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**SHOP-TESTED:**  
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**Sliding**  
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# TAKING MEASURE

WOOD  
MAGAZINE

## Strike a cord



In 2002, I got my hands on a Porter-Cable 9290: the first cordless router powerful enough for woodworking. In our tests, we routed more than 100 lineal feet of ½" round-over in red oak before exhausting its 19.2-volt battery. Today's cordless routers weigh way less and rout three times as much on a charge.

My parents gifted me my first cordless tool (a 9.6-volt Makita drill driver—you know the one) when Annette and I bought our first house in 1988. Dad already had one, and when we worked on projects together, I marveled at the tool's convenience, despite its awkward nose-heaviness and the need to recharge the battery after driving a few dozen fasteners.

Over the years, manufacturers jacked up voltage to improve runtimes, and tried to cut the cord from other tools, such as circ saws, jigsaws, and sanders. But most of those early efforts fell short of expectations, even with 18 volts bursting from the bulky batteries.

Fast-forward 20 years or so: I'm at a product launch where Milwaukee Tool revealed a line of tools powered by 36-volt lithium-ion batteries, the highest voltage yet for cordless tools. Fed up with the I-can-top-that escalation of (battery) power, a cynic at my table shouted, "Why not 120-volt cordless!?"

He might have simply asked, "Why?"

Turns out, his outburst was more foreshadowing than flippant. Today, rechargeable batteries power routers, shop vacuums, and even tablesaws. All manner of outdoor equipment, from string trimmers, to chainsaws, to riding lawn mowers, fer-cryin'-out-loud, come in capable cordless and fuel-free versions. You can even buy battery-powered inverters to run the tools that aren't already battery-powered.

Why? Why go cordless in the shop, where open outlets abound? Just as in 1988, convenience. Work anywhere without dragging out an extension cord. Rout around a panel without ever stopping to move the cord out of the way. I even prefer a cordless tool when it's tethered to a dust-collection hose; without a cord, I've cut half of the hassle.

Fact is, with today's brushless motors, you don't compromise performance for the sake of portability. For example, in our test of compact mitersaws starting on *page 52*, five of the six cordless models tested achieved more than 200 cuts through 2×4 pine on a single charge. (Pretty sure I'd be exhausted before the batteries on these things...)

Twenty years ago, I had my garage extensively/expensively rewired because its shared circuit breaker and few code-mandated receptacles couldn't accommodate the demands of a power-tool-intensive woodshop. The same garage shop five years from now will probably get by with those scant outlets occupied by a few battery chargers.

Why not?

See you in the shop!

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Instagram: @wood\_editor

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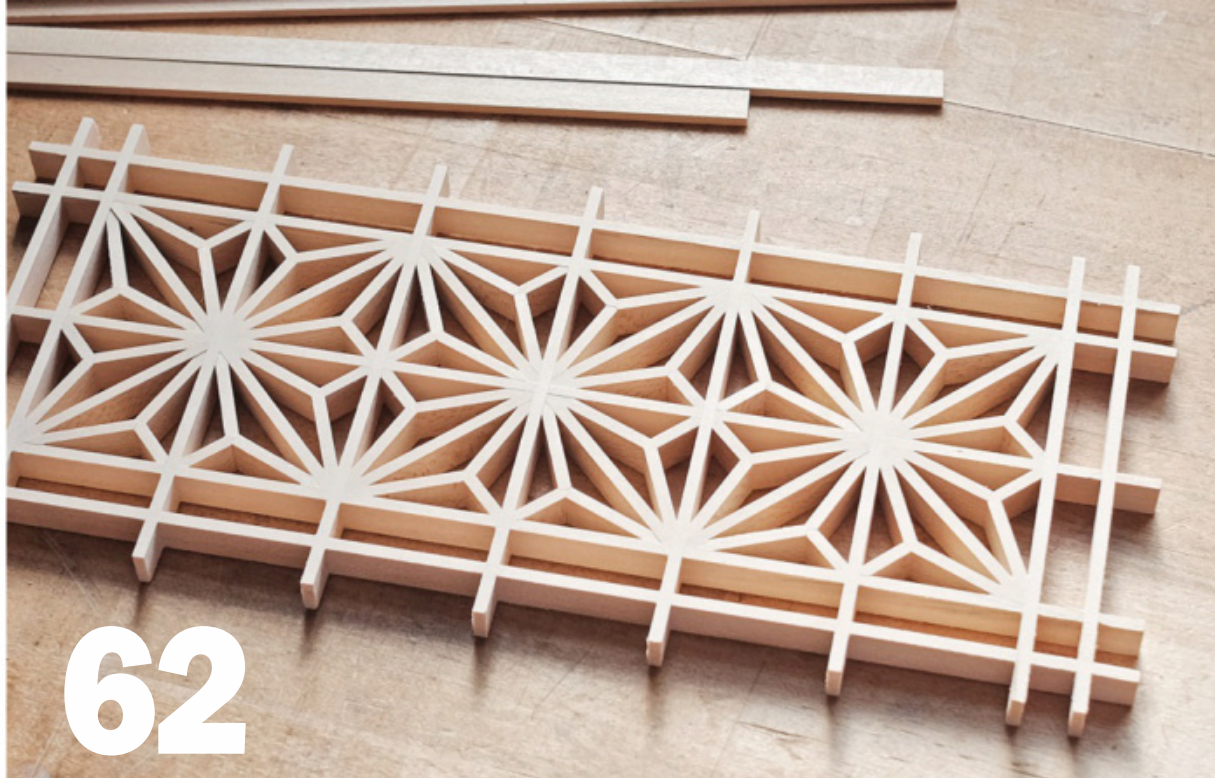
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# HI, BOARD, I'M DAD.

Father's Day is near. And we all know what that means. That's right: dad jokes. Universally considered the pinnacle of humor and the crowning achievement of the successful *paterfamilias*, dad jokes go together with woodworking like farts and matches. To wit...



"You make a better door than you do a window."

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"How'd these lumber-milling articles get on the internet? They logged in."

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Using a bandsaw mill: [woodmagazine.com/123456](http://woodmagazine.com/123456)

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Working with natural-edge slabs: [woodmagazine.com/letmein](http://woodmagazine.com/letmein)



"I can cut a board just by looking at it. It's true! I saw it with my own eyes."

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Cast your eyes upon these tracksaws: [woodmagazine.com/myowntracksaw](http://woodmagazine.com/myowntracksaw)

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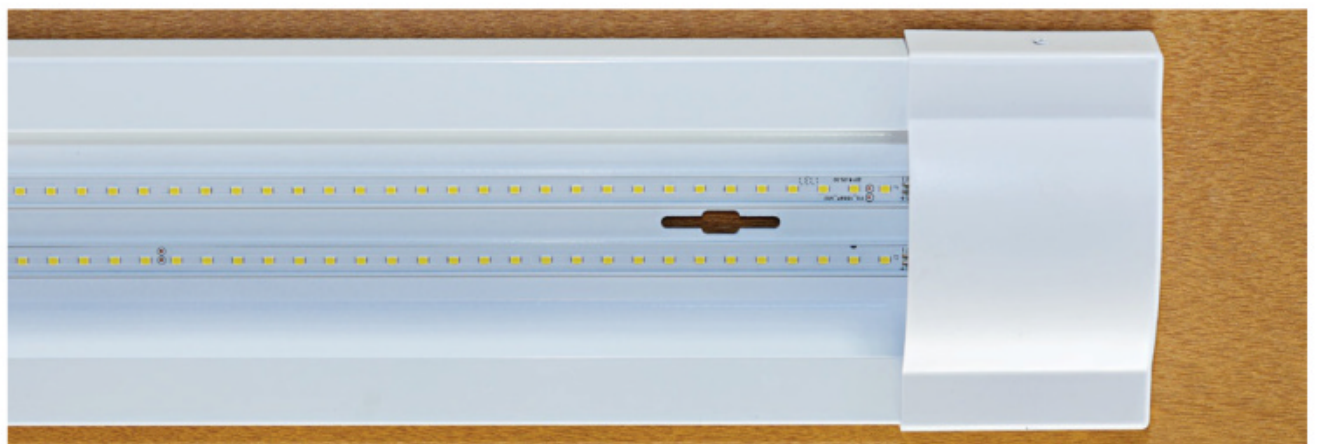
"Dad, can you make me a sandwich?" "Poof! You're a sandwich!"

Can you make me a shelf? [woodmagazine.com/poofyoureashelf](http://woodmagazine.com/poofyoureashelf)

Can you make me a box? [woodmagazine.com/poofyoureabox](http://woodmagazine.com/poofyoureabox)

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"People are usually shocked when they find out I'm a poor electrician."

Brilliant shop lighting upgrades: [woodmagazine.com/betterlight](http://woodmagazine.com/betterlight)

Workshop wiring requirements: [woodmagazine.com/shopwiring](http://woodmagazine.com/shopwiring)

Anything wrong with two-prong? [woodmagazine.com/twoprong](http://woodmagazine.com/twoprong)

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# SOUNDING BOARD

## YOUR VOICE

### The tower of the hour

*I've had a clutter problem in my shop for quite awhile, so when I saw the Tool Tower on the cover of issue 273 (March 2021), it all clicked for me! I knew it was the exact plan I needed. I modified the design to hold my large tablesaw jigs on the left side and the back, as shown below. Those are now up off the floor and out of the way.*

*I reused some old drawer pulls and other hanging hardware that had been waiting years to be put back to use, so I was able to build it all under your estimated budget. I really appreciate the guidance and plans you provided. Thank you!*

—**Dave Dillman**  
Durango, Colo.



*Your Tool Tower project was timely for me, as I had just begun to design a caddy for my sanding machines and tools. Using your plan as inspiration, I was able to go well beyond what my original ideas were. Because electrical outlets are limited in my garage shop, I mounted a power strip with a long cord on my tower, as shown above right. Now I only have to run one cord to wherever I'm working to connect all my power tools.*

*Quick story about the ugly color: I had a half pint of Sedona Red stain that I had tried on another project (hated it), so I decided to use it up here. Still hating it on the tower, I thought a contrasting color might help, so I also stained some parts Colonial Maple. As luck would have it, I ran just short of the Sedona Red and had to buy another half pint to finish the staining.*

*Thanks for the great project. I enjoy reading WOOD® magazine and look forward to each issue. My skills have definitely improved because of your tips, articles, and projects.*

—**Allen Kerns**  
Cincinnati, Ohio

*I'd been looking for a way to create more storage in my small shop and then issue 273 arrived with the Tool Tower plan. Perfect! I may modify the plan to fit the tower under a set of stairs.*

*I do have a couple of suggestions: First, I like to use plastic garden-hose holders for hanging my pneumatic hoses and electric cords—the curved surface minimizes kinking, and I can hang several hoses/cords on each. Colored hook-and-loop straps help keep them separate. Second, I would recommend loading the heaviest items on the bottom of the Tool Tower to prevent a tipping hazard.*

—**Tom Chadwick**  
Glen Rock, N.J.

The top-shelf spacing discourages storing heavy tools up high, Tom. But I've been using this design in my home shop for several years and never had a problem with tippiness. As you can see, my tower (at right) is still standing tall, despite three loaded, fully extended top drawers.

—Kevin Boyle,  
Senior Design Editor



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# SOUNDING BOARD

## YOUR PROJECTS



After seeing photos and videos about them online, **Dan Aas**, of Fort Myers, Fla., decided to build a “tensegrity” (tensional-integrity) table out of walnut, along with some maple and ash in the top. Nearly invisible threads of 80-pound-test fishing line connect the corners; a three-filament braid of the same line provides the center tension.



**Chuck Belesky**, of Riley, Mich., made this tool chest for his 14-year-old grandson, Colton, completely out of air-dried cherry harvested from a tree that fell in the family cemetery. Plans came from issue 217 (March 2013).



Fascinated by the 3D look of the Zigzag Box in issue 243 (November 2016), **Larry Luebbert**, of Iowa City, Iowa, borrowed the design to make the lid of this Japanese puzzle box for his magic-loving grandson, Drew. It takes four steps to access the box interior, which holds 8½×11" materials.



After a four-year hiatus, **Andrew Thaler**, of St. Michaels, Md., fired up his woodworking tools again during the lockdown and built most of the furniture in his family's new house. The legs of this table came from a piece of African mahogany Andrew found in the old farmhouse they moved from; the natural-edge tabletop is locally sourced cherry.



►To find the plans that inspired many of these projects, search [woodstore.net](http://woodstore.net), or point your smartphone's camera at this code.



## SOUNDING BOARD YOUR PROJECTS



Inspired by our tabletop version in issue 268 (July 2020), **Kevin Rutter**, of Granite Falls, N.C., went all out and built this full-size shuffleboard table. Its 9'-long spalted-hickory top, with inlaid aluminum markers, contains several humidors in pockets to ensure the table maintains a perfect cope. Kevin fashioned the scorekeepers from fiberglass tent rods.



**Cecilia Turriff**, a 70-year-old grandmother from Green Bay, Wis., upcycled a stained-glass panel from an old house, an oak futon, and hardware from a sample board at the Habitat for Humanity ReStore to build this cabinet.



This amazing globe, built by **Roy Quast**, of Hockley, Texas, consumed countless hours and 2,268 pieces of 40 different wood species from around the world. The 12½" globe spins in a 17½"-tall stand.

**Mark Oliver**, of Elizabethtown, Pa., chose to showcase rather than discard sharply contrasting heartwood and sapwood in this curly-maple bread box with walnut accents. The lid features a geometric cutting board, with a crumb-catching grid to keep the kitchen tidy.



### Send us a photo of your work

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

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9

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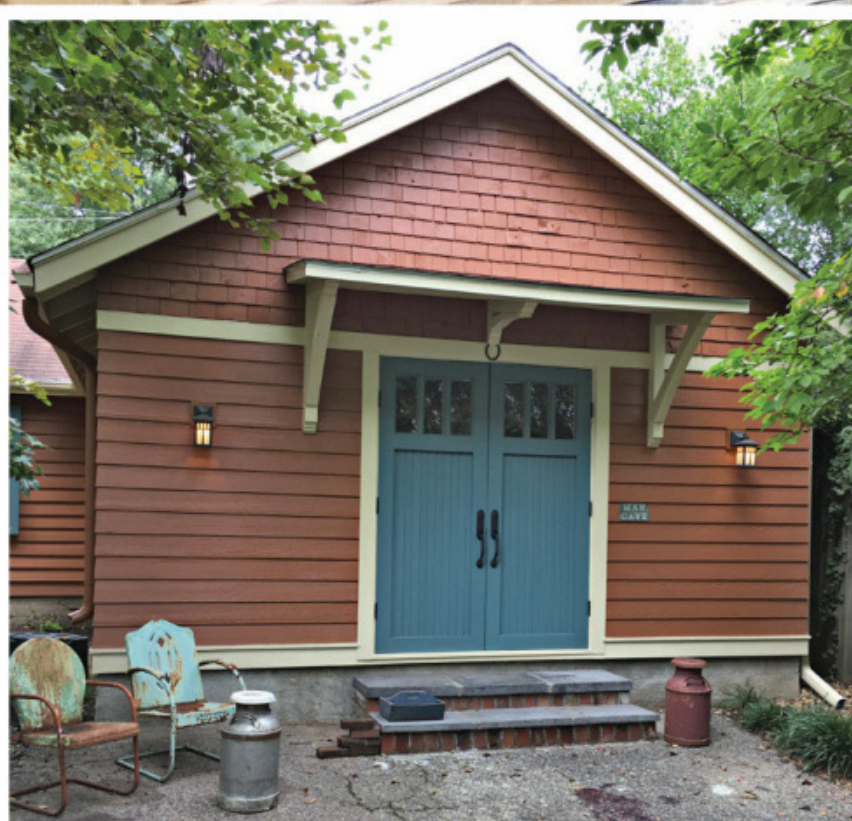


# SOUNDING BOARD

YOUR SHOP

Reclaimed flooring and a corrugated metal ceiling reduced construction costs while adding a nostalgic, industrial feel to the workshop.

## Vintage Garage: The Extended Edition



Originally a two-car garage with an attached cottage, Dan extended the garage structure to its 37'x19' footprint while keeping the guest cottage intact.



Dan tucked a rest haven into one corner. He and his wife often take breaks and relax in this cozy spot.

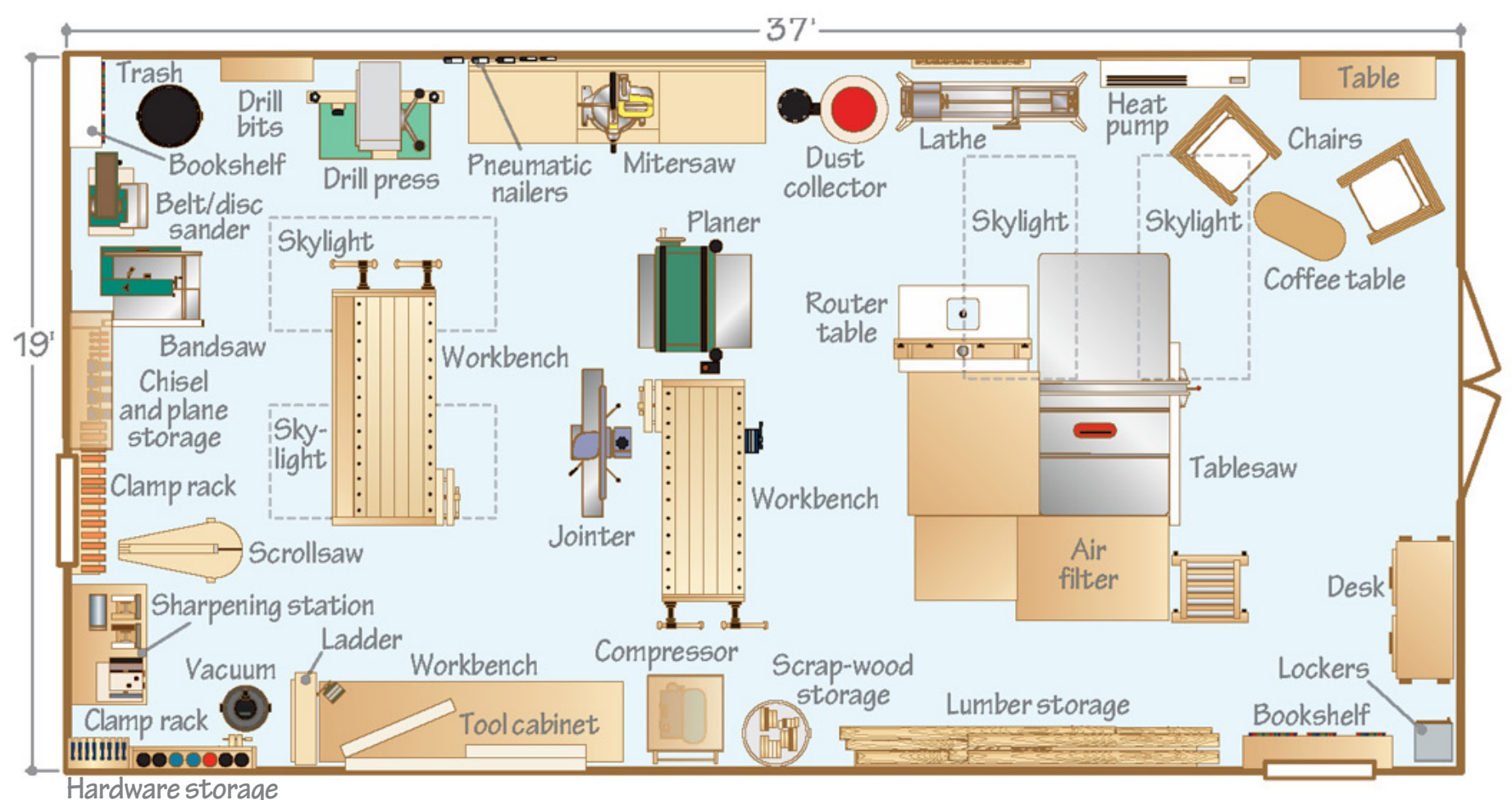
Living in a 1920s-vintage neighborhood in the city means garages are small, if they exist at all. So Dan Swanson considered the two-car garage on his midtown Memphis city lot a luxury.

