

ISSUE 288 MAY 2023

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**MOST TRUSTED**  
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### 34" BENCHTOP RADIAL DRILL PRESS

- Motor: 1/2 HP, single-phase, 120V, 4.7A
- Swing: 34"
- Head tilt: 45° right, 90° left
- Head swivel: 360°
- Spindle taper: JT-33
- Spindle travel: 3 1/4"
- Spindle speeds: 5, 550–3000 RPM
- Drill chuck: 1/16"–5/8"
- Drilling capacity: 1/2" mild steel
- Table size: 8 5/8" x 9"
- Table tilts: 90° left/right
- Column diameter: 2.36"
- Footprint: 13 1/2" x 8 1/2"
- Overall size: 11 1/2" W x 33 1/2" D x 31 1/2" H
- Approximate shipping weight: 97 lbs.



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### 8" COMBO PLANNER/JOINTER

- Motor: 1 1/2 HP, 120V, single-phase, 15A
- Maximum cut width: 8"
- Maximum cut depth: 1/16"
- Minimum workpiece length: 6"
- Minimum thickness: 1/4"
- Cutterhead speed: 8500 RPM
- Cuts per minute: 17,000
- Planing feed rate: 22 FPM
- Bevel jointing: 0–45°
- Fence size: 21" L x 4" H
- Planer table size: 13 3/4" L x 8" W
- Jointer table size: 29 1/4" L x 8 1/4" W
- Footprint: 15 1/2" x 10 1/2"
- Overall dimensions: 31" W x 17 1/2" D x 18 1/2" H
- Approximate shipping weight: 57 lbs.



**WARNING! †¹**  
**G0958 ONLY \$549<sup>00</sup>**



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### 14" X 37" WOOD LATHE WITH COPY ATTACHMENT

- Motor: 3/4" HP, 110V, single-phase, 11A
- Swing over bed: 14"
- Swing over tool rest base: 12"
- Distance between centers: 37"
- Distance between centers with copy device: 32"
- Spindle speeds: 10, 600–2400 RPM
- Spindle taper: MT#2
- Spindle thread size: 1" x 8 TPI
- Tailstock taper: MT#2
- Tool rest width: 12"
- Tool rest post diameter: 1"
- Overall dimensions: 62" W x 24" D x 48" H
- Approx. shipping weight: 164 lb.



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### 18" 1 1/2 HP OPEN-END DRUM SANDER WITH VS FEED

- Motor: 1 1/2 HP, 120V, single-phase, 13A
- Drum surface speed: 2600 FPM and 3400 FPM
- Conveyor feed rate: Variable, 0–12 FPM
- Max. stock dimensions: 36" W x 4 1/2" H
- Min. board length: 6"
- Min. board thickness: 1/8"
- Sanding drum size: 4"
- Dust collection port: 4"
- Overall size: 35 1/2" W x 22 1/2" D x 50" H
- Approx. shipping weight: 235 lbs.



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### 1 1/2 HP PORTABLE CYCLONE DUST COLLECTOR

- Motor: 1 1/2 HP, 110V, single-phase, 15A
- Intake hole size: 6"
- Impeller: 12 3/4" aluminum
- Airflow capacity: 868 CFM @ 1.8" SP
- Max static pressure: 9.7"
- Filtration: 1-micron
- Filter surface area: 28.1 sq. ft.
- Collection size: 20-gallon drum
- Sound rating: 78dB
- Overall dimensions: 27 1/2" W x 44" L x 70" H
- Approx. shipping weight: 278 lbs.



**WARNING! †¹**  
**G0860 ONLY \$1095<sup>00</sup>**



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### 17" 2 HP BANDSAW

- Motor: 2 HP, 110V/220V (prewired 220V), single-phase, 20A/10A
- Cutting capacity: 16 1/4" left of blade
- Maximum cutting height: 12 1/8"
- Blade size: 131 1/2" long
- Blade width range: 1/8"–1" wide
• Blade speeds: 1700, 3500 FPM
- Table size: 17" x 17" x 1 1/2" thick
- Table tilt: 10° left, 45° right
- Floor to table height: 37 1/2"
- Footprint: 27" W x 18" D
- Overall dimensions: 32" W x 32" D x 73" H
- Shipping weight: 322 lbs.



**WARNING! †¹**  
**G0513 ONLY \$1495<sup>00</sup>**



**\$249**  
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LOWER 48 STATES

### 10" HYBRID TABLE SAW

- Motor: 2 HP, 115V/230V, single-phase, 16A/8A
- Rip capacity: 31 1/2" right, 11 3/8" left of blade
- Max. depth of cut @ 90°: 3 1/8"
- Max. depth of cut @ 45°: 2 1/8"
- Table size with extension wings: 40 1/8" W x 27" D
- Distance from front of table to center of blade: 16 1/4"
- Floor-to-table height: 34 1/4"

- Arbor diameter: 5/8"
- Arbor speed: 4000 RPM
- Max. width of dado: 13/16"
- Dust port size: 4"
- Overall dimensions: 66" W x 40" D x 48" H
- Footprint: 20 1/2" L x 19 1/2" W
- Approx. shipping weight: 449 lbs.



**WARNING! †¹**  
**G0899 ONLY \$1695<sup>00</sup>**



**\$249**  
SHIPPING  
LOWER 48 STATES

### 15" 3 HP PLANER WITH CABINET STAND

- Motor: 3 HP, 230V, single-phase, 12A
- Max. stock width: 15"
- Max. stock thickness: 6"
- Min. stock thickness: 3/16"
- Min. stock length: 6"
- Max. cutting depth: 1/8"
- Cutterhead diameter: 3"
- Cutterhead type: 3-knife
- Knife size & type: 15" x 1" x 1/8", HSS
- Cutterhead speed: 5000 RPM
- Feed rate: 16 & 28 FPM
- Table size with extensions: 15" x 48"
- Dust port size: 4"
- Footprint: 21 1/2" x 21"
- Overall dimensions: 32" W x 48" D x 44" H
- Approx. shipping weight: 552 lbs.



**WARNING! †¹**  
**G1021Z ONLY \$2195<sup>00</sup>**



**\$329**  
SHIPPING  
LOWER 48 STATES

### 8" X 76" PARALLELOGRAM JOINTER WITH HELICAL CUTTERHEAD & MOBILE BASE

- Motor: 3 HP, 230V, single-phase, 12A
- Max. width of cut: 8"
- Max. depth of cut: 1/8"
- Max. rabbeting depth: 1/2"
- Cutterhead diameter: 3 1/16"
- Cutterhead type: 4-row helical with 36 inserts
- Insert size, type: 15 x 15 x 2.5mm, indexable carbide
- Cutterhead speed: 5500 RPM
- Table size: 8" x 76"

- Fence size: 38" x 4 1/2"
- Min. stock length: 10"
- Min. stock thickness: 1/2"
- Dust port size: 4"
- Footprint: 16" x 40"
- Overall dimensions: 76" W x 25" D x 41 1/2" H
- Approx. shipping weight: 487 lbs.



**WARNING! †¹**  
**G0858 ONLY \$2095<sup>00</sup>**



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# TEAM CLEAN OR TEAM DIRTY?

## THERE ARE TWO TYPES OF WORKSHOPS IN THE WORLD: DIRTY & DISORGANIZED OR CLEAN & EFFICIENT.

There are two types of false dichotomies in the world: those that are instructional and those that are suspect. The one above is likely the latter. But there is pretty much one type of letter we receive regarding our regular “Your Shop” column, and it tends to be a variation on the theme of “That shop is so neat and sawdust-free, there can’t possibly be any woodworking happening in it.”

On the other extreme is my ironically-non-magazine-worthy shop of which has been said, “Your shop is so messy, there can’t possibly be any woodworking happening in it.”

When I start to worry about it, I repeat the mantra: “Woodworking is my *hobby*.” It helps me remember what woodworking is *not* for me: a competition. Nothing sucks the joy out of my hobby faster than comparing myself to another woodworker or jealously worrying about my shop habits.

So I’ve given myself permission to be messy. I tend to be a “process-oriented” rather than a “project-oriented” woodworker (another nice false dichotomy); I find more joy in the journey than the destination. I’ll design a desk down to the last joint never intending to build it. I’ll make all the jigs necessary to mass-produce intricate end-grain cutting boards, but lose interest after completing the first few. I’ll choose a project for a challenging technique only to find myself stuck and scratching my head. I will have multiple projects going at once, jumping among them as my interest re-sparks or an aha moment gets me unstuck. It’s a never-ending joyous mess.

Other woodworkers find their joy in the completion. Each finished project is a distinct and shining point of pride, as well as a clean break where shop cleaning often happens. And the clean shop is, itself, a completion that brings satisfaction. Another type of joyous cycle!

So I’ve got no reason to question the woodworking habits of Bill Houghton, this issue’s featured shop owner on *page 12*, because he has a cleaner shop than mine. Both of us are finding joy in woodworking despite a difference in appearances. And because his shop is organized, I can more easily spot inspiration and tips for my own messy shop in his clean one.

So, if you’re my fellow dirty-shopper and you don’t feel that your workshop is well-represented in these pages, don’t fret about it. Grab what inspiration and tips you can, pack them into your messy shop, and carry on with your hobby. Will we publish photos of your messy shop if you send them? Maybe not. A magazine is still a visual medium, after all. If you send pictures of your messy shop to me at [woodmail@woodmagazine.com](mailto:woodmail@woodmagazine.com), will I tell you that it’s messier than mine? Almost certainly not. This is one area where I’m quite the competitor.

Whatever your shop looks like, get out there and make something.

We’ll help. 🌱



▲ With extreme reluctance, I present to you my shop, pre-spring-cleanup. Sharing space with lawn equipment, auto tools, and bicycles are multiple in-progress projects, assorted lumber, and sawdust piles. It is my sincere hope that you never see this again.

*Lucas*  
LUCAS PETERS

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# WOOD®

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# TOOL! ~~TAX~~ SEASON

You've maxed out the exemptions on your W-4 form, claimed every child in the neighborhood as a dependent, and deducted your hobby shop as a business expense. Now, the payoff: that sweet, sweet tax return. We all know you're spending it on tools. But before you dive into these head-to-head reviews to help you decide which, please allow us to say that presenting them to you in no way implies our endorsement of your tax fraud and by visiting these links, you acknowledge that you absolve *WOOD*® magazine of any complicity in your crimes and misdemeanors. Shame on you; now go buy these tools!



## DRILLING LOOPHOLES

We direct-deposited two Top Tool awards into this head-to-head test of big drill presses. Pick the one that best suits your tax bracket.

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## PLANER AUDIT

There was no withholding in our review of these 15 models, which found one benchtop planer worthy to be named Top Tool.

Get the plane scoop at [woodmagazine.com/planeraudit](http://woodmagazine.com/planeraudit)



## READ MY LIPS: NEW BANDSAW

Go ahead and buy one of these deluxe 14" bandsaws. You don't need permission. Did you file as head of household or didn't you?

Nothing is certain but our bandsaw advice at [woodmagazine.com/deathandtaxes](http://woodmagazine.com/deathandtaxes)



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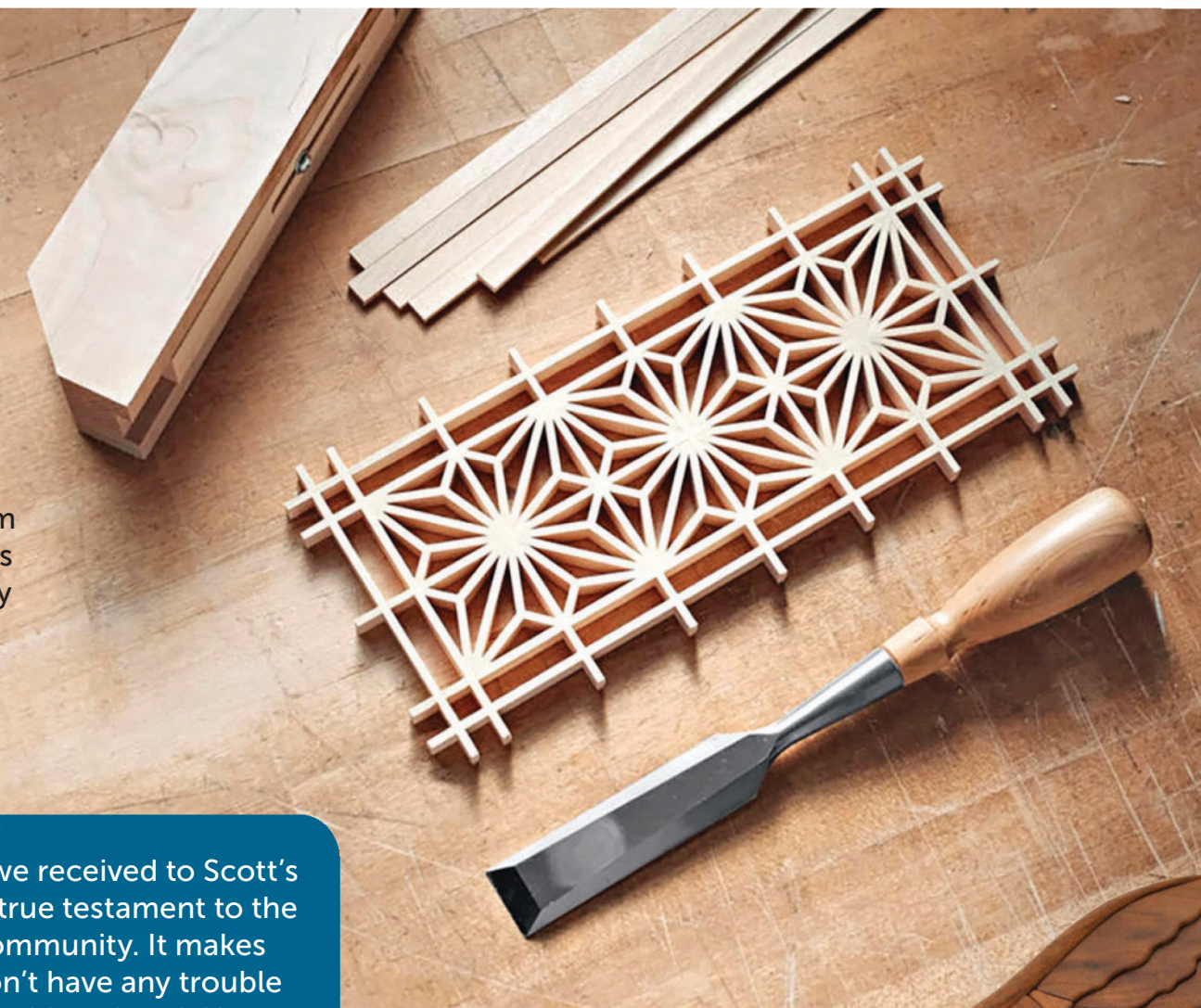
# APARTMENT ADVICE

I read Scott Smith's letter seeking advice for his father who wanted to continue woodworking in his retirement-home apartment (Issue 285, Nov. 2022). I hope I will still be looking for projects to do when I am 89! My first thought was Kumiko. It's a quiet, low-dust process, especially if you can buy the strips or have a local woodworker help make them.

**Dan Erickson**  
via email

Great idea, Dan! The responses we received to Scott's letter were overwhelming and a true testament to the solidarity in the woodworking community. It makes me believe that Scott's father won't have any trouble finding local woodworkers to give him a hand. Here are just a few of the many responses.

**Lucas Peters**  
Editor-in-Chief



I'm also nearly 90 years old and doing woodworking in my apartment. I make intarsia and toys with my scrollsaw. To minimize dust and noise, I use the Scrollnado dust collection system ([amazon.com](https://www.amazon.com)) connected to a dust extractor with HEPA filters. Most importantly, I got to know my neighbors and their routines to minimize annoyance. Also, I make them useful gifts on occasion.

**Charles Culler, Jr.**  
via email

I am also getting to the age where I'll have to downsize. So I have been experimenting with marquetry. With a couple of metal rulers, a few sharp knives, tape, glue, and an assortment of veneers you can create all kinds of designs suitable for framing.

**Jerry Booz**  
Chester County, Pennsylvania

When I can't make noise or use power tools, I turn to a shaving horse along with a drawknife, carving knife, hook knife, spoke-shave, and scorp. I have made all kinds of spoons, spatulas, and even walking sticks for my family and friends. Aside from the shaving horse, all of the tools fit in a small cloth bag.

**David Humes**  
Palm Bay, Florida







## CNC CUTS BOTH WAYS

After reading the Issue 284 (October 2022) article on double-sided CNC carving, I decided to use that technique this year in my grandchildren's Christmas presents. I'm retired and a hobbyist woodworker. I've been working with my CNC machine for six years, but it's been one long learning curve. I made these boxes from curly cherry, maple, oak, and walnut, and filled the carved lids with colored epoxy.

**Glen Cutcher**

Vermilion, Ohio

## DOUBLE ON THE ROCKS

I made these white oak rocking chairs from issue 183 (May 2008). They are the first rocking chairs I've made, but they will not be the last.

**Eugene Bialecki**

Danville, Pennsylvania



## BIG LEAGUE SHADOW BOXES

My son, Brady Hindersmann, started woodworking when he was eight years old. Never one to do things by halves, he was previously featured in *WOOD* magazine for building your entire line of construction-grade toys (and a barrister's bookcase to display them!). Now 24, he recently completed 30 shadow boxes from Issue 230 (Dec/Jan 2014/2015) to house a pennant, ball, and ticket from each Major League Baseball team. Only five balls remain to be added, one for each of the stadiums our family has yet to visit.

**Tonya Hindersmann**

Marthasville, Missouri

## FOUR O' THE CLOCKS

I try to build something special for my three daughters each Christmas. This year, I chose the Greene-and-Greene-inspired clocks from issue 201 (November 2010), a project I'd been wanting to tackle for some time. You're not mis-counting; I built an extra one for myself. 🌲

**Jim Hill**

Bremerton, Washington



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mantle clock plans at  
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• **DON KNISPEL** of Wausau, Wisconsin, was able to secure an inexpensive designer for this custom crafter's cabinet: His wife drew up the project for him to complete. He got a good deal on the cherry, too—only 90¢ per board foot, kiln dried. Wisely, he did not reveal his lumber supplier when he sent this photo. He also did not mention whether his wife takes design commissions.



• Custom furniture maker **DAVID GRULEY** of Mancelona, Michigan, was asked by a friend to design and build this "Boat Bar" to resemble the distinctive stern of a Chris-Craft runabout. It's made from solid African mahogany and authentic Chris-Craft hardware. Though he's not a boat-builder himself, he spent a lot of time studying how wooden boats are built before taking on this challenge.



• **LARRY BUETTNER** of Waterford, Michigan, has been woodworking for over 45 years. He crafted this segmented vase using a bandsaw and careful sanding—no lathe required!

• For **FRANK TURRO** of Stratford, Connecticut, four grandsons means building four of every toy. The boys, ranging from four to seven years old, have received numerous construction toys before Frank switched to monster trucks this year. He even built a toy chest to store them. Great work, Frank!



## SEND US A PHOTO OF YOUR WORK

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• **DOUG FINDLEY** of Randle, Washington, made peace sign decorations out of figured big-leaf maple using his scrollsaw, rasps, and plenty of sanding. He framed them with barnwood backed with velveteen fabric. "They represent something the world is in short supply of," he says.



• Building a treasure box for his grandkids' fifth birthday has become a family tradition for **JOHN HARVEY** of Loveland, Colorado. He wanted to do something special for Alex, the first grandson to receive one. Always active, Alex needed something extra sturdy for his treasures. John added maple to box-jointed padauk and used sturdy clasps to close the lid. To personalize it, he had a bison (Alex's favorite) engraved on the lid with Alex's name inside.



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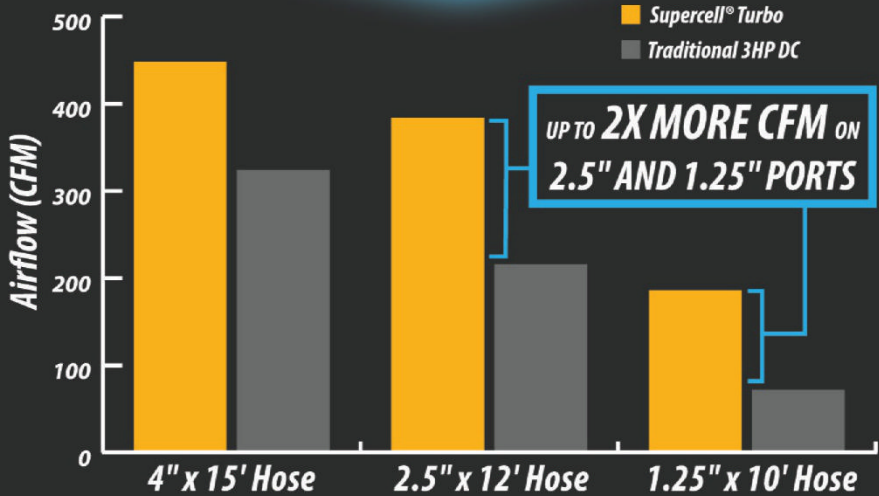
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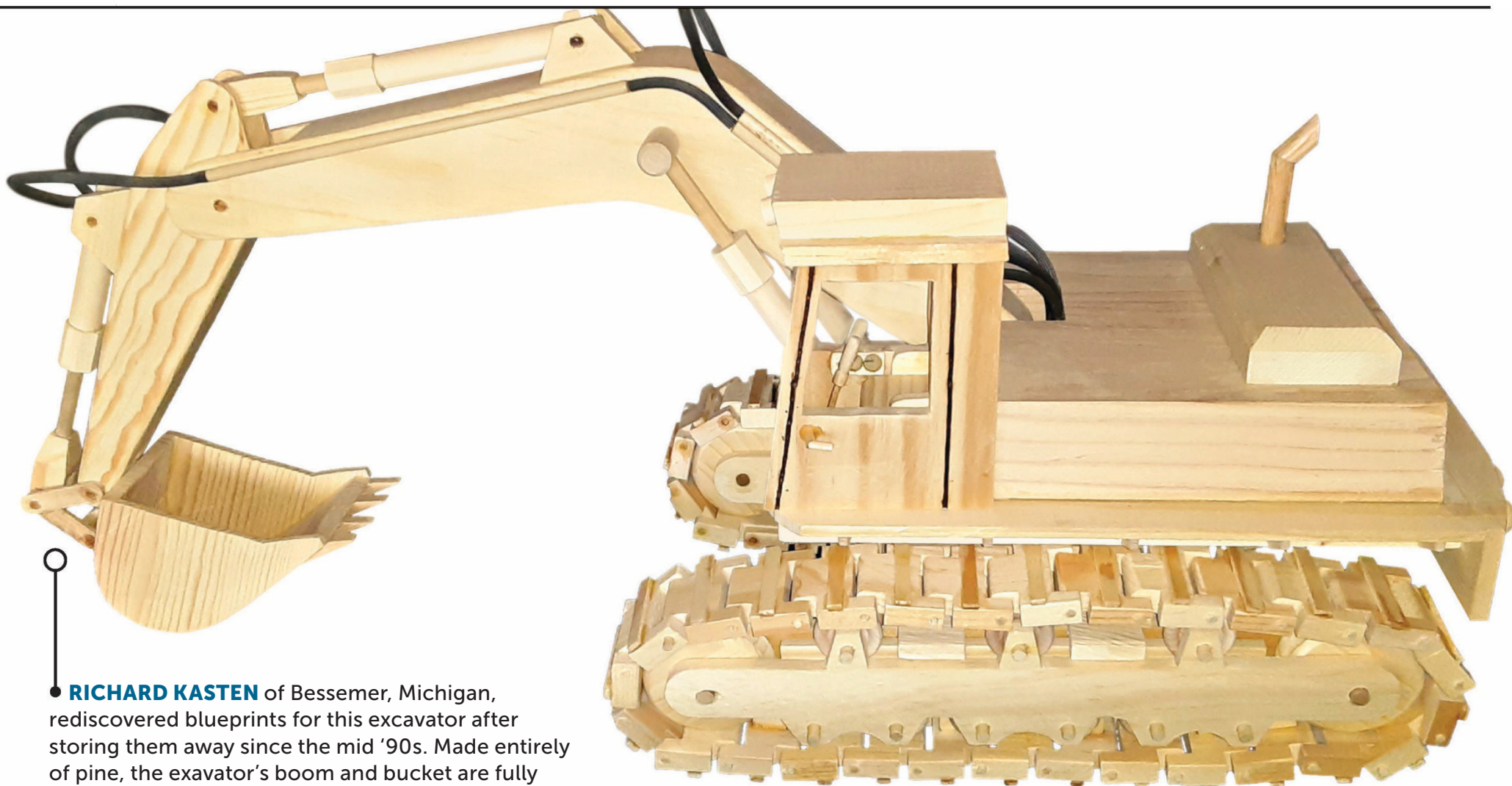
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• **RICHARD KASTEN** of Bessemer, Michigan, rediscovered blueprints for this excavator after storing them away since the mid '90s. Made entirely of pine, the excavator's boom and bucket are fully articulated, as are the three-piece hydraulic cylinders. Each track is made of 56 individual pieces and the machine rolls just like the real thing.

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A horse stable transformation creates the heart and soul of a workshop haven.

WRITER: RANDY MAXEY



Natural light floods Bill Houghton's workshop to create an inviting work environment.



▲ Bill Houghton's interest in woodworking started in a 7th-grade shop class. A retired electrical contractor who raised seven children, he has had plenty of projects to complete.



## SHOW US YOUR SHOP

Send high-resolution digital photos of your shop to [woodmail@woodmagazine.com](mailto:woodmail@woodmagazine.com) and we may showcase it in the magazine!

Where most would see an old pole barn, Bill Houghton saw a blank canvas for a dream workshop. Bill set about transforming the former horse stable into a center for his woodworking and the restoration of a 1948 Ford F-1 panel truck.

Bill started by partitioning the barn into three spaces: an auto shop, a woodshop, and a large utility room that includes a half bath.

Next, he cut window openings in the metal siding. Previous owners had installed rigid foam insulation between the 2x4 banding before covering it with plywood. In front of this, Bill added framed and insulated walls before covering them with 1/2" drywall and wainscoting. The result is an exterior wall thickness of over 6 1/2".

For the ceiling, Bill added joists between the trusses, covered them with

painted OSB, then piled 10" of insulation on top. The 10' ceiling height provides plenty of room for maneuvering long boards. LED lighting supplements the natural light spilling in from the array of windows around the shop.

For power, Bill installed a dedicated 200-amp, 40-circuit panel. To avoid tripping over cords strung across the floor, he mounted a cable reel on the ceiling over the main workbench. Convenient 120- and 240-volt cord drops near the major tools plug into turn-lock receptacles in the ceiling.

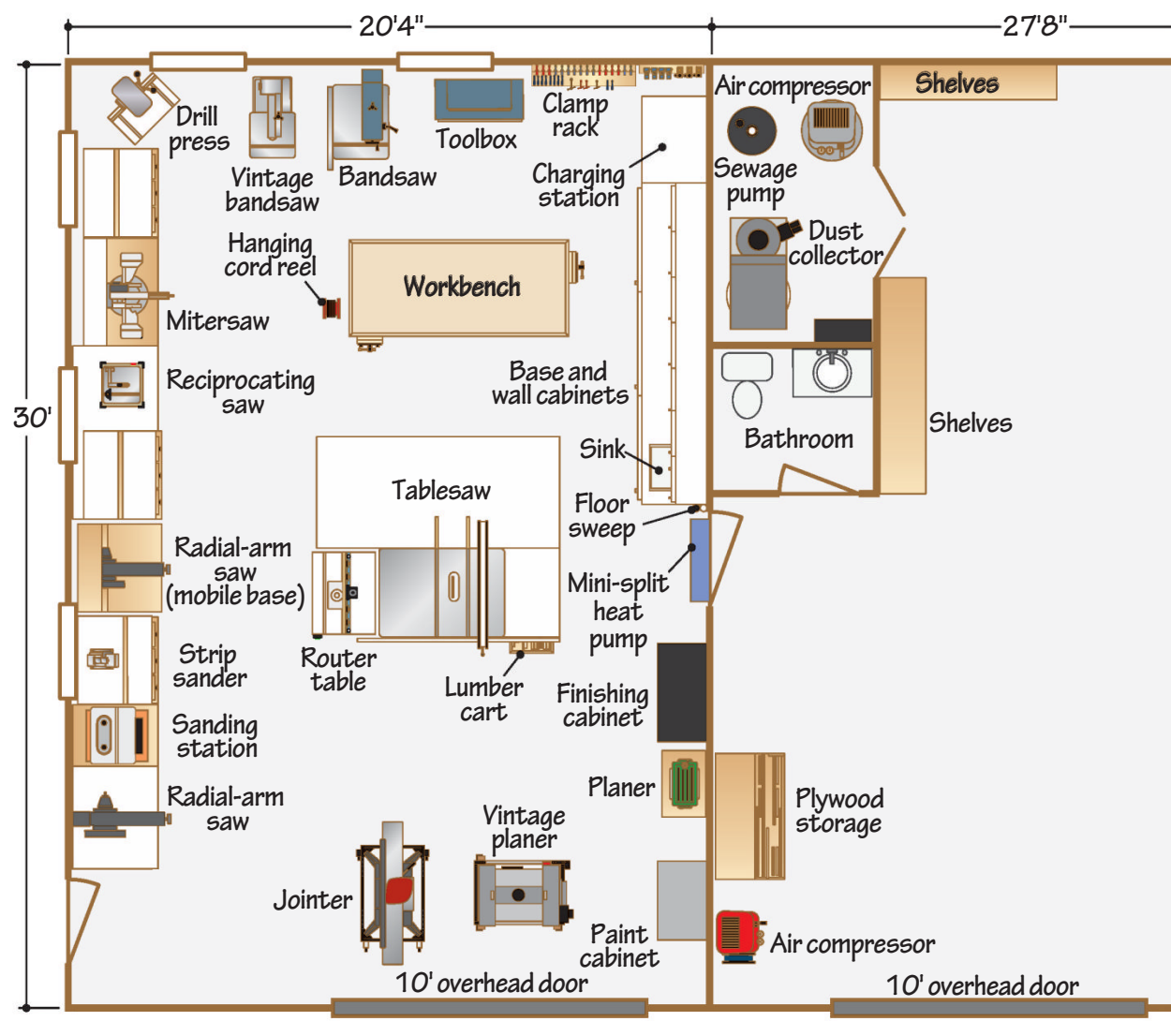
A mini-split heat pump system heats and cools the shop. It's supplemented by a ceiling-mounted electric heater that's fired up when the outside temperatures drop below freezing.

Dust collection consists of a 3-hp dust collector connected to thin-wall PVC piping. Flexible hoses connect the major



tools to the wall-mounted dust gates. A 7½-hp air compressor feeds ¾" flexible HDPE-over-aluminum tubing that let him customize the installation. He used a kit ([rapidairproducts.com](http://rapidairproducts.com)) that included compression fittings and tools for DIY installation. The compressor and dust collector reside in the utility room to keep the noise levels in the shop in a more comfortable range.

Bill admits he's a penny-pincher when it comes to shop purchases. He outfitted his shop with bargain tools and equipment, older tools requiring repairs, or garage-sale deals. His finds include a 5-hp Rockwell model 18 planer, a Foley-Belsaw jointer/molder, and several vintage saws. Many of the base and wall cabinets were destined for the landfill until Bill snagged them and gave them a new life in his shop. To create flat and stable worksurfaces, he used MDF topped with ¼" hardboard then added hardwood edging.



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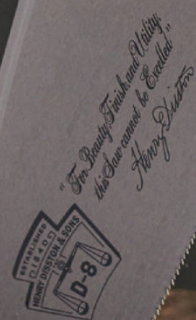




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### YOUR SHOP



This "wall of tools" features aligned worksurfaces to support long workpieces when using the radial-arm saws or compound mitersaw.



Wall-mounted racks keep clamps accessible while saving wall space with their compact design. The hinged front section swings out to allow access to longer clamps.



Designed to fit a narrow space beside the garage door, this storage rack keeps cutoffs and sheet goods in neat order.

Two radial-arm saws and the mitersaw create a cutting trio along one wall. Bill made sure the tables of the saws were at the same level to support long boards. Bill dedicated one of the radial-arm saws to cutting dadoes. The other serves primarily for crosscutting boards to rough length.

Larger tools like the planer, molder, and bandsaws rest on mobile bases. Several benchtop tools, including the mitersaw and radial-arm saws, reside on cabinet bases with casters. The cabinets provide ample storage space for accessories.

Bill's tablesaw is the heart of his shop. The large outfeed table features storage underneath. A scrap bin conveniently tucks under the wing of the tablesaw. He also added a tool well to keep his most-used tablesaw accessories at hand.

Woodworking is in Bill's blood. "I learned much from spending weekends with my grandfather while growing up," he says. His shop projects include repairing pieces, repurposing items, or building new cabinets for an antique store owned by two of his daughters. 🌳



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# Q: TRACKSAW VS. CIRCULAR SAW

I hear a lot of talk about tracksaws and how useful they are. For years, I've gotten by just fine using a circular saw with a straightedge guide. Am I missing something? Is there a big advantage to a tracksaw vs. a circular saw with a guide?

**Bill Wilcox**  
Asheville, North Carolina



**A:** Most circular saws live their lives as construction tools; they're great for quickly crosscutting framing lumber or breaking down sheet goods. But upgrade the stock blade and pair it with either a shop-made guide (*below*) or aftermarket straightedge and you can get cuts that rival those of most tracksaws (or tablesaws).

Tracksaws take this concept a step further. Instead of riding alongside a straightedge guide, a tracksaw rides on top of a track with the blade tight against one edge. The track aids precision by preventing the saw from drifting off the layout line while making the cut.

The base of a tracksaw features a zero-clearance opening, which eliminates tear-out, especially in fragile plywood veneers. Better tracksaws are furnished with high-quality blades for smooth, finished cuts. Lighter-weight materials and integrated clamps make attaching the track to your workpiece easier than with a shop-made guide. And some tracksaws offer stops, track extensions, or other accessories that increase both the accuracy and versatility of the tool.

The blade on most tracksaws is almost fully enclosed, making the saw safer to use and also greatly improving dust collection capability. Most tracksaws have a riving knife to prevent kickback (something most circular saws lack).

Tracksaws—also known as plunge saws—feature a hinged or pivoting design that allows you to place the saw where you'd like to start the cut, turn it on, and plunge

the blade into the workpiece. This makes them ideal for interior cutouts. The geometry of tracksaws also allows them to follow the track guide strip even with the blade tilted for a beveled cut.

Tracksaws cost several times more than a comparable circular saw and shop-made guide, so the choice really comes down to your budget and your intended use. If you anticipate this being your only saw, or one you'll use often, you're better off investing in a tracksaw. But for less frequent use, a circular saw with a guide should prove more than adequate. 🌲



Have a question? Drop us an e-mail.  
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Make a straightedge guide for a circ saw:  
[woodmagazine.com/straightedge](http://woodmagazine.com/straightedge)





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# GROOVY WALL CLEATS

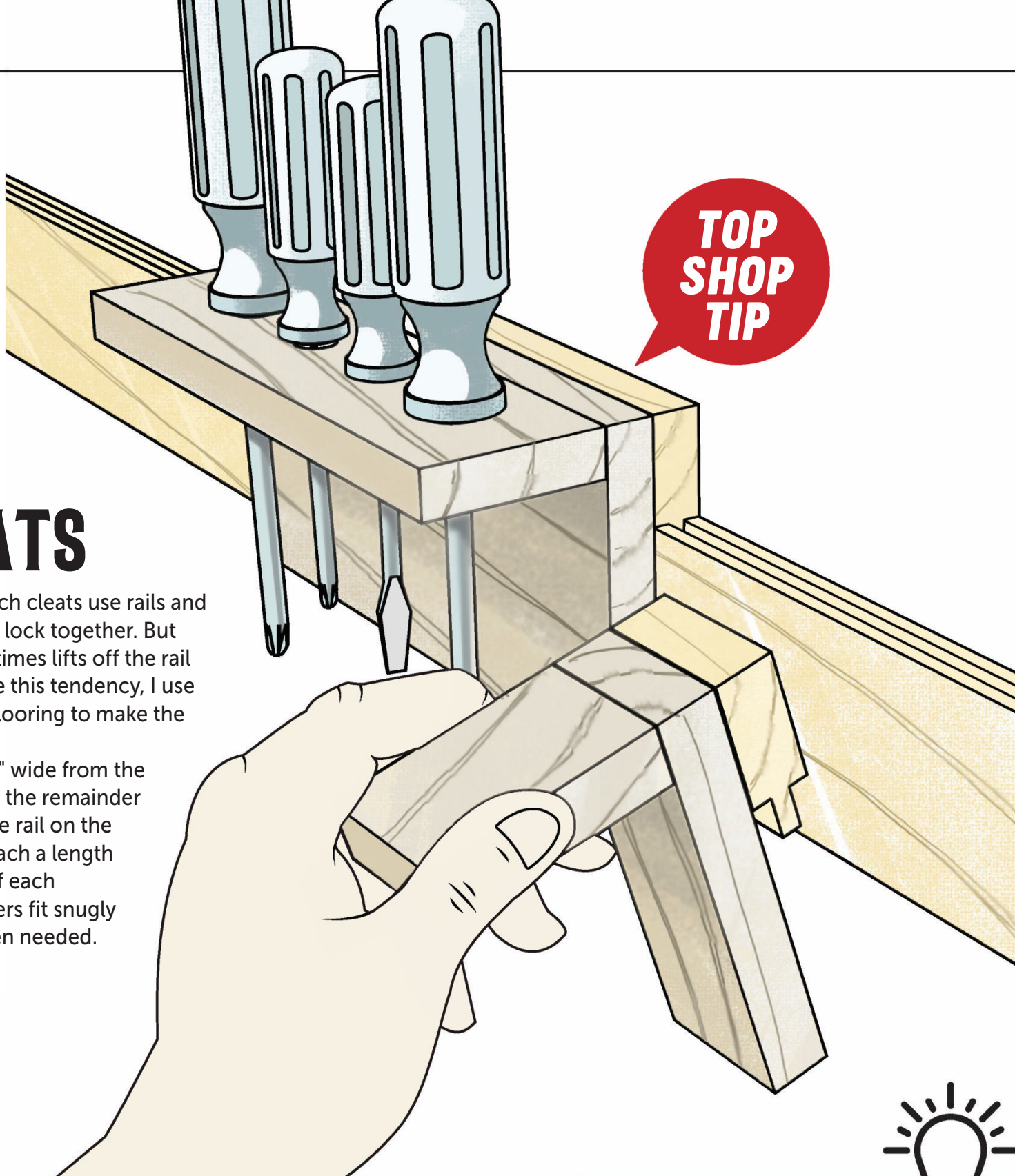
For wall storage, traditional French cleats use rails and hangers with beveled edges that lock together. But I've found that the hanger sometimes lifts off the rail when removing a tool. To reduce this tendency, I use tongue-and-groove hardwood flooring to make the rails and hangers.

Start by ripping a strip about 1" wide from the tongue edge of the flooring. Use the remainder of the plank as the rail. Mount the rail on the wall with the groove side up. Attach a length of the tongue strip to the back of each hanger. You'll find that the hangers fit snugly on the rail yet remove easily when needed.

