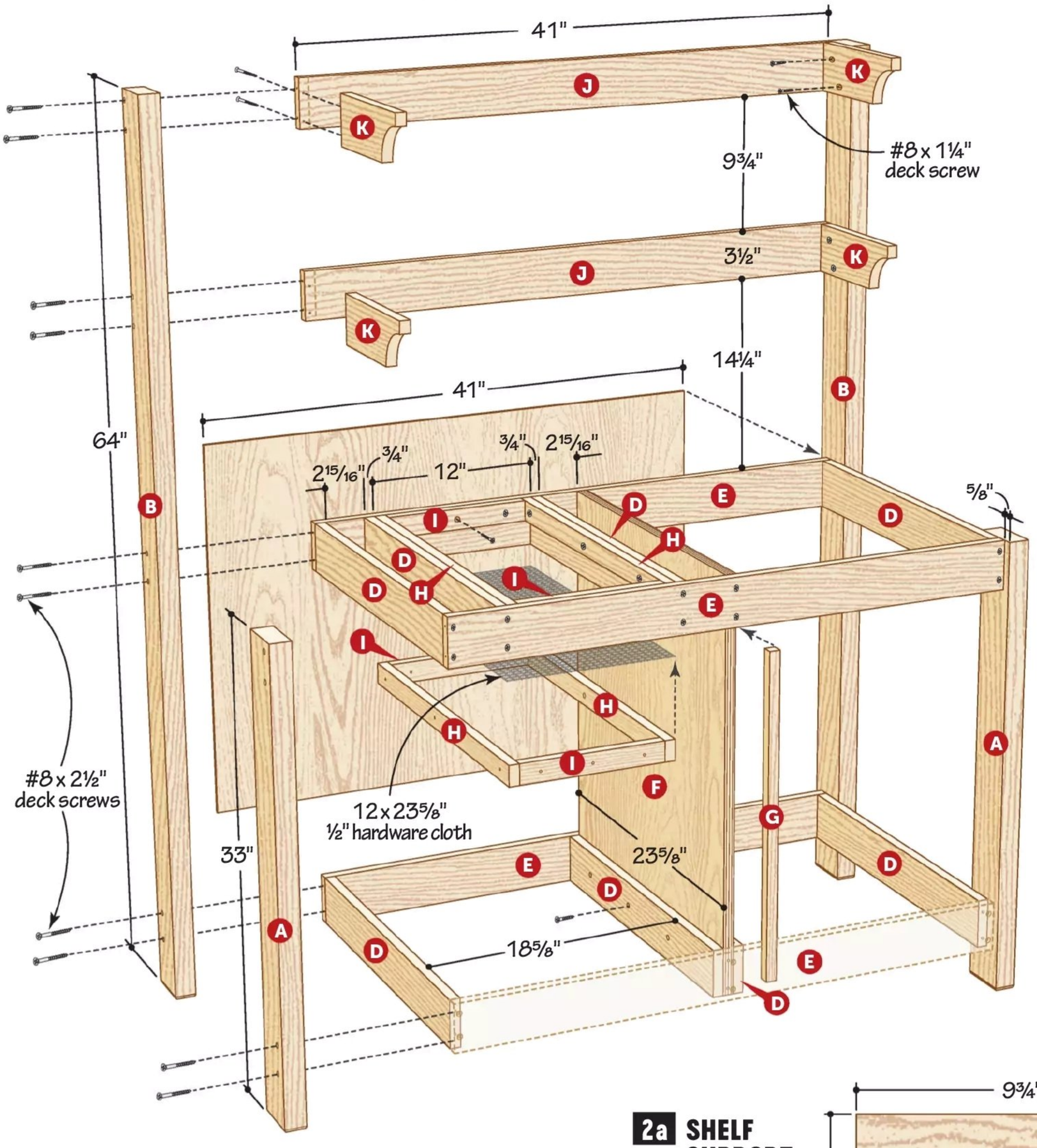
1 Cut the bench stretchers (E) to size **[Materials List]** and attach them to the side assemblies **[Photo B]**. After you attach the front and back stretchers, drill countersink holes through the legs (A,B) and into the ends of the stretchers. Then drive in screws.

2 Measure from the top edge of the upper front stretcher (E) to the bottom edge of the lower front stretcher to determine the length of the divider (F). Cut it to size from ¾" exterior-grade plywood **[Materials List]**. Glue and screw one of the bench rails (D) you set aside earlier to each face of the divider, flush with the bottom end **[Drawing 2]**.

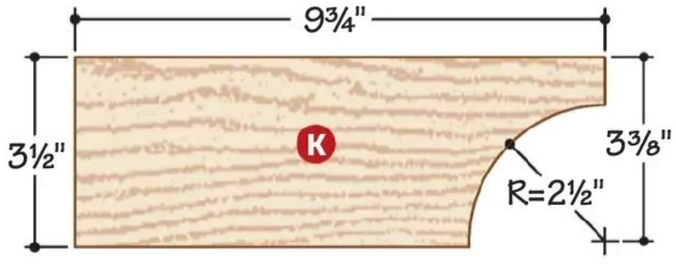


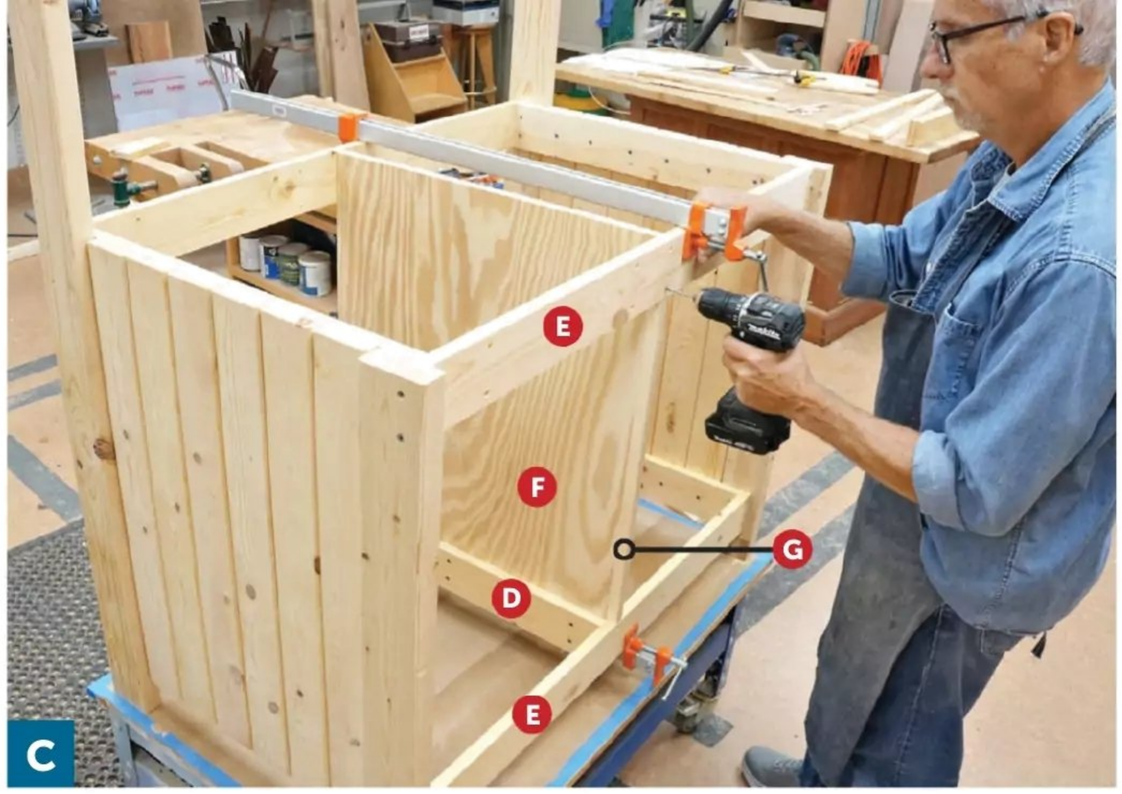
Clamp blocks to the legs (A) to position and support the stretchers (E). Glue the stretchers to the bench rails (D), drill countersunk holes, then drive in screws. Repeat to install the back stretchers.

2 CARCASE

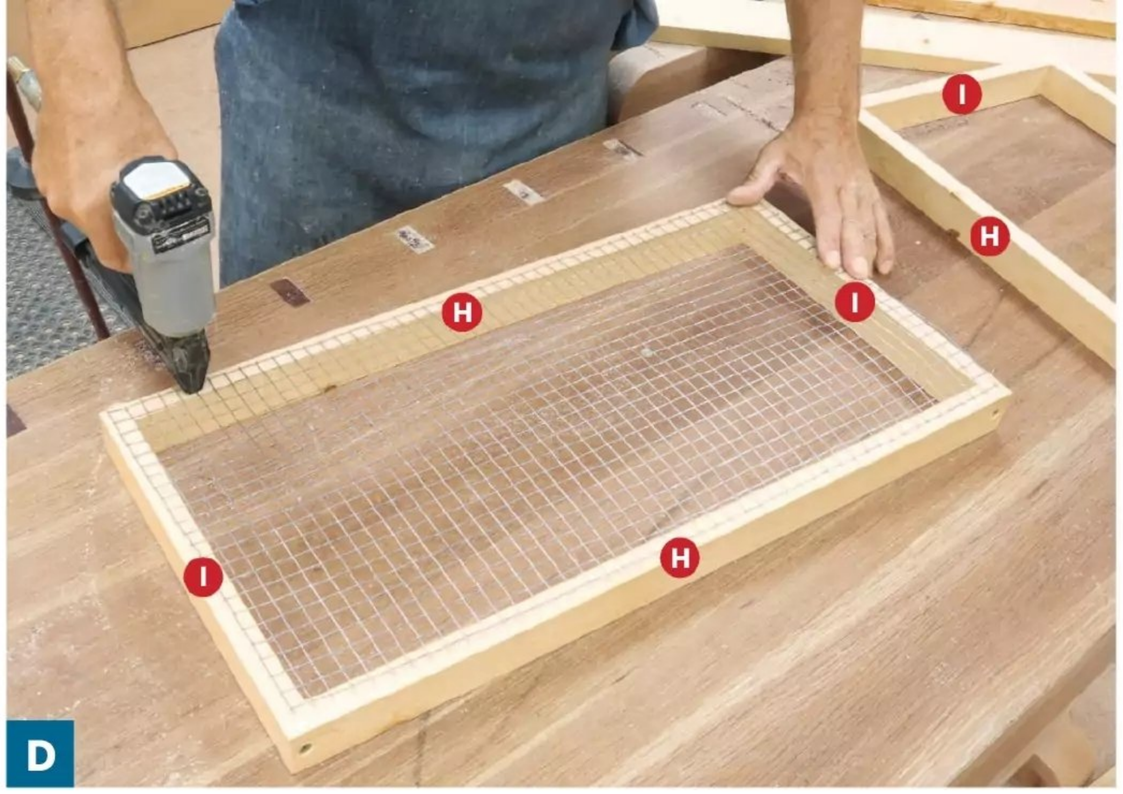


2a SHELF SUPPORT





Glue and clamp the divider assembly (D/F/G) centered on the stretchers (E) with the rails (D) flush with the lower stretchers. Drill countersunk pilot holes, then drive in the screws.