Even at that, Dan realized the garage was too small to meet his requirements for a workshop. So, he poured a slab in front of the garage, built an addition, and used a laminated beam to span the original opening. Traditional construction calls for wood collar ties across the top plates of opposing walls to prevent them from bowing out.

However, Dan was after a more open feel, so he had a local metal shop fabricate steel rods and turnbuckles to tie the walls together.

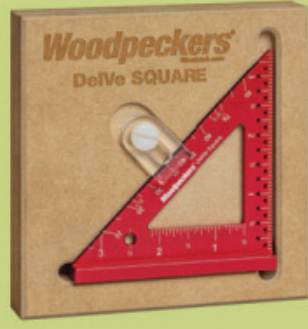
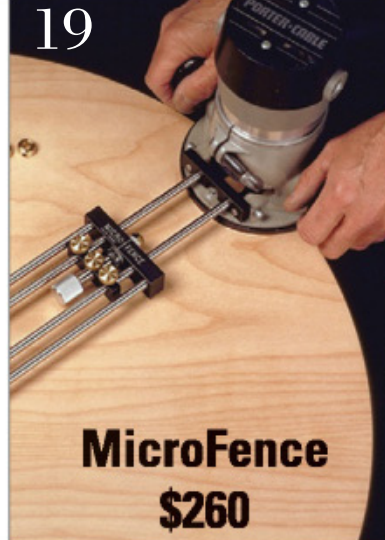
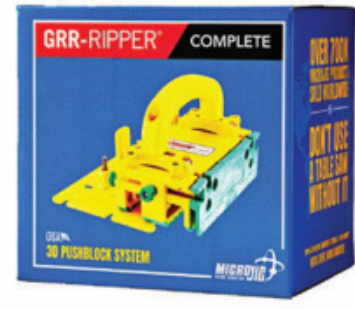
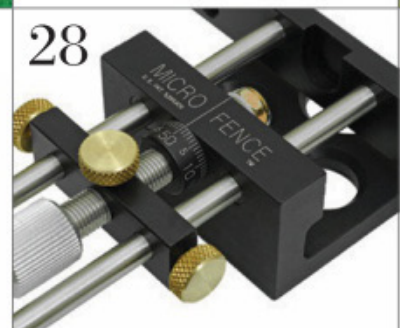
Dan covered the floor of the shop with a moisture barrier, two inches of rigid foam insulation, then a layer of ¾" plywood sub-floor with reclaimed oak flooring.

He sprayed foam on the interior walls and ceiling, then covered the walls with painted T1-11 sheathing. That means he doesn't have to always find a stud when mounting cabinets and tool racks, though he still tries to screw into wall studs where possible. Recycled steel





# WOOD Father's Day Giveaway

| SUNDAY                                                                                                                                                                    | MONDAY                                                                                                                                  | TUESDAY                                                                                                                                            | WEDNESDAY                                                                                                                         | THURSDAY                                                                                                                                | FRIDAY                                                                                                                                | SATURDAY                                                                                                                                             |
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| <p>9</p>  <p><b>Peachtree</b><br/>\$105</p>                                              | <p>10</p>  <p><b>The Woodsmith Store</b><br/>\$100</p> | <p>11</p>  <p><b>Lignomat</b><br/>\$92</p>                       | <p>12</p>  <p><b>Woodpeckers</b><br/>\$120</p> | <p>13</p>  <p><b>WOOD Magazine</b><br/>\$150</p>     | <p>14</p>  <p><b>Fuji Spray Systems</b> \$275</p> | <p>15</p>  <p><b>Roo Glue</b><br/>\$80</p>                        |
| <p>16</p>  <p><b>Woodpeckers</b><br/>\$270</p>                                         | <p>17</p>  <p><b>Peachtree</b><br/>\$60</p>          | <p>18</p>  <p><b>Woodworkers Guild of America</b><br/>\$129</p> | <p>19</p>  <p><b>MicroFence</b><br/>\$260</p> | <p>20</p>  <p><b>Roo Glue</b><br/>\$80</p>         | <p>21</p>  <p><b>Peachtree</b><br/>\$70</p>      | <p>22</p>  <p><b>WOOD Magazine</b><br/>\$150</p>                |
| <p>23</p>  <p><b>Lignomat</b><br/>\$92</p>                                             | <p>24</p>  <p><b>Woodpeckers</b><br/>\$90</p>        | <p>25</p>  <p><b>Peachtree</b><br/>\$55</p>                     | <p>26</p>  <p><b>Castle</b><br/>\$400</p>    | <p>27</p>  <p><b>The Woodsmith Store</b> \$130</p> | <p>28</p>  <p><b>MicroFence</b><br/>\$220</p>    | <p>29</p>  <p><b>Woodworkers Guild of America</b><br/>\$129</p> |
| <p>30</p>  <p><b>WOOD Magazine</b><br/>\$150</p>                                       | <p>31</p>  <p><b>Fuji Spray Systems</b> \$459</p>    | <p><b>Enter Daily May 7 - 31, 2021</b></p> <p><a href="http://WWW.WOODMAGAZINE.COM/MAY2021SWEEPS">WWW.WOODMAGAZINE.COM/MAY2021SWEEPS</a></p>       |                                                                                                                                   |                                                                                                                                         |                                                                                                                                       |                                                                                                                                                      |

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**Clamshell-style cabinets Dan built for his tools** double the storage space while keeping items readily accessible.



**To maximize wall space** Dan opted to not install additional windows. Four skylights and several daylight LED warehouse fixtures provide plenty of illumination.

corrugated panels line the vaulted ceiling. Dan was pleasantly surprised that the metal didn't amplify the noise level in the shop.

A 100-amp subpanel from the 200-amp main panel in the house provides electricity. Dan mounted most of the receptacles 4' above the floor for convenience. An Amana 15,000-BTU heat pump takes care of heating and cooling the shop.

Walking through the double doors, you face Dan's tablesaw. He included storage underneath the large outfeed table and tucked his router table behind the tablesaw, next to the outfeed table. Dan made an air-filtration system using an old furnace blower. It resides in a cabinet that doubles as a tablesaw wing extension.





**Dan built this well-organized till** to provide easy access to his hand tools. He says he wants to learn how to use them more often in his woodworking projects.



**A salvaged base cabinet** from an old church serves as a handy work surface. Wall space above gives Dan plenty of real estate for more storage.

Press deeper into the shop and you'll find a pair of traditional woodworking benches: one he built, and another he completed from a benchtop his father made. Dan built a mobile, dedicated sharpening and buffing station in addition to a cart to house the hot-dog-style air compressor, hoses, and accessories.

Dan included his father's shop-built scrollsaw in his collection of tools. In one corner he keeps a collection of books and magazines next to a desk made by a friend.

In another corner, next to the entrance to the shop, Dan created a seating area. His wife often brings out a beverage and a cheese tray on Saturday afternoons. "That's my cue to quit," he says. In nice weather, they open the double doors and "enjoy the waning day." 🌳



**After working behind a desk** as an attorney, Dan Swanson likes to unwind in his spacious workshop.

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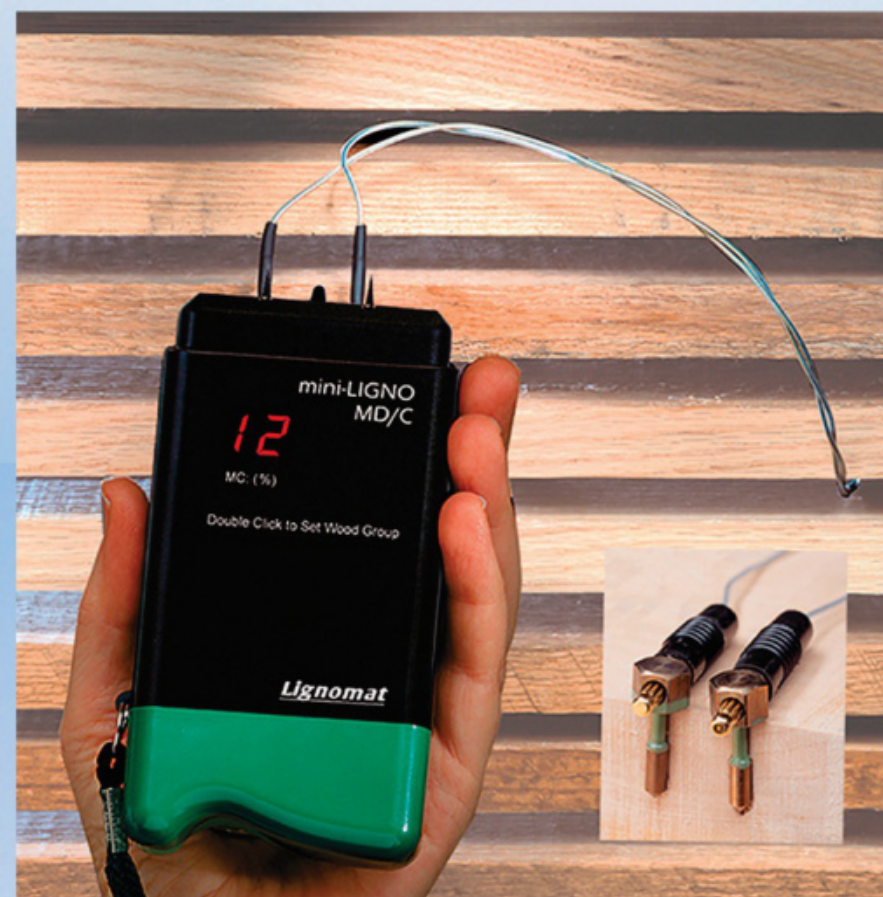


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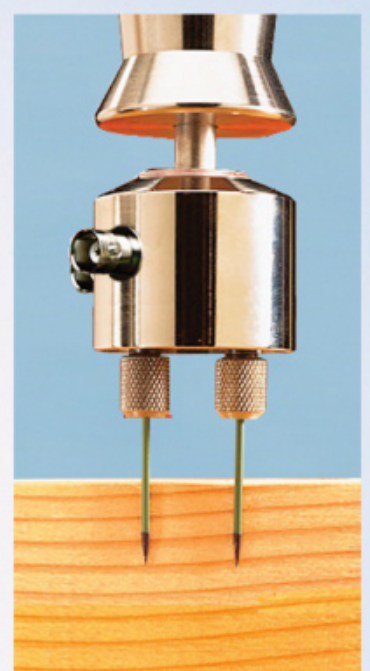
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## Q Clearing the air on respirator ratings

I recently started to order some disposable dust masks to use in my shop and was a bit overwhelmed by all the choices. What do the different ratings mean and which one is best for woodworking?

—Guy Rule, Boise, Idaho

A Before answering your question, Guy, let's make a distinction between the different types of dust masks and respirators. So-called “nuisance” dust masks are the inexpensive, loose-fitting masks often sold in bulk packs. While these may help prevent large dust particles from causing a sneezing or coughing fit, they aren't very effective at filtering out fine dust. Respirators, on the other hand, form a tight seal around your mouth and nose, filtering the air as you inhale and preventing that fine dust from entering your lungs where it can cause damage. Respirators are available as disposable, paper/cloth masks or as half- or full-face elastomeric masks with replaceable cartridges.

In order to help users select the proper respirator for the task at hand, the National Institute for Occupational Safety and Health (NIOSH) sets standards for respirators sold in the United States. Manufacturers label all NIOSH-approved respirators and cartridges with a letter/number designation based on the type of particles they filter and their efficiency. The three classes of respirators are N for non-resistant to oil, R for oil-resistant, and P for oil-proof. But the effectiveness rating matters most to woodworkers. A respirator



with a rating of 95 filters out 95% of particles down to three microns in size. (For comparison, the average human hair measures approximately 70 microns in diameter.)

Disposable N95 respirators adequately protect your lungs from airborne sawdust and are a little more comfortable to wear than a full-face respirator. If you have lung issues or a health condition requiring added protection, choose an N99 or N100 respirator. When spraying oil-based paints or finishes, choose a half- or full-face respirator equipped with cartridges capable of filtering out organic vapors.

Keep in mind that any respirator works only if you wear it properly. Check for a good seal around your nose and mouth to prevent air from entering around the filter. And most important, remember to put it on *before* you fire up that table saw, sander, or spray gun. 🌳

Have a question?  
Drop us an e-mail.  
[askwood@woodmagazine.com](mailto:askwood@woodmagazine.com)



Disposable N95 respirator

Half-face cartridge respirator

Nuisance dust mask

**Look for a rating** stamped directly on the front of the respirator (*left*) or on the replaceable cartridges (*center*). Nuisance dust masks (*right*) are not rated and will be unmarked.





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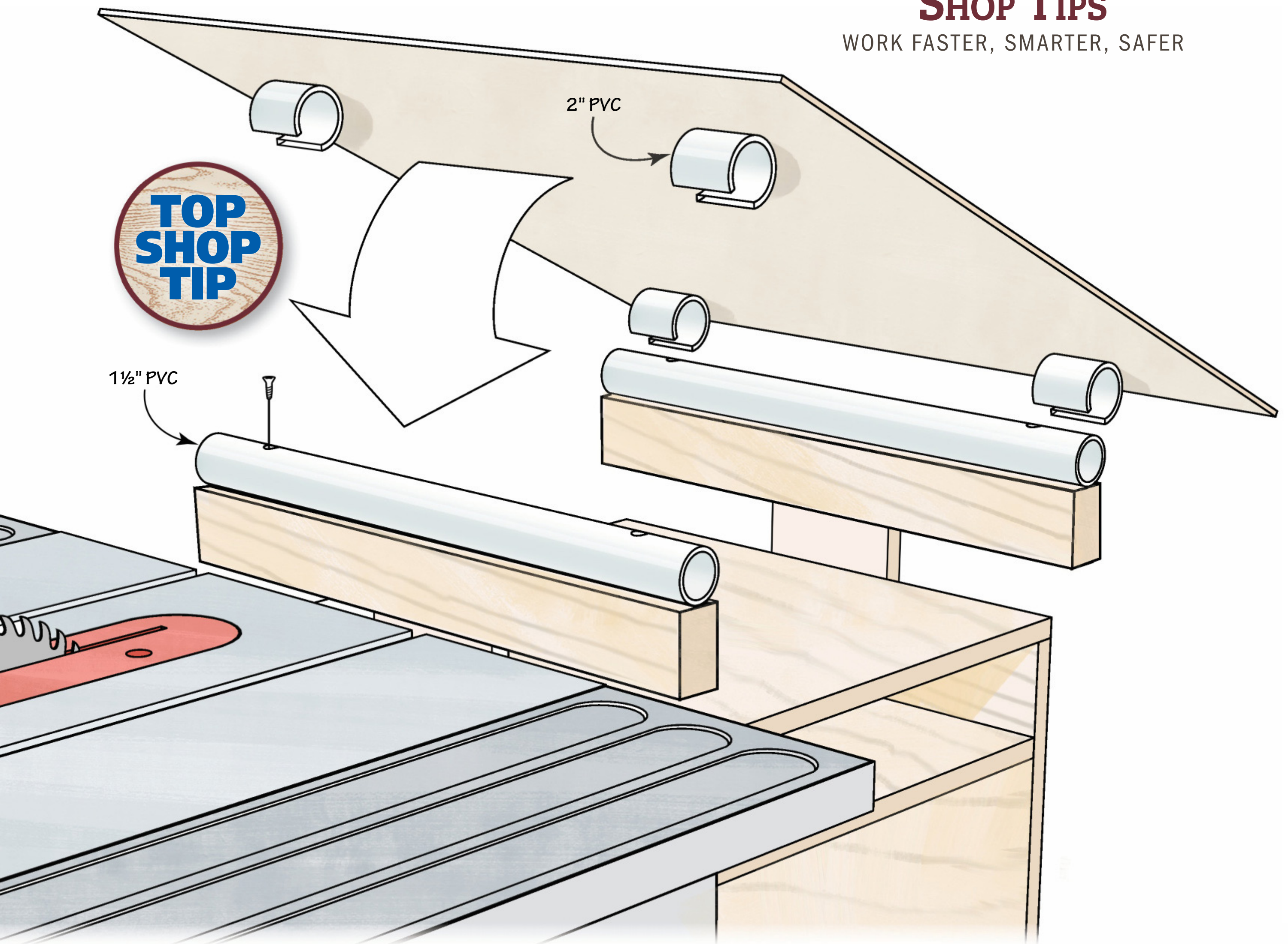


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## Extended service with clip-on auxiliary worksurface

I use a mobile cart with adjustable-height rollers as outfeed support for my tablesaw. Because of the motor and dust collection hose, I can't position a roller close enough to prevent short pieces from falling to the floor. To support and "capture" these pieces, I made an auxiliary table that clips onto the cart.