**Chris Hubert**  
Lakewood, Washington



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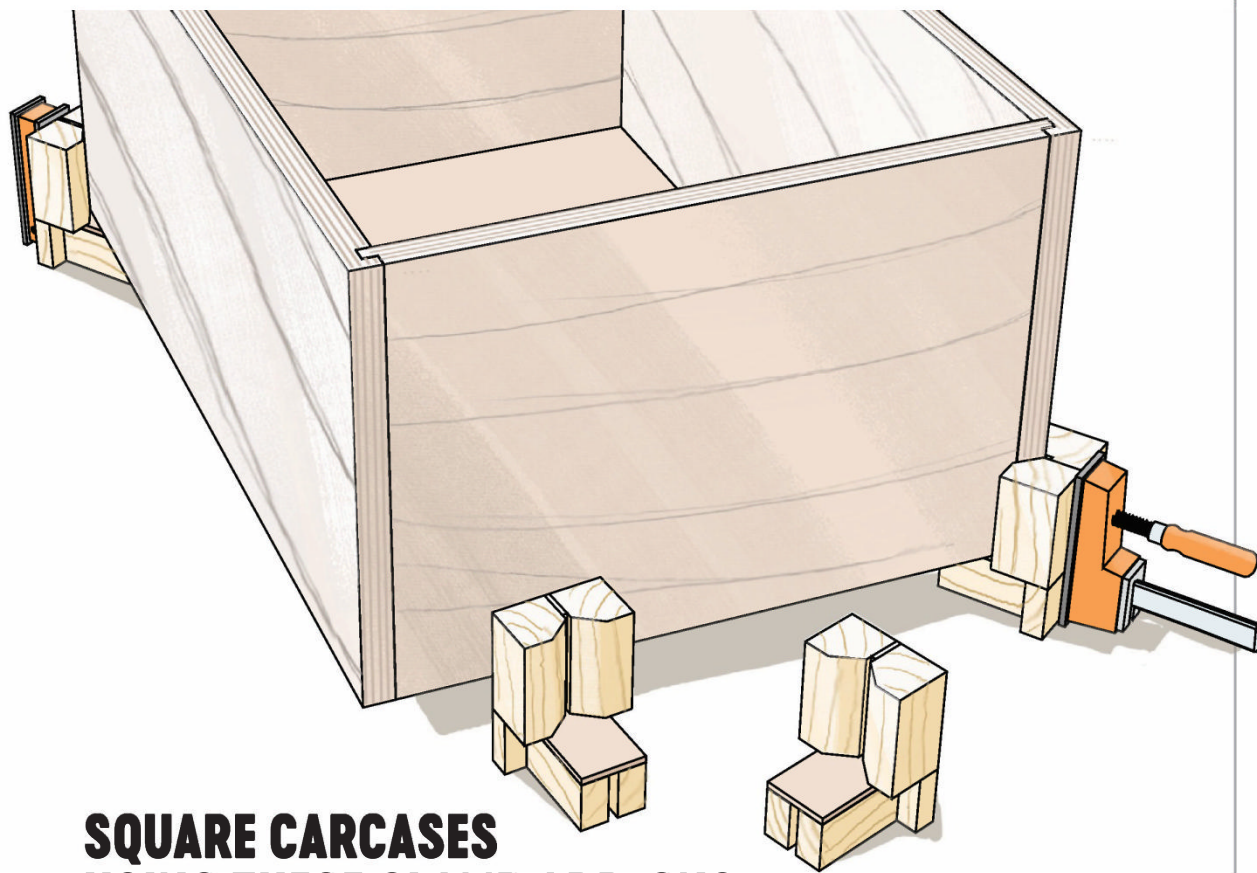
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## SQUARE CARCASSES USING THESE CLAMP ADD-ONS

When gluing up a cabinet carcass, it can be a task to keep the sides square. Clamping diagonally to square up the assembly is difficult with conventional clamps, so I made squaring blocks that straddle the bar of my parallel-jaw clamps. They feature a V-notch that cradles the cabinet corners while you snug the clamp to bring the cabinet square.

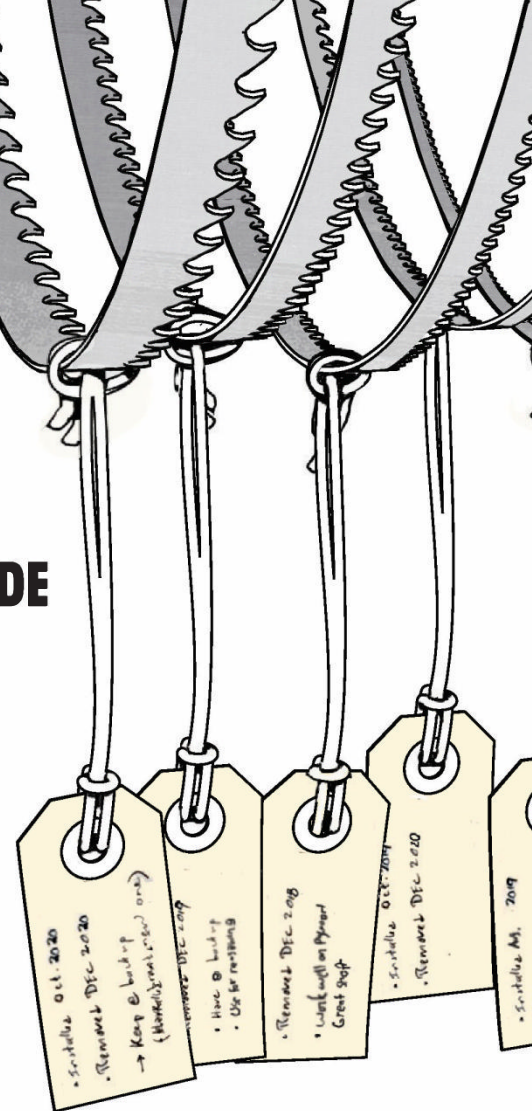
**Dan Martin**  
Galena, Ohio

## LABELS BRING BANDSAW BLADE BENEFITS

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

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

**Paul Baker**  
San Francisco

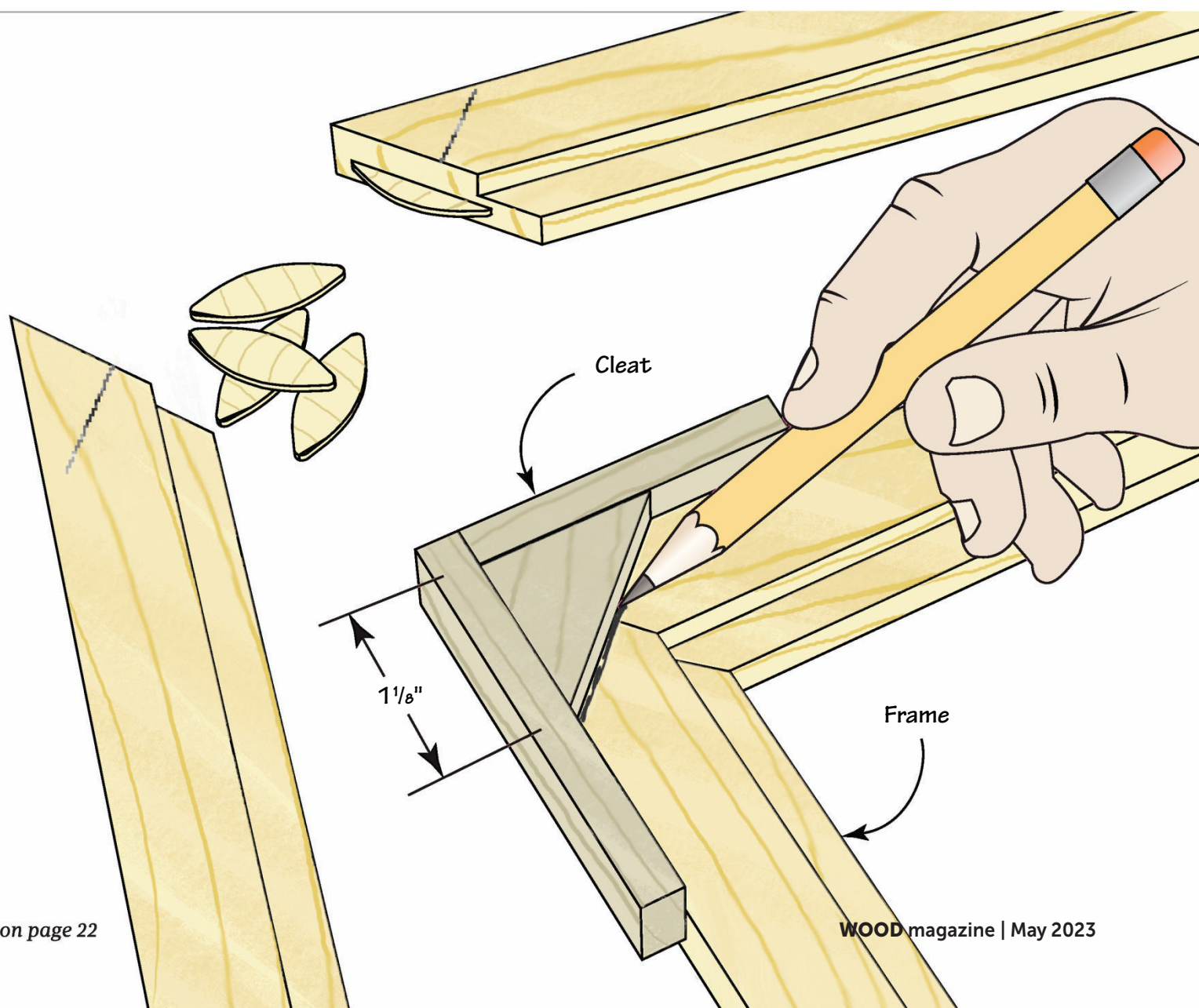


## MARK BISCUITS FOR BETTER FRAME BUILDS

When I make picture frames with mitered corners, I like to use the small, #FF biscuits to reinforce the joints. This size of biscuit works for frame stock at least 1½" wide.

I came up with this simple triangular-block jig outfitted with cleats that fits over the dry-assembled joint. The jig marks the location of the biscuit to provide minimum clearance from the outside corner of the frame. Mark a line across the frame pieces along the triangle's edge to identify the location for the biscuit and registration point for the biscuit joiner.

**Gene Heimerman**  
Perry, Iowa





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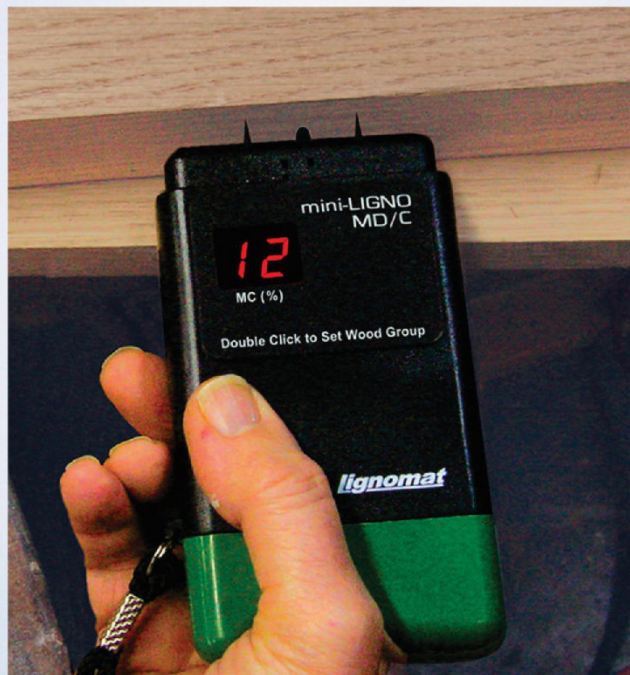


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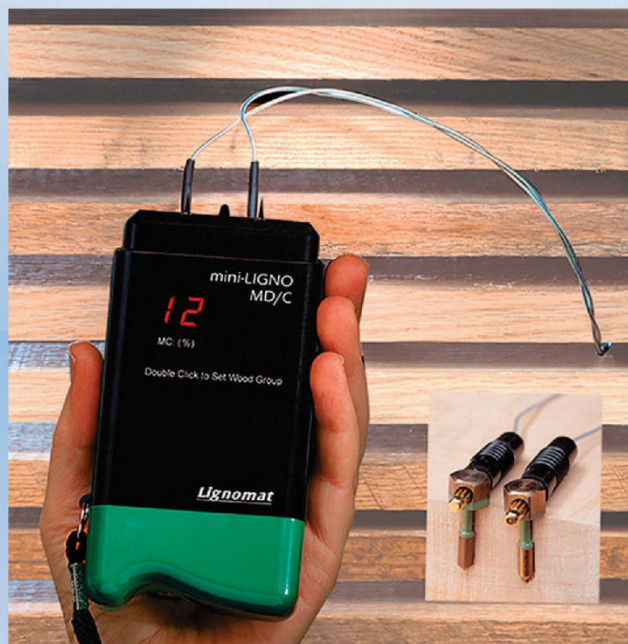


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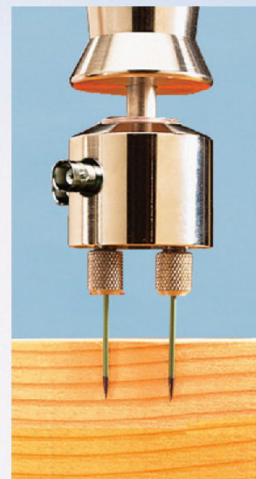
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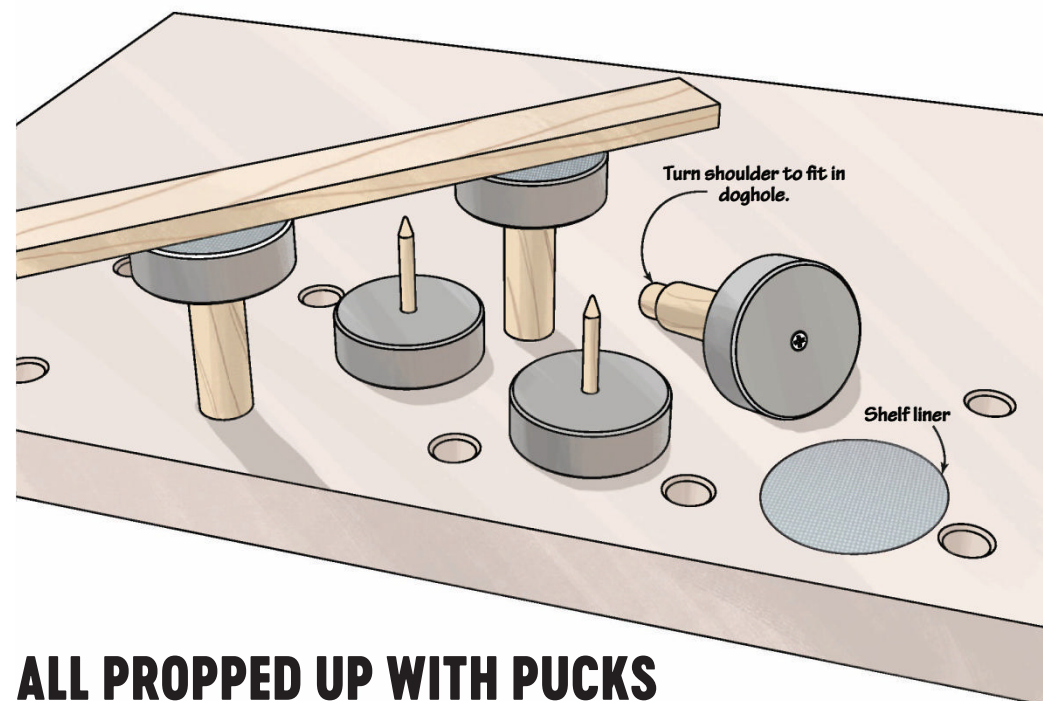


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## SHOP TIPS



## ALL PROPPED UP WITH PUCKS

Commercial bench risers excel at supporting a workpiece for routing, finishing, and other benchtop tasks. I've discovered that I can modify hockey pucks to use as bench risers for about one-third the cost of commercial ones. I purchased my pucks online but you might also find them in stores that sell used sports equipment. Shelf-liner material glued to the faces of each puck adds grip to keep the workpiece in place.

Make your own standoffs on the lathe by turning a shoulder that fits into a doghole. To make supports for applying a finish, use a length of 1/4" dowel, sharpen one end, and insert the opposite end into a hole drilled in the puck. The list of uses for these shop helpers is endless.

**Steve Pietrowicz**

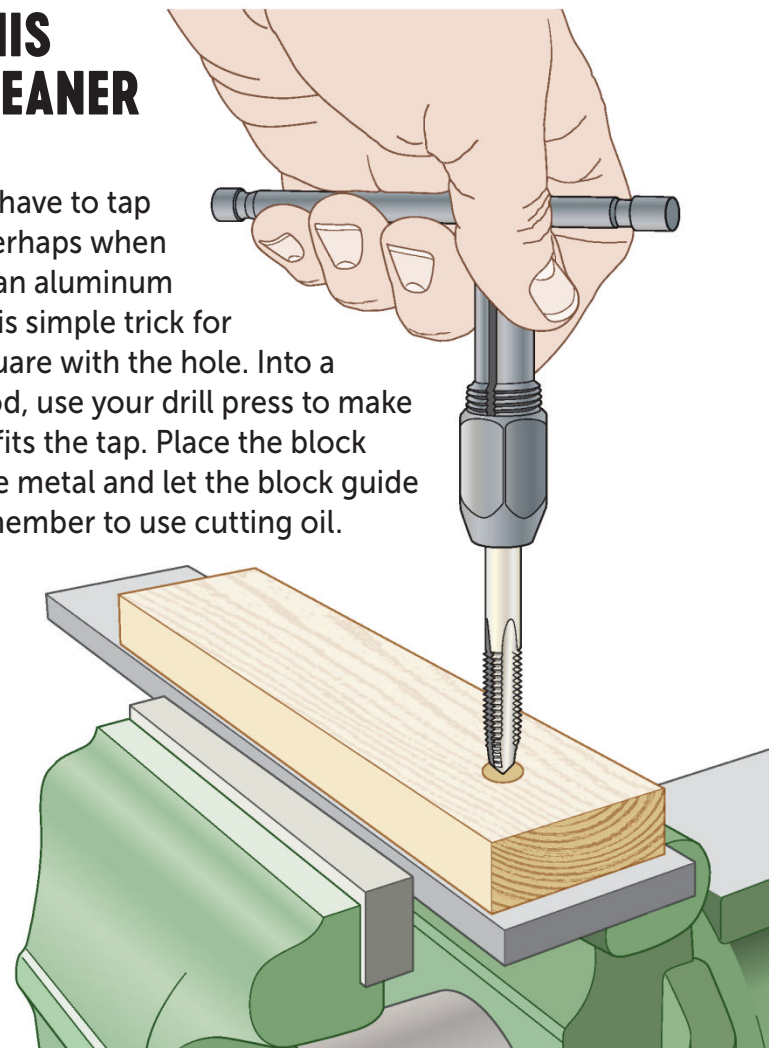
Cresco, Pennsylvania

## TAP INTO THIS IDEA FOR CLEANER THREADS

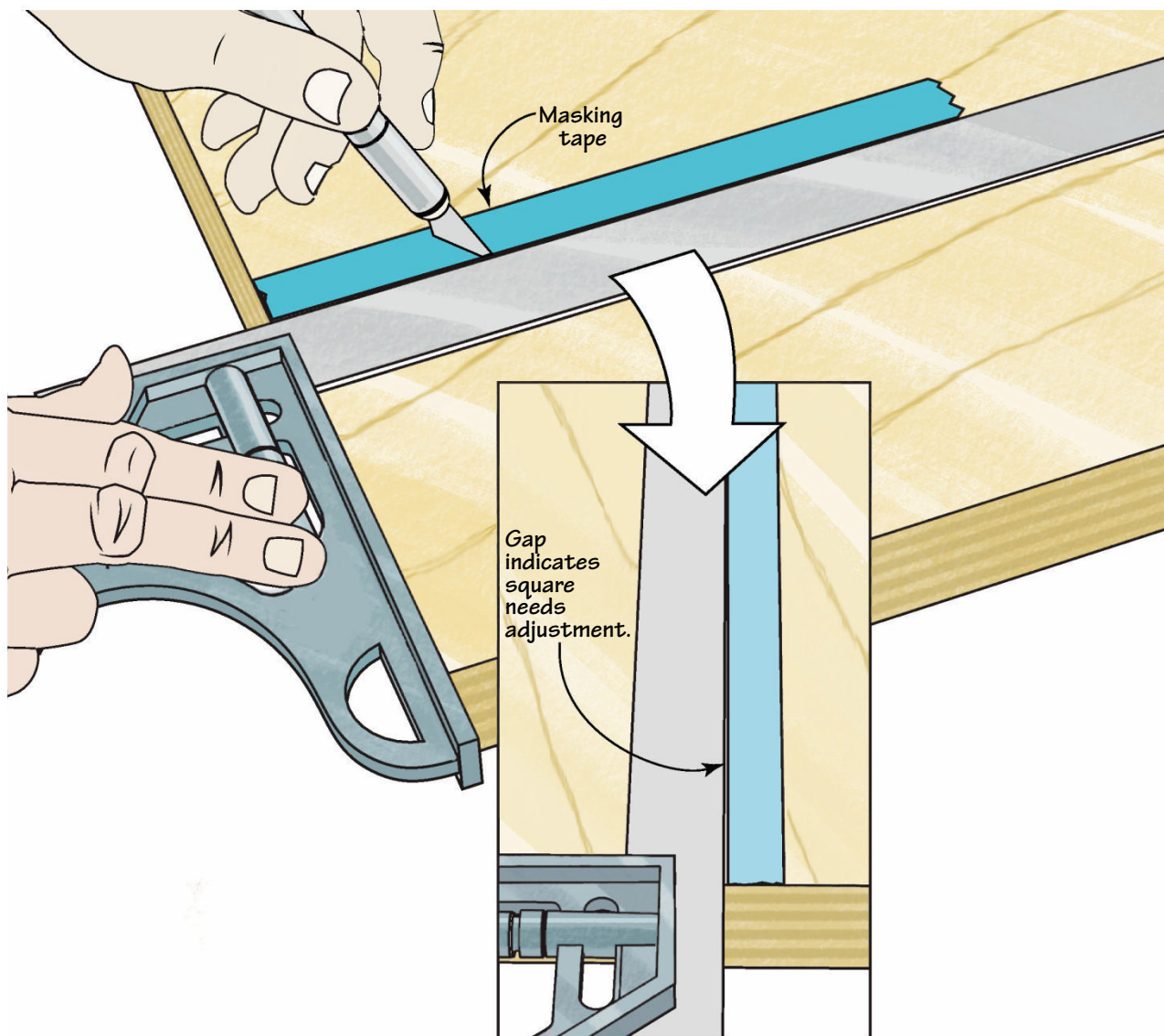
The next time you have to tap a hole in metal—perhaps when building a jig with an aluminum part or two—try this simple trick for starting the tap square with the hole. Into a small block of wood, use your drill press to make a hole that snugly fits the tap. Place the block over the hole in the metal and let the block guide the tap at 90°. Remember to use cutting oil.

**Dan Martin**

Galena, Ohio







## MASK OUT INACCURATE SQUARES

Using a pencil line to check the accuracy of a square proves reasonably accurate. But I found that painter's tape provides a visual contrast for precise, easy-to-see results.

Apply a strip of tape pretty perpendicular—it doesn't have to be perfect—to a straight edge of the workpiece. With the head of the square tight against the workpiece and one edge of the blade over the tape, run a sharp knife along the blade, slicing through the tape, and remove the waste. Flip the square over and hold it against the knife line. If there's a gap, the square needs adjustment.

**Charles Mak**  
Calgary, Alberta

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# A BENCH FOR YOUR BOXES

Protect your packages and park your posterior with this handsome addition to any front porch.

WRITER: ZACH BROWN  
DESIGNER: JOHN OLSON  
BUILDER: BRIAN BERGSTROM



**OVERALL DIMENSIONS**  
39"W x 19<sup>3</sup>/<sub>4</sub>"D x 35<sup>1</sup>/<sub>2</sub>"H





Whether you need protection from the porch pirates or a seat in the shade, this bench has your booty covered. Throw in a backrest plus arms and it does not sacrifice on comfort, either.

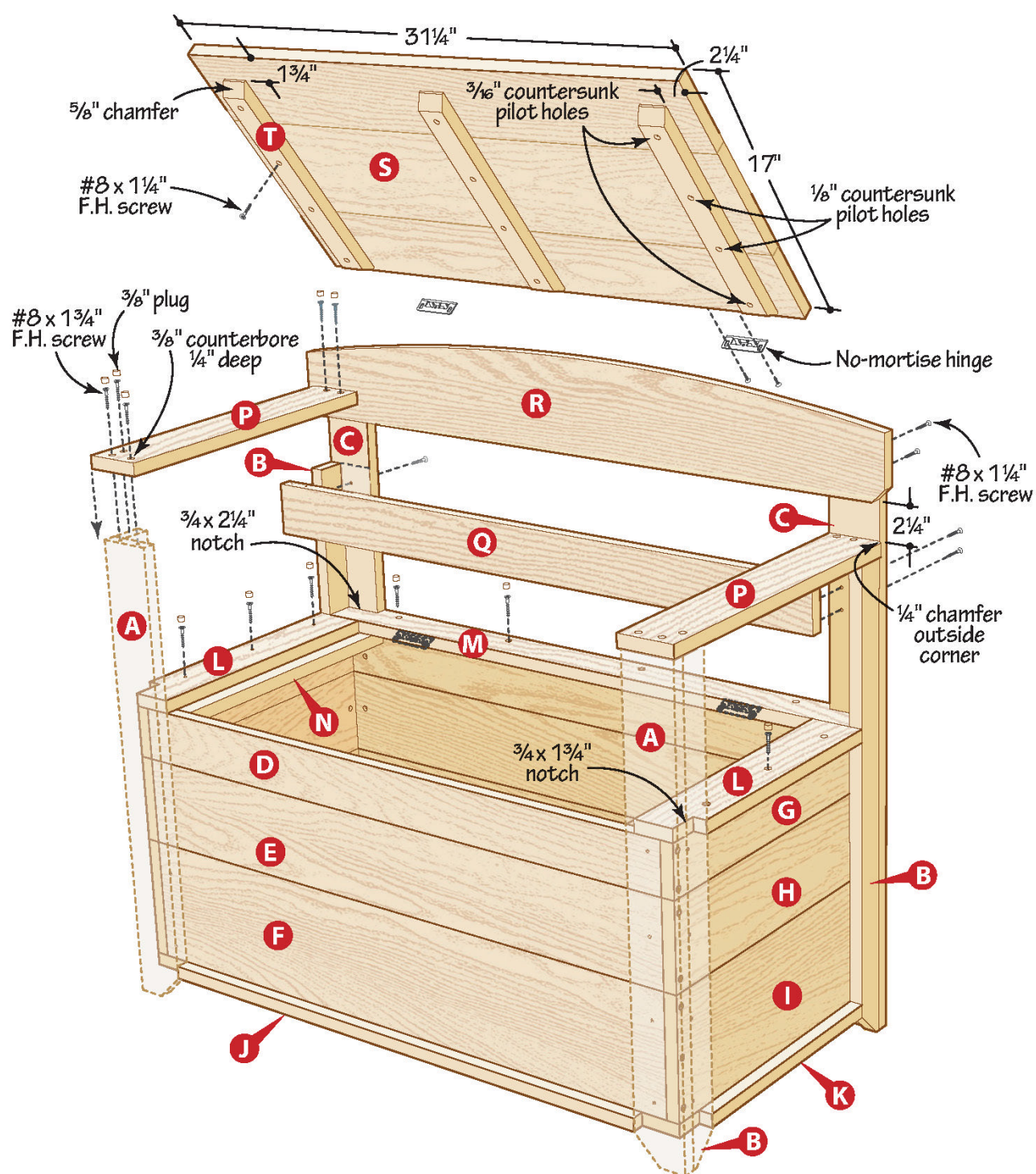
Camouflaging packages from casual view goes a long way toward deterring porch pirates, who are looking for a quick, sure score. Most major online retailers and parcel services let you add delivery instructions where you can request your order be hidden in your new package safe.

The simple design looks at home in any environment, and it's easy to build. We'll show you how.

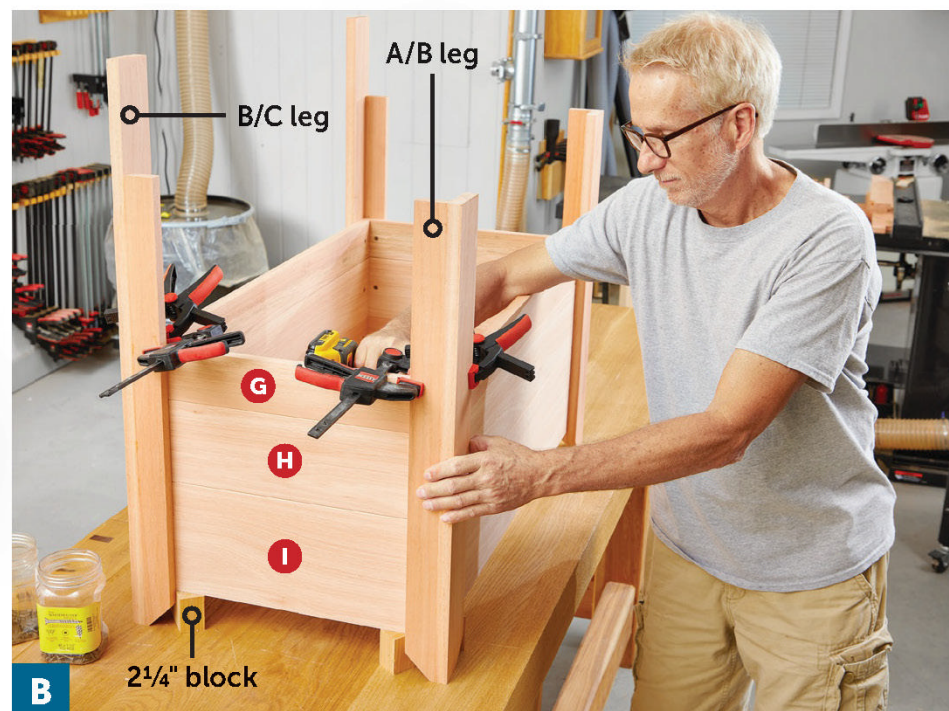
## BEGIN WITH THE BASE

- 1 Cut the leg parts (A-C) to size [Materials List], then glue and clamp the end legs (B) to each front and back leg, forming mirrored pairs [Drawing 1]. We used a water-resistant PVA glue.
- 2 Once the glue dries, taper the bottom end of each leg assembly [Photo A].
- 3 Cut the box side slats (D-I) to size. Glue and screw the end upper slats (G) to the ends of the front/back upper slats (D) to make a frame [Drawing 1a]. Repeat with the middle slats (H, E) and lower slats (I, F).
- 4 Stack the box frames (D/G, E/H, F/I), clamp a leg assembly (A/B or B/C) to each corner [Photo B], and screw the frames to the legs from the inside of the box [Drawing 1].

## EXPLODED VIEW



Adjust your miter gauge to 45° and cut the first taper. Then, rotate the miter gauge in the opposite direction to cut the other side.



Stack the box frames on top of 2 1/4"-tall spacer blocks to create an equal offset for all four legs.



## TACKLE THE TRIM WORK

**1** Cut the bottom supports (J, K) to size. Notch two corners of each end support (K) to fit around the legs [Drawing 1], then glue and screw the supports to the bottom of the box [Photo C].

**2** Cut the upper trim (L, M) to size. Notch one corner of each end trim (L) and two corners of the back trim (M) [Exploded View]. Glue and screw the upper trim to the top of the box assembly [Photo D].

**3** Cut the lid supports (N) to size and glue and clamp them to the bottom of the end trim (L) [Exploded View].

**4** Cut the bottom slats (O) to size and place them inside the box on the bottom supports (J, K). We left our bottom slats unattached so we could remove them to clean the box.

## ADD TWO ARMS AND A BACK

**1** Cut the armrests (P) to size, then add a chamfer to the outside back corner as a transition into the narrower back legs (C) [Exploded View]. Drill counterbored holes, then glue and screw the arms to the tops of the legs.

**2** Cut the lower backrest (Q) to size. Drill counterbored holes through the back face of the legs (C), then glue and screw the backrest in place [Exploded View].

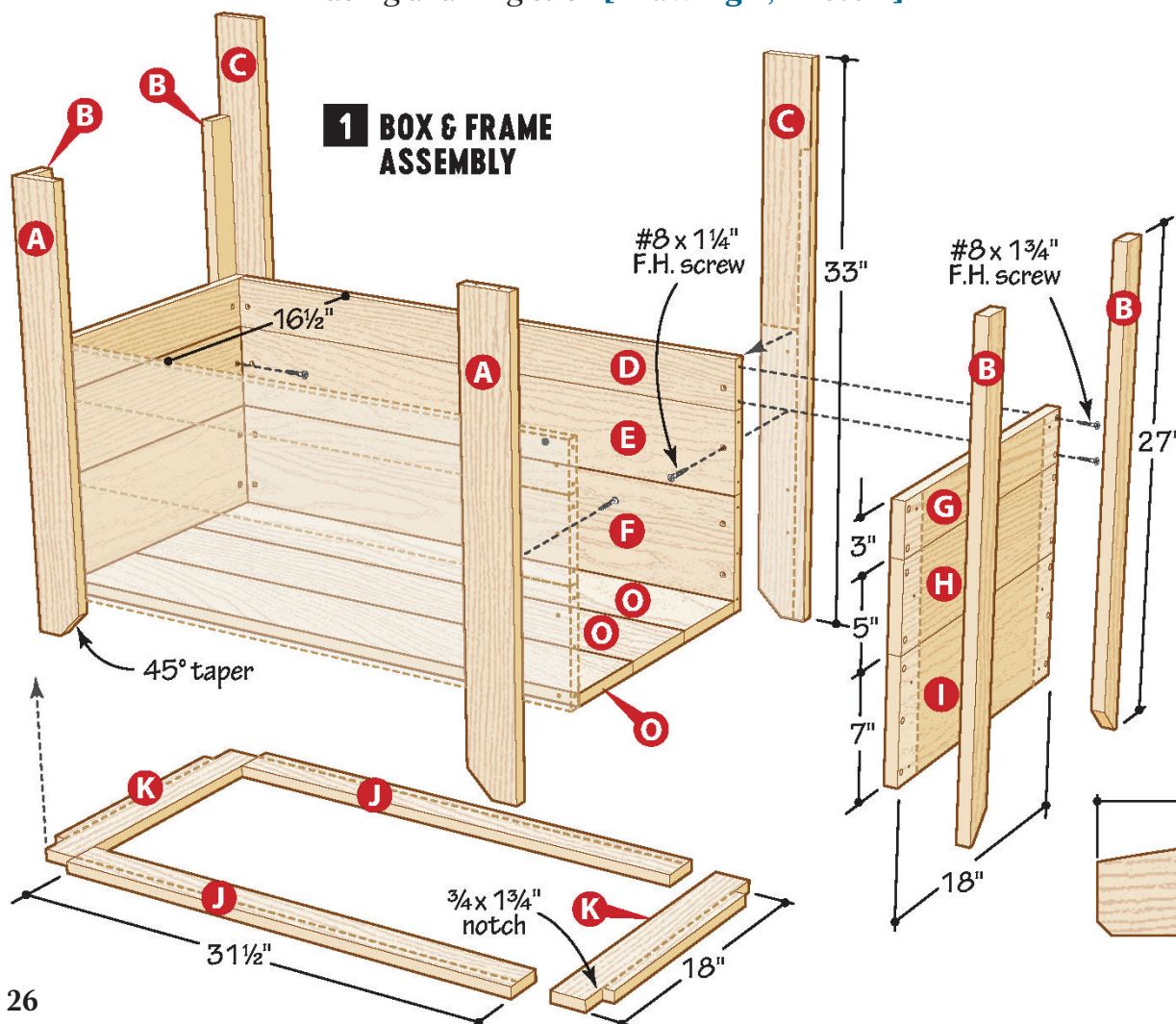
**3** Cut an oversize blank for the upper backrest (R) and lay out the shape using a fairing stick [Drawing 2, Photo E].



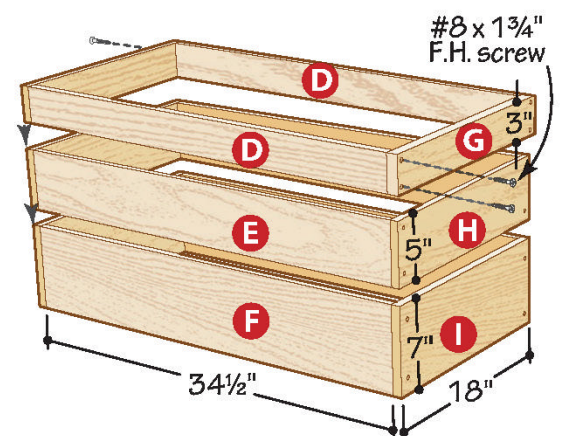
Screw the supports (J, K) to the bottom edges of the box assembly (F/I), flush with the outside faces of the legs.



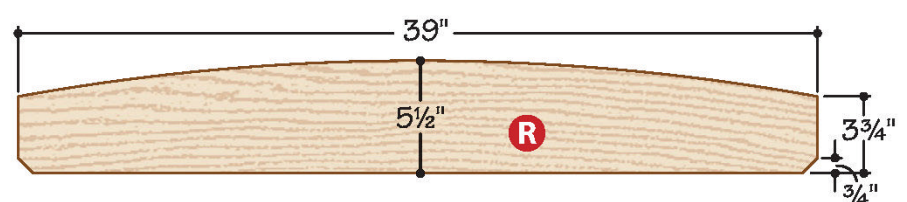
Drill counterbored pilot holes in the upper trim pieces (L, M) then screw them to the top edges of the box assembly (D/G), flush with the outside faces of the legs.



### 1a BOX ASSEMBLY



### 2 UPPER BACKREST







Mark the layout points on the blank, then connect the dots with a fairing stick to draw the arc.

4 Cut and sand the upper backrest to shape. Then, counterbore, glue, and screw it through the back side of the back legs [Exploded View].

### LASTLY, THE LID

- 1 Glue up a panel for the lid (S) [Exploded View] then cut it to length. Cut the lid cleats (T) to size and chamfer the ends.
- 2 Drill the pilot holes in the cleats [Exploded View]. The oversize holes on the ends allow for seasonal wood movement in the lid. Screw the cleats to the bottom of the lid, without glue.
- 3 Plug the counterbored screw holes, then finish-sand the bench and the lid before applying a finish. We brushed on three coats of water-based exterior varnish, sanding between coats.
- 4 Once the finish dries, attach the lid using no-mortise hinges [Exploded View]. Place the bench by your front door and order your packages with peace of mind. 🌲

## REGARDING RED GRANDIS

Red grandis is an FSC-certified hardwood harvested from plantation-grown eucalyptus trees in Uruguay, and often marketed as a “greener” alternative to exotics like mahogany. Common uses include interior cabinetry and millwork, as well as exterior furniture, windows and doors. We like it for furniture because it’s easy to work, is durable, and takes a finish well.

We purchased ours at Woodworkers Source (woodworkerssource.com, 800-423-2450).