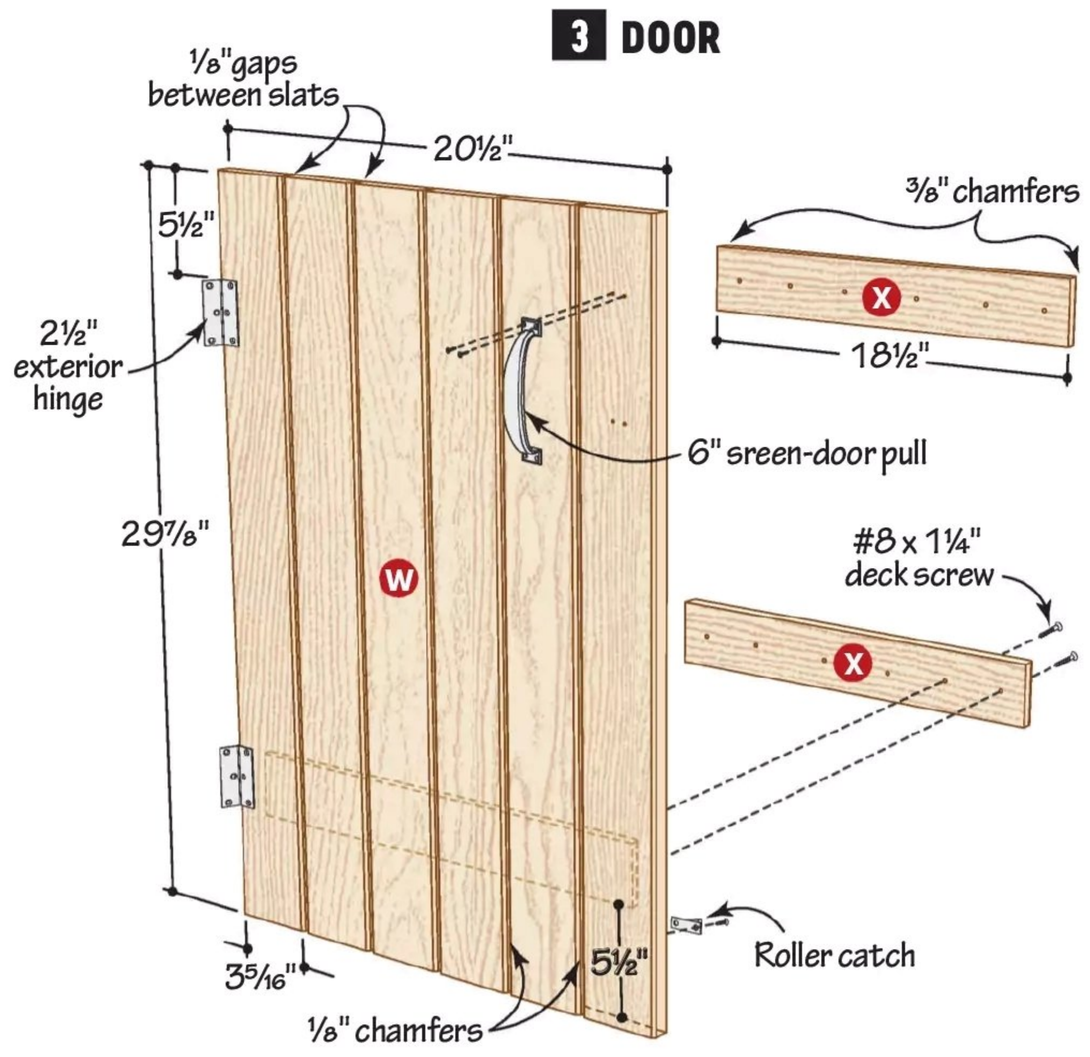


Cut a piece of ½" hardware cloth to 12×23⅝", then staple it in place. We used a pneumatic crown stapler, but a manual staple gun or poultry staples would work, too.

3 Cut the divider trim (G) to fit between the front rails, then glue it to the front edge of the divider assembly (D/F) 3½" from the bottom end. After the glue dries, glue and screw the divider assembly into place **[Photo C]**.

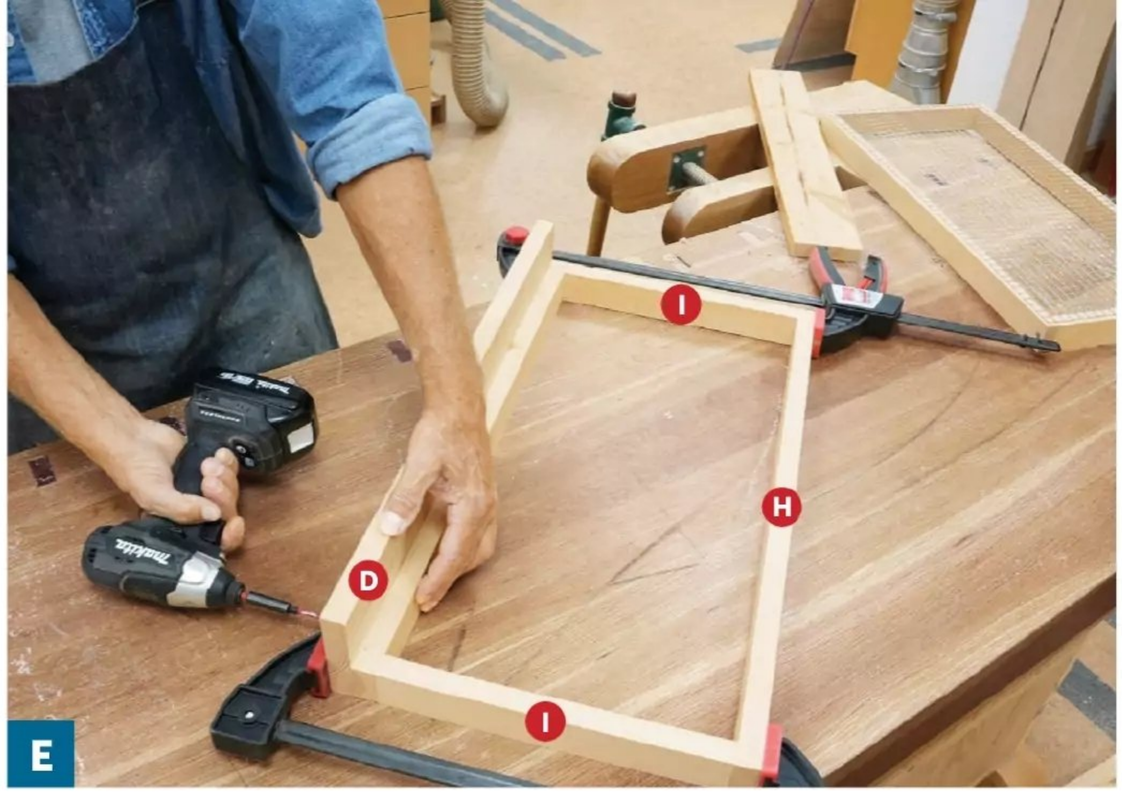
4 Cut the screen frame sides and ends (H, I) to size **[Materials List]**. Glue and screw the sides to the ends to form two frames **[Drawing 2]**. Add hardware cloth to one of the frames **[Photo D]**.

5 Attach the remaining two bench rails (D) to the screen frame (H/I) that doesn't have hardware cloth **[Photo E]**. Position the other screen frame on top of the first one, sandwiching the hardware cloth between the frames, then screw it to the bench rails.

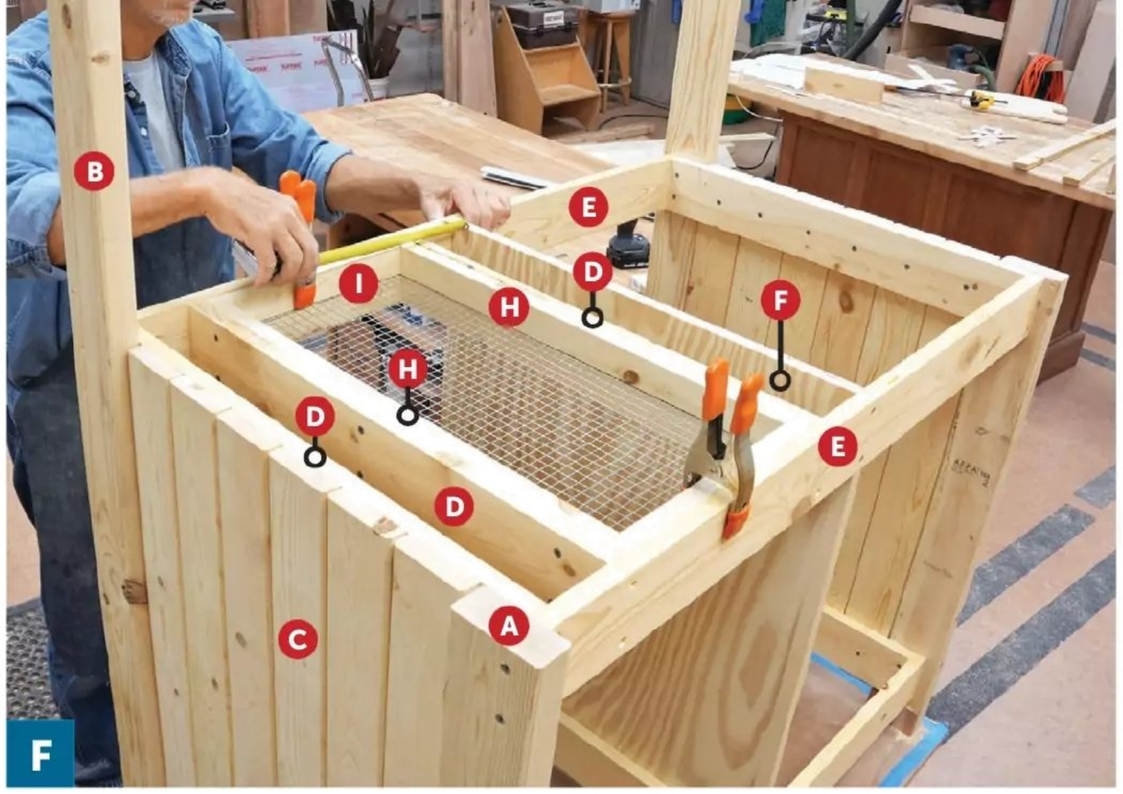


Sturdy hardware cloth supports pots as you add soil while allowing excess to drop into a tub located below.

Generous storage space holds pots and garden accessories below a plastic tub that stops soil from falling through.



Glue and clamp the screen frame (H/I) without the hardware cloth to a bench rail (D) with the ends flush. Drill countersunk holes, and screw the rail to the screen frame. Then attach the other bench rail.



To position the screen frame assembly (D/H/I), clamp it between the upper stretchers (E) flush with the top edge and centered between the divider (F) and the left-hand case rail (D).

6 Position the tray assembly (D/H/I) in its opening in the case **[Photo F]**. Drill countersunk screw holes through the inside of the tray ends (I) into the stretchers (E) and screw the assembly in place **[Drawing 2]**.

7 Cut the shelf stretchers (J) and shelf supports (K) to size **[Materials List]**. Lay out the curve on each shelf support **[Drawing 2a]**, then jigsaw or bandsaw them to shape, staying just outside the line. Sand the curves smooth. Glue and screw two supports to the face of each shelf stretcher, flush with the ends **[Drawing 2]**. Position and clamp one shelf assembly (J/K) between the back legs (B) and attach it **[Photo G]**. Then install the other shelf assembly.

To position the lower shelf assembly (J/K), clamp two 14¼"-long scrapwood support blocks to the back legs. Rest the assembly on top of the blocks, check for square, and screw it in place.

> **SIMPLE CONSTRUCTION USING READILY AVAILABLE MATERIALS MAKES THIS POTTING BENCH AN EASY WEEKEND PROJECT.**
>
> *-KEVIN BOYLE, SENIOR DESIGN EDITOR*

ADD BENCH AND SHELF TOPS

The bench and shelf top slats get the same 1/8" edge chamfer treatment as the sides. So once you've ripped stock for these pieces to width **[Materials List, Cutting Diagram]**, rout a 1/8" chamfer along both edges of the top faces.

1 With the stock ripped to width, cut the long slats (L), mid slats (M), short slats (N), filler slats (O), and lid slats (P) to length **[Materials List]**.

2 Attach the first long slat (L) to the bench cabinet, centered lengthwise and overhanging the front edge of the front legs (A) by 1/4" **[Exploded View]**. Using 1/8" spacers between the slats, install a second long slat, the mid slats (M), and short slats (N), keeping the outer ends flush with the first slat. Then install the remaining long slat (L) and the filler slat (O).