First, I replaced the steel rollers with 1 1/2" PVC pipe sections, securing them with screws to a length of 2x4. To create the clips that

snap over the 1 1/2" pipe, I cut 2" sections of 2" PVC pipe, and cut out a 1" piece so the section resembled a C-shaped bracelet. I sanded all the sharp edges smooth.

I screwed the clips to a scrap piece of plywood, spacing them to align with the PVC supports on the cart, and allowing for an overhang that butts against the saw table. A firm press snaps the clips to the pipe below.

—Samuel Jenkins, Bastrop, Texas

### Tips earn up to \$150.

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

Send your tip, photos or drawings, and contact info to [shoptips@woodmagazine.com](mailto:shoptips@woodmagazine.com)

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



For sending this issue's *Top Shop Tip*, Sam receives a DeWalt cordless tool kit worth \$400.



continued on page 18

WOOD magazine July 2021



# Solid Beadlock® joints:

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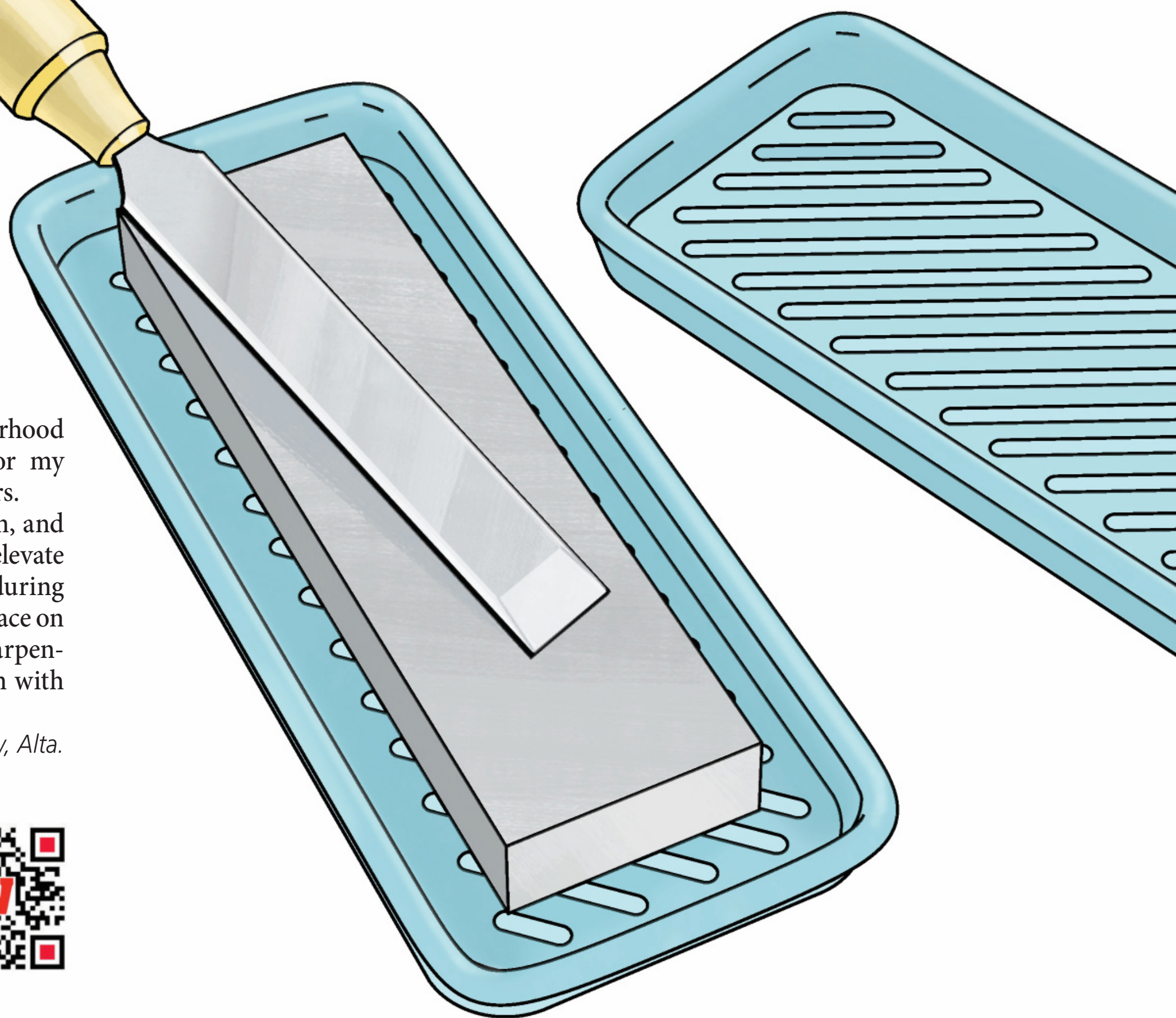
## Non-slip grip for sharpening stones

While browsing the aisles of my neighborhood discount store, I ran across cradles for my sharpening stones: silicone sponge holders.

Their size matches my coarse, medium, and fine waterstones. The ribs on the bottom elevate the stone away from the swarf generated during sharpening. Being silicone, they stay in place on my benchtop without slipping while sharpening, and cleanup is easy—just rinse them with soap and water.

—Charles Mak, Calgary, Alta.

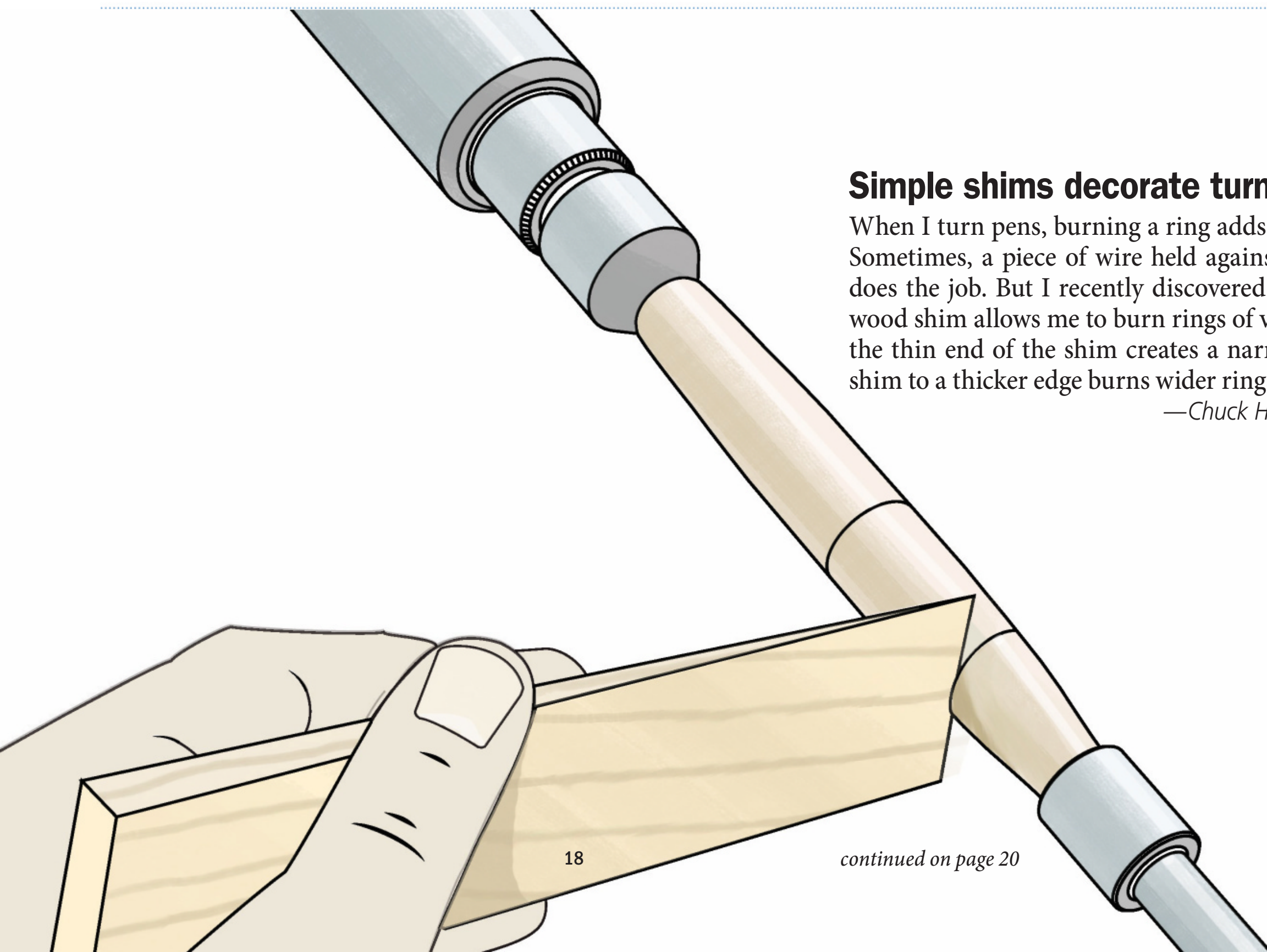
► Buy silicone trays.  
[woodmagazine.com/  
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## Simple shims decorate turnings

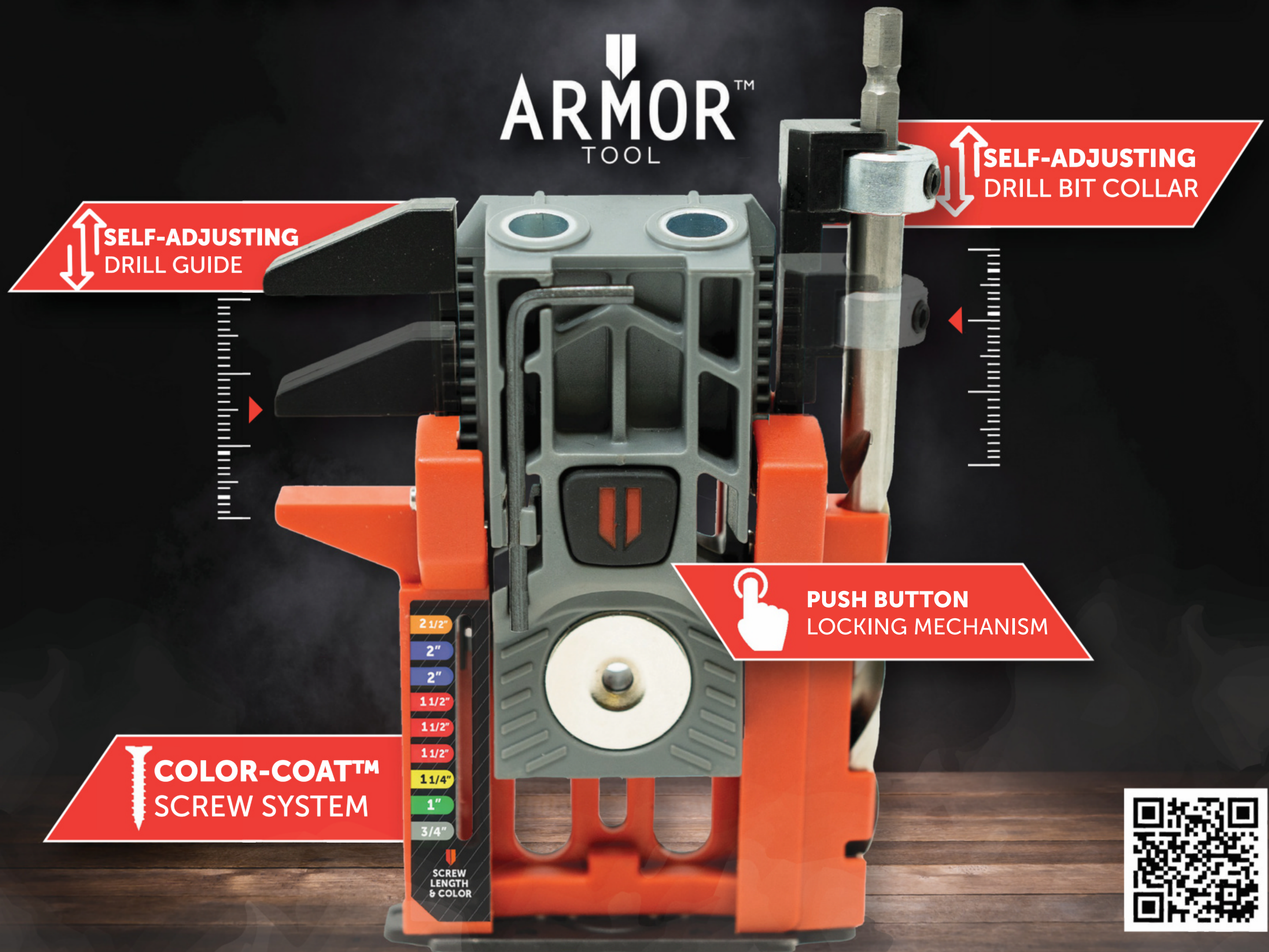
When I turn pens, burning a ring adds detail and character. Sometimes, a piece of wire held against the spinning piece does the job. But I recently discovered that using a tapered wood shim allows me to burn rings of various widths. Using the thin end of the shim creates a narrow ring; cutting the shim to a thicker edge burns wider rings.

—Chuck Hunter, Brunswick, Ohio





# THE PERFECT GIFT DOESN'T EXI...



## JUST IN TIME FOR FATHER'S DAY **THE NEW SELF-ADJUSTING MINI-JIG**

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## SHOP TIPS

### Swing by and turn to efficient tool storage on the double

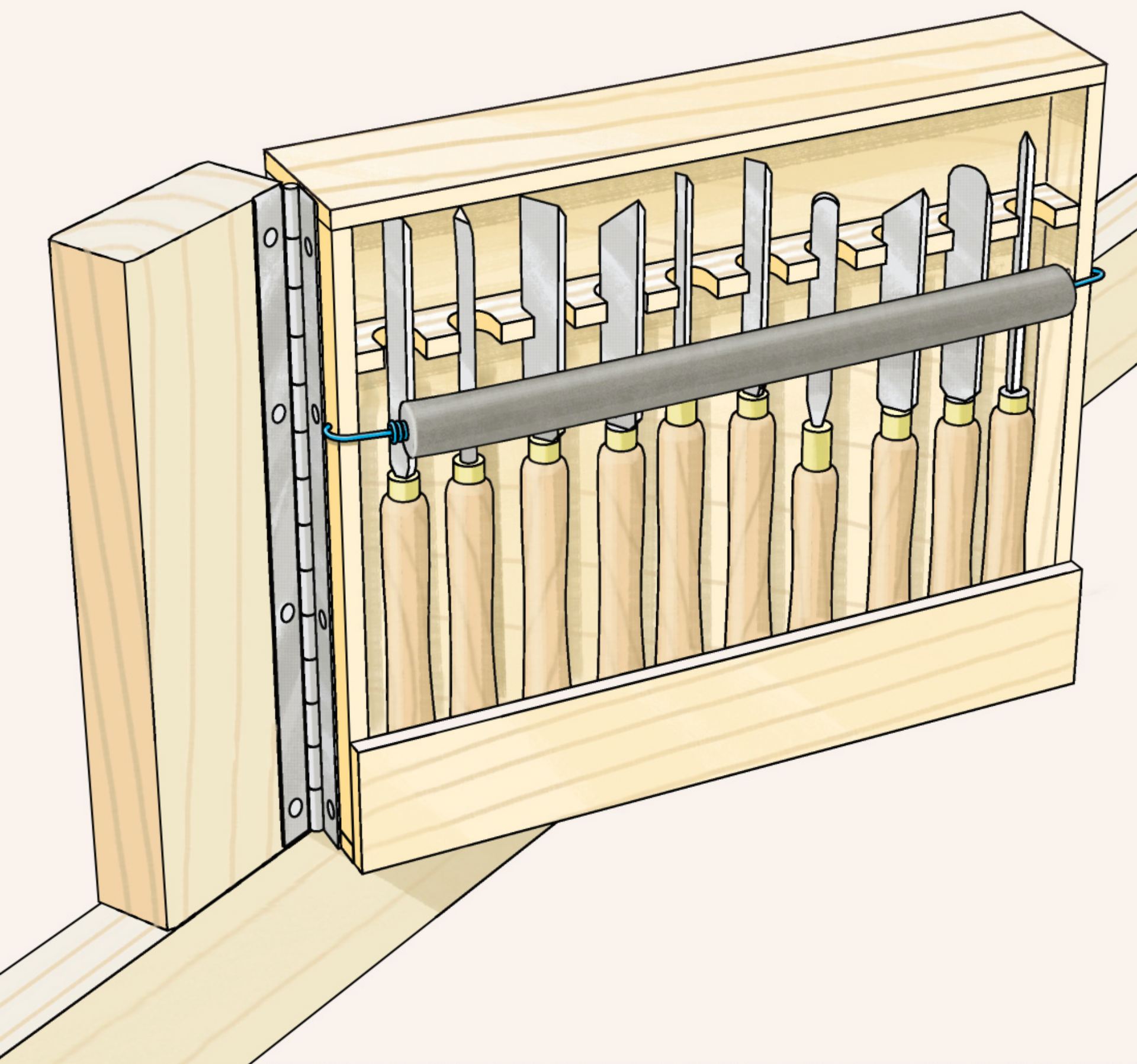
To store my collection of turning tools, I designed this dual-sided, hinged rack. It hangs on the wall near my lathe.

The two-sided rack consists of a simple frame assembly with a  $\frac{1}{4}$ "-wide groove centered along the inside to hold a plywood panel. Size the frame to fit your set of tools. On the inside bottom, drill shallow counterbores for the handles. Then glue up the frame and panel.