## MATERIALS LIST

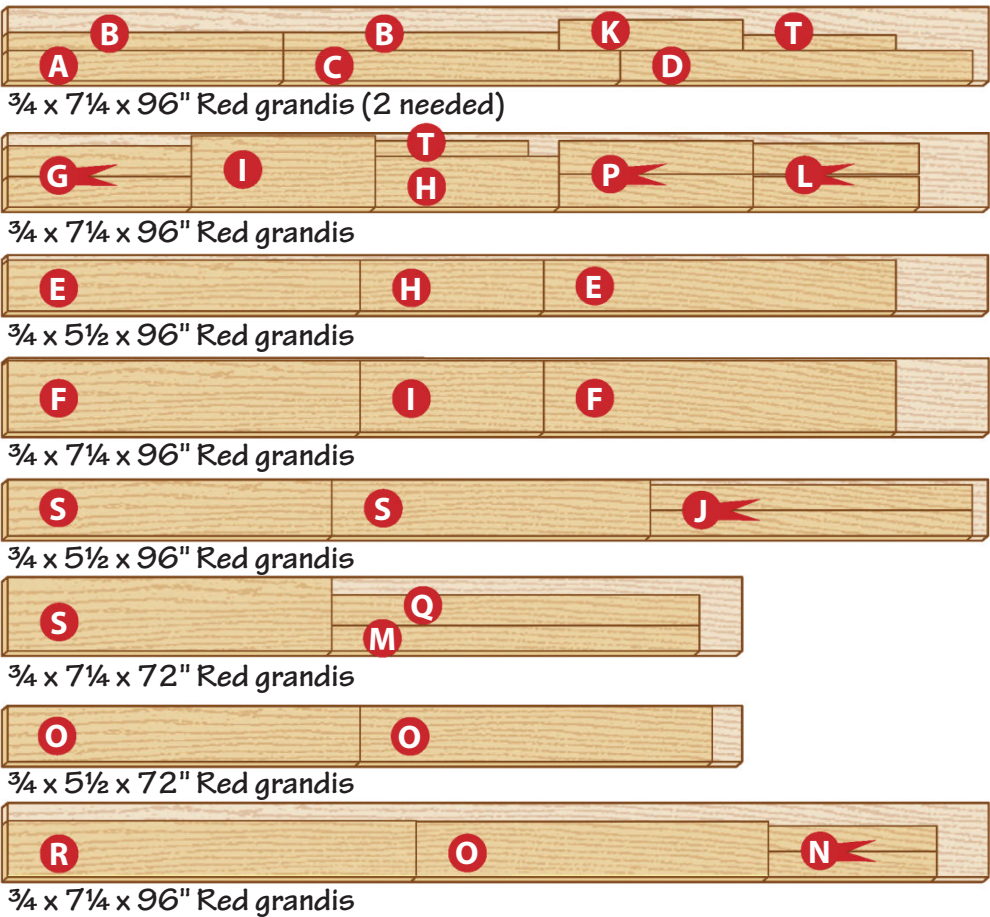
| PART |                            | FINISHED SIZE |         |         | Matl. | Qty. |
|------|----------------------------|---------------|---------|---------|-------|------|
|      |                            | T             | W       | L       |       |      |
| A    | FRONT LEGS                 | 3/4"          | 3"      | 27"     | RG    | 2    |
| B    | END LEGS                   | 3/4"          | 1 3/4"  | 27"     | RG    | 4    |
| C    | BACK LEGS                  | 3/4"          | 3"      | 33"     | RG    | 2    |
| D    | FRONT/BACK UPPER SLATS     | 3/4"          | 3"      | 34 1/2" | RG    | 2    |
| E    | FRONT/BACK MIDDLE SLATS    | 3/4"          | 5"      | 34 1/2" | RG    | 2    |
| F    | FRONT/BACK LOWER SLATS     | 3/4"          | 7"      | 34 1/2" | RG    | 2    |
| G    | END UPPER SLATS            | 3/4"          | 3"      | 18"     | RG    | 2    |
| H    | END MIDDLE SLATS           | 3/4"          | 5"      | 18"     | RG    | 2    |
| I    | END LOWER SLATS            | 3/4"          | 7"      | 18"     | RG    | 2    |
| J    | FRONT/BACK BOTTOM SUPPORTS | 3/4"          | 2 1/2"  | 31 1/2" | RG    | 2    |
| K    | END BOTTOM SUPPORTS        | 3/4"          | 3"      | 18"     | RG    | 2    |
| L    | UPPER END TRIM             | 3/4"          | 3"      | 16 1/4" | RG    | 2    |
| M    | UPPER BACK TRIM            | 3/4"          | 2 1/2"  | 36"     | RG    | 1    |
| N    | LID SUPPORTS               | 3/4"          | 2 1/2"  | 16 1/2" | RG    | 2    |
| O    | BOTTOM SLATS               | 3/4"          | 5 7/16" | 34 1/2" | RG    | 3    |
| P    | ARMRESTS                   | 3/4"          | 3 1/4"  | 19"     | RG    | 2    |
| Q    | LOWER BACKREST             | 3/4"          | 3"      | 36"     | RG    | 1    |
| R*   | UPPER BACKREST             | 3/4"          | 5 1/2"  | 39"     | RG    | 1    |
| S    | LID                        | 3/4"          | 17"     | 31 1/4" | EGG   | 1    |
| T    | LID CLEATS                 | 3/4"          | 1 1/2"  | 15"     | RG    | 3    |

\*Parts initially cut oversize. See the instructions.

**MATERIALS KEY:** RG—red grandis, EGG—edge-glued red grandis.  
**SUPPLIES:** #8x1 1/4" F.H. screws, #8x1 3/4" F.H. screws, no-mortise hinges (2).  
**BLADES AND BITS:** 3/8" plug cutter.  
**SOURCE:** Red grandis 4/4 lumber, Woodworkers Source, woodworkerssource.com, 800-423-2450.  
**PROJECT COST:** It cost us about \$400 to build this project. Your cost will vary by region and source.

## CUTTING DIAGRAM

This project requires 40 board feet of 4/4 red grandis based on the example boards shown below.









# REPEATED CURVES AHEAD

## HOW TO CUT IDENTICAL SHAPES ON THE BANDSAW

A template and a jig make curved cuts predictable and repeatable.

WRITERS: HUY HUYNH WITH RANDY MAXEY

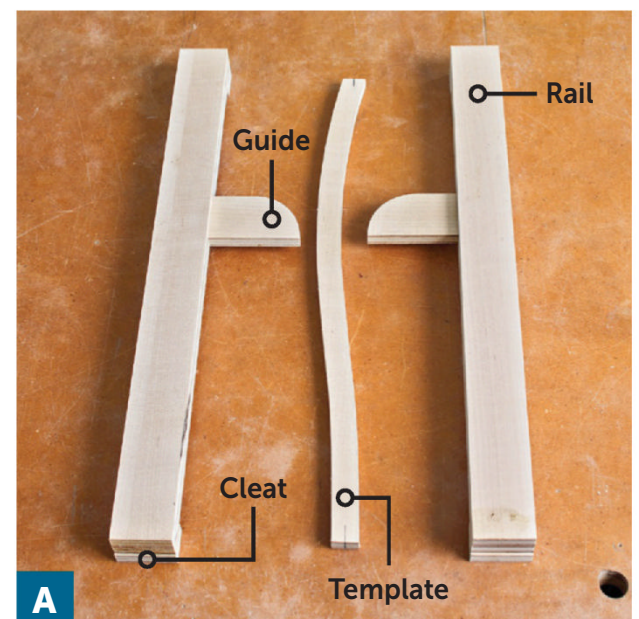
When I was commissioned to make a set of eight chairs, I was faced with cutting multiple back slats with serpentine curves. I had to figure out a way to make all the slats identical. I used a template and a simple band-saw jig to make the duplicate parts.

My bandsaw jig [Photo A] consists of two rails that span the bandsaw table from front to back. Cleats at each end overhang the table edges to help position the rails, and clamps hold them in place (*previous page*). A guide extends from the bottom of each rail toward the blade to capture a template that has been cut to the desired shape and fastened to the bottom of the workpiece.

### BUILD A SIMPLE BANDSAW JIG

Make the rails from two layers of  $\frac{1}{2}$ " plywood. First, cut six 2" strips a few inches longer than the depth of your bandsaw table.

Glue two strips face-to-face to make each rail, and trim the edges flush and straight after the glue dries. From one



Two rails with guides for the template to follow make up this simple bandsaw jig.

remaining strip cut four 1"-long cleats. Fasten a cleat, checking for square, at each end of the rails for a snug fit over the front and rear of the bandsaw table.

Cut 6"-long guides from the remaining strip then bandsaw a point at one end of each guide. Sand a slight radius at the point for the template to smoothly ride against during the cut. Place the rails on the bandsaw table against the blade and mark the tooth location. The guide will be attached in front of the blade with the flat edge aligned with this mark. Position the guides and mark their width on the rails. Rout dadoes on the bottom to fit the guides. Glue the guides in place then wax the points of the guides to reduce friction during use.



### MEET THE MAKER

Huy Huynh is a full-time aerospace engineer and part-time woodworker who produces commissioned furniture pieces. He also has a prolific social media presence (@AlabamaWoodworker), where he documents his builds out of his garage workshop in Madison, Alabama.



## CREATING CLONED PARTS

The first step to creating identical parts is to make a template shaped to match the desired profile—in this case, the curved slat. Make the template from material at least the same thickness as the jig's guides; I used the same 1/2" plywood. Take time to sand the template smooth to avoid transferring any lumps and bumps to the final workpiece.

Cut the blanks to finished length. Because I assembled my chairs with loose tenons, I didn't have to account for tenon length. I did cut the mortises in the ends while the stock was still square.

If you use traditional mortise-and-tenon joinery, do the same for the tenons on your slats.

Trace a guideline on one side of the blank to serve as a reference to follow at the bandsaw. To do this, align the template with a corner of the blank and draw the outline on the face [Photo B]. Then secure the template to the opposite face of the blank with double-faced tape [Photo C].

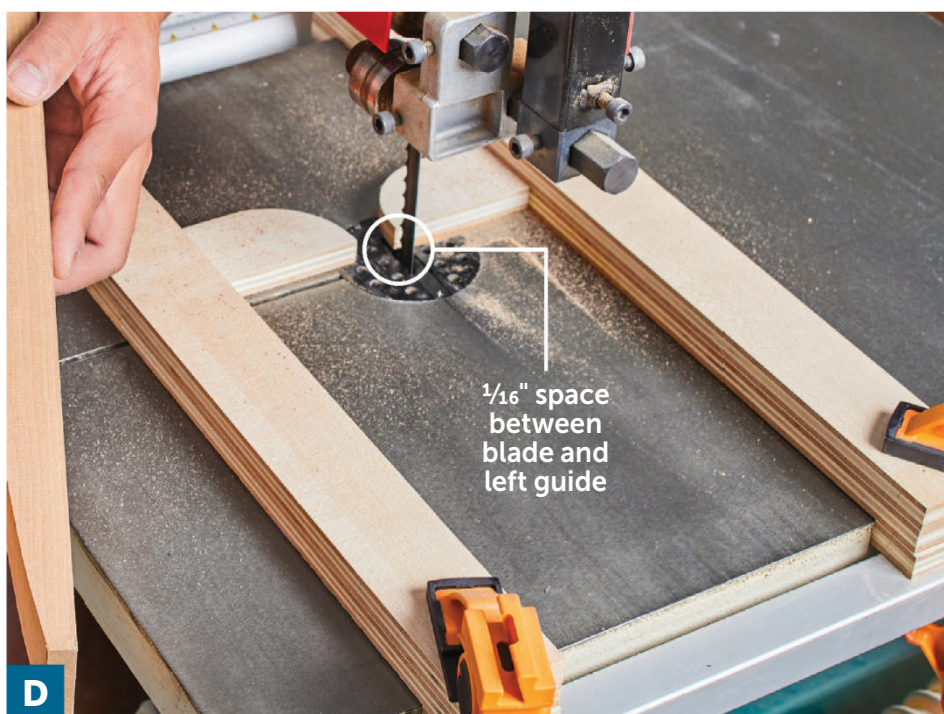
Clamp the jig rails to the bandsaw table, leaving 1/16" space between the blade and left guide [Photo D]. Use the



**B** Trace the outline of the template on the top face of the workpiece. This helps you visualize the position of the template, which will be hidden under the workpiece, as you cut.



**C** Turn the workpiece over with the opposite face up. Then attach the template. Note that the template has to be flipped to mirror its position on the first face.



**D** Positioning the left guide 1/16" away from the blade leaves just enough material to be smoothed to final shape later.

template as a spacer to position the right guide. The template follows the left guide while the right guide offers additional tracking, balance, and workpiece support during the cut.

Place the end of the blank on top of the guides with the template positioned between them. Feed the blank slowly to leave the cleanest possible surface. Maneuver the blank so the blade always cuts parallel to the traced pencil guideline [Photo E]. I grip the blank at the ends making it easy to feed the material while moving my hands laterally to follow the curves. Once you've cut one face, rotate the blank 180° and cut the opposite face [Photo F]. All that's left is smooth the curves (see *Shapely Curves*, next page). 🌲





With the template facedown, make the cut while keeping the template tight against the left guide. The blank passes over the top of the guides.



Rotate the blank end-for-end to cut the matching curve on the opposite face of the blank. Keep the template against the left guide.

## SHAPELY CURVES

The slats require some handwork to remove the bandsaw marks. But they're too wide to use a flush-trim bit at the router table, so you have to get creative.

Securing the slats while you work them smooth is part of the challenge. I used a couple of blocks clamped in the face vise. I fastened a floating tenon to the end of each block and secured the slat between them with the tenons in the mortises.

I like to use spokeshaves, a card scraper, and an orbital sander to get a finish-ready surface. The spokeshaves remove most of the blade marks left by the bandsaw. Work to the layout lines you marked on the blank. Finish up with the card scraper and then a random-orbital sander, using progressively finer grits.



It's easier to smooth the slats if they're clamped securely and elevated above the workbench.



Use a flat-sole spokeshave to fair the outside curves. A convex-sole spokeshave makes it easy to smooth the inside curves.



A soft pad on a random-orbit sander smooths the curves and prepares the slats for a finish.



# SMALL-SHOP PROJECT CENTER

See page 80  
for a preview  
of next issue's  
accompanying  
storage unit



Make your power tools work big  
in a small footprint with this project center. It  
combines a tablesaw cabinet, router table, and  
outfeed support in one mobile, stowable package.

WRITER: BRYAN NELSON  
PROJECT DESIGNER: KEVIN BOYLE  
BUILDER: BRIAN BERGSTROM

PHOTOGRAPHER: JACOB FOX; ILLUSTRATORS: ROXANNE LEMOINE, LORNA JOHNSON

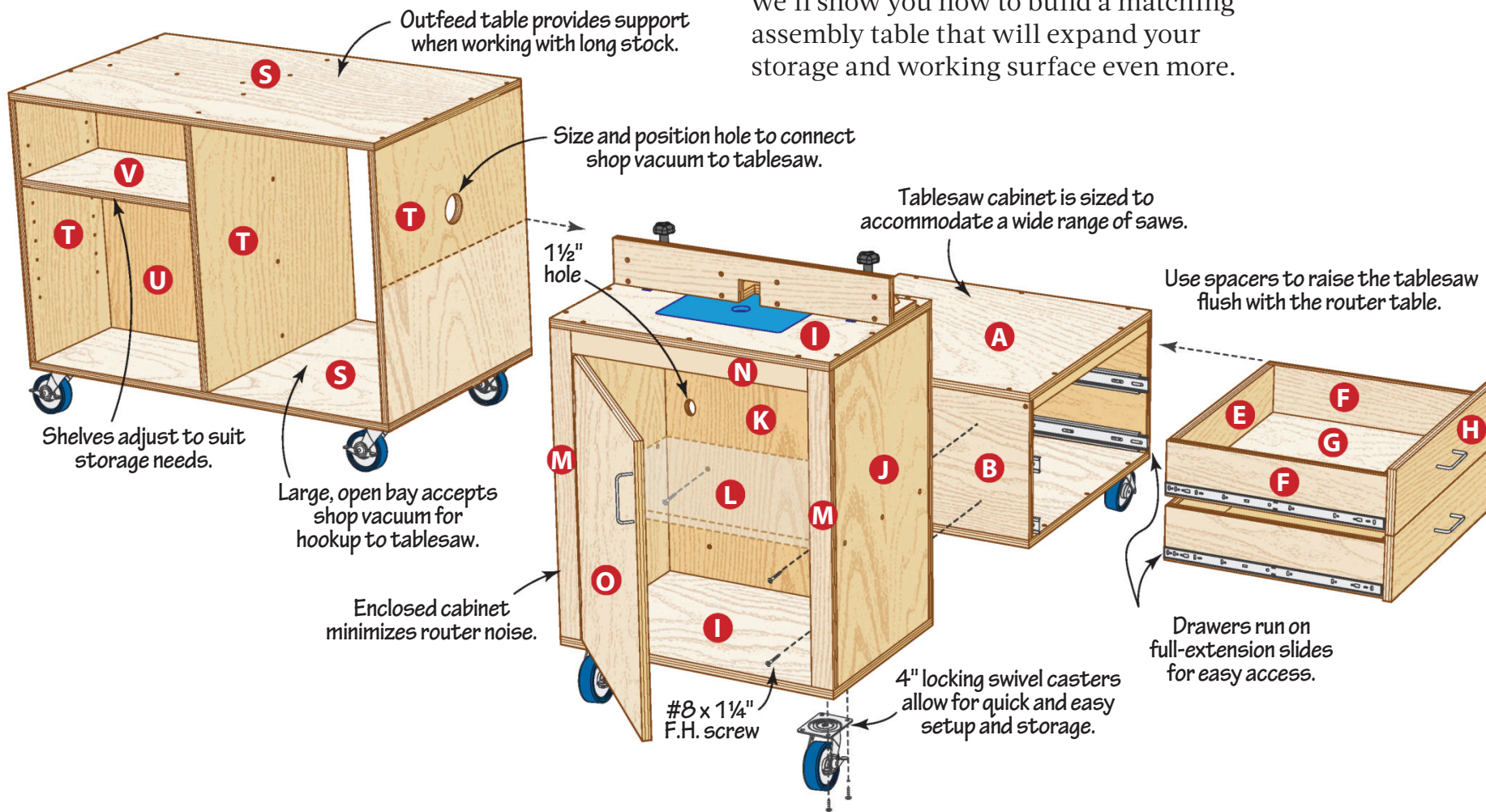


**L**arge projects challenge small shops, especially when working with handheld power tools and benchtop machines. This project center meets that challenge with a simple-to-build cabinet that provides a solid foundation for your tablesaw and router. The addition of the outfeed cabinet ensures larger workpieces

have solid support as you make a cut. And the router table doubles as side support during tablesaw use.

Supported by sturdy locking swivel casters, the tablesaw and router cabinet assembly rolls smoothly around the shop for easy setup and locks securely for use. When you're done, unlock the casters and park everything out of the way. Looking for more bench space? In the next issue we'll show you how to build a matching assembly table that will expand your storage and working surface even more.

## EXPLODED VIEW



## START WITH THE TABLESAW CABINET

The actual thickness of plywood is often less than its stated value. Measure yours and account for this as you build, cutting parts to fit as you go.

**1** Cut the top/bottom (A) and sides (B) to size **[Materials List, Drawing 1]**. Assemble one side and the bottom using glue, screws, and assembly squares to ensure a square case. Cut the back (C) to size, then glue and screw it into place, ensuring the edges are flush. Finally, glue and screw the remaining side and top into place, using the back to square the case.



Get great tips for  
laying out and working  
with plywood.  
woodmagazine.com/  
preciselayout

## OVERALL DIMENSIONS

### Tablesaw & Router Table

26"W x 44"D x 38<sup>1</sup>/<sub>4</sub>"H

## Outfeed Table

44"W x 26"D x 34<sup>1</sup>/<sub>4</sub>"H





**1 TABLESAW CABINET**

The diagram illustrates the assembly of a table saw cabinet. Key components and steps include:

- Part A:** The main cabinet base, shown as a 26" x 26" square.
- Part B:** A side panel, 26" wide and 13" high, featuring a  $\frac{3}{32}$ " pilot hole, countersunk.
- Part C:** The rear panel of the cabinet.
- Part D:** A 1" thick support block.
- Part E:** The drawer front panel.
- Part F:** The drawer side panels.
- Part G:** The drawer bottom panel.
- Part H:** The drawer front panel, which includes a 4" pull.

Assembly details and dimensions:

- Screws:** #8 x  $1\frac{1}{2}$ " F.H. screw.
- Drawer Slide:** 20" drawer slide.
- Drawer Dimensions:** The drawer is 26" wide and 13" high. The front panel (H) is 4" high.
- Drawer Bottom (G):** The bottom panel is  $\frac{1}{16}$ " from the bottom of the drawer.
- Drawer Front (H):** The front panel is  $\frac{3}{4}$ " from the bottom of the drawer.
- Drawer Side (F):** The side panel is  $6\frac{1}{32}$ " from the bottom of the drawer.

**5** Cut the false fronts (H) to size and screw them to the drawer fronts, centered side-to-side and flush at the bottom **[Drawing 2]**. Attach the cabinet members of the drawer slides to the drawers **[Photo A]**.

**No dado blade?  
Make two passes  
with a standard rip  
blade to cut the  
drawer bottom  
groove, completing  
one pass on a test  
scrap and all parts  
before adjusting  
the fence for the  
second pass.**

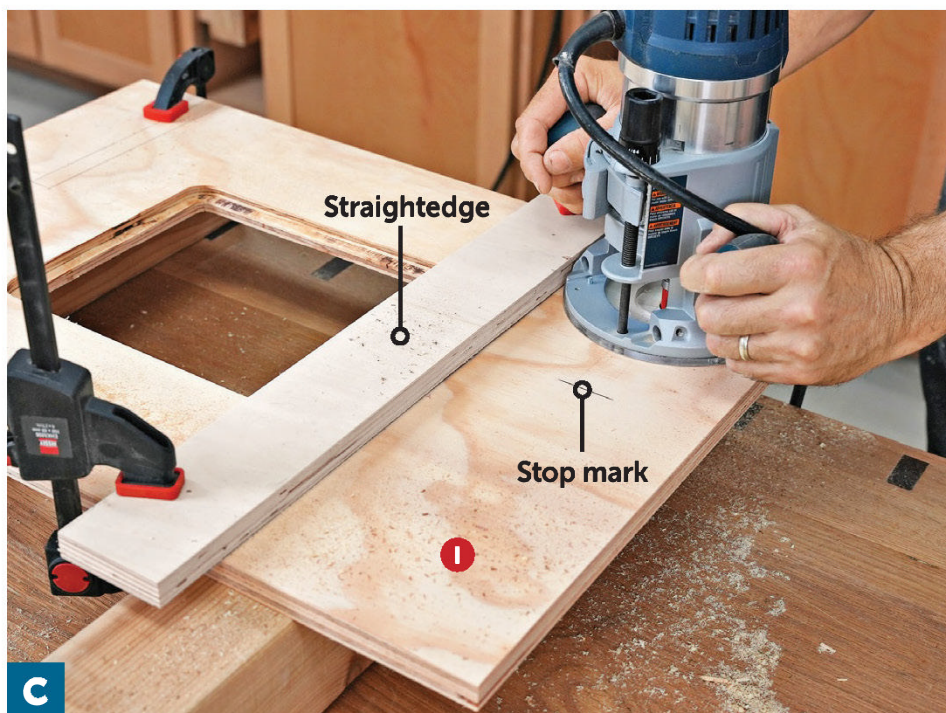
Diagram illustrating the assembly of a wooden cabinet, showing components E, F, G, and H with dimensions and assembly instructions:

- Component H:** Dimensions:  $24\frac{3}{8}"$  (length),  $5\frac{29}{32}"$  (height), and  $4"$  pull (distance from top edge).
- Component E:** Dimensions:  $21\frac{15}{16}"$  (length) and  $5"$  (height). Assembly instruction:  $1\frac{1}{4}"$  pocket-hole screw.
- Component F:** Dimensions:  $20"$  (length) and  $5"$  (height). Assembly instruction:  $20"$  drawer slide.
- Component G:** Dimensions:  $19\frac{1}{4}"$  (width) and  $22\frac{11}{16}"$  (length). Assembly instruction:  $\frac{1}{4}"$  grooves  $\frac{3}{8}"$  deep.



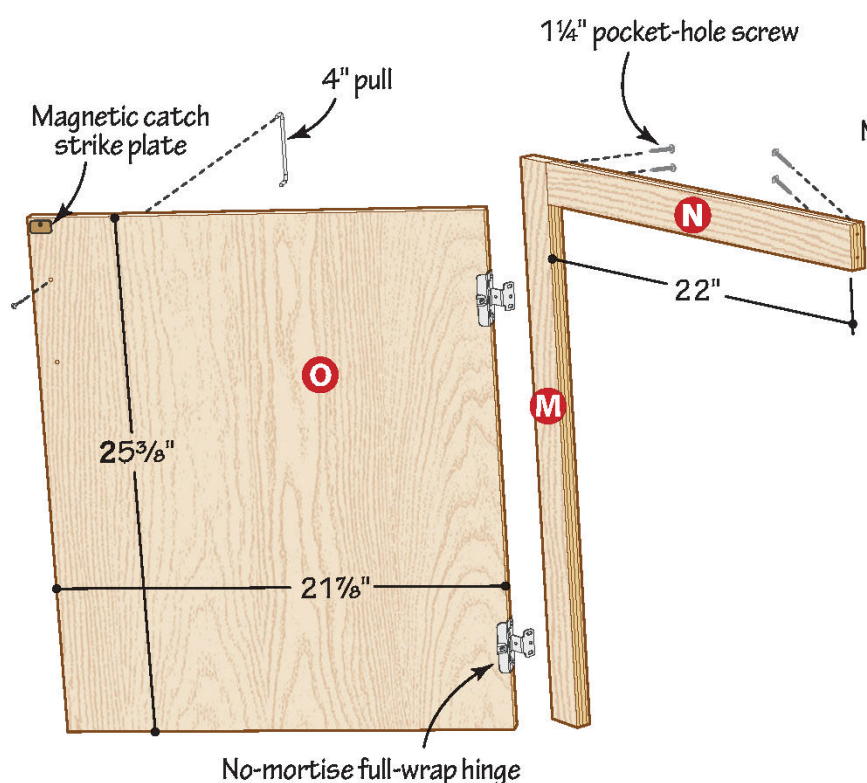
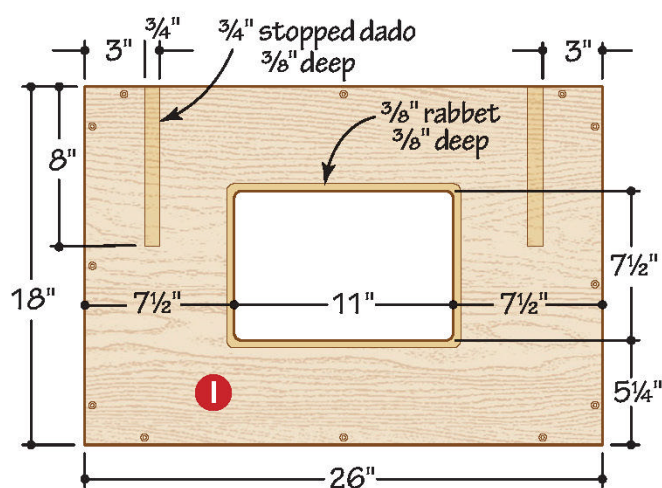
Set an upper slide on a  $6\frac{1}{32}$ "-wide spacer, set the slide back the thickness of the false front (H), and screw the slide in place. Repeat for the other side. For the lower slides, use a pair of  $\frac{1}{16}$ " drill bits as spacers.



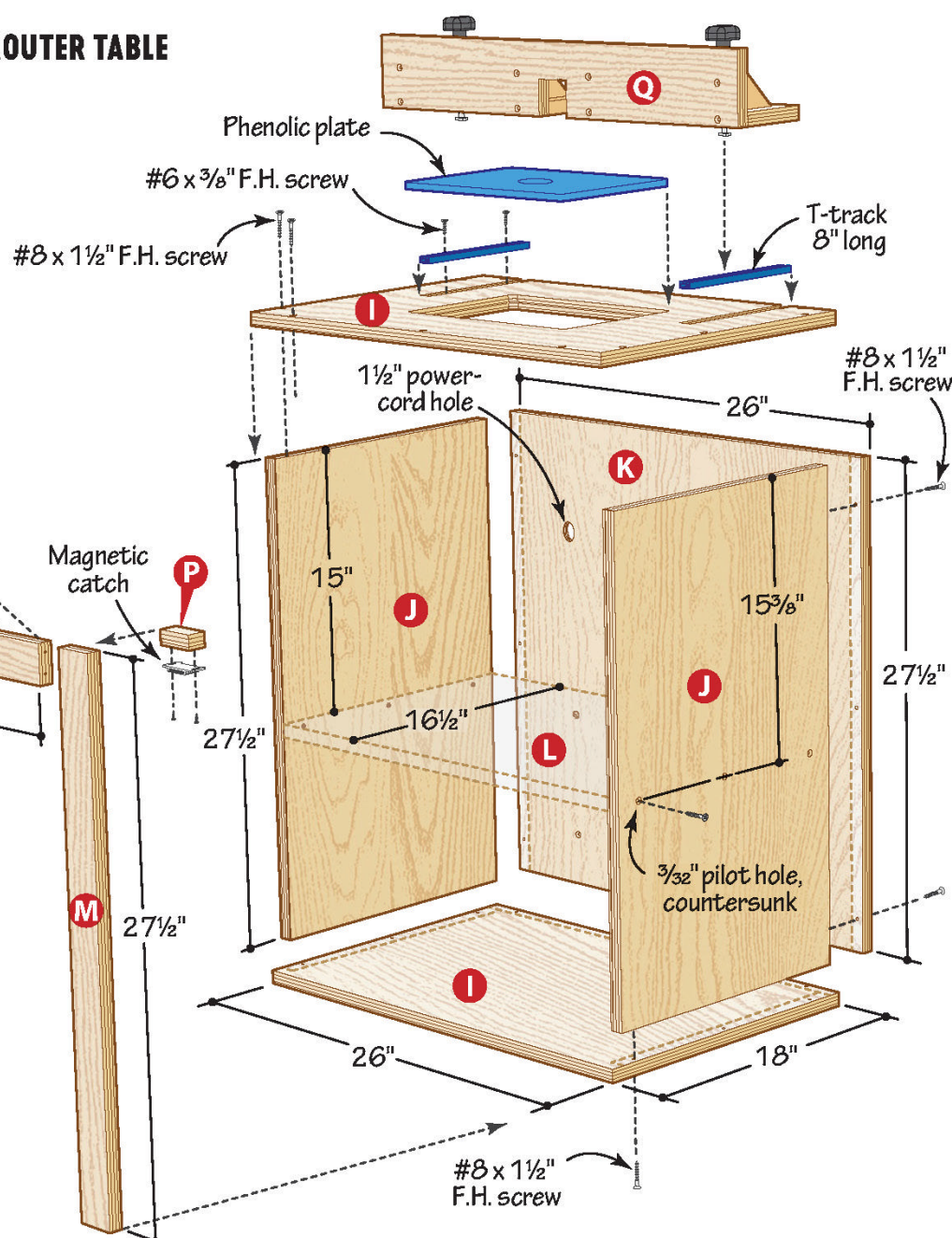


Lay out the locations of the stopped dados in the top. Clamp a straightedge in place, install a  $\frac{3}{4}$ " straight bit, and then rout the dados. Square up the ends of the dados with a chisel.

### 3a ROUTER TABLETOP



### 3 ROUTER TABLE



**6** Screw the case member of each drawer slide to the cabinet [Photo B].

**7** Attach the drawer pulls centered on the false fronts and insert the drawers into the tablesaw cabinet.

## ON TO THE ROUTER TABLE

**1** Cut the router table top/bottom (I) to size [Drawing 3] and set the bottom aside for now. Form an opening in the top of the router table [Drawing 3a] (see *Installing an Insert Plate* on page 36).

**2** Rout stopped dados sized for the fence T-track [Photo C].

**3** Cut the router table sides (J) and back (K) to size [Drawing 3], then glue and screw them together. Drill an access hole in the back for the router power cord. Glue and screw the bottom (I) to the sides and back, keeping the rear edge of the bottom flush with the outside face of the back (K).

**4** Cut the shelf (L) to size and then glue and screw the shelf to the sides and back (J/K).

### TIP!

Measure from the cutting edge of the router bit to the outside edge of the router baseplate. This is how far the straightedge should be from the stopped dado layout line.



**5** From  $\frac{3}{4}$ " plywood, cut the face-frame stiles (M) and rail (N) to size [Drawing 3]. Drill pocket holes in the rail, then glue and screw the rail to the stiles. Glue the face-frame assembly (M/N) to the cabinet (I-L). Finally, glue and screw the top (I) into place.

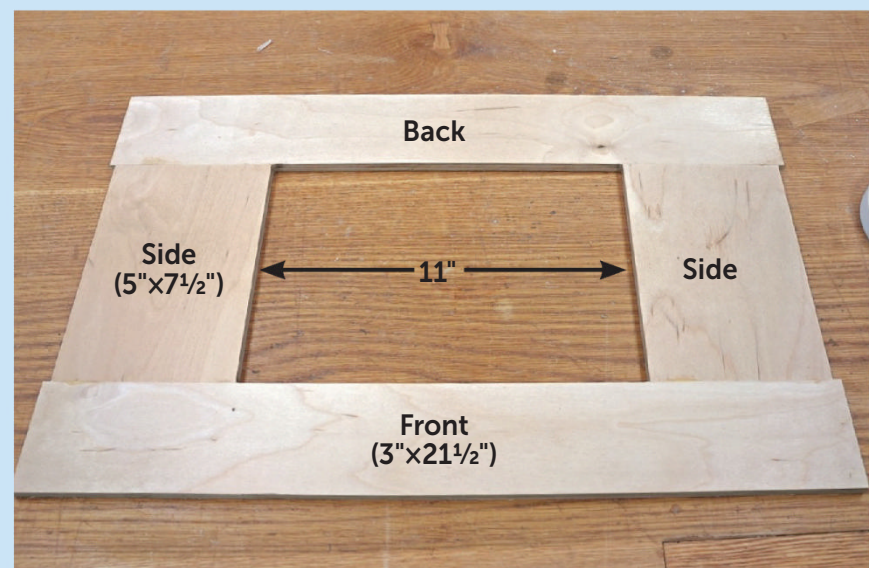
**6** Measure the opening and size the door (O) to leave a  $\frac{1}{16}$ " gap all around [Drawing 3]. Attach the hinges to the door and then to the face frame. Cut the catch block (P) to size and glue it behind the face-frame rail (N) opposite the hinges and flush with the bottom of the rail. Screw the door handle and magnetic catch into place.

## INSTALL AN INSERT PLATE

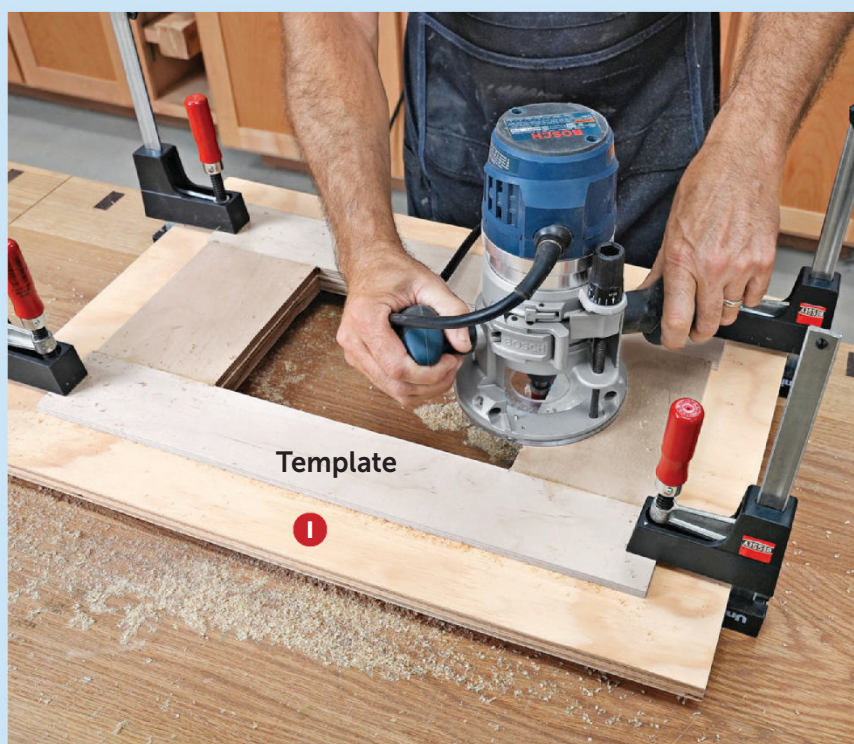
Custom-fitting an insert plate into a router tabletop takes only a pair of bits (pattern and rabbeting), a shop-built template, and a few simple steps. You'll start by sizing an opening in the top  $\frac{3}{4}$ " less in both directions than the router plate [Sources]. Lay out the opening in the router-table top [Drawing 3a] and then drill  $\frac{3}{4}$ "-diameter holes inside each corner. Remove the waste with a jigsaw, cutting  $\frac{1}{16}$ " inside the layout lines.

Next, create a template (*right*) and use it to trim the opening flush to the layout lines. Then add a rabbeted lip sized to accept the insert plate.

Check the fit. If the rabbeted opening is too small, flip the top over and re-attach the template, shifting it slightly as needed. Then re-trim the edges. If the insert plate fits loosely, install screws in the rabbeted shoulder along one side, and screw them in or out to create a snug fit for the plate.



From  $\frac{1}{4}$ " plywood, create a template to rout an opening for the insert plate. Cut the strips to size and then glue the front and back strips to the sides and allow the glue to dry.



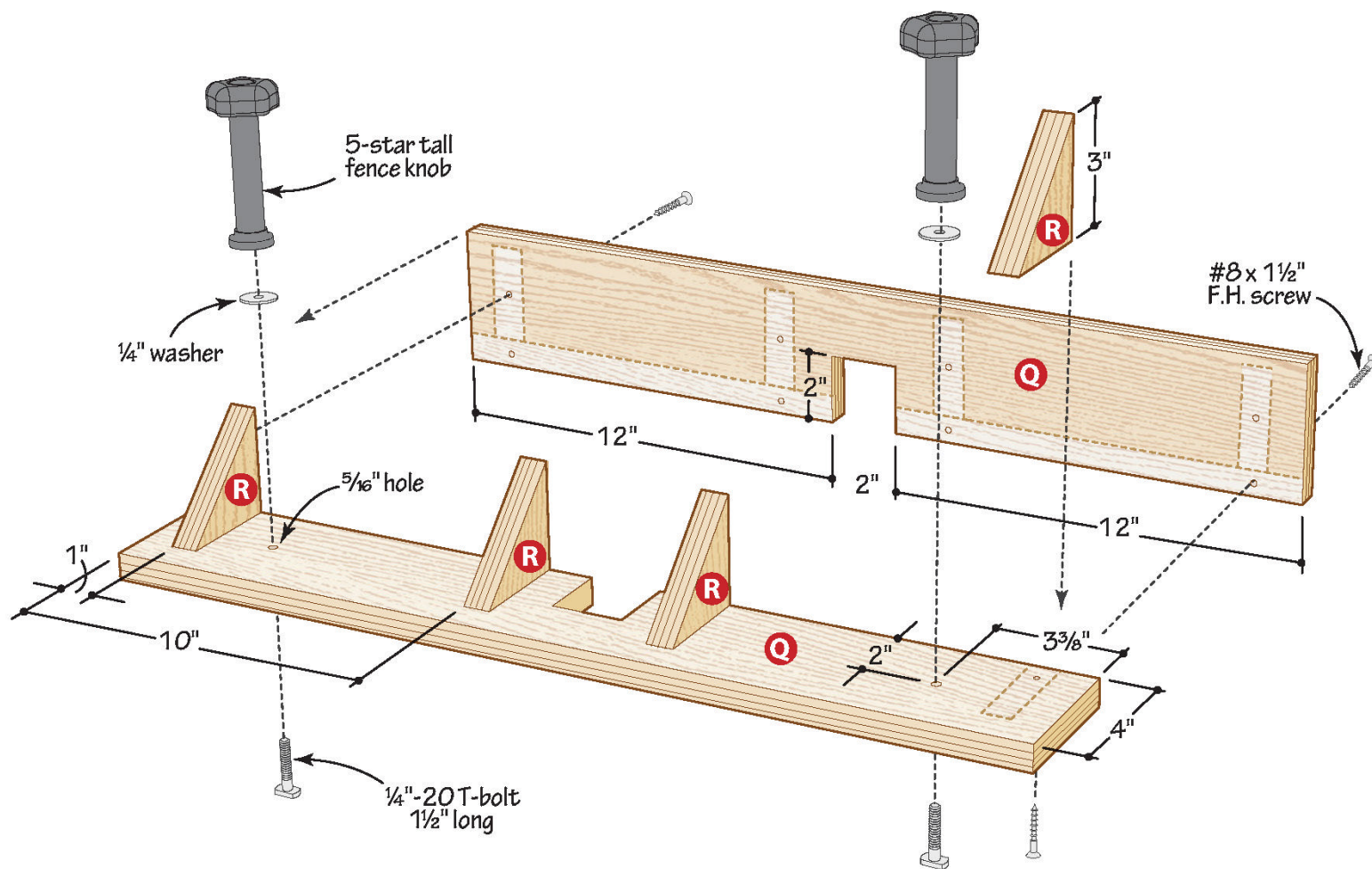
Center the template on the top (I) over the roughed out opening and clamp it in place. Rout the inside edge of the opening flush with the template using a  $\frac{3}{4}$ "-diameter pattern bit.