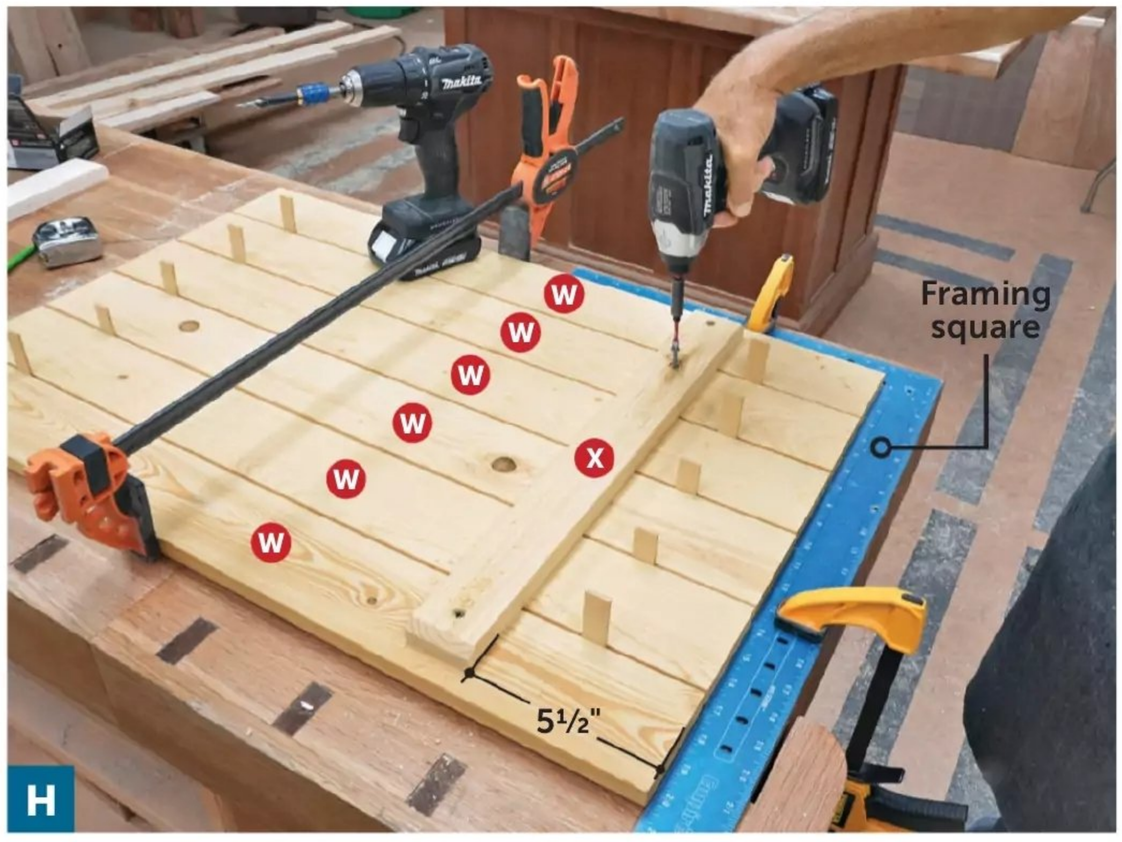
3 Using the same procedure, screw three long slats (L) to the upper shelf supports (K) **[Exploded View]**. Then attach the long slats and filler slat (O) to the lower shelf supports.

4 Cut the lid cleats (Q) and shelf cleats (R) to size **[Materials List]**. Set the shelf cleats aside. Lay the three lid slats (P) on your workbench chamfered face down and 1/8" spacers between them. Clamp them together, keeping the ends flush. Spread glue on the lid cleats, position them at least 3/4" from the ends of the lid slats, and screw the cleats to the slats. Mark the center of the lid assembly and drill a 1" finger hole. Sand the hole to ease the edges.

5 Retrieve the shelf cleats (R) and rout a 3/8" chamfer on one end of each **[Exploded View]**. Glue and clamp them to the underside of each shelf assembly, centered. Then screw them to the shelves.

6 Cut backsplashes (S) to size and glue them flush with the rear edge of the filler slats (O) on the bench and lower shelf.

> **ACCESSORIZE YOUR BENCH WITH HOOKS AND HOLDERS THAT KEEP POTTING TOOLS WITHIN EASY REACH.**
>
> *-KERRY GIBSON, CONTRIBUTING EDITOR*



Clamp a framing square to your workbench, then butt the six door slats (W) to keep the ends flush. Insert 1/8" spacers between the slats, clamp them together, then glue and screw the cleats (X) to the slats.

BUILD AN OUTDOOR BENCH TO LAST

Building a project to withstand the elements requires a design that effectively deals with moisture along with wise material choices.

Keep it waterproof

Potting benches get dirty, so choose exterior glue that's waterproof, not just water-resistant, and you can hose the bench down without concern over glued joints coming apart.

Let it breathe

Building with slats rather than solid panels allows easy water drainage along with air circulation that dries the bench and its contents to prevent rust and mildew.

Protect with pigment

Skip clear exterior finishes and opt for semitransparent exterior stain. It lets the grain show but contains pigment particles that block destructive ultraviolet (UV) rays.

Simplify dry storage

Use lidded plastic storage tubs to prevent stored soil from saturating and to provide reliable, easily replaceable dry storage.

Clear totes make it easy to see what's stored inside, so you spend time potting instead of searching for supplies.

Handle the hardware

Choose stainless steel or coated screws to prevent rust that discolors wood and causes fasteners to fail.

Rust stains discolor wood and soak in deep, making them almost impossible to get rid of.

Stop water slurping

End grain magnified looks like a bunch of drinking straws that siphon up water with ease. Prevent that by driving zinc-coated lag screws into the legs. As a bonus, they also act as levelers.

PINE IS FINE

Cedar, white oak, and cypress hold up well outdoors because they're naturally resistant to decay. Plain pine is not. So why did we use it? Mainly, pine costs a lot less than those other outdoor woods. Untreated pine also doesn't come with pressure-treated pine's potential problems, such as warping, wetness, weight, and chemical concerns. Protect the wood against water and UV light, and lowly pine can serve a long time for utilitarian outdoor projects.

OUTFIT INSIDE AND OUT

Note: **We used 15- and 30-quart tubs that measure 18¾×13⅜". Adjust the width of the tub supports (V) and the cleat (U) positions in the cabinet to suit your tubs.**

1 Cut the bottom slats (T) to fit between the sides and divider **[Materials List]** and screw them to the bench rails (D), using ⅛" spacers to position them **[Exploded View]**.

2 Cut the tub cleats (U) and tub supports (V) to size. Glue and screw a support to the upper edge of each cleat. Set these assemblies aside for now.

3 Cut the door slats (W) and door cleats (X) to size **[Drawing 3]**. Chamfer the edges of the slats and the ends of the cleats.

4 Align the ends of six door slats (W), insert ⅛" spacers between the slats and clamp across the slats **[Photo H]**. Glue and screw the door cleats to the slats, centered side to side. Repeat for the other door.

5 Test-fit the doors in the bench and, if necessary, sand or plane the outer door slats to leave a gap between the doors, and between the doors and front legs.

6 Attach the hinges to the doors so the barrel of each hinge is centered on the edge of the door. Clamp a block to the lower stretcher, position the door, and screw the hinges to the front leg **[Photo I]**. Repeat to install the other door.

7 Cut the back (Y) to size from ¼" exterior-grade plywood. To make finishing easier, leave the back off for now. Remove the hinges and finish-sand the entire bench, easing any sharp edges. Apply the finish of your choice. To ensure the pine would last outdoors, we used semitransparent stain on all the outside and inside surfaces **[Sources]**. See *Build an Outdoor Bench to Last, page 59*, to learn more reasons this bench holds up.

8 When the finish dries, install the bin cleats/supports so the rear end of each assembly aligns with the rear edge of the divider (F). Nail the back in place. Re-install the hinges and the doors, mount the door handles and install the door catches. Add any tool-hanging hooks you may want. As a final step, drill a 3/16" pilot hole in the bottom of each leg, centered, and drive a lag screw into the bottom of each leg. This holds the legs up off the ground to minimize moisture wicking, and allows adjustment to level the bench on an uneven surface.

Now round up your pots, trowels, tools, seeds, and soil and put that green thumb to work.

I

With the hinges attached to the door, clamp a block to the lower stretcher to support the door. Leave a 1/16" gap between the door and the front legs, then screw the hinges to the front leg.

MATERIALS LIST

PART		FINISHED SIZE T	W	L	Matl.	Qty.
A	FRONT LEGS	1½"	3½"	33"	P	2
B	BACK LEGS	1½"	3½"	64"	P	2
C	SIDE SLATS	¾"	3⅛"	30"	P	12
D	BENCH RAILS	¾"	3½"	23⅝"	P	8
E	BENCH STRETCHERS	¾"	3½"	41"	P	4
F	DIVIDER	¾"	23⅝"	30"	Ply	1
G	DIVIDER TRIM	¾"	¾"	23"	P	1
H	SCREEN FRAME SIDES	¾"	1½"	23⅝"	P	4
I	SCREEN FRAME ENDS	¾"	1½"	10½"	P	4
J	SHELF STRETCHERS	¾"	3½"	41"	P	2
K	SHELF SUPPORTS	¾"	3½"	9¾"	P	4
L	LONG SLATS	¾"	3½"	44½"	P	8
M	MID SLATS	¾"	4"	26 5/16"	P	3
N	SHORT SLATS	¾"	4"	6 3/16"	P	3
O	FILLER SLATS	¾"	3½"	41"	P	2
P	LID SLATS	¾"	3½"	11⅞"	P	2
Q	LID CLEATS	¾"	1½"	10½"	P	2
R	SHELF CLEATS	¾"	2"	9¾"	P	2
S	BACKSPLASHES	¾"	2"	41"	P	2
T	BOTTOM SLATS	¾"	3⅜"	20⅛"	P	14
U	TUB CLEATS	¾"	1½"	23⅝"	P	6
V*	TUB SUPPORTS	¾"	4"	23⅝"	P	6
W	DOOR SLATS	¾"	3 5/16"	29⅞"	P	12
X	DOOR CLEATS	¾"	3"	18½"	P	4
Y	BACK	¼"	30"	41"	Ply	1

*Adjust width to fit plastic bins. See the instructions.

MATERIALS KEY: P–pine, Ply–exterior-grade plywood.
SUPPLIES: #8×2½ deck screws, #8×1¼" deck screws, 24×24" ½" hardware cloth, ⅜×2" lag screws, three plastic storage bins (approximately 18¾×13⅜" including lip - depth can vary)
BITS: 45° chamfer and ¼" round-over router bits, 1" drill bit.
SOURCES: Door catch, no. 233957, $2 ea.; screen door handle, no. 3735981, $7 ea.; 2½" door hinges, no. 3734354, $4 ea.; Valspar "Stylewood" semi-transparent exterior wood stain, quart no. 1028085, $21; lowes.com.
PROJECT COST: It cost us about $300 to build this project. Your cost will vary by region and source.

CUTTING DIAGRAM

We purchased three 8' 2x4s, four 8' 1x2s, 23 8' 1x4s, and four 8' 1x6s and cut them to the sizes shown in these sample boards.

1½ x 3½ x 96" Pine

1½ x 3½ x 96" Pine (2 needed)

¾ x 3½ x 96" Pine (6 needed)

¾ x 3½ x 96" Pine

¾ x 3½ x 96" Pine (2 needed)

¾ x 3½ x 96" Pine (2 needed)

¾ x 3½ x 96" Pine (4 needed)

¾ x 3½ x 96" Pine (4 needed)

¾ x 3½ x 96" Pine (4 needed)

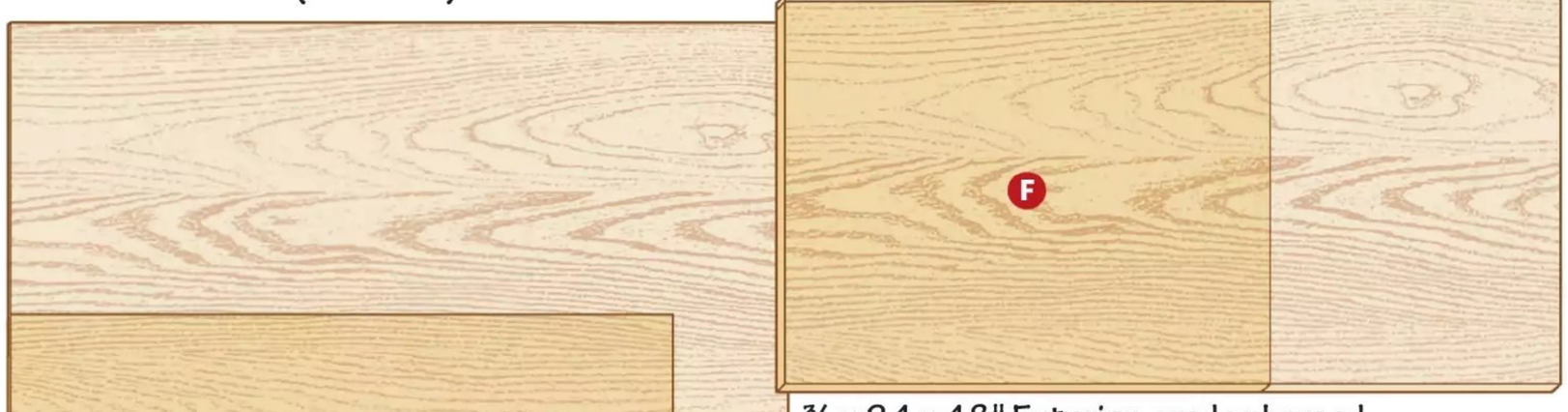
¾ x 1½ x 96" Pine (2 needed)