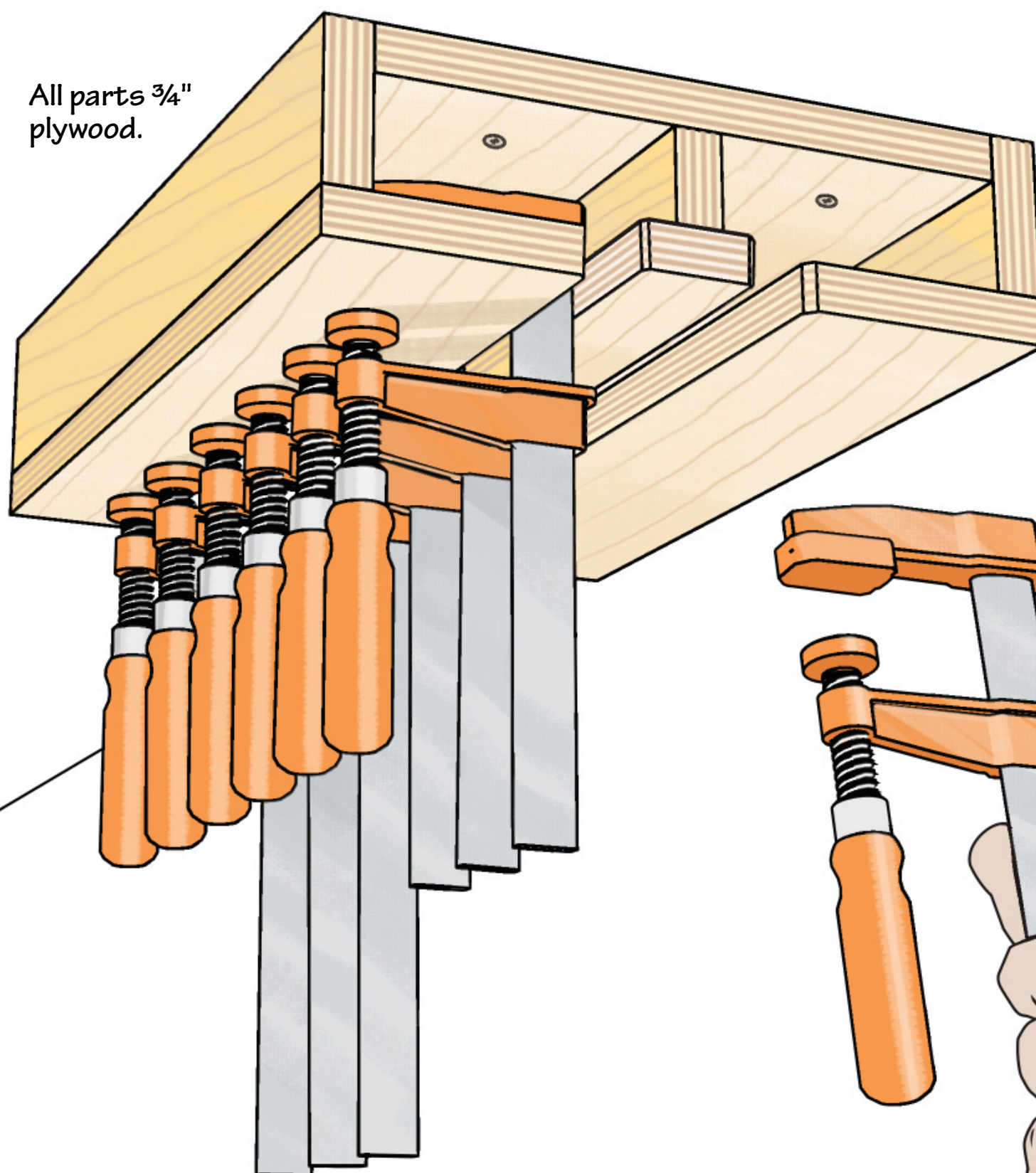
Along the bottom, a wide rail secures the tool handles so they stay put when swinging the rack. Notched racks glued to the center panel hold the business end of the tool. I slipped a section of pipe insulation over a short bungee cord to hold the tools securely.

Mount a length of 2×4 vertically on the wall to mount the rack using a continuous (piano) hinge.

—Mike Staszak, New Braunfels, Texas



All parts  $\frac{3}{4}$ " plywood.

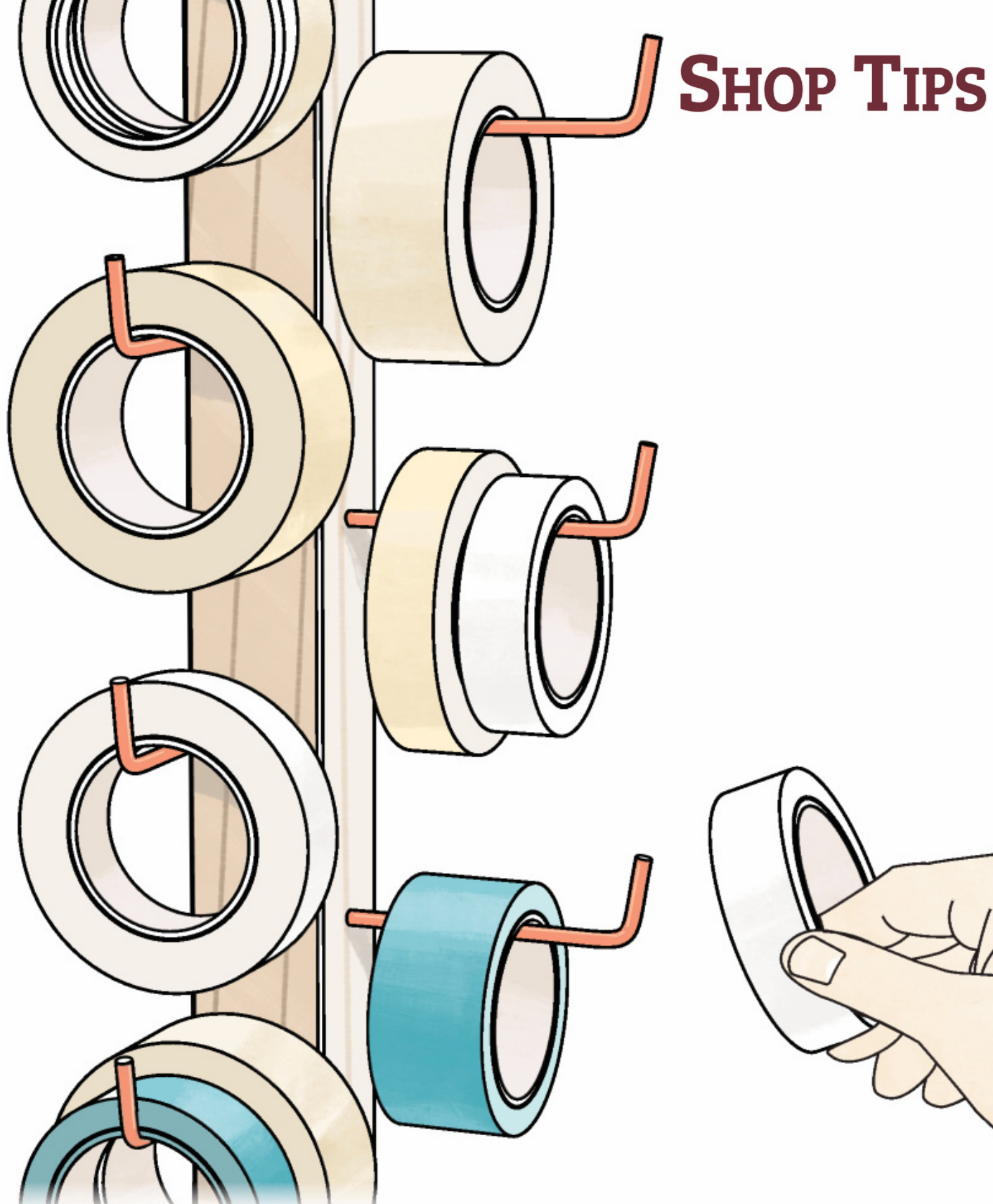


### Get hung up on storing F-clamps

Finding a place to store my F-clamps was quite the challenge—until I looked up and realized the answer was right above me. This ceiling-mounted rack helps me sort and store clamps based on their length.

—Harmon Fisher, Henrico, Va.





## SHOP TIPS

### Branch out for easy-access tape storage

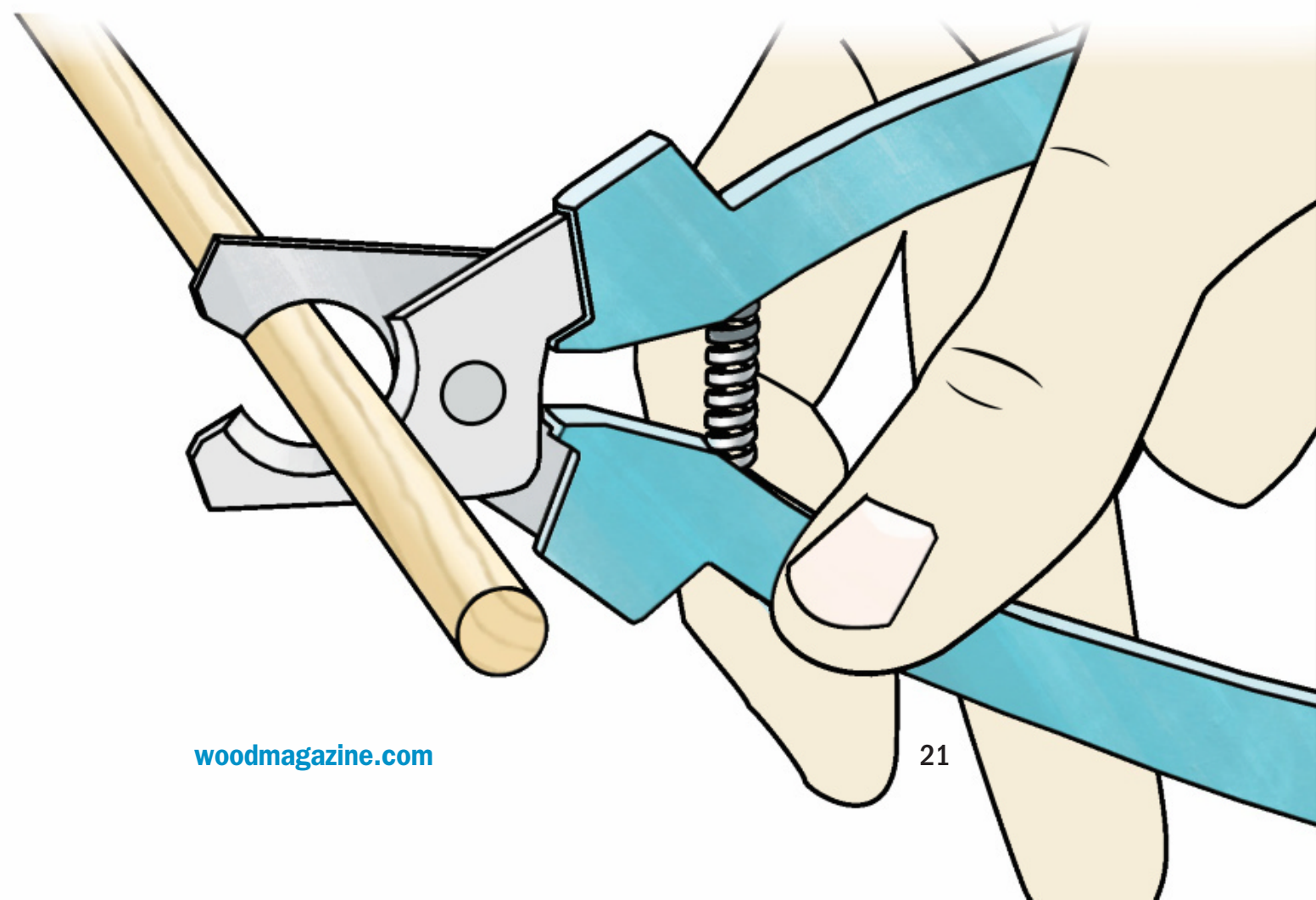
When I need to use tape I always seem to end up hunting for the right one at the bottom of a drawer. This tape “tree” is an easy, inexpensive solution. It consists of length of 2×2 with an eye hook in one end for hanging it from the ceiling. Along the length of the 2×2, long L-hooks accommodate various sizes of tape rolls. Hung in the corner of my shop, every roll of tape remains visible and within reach.

—Oneil Long, Mound City, Mo.

### Clipping dowels has gone to the dogs

I discovered a quick and easy way to cut small-diameter dowels to length—dog nail clippers. This inexpensive tool can handle dowels up to ¼" diameter. Align the blades right on the cutline for perfect lengths. They make a clean cut without the “fuzz” you sometimes get when using a saw. 🐾

—Armando Blanco, USAF retired, Austin, Texas





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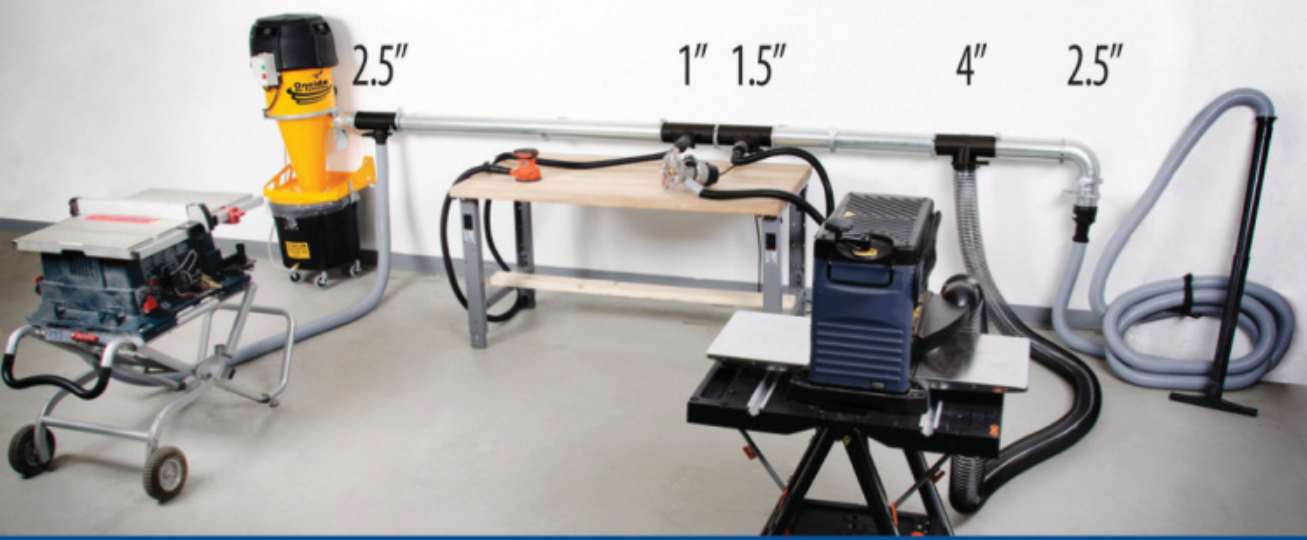
“Best Dust Collection Product of 2020”

FDMC Magazine - Dec. 2020

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# Outdoor Bench

*Perfect for the garden or the front porch*

Featuring a curved seat shape and slatted backrest, this bench brings comfort and style to your outdoor living space. We've included a template pattern for the seat curve to take out the guesswork, so you can spend more time relaxing.

D I M E N S I O N S :  
48 1/4" W x 30" D x 42 1/4" H

Approximate materials cost:

**\$250**

Plenty of room for

**2**





**A**

**Align the template** with the edges and ends of each workpiece, then trace along the top edge.



**B**

**Glue and clamp** the front and back rails (E) between the side assemblies. Check for square.

## First, a frame

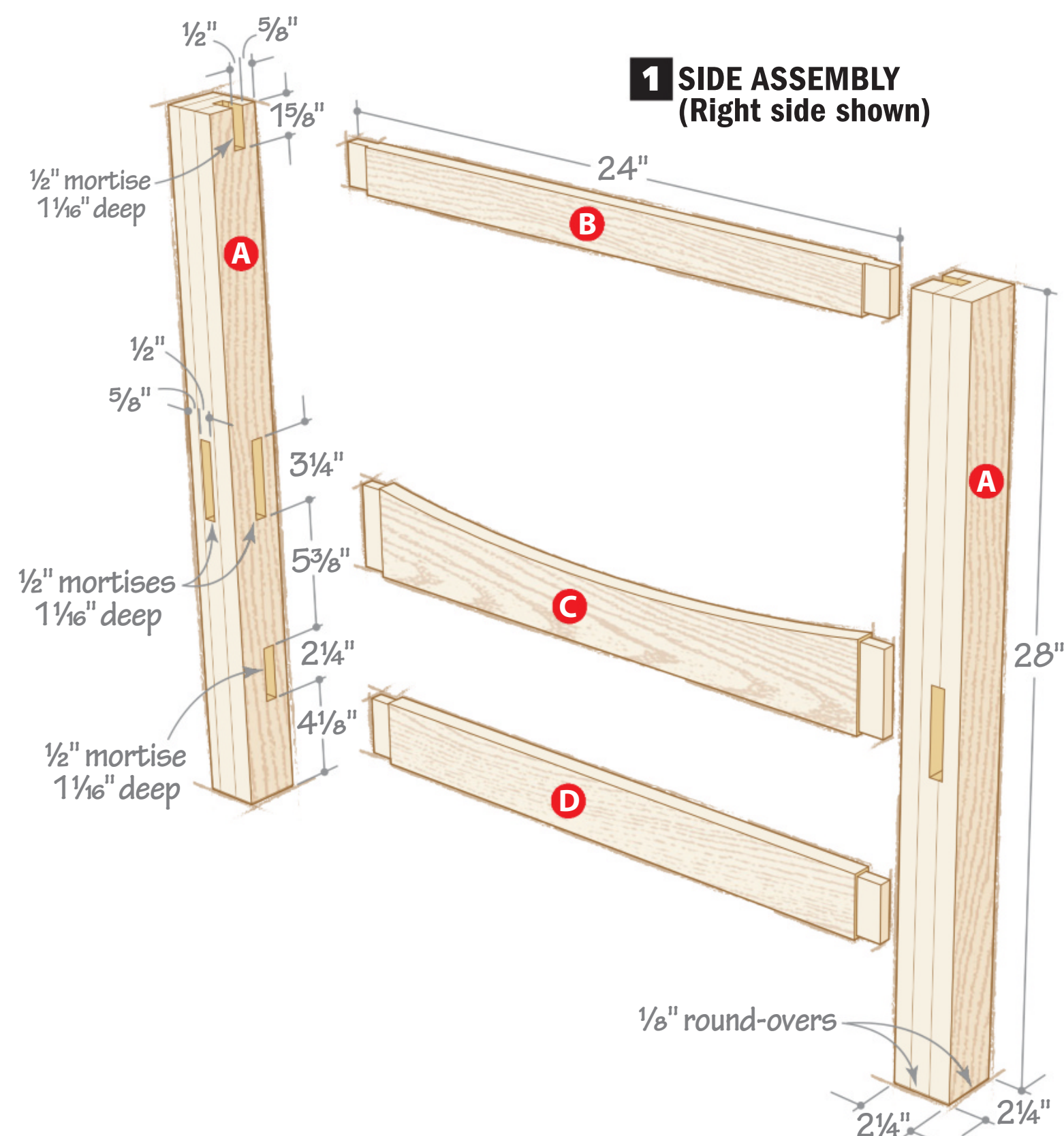
- Learn four ways to make mortise and tenon joints.  
[woodmagazine.com/mt4ways](http://woodmagazine.com/mt4ways)

**1** From  $\frac{3}{4}$ " stock, laminate the legs (A) and cut them to size [Materials List, Drawing 1]. Cut the mortises in the legs.