Remove the template and install a rabbeting bit in the router. Rabbet the top edge to form a recess that matches the thickness of the router insert plate.



## 4 ROUTER-TABLE FENCE



## ADD A SIMPLE, STURDY FENCE

- 1** Cut two pieces of T-track to length to fit the stopped dados in the top (I) **[Drawing 3]**. Screw the T-track into place.
- 2** Cut the fence face and base (Q) to size **[Drawing 4]**, then cut out centered notches in each. Use the T-track to mark the locations for the mounting holes in the base for the router fence knobs, then drill the holes. Glue and screw the face to the base.
- 3** Miter-cut a set of brackets (R) to size. Glue and screw them to the fence/base assembly.
- 4** Remove the drawers and screw the router table to the tablesaw cabinet **[Exploded View]**, flush at the bottom and along the sides.
- 5** Screw a set of casters to the bottom outside corners of the assembly, making sure the locking mechanisms are accessible. Flip the assembly onto the casters and reinstall the drawers.



Check out these tips  
for installing  
aluminum T-track.  
woodmagazine.com/  
ttracktips



## ONE CABINET TO GO



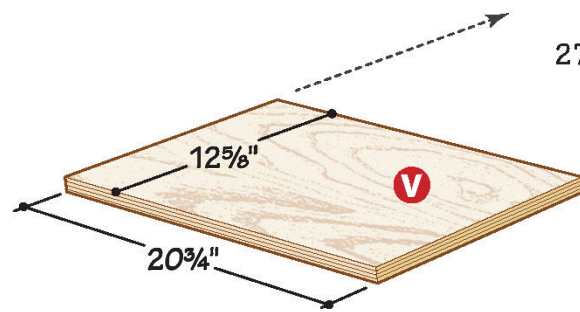
Learn how to drill shelf-pin holes quickly and accurately.

woodmagazine.com/  
fastshelfpins

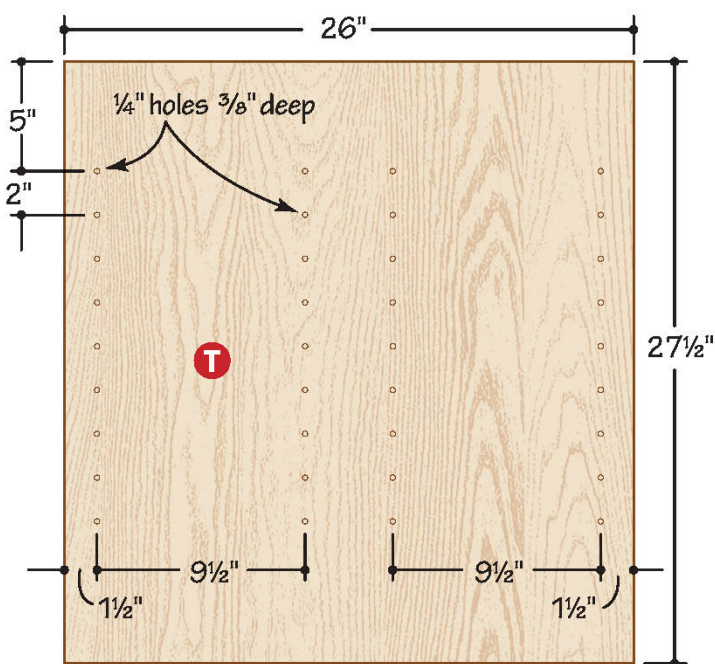
**1** Cut the top/bottom (S), sides/center (T), and divider (U) to final size [Drawing 5]. Drill shelf-pin holes in the left side and center [Drawing 5a].

**2** Glue and screw the left side, divider, and center together, making sure the shelf-pin holes face each other and the divider is centered. Next, glue and screw the assembly to the bottom, then add the remaining side and top.

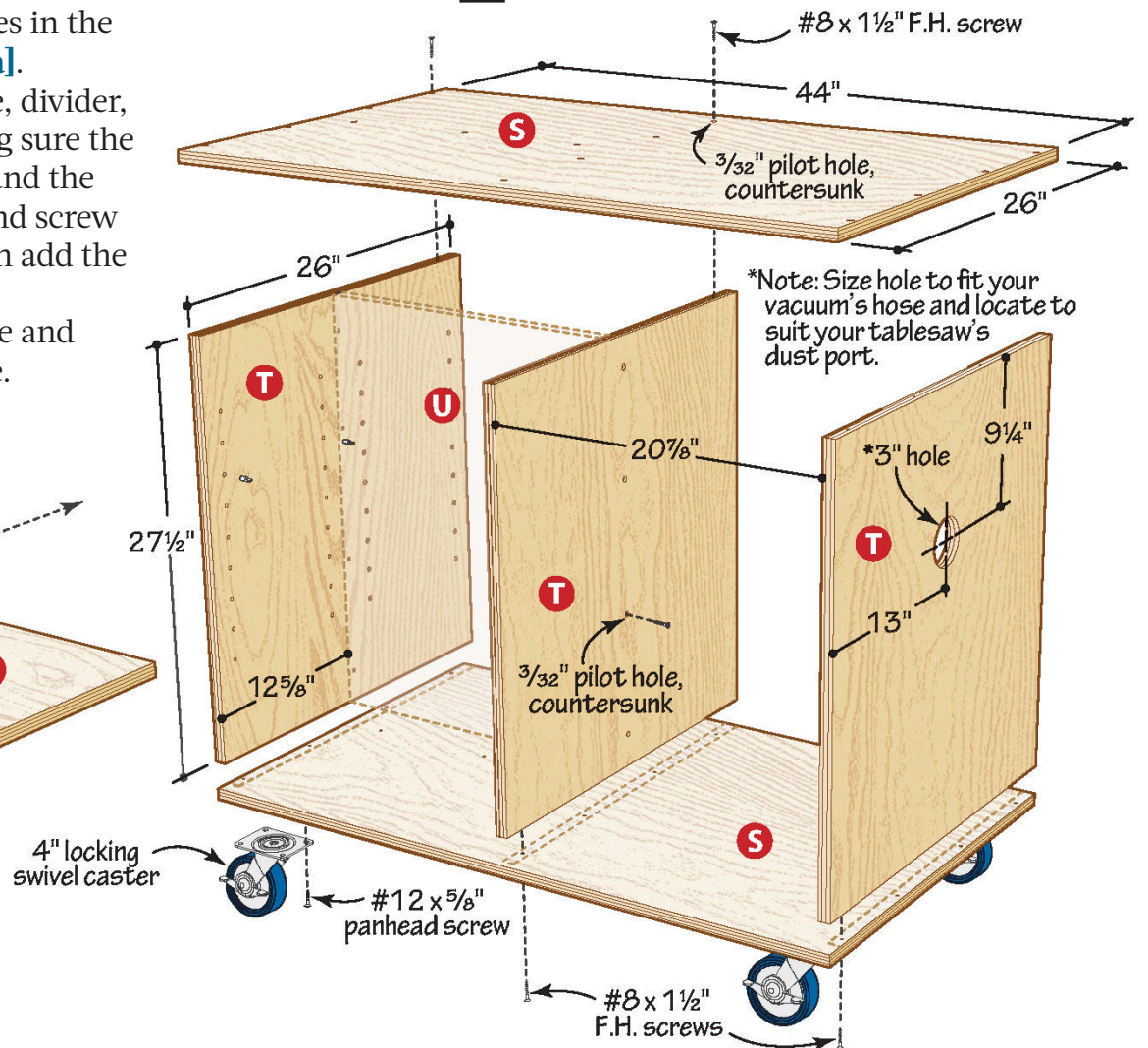
**3** Flip the assembly on its side and screw the casters into place.



**5a** OUTFEED TABLE SIDE/CENTER



**5** OUTFEED TABLE



**4** Cut the adjustable shelves (V) to size and finish-sand.

**5** If you plan to use the open bay of the outfeed table to hold a vacuum for the tablesaw, drill a hole in the side to fit the dust hose, locating it in a position convenient to your tablesaw's dust port.

**6** Disassemble as needed to finish-sand, then apply a finish. Polyurethane provides good protection for shop projects such as this.



## MOUNTING A ROUTER

If you buy an insert plate predrilled to match your router [Sources], then mounting your router to the insert plate is just a matter of screwing it into place. (You may need longer screws to accommodate the thickness of the baseplate.) If none of the predrilled plates matches your router, buy a blank plate and follow the included instructions. Or simply use your router's baseplate as a template, *left*, to locate, drill, and countersink or counterbore matching holes (be sure the baseplate is centered). Then, attach your router to the plate.



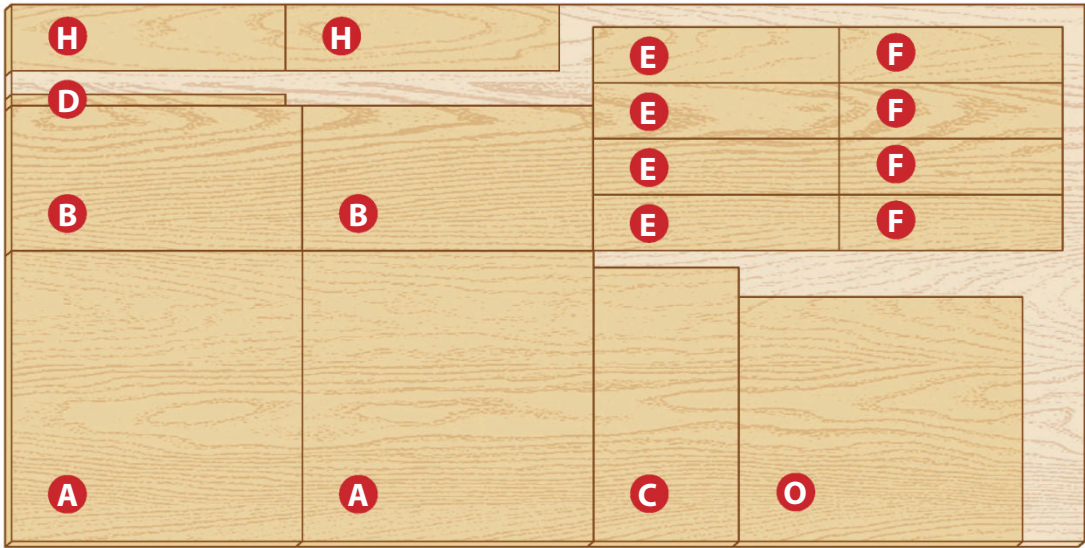
7 Reassemble everything, attach your router to the insert plate (see *Mounting a Router, previous page*), and then slip it into the router table. Add a pair of spacers (W) under the saw, thickening them to bring the top of the saw table flush with the tops of the router table and outfeed table. Your compact station is now ready to rock and roll (when you need it to)! 🌲

MATERIALS LIST

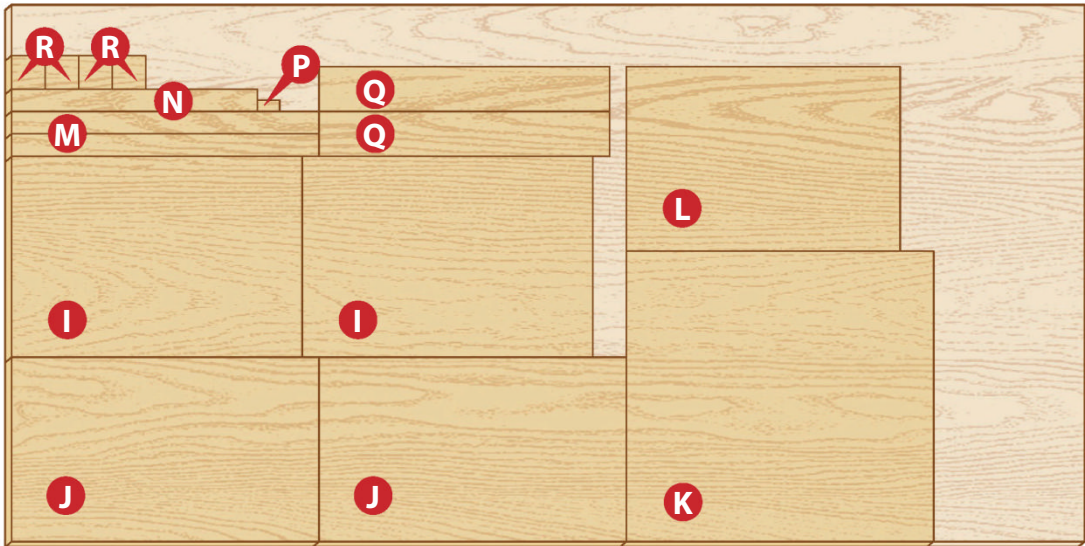
| PART             |                     | FINISHED SIZE                 |                                    |                                    | Matl. | Qty. |
|------------------|---------------------|-------------------------------|------------------------------------|------------------------------------|-------|------|
|                  |                     | T                             | W                                  | L                                  |       |      |
| TABLESAW CABINET |                     |                               |                                    |                                    |       |      |
| A                | TOP/BOTTOM          | 3/4"                          | 26"                                | 26"                                | P     | 2    |
| B                | SIDES               | 3/4"                          | 13"                                | 26"                                | P     | 2    |
| C                | BACK                | 3/4"                          | 24½"                               | 13"                                | P     | 1    |
| D                | FRONT STRETCHER     | 3/4"                          | 1"                                 | 24½"                               | P     | 1    |
| E                | DRAWER FRONTS/BACKS | 3/4"                          | 5"                                 | 21 <sup>15</sup> / <sub>16</sub> " | P     | 4    |
| F                | DRAWER SIDES        | 3/4"                          | 5"                                 | 20"                                | P     | 4    |
| G                | DRAWER BOTTOMS      | 1/4"                          | 22 <sup>11</sup> / <sub>16</sub> " | 19¼"                               | P     | 2    |
| H                | DRAWER FALSE FRONTS | 3/4"                          | 5 <sup>29</sup> / <sub>32</sub> "  | 24 <sup>3</sup> / <sub>8</sub> "   | P     | 2    |
| ROUTER TABLE     |                     |                               |                                    |                                    |       |      |
| I                | TOP/BOTTOM          | 3/4"                          | 18"                                | 26"                                | P     | 2    |
| J                | SIDES               | 3/4"                          | 16½"                               | 27½"                               | P     | 2    |
| K                | BACK                | 3/4"                          | 26"                                | 27½"                               | P     | 1    |
| L                | SHELF               | 3/4"                          | 16½"                               | 24½"                               | P     | 1    |
| M                | FACE-FRAME STILES   | 3/4"                          | 2"                                 | 27½"                               | P     | 2    |
| N                | FACE-FRAME RAIL     | 3/4"                          | 2"                                 | 22"                                | P     | 1    |
| O                | DOOR                | 3/4"                          | 21 <sup>7</sup> / <sub>8</sub> "   | 25 <sup>3</sup> / <sub>8</sub> "   | P     | 1    |
| P                | CATCH BLOCK         | 3/4"                          | 1"                                 | 2"                                 | P     | 1    |
| Q                | FENCE FACE/BASE     | 3/4"                          | 4"                                 | 26"                                | P     | 2    |
| R                | FENCE BRACKETS      | 3/4"                          | 3"                                 | 3"                                 | P     | 4    |
| OUTFEED TABLE    |                     |                               |                                    |                                    |       |      |
| S                | TOP/BOTTOM          | 3/4"                          | 26"                                | 44"                                | P     | 2    |
| T                | SIDES/CENTER        | 3/4"                          | 26"                                | 27½"                               | P     | 3    |
| U                | DIVIDER             | 3/4"                          | 20 <sup>7</sup> / <sub>8</sub> "   | 27½"                               | P     | 1    |
| V                | ADJUSTABLE SHELVES  | 3/4"                          | 12 <sup>5</sup> / <sub>8</sub> "   | 20 <sup>3</sup> / <sub>4</sub> "   | P     | 4    |
| W                | TABLESAW SPACERS    | Size/material to fit your saw |                                    |                                    |       | 2    |

**MATERIALS KEY:** P-Pine plywood.  
**SUPPLIES:** #6x3/8" flathead screws, #8x1 1/2" flathead screws, 1/4" washers, #12x5/8" panhead screws, pocket-hole screws.  
**BITS:** 3/8" rabbeting router bit, 3/4x1" pattern router bit, 3/4" straight bit.  
**SOURCES:** 4" heavy-duty polyurethane casters no. 84718 (8), \$13.99 each; 2" universal T-track no. 22104, \$10.99; 5-star tall fence knobs no. 58063, \$10.99 pair; 1/4"-20 T-bolts (5 pack) no. 38002, \$6.99; phenolic router plate no. 56845, \$69.99 (Note: This is a generic, undrilled plate; plates drilled to match specific routers are available.); 20" full-extension drawer slides no. 65669 (2 pairs), \$20.99 pair; shelf pins no. 22773, \$6.99 (16 pack); narrow profile magnetic catch no. 26559, \$4.49; satin nickel pull no. 1007320 (3), \$2.11 each; satin nickel ball-tip full back-to-back wrap-around hinges no. 27505 (1 pair), \$10.99 pair, Rockler, 800-279-4441, rockler.com.  
**PROJECT COST:** It cost us about \$500 to build this project. Your cost will vary by region and source.

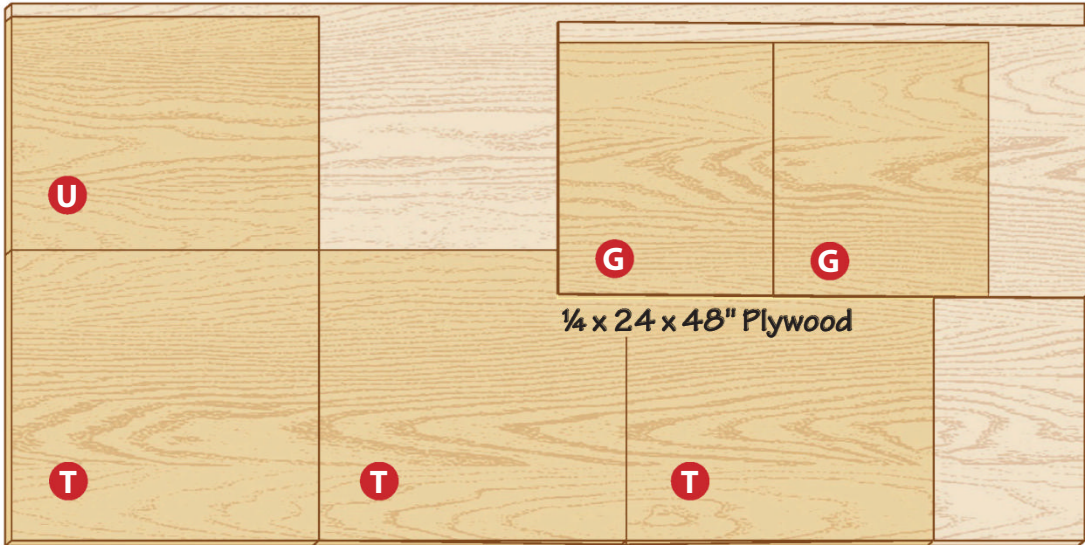
CUTTING DIAGRAM



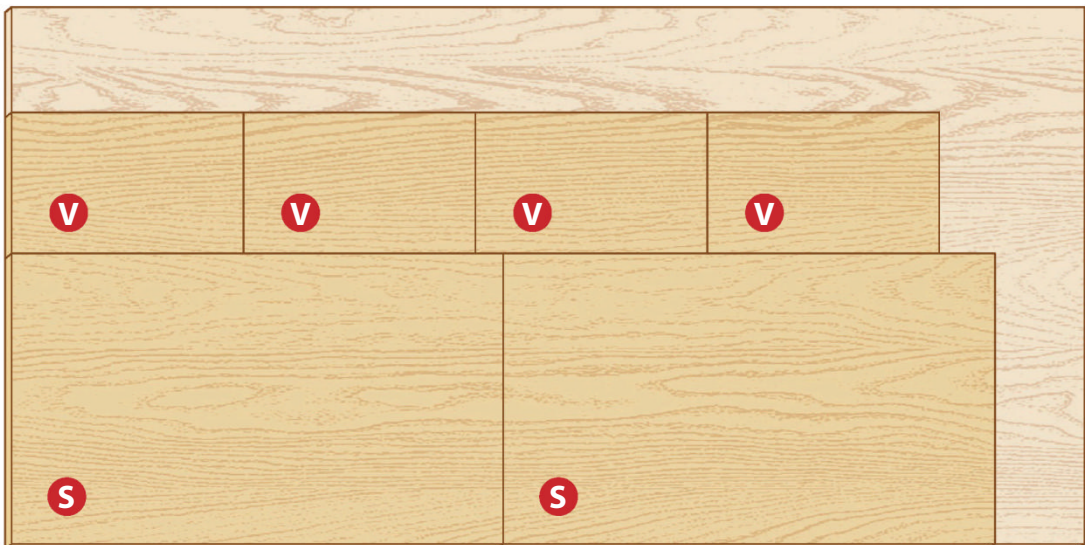
3/4 x 48 x 96" Plywood



3/4 x 48 x 96" Plywood



3/4 x 48 x 96" Plywood



3/4 x 48 x 96" Plywood



# STEP-BACK (IN TIME) BOOKCASE

Solid-wood construction, dovetail joinery,  
and period hardware all come together  
in this traditional-looking case.

WRITER: VINCE ANCONA  
DESIGNER/BUILDER: JOHN OLSON



OVERALL DIMENSIONS  
22¼"W x 12½"D x 51½"H



Small bookcases were once common in most homes. Placed next to an easy chair and reading lamp, they were an ideal way to store your favorite books within arm's reach. Although books now compete for our attention with all sorts of electronic devices, there's still a "case" to be made for having a furniture piece like this one.

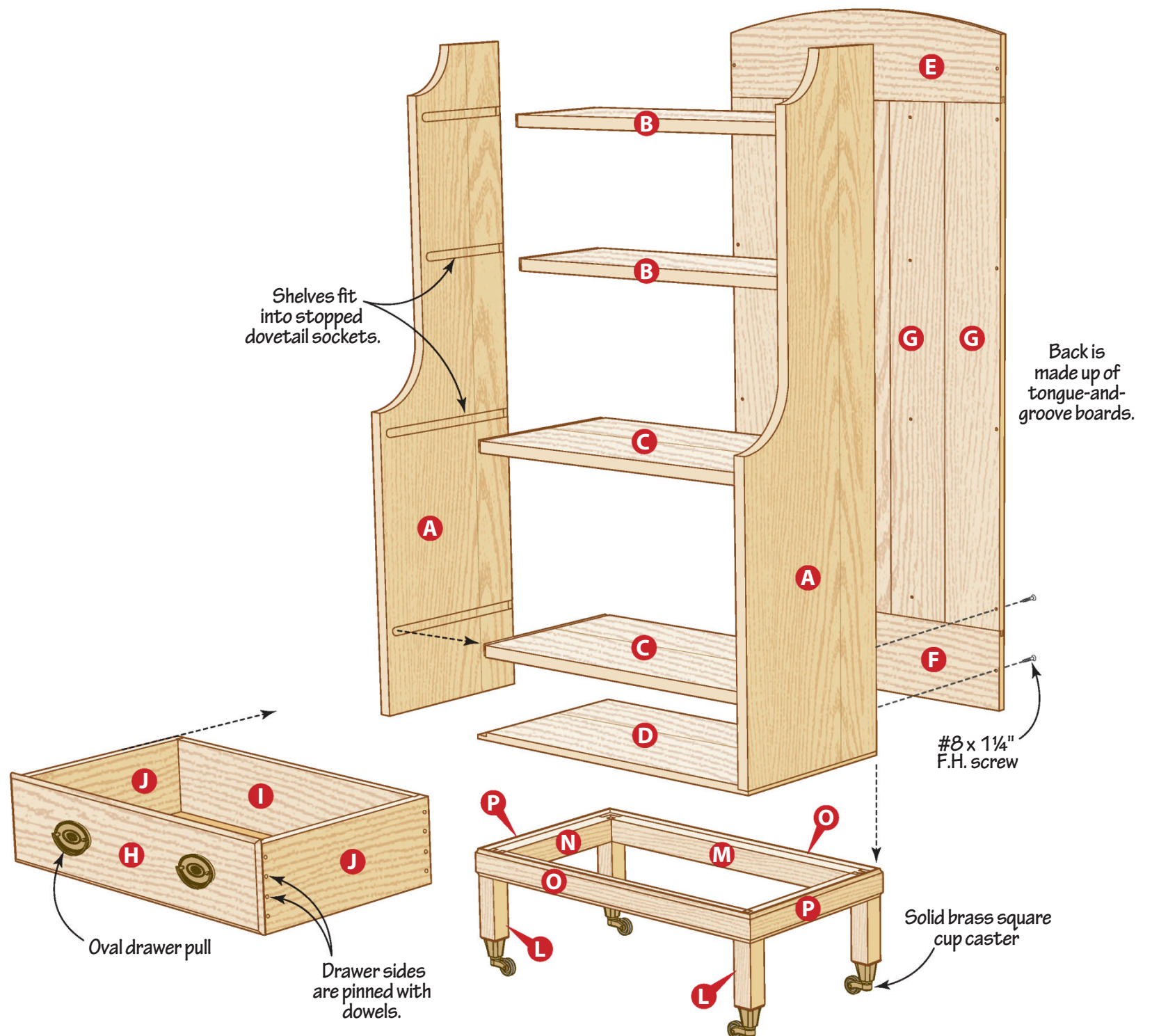
## BUILD A STRONG CASE

Sliding dovetail joints connect the shelves to the sides of the bookcase. A jig aids in routing the sockets in the sides, while the router table makes quick work of creating the sliding dovetails on the shelves.

**1** Glue up solid-wood panels for the sides (A), narrow shelves (B), wide shelves (C), and bottom (D) of the bookcase [Materials List, Drawing 1].



### EXPLODED VIEW





# WHAT IS AVAXHOME?



# AVAXHOME-

the biggest Internet portal,  
providing you various content:  
brand new books, trending movies,  
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recent software, latest music releases.

Unlimited satisfaction one low price

Cheap constant access to piping hot media

Protect your downloadings from Big brother

Safer, than torrent-trackers

18 years of seamless operation and our users' satisfaction

All languages

Brand new content

One site

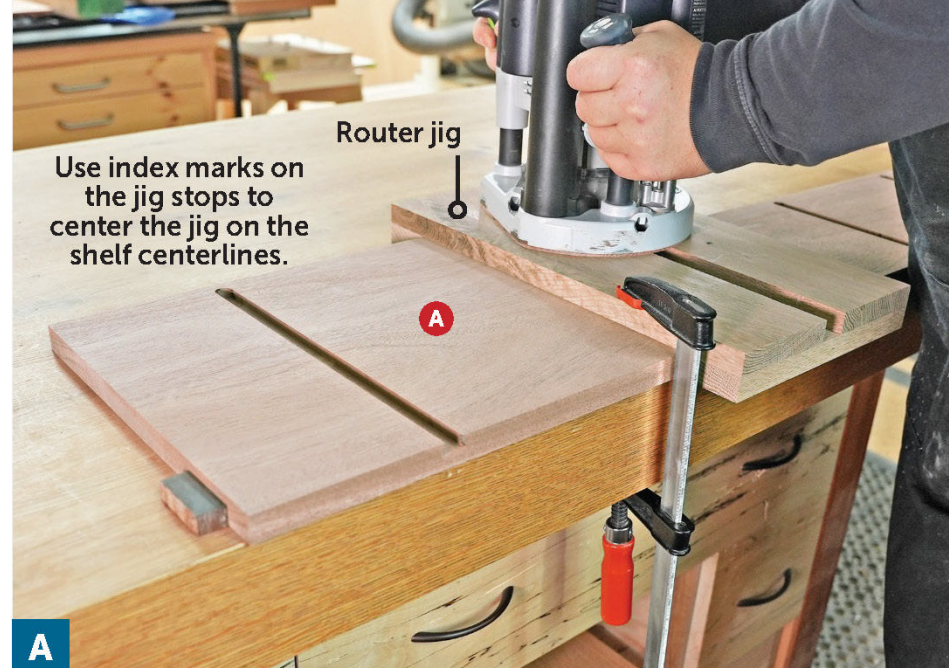
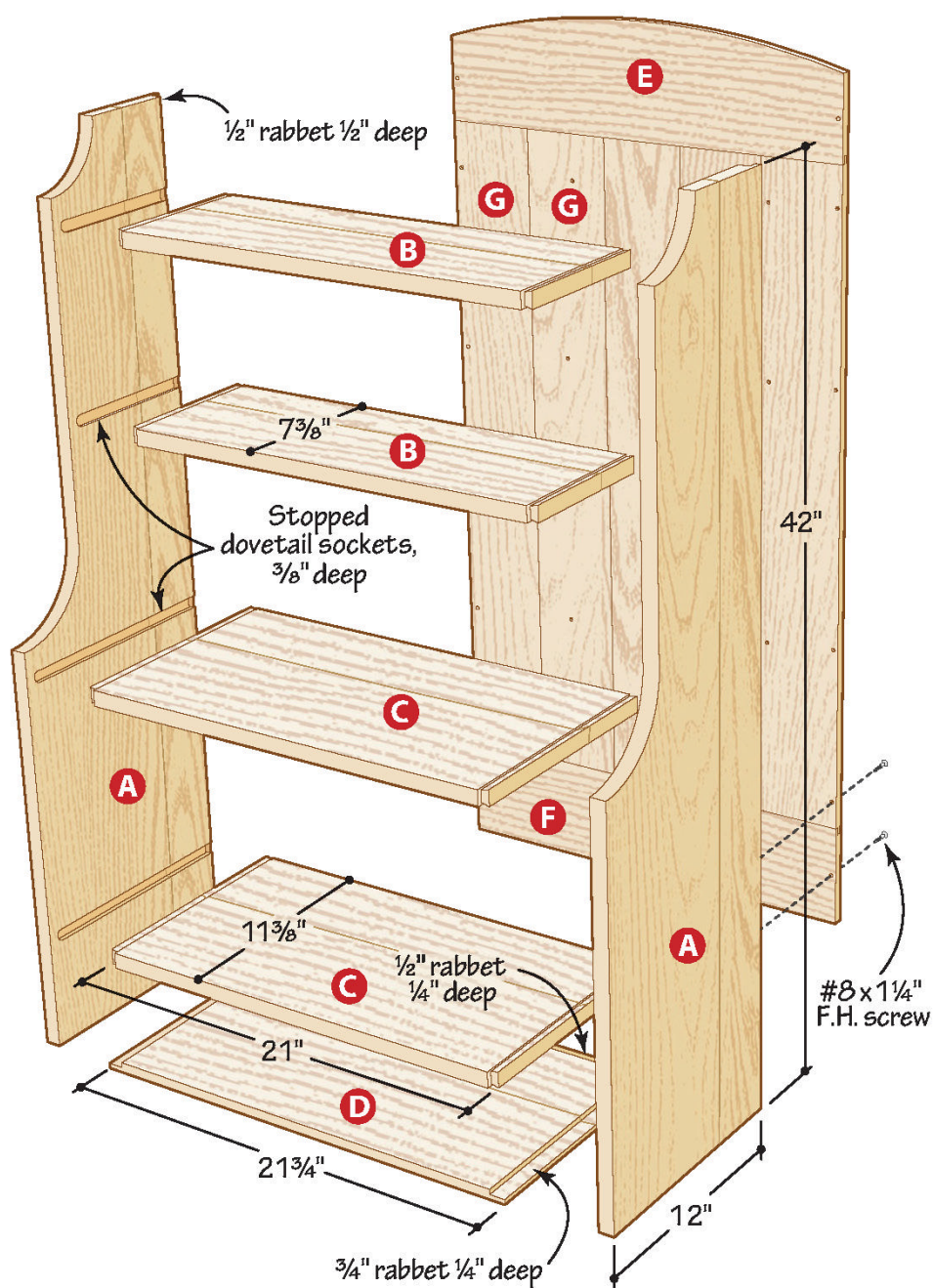
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## 1 CASE EXPLODED VIEW



Using the router jig along with a 1/2" spiral upcut bit and 1"-diameter guide bushing, rout stopped dados to remove the bulk of the waste for what will become the dovetail slots.

**2** Cut the sides (A) to overall size, then lay out the step-back and curves [Drawing 2]. Rough-cut the curves using a jigsaw, then make the stopped, straight cut at the tablesaw.

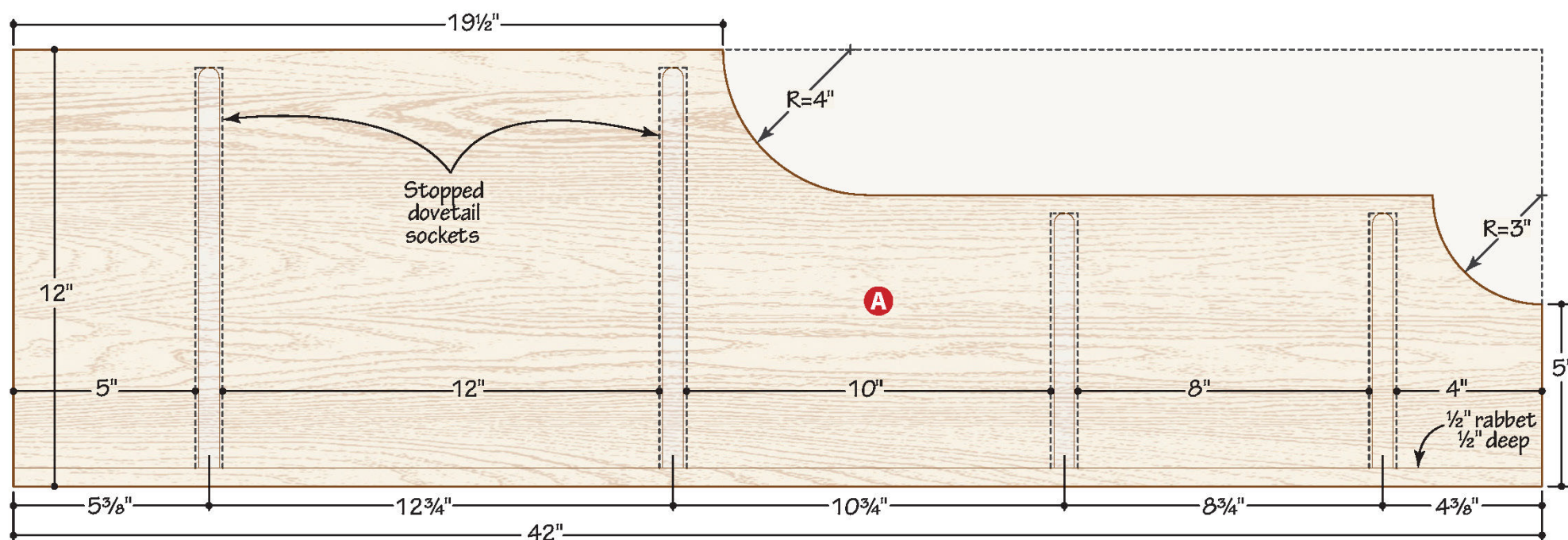
**3** Gang the two sides together using double-faced tape and sand the curves smooth. Separate the sides and lay out the centerlines for the shelf locations on the inside face of both pieces.

**4** Make the jig shown in Drawing 3, then use it to rout stopped dados in the sides (A) at each shelf location to remove the bulk of the waste [Photos A, B]. Then follow this up with a dovetail bit to complete the sockets for the sliding dovetails [Photo C].

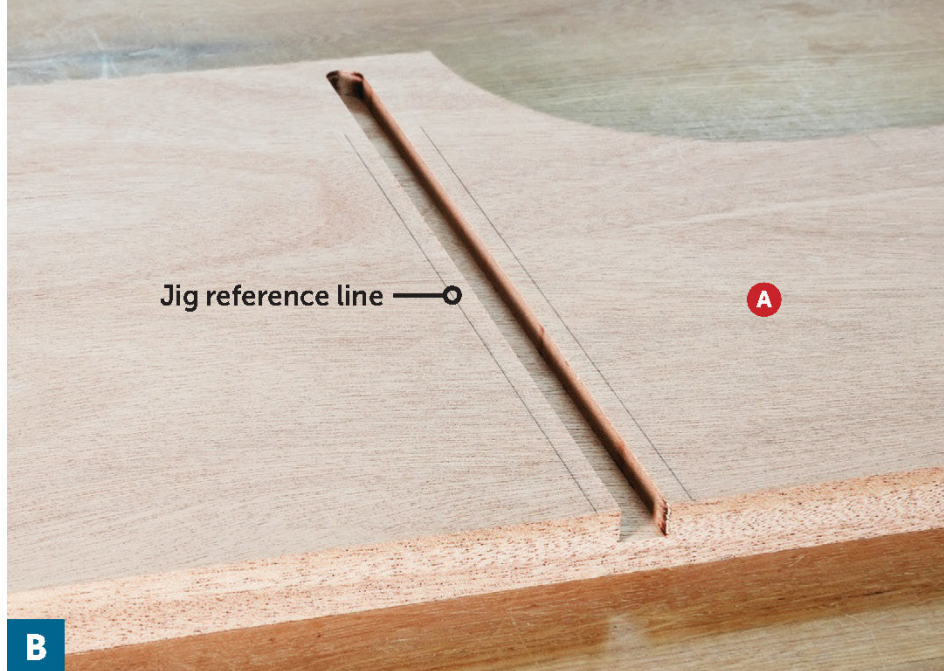
**5** Cut the narrow and wide shelves (B, C) to finished size. Install the dovetail bit in the router table, setting the bit height to match the depth of the sockets in the sides. Rout the sliding dovetails on the ends of the shelves [Photo D, Drawing 1].

**Note:** Use the base router jig when routing the sockets for the wide shelves (C). Include the narrow shelf filler when routing the sockets for the narrow shelves (B).

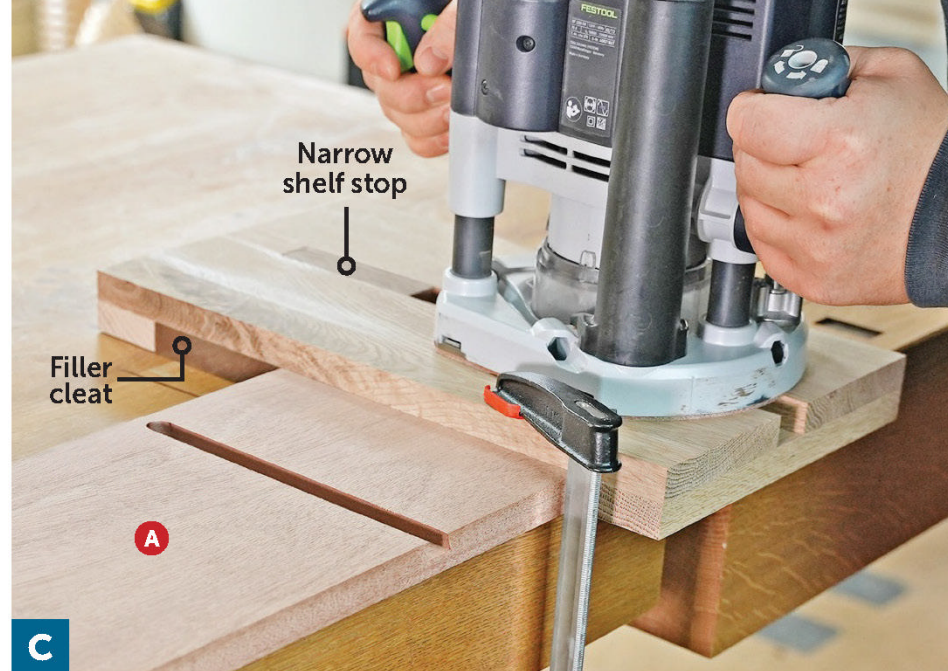
## 2 SIDE







Before removing the jig to rout the next dado, scribe lines along the edges of the opening of the jig to aid in repositioning it later when routing the dovetail slots.