¾ x 1½ x 96" Pine (2 needed)

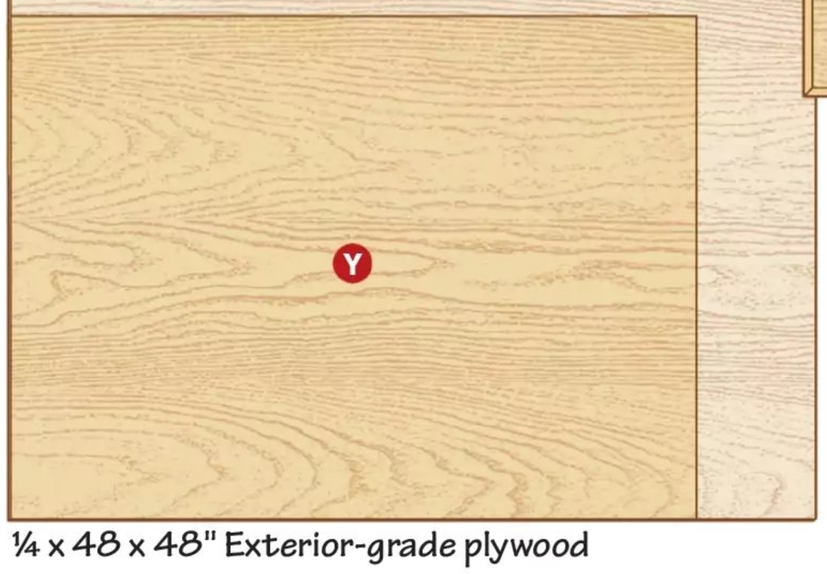
¾ x 5½ x 96" Pine

¾ x 5½ x 96" Pine

¾ x 5½ x 96" Pine (2 needed)



¾ x 24 x 48" Exterior-grade plywood



¼ x 48 x 48" Exterior-grade plywood

MULTI-TIER DISPLAY TOWER

Whether you call them keepsakes, knickknacks, or tchotchkes, show off a few of your favorite things with this contemporary unit.

WRITER: VINCE ANCONA
DESIGNER: KEVIN BOYLE
BUILDER: BRIAN BERGSTROM
PHOTOGRAPHER: CARSON DOWNING; **ILLUSTRATORS:** ROXANNE LEMOINE, LORNA JOHNSON

OVERALL DIMENSIONS
13¾"W × 13¾"D × 38¾"H

We've all seen traditional display cabinets–the kind big enough to house a complete collection of Precious Moments figurines. This scaled-down display tower takes a less-is-more approach, providing space to highlight a selection of carefully curated items.

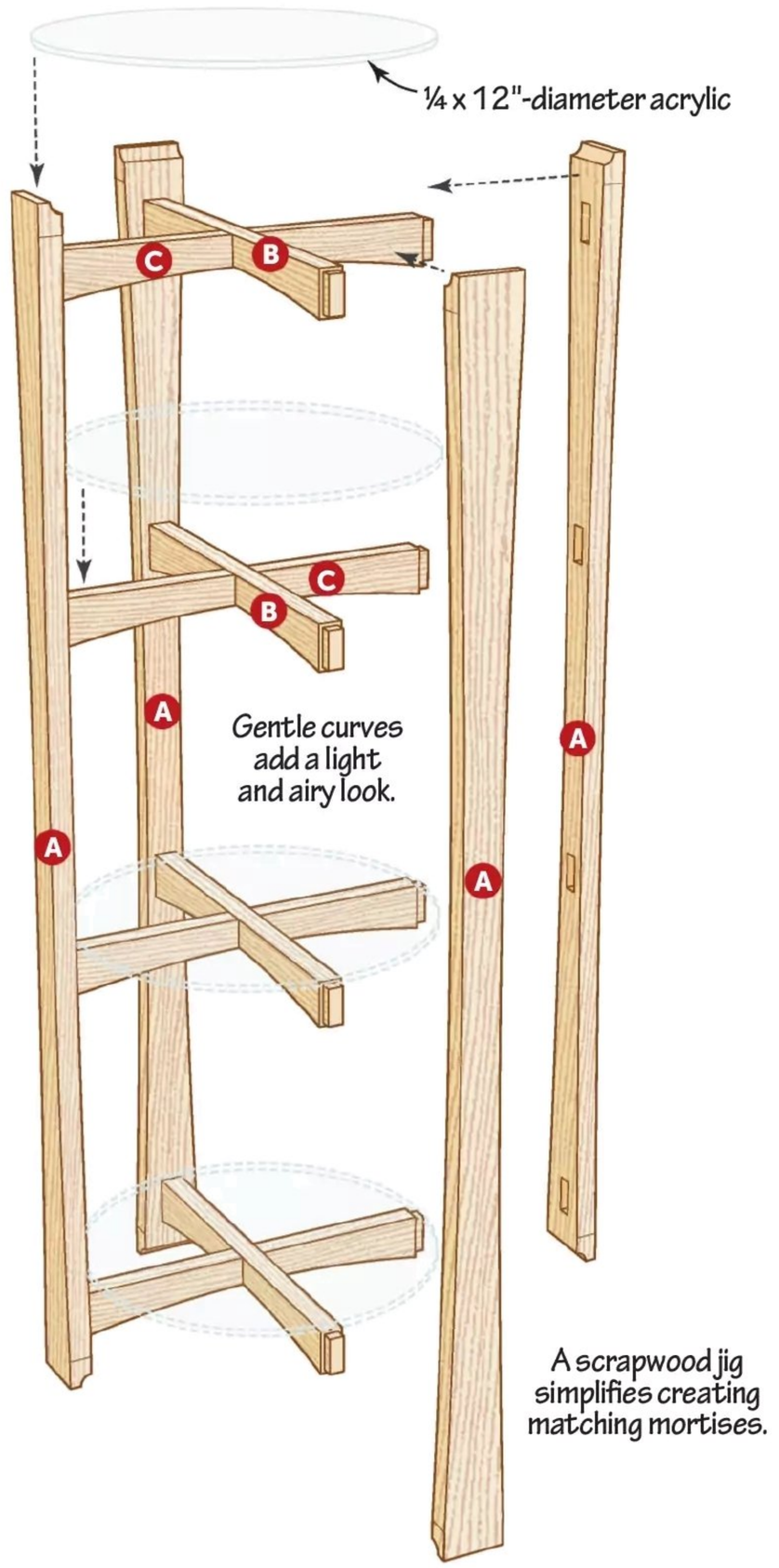
The construction also reflects this minimalist approach, employing simple joinery and just a handful of parts. To top it off, we used clear acrylic rounds for the shelves **[Source]**, eliminating the expense and worry of glass shelving.

SHAPE THE LEGS

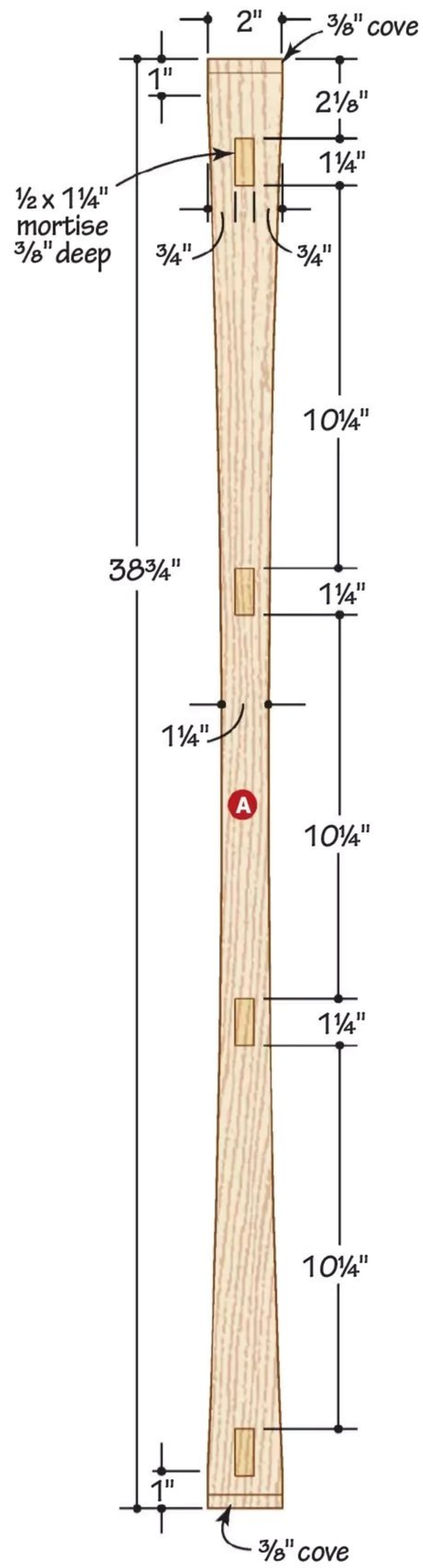
1 Cut the legs (A) to length and overall width **[Materials List, Exploded View]**. Before creating the curves on the legs, lay out and rout the mortises **[Drawing 1]**. We did this with a jig glued up from plywood strips **[Drawing 2]**. Install a 3/8" guide bushing and a 1/4" bit in your plunge router, then cut the mortises in each leg **[Photo A]**.

Side and end cleats register the mortising template on the leg (A), allowing you to rout the mortises with a 1/4" spiral upcut bit and a 3/8" guide bushing. Square up the corners with a chisel after routing.