**2** Cut the rails (B–E), and seat supports (F) to size [Drawings 1, 2]. Cut the tenons on the ends of the rails [Drawing 2a].

**3** Lay out the seat curve on a piece of  $\frac{1}{4}$ " MDF or hardboard [Drawing 3]. Cut and sand to the line. Trace the template on the side mid rails (C) and seat supports (F) [Photo A, Drawing 2], then cut and sand to the line.

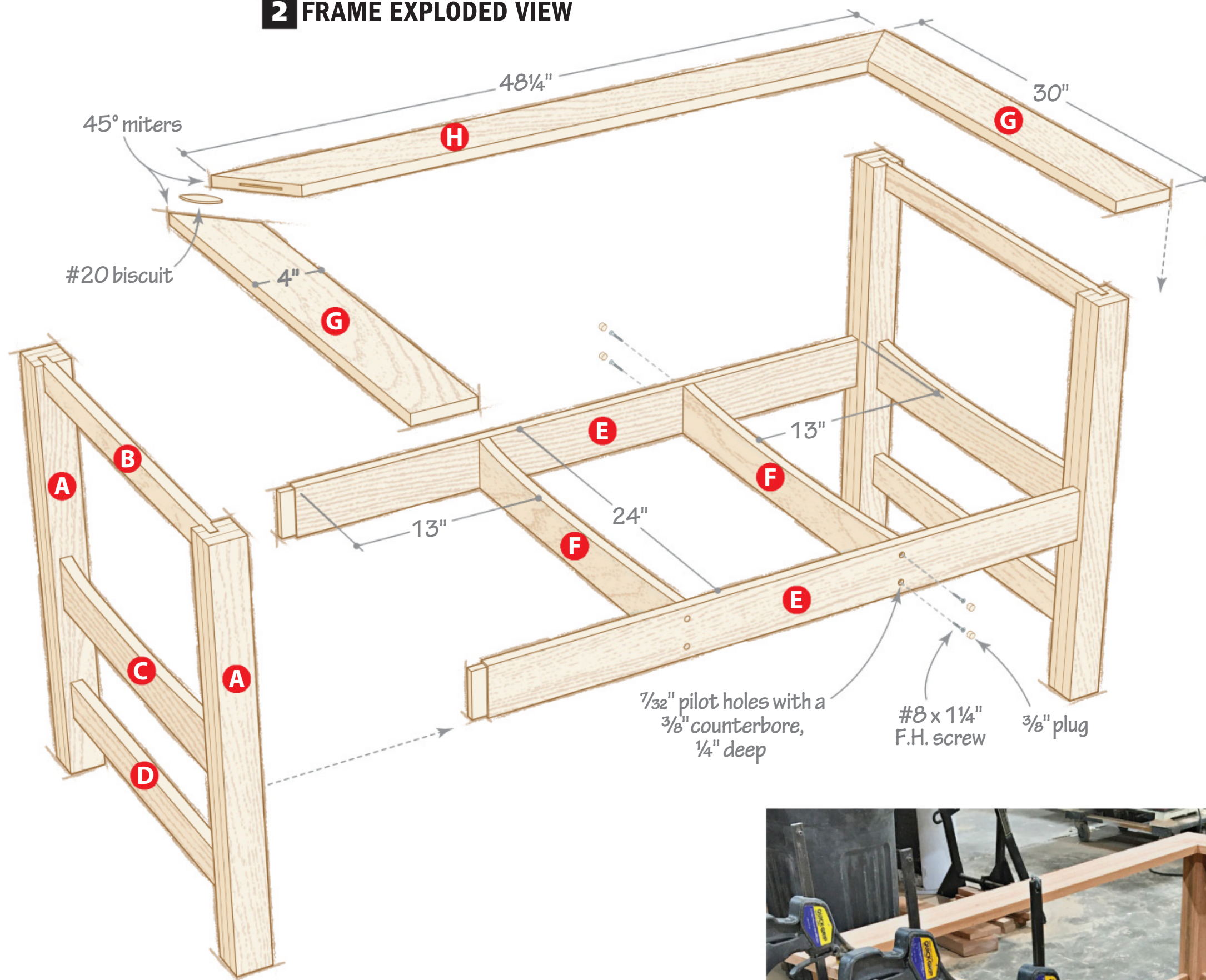
**4** Finish-sand the side rails (B, C, D) and inside faces of the legs (A). Apply glue to the side rail tenons and assemble the sides.



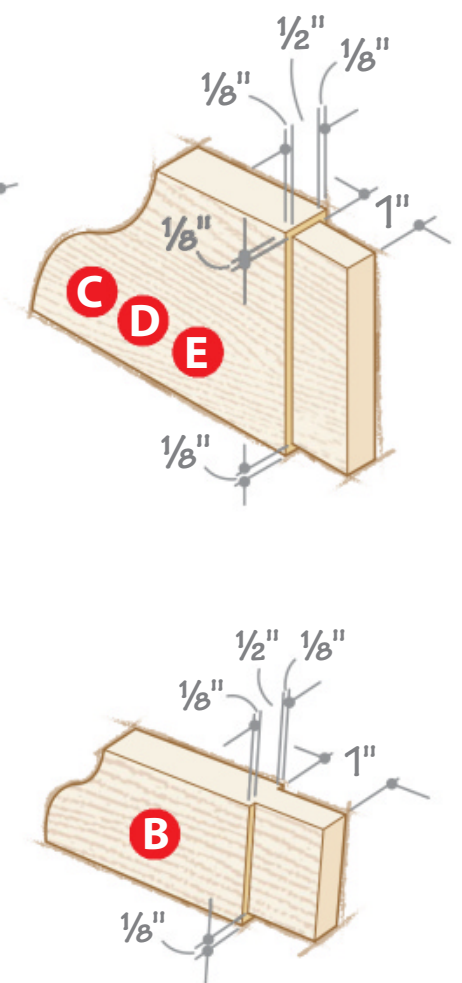
## 1 SIDE ASSEMB



## 2 FRAME EXPLODED VIEW



## 2a FRAME RAIL TENON DETAIL



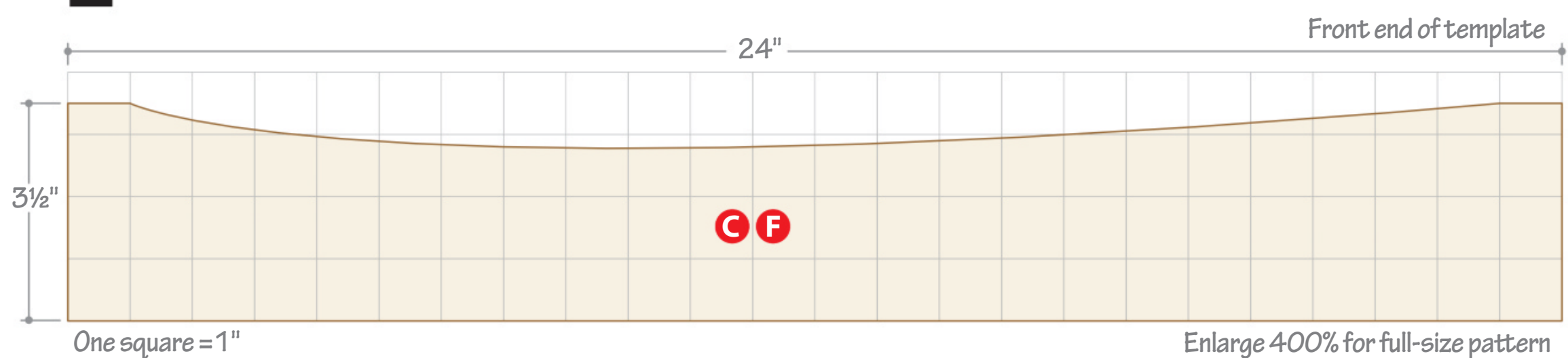
**Tip!** Increase the reach of your pipe clamp by joining two shorter clamps with a threaded coupler.

- 5** Finish-sand the front and back rails (E), then assemble the frame [Photo B].
- 6** Cut the arms (G) and armrest back (H) to size, mitering the ends [Drawing 2].
- 7** Cut the biscuit slots, then glue up the armrest assembly. After the glue dries, attach it to the frame [Photo C].



**C** Glue and clamp the armrest assembly to the frame, centered left-to-right and front-to-back.

## 3 SEAT CURVE TEMPLATE PATTERN











**Position the backrest assembly** on the side bottom rails (D), 4½" from the back legs (A). Clamp it in place.



**Screw the backrest support (M)** to the side bottom rails (D) using a right-angle attachment in your drill.

### Nearly ready for relaxation

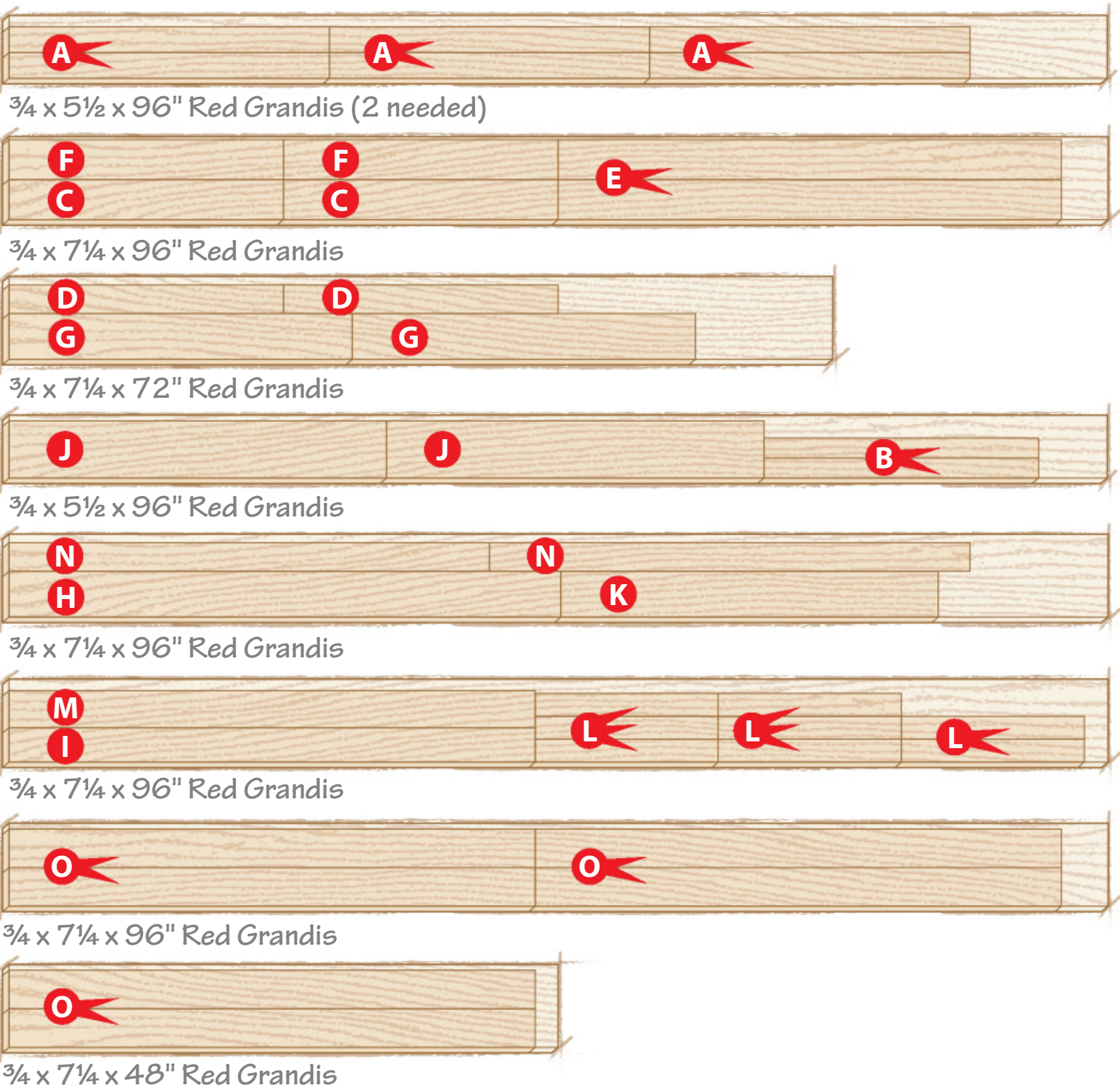
- 1** Screw the seat supports (F) between the front and back seat rails (E) [Drawing 2].
- 2** Cut the seat slats (N, O) to size and finish-sand them, rounding the top edges slightly.
- 3** Screw the front and back slats (N) between the legs (A), and positioned front-to-back flush with the inside face of each leg [Drawing 5].

- 4** Position one of the center slats (O) against the backrest, centered side-to-side. Mark and notch out the locations of the backrest stiles (J, K) [Drawing 5].
- 5** Evenly space the center seat slats (O) on the seat and screw them in place [Drawing 5].
- 6** Touch up any remaining sanding and apply an outdoor finish. We used General Finishes Outdoor Oil. Once the finish dries, move the bench outside and take a load off. 🌳



► Watch a video with tips on cutting and installing wood plugs. [woodmagazine.com/screwplugs](http://woodmagazine.com/screwplugs)

### Cutting Diagram



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

### Materials List

| Part |                       | FINISHED SIZE |     |      | Matl. | Qty. |
|------|-----------------------|---------------|-----|------|-------|------|
|      |                       | T             | W   | L    |       |      |
| A    | legs                  | 2¼"           | 2¼" | 28"  | RGL   | 4    |
| B    | side top rails        | ¾"            | 1¾" | 24"  | RG    | 2    |
| C    | side mid rails        | ¾"            | 3½" | 24"  | RG    | 2    |
| D    | side bottom rails     | ¾"            | 2½" | 24"  | RG    | 2    |
| E    | front/back rails      | ¾"            | 3½" | 44"  | RG    | 2    |
| F    | seat supports         | ¾"            | 3½" | 24"  | RG    | 2    |
| G    | arms                  | ¾"            | 4"  | 30"  | RG    | 2    |
| H    | armrest back          | ¾"            | 4"  | 48¼" | RG    | 1    |
| I    | top rail              | ¾"            | 3"  | 46"  | RG    | 1    |
| J    | outside stiles        | ¾"            | 5"  | 33"  | RG    | 2    |
| K    | center stile          | ¾"            | 4"  | 33"  | RG    | 1    |
| L    | slats                 | ¾"            | 2"  | 16"  | RG    | 8    |
| M    | backrest support      | ¾"            | 3¼" | 46"  | RG    | 1    |
| N    | front/back seat slats | ¾"            | 2½" | 42"  | RG    | 2    |
| O    | center seat slats     | ¾"            | 3⅜" | 46"  | RG    | 6    |

**Materials key:** RGL-laminated Red Grandis, RG-Red Grandis.  
**Supplies:** #8×1¼" flathead screws, #8×1½" flathead screws, #20 biscuits.  
**Blade and bits:** Dado set; ⅜" plug cutter.