Using a  $\frac{3}{4}$ " dovetail bit and the same guide bushing, rout the  $\frac{3}{8}$ "-deep dovetail sockets. Use the narrow-shelf filler with the jig when routing the sockets for the narrow shelves.

**6** Using a dado blade partially buried in an auxiliary fence, rabbet the back inside edge of each case side [Drawing 1].

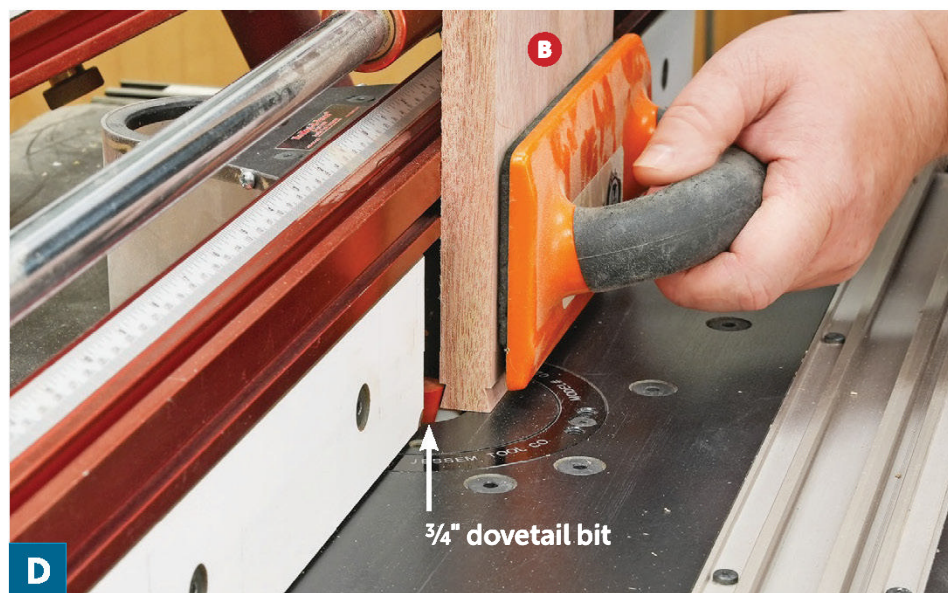
**7** Notch the front corners of each shelf [Drawing 4] so that when they are installed in the dovetails, the back edge lines up with the rabbets in the sides.

### TIP!

Avoid excess squeeze-out by applying glue only to the back half of each socket.

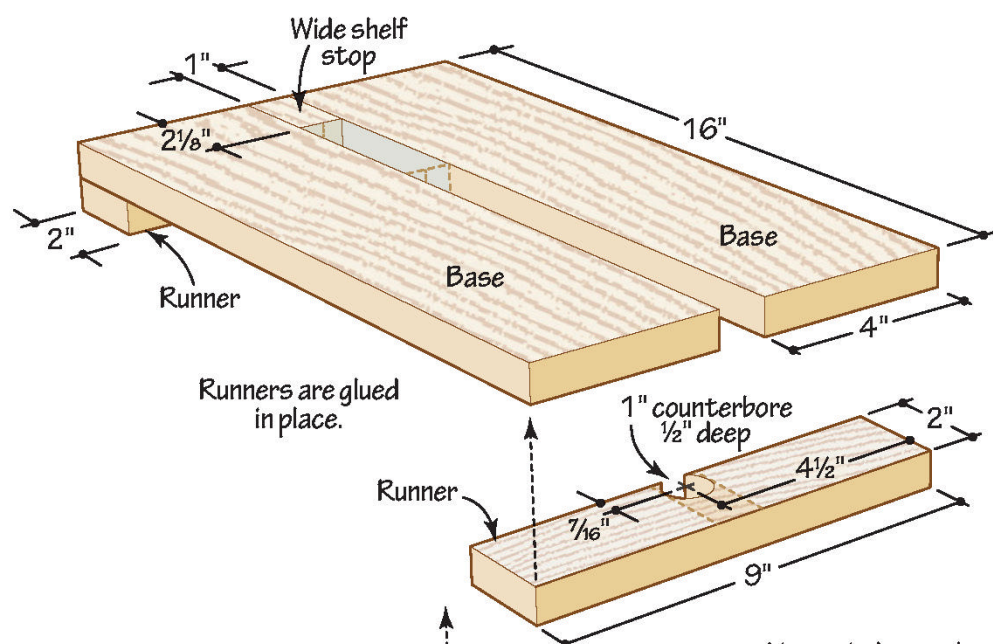
**8** Starting at the bottom of the case, glue and clamp the lower wide shelf between the sides. Then add the other wide shelf, followed by the narrow shelves.

**9** Measure the case's width and cut the bottom (D) to final size. Then, using a dado blade, rabbet the ends and back edge [Drawing 1].

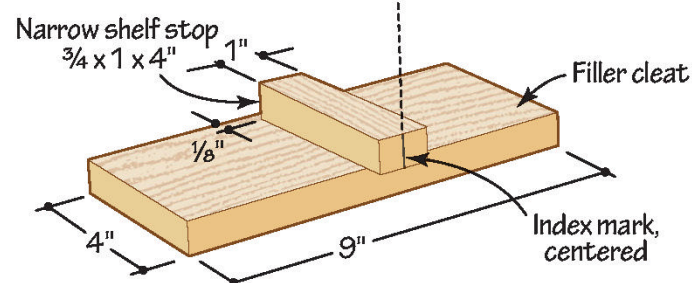


Using the same dovetail bit, rout a dovetail on both ends of the shelves (B, C), sneaking up on the final thickness of the dovetail for a sliding fit with the sockets in the sides (A).

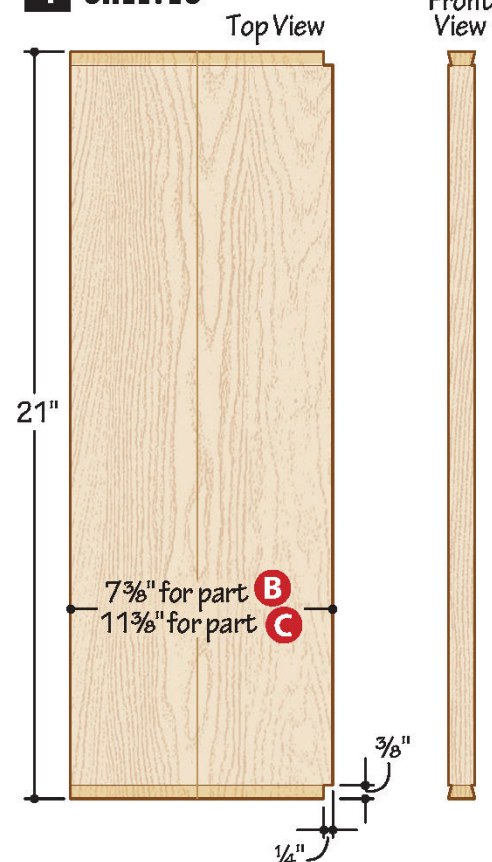
## 3 ROUTER JIG EXPLODED VIEW



### 3a NARROW-SHELF FILLER



## 4 SHELVES



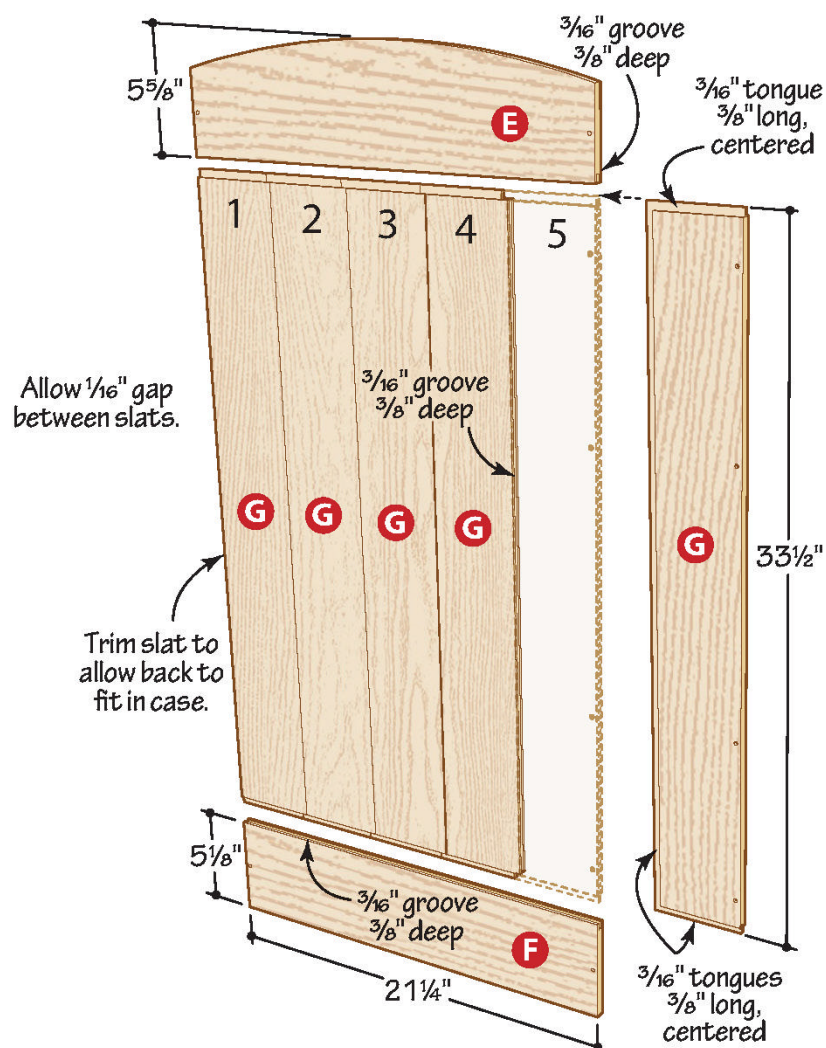


## BACK THAT CASE UP

Tongue-and-groove boards make up the back of the bookcase. Start by planing the stock for the aprons and back slats to  $\frac{1}{2}$ ".

- 1 Cut the upper (E) and lower (F) aprons and back slats (G) to overall size [Materials List, Drawings 5 and 5a].

### 5 BACK ASSEMBLY



- 2 Lay the back slats out on your bench in the order they will be installed in the case. From left to right, number each slat to maintain the order. Using a flat-grind rip blade, cut a centered  $\frac{3}{16}$ "-wide groove on one edge of each apron and one edge of back slats 1 through 4.

- 3 Install a dado blade in your saw and cut centered tongues on both ends of all five back slats. Then cut a tongue along one edge of slats 2 through 5.

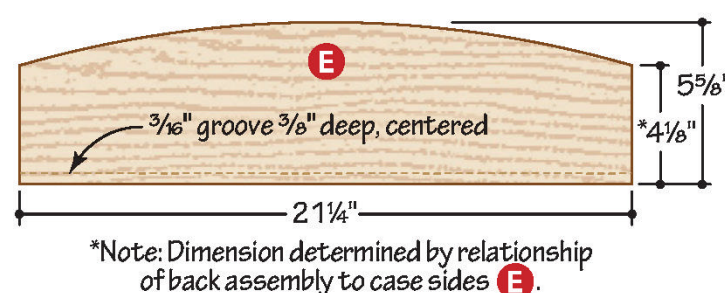
- 4 To fit all five slats in the case, you'll have to rip slat number 1 down in width. (We ripped our slat down to  $4\frac{1}{4}$ ", which allows for a  $\frac{1}{16}$ " gap between the slats for wood movement.)

- 5 Dry-fit the back assembly into the case. Mark the top end of the case sides (A) on the upper apron (E). Using these endpoints, lay out the curve on the upper apron. Cut and sand the curve to shape. Set the parts for the back assembly aside for now while you complete the rest of the bookcase.

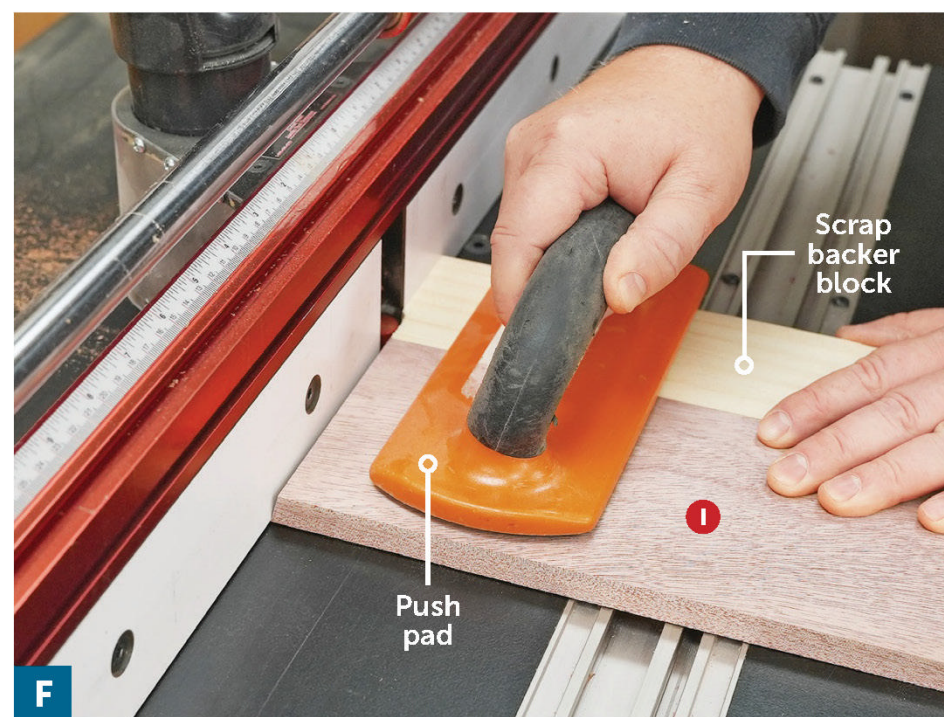


Watch a video on using a fairing stick to lay out a curve.  
woodmagazine.com/perfectcurves

### 5a UPPER APRON



Position the router-table fence so the dovetail bit just kisses the corner of the workpiece. Cut a dovetail at each end of the drawer sides (J), but on the inside face only.



Bevel the ends of the drawer back, backing up the cut to prevent tearout. Hold the workpiece firmly with a push pad to prevent it from wedging under the bottom edge of the fence.



## ADD A DRAWER

**1** Cut the drawer front (H), back (I), and sides (J) to size, noting the thickness of each piece [Drawing 6, Materials List].

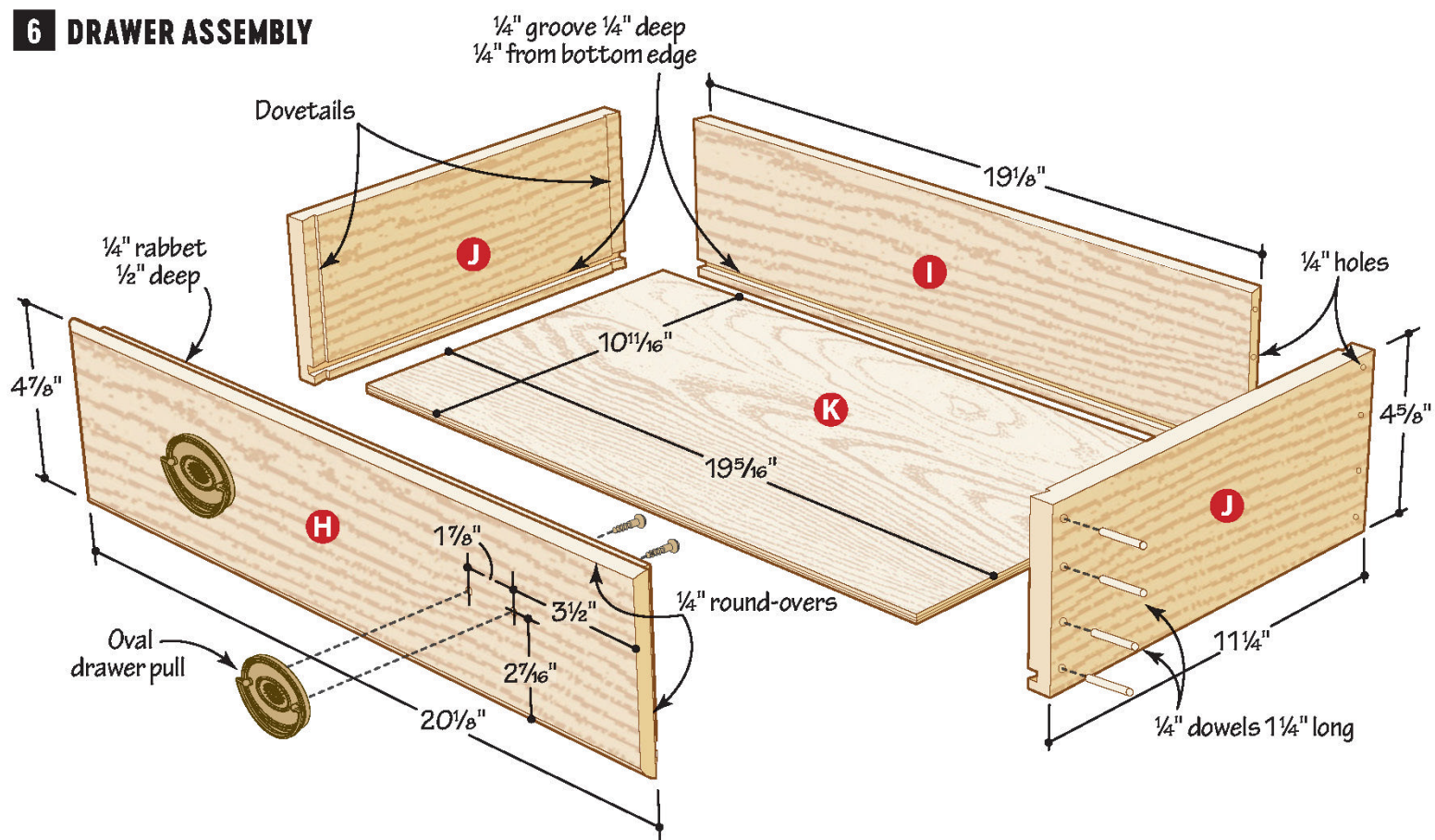
**2** With the  $\frac{3}{4}$ " dovetail bit still installed in your router table, set its height to match the thickness of the drawer back (I). Rout a shallow dovetail on the inside face at both ends of the drawer sides (J) [Photo E, Drawing 6a].

**3** Without changing the bit or fence settings, bevel the ends of the drawer back (I) [Photo F, Drawing 6a].

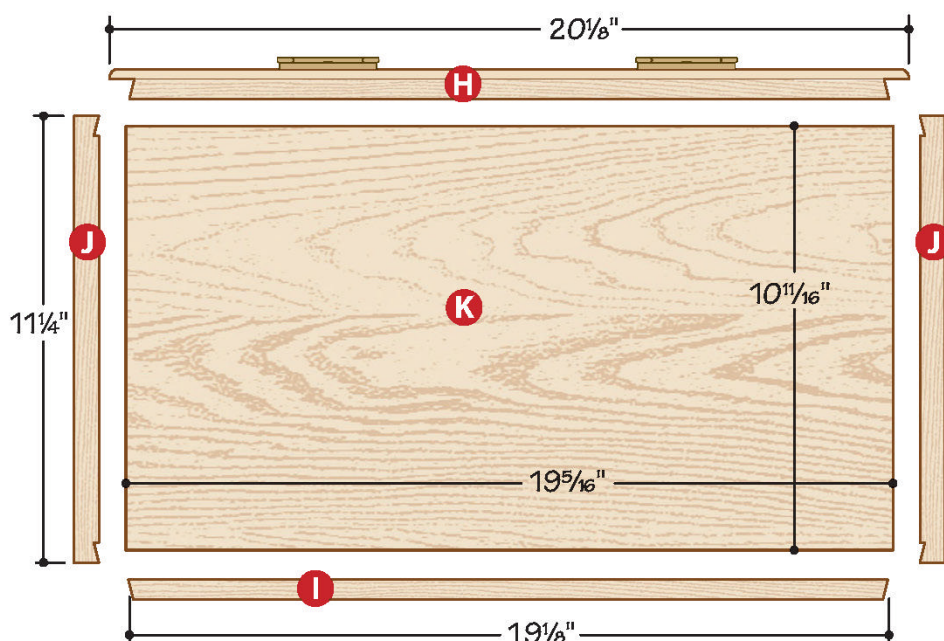


Position the router-table fence to expose  $\frac{5}{8}$ " of the router bit, then rout a rabbeted dovetail on each end of the drawer front (H).

## 6 DRAWER ASSEMBLY



### 6a DRAWER



**4** Without changing the bit height, adjust the router-table fence to cut a rabbeted dovetail on the ends of the drawer front (H) [Photo G, Drawing 6a].

**5** At the tablesaw, cut a rabbet on the top inside edge of the drawer front (H) [Drawing 6].

**6** Cut a  $\frac{1}{4}$ " groove near the bottom edge of the inside face of the drawer front, back, and sides. Cut the drawer bottom (K) to size. Finish-sand all the drawer parts, then glue and clamp the drawer box.

**7** After the glue dries, drill  $\frac{1}{4}$ " holes through the drawer sides into the ends of the drawer front and back [Drawing 6]. Glue dowels in the holes and trim them flush. Round over the front edges and ends of the drawer front.





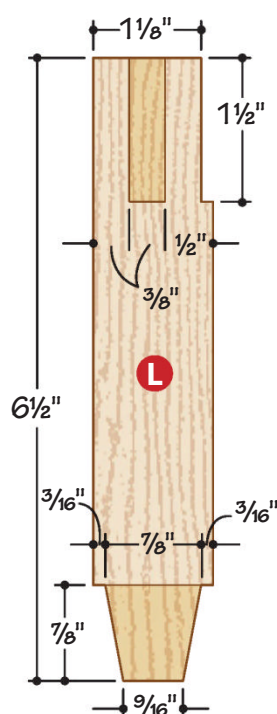
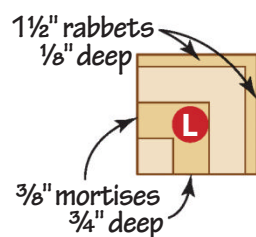
**H** Using a  $\frac{3}{8}$ "-diameter spiral upcut bit, rout the first mortise in all four legs (L). Then reposition the fence to rout the second mortise.



**I** With a stop block clamped to the miter-gauge fence, cut  $\frac{3}{16}$ "-deep shoulders on all four faces of the legs (L) to create the tapered feet.

## DO SOME LEG LIFTS

### 7 LEG



**1** Cut four blanks for the legs (L) to size [Drawing 7]. Lay out the mortise locations. Rout away the bulk of the waste for the mortises at the router table [Photo H], then square up the ends of the mortises with a chisel.

**2** Lay out the tapered foot on the end of each leg to match the cup casters [Drawing 7]. Make the angled cuts at the bandsaw, then cut the shoulders at the tablesaw [Photo I].

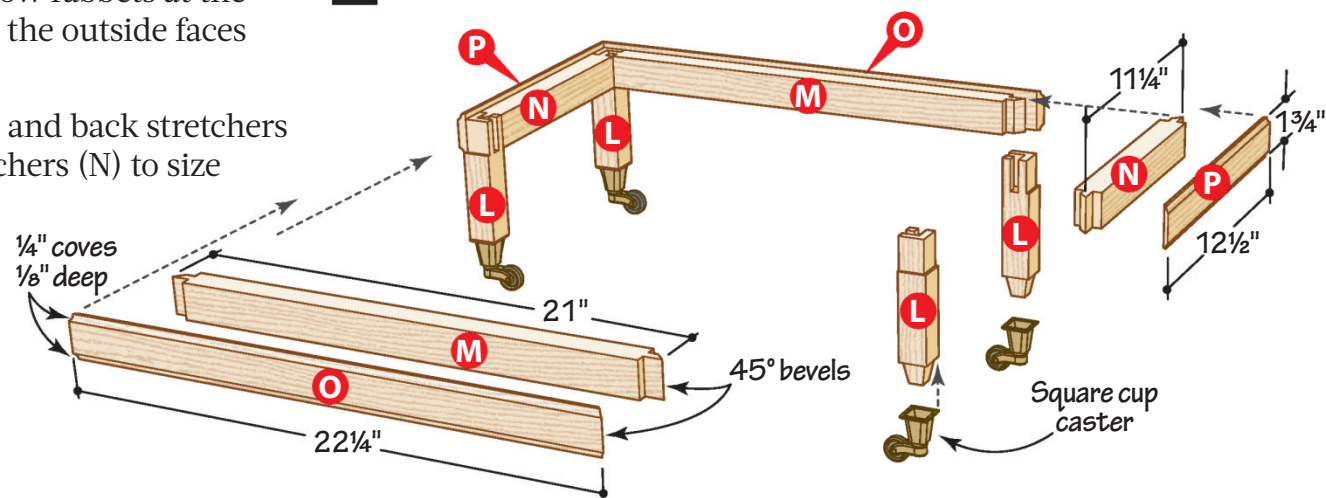
**3** Cut a pair of shallow rabbets at the top of each leg on the outside faces [Drawing 7].

**4** Cut the base front and back stretchers (M) and side stretchers (N) to size [Drawing 8] and cut tenons on the ends [Drawing 8a]. Miter-cut the end of each tenon at 45°. Dry-assemble the

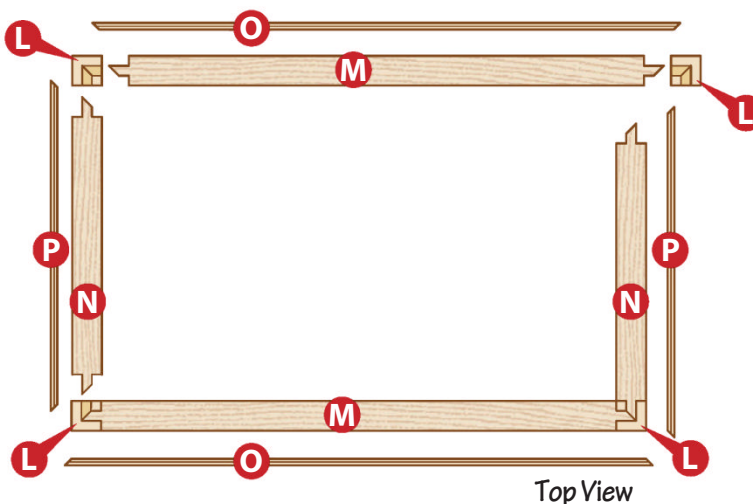
base parts to check the fit, then glue and clamp the base assembly.

**5** Cut the front and back base trim (O) and side base trim (P) to width and then miter-cut the pieces to length to fit around the base assembly [Drawings 8 and 8b]. Rout a cove along both edges of all four base trim pieces. Glue the base trim to the base assembly, flush with the bottom edge of the stretchers [Photo J].

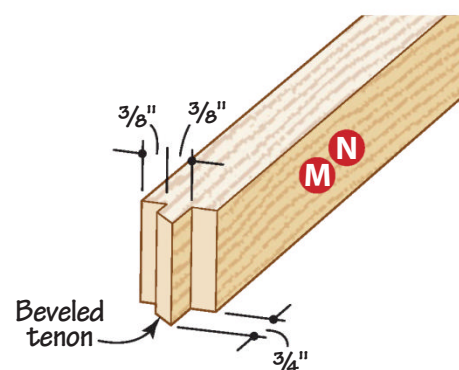
### 8 BASE



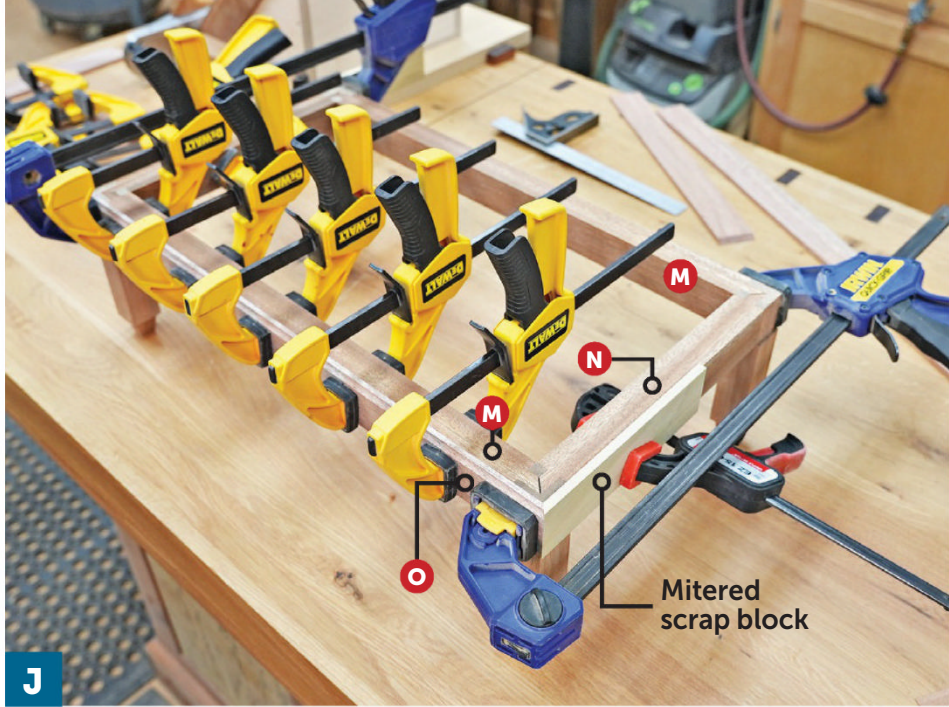
### 8b BASE



### 8a TENON DETAIL







Glue the base trim (O, P) to the base one piece at a time, using a mitered scrap block to position the first piece.

## COMPLETE THE FINAL CHAPTER

**1** Finish-sand all the assemblies to 220-grit and apply a stain. (We used Old Masters Rich Mahogany.) With the stain dry, apply a seal coat of dewaxed shellac followed by three coats of lacquer or polyurethane.

**2** Attach the back assembly to the case by driving screws through the back into the rabbets in the sides and back edges of the shelves.

**3** Apply a dab of epoxy to the bottom of each leg (L) and mount the cup casters using the included screws. Set the bookcase on the base.

**4** Drill holes in the drawer front (H) for the pulls and mount the hardware. Slide the drawer into its opening. After gently wheeling the bookcase to its designated spot, fill the shelves with your favorite woodworking books. 📖

## MATERIALS LIST

| PART      |                       | FINISHED SIZE |           |          | Matl. | Qty. |
|-----------|-----------------------|---------------|-----------|----------|-------|------|
|           |                       | T             | W         | L        |       |      |
| <b>A</b>  | SIDES                 | 3/4"          | 12"       | 42"      | AM    | 2    |
| <b>B</b>  | NARROW SHELVES        | 3/4"          | 7 3/8"    | 21"      | AM    | 2    |
| <b>C</b>  | WIDE SHELVES          | 3/4"          | 11 3/8"   | 21"      | AM    | 2    |
| <b>D</b>  | BOTTOM                | 1/2"          | 12"       | 21 3/4"  | AM    | 1    |
| <b>E</b>  | UPPER APRON           | 1/2"          | 5 5/8"    | 21 1/4"  | AM    | 1    |
| <b>F</b>  | LOWER APRON           | 1/2"          | 5 1/8"    | 21 1/4"  | AM    | 1    |
| <b>G</b>  | BACK SLATS            | 1/2"          | 4 9/16"   | 33 1/2"  | AM    | 5    |
| <b>H</b>  | DRAWER FRONT          | 3/4"          | 47/8"     | 20 3/8"  | AM    | 1    |
| <b>I</b>  | DRAWER BACK           | 1/2"          | 4 5/8"    | 19 1/8"  | AM    | 1    |
| <b>J</b>  | DRAWER SIDES          | 5/8"          | 4 5/8"    | 11 1/4"  | AM    | 2    |
| <b>K</b>  | DRAWER BOTTOM         | 1/4"          | 10 11/16" | 19 5/16" | MP    | 1    |
| <b>L</b>  | LEGS                  | 1 1/4"        | 1 1/4"    | 6 1/2"   | AM    | 4    |
| <b>M</b>  | FRONT/BACK STRETCHERS | 1 1/8"        | 1 1/2"    | 21"      | AM    | 2    |
| <b>N</b>  | SIDE STRETCHERS       | 1 1/8"        | 1 1/2"    | 11 1/4"  | AM    | 2    |
| <b>O*</b> | FRONT/BACK TRIM       | 1/4"          | 1 3/4"    | 22 3/4"  | AM    | 2    |
| <b>P*</b> | SIDE TRIM             | 1/4"          | 1 3/4"    | 12 1/2"  | AM    | 2    |

\*Parts initially cut oversize. See the instructions.

**MATERIALS KEY:** AM—African mahogany, MP—maple plywood.

**SUPPLIES:** #8x1 1/4" flathead screws, 1/4" birch dowel stock.

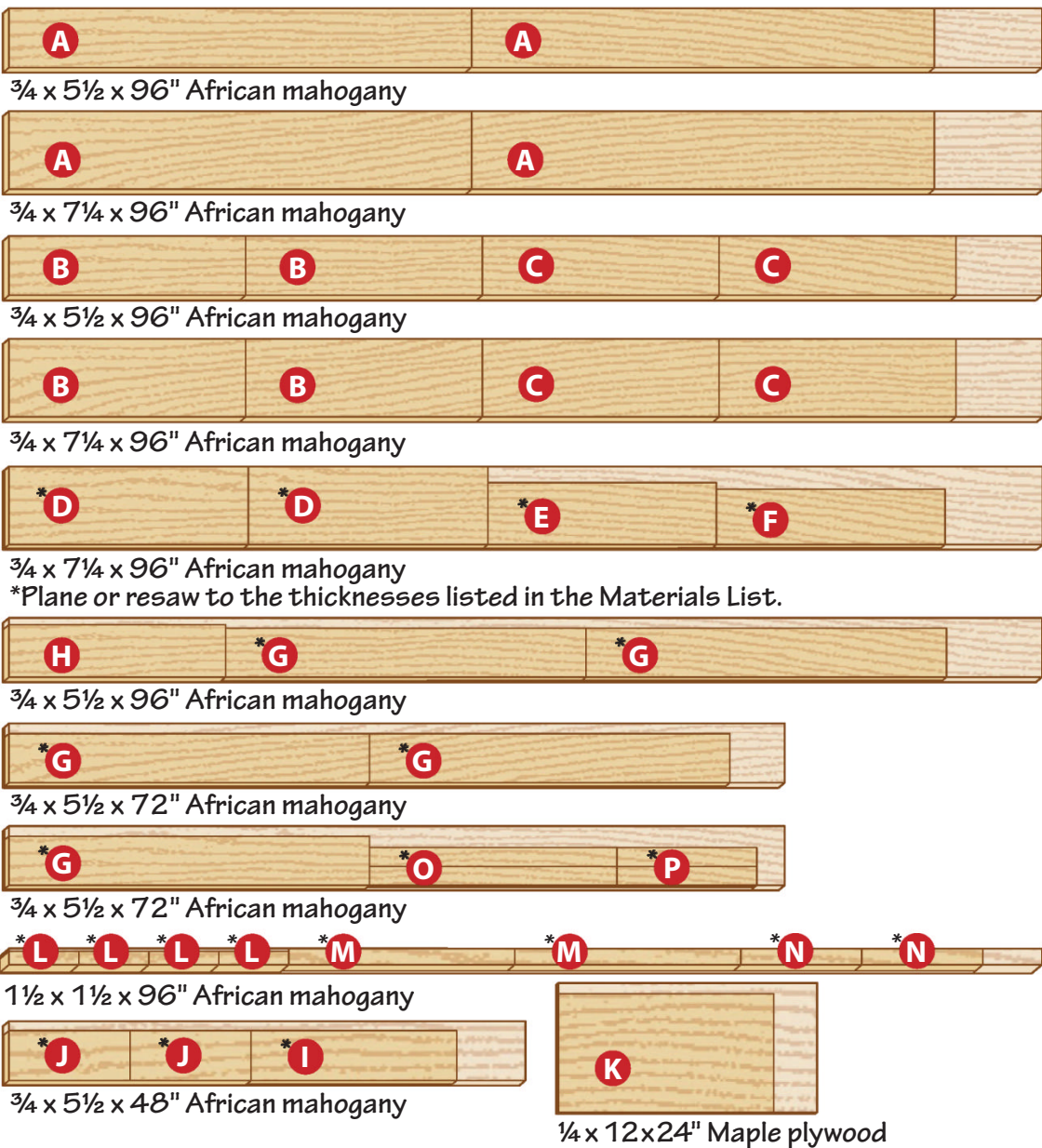
**BLADES AND BITS:** Dado set, 1/2" spiral upcut bit, 3/4" dovetail bit, 3/8" spiral upcut bit, 1/4" roundover bit, 1/4" cove bit.

**SOURCES:** Square cup caster, antique brass no. 250CAS5A (4), \$39.95; 1 7/8" bore oval handle, antique brass no. 27P18 (2), \$15.95, Whitechapel Ltd., 800-468-5534, whitechapel-ltd.com.

**PROJECT COST:** It cost us about \$630 to build this project. Your cost will vary by region and source.

## CUTTING DIAGRAM

This project requires 35 board feet of 4/4 African mahogany and 2 board feet of 8/4 African mahogany based on example boards shown.







# SCREW

## FUNDAMENTALS

Don't get screwed up when selecting the right fastener for your project. Use these guidelines to make the right choice every time.

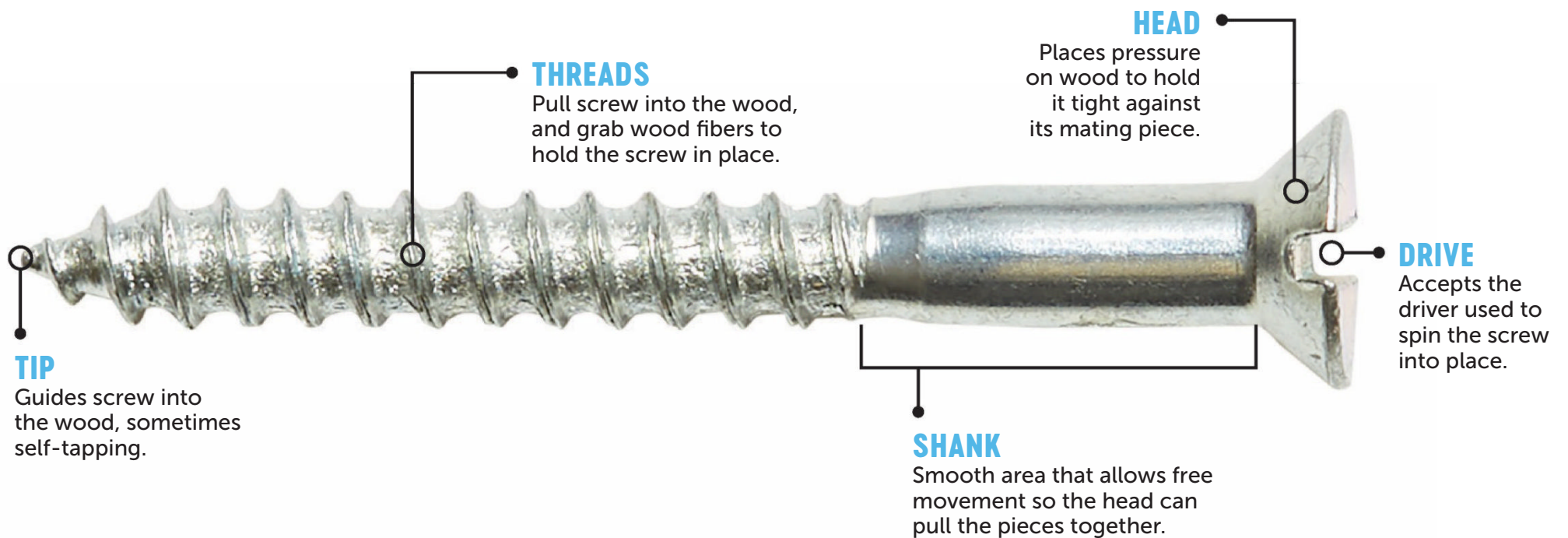
WRITER: VINCE ANCONA WITH DAVE STONE

PHOTOGRAPHERS: MARTY BALDWIN & GRANT WEBSTER



Walk into just about any hardware store or home center and you'll encounter an entire aisle dedicated to screws and fasteners. Finding exactly what you need may feel overwhelming. To help make sense of all the choices, we've broken things down to the fundamentals.