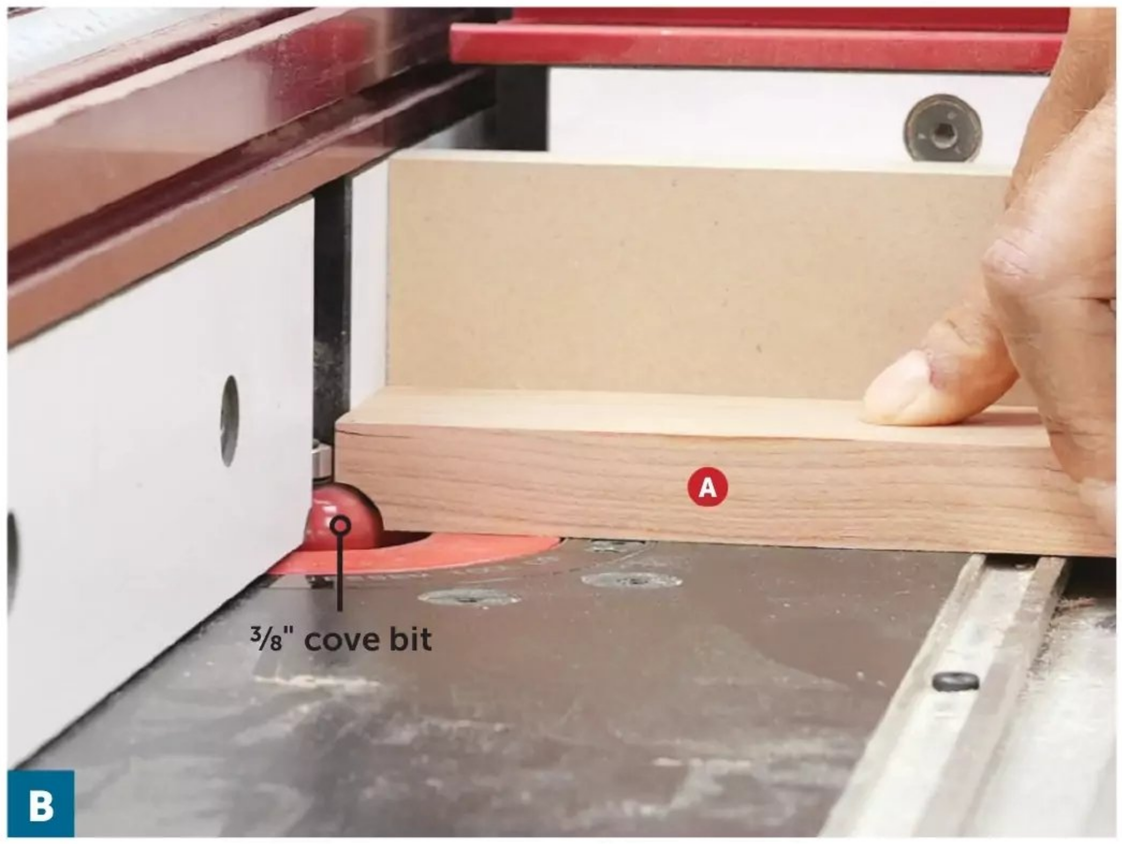
EXPLODED VIEW



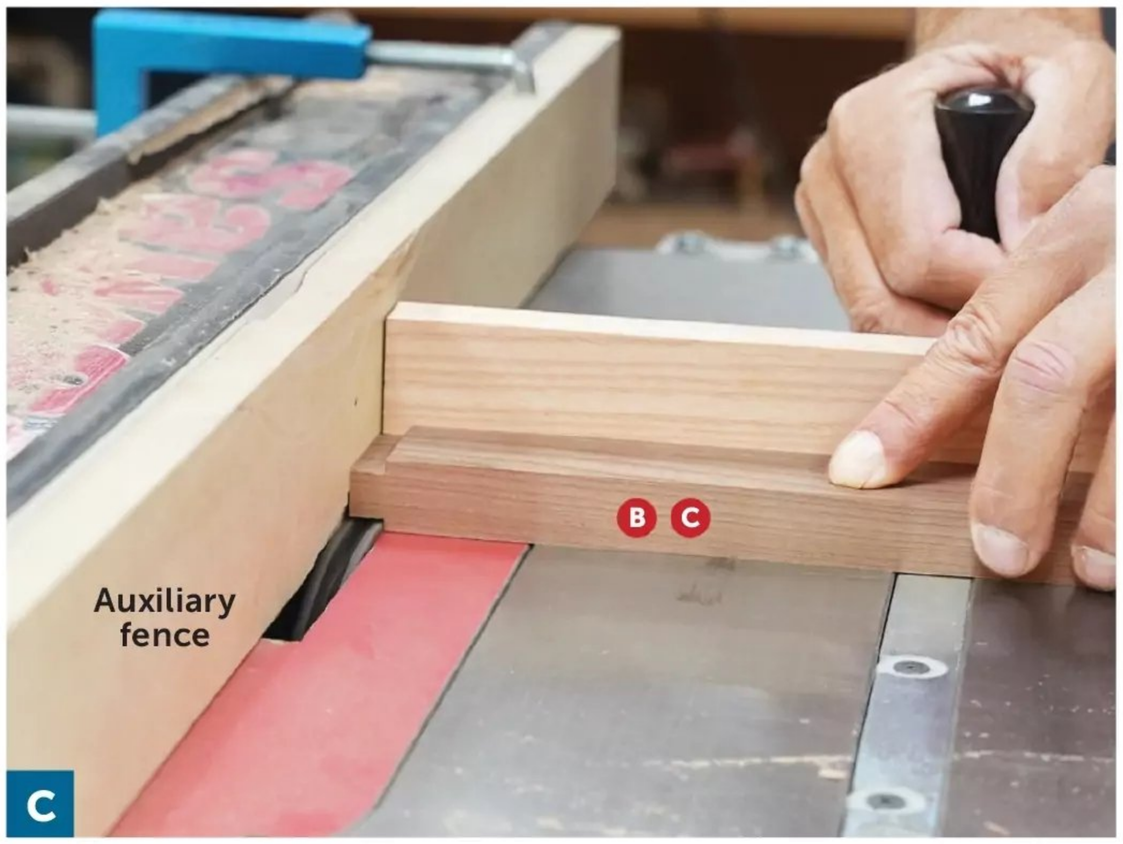
1 LEG



> **THIS PROJECT LENDS ITSELF TO MAKING TEMPLATES FOR THE LEGS AND CROSS RAILS, ESPECIALLY IF YOU PLAN ON BUILDING MORE THAN ONE.**
>
> ***-KEVIN BOYLE, SENIOR DESIGN EDITOR***



To rout the coves on the ends of the legs (A), position the router table fence flush with the bearing of the cove bit. Use an auxiliary fence on your miter gauge to back up the cut to prevent tear-out.



Bury the dado blade in an auxiliary rip fence to cut the tenons on the ends of the rails (B, C). A fence attached to the miter gauge backs up the cuts to prevent tear-out.

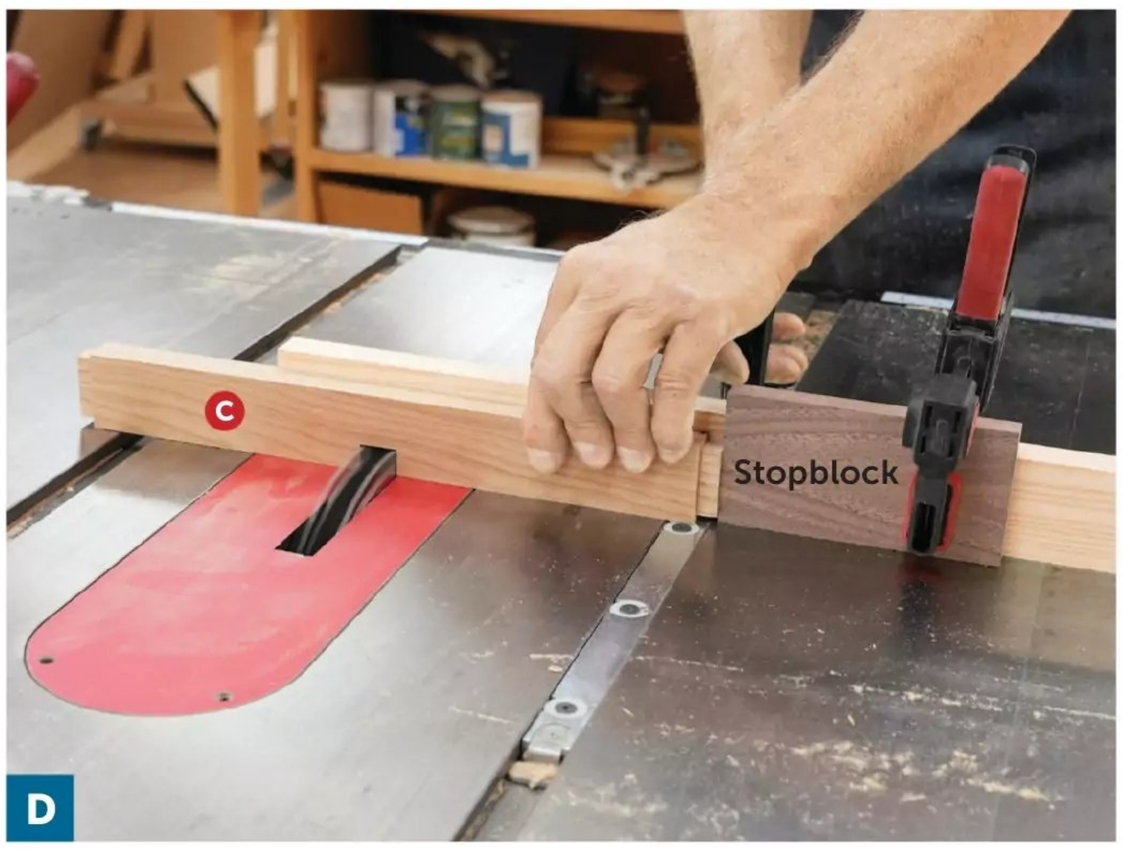
Learn how to make a simple fairing stick at: woodmagazine.com/fairingstick

2 Install a 3/8" cove bit in your router table and, using a straightedge, position the fence so it's flush with the bit's bearing. Rout a cove on both ends of each leg **[Photo B]**.

3 Use a fairing stick to lay out the curves on one of the legs, starting and stopping 1" from the ends **[Drawing 1]**. Cut the profile with a bandsaw or jigsaw, staying just outside of the lines. Sand the edges up to the layout lines. Using this leg as a pattern, lay out the curves on the other three legs and rough-cut them. Complete the curves with a router and flush-trim bit, using the first leg as a template attached with double-faced tape.

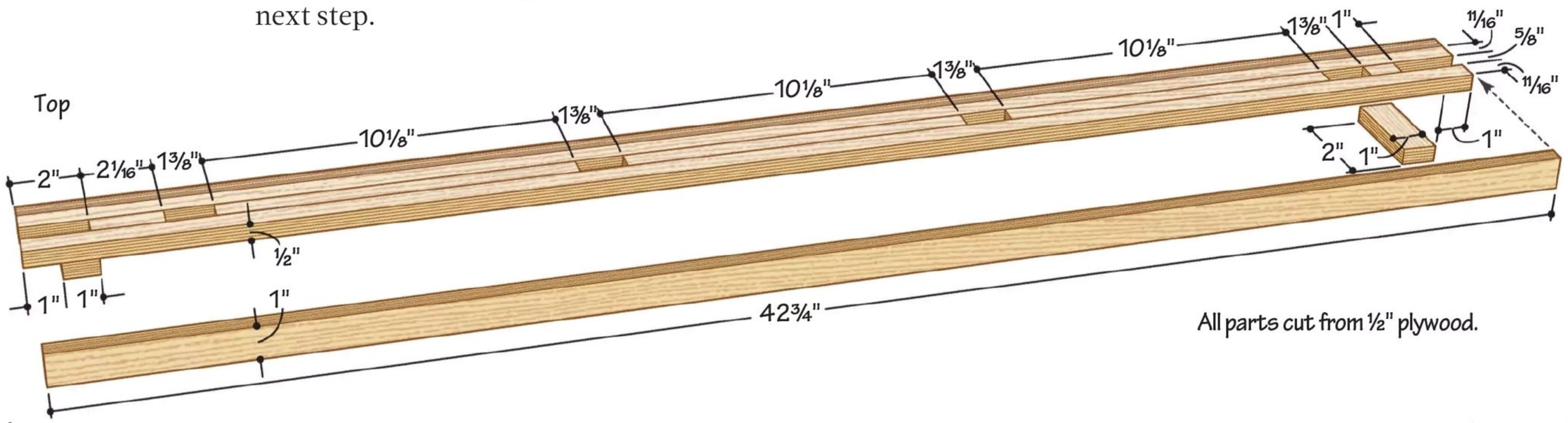
4 Cut the upper (B) and lower (C) rails to size **[Drawing 3]**. Cut tenons on the ends of all the rails to fit the mortises in the legs (A) **[Drawing 3a, Photo C]**.

5 Using a dado blade, cut notches in the rails to create half-lap joints **[Drawing 3, Photo D]**. Note that the notches in the upper rails (B) are deeper than those in the lower rails (C) to account for the curve you'll add in the next step.



Install a dado blade to match the thickness of the rails. Cut 1/2"-deep notches in the lower rails (C), using a stopblock to center the notches. Raise the blade to 1" and cut notches in the upper rails (B).

2 MORTISE JIG



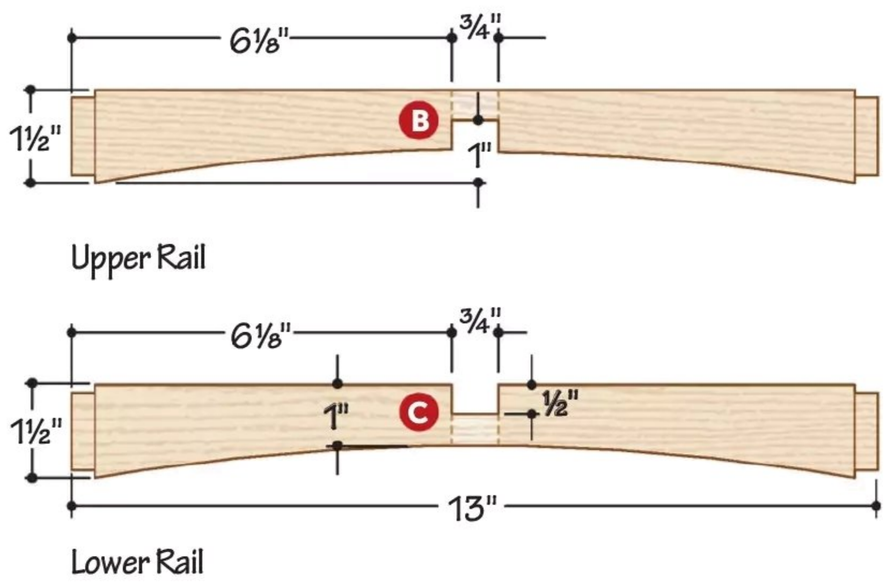
All parts cut from 1/2" plywood.