# Briefcase Router Table

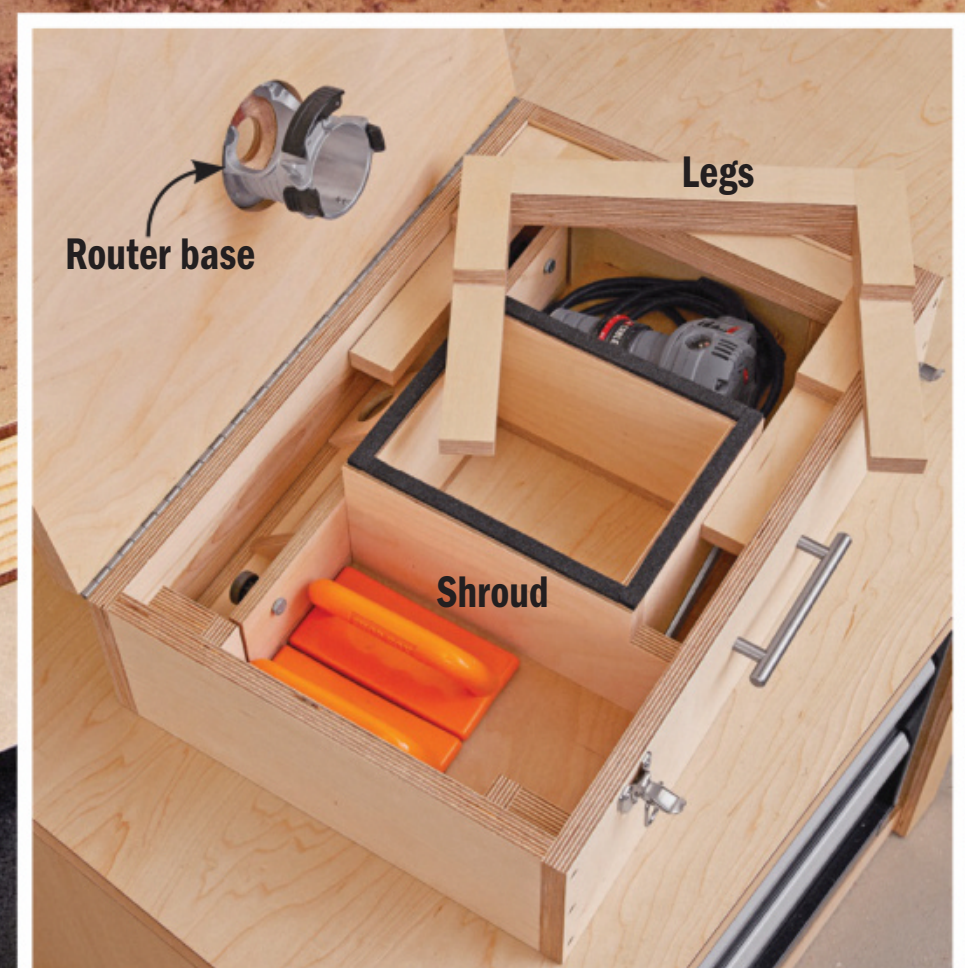
*Equipped with an affordable trim router, this totable table means business.*



**D I M E N S I O N S :**  
21½" W x 14½" D x 13½" H

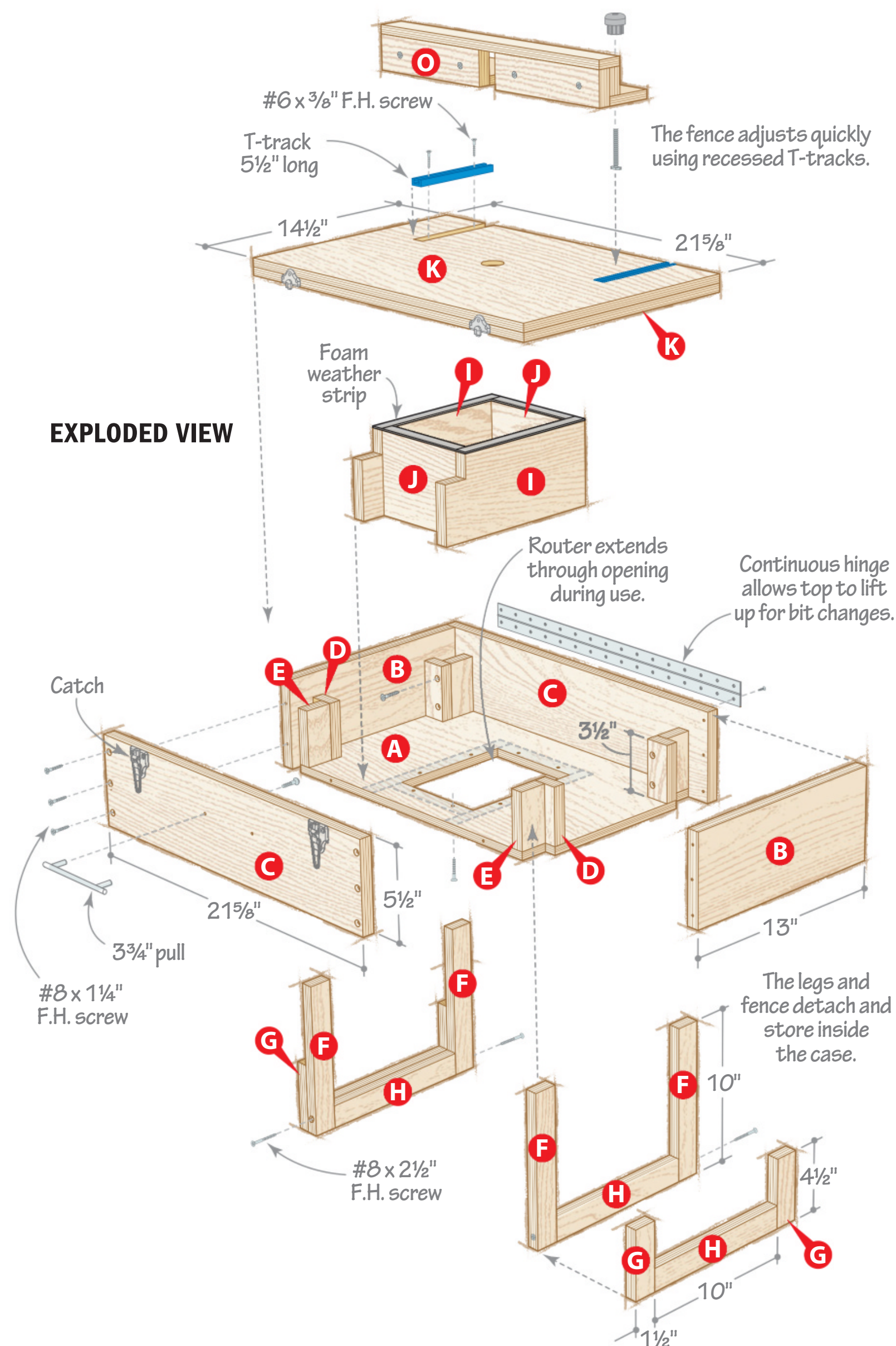
Approximate materials cost:  
**\$120**  
Plus \$66 for hardware

**13½"**  
tall, ready for use

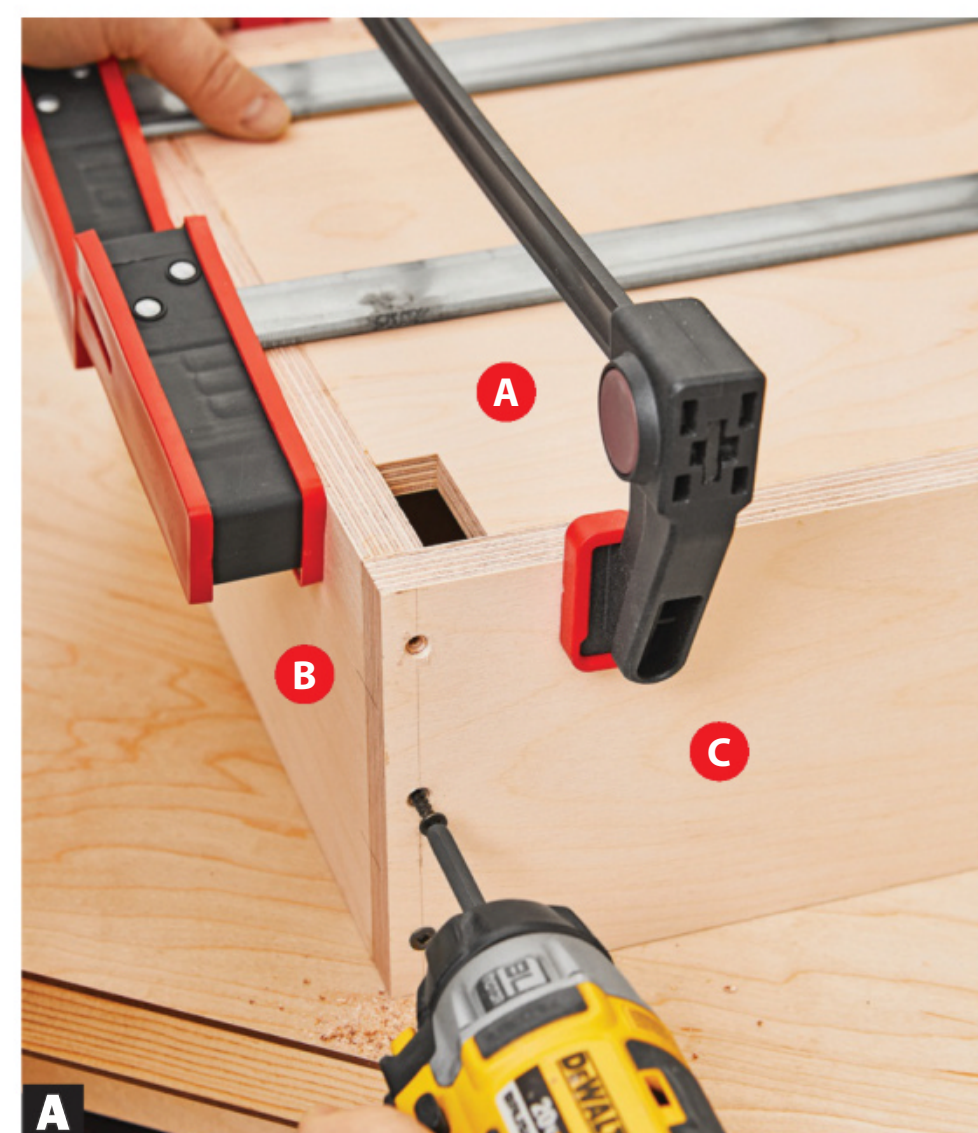
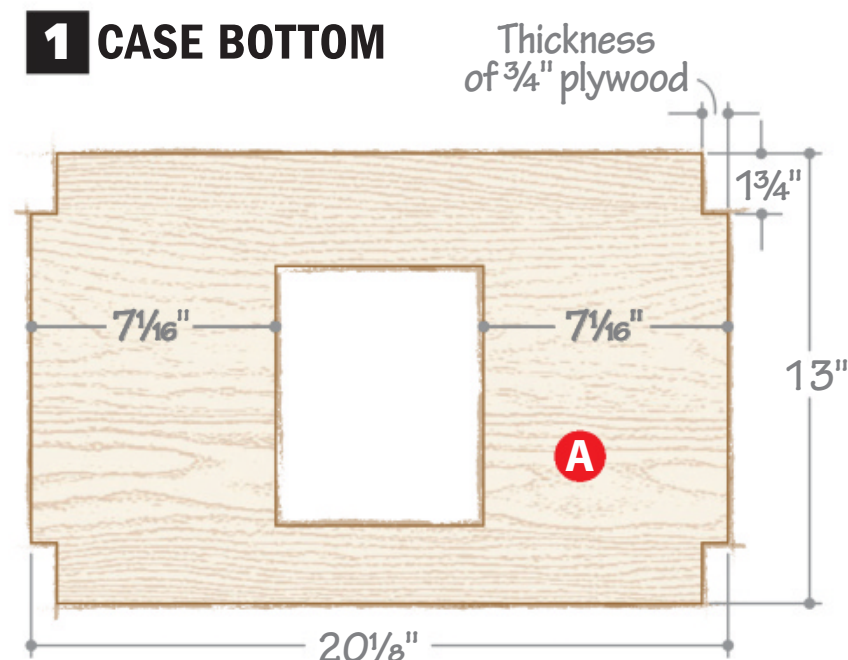


Leave the router base attached to the top and pack the router, fence, and accessories around the shroud. Tuck the legs in, then latch the case for storage and transport.





## 1 CASE BOTTOM



**A** Glue and clamp the sides (B) to the bottom (A), then glue and screw the front and back (C) to the sides.

**D**esign Editor John Olson wasn't thinking outside the box when he ideated this results-driven router table. Instead, he was laser-focused on what he could fit *inside* the box. We're pretty sure the actionable synergies are shifting paradigms here, too, but we don't know what that means, so we'll just sell the sizzle: The 1"-thick tabletop provides a best-in-class flat surface; fence-mounted dust collection minimizes the mess; and it all self-stows in a compact package. Win-win-win.

We equipped it with a Porter-Cable PCE6435—the top tool in our trim router shop test (issue 268, July 2020)—which measures 3 1/2" in diameter at the base (minus the subbase) and 7 1/2" tall without the collar. To

accept a larger router, adjust the part sizes and hole in the bottom tabletop to fit that router and allow the top to open and close.

## Bring innovation to the table

Baltic birch plywood comes in metric thicknesses close to, but less than, 1/2" and 3/4". Measure assemblies as you build them, and adjust part dimensions to accommodate the slight size differences.

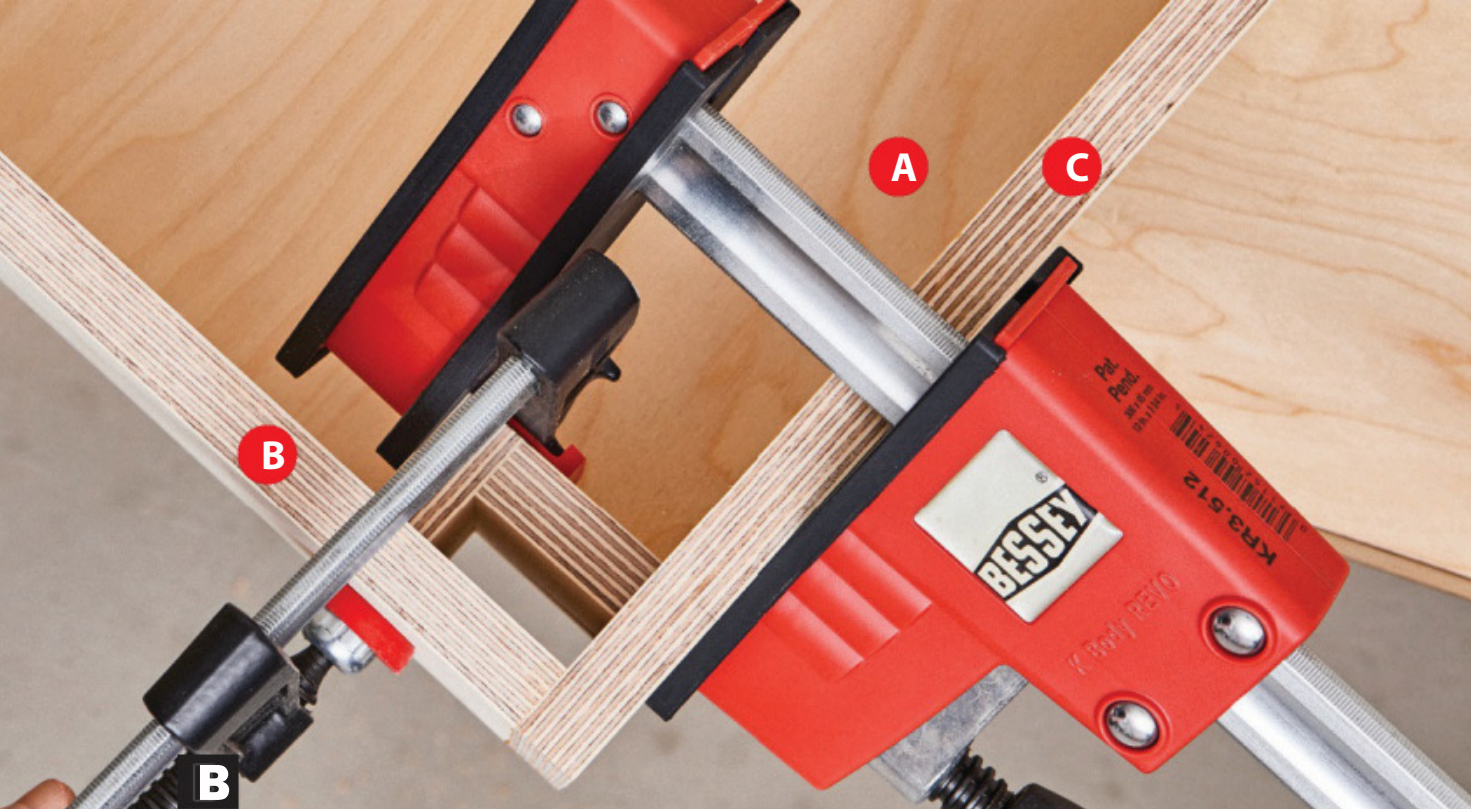
**1** Cut the case parts A–K to size and label each with its part letter [Materials List]. Jigsaw notches in the case bottom (A) to suit the actual thickness of the 3/4" plywood [Drawing 1]. Dry-fit the sides (B), front, and back (C). Drill countersunk pilot holes, then glue and clamp the case [Exploded View, Photo A].

**Note:** Cut the rails (H) 1/4" overlength.

**Note:** Drill 1/8" countersunk pilot holes for #8 screws in Baltic birch plywood.

**Note:** A router with a top-mounted power switch will be easier to operate while mounted in the table.





**The corner blocks should align** with the edges of the notches in the bottom (A), and a leg (F) should slide in for a snug fit.

**Tip!** If your clamps can't reach deep enough to press the blocks (D, E) against the case, screw through the case sides (B), front, and back (C) to secure the blocks.

► **Laminate:** To glue workpieces face-to-face.

**2** Fine-tune the corner blocks (D, E) to fit the notches in the bottom (A) [Exploded View]. Glue and screw one small block to each large block, and then glue the block assemblies to the case [Photo B].

**3** Glue the long legs (F) to the short legs (G) flush at the sides and one end [Exploded View]. After the glue dries, fit the legs (F/G) in the case openings, and cut the rails (H) to fit between them. Laminate the rails into two 1½"-thick rail assemblies, flush all around. Glue the rails to the legs [Photo C]. After the glue dries, reinforce the joint with screws.