While there are many different types of screws, they all have one thing in common: a spiral thread that wraps around the length of the shank, plus a head that contains a drive—the recess used with a driver to install the screw (*below*). Screws may seem pretty basic, but understanding the purpose of each feature proves key to selecting the right screw.

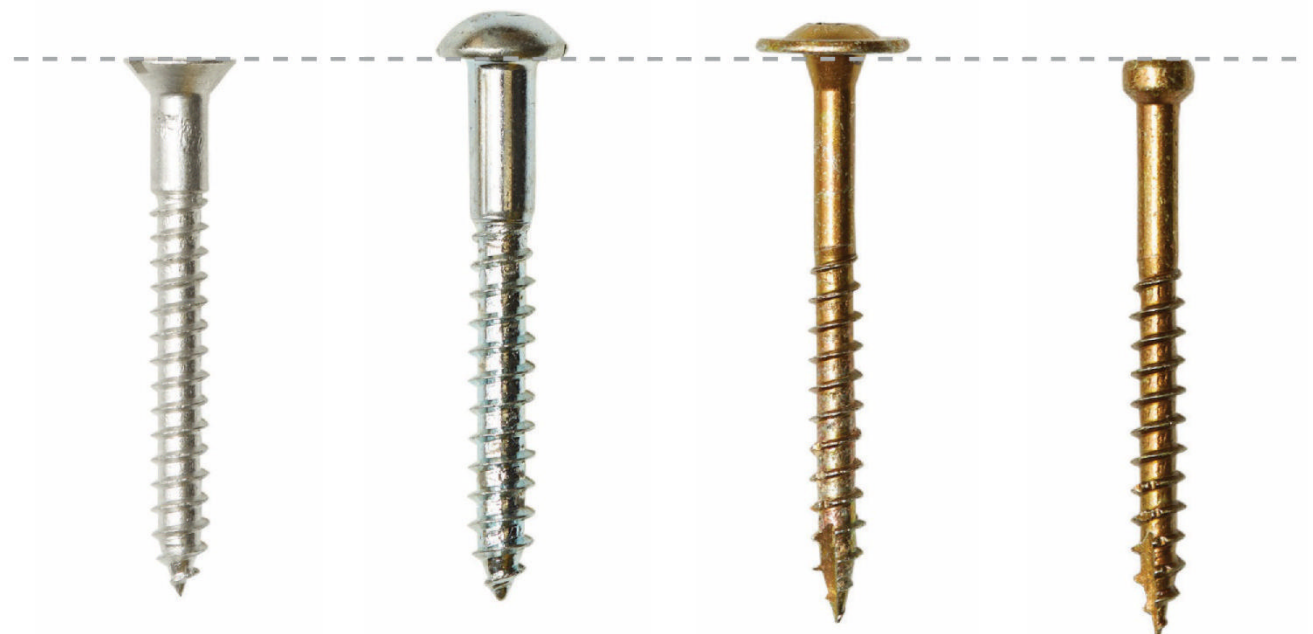


## WORK FROM THE HEAD DOWN

Wood screws come in several head styles, with flathead being the most common. Screws with this head style are driven flush with the surface of the wood or countersunk and covered with a plug or plastic cap.

Other common wood-screw head styles include round, oval, panhead, washer-head, and trimhead. Each head style serves a unique purpose.

The dashed line (*right*) indicates how to determine screw length: Measure from the top face of flathead screws, and from the underside of the head on screws with domed tops.



**FLATHEAD**  
Flat on top with a conical underside, a flathead screw distributes the head's clamping force outward in all directions. Most projects in *WOOD*® magazine call for this type.

**ROUNDHEAD & OVALHEAD**  
These screws feature a decorative head that sits above the face of the wood and a flat underside that creates clamping force straight down around the screw.

**PANHEAD & WASHER-HEAD**  
Panhead and washer-head screws use a wide head, flat on the underside, to spread clamping force over a larger area to increase holding power.

**TRIMHEAD**  
Trimhead screws' small diameter makes them less visible and easier to hide with putty or wood filler. These screws are commonly used for joining cabinets and installing decking.



## GO FOR A DRIVE



Learn more about the invention of Robertson screws and Henry Ford's role in slowing their adoption. [woodmagazine.com/robertson](http://woodmagazine.com/robertson)

In addition to the head style, screws come in multiple drive styles. Slotted drives have been around the longest. While not as common for project building today, these screws come in handy for period pieces or when you wish to match existing screws in a project.

The Phillips drive improves on slotted screws with a cross-shaped opening that provides more surface area for the driver tip to grip. Phillips drivers are available in different sizes, and you should pair them with the appropriate drive size.

Robertson, or square-drive, screws use a square recess in the head that matches a square-tipped driver to

prevent the drive tip from camming out as easily. Like Phillips screws, square drivers come in a few different sizes.

As drill/drivers became more powerful and impact drivers more common, even square drives have grown more susceptible to camming out. Star drives (often referred to as Torx, the name of one brand) combat that with a six-lobed, star-shaped opening. The matching driver, also made in several sizes, engages in these lobes over a much larger surface area to grip into the screw's drive and not cam out.

You may also find a combination of these drives, such as slotted and Phillips combo, or square and Phillips combo.

**Note:** Camming out happens when rotational torque on a driver causes it to exceed the drive's ability to hold, so the driver slips out of the screw.



### SLOTTED

Slotted drives, the oldest style, take a straight screwdriver. Drive these screws by hand because the slip-prone straight blade is easily misaligned.



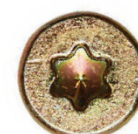
### PHILLIPS

Phillips drives use a pointed, crossed driver that aligns and stays engaged better than a slot. Under heavy load, the driver tends to rise and cam out.



### SQUARE

A square drive grips the driver tightly and is less likely to cam out than a Phillips drive. Square drives gained favor as power drill/drivers became common.



### STAR

Star drives provide multiple contact points for the driver to reduce camming out. This drive is more common in construction screws than in wood screws.

## PUT ON NICE THREADS

Wood screws begin their lives as round wire, and the threads are either cut or rolled. Screws with cut threads start out with wire of a larger diameter, and the threads are cut into the metal. Most wood screws are only partially threaded; the threads don't run the entire length of the shank. This allows the screw to "let go" of the entry piece so it doesn't fight against itself as it draws the workpieces together tightly, the threads biting into only the second piece as the head clamps down on the first.

This creates the traditional wood screw look. A cut-thread design also explains why two holes are specified for tradi-

tional wood screws: a pilot hole that the threaded portion bites into, and a larger shank hole that gives clearance around the unthreaded upper shank.

Screws with rolled threads use a smaller wire diameter. Squeezing the wire between rollers forms the threads. As a result, the shank of the screw is smaller in diameter than the threaded portion. This method costs less to produce because smaller-diameter wire is used to make the screws.

Construction screws and some other types also incorporate special features at the tip, such as cutting flutes that make them self-tapping.



### CUT

Screws with cut threads taper from the underside of the head to the tip, with threads that are almost the same diameter as the shank.



### ROLLED

Rolled-thread screws have a narrower shank with threads that protrude and don't require a shank hole, just a pilot hole.



SELECT A SIZE

Wood screws are sized using a gauge numbering system that ranges from 0000 to 32. The higher the number, the larger the screw—both in shank diameter and in head size. Despite this wide range, sizes 4 through 14 are the ones most commonly available. And for furniture construction, sizes 6, 8, and 10 cover most needs. You can learn more about screw sizing in the chart below.

Each size of screw is also available in a number of different lengths to accommodate different wood thicknesses. When joining two boards face-to-face, choose a length that will penetrate at least halfway into the thickness of the second piece. When driving a screw into end grain, choose a screw that will penetrate the end grain at least 1½" to 2" to prevent the screw from pulling out. 🌲

TRADITIONAL WOOD SCREWS

| GAUGE                    |          | 2      | 3      | 4      | 5     | 6     | 7     | 8      | 9      | 10     | 12    | 14    |
|--------------------------|----------|--------|--------|--------|-------|-------|-------|--------|--------|--------|-------|-------|
| HEAD-BORE SIZE           |          |        |        |        |       |       |       |        |        |        |       |       |
|                          |          | 11/64" | 13/64" | 15/64" | 1/4"  | 9/32" | 5/16" | 11/32" | 23/64" | 25/64" | 7/16" | 1/2"  |
| SHANK-HOLE SIZE          |          |        |        |        |       |       |       |        |        |        |       |       |
|                          |          | 3/32"  | 7/64"  | 7/64"  | 1/8"  | 9/64" | 5/32" | 5/32"  | 11/64" | 3/16"  | 7/32" | 1/4"  |
| PILOT-HOLE SIZE          | HARDWOOD |        |        |        |       |       |       |        |        |        |       |       |
|                          | SOFTWOOD |        |        |        |       |       |       |        |        |        |       |       |
|                          |          | 1/16"  | 1/16"  | 5/64"  | 5/64" | 3/32" | 7/64" | 7/64"  | 1/8"   | 1/8"   | 9/64" | 5/32" |
|                          |          | 1/16"  | 1/16"  | 1/16"  | 1/16" | 5/64" | 3/32" | 3/32"  | 7/64"  | 7/64"  | 1/8"  | 9/64" |
| AVAILABLE LENGTHS        |          |        |        |        |       |       |       |        |        |        |       |       |
| 1/4"                     |          |        |        |        |       |       |       |        |        |        |       |       |
| 3/8"                     |          |        |        |        |       |       |       |        |        |        |       |       |
| 1/2"                     |          |        |        |        |       |       |       |        |        |        |       |       |
| 5/8"                     |          |        |        |        |       |       |       |        |        |        |       |       |
| 3/4"                     |          |        |        |        |       |       |       |        |        |        |       |       |
| 1"                       |          |        |        |        |       |       |       |        |        |        |       |       |
| 1 1/8"                   |          |        |        |        |       |       |       |        |        |        |       |       |
| 1 1/4"                   |          |        |        |        |       |       |       |        |        |        |       |       |
| 1 3/8"                   |          |        |        |        |       |       |       |        |        |        |       |       |
| 1 1/2"                   |          |        |        |        |       |       |       |        |        |        |       |       |
| 1 5/8"                   |          |        |        |        |       |       |       |        |        |        |       |       |
| 1 3/4"                   |          |        |        |        |       |       |       |        |        |        |       |       |
| 2"                       |          |        |        |        |       |       |       |        |        |        |       |       |
| 2 1/4"                   |          |        |        |        |       |       |       |        |        |        |       |       |
| 2 1/2"                   |          |        |        |        |       |       |       |        |        |        |       |       |
| 2 3/4"                   |          |        |        |        |       |       |       |        |        |        |       |       |
| 3"                       |          |        |        |        |       |       |       |        |        |        |       |       |
| 3 1/4"                   |          |        |        |        |       |       |       |        |        |        |       |       |
| 3 1/2"                   |          |        |        |        |       |       |       |        |        |        |       |       |
| 3 3/4"                   |          |        |        |        |       |       |       |        |        |        |       |       |
| 4"                       |          |        |        |        |       |       |       |        |        |        |       |       |
| PHILLIPS-HEAD POINT SIZE |          | #1     |        |        | #2    |       |       |        |        |        | #3    |       |
| SQUARE-DRIVE BIT SIZE    |          | #0     |        |        | #1    |       |       | #2     |        |        | #3    |       |

ROLLED-WIRE SCREWS

| 4                      | 6      | 8      | 10     | 12    | 14    |
|------------------------|--------|--------|--------|-------|-------|
|                        |        |        |        |       |       |
| 7/32"                  | 17/64" | 11/32" | 23/64" | 7/16" | 1/2"  |
| No shank hole required |        |        |        |       |       |
|                        |        |        |        |       |       |
| 5/64"                  | 7/64"  | 1/8"   | 9/64"  | 5/32" | 3/16" |
|                        |        |        |        |       |       |
| 1/16"                  | 3/32"  | 7/64"  | 1/8"   | 9/64" | 5/32" |
|                        |        |        |        |       |       |
| #1                     |        | #2     |        | #3    |       |
| #0                     | #1     | #2     |        | #3    |       |

GETTY IMAGES: DUCKYCARDS



MASTER THE MATERIALS

Wood screws are typically made of mild steel, but you'll also find them in brass, stainless steel, and silicon bronze. Screws for indoor use may be bare metal or have a coating, such as zinc. Use brass screws—which may be solid brass or brass plated—for decorative applications such as hardware. Use stainless steel and silicon bronze screws for outdoor applications because they don't rust. (Boat-builders prefer silicon bronze.) Many outdoor screws are made from mild steel, and then given an anti-corrosion coating that helps them last in damp conditions while keeping the cost lower than silicon bronze or stainless.

TIP!

To prevent stripping or breaking brass screws, drive an identical-size steel screw into the hole first. Then remove the steel screw and drive the brass screw into the threaded hole.



# A TIMELY BOX

You'll find shop time passes quickly while creating this classy keepsake box befitting your collection of timepieces.

WRITER: BRYAN NELSON  
DESIGNER/BUILDER: KEVIN BOYLE



OVERALL DIMENSIONS  
11"W x 4<sup>3</sup>/<sub>4</sub>"D x 3<sup>1</sup>/<sub>4</sub>"H



Small projects like this timepiece keepsake box allow you to use that special figured wood you've squirreled away for just the right project. Plus, this box provides the perfect opportunity to practice techniques such as miter-cutting small parts and gluing up small frames.

## BUILD A BASIC BOX

Matching the top of a box to its base becomes a simple process when you start the build with an extra-tall box and rip the top free for a perfect match.

**1** From  $\frac{1}{2}$ "-thick stock, rip blanks for the front/back and ends of the box, making them  $\frac{1}{8}$ " over-width ( $2\frac{5}{8}$ "). Then miter-cut the front/back (A) and ends (B) to length [Materials List, Drawing 1], cutting an extra end or two from scrap stock for setup use later. Finish-sand the inside faces.

**2** Rabbet the lower inside edge of the front/back and ends [Exploded View, Drawing 1], then glue up the box. Once dry, finish-sand the outside faces and edges.

**3** Cut the box top from the box base [Photo A], then sand the edges to remove any blade marks [Photo B].

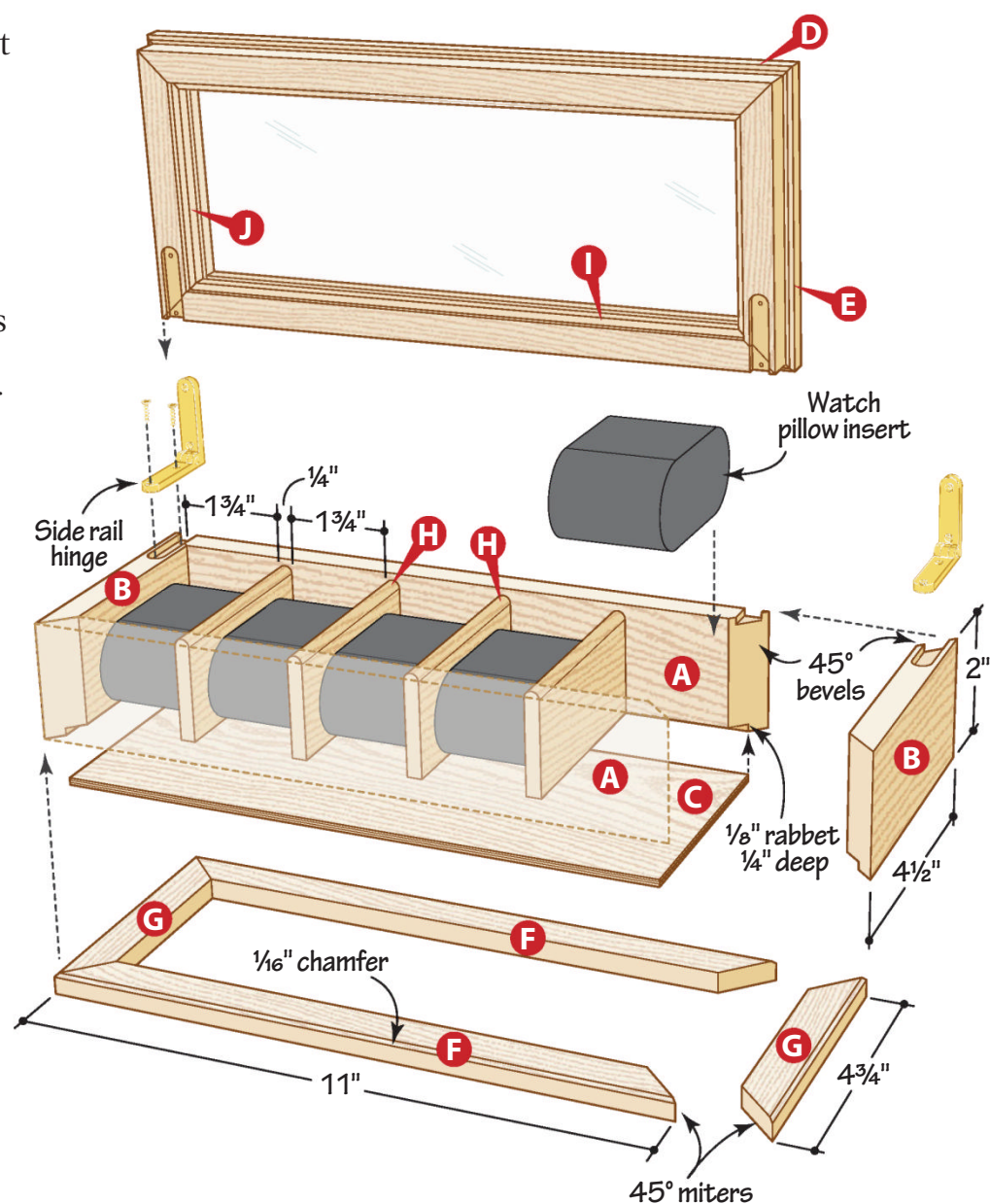
**4** Install a  $\frac{5}{16}$ " straight bit in your router table. Set the height to match the thickness of one of the hinge leaves [Sources] and adjust the fence to center the bit on  $\frac{1}{2}$ "-thick stock. Clamp a stopblock to the fence to create a  $1\frac{5}{16}$ "-long groove. Rout a test hinge mortise in one of the extra ends cut earlier.

**5** Rout the hinge mortises in the box base and top [Photos C, D, Drawings 1a, 2a].

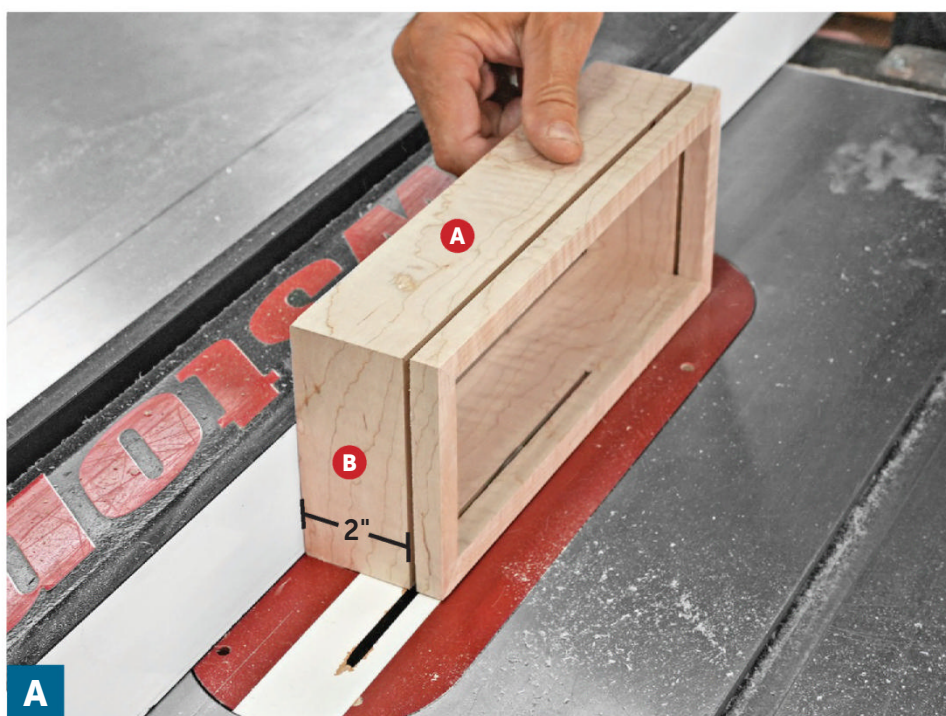
### TIP!

Make a pencil mark across the end before cutting the top free to help orient the top and base later.

## EXPLODED VIEW



**6** Cut the box bottom (C) to size, finish-sand, and then glue it into the rabbet in the box base [Exploded View, Drawing 1b].



Set the rip fence 2" from the blade to size the box parts, then make a pass across the ends of the box. Rip the top free by making a pass through the front and back of the box, allowing the top to fall free.



Attach 150-grit sandpaper to a flat surface. Remove any blade or burn marks on the mating edges of the box top and base by sanding in small, circular motions.





After verifying the stopblock, fence position, and router bit height using the test piece, rout the hinge mortise in one corner of the lid. Repeat the process for one corner of the box.

Reposition the stopblock to the other side of the bit for the remaining mortises. Set the top (and base) against the stopblock and lower it onto the spinning bit, then pull the workpiece along the fence.

## FRAME THE TOP AND BOTTOM

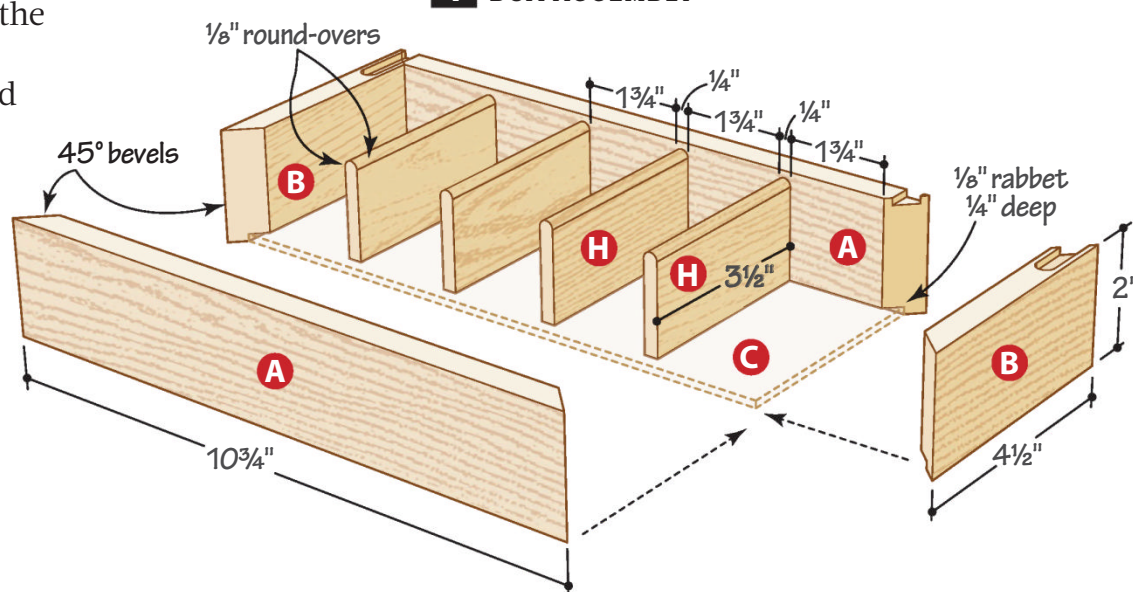
- 1 Rip  $\frac{3}{8}$ "-thick stock to a width of  $\frac{3}{4}$ " for the base and lid frames, then miter-cut the lid front/back (D), lid ends (E), base front/back (F), and base ends (G) to final length [Exploded View, Drawing 2].
- 2 Rout a chamfer on the top inside edge of the lid front/back (D) and ends (E) [Drawings 2, 2b]. Glue up the lid frame (D/E) and base frame (F/G) [Photo E] and finish-sand both.
- 3 Rout a smaller chamfer on the lower outside edge of the lid frame (D/E) and the top outside edge of the base frame (F/G) [Drawings 1b, 2b].
- 4 Glue the base frame centered on the box base (A-C) [Exploded View, Drawing 1b] and the lid frame centered on the box top [Drawing 2, 2b].
- 5 Cut the dividers (H) to size, then rout round-overs on the top edges [Drawing 1]. Glue the dividers into the box base [Photo F].
- 6 Rip  $\frac{1}{8}$ "-wide strips for the glass stop, then miter-cut the long and short stops (I, J) to fit inside the lid (A/B/D/E). Finish-sand them and then set them aside.

- 7 Check the fit of the hinges to the box base and lid, then screw them into place. Once the fit looks good, remove the hinges. Complete any touchup sanding and apply a finish to the box base, lid, and glass stops. We sprayed on a couple coats of satin lacquer.
- 8 Install the glass in the lid and pin-nail the stops into place, then reinstall the hinges and add the watch inserts. Gather your watch collection; it's time to slip them into their new home! 🌲

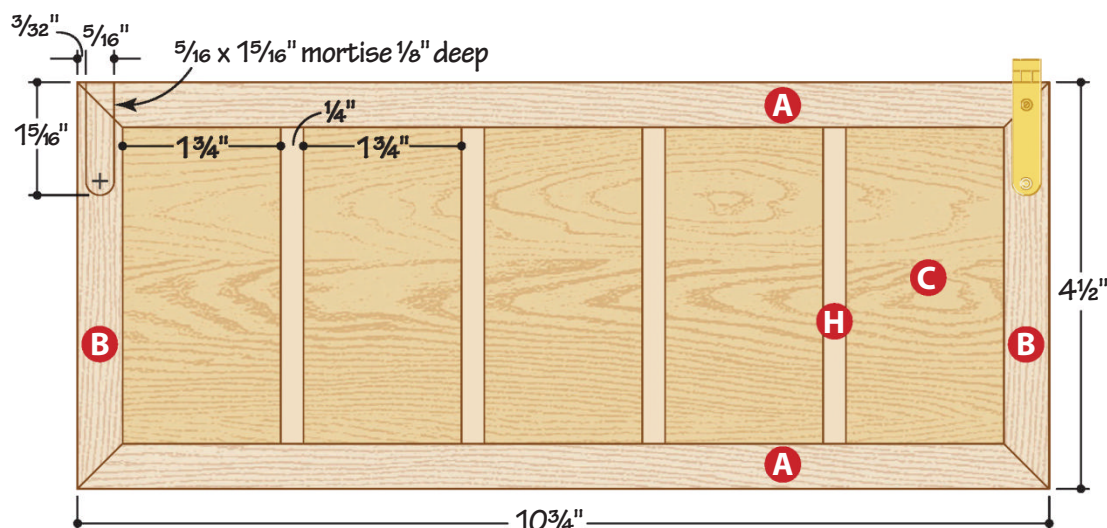


Watch a video on safely ripping thin strips.  
woodmagazine.com/thinstrips

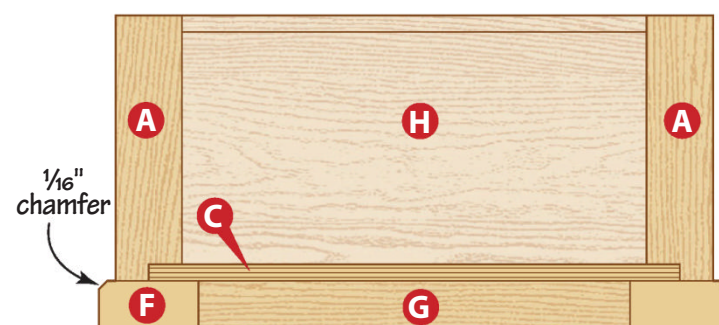
### 1 BOX ASSEMBLY



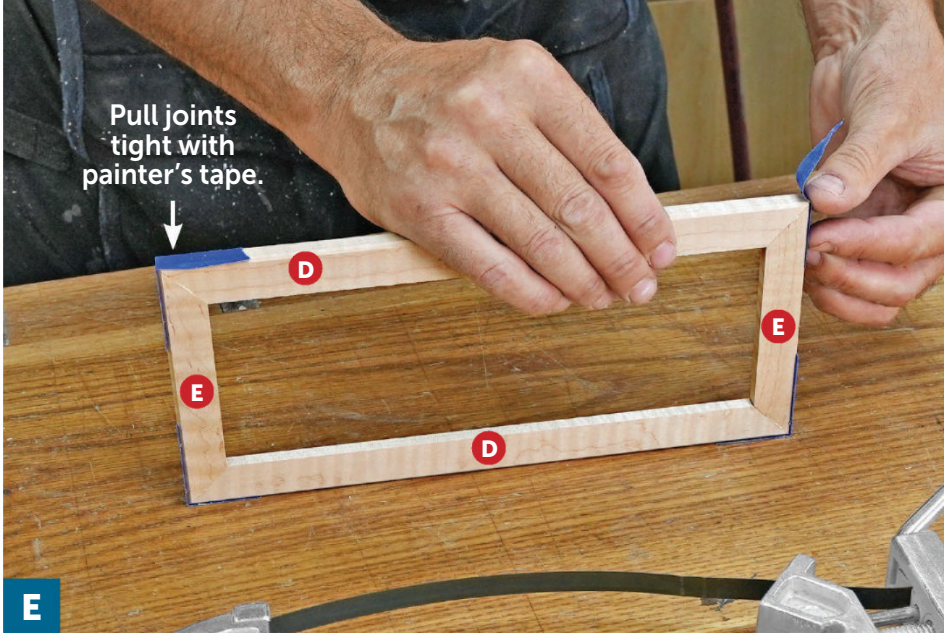
### 1a HINGE MORTISE DETAIL, BOX BASE



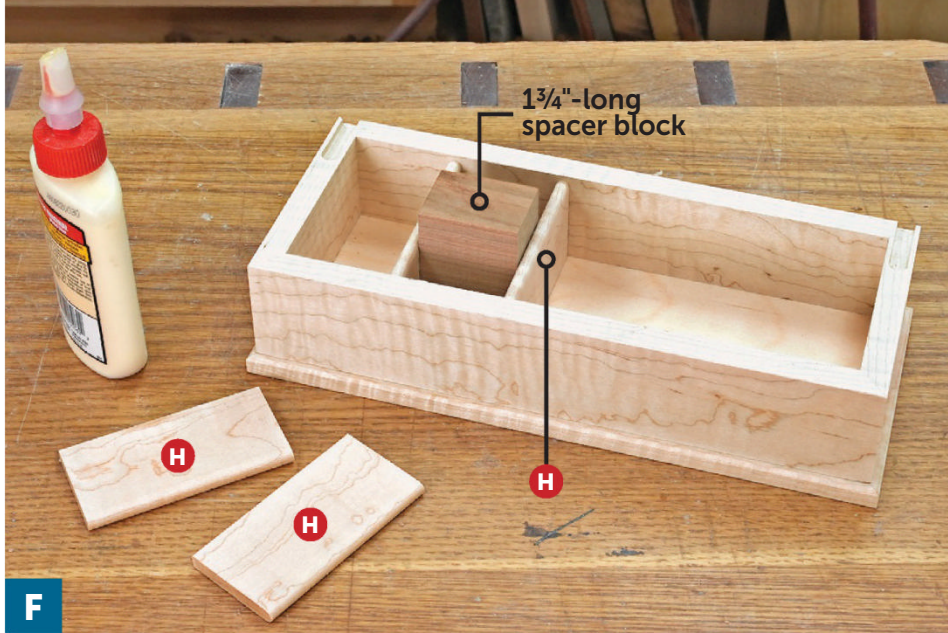
### 1b BOX END SECTION VIEW





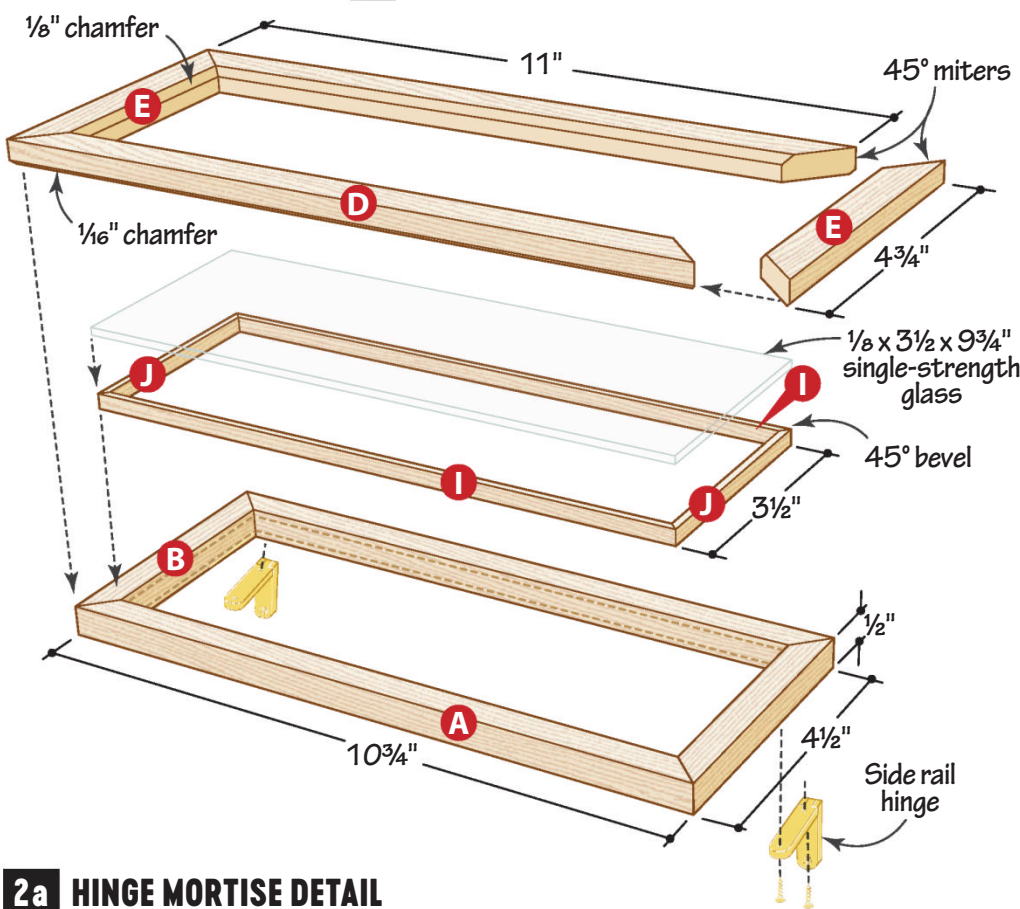


Use painter's tape as hinges on three of the joints, add glue to the miters, fold into a frame, and tape the last joint. If needed, add a band clamp to pull the joints tight.

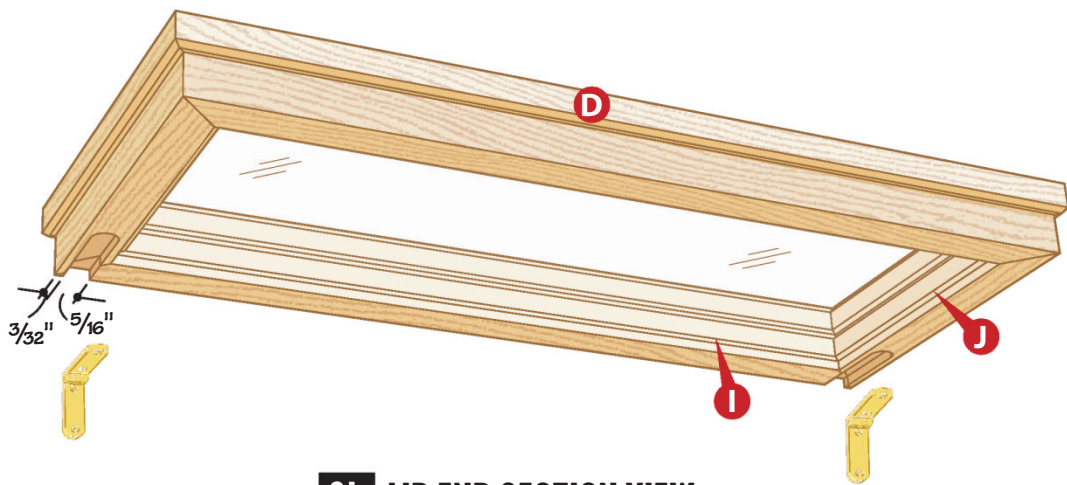


Cut a spacer block to help position the dividers (H) evenly across the box base. To aid cleanup, use only a light layer of glue when attaching the spacers, wiping away any stray glue before it hardens.

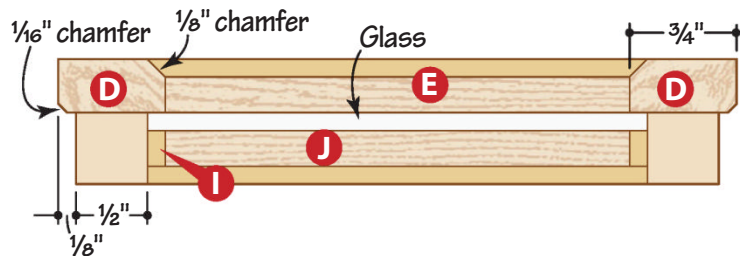
## 2 LID ASSEMBLY



### 2a HINGE MORTISE DETAIL



### 2b LID END SECTION VIEW



## MATERIALS LIST

| PART |                       | FINISHED SIZE |        |         | Matl. | Qty. |
|------|-----------------------|---------------|--------|---------|-------|------|
|      |                       | T             | W      | L       |       |      |
| A*   | BOX FRONT/BACK        | 1/2"          | 2 1/2" | 10 3/4" | CM    | 2    |
| B*   | BOX ENDS              | 1/2"          | 2 1/2" | 4 1/2"  | CM    | 2    |
| C    | BOX BOTTOM            | 1/8"          | 4"     | 10 1/4" | MP    | 1    |
| D*   | LID FRAME FRONT/BACK  | 3/8"          | 3/4"   | 11"     | CM    | 2    |
| E*   | LID FRAME ENDS        | 3/8"          | 3/4"   | 4 3/4"  | CM    | 2    |
| F*   | BASE FRAME FRONT/BACK | 3/8"          | 3/4"   | 11"     | CM    | 2    |
| G*   | BASE FRAME ENDS       | 3/8"          | 3/4"   | 4 3/4"  | CM    | 2    |
| H    | DIVIDERS              | 1/4"          | 1 3/4" | 3 1/2"  | CM    | 4    |
| I*   | LONG GLASS STOPS      | 1/4"          | 1/8"   | 9 3/4"  | CM    | 2    |
| J*   | SHORT GLASS STOPS     | 1/4"          | 1/8"   | 3 1/2"  | CM    | 2    |

\*Parts initially cut oversize. See the instructions.

**MATERIALS KEY:** CM—curly maple, MP—maple plywood.

**SUPPLIES:** Single-strength glass.

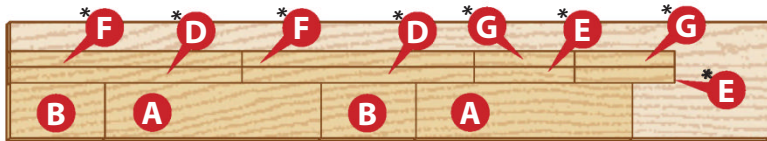
**BITS:** 5/16" straight, 45° chamfer, 1/8" round-over router bits.

**SOURCES:** Side rail hinges no. 161694 (1 pair), \$25.99, Woodcraft, 800-225-1153, woodcraft.com. Watch pillow inserts, \$9.99, woodmagazine.com/watchinserts.

**PROJECT COST:** It cost us about \$60 to build this project. Your cost will vary by region and source.

## CUTTING DIAGRAM

This project requires 1.4 square feet of 1/2" curly maple and 0.5 square feet of 1/4" curly maple based on example boards shown.