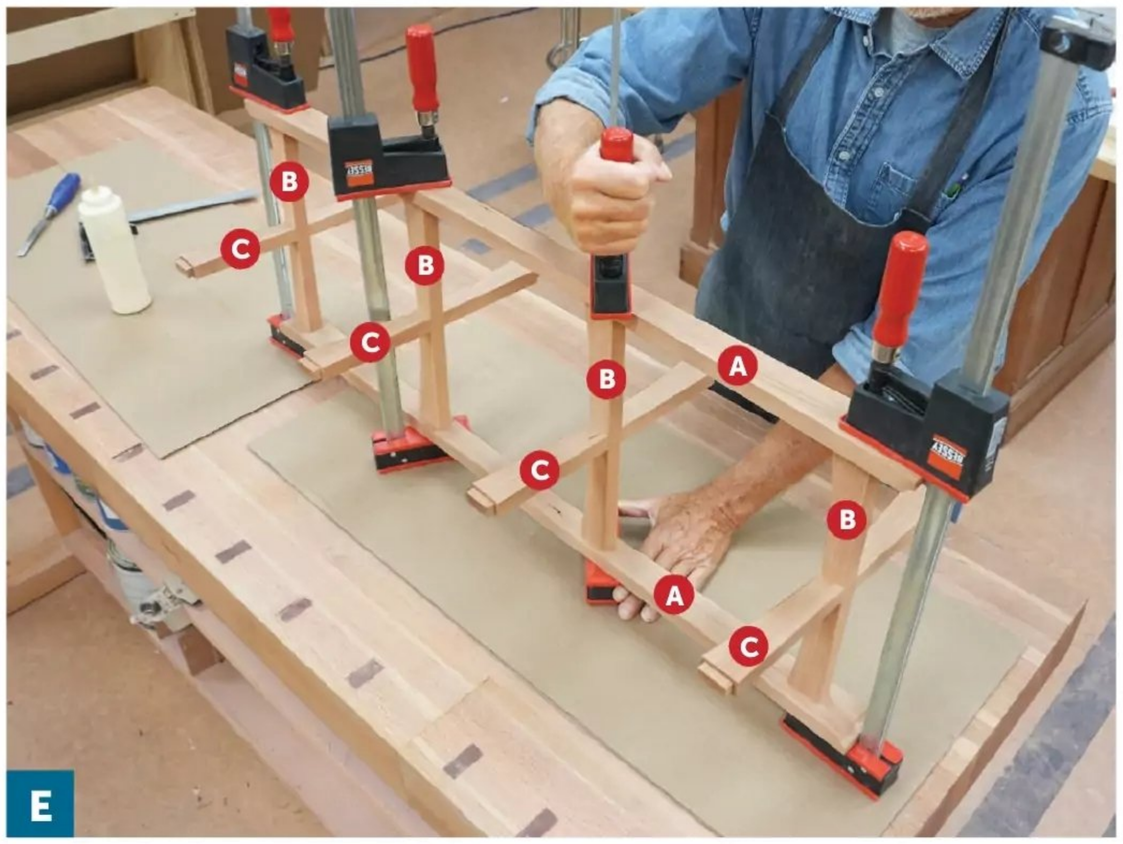
TIP!

When laying out the curves on the rails, pay attention to the orientation of the notches.

6 Lay out the curve on one of the lower rails (C). Cut and sand the profile to shape, then use it as a template to lay out the curve on the remaining rails. Make sure to properly orient the curve on the notched edge of the upper rails (B), and on the un-notched edge of the lower rails so you end up with four of each. Rough-cut then flush-trim the remaining rails, just as you did with the legs.

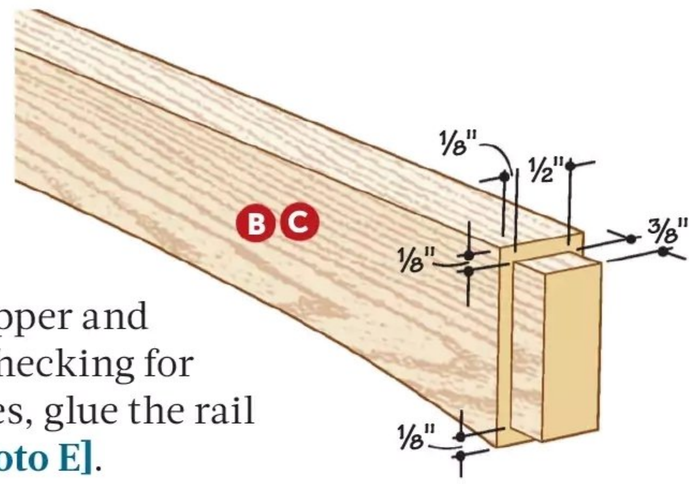
3 RAILS





Glue and clamp the four rail assemblies (B/C) between a pair of legs (A), making sure the rails are oriented in the proper direction. After the glue sets up, add the second pair of legs.

3a CROSS RAIL TENON DETAIL



ASSEMBLY

1 Glue the four sets of upper and lower rails together, checking for square. After the glue dries, glue the rail assemblies to the legs **[Photo E]**.

2 Finish-sand the tower to 220 grit, easing any sharp edges.

3 Apply a clear finish. We wiped on three coats of General Finishes satin Arm-R-Seal, sanding lightly between coats with a 320-grit sanding sponge.

4 Move the tower to your desired location, place the acrylic rounds on the rail assemblies, and fill the shelves with your favorite treasures. But please, no Precious Moments.

MATERIALS LIST

PART		FINISHED SIZE T	W	L	Matl.	Qty.
A	LEGS	¾"	2"	38¾"	C	4
B	UPPER RAILS	¾"	1½"	13"	C	4
C	LOWER RAILS	¾"	1½"	13"	C	4

MATERIALS KEY: C–cherry.
BLADE AND BITS: Dado blade, ¼" spiral upcut bit, ⅜" cove bit, ⅜" guide bushing, flush-trim bit.
SOURCE: ¼×12" acrylic rounds (4-pack), $25, woodmagazine.com/acrylicrounds
PROJECT COST: It cost us about $60 to build this project. Your cost will vary by region and source.

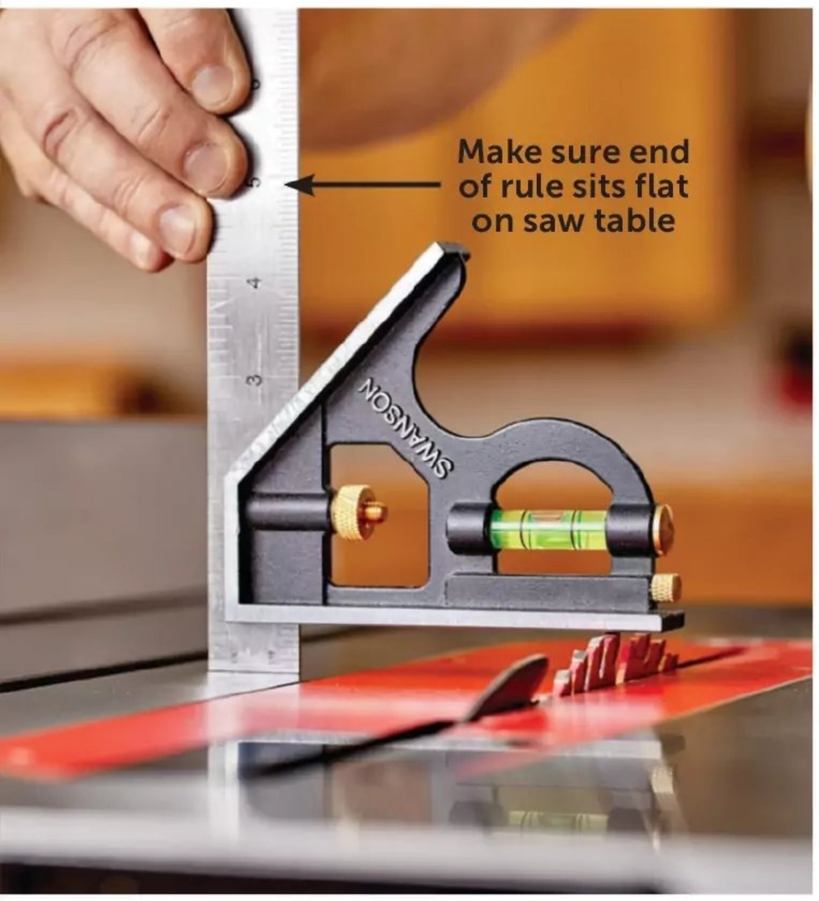
12 TOP TABLESAW SETUP TOOLS

The right setup accessories simplify making safe and precise tablesaw cuts. We recommend these *WOOD*® editor favorites.

WRITER: DAVE STONE

Inaccurate tablesaw setups can derail a project quickly, wasting time, wood, and money. We've selected a dozen of our favorite tablesaw setup tools **[Sources]** that we use in our shop to quickly dial in precision for our tablesaw cuts. Some have overlapping capabilities, so you may not need them all, but who ever wished for fewer ways to make accurate cuts?

Raise blade to maximum height when checking for square.



1 COMBINATION SQUARE

Few things frustrate more than making a bunch of cuts then finding out the blade wasn't set at exactly 90° to the table; especially because you usually don't find the error until it's time for a glue-up or assembly.

That's why we periodically double-check that the blade is set exactly at 90° to the table—even if we haven't changed it in a while. And our tool of choice isn't the saw's blade-tilt gauge. Instead, reach for a combination square (*previous page*). Just place the head flat on the saw table, and the rule tight against the blade's plate while avoiding the teeth. Then adjust the blade-tilt knob until there's no gap between the rule and the blade. It's simple, quick, and accurate.

A combination square also makes a great blade-height gauge (*above*). Extend the rule to the measurement you need, rest the end of the rule on the saw table or throat plate, then raise the blade until the highest tooth just touches the face of the square's head. Once a tooth makes contact, move both the square and blade back and forth by hand to ensure that the tooth's highest point matches the desired height. The tooth should touch the head, but easily slide past without tilting the square.