## Build a top and circle back

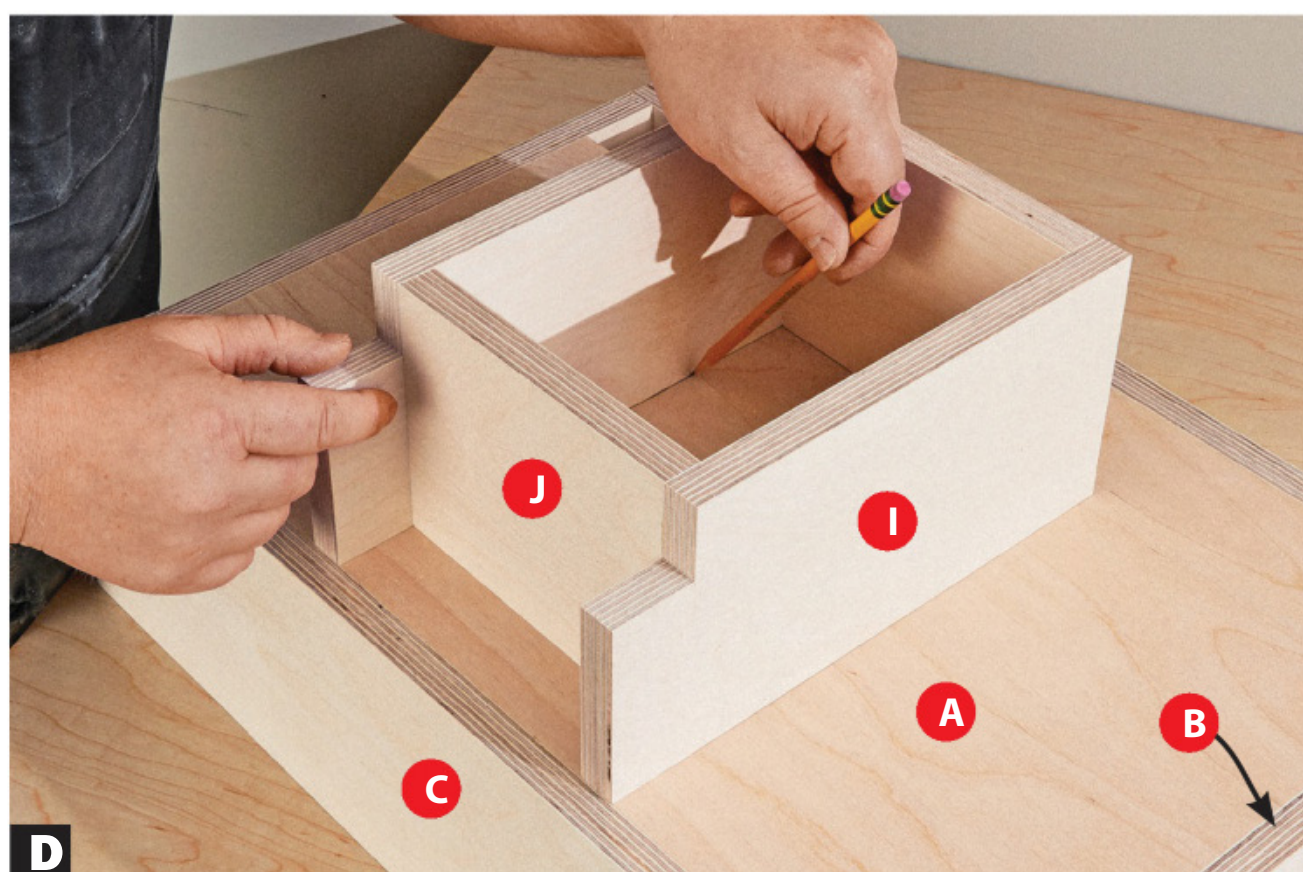
**1** Notch the shroud sides (I) [Drawing 2]. Glue and clamp the sides to the shroud front and back (J) [Exploded View].

**2** Trace the shroud opening on the bottom (A) [Drawing 1, Photo D] and cut the hole [Photo E]. Square the corners with a chisel and sand the edges smooth. Glue and screw the shroud to the case.

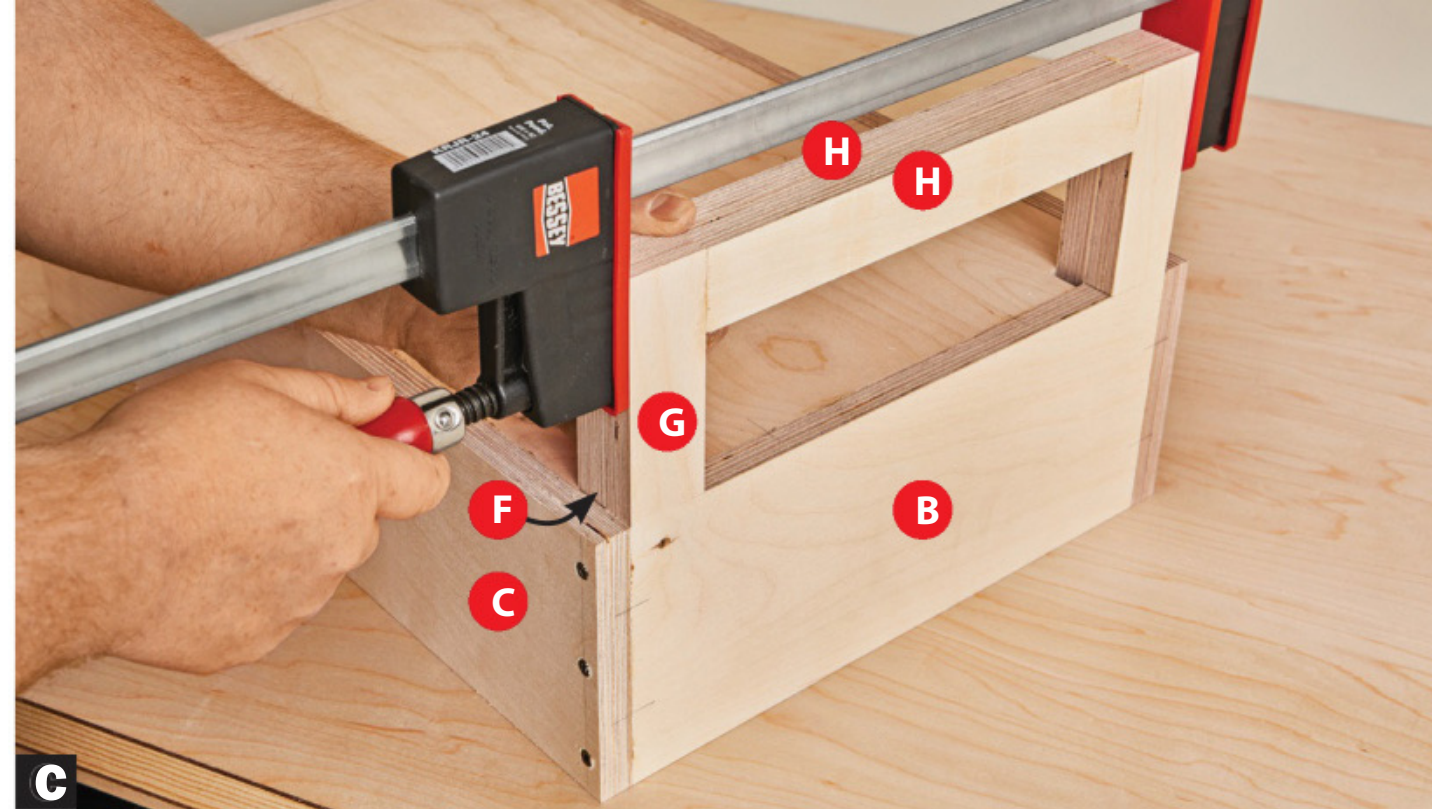
**3** Drill the holes in the tops (K) [Drawing 3]. Laminate the tops with the ends and edges flush.

**4** Using a dado clean-out router bit, gradually deepen the 3½" hole until the remaining thickness of the upper top

**Tip!** A 3½" holesaw with an arbor costs less than \$25, and the arbor can be used with a variety of holesaws.



**Center the shroud on the bottom (A)** with the shroud sides (I) flush with the front edge of the bottom. Then trace around the inside.

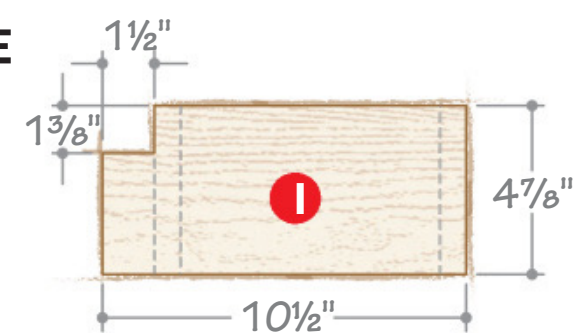


**Gluing the rails (H/H) to the legs (F/G)** with the legs inserted into the case prevents the leg assembly from twisting during the glue-up.

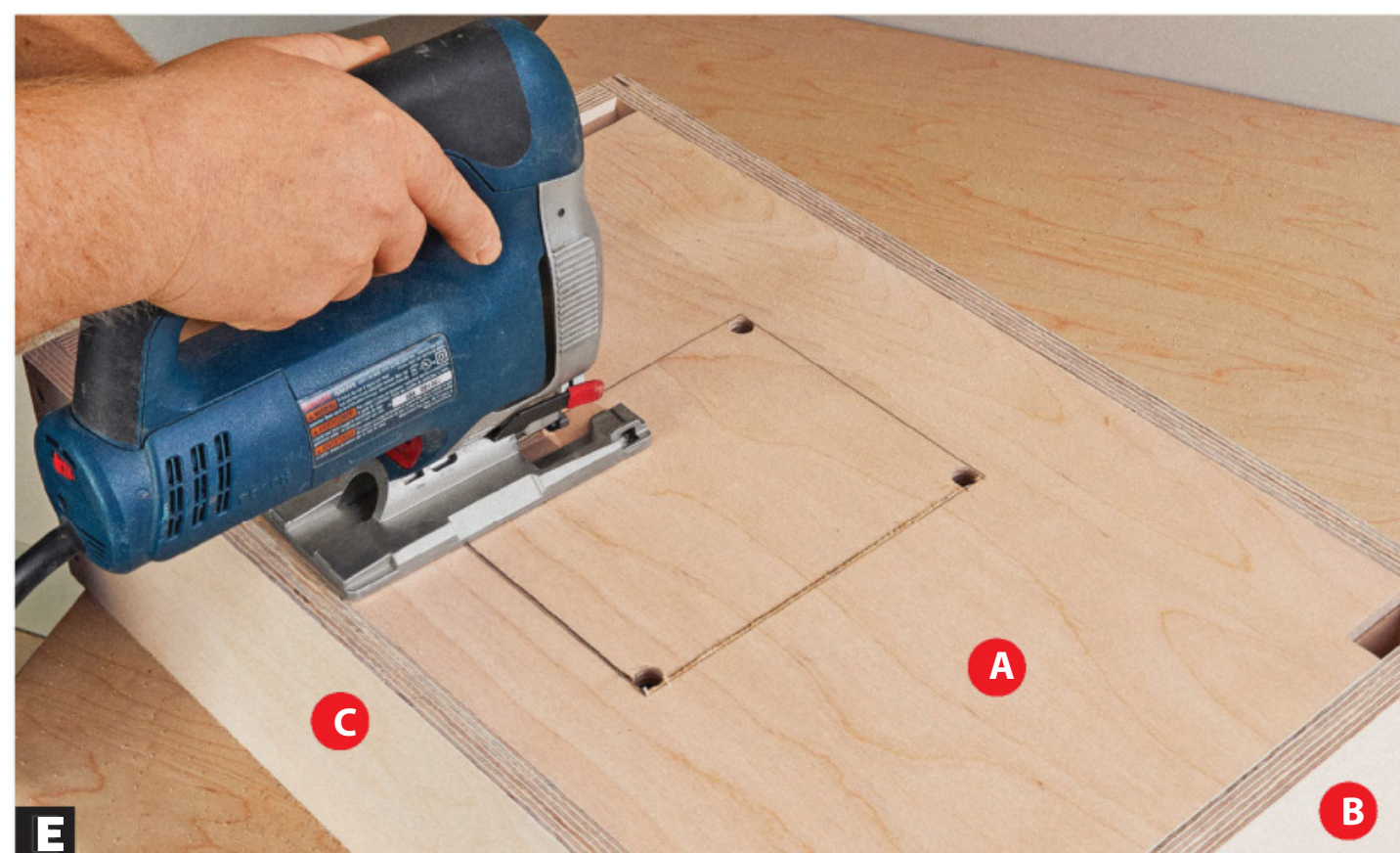
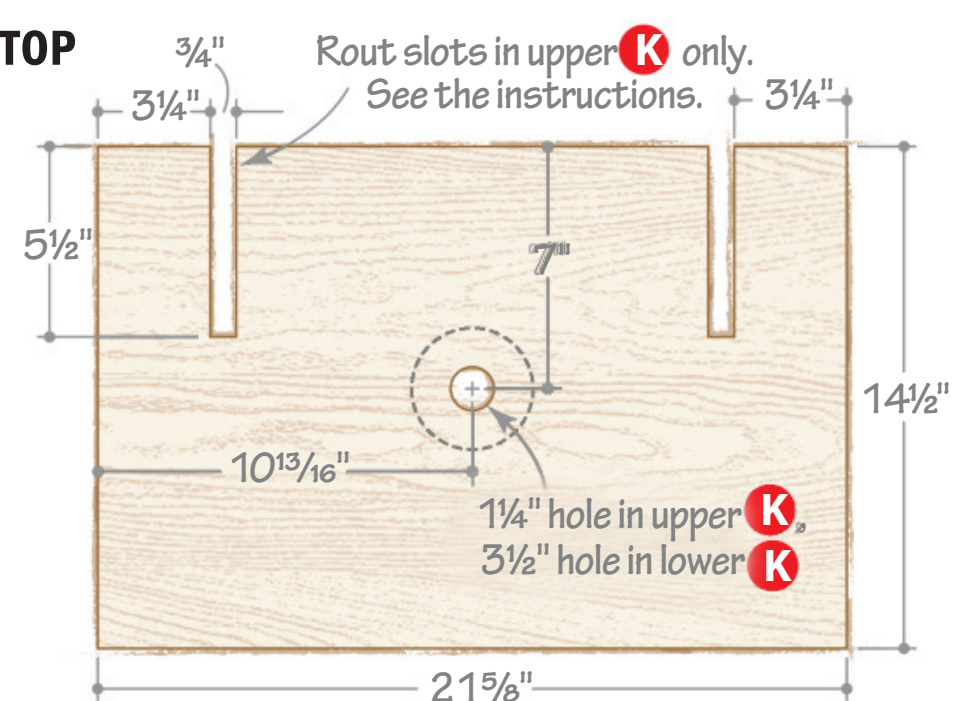
matches the thickness of your router sub-base [Photo F].

**5** Build a template [Fast-track the T-track] and use it with a dado clean-out bit to rout the stopped dados in the upper top [Drawing 3, Photo G]. Cut T-track [Sources] to length with two screw holes in each piece and set the tracks aside.

## 2 SHROUD SIDE



## 3 CASE TOP



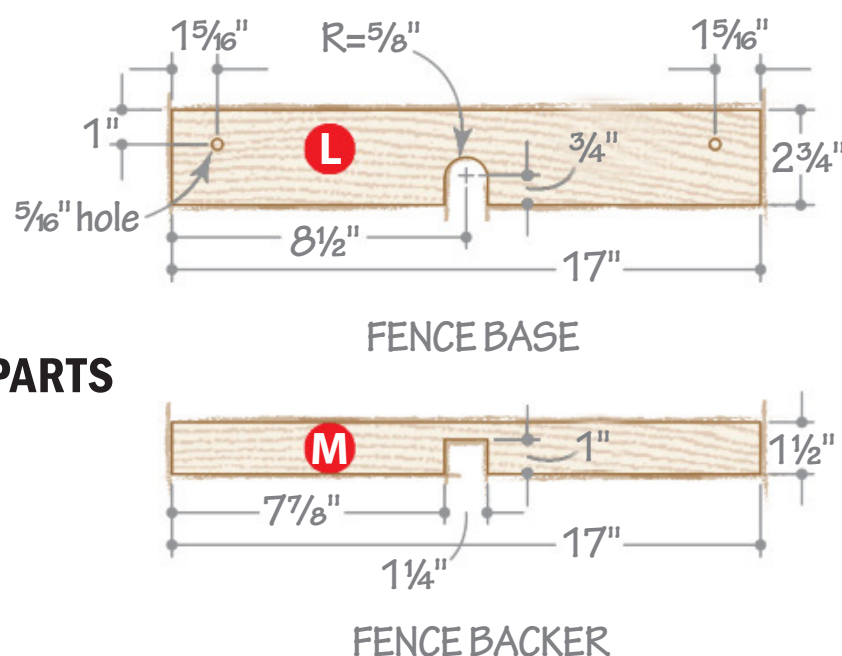
**Drill a hole at each corner** and jigsaw between the holes. A blade with 20 or more teeth per inch makes smooth cuts.





**F**

Use the 3½" hole edges as a template for routing into the upper top (K) using a dado clean-out bit (inset).



#### 4 FENCE PARTS

**Note:** By not gluing the inserts (O) to the backer (M), you can replace them should they become worn or damaged.

**Note:** The center braces (P) are spaced to accept a 1⅜" vacuum hose end. Reposition them and widen the hood (Q) for a larger hose end.