1/2 x 5 1/2 x 36" Curly maple \*Plane or resaw to the thickness listed in the Materials List.



1/4 x 3 1/2 x 18" Curly maple



1/8 x 6 x 12" Maple plywood





• SHOP TESTED •

# STONE-COLD SHARP

We test three categories of sharpening stones to find the best for putting a keen edge on your tools.

WRITER: BOB HUNTER  
TOOL TESTER: JOHN OLSON

PHOTOGRAPHER: JACOB FOX



**Note:** Sharpening stones sell in 2–4" widths and 6–12" lengths. We prefer the 3x8" size because it accommodates the full width of most common plane irons and allows for a comfortable stroke length.

Sharpening stones remain our tried-and-true favorite sharpening medium for most hand-tool blades. They're easy to use, require only human power, and sell for reasonable prices. But how do you know which stones to choose? We tested a variety of waterstones, ceramic waterstones, and diamond stones—11 sets ranging from 125-grit to 8,000 (more than two dozen stones in all)—to find the best fit for you. We flattened the stones that needed it, then sharpened chisels and plane irons, measuring the time it took for each as well as how much these stones dished out.

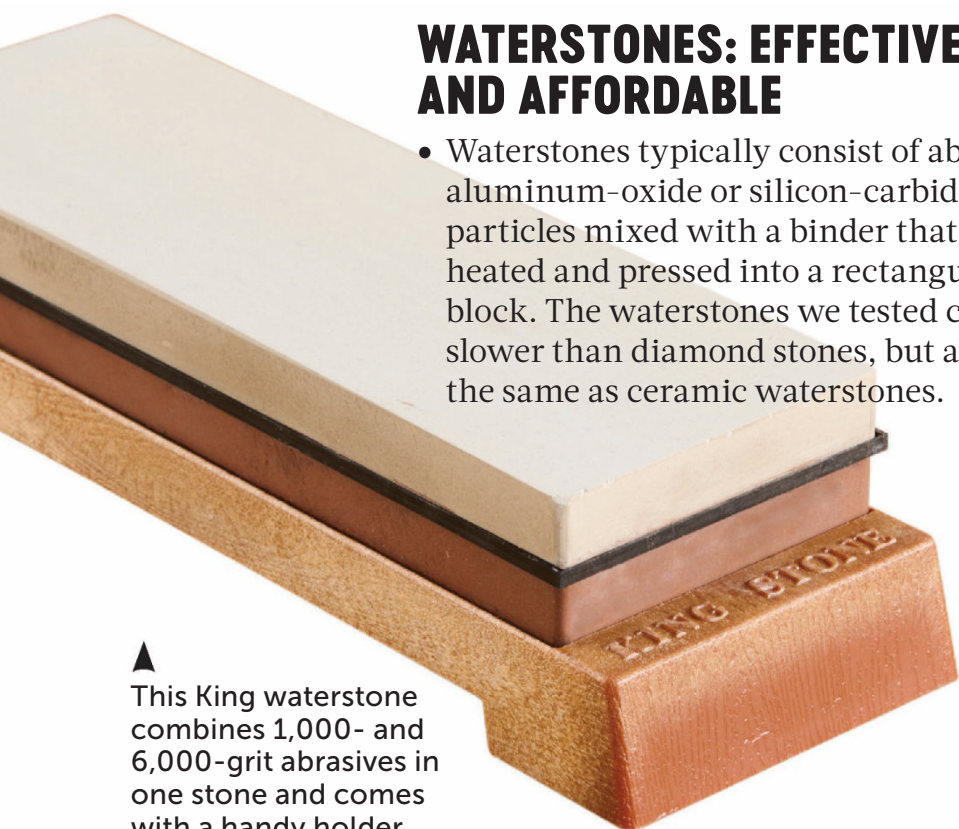
No matter which stones you select, you'll need, ideally, three or four in progressive grits to shape and then hone blades to a perfectly sharp edge. (Learn how to do this on page 61.)

## WATERSTONES: EFFECTIVE AND AFFORDABLE

- Waterstones typically consist of abrasive aluminum-oxide or silicon-carbide particles mixed with a binder that is heated and pressed into a rectangular block. The waterstones we tested cut slower than diamond stones, but about the same as ceramic waterstones.



To ensure accurate, consistent results, we tested the stones using identical plane irons, always held in honing guides. See our review of several honing guides on page 74.



▲ This King waterstone combines 1,000- and 6,000-grit abrasives in one stone and comes with a handy holder.

- Waterstones wear quickly, exposing fresh grit to cut the steel. But because they're softer, they also flatten more easily than other stones. (See examples of fast- and slow-wearing stones on page 59.)
- You can get three to four stones for less than \$170, making them the most affordable option. Two-sided stones, shown at left, save even more.
- Waterstones must soak for at least 15 minutes before use, a delay not required by other types we tested. Allowing wet stones to freeze or letting fine-grit stones (4,000 and up) soak long-term can cause them to break apart.
- Periodically dribble a little water on the stone during use to help it cut better and clear the slurry, known as *swarf*. These stones tend to be the messiest.

## WHERE TO GET THE STONES WE TESTED

### WATERSTONES

- Naniwa 220 (\$27), 1,000 (\$27), and 6,000 (\$47), **Sharpening Supplies**, [sharpeningsupplies.com](http://sharpeningsupplies.com)
- Norton 220/1,000 and 4,000/8,000 (\$165), **Peachtree Woodworking**, [ptreeusa.com](http://ptreeusa.com)
- Pride 220/1,000 (\$47) and 6,000/10,000 (\$90), **Woodcraft**, [woodcraft.com](http://woodcraft.com)
- King 250/1,000 (\$28), 1,000/6,000 (\$46), and 1,200/8,000 (\$50), **Woodcraft**

### CERAMIC WATERSTONES

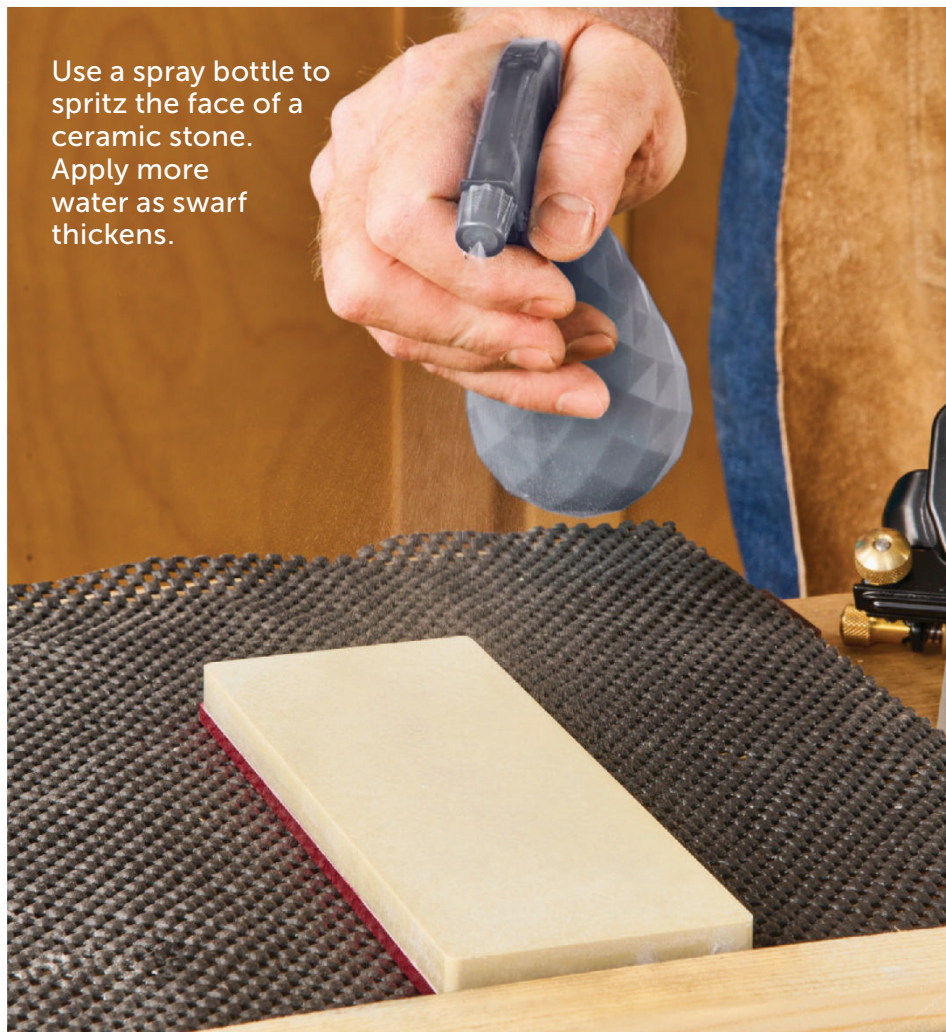
- Nano Hone 70-micron/200-grit (\$70), 15-micron/1,000 (\$85), 6-micron/3,000 (\$95), 2-micron/6,000 (\$105), **Nano Hone**, [nanohone.com](http://nanohone.com)
- Shapton glass 220 (\$45), 1,000 (\$55), 4,000 (\$69), and 8,000 (\$96), **Woodcraft**

### DIAMOND STONES

- DMT DuoSharp extra coarse (220)/coarse (325) (\$128) and fine (600)/extra fine (1,200) (\$128), **DMT**, [dmtsharp.com](http://dmtsharp.com)
- DMT Dia-Sharp extra-extra coarse (120) (\$128), extra coarse (220) (\$83), and extra fine (1,200) (\$83), **DMT**
- M.Power 300/1,200 (\$120), **M.Power**, [mpower-tools.com](http://mpower-tools.com)
- Trend 300/1,000 (\$133), **Woodcraft**
- Ultra Sharp coarse (300) (\$49), **Best Sharpening Stones**, [bestsharpeningstones.com](http://bestsharpeningstones.com)



Use a spray bottle to spritz the face of a ceramic stone. Apply more water as swarf thickens.



## CERAMICS: LESS WATER, LESS WEAR

- Ceramic waterstones use similar ceramic particles, but are heated to a higher temperature than waterstones. We found that ceramics sharpen at about the same rate as most waterstones (*next page*) but wear at a much slower rate. Although you can find these as solid stones, most are bonded onto a glass or aluminum substrate to reduce the amount of ceramic material (to lower the price) and maintain flatness. Substrates do leave the backs of the stones slick, so plan to use a holder or grippy mat when sharpening.
- Ceramic stones sell for about 50 percent more than comparable waterstones, and some cost the same as diamond stones.
- Ceramics are ready to use immediately. Instead of soaking them in a water bath, just sprinkle or spray water onto them during use, as shown at *left*.
- Ceramics require less cleanup after sharpening: Just rinse and wipe dry.

## DIAMONDS ARE A WOODWORKER'S FRIEND, TOO



Build a sharpening station for your stones.  
woodstore.net/  
sharpstation

- Diamond stones consist of tiny particles bonded onto a steel or aluminum plate. This ensures flatness and makes the “stone” less break-prone if dropped.
- In our testing, diamond stones cut the quickest of all types for both shaping and initial honing. But because they come only in grits from 120 to 1,200, you’ll need to supplement them with waterstones or ceramic stones of finer grits for final honing, making diamond stones the costliest option (for half the process).
- Whereas waterstones and ceramics are designed to wear away to reveal fresh abrasive, diamond proves less friable (easily broken down). Its hardness, combined with a rigid bond on the metal plate, means these stones don’t require flattening. You can even use a diamond stone to flatten waterstones and ceramics.
- As with the other stones, diamond stones require lubrication during use. While some call for proprietary lubricants, we found that water worked just as well. Be sure to rinse and wipe the stones when finished and allow them to dry thoroughly to prevent rust from forming on stones with steel plates.
- Diamond stones with empty spaces or patterns allow for swarf to gather and run off the surface during use. Solid-surface diamond stones, such as the Ultra Sharp and DMT Dia-Sharp, don’t do this. In our testing, we did not find a significant performance advantage for either style.
- Reducing abrasive with patterning reduces cost, and two-sided stones, such as the DMT DuoSharp in extra coarse/coarse (220/325 grit, \$128) add to that value by doubling the grits. By comparison, the single-sided DMT Dia-Sharp in extra-extra coarse (120 grit) costs the same \$128 because it fully coats a single surface in diamonds.



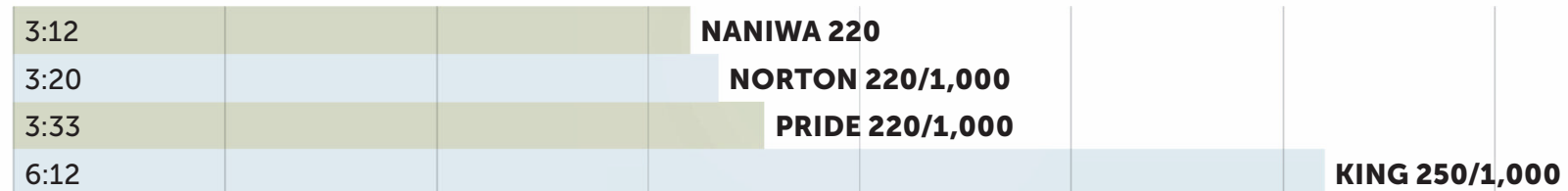
◀ The M.Power double-sided diamond stone includes a pump bottle of synthetic lubricant. The stone’s hollow plate reduces weight and cost.



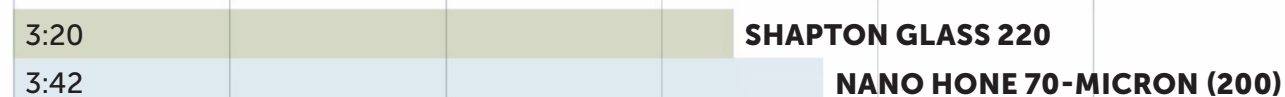
# DIAMOND STONES CUT FASTEST

To test each coarse\* shaping stone's ability to cut quickly, we secured an A2-steel block-plane blade with a hollow grind in a honing guide (at a 25° bevel) and stroked it until we had formed a 3/32"-deep flat across the blade's width. We timed this process and then averaged the results of three trials, presented here.

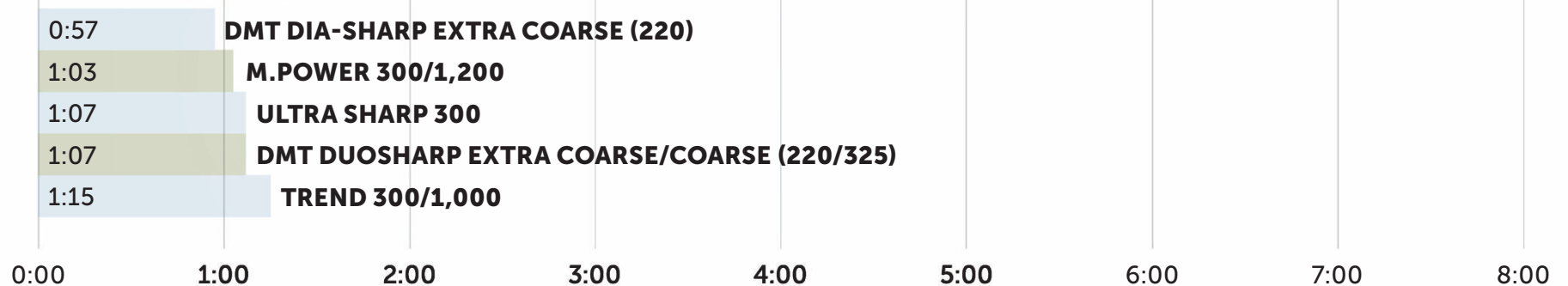
## WATERSTONES



## CERAMIC WATERSTONES



## DIAMOND STONES



\* We tested finer-grit stones by honing these same plane irons and found that, while the times were shorter, they reflect the same order as with the coarse-grit stones.

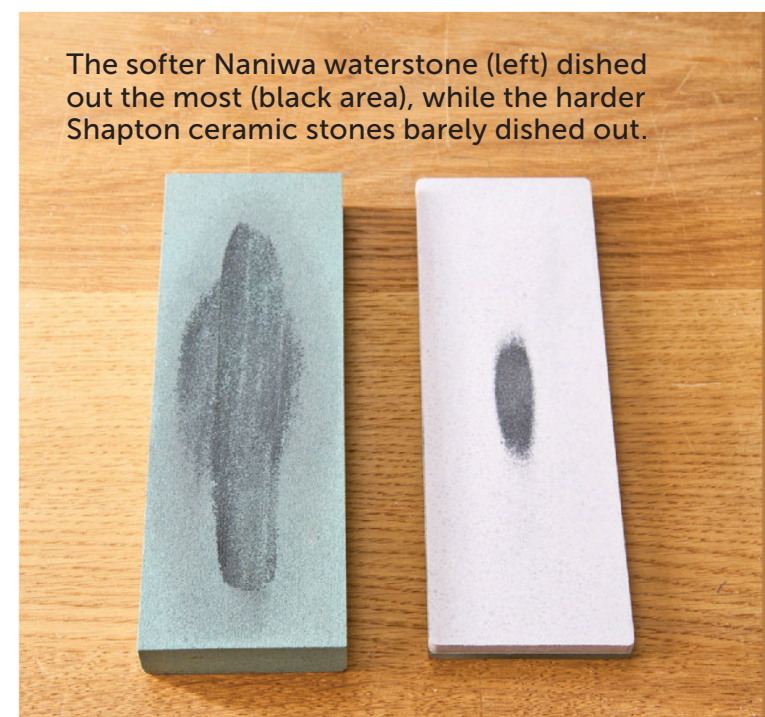


After sharpening a chisel on all stones, we flattened each stone with a coarse diamond stone.

## DON'T GET IN A GROOVE: FLATTEN YOUR STONES

Waterstones and ceramic stones wear by design as the abrasive and binder break down to expose fresh abrasive particles. This keeps the stones working, but also means the stones dish out. So, you need to flatten these stones to prevent your tool edges from mimicking this dished-out shape. (Diamond stones, with their particle-on-metal construction, don't need flattening.) We used a diamond stone to flatten dished stones, *left*, but you could also use a dedicated flattening stone.

To measure the dishing that occurs with each stone, we sharpened a 3/4"-wide chisel with a honing guide to equal sharpness on each stone. After cleaning away the swarf, we sprayed each stone with black guide coat—a product used in automotive body work to reveal imperfections when sanding. Then we made five flattening strokes on



The softer Naniwa waterstone (left) dished out the most (black area), while the harder Shapton ceramic stones barely dished out.

each stone, which revealed the extent of the dishing by the coating that remained, as shown *above*.



## GET SHARP, STAY SHARP WITH THESE WINNING STONES

We appreciate very sharp tools, but we want sharpening to happen fast. That's why, based on our tests, we prefer fast-cutting diamond stones for shaping and durable ceramic stones for honing. We couldn't pick just one Top Tool, though, because we recommend you get stones in four grit ranges: You'll want 220-325 for initial shaping and 1,000-1,200 for follow-up. Choose a 3,000-4,000 stone for initial honing and a 6,000-8,000 stone for final honing. Because we had virtual ties in our results, we named two Top Tools in each of these ranges.



### SHAPING EXTRA COARSE

**A DMT DIA-SHARP** Extra-coarse (220-grit) diamond stone, no. D8X

**B DMT DUOSHARP** Extra-coarse/coarse (220/325) combination diamond stone, no. W8CXNB

### COARSE

**DMT DIA-SHARP** Extra-fine (1,200-grit) diamond stone, no. D8E

**DMT DUOSHARP** Fine/extra-fine (600/1,200) diamond stone, no. W8EFNB

### HONING

#### FINE

**C SHAPTON** 4,000-grit glass ceramic stone, no. 834943

**D NANO HONE** 6-micron (3,000-grit) ceramic stone

#### EXTRA FINE

**SHAPTON** 8,000-grit glass ceramic stone, no. 834945

**NANO HONE** 2-micron (6,000-grit) ceramic stone

If you're working with a limited budget, consider the Top Value Norton combination waterstones in 220/1,000 and 4,000/8,000 grits. You get both in a kit with a flattening stone and plastic storage cases for \$165.





# HOW TO SHARPEN WITH STONES

Follow these simple steps to put a keen edge on any chisel, plane iron, or spokeshave blade.

## START THE PROCESS BY SHAPING THE BEVEL

Sharpening consists of two steps: shaping and honing. During shaping you create the primary bevel angle on the cutting edge—usually 25° or 30°—with either a flat grind or hollow grind. You can use stones (120–325-grit) to create a flat grind, shown *far right*, by sharpening until the full depth of the cutting edge (front to back) is flat.

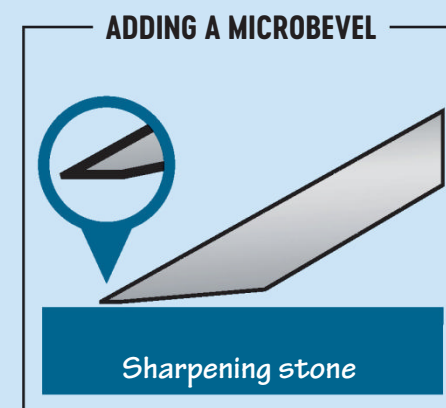
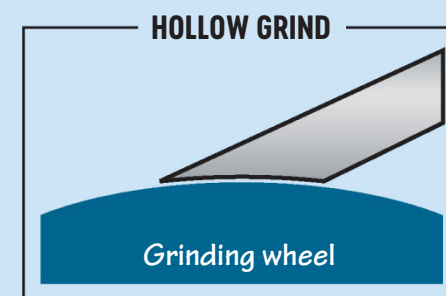
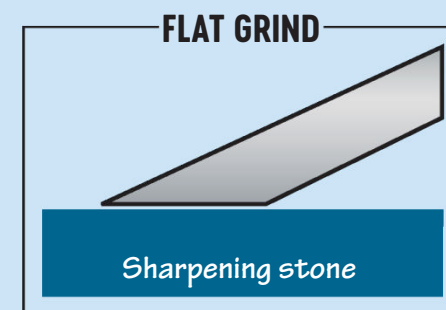
Even quicker, you can form a hollow grind at the bench grinder using a 100- or 120-grit aluminum-oxide wheel. Then shape the tool further on a coarse stone to create a narrow flat (about 1/16") across the full width on the front and back of the bevel. The middle remains hollow, leaving less material to abrade away in subsequent honings. Return to this step as the bevel flattens.

### A FEW POINTS:

- Diamond stones cut aggressively, leaving deeper scratches than waterstones and ceramics. This makes initial shaping faster, but adds a little more time to remove those scratches when you move on to finer-grit synthetic stones.
- When shaping a tool on a bench grinder, avoid overheating the tool, which can negatively affect the steel's temper. Have a cup of water nearby to quench the tool often.



With the tool rest set at the desired angle, hold the tool flat on the rest, sliding it side to side as the stone grinds.



By honing a microbevel onto your tool's cutting edge, you need only remove material from the leading edge, a quick task.

## NOW HONE TO A KEEN EDGE

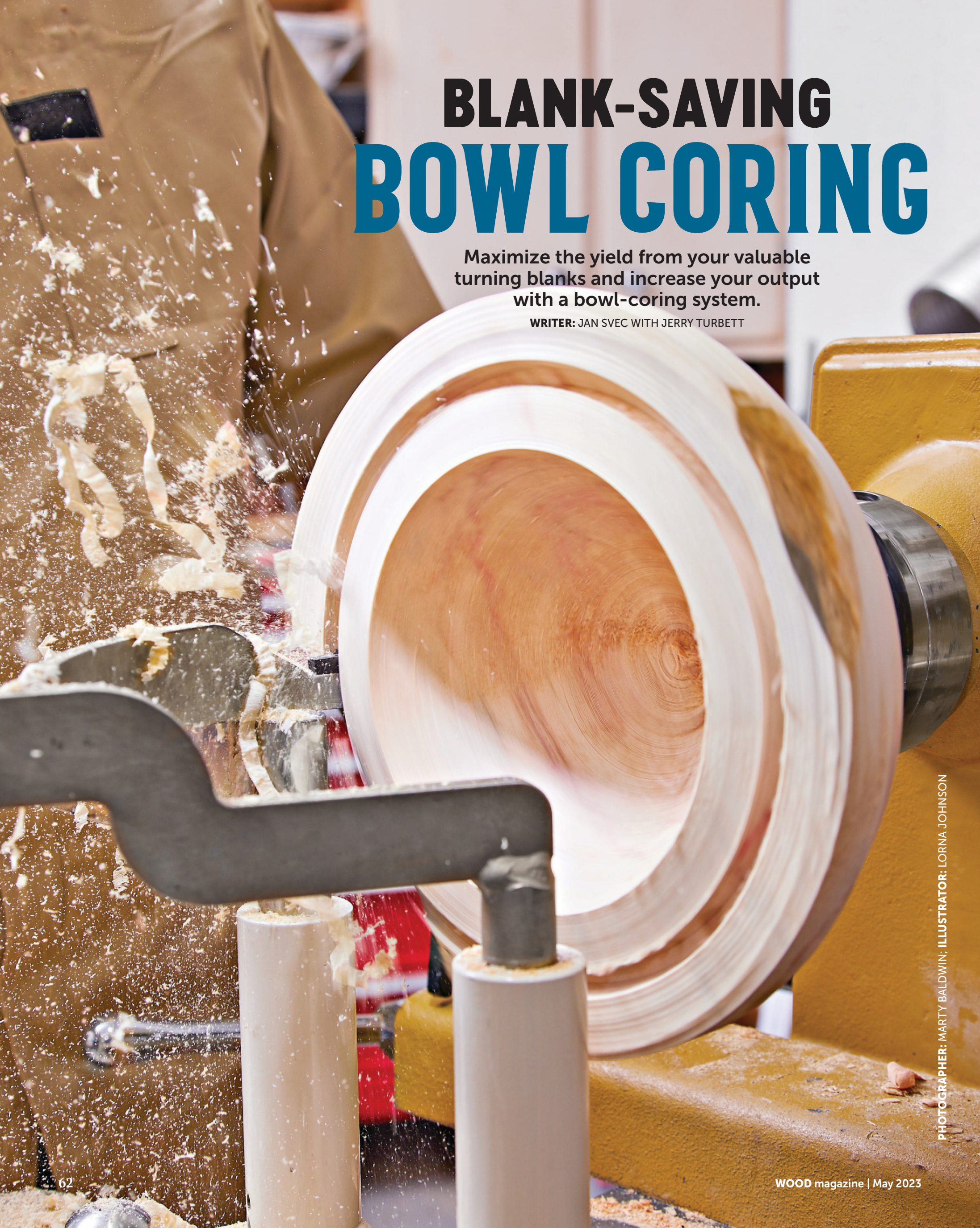
With the primary bevel established, move on to honing at the same bevel angle. On a 1,000- or 1,200-grit stone, stroke the blade as needed to remove the scratches left from the coarse stone. Repeat the process with 4,000 and 8,000 stones until the bevel has a mirror finish.

Some woodworkers prefer to add a microbevel, which is a very thin bevel at a 3–5° steeper angle along the cutting edge, as shown at *left*. A microbevel doesn't make the edge sharper than a flat bevel. It does, just like a hollow grind, leave a smaller area to hone, making subsequent honings faster.

### A FEW POINTS:

- You can usually hone a blade multiple times before you need to return to the coarse stones to reshape the bevel.
- If a manufacturer doesn't offer a 4,000- or 8,000-grit stone, there's a good chance they make 6,000 and 10,000, and these will substitute nicely.
- Fine-grit stones tend to be softer than coarse stones, so treat them gently to avoid tool gouges or chipped edges.
- Manufacturers use the designations "coarse" and "fine" differently when referring to their own products, so be sure to look for the grit rating to know what you're actually buying.





# BLANK-SAVING BOWL CORING

Maximize the yield from your valuable turning blanks and increase your output with a bowl-coring system.

WRITER: JAN SVEC WITH JERRY TURBETT

PHOTOGRAPHER: MARTY BALDWIN; ILLUSTRATOR: LORNA JOHNSON



Typical bowl hollowing reduces a huge portion of your turning blank to shavings—not a big deal when you rescued your blank from the firewood pile. But when you run across a rare, highly figured chunk of wood, such waste borders on criminal. Coring rescues that material by producing nesting bowl sets—a plus no matter what kind of wood you turn.

Coring requires specialty equipment (see *Oneway System Cuts to the Core*, below) that makes deep cuts into the wood. So, core the bowls from a green blank, then turn them to their final shape later—a process known as “twice turning.”

**TWICE TURNING:** Rough-turning a green bowl and letting it dry before turning the dry bowl to its final shape. The technique reduces the development of drying cracks.



With the blank between centers, turn a hemispherical shape on the outside and form a  $4 \times \frac{5}{8}$ " tenon to fit into a four-jaw chuck. This creates the rough shape of the largest bowl.



Mark the inside diameter of the largest bowl on the face of the blank:  $1\frac{1}{2}$ " from the rim, in this case. Make another mark equal to the width of the coring cutter. Then mark the inside diameter and kerf for the second bowl.

## ROUND DOWN TO GET STARTED

The coring knives cut circular arcs, meaning the radius of the rough-turned bowl equals one-half of the diameter. So, selecting a blank with a depth equal to one-half its diameter provides sufficient material for the next operations. Here, we used a 15"-diameter blank with a depth of  $7\frac{1}{2}$ ".

First, refine the shape of the blank [Photo A]. Turn the blank around, and mount it in a four-jaw chuck. Then flatten the blank face. The  $\frac{5}{8}$ " tenon and face flattening reduce blank depth enough to allow proper positioning of the coring-knife post later. We'll make two coring cuts, one each with the 9" and the  $11\frac{1}{2}$ " coring knives, to yield three bowls.

## MARK THE BLANK FOR CORING

When coring, you'll initially cut the bowls with extra-thick walls. This allows the bowls to shrink and warp when drying while leaving plenty of material to turn back to round or customize the bowl shape as you thin the walls during final turning.

Making the wall thickness about 10% of the bowl's diameter works well. We used a 15" bowl blank, so the wall of the largest bowl equals 10% of 15", or  $1\frac{1}{2}$ ". Mark the wall locations on the face of the blank [Photo B].

Measure the diameter of the inner circle, calculate 10% of this dimension, and mark the second diameter and cutter kerf.

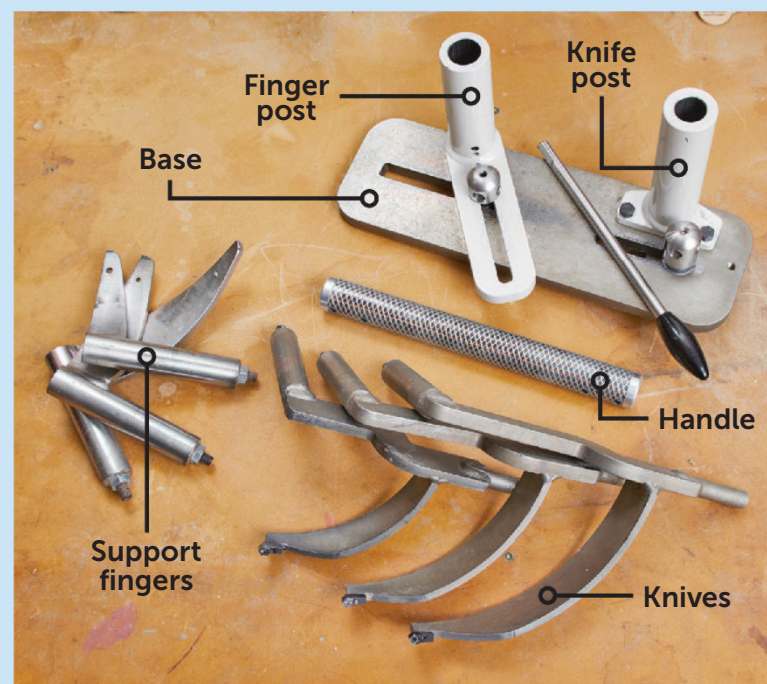
## ONEWAY SYSTEM CUTS TO THE CORE

The few bowl-coring systems on the market differ slightly, but all operate on the same principle: A supported curved knife plunges into a blank to simultaneously form the interior and exterior of adjacent bowls. To turn these bowls, we used the Easy-Core System from Oneway ([oneway.ca](http://oneway.ca)), shown below. It's easy to master and provides excellent results.

The standard system consists of a knife handle and a base with two posts that hold the knives and support fingers. Four base sizes fit lathes with different swing capacities. You choose the one that fits your lathe's capacity.

Interchangeable knives are sold separately and come in four sizes (9",  $11\frac{1}{2}$ ",  $13\frac{1}{2}$ ",  $16\frac{1}{4}$ ") representing the approximate bowl diameter each creates. Each knife comes with an accompanying support finger. Making bowls of three sizes from our blank required two different knives. The knives come with high-speed steel cutters, and Oneway offers carbide versions. We used aftermarket Korpro cutters made by [huntertoolsystems.com](http://huntertoolsystems.com) that are reversible and stay sharp longer.

Though the Easy-Core system requires a sizeable investment, it yields multiple bowls with little waste from rare and expensive blanks. The system requires blanks with fairly flat faces, so it won't accommodate natural-edge blanks with large undulations.





Now mark the depth of each bowl using the same measurements and marks as you used on the face. You'll use these marks to figure out where to position the post for the coring knife. Start with the largest (outside) bowl and mark its thickness ( $1\frac{1}{2}$ " in our case) along with the kerf [Photo C]. Then mark the thickness of the second bowl along with its kerf.

## SET UP THE SYSTEM

Position the banjo and tool rest out of the way, removing them from the lathe if necessary, and place the coring base unit on the lathe ways.

Install the smallest coring knife and matching support finger in their respective base-unit posts, pivoting the support finger off to the side. Adjust the height of the knife in its post so the cutter sits  $\frac{1}{16}$ " above the centerline of the blank. Position and raise the support finger so its shaft centers under and firmly supports the knife, and tighten its locking nut.

Determine the distance between the center of the knife post and the face of the blank [Drawing 1]. Hold the coring knife cutter against the face of the blank centered in the kerf allowance marks for the smallest bowl. Slide and rotate the base unit until the center-of-knife-post to face-of-blank distance matches the distance determined. Tighten the base-unit locking nut.



**C** Start from the bottom of the bowl blank (where the chuck jaws contact the tenon shoulder) and mark the thickness of the largest bowl. Then mark the kerf allowance ( $\frac{3}{8}$ " for our aftermarket cutter).

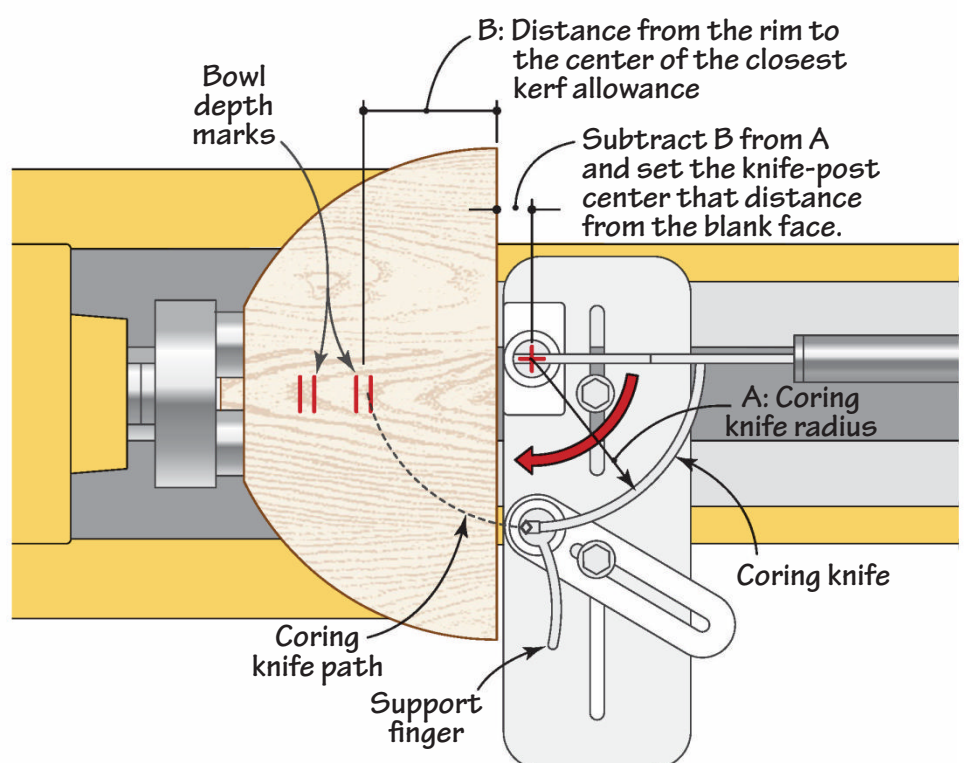
## START CORING

Running the lathe at 500 rpm, slowly pivot the coring knife into the blank. Coring requires only light feed pressure. Any need for excessive pressure means the cutter needs sharpening or replacement, or a chip embedded on the cutter needs to be cleared. As the cut deepens, regularly back out the knife to clear chips. Periodic backing out also keeps the kerf open, because the blank may distort due to releasing internal stress.

**Note:** For large bowl blanks, dampen vibration by engaging the tailstock center. When starting the cut, the coring knife will be in the way, but as the knife pivots into the blank you'll be able to engage the tailstock center.



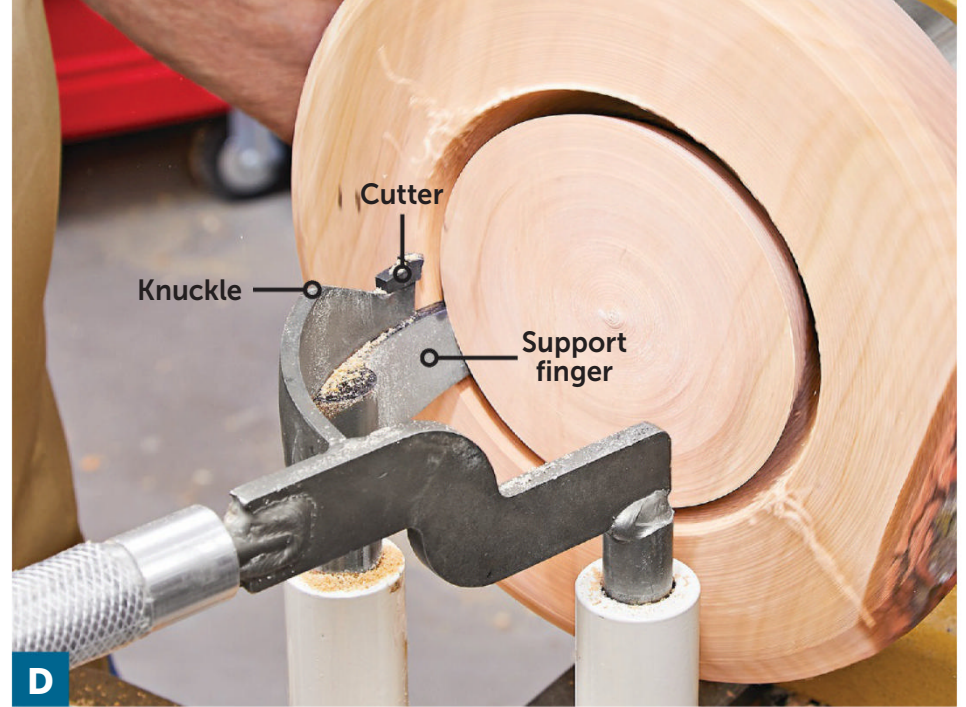
## 1 SYSTEM SETUP





When the knuckle of the knife reaches the blank face, it's time to stop and engage the support finger [Photo D]. Make sure the blank rotates freely and resume coring. As the cut progresses, periodically stop and adjust the support finger deeper into the cut.

As the knife pivots into the blank and the handle approaches a position parallel to the blank face, a slight flutter indicates you are close to the end of the cut. You have two choices: Continue cutting and completely part the bowl from the blank, or stop cutting, turn off the lathe, and break the bowl free with your hand.



Loosen the finger-post nut, insert the finger into the kerf until it bottoms out, and then slightly back it out. Align the curve of the support finger with the curve of the coring knife and tighten the post nut.