12" Combination Square no. TC132, $14, ***swansontoolco.com***

PHOTOGRAPHER: CARSON DOWNING

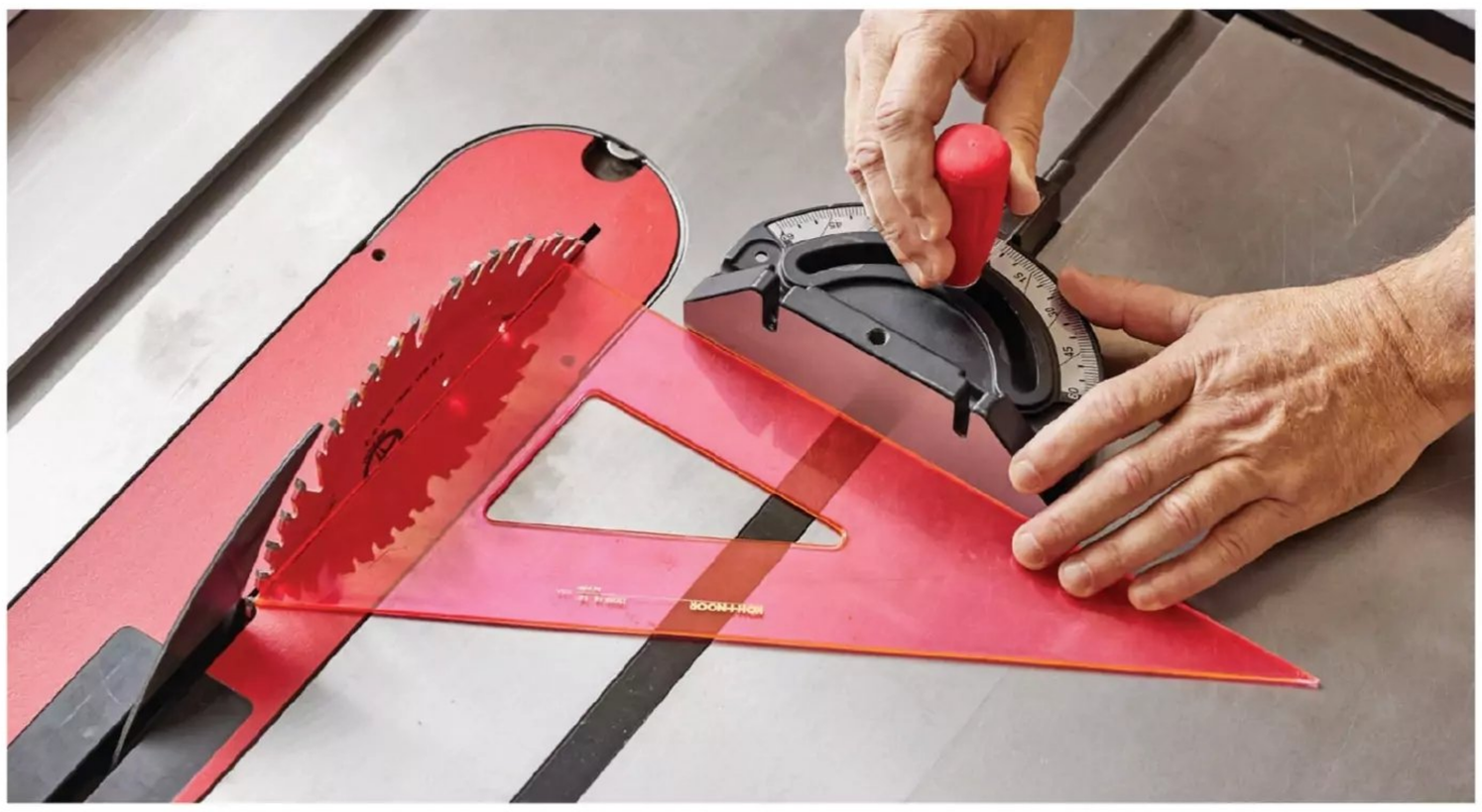
2 DIGITAL HEIGHT GAUGE

Like a combination square, a digital height gauge is useful for setting cutting depths. The process is similar. Stand it on your saw table (magnets in the feet help hold this gauge in place), lower the rule against the table and zero out the readout. Raise the rule to the height you need, lock it in place, then straddle the blade and raise it until it makes contact. Then move the gauge and blade back and forth by hand to ensure you're at the highest spot on the blade.

A digital height gauge proves superior to a combination square when you need to make incrementally deeper cuts. Zero the readout at your set height, then adjust the rule to match the height change you need. Return to the previous height by adjusting the rule until the readout shows zero again.

A digital height gauge also lets you display the measurement in fractions or decimals. Most display millimeters, as well, which simplifies working with metric plans.

3" Mini Digital Height Gauge no. WR25, $25, ***wixey.com***



3 DRAFTING TRIANGLE

Accurate crosscuts rely on a properly adjusted miter gauge. And even if you haven't changed its setup, you can easily knock your miter gauge slightly out of square as you remove and install it during regular use. Unfortunately, you usually won't find out until long after you make the cut.

To quickly and accurately check your miter gauge, keep an acrylic triangle (often called a drafting or artist's triangle) close at hand. They're inexpensive and accurate. Rest one edge against the blade plate (not against the teeth) and the other against the face of the miter gauge (*above*). Adjust the gauge, then lock it in. It takes only a moment, and it ensures a square cut.

10" Fluorescent Professional Triangle 30°/60° no. 20214, $8, ***draftingsteals.com***

DRAFTING TRIANGLES ALSO COME IN HANDY FOR LAYOUT TASKS, SO PICK UP A SET THAT INCLUDES A COUPLE DIFFERENT SIZE/ANGLE COMBINATIONS ALONG WITH A PROTRACTOR.

4 SETUP BLOCKS

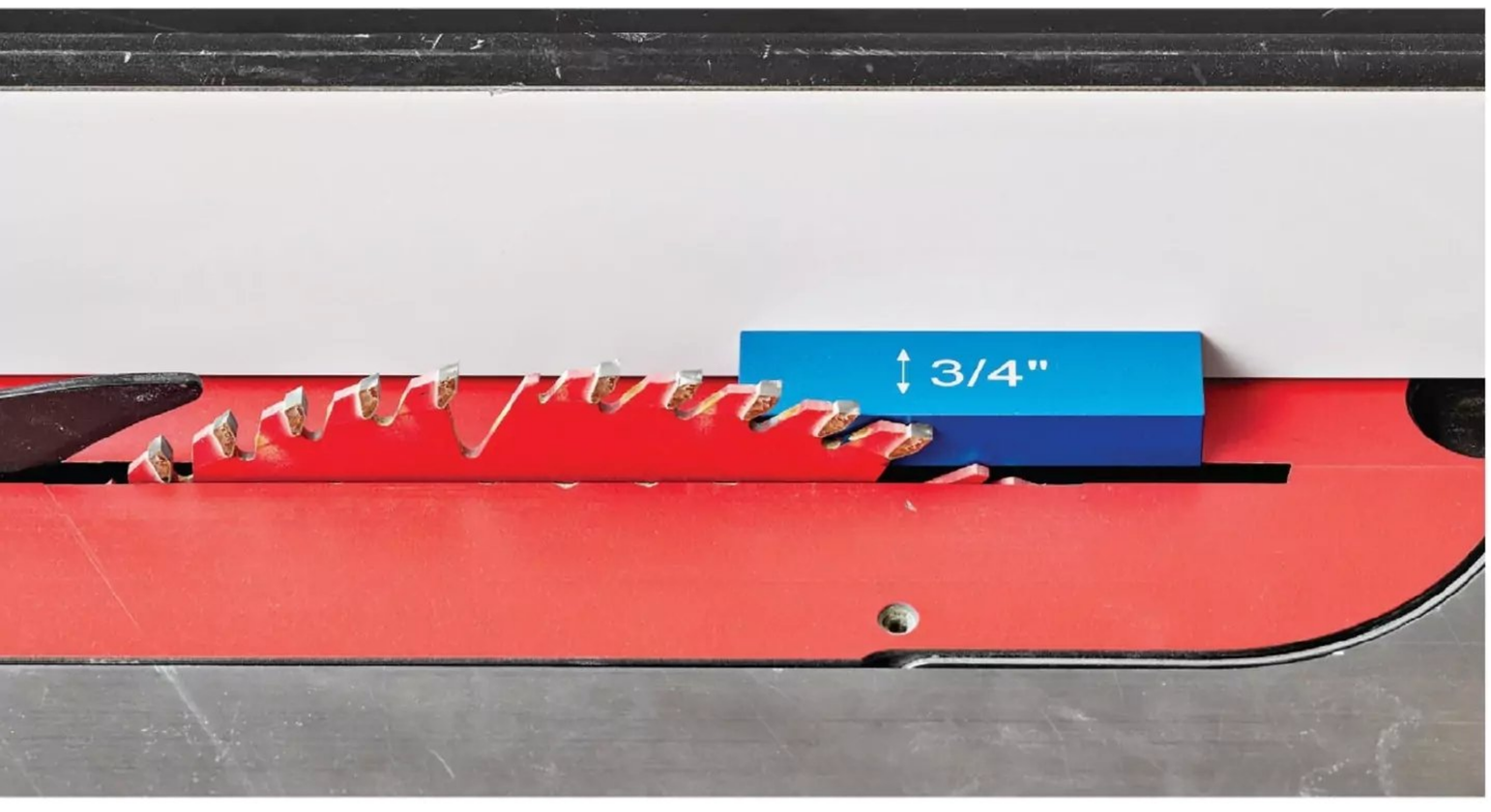
Aluminum setup blocks (*below*) are machined to exacting tolerances to ensure accurate positioning while eliminating the chance of misreading the scale on a rip fence or rule. They are sold in sets, with sizes ranging from 1/16" to 3" in 1/32" and 1/16" increments, and can be used alone or stacked to create a wide range of measurements. Blocks come in handy when positioning the rip fence, a standoff block, or a thin-strip stop. For the most accurate results, make sure the block fits snugly in place with no gap, but can still slide with light resistance before removing it to make your cuts.

15-piece Setup Blocks Set no.71843, $54, ***powertecproducts.com***

TIP!

If you're using an alternate top bevel (ATB) saw blade, align the square with a tooth that has its high side facing the fence to get the most-accurate reading.

USE SETUP BLOCKS TO ACCURATELY DIAL IN YOUR FENCE'S CURSOR BY POSITIONING A BLOCK BETWEEN THE FENCE AND BLADE, THEN ADJUSTING THE CURSOR TO MATCH THE BLOCK'S DIMENSION.



5 FLAT SQUARE

Rip fence scales prove highly accurate on modern tablesaws that have been properly set up, but they're not always easy to read. That's why a flat square (*above*) belongs in your tool apron. Available in 6" and 12" sizes, the long leg slips into a blade gullet where you can align a tooth easily with the measuring scale. Yes, you can do the same with a rule, but a flat square ensures that your reading is truly perpendicular to the fence for absolute accuracy.

Hold the square's long leg against the saw table, then tilt the short leg up to rest directly against a saw-blade tooth and to prevent the square from slipping under the rip fence. It's also easy to lay the square over a piece you've just cut to ensure it matches the measurement you wanted.

Veritas Precision Square no. 05N3501, $49, ***leevalley.com***

6 DIGITAL ANGLE GAUGE

When tilting the blade to make a bevel cut, don't rely solely on the saw's built-in angle scale for rough measurements. Instead, consider a digital angle gauge, which cost as little as $20. They're exceptionally accurate for setting bevels at whole or fractions of a degree.

To get a proper reading, with each use place the gauge against your saw table and zero it out. Then stick the gauge to the blade by its built-in magnets and crank the saw's blade-tilt wheel until the readout shows the angle you need.

Digital Angle Gauge no. WR365, $45, ***wixey.com***

Some models show both an absolute angle (relative to the earth's core) and a larger angle reading that is relative to the surface you set as zero. Use the latter in your setup.

KEEP THE FACE OF THE ANGLE GAUGE PERPENDICULAR TO THE THROAT-PLATE OPENING TO ENSURE THE MOST-ACCURATE READING.

7 DIGITAL PROTRACTOR

Standard tablesaw miter gauges lack the precision and built-in stops necessary to lock in exact angles beyond 90° and 45°. A digital protractor provides that precision, down to 1/10°, at a fraction of the cost of a high-end miter gauge.

Choose a protractor with long legs like this 18" model (*below*) to span the distance between the miter-gauge head and the blade. Its magnetized edges allow one leg to stick to two opposing blade teeth while you position and adjust the miter gauge.

18" Digital Protractor no. WR418, $85, ***wixey.com***

TO SIMPLIFY MITER-GAUGE SETUP, ADJUST THE LEGS OF THE PROTRACTOR TO 90°, THEN ZERO THE READOUT. READINGS WILL THEN MATCH THE ANGLE SCALE ON YOUR MITER GAUGE.

TIP!

Loosen the miter-gauge locking knob, hold the protractor against the saw table, then slide the miter gauge against the protractor leg and tighten the knob.

8 CALIPERS

Oftentimes, cutting to fit proves more accurate than cutting to size. Instead of relying on trial and error and a bunch of test cuts, pick up a set of calipers (*right*) and use it to compare setups with your parts. Unless you're an engineer, get one with a dial that reads in fractions rather than decimals. Better yet, get calipers with a digital display that lets you choose either, as well as millimeters, like this one. Calipers can measure thickness or width using the inside-measure and outside-measure jaws. Or use the beam that protrudes from the bottom to measure the depth of rabbets, dadoes, and holes. As you should with all digital gauges, reset zero each time you use calipers to ensure accuracy.

IP54 Electronic Digital Caliper 0-6" no. 100-333-8B, $42, ***igaging.com***

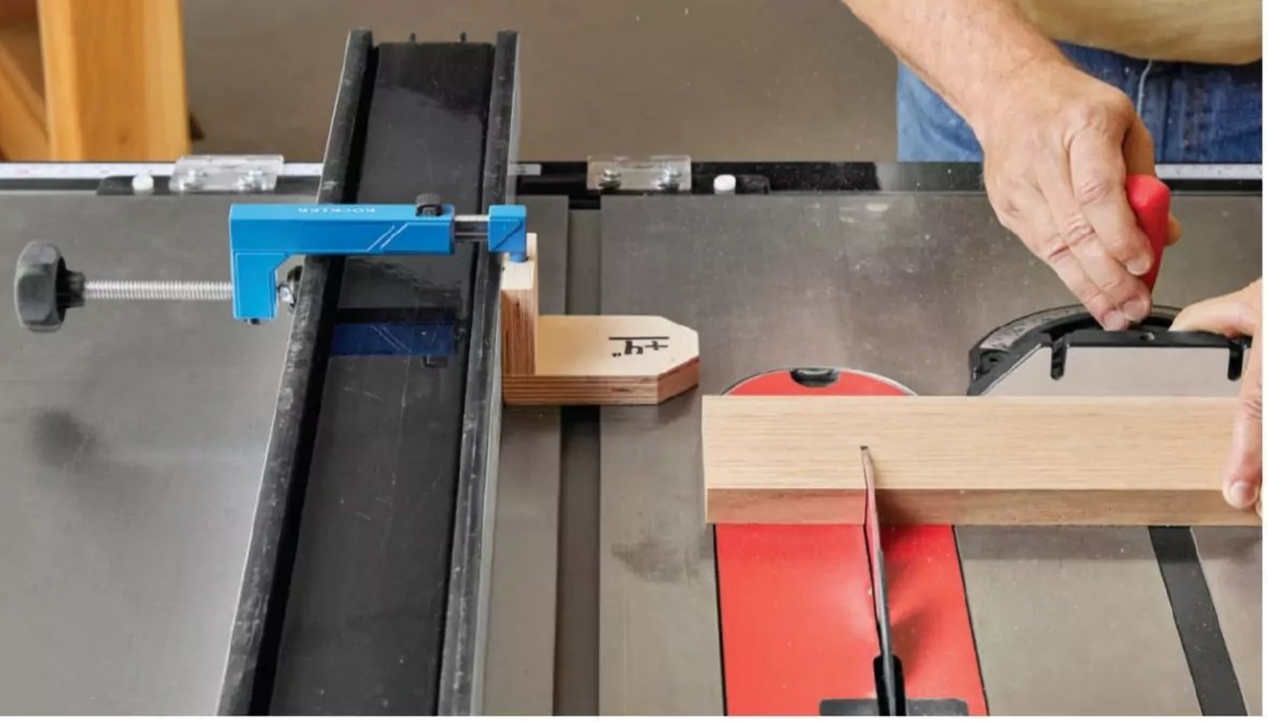
WHEN CUTTING A MORTISE-AND-TENON JOINT, IT'S MUCH EASIER TO CUT THE MORTISE FIRST, THEN SIZE THE TENON TO FIT.

9 TOOL SETTING GAUGE

Combine the adjustability of a combination square with the accuracy of setup blocks, and you might end up with this tool setting gauge (*right*). Detents every 1/16" lock your setting in place, and it has a dual scale that allows you to measure from the rip fence to the inside or outside of the blade. We liked this one so much we gave it one of our 2025 innovation awards. While 1/16" increments might not cover every setup you need, you can pair it with setup blocks in 1/32" increments to increase the gauge's options.

Stainless Tool Setting Gauge, small no. 07311, $63, ***jessem.com***

See all of the 2025 *WOOD* Innovation Award winners.
woodmagazine.com/innovation2025



10 RIP-FENCE CLAMPS

Adding a shop-made auxiliary face or standoff block to the rip fence can prove challenging. Few fences have provisions such as T-slots, and many clamps get in the way. Universal fence clamps (*left*) simplify the task greatly. While designs vary, most fit like this model, spanning the fence with an adjustable jaw on one end and a pin on the other that slips into a hole in your shop-made accessory. Usually sold in pairs, you'll find the clamps indispensable at the tablesaw and handy for router-table and drill-press setups, as well.

Universal Fence Clamps (pair) no. 75668, $20, ***rockler.com***

11 THIN STRIP JIG

Ripping thin strips (less than ½" wide or so) between the blade and the fence is a good recipe for kickback. But lining up a cut on the offcut side of the blade can be a fiddly combination of fence-bumping, tape measure juggling, and eye squinting. A thin-strip jig (*right*) makes it hassle free and repeatable.

You calibrate the jig once by fitting it to your table's miter slot, sliding the guide until it touches a blade tooth, then zeroing the cursors. After that, just drop it in your miter slot ahead of the blade on the infeed side and set the width you want. Position and lock the fence with the workpiece snug but slideable between jig and fence, then rip, repeating for multiple thin strips. This model features a ball-bearing guide and capacity from 1/32" to 1¼", along with Imperial and metric measuring scales.

Thin Rip Guide no. TRG, $170, ***woodpeck.com***

TIP!

Adjust the rip fence glides to prevent the fence from shifting as you lock the handle, which can angle it toward or away from the jig, decreasing accuracy and potentially causing binding.

12 FEATHERBOARDS

A featherboard isn't really a setup tool. But a featherboard, especially one that applies pressure both vertically and horizontally (*left*), holds your board flat against the saw table and tight to the fence. That helps maintain all the exacting setups you worked so meticulously to achieve. When making through-cuts, Always set featherboards up forward of the blade's infeed. Placing one alongside or beyond the blade will pinch the saw kerf shut and may cause kickback.

Pro Table Featherboard no. 8110328, $85; Vertical Featherboard with Risers no. 8110178, $26; ***magswitch.com***

TIP!

Don't overdo the pressure when positioning a featherboard. Having so many contact points means each one only needs to apply light pressure to effectively do its job.

These twelve setup tools see a lot of use in our shop, but we know many others exist–some store-bought and others homegrown. What are some of your favorite tablesaw setup accessories? Send your list to us at woodmail@woodmagazine.com.

D6

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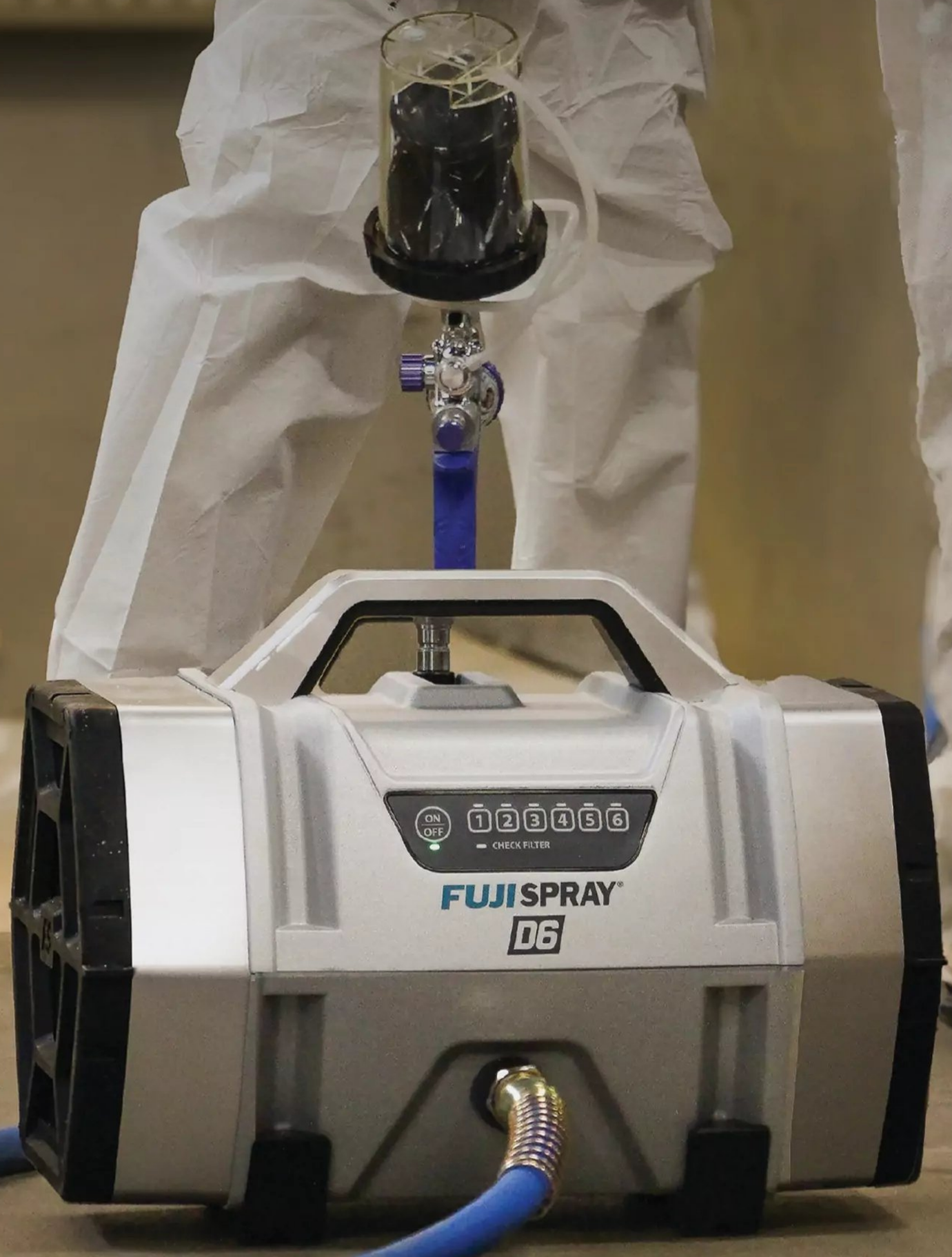

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PHOTOGRAPHER: JAKE STERNQUIST

Milwaukee

Milwaukee's 2-gallon compressor stands out with its quiet operation. It registered 80 decibels in our testing (compared to 92 decibels for our corded pancake compressor). It's quiet enough that you can carry on a conversation while it's running without raising your voice. This 18-volt compressor delivers 1.2 cubic feet of air per minute (cfm) @ 90 pounds per square inch (psi), with a maximum pressure of 135 psi., which proved more than adequate for shooting brads and finish nails. Tipping the scales at 31.25 lbs, it's the heaviest model of the bunch. But the low-profile design allows you to carry it at your side like a suitcase and then set it down flat.

Milwaukee, *milwaukeetool.com*
M18 Fuel 2-gallon cordless air compressor, no. 2840-20, $349 (tool only)

continued on page 74

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Makita

Makita's 40-volt, 2-gallon compressor manages to stand out in, not just one, but several categories. Extremely quiet (73 decibels by our tests) and lightweight (20.9 lbs), it boasts one of the fastest recovery times of the tested models. It delivers 1.2 cfm @ 90 psi, with a maximum pressure of 135 psi. We especially like the compact, well-balanced design, which makes this compressor easy to move about the shop.

Makita, *makitatools.com*
40V Max XGT 2-gallon cordless air compressor, no. AC001GZ, $399 (tool only)

DeWalt

DeWalt's 2.5 gallon compressor features a pancake tank that delivers 135 maximum psi and 1.0 cfm @ 90 psi. Line pressure is controlled by simply turning a knob to the desired pressure (rather than a traditional regulator knob and gauge). The compact, vertical design makes it easy to pick up and carry the compressor and provides convenient access to the battery. The recovery time is relatively long and it runs fairly loud, but if you're already invested in DeWalt's 20-volt MAX battery platform, this compressor makes sense, especially at its price point.

DeWalt, *dewalt.com*
20-volt Max 2.5-gallon cordless air compressor, no. DCC2520B, $219 (tool only)

Metabo

Metabo's 2-gallon compressor features the highest cfm rating (1.6 cfm at 90 psi) of all the models we looked at. It has one of the fastest fill and recovery times (tied only with the Makita). As an added feature, it can run on either a 36-volt cordless battery or a plug-in power adapter (both sold separately), giving you the best of both worlds. We wish it operated more quietly, but if that's not an issue for you, there's a lot to like about this compressor.

Metabo, *metabo-hpt.com*
36V Multivolt 2-gallon cordless air compressor, no. EC36DAQ4, $256 (tool only)

Craftsman

With 125 maximum psi and 1.0 cfm @ 90 psi, Craftsman's 20-volt, 2.5 gallon compressor packs slightly less punch than the competition (yet still plenty to power our brad and finish nailers). If that were the only thing holding it back, we'd be okay with it. But the long recovery time and lack of a quarter-turn drain valve puts this compressor behind the others. On the plus side, at 19.4 lbs (without battery) this was the lightest compressor of the bunch, making it the easiest to transport.

Craftsman, *craftsman.com*
V20* 2.5-gallon cordless air compressor, no. CMCC2520B, $189 (tool only)

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This tot-sized table hides a playful secret beneath its lift-off top: tubs of tactile fun like sand, clay, or water.

CONTEMPORARY CABINET

Book-matched veneer and three-way miters invite deeper inspection and admiration of this elegant, skill-building cabinet.

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