## TENON THE CORE

Remove the coring knife and support finger from their posts. Loosen the base-unit locking bolt and slide the unit out of the way. Form a tenon on the bottom of the bowl [Photo E] and set this first bowl aside.

## MOVE ON TO NUMBER TWO

Stow the tool rest and banjo and reposition the base unit. Install the next-larger coring knife and support finger set (the 11½" knife in our case). Use the markings on the blank, just as you did for the first bowl, to position the coring knife and support finger posts. Remove the handle from the first knife and mount it on the second. Core the second bowl [Photo F] and form its tenon.

With coring complete, remove the coring system from the lathe. Position the banjo and tool rest, clean up the inside of the largest bowl as needed, and remove it from the lathe. Repeat with the other two bowls, hollowing the smallest bowl to a wall thickness equal to 10% of its diameter.

Rough-turned green bowls must dry before final turning. Air-drying takes one year per inch of wall thickness. To prevent splitting, some turners coat the entire bowl with Anchorseal while others seal them inside brown-paper bags. Either way, they should be stored in a cool, dry place.

Now you'll have to wait to finish-turn the bowls, but coring is so much fun, let's sweep up the shavings and look for another blank. 🌲



Flip the bowl around and fit it into the blank recess, using it as a jam chuck. Center the bowl, and support it with the tailstock center. Position the banjo and tool rest and form a tenon.



Core the second bowl using the same techniques as the first. When the knife knuckle reaches the blank face, insert the support finger into the kerf to support the knife as you cut deeper.



# SHADOW BOX MIRROR

Mirror, mirror on the  
wall, who's the fairest  
woodworker of all?

WRITER: ZACH BROWN  
DESIGNER/BUILDER: KEVIN BOYLE

OVERALL DIMENSIONS  
33½"W x 5"D x 29½"H

PHOTOGRAPHER: MARTY BALDWIN; ILLUSTRATORS: ROXANNE LEMOINE, LORNA JOHNSON



**C**urate a selection of treasures and check out that beautiful mug on your way out the door with this flexible display mirror.

The vertical dividers are dadoed into the frame for strength, while the shelves remain adjustable. Reposition them over time to display the cool rocks you found in the desert, dried flowers from the garden, and much more.

## SIMPLE SETUP FOR DADOES

**1** Install a  $\frac{1}{2}$ " dado set in your tablesaw and cut a test dado in a piece of scrap. Ripcut stock to width for parts A–F [Materials List], then plane it to thickness until it fits in your test dado. From this stock, cut parts A–F to length.

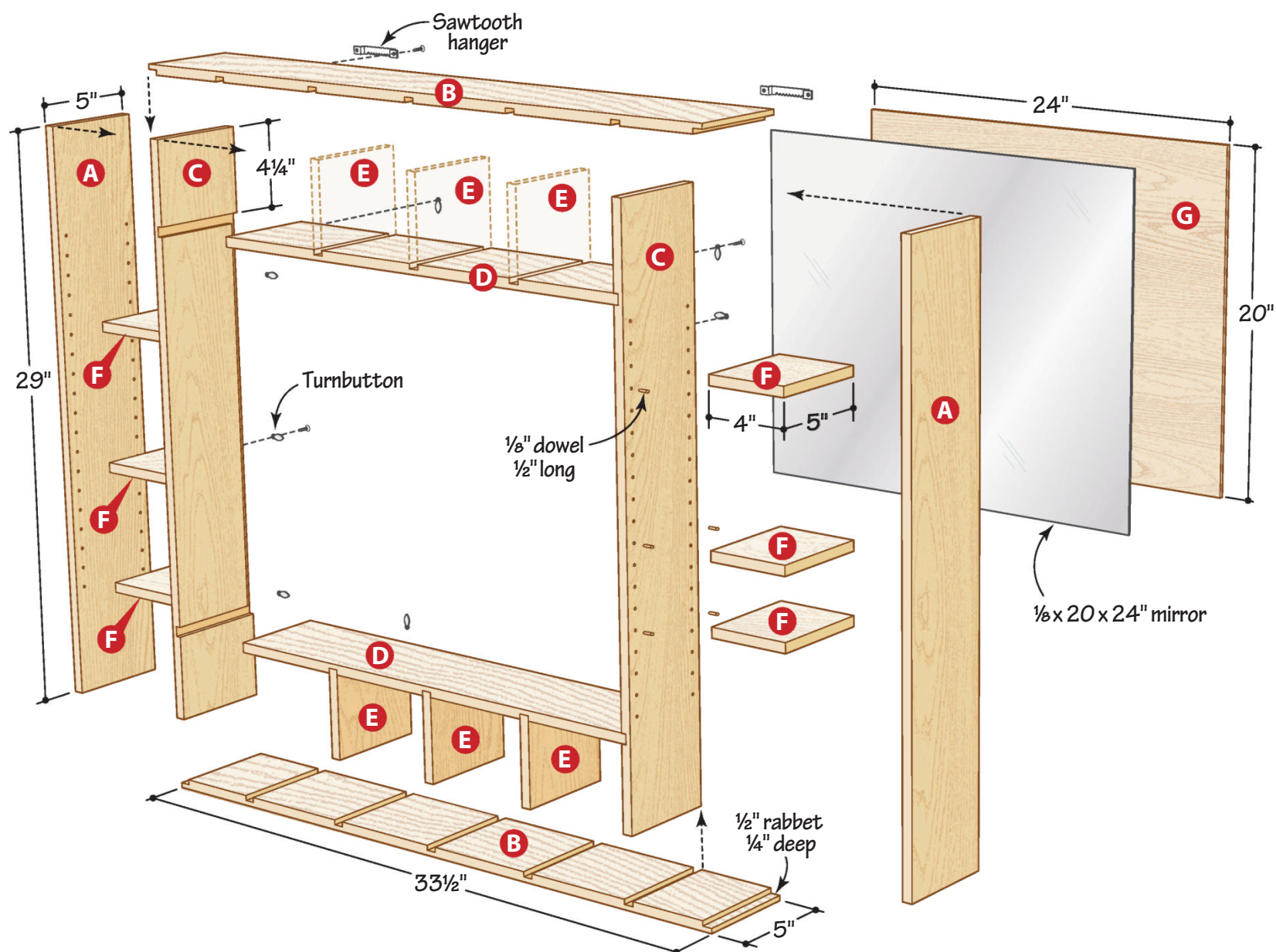
**2** Attach an auxiliary fence to your tablesaw's rip fence, then adjust the fence until it is just touching the



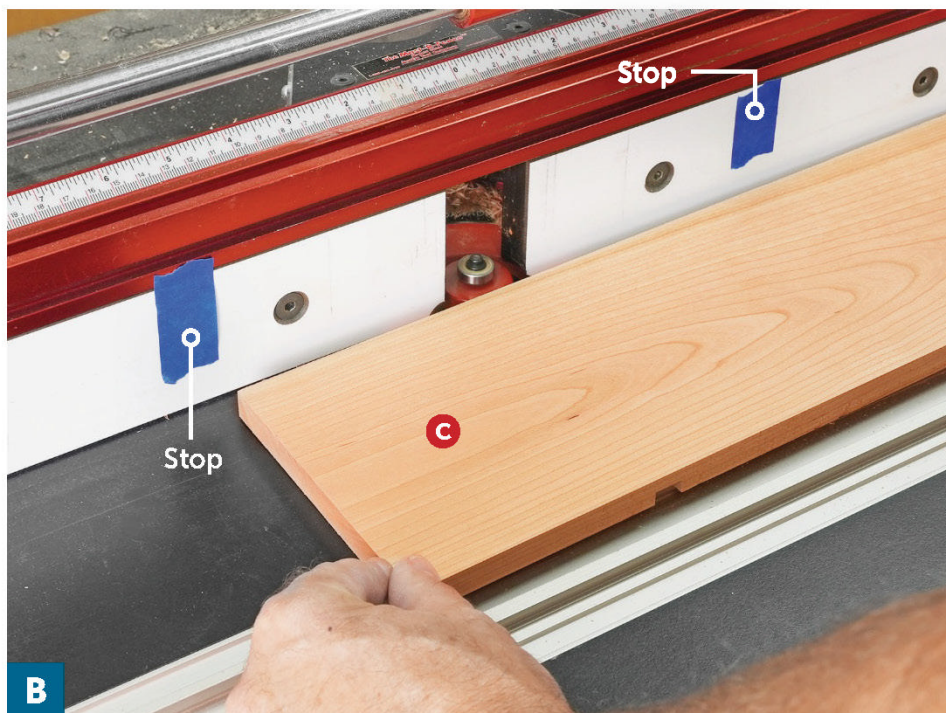
Set the rip fence  $4\frac{1}{2}$ " from the blade to cut the two outermost dados on each outer top and bottom (B). Then, adjust the fence and repeat for the remaining dados.

dado blade. Install another auxiliary fence on your miter gauge, and use it to rabbet both ends of the outer top and bottom (B) [Drawing 1]. Remove the auxiliary fence from the rip fence, then cut the dados [Photo A].

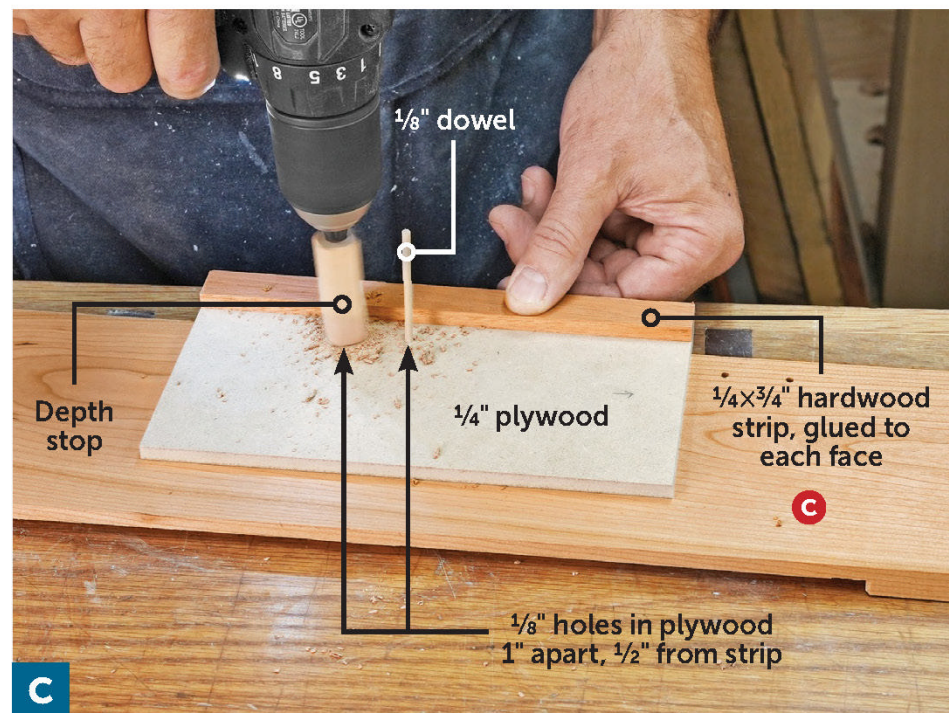
## EXPLODED VIEW







Install a rabbeting bit in your router table and rabbet the inner top and bottom (D) and inner sides (C). Use masking tape on the fence to indicate starting and stopping points for the stopped rabbets.

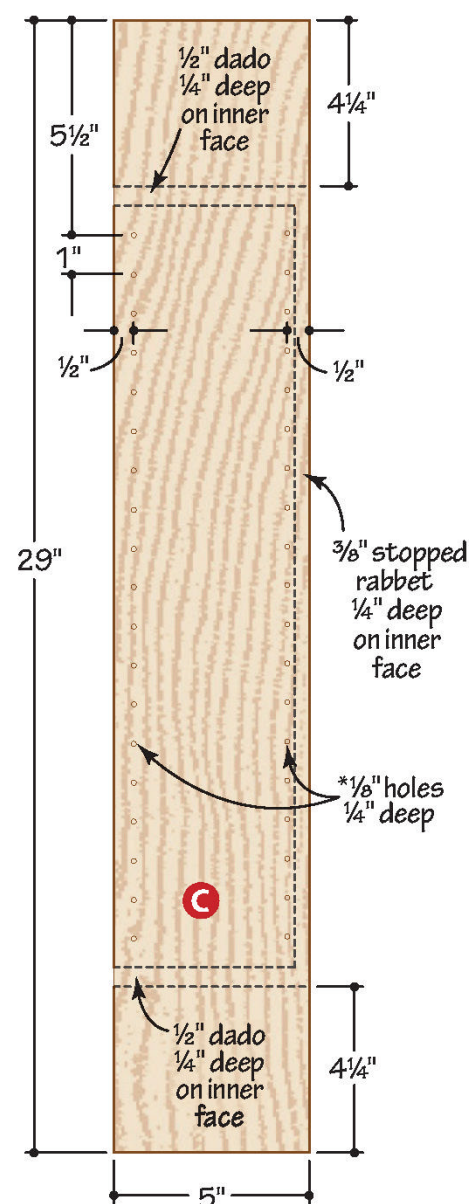


Use a  $\frac{1}{8}$ " dowel to register the jig in a previously drilled hole as you drill the shelf-pin holes. A piece of scrap with a  $\frac{1}{8}$ " hole through the center makes a good depth stop.

**3** Cut the dados in the inner sides (C) and inner top and bottom (D) [Drawings 2 & 3] using the same method. Then move to the router table to create the stopped rabbets on the inside faces of the inner sides [Photo B]. Use the same setup to rout full-length rabbets in the inner top and bottom.

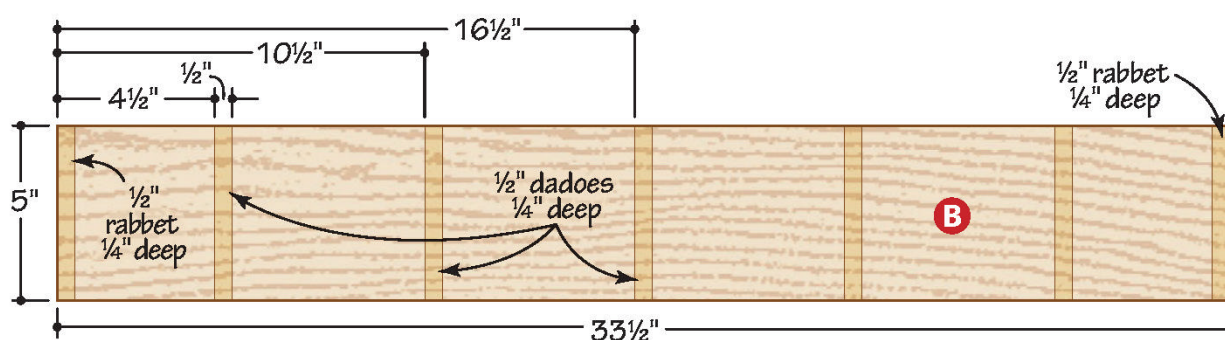
**4** Make a simple hole-drilling jig and use it to drill the shelf-pin holes in the outer sides (A) and inner sides (C) [Photo C].

## 2 INNER SIDES (Right side shown; left side is a mirror image.)

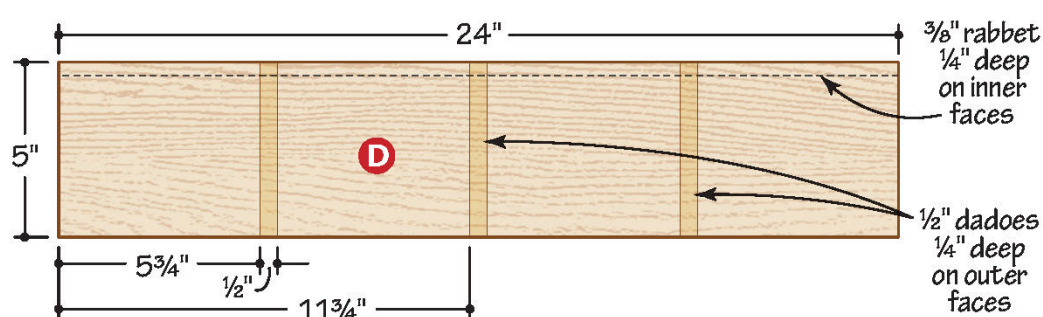


\*Note: Use the same shelf-pin hole layout on the inner faces of the outer sides (A).

## 1 OUTER TOP/BOTTOM



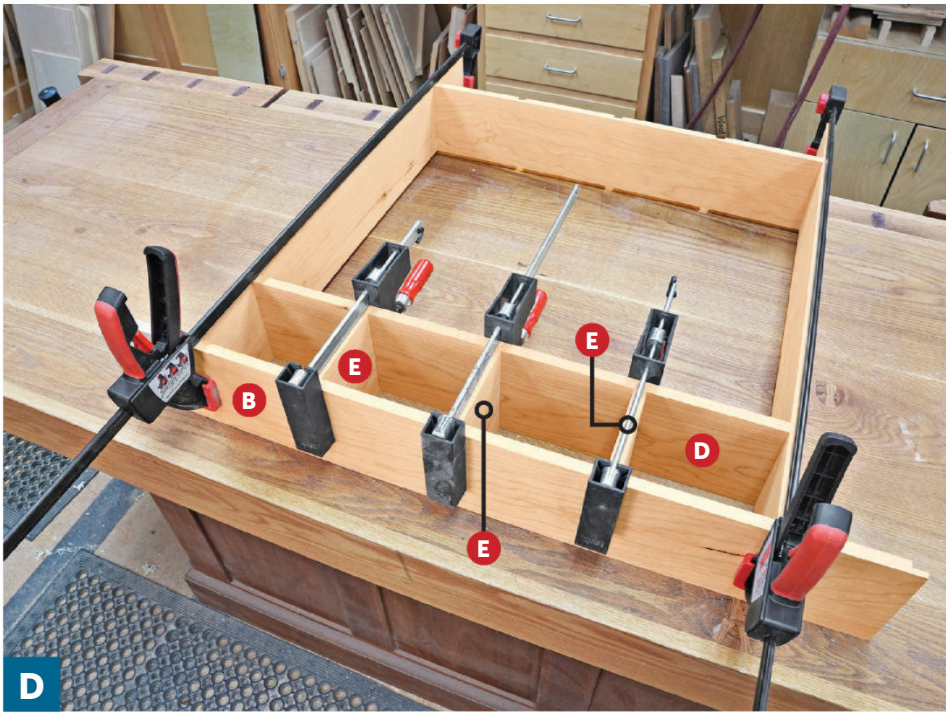
## 3 INNER TOP/BOTTOM





ASSEMBLE AND HANG

- 1 Finish-sand the parts. Be careful not to sand too much on the ends of the parts, loosening their fit in the dados.
- 2 Glue and clamp the inner top and bottom (D) between the inner sides (C), checking for square [Exploded View]. Once the glue dries, add to the assembly three vertical dividers (E) and one outer top/bottom (B) [Photo D].
- 3 After this end of the assembly has had time to dry, add the remaining vertical dividers and outer top/bottom to the other end [Exploded View]. Finally, glue and clamp the outer sides (A) to the ends of the outer top and bottom to complete the frame assembly.
- 4 Measure the opening and cut the back (G) to fit, then finish-sand. Apply a finish to the frame assembly, shelves, and back. We sprayed on a matte lacquer. Once the finish dries, install the mirror and back using turnbuttons [Exploded View].
- 5 Install sawtooth hangers on the back edge of the outer top (B) [Exploded View]. Spacing these so the centers are 16" apart should align with most wall stud spacing.
- 6 Hang the mirror on a wall aligned with wall studs, if possible. If your location doesn't align with studs, install heavy-duty wall anchors. Lastly, cut 1/2" lengths of 1/8" dowel for shelf pins and install the shelves as desired. Lookin' good! 🌲



Glue three vertical dividers (E) to an inner top/bottom (D). Then, glue and clamp the outer top/bottom (B) to the same end of the assembly.

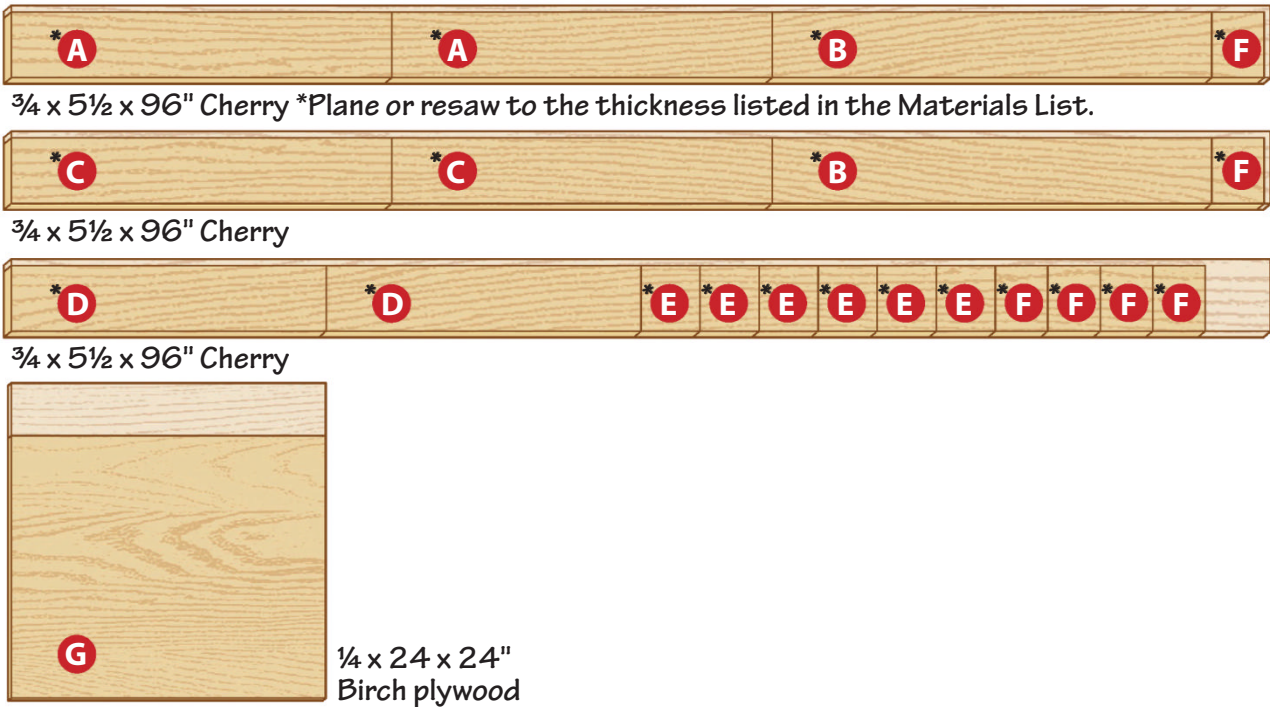
MATERIALS LIST

| PART |                    | FINISHED SIZE |     |      | Matl. | Qty. |
|------|--------------------|---------------|-----|------|-------|------|
|      |                    | T             | W   | L    |       |      |
| A    | OUTER SIDES        | 1½"           | 5"  | 29"  | C     | 2    |
| B    | OUTER TOP/BOTTOM   | 1½"           | 5"  | 33½" | C     | 2    |
| C    | INNER SIDES        | 1½"           | 5"  | 29"  | C     | 2    |
| D    | INNER TOP/BOTTOM   | 1½"           | 5"  | 24"  | C     | 2    |
| E    | VERTICAL DIVIDERS  | 1½"           | 5"  | 4½"  | C     | 6    |
| F    | ADJUSTABLE SHELVES | 1½"           | 5"  | 4"   | C     | 6    |
| G    | BACK               | 1¼"           | 20" | 24"  | BP    | 1    |

**MATERIALS KEY:** C—cherry, BP—birch plywood.  
**BLADE AND BIT:** Dado set, rabbeting router bit.  
**SUPPLIES:** 1/8" dowel  
**SOURCE:** 20x24" beveled frameless mirror no. 4889914, \$21.98; turnbuttons (10) no. 809415 [pack of 4], \$2; sawtooth hangers (2) no. 52716 [pack of 5], \$2.38, Lowe's, lowes.com.  
**PROJECT COST:** It cost us about \$80 to build this project. Your cost will vary by region and source.

CUTTING DIAGRAM

This project requires 12 board feet of 4/4 cherry and 4 square feet of birch plywood based on example boards shown.







# CHOOSING & USING FLUSH-TRIMMING ROUTER BITS

Rout smooth and flush with the precision of these versatile, bearing-guided bits.

WRITER: BOB HUNTER

PHOTOGRAPHER: MARTY BALDWIN



Whether you're creating duplicate project parts from a template or trimming one surface even with another, reach for a flush-trimming bit.

## WHAT THESE BITS CAN DO

A flush-trimming bit is, simply put, a bearing-guided bit that's used to rout one surface flush (even) with an adjoining surface. Several types exist, as shown in *Five Types of Trimmers*, below.



To create a perfect inlay, fit it slightly protruding, then use a flush-trimming bit to rout away the proud surface.



Easily trim solid-wood edging on veneered plywood with a flush-trimming bit and trim router. Hold the base flat on the edging to prevent gouges caused by tilting.

## FIVE TYPES OF TRIMMERS

Flush-trimming bits come in several styles. Here's what you need to know about each one:

### 1. STRAIGHT FLUTE

If you're on a very limited budget, this is your bit because you can find a high-quality one for about \$20. However, its straight flutes increase the likelihood of tear-out.

### 2. ANGLED FLUTE

This bit costs a little more than a straight-flute trimmer, but its shear-cutting angle reduces the risk of tear-out.

### 3. DOWNCUT SPIRAL

So named because the angle of the cutters push fibers away from the router, this solid-carbide bit costs double or more than a straight-flute bit. However, its shear-cutting angle results in almost no tear-out because in flush-trimming situations, it is pushing the fibers toward the supporting template material that the bit rides along.

### 4. UPCUT SPIRAL

Priced about the same as the downcut bit, this bit cuts nearly as cleanly due to its shear angle. Choose this bit when dust collection is a priority. It pulls fibers and chips toward the router where they can be extracted by your dust attachment or more easily fall into your router table.

### 5. COMPRESSION

At \$50 or more, the compression bit costs the most, but we prefer it because it works for nearly all flush-trimming tasks.

Featuring both upcut and downcut spiral cutters angling toward the center, it provides the best protection against tear-out. Most of these come with 1/2" shanks. Dual-bearing compression bits (one above and one below the cutters) prove useful in almost any flush-trimming scenario.





With all types of flush-trimmers, the bearing, located at the end of the bit and matching its diameter, rides against one surface while the cutters trim the other surface perfectly flush, as shown in the opening photo.

Flush-trimming bits excel at trimming edge banding or solid-wood edging and trimming inlays (*previous page*), as well as finishing off proud box joints (*below*) and through dovetails. Regardless of the cutter length, you need only extend enough bit so that the bearing rides against the reference edge. We also prefer flush-trimming bits over pattern bits for template-routing at the router table (see *Flush-Trimming Vs. Pattern Bits: What's the Difference?*, right) because they place the template on top where it's visible and expose no more of the bit than necessary. 🌲



To prevent tilting when using a midsize or larger router to trim edging, clamp two workpieces together with a spacer—even at the top—for better support.



When trimming box joints or dovetails, elevate the project on a scrap board before routing. This ensures the vertical surface sits precisely 90° to the bit.



## FLUSH-TRIMMING VS. PATTERN BITS: WHAT'S THE DIFFERENCE?

A flush-trimming bit has a bearing mounted at the end opposite the shank. A pattern bit's bearing rests between the cutting edges and upper shank, as shown *above*. They perform essentially the same task, but with one significant difference: the amount of bit that must be exposed to make the cut. A pattern bit's entire cutter length must be extended from the router base or table for the bearing to reach the template, a potential safety hazard that increases with longer cutting edges. These bits have a capability flush-trimmers don't, though: With the cutters at the end of the shank, you can rout partial-depth mortises, rabbets, or bowl interiors while following a template.



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## 4 FOR SLOPES, PLAY AREAS, BARE SPOTS AND PARTIAL SHADE

Can't beat Amazoy as the low-cost answer for hard-to-cover spots, play-worn areas, partial shade and erosion on slopes.

## 5 IT STAYS GREEN IN SPITE OF HEAT AND DROUGHT

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shade to full sun.



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|-----------|------------|--------------|------------|-----------|---------|
| 450       | —          | 3            | \$ 47.50   | \$22.00   | —       |
| 750       | +150       | 6            | \$ 72.50   | \$27.50   | 25%     |
| 1100      | +400       | 10           | \$110.00   | \$40.00   | 32%     |
| 2000      | +1000      | 20           | \$180.00   | \$65.00   | 46%     |
| 3000      | +1500      | 30           | \$240.00   | \$75.00   | 52%     |

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| 25          | +5         | 2    | \$ 42.50   | \$20.00   | 25%     |
| 60          | +15        | 5    | \$ 97.50   | \$32.00   | 35%     |
| 120         | +30        | 10   | \$145.00   | \$50.00   | 53%     |
| 240         | +60        | 20   | \$260.00   | \$90.00   | 59%     |

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# HONING GUIDES

A honing guide provides the best way to achieve the accurate, consistent sharpening results your chisels, plane irons, and other edge tools require. Here we present four honing guides that should serve you well. (Depending on your tools, you might need more than one.)



## Lie-Nielsen Honing Guide

This honing guide looks simplistic and small, but it delivers outsized performance, firmly holding plane irons and chisels up to 2<sup>5</sup>/<sub>8</sub>" wide—which covers most of the tools we use. The single roller balances well and the jaws provide good grip. Seven sets of accessory jaws (sold separately for \$45 each) attach to hold chisels narrower than 5/16", mortising chisels, spokeshave blades, and skewed chisels or plane irons.

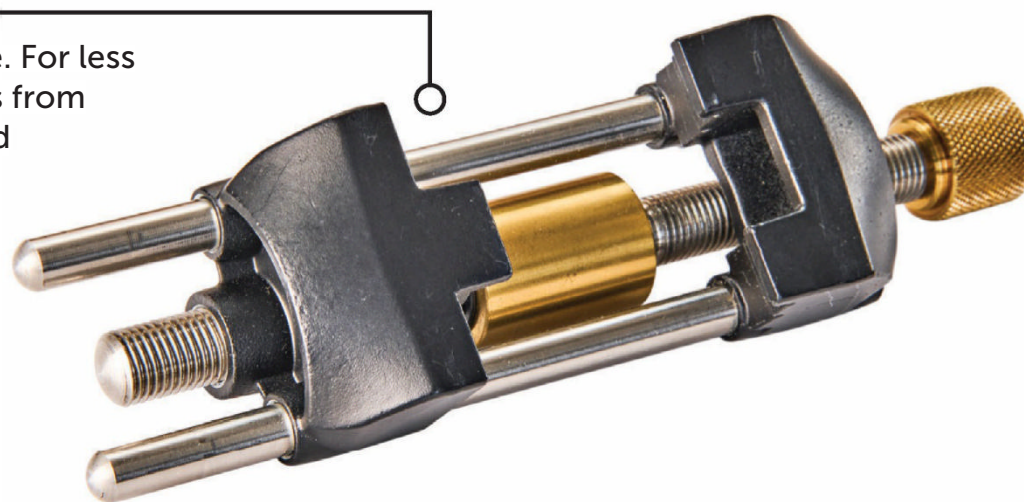
Lie-Nielsen, [lie-nielsen.com](http://lie-nielsen.com)  
no. 1-HG, \$150



### Veritas Side-Clamping Guide

You can't beat the value of this guide. For less than \$50, it holds and sharpens tools from  $\frac{1}{8}$ " to  $2\frac{1}{2}$ " wide. The uniquely shaped jaws enable you to hold differently shaped edge tools, such as shoulder-plane and plow-plane irons, that prove difficult to hold in other guides.

Lee Valley, [leevalley.com](http://leevalley.com)  
no. 05M0940, \$46.50



### Veritas Short-Blade Guide

Because they're too short for most honing guides, blades from spokeshaves, palm planes, and miniature planes limit your sharpening technique to freehand—until now, that is. This guide holds short blades up to  $2\frac{5}{8}$ " wide to sharpen at either 25° or 30°. A registration plate makes it easy to set up the bevel angle. The guide comes with a shim for honing a microbevel, but we found it clumsy to use.

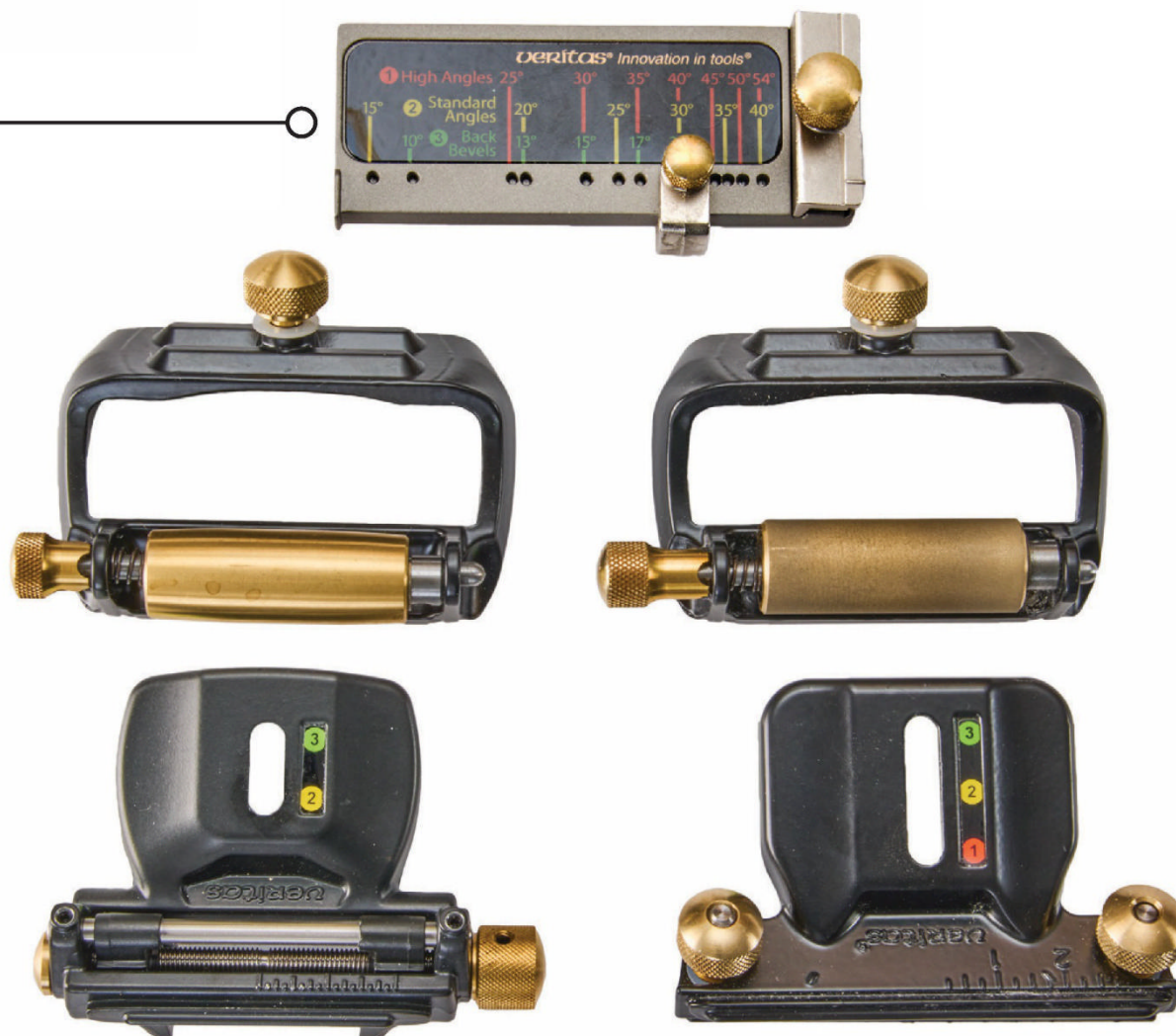
Lee Valley, [leevalley.com](http://leevalley.com)  
no. 05M0930, \$62.50



### Veritas Mk.II Deluxe Set

We have used and loved the versatile Veritas Mk.II Standard Honing Guide (no. 05M0901, \$77.50) to sharpen 15°–54° bevel angles on chisels as narrow as  $\frac{1}{2}$ " and plane irons as wide as  $2\frac{7}{8}$ " up to  $1\frac{5}{32}$ " thick. This set includes that standard guide plus a narrow-jaw guide for chisels and plane irons up to  $1\frac{1}{2}$ " wide. You get two rollers: one flat for standard bevels (most of what you'll sharpen), and a cambered one for irons with slightly rounded bevels, such as for smoothing planes (to avoid gouging on overlapping strokes). The set comes with the handy angle-registration jig. A registration guide for skew chisels (no. 05M0903, \$37.50) is sold separately.

Lee Valley, [leevalley.com](http://leevalley.com)  
no. 05M0920, \$139





# TWO NEW OFFERINGS DUST UP THE SEPARATOR MARKET



## SHOP-TESTED ONEIDA UPGRADES THE DUST DEPUTY

Tester: Dan Chodur

The new Dust Deputy 2.5 features a redesigned air-exchange system with larger 2½"-O.D. ports. That means a standard shop-vacuum hose now fits inside the inlet—which is no longer tapered—for a perfect fit that doesn't obstruct airflow. The included 4½' hose works with either port. In our testing of several separators, this unit consistently trapped the most dust and chips, helping to keep the vac cleaner. I like the drum because it prevents tipping and provides a large collection space that's easy to dump. (You can buy just the separator, no. AXD250504PL, \$95, if you prefer to mount on your own 5-gallon bucket or container.)

Oneida, [oneida-air.com](http://oneida-air.com)  
Dust Deputy 2.5 deluxe cyclone separator kit with 10-gallon drum, no. AXD250010, \$200



## SHOP-TESTED BUCKET-TOPPER WORKS WELL AND COSTS LITTLE

Tester: Dan Chodur

This new separator from Infinity allowed only the finest dust to get through to the vacuum, with performance almost on par with the Oneida Dust Deputy 2.5. And its price makes it a great value.

The 2½"-O.D. ports work well, although no hose comes with the unit. But any common 2½" shop-vacuum hose will work. You also provide the collection container—we used a common 5-gallon bucket with lid. The optional lid stiffener, shown, reduces flex to improve performance; or you could easily make your own from ¾" MDF or plywood.

My only complaint: The setup is tall and narrow, so it tips easily. A weight in the bucket or a shop-made stand would secure it.

Infinity Cutting Tools, [infinitytools.com](http://infinitytools.com)  
DIY Quick Snap dust separator, no. 115-279, \$60; lid stiffener, no. 115-278, \$15



## SHOP-TESTED GO BIG, WITH FINESSE

Tester: Bob Hunter

If you prefer a heavy-duty cordless hammer drill for your shop and tool kit, this new Bosch makes a great choice. The Profactor drill delivers an amazing amount of torque (rated at 1,330 inch-pounds) that powers through difficult drilling, and includes a sensor that stops the chuck when the drill bit binds on a knot or similar obstacle, preventing the sudden twisting yank that happens with most high-torque drills. I drilled all sorts of holes in hardwood, pressure-treated pine, Douglas fir, and concrete (hammer mode for that one), and found this drill up to the challenge each time. Plus, included sensors help you accurately drill angled holes. This big torquer might be overkill for many shop uses, but it's a good workhorse to have around.

Bosch, [boschtools.com](http://boschtools.com)  
18-volt Profactor high-torque hammer drill, no. GSB18V-1330CN, \$200 (battery and charger sold separately)



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**PROJECT ASSEMBLY PRODIGY**  
A companion to the “Small Shop Project Center” (page 32), this mobile workhorse makes assembly easy with ample workspace and tools close at hand.



**ARTS & CRAFTS FLOOR LAMP**  
Mica panels bank the light to a warm glow, while white oak grain shines through in this timeless tall lamp.



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These compact machines offer full-sized flattening at an entry-level price, making them great if you're buying your first or if you just want to save some room in a space-starved shop. We test 12 to find the best.

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