### A fence for the cutting edge

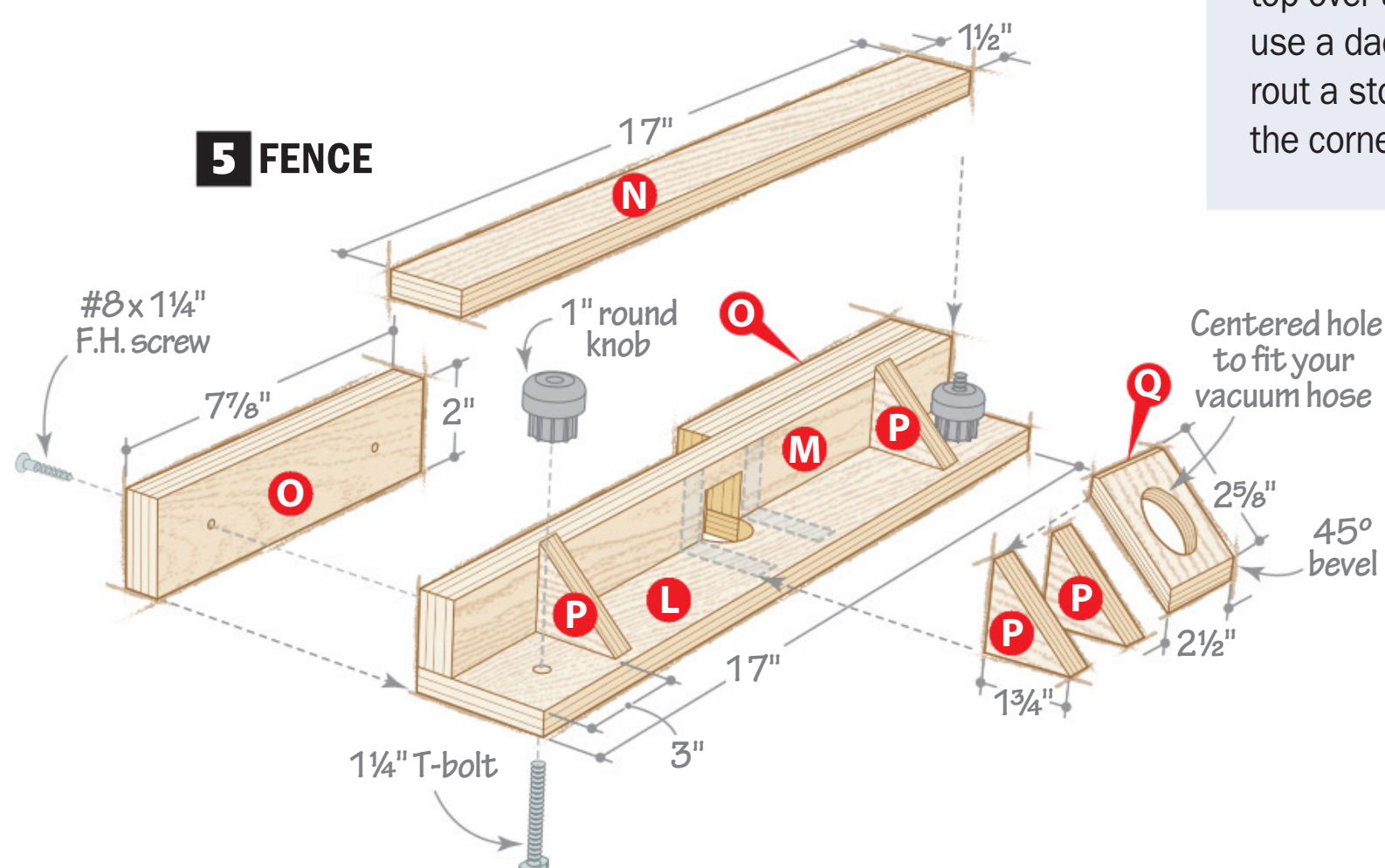
**1** Cut the fence parts L–O to size. Notch the base (L) and backer (M) [Drawing 4]. Glue the backer (M) between the base and cap (N) [Drawing 5, Photo H].

**2** Drill countersunk pilot holes into both fence inserts (O) and screw them to the fence backer (M) [Exploded View].

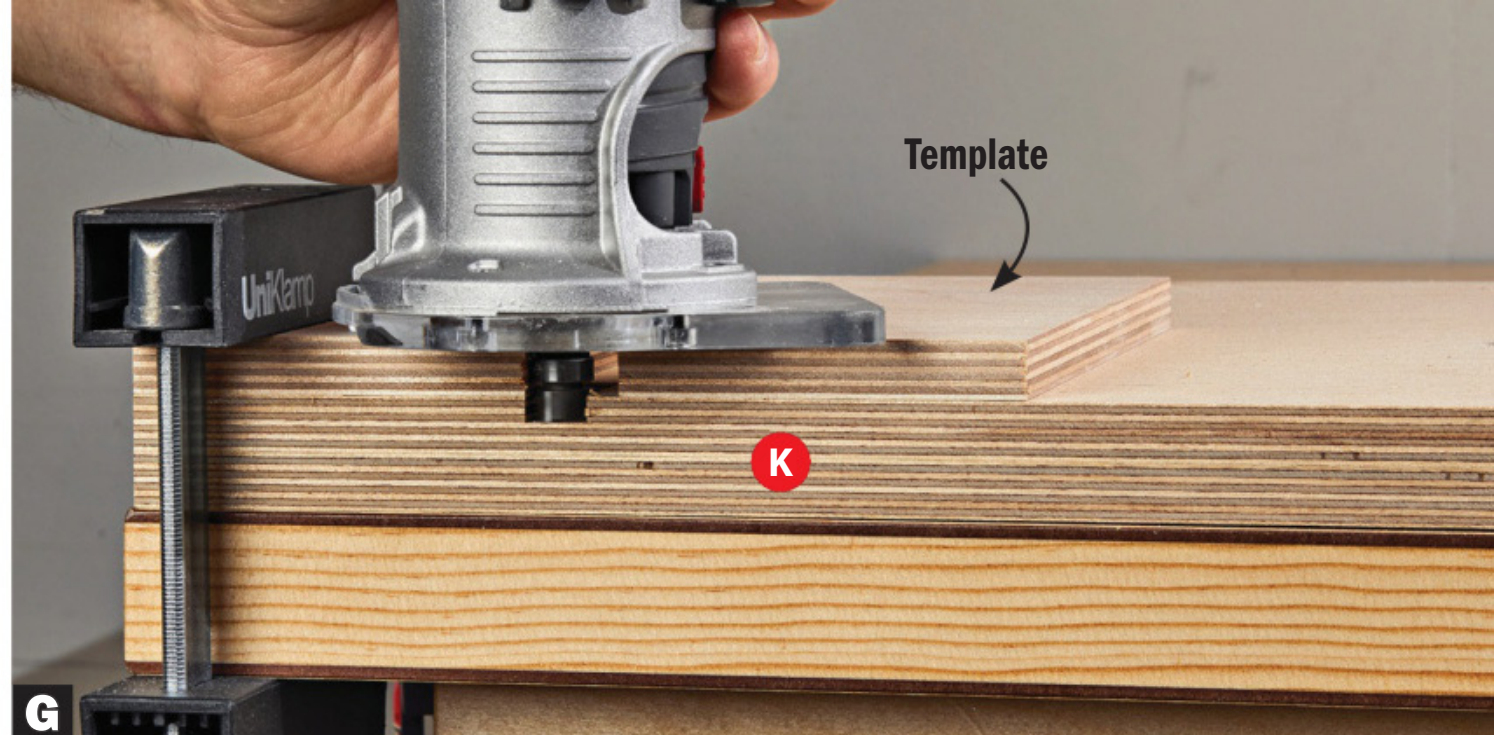
**3** Miter-cut the braces (P) from a ½×1¾×12" plywood strip. Glue and clamp the braces to the fence [Drawing 5].

**4** Bevel-cut the dust hood (Q) and drill a centered hole sized to fit the hose of your shop-vacuum [Drawings 5 and 5a]. Glue and clamp the hood to the fence assembly.

**5** Center the fence assembly on the top (K) and transfer the edges of the T-track dadoes to the fence bottom (L). Drill the bottom to accept the T-bolts [Drawing 4].

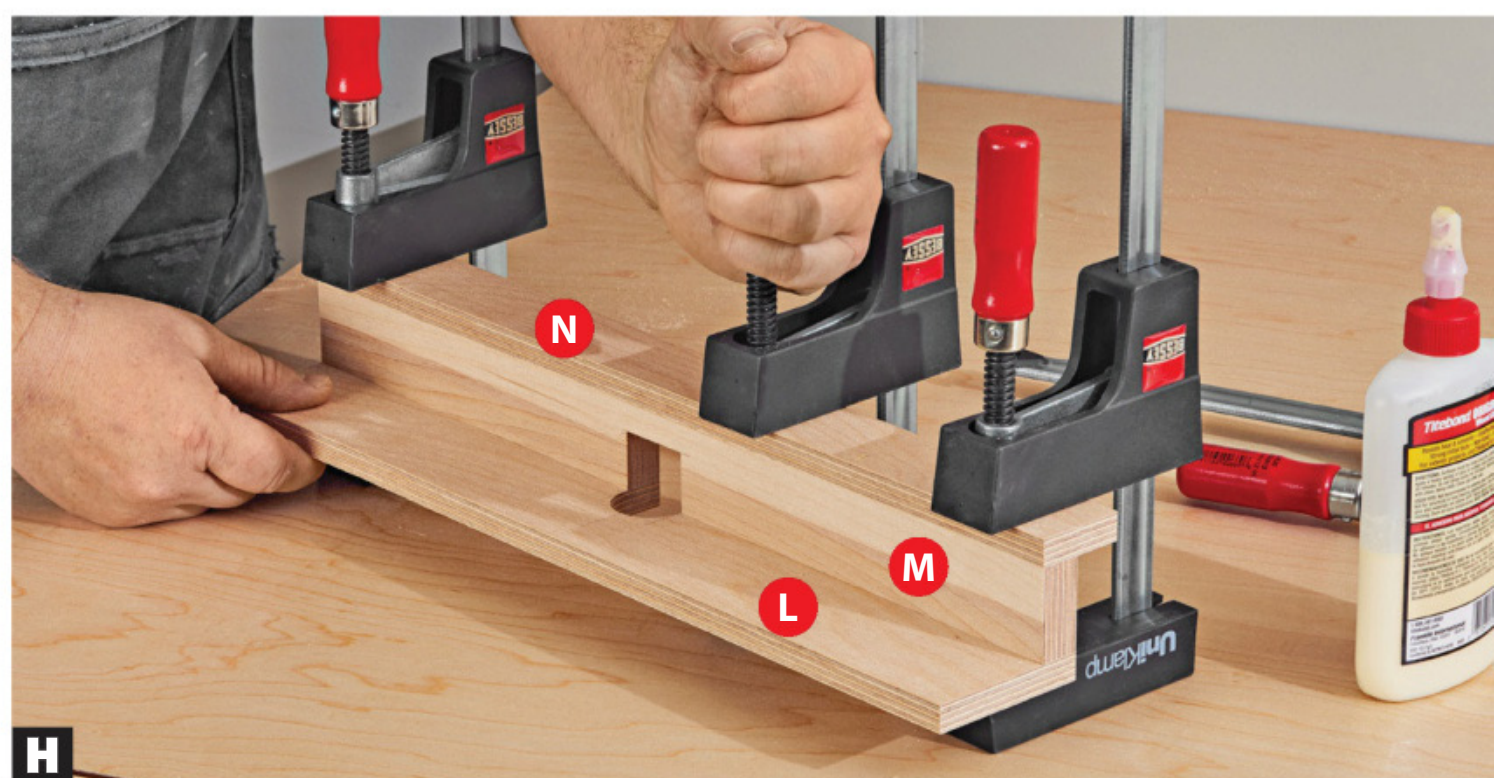


#### 5 FENCE



**G**

Rout stopped dadoes for the tracks in a series of shallow passes using a dado clean-out bit guided by the routing template. Stop when the T-track fits flush with the top face of the top (K).



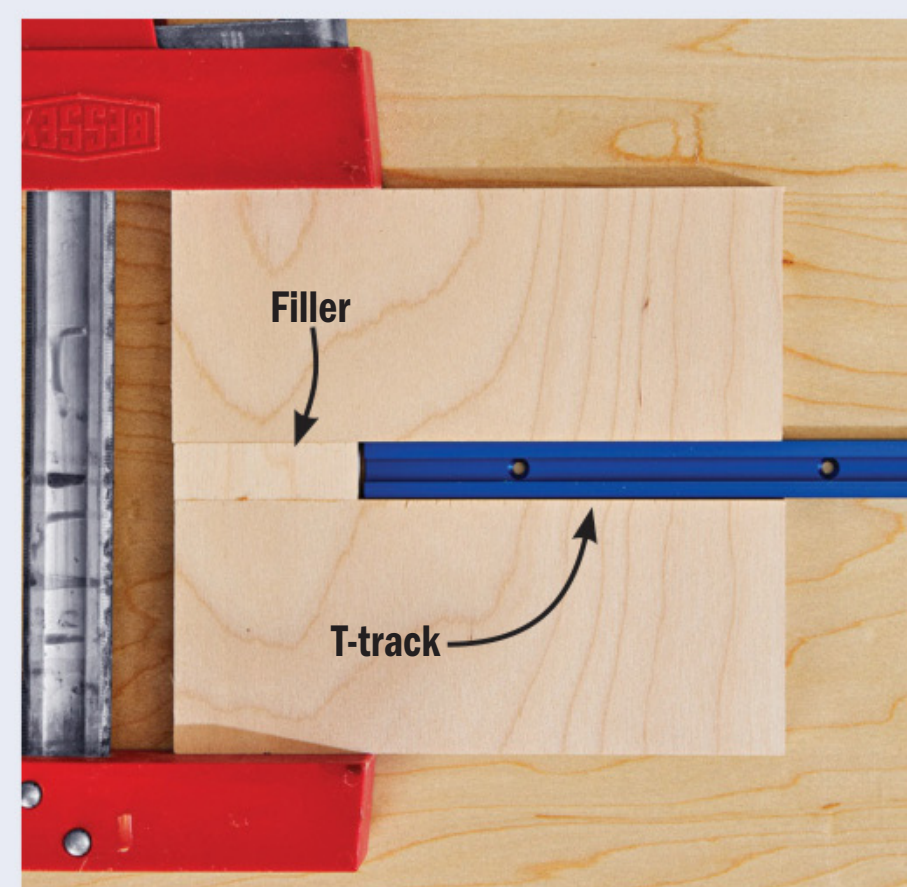
**H**

The base, backer, and cap (L, M, N) form a Z-shape framework. Double-check that the edge of the cap (N) rests flush with the rear face of the backer (M).

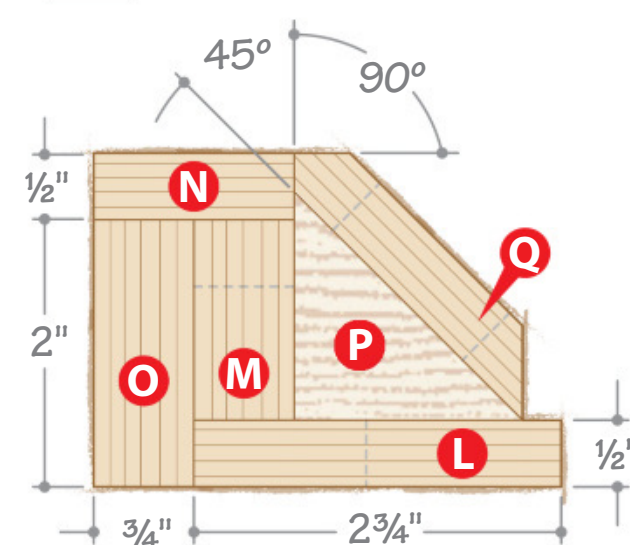
### Fast-track the T-track

Build this simple jig and dado the top (K) for tight-fitting T-tracks. From ½" plywood, cut two 3¼×8" pieces and one ¾×2½" filler. Glue the filler between the 8" pieces, as shown at right. Insert a piece of T-track in the opening to help maintain the correct spacing.

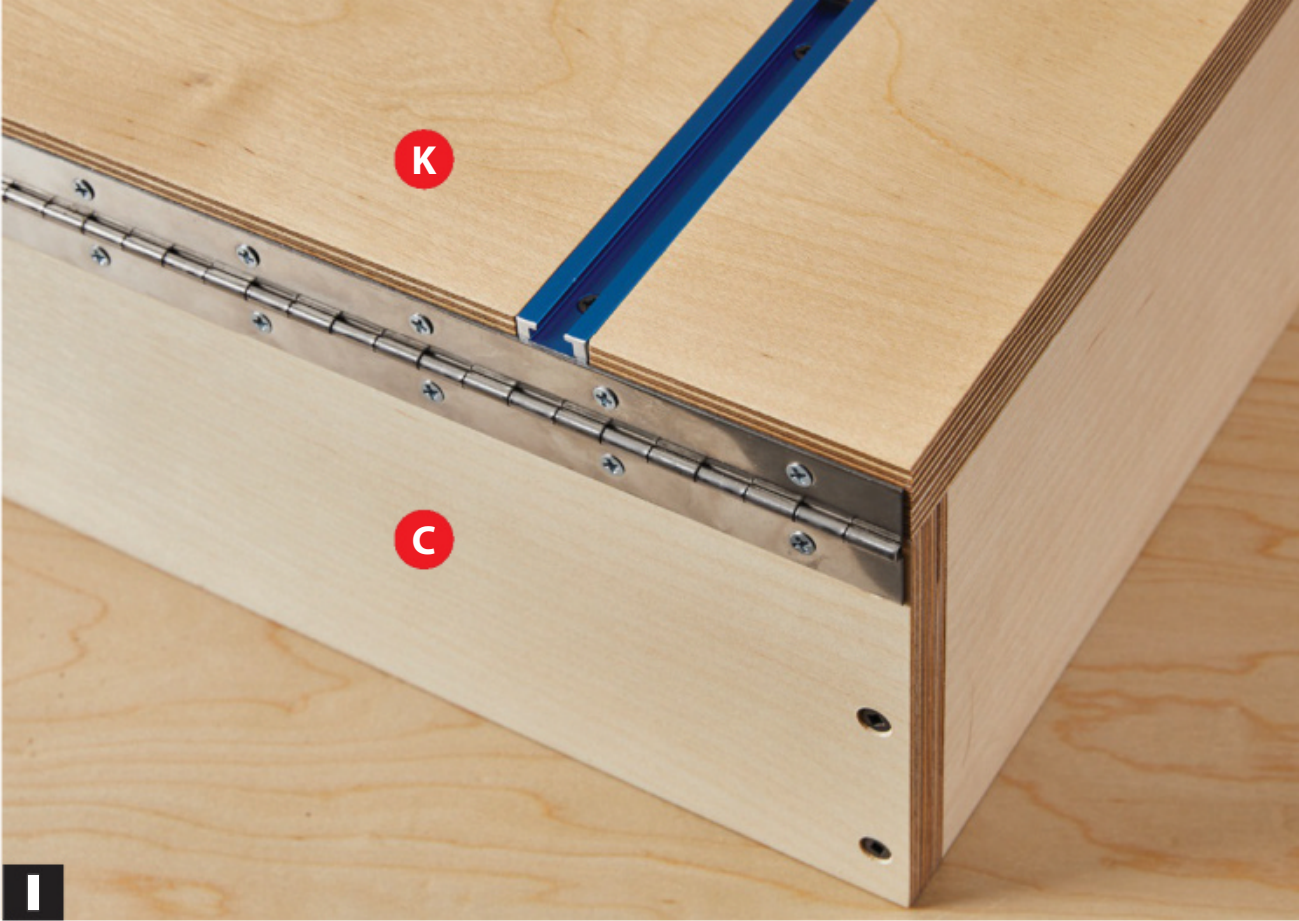
Clamp the template to the top over a track location and use a dado clean-out bit to rout a stopped dado. Square the corners with a chisel.



#### 5a SIDE VIEW







**I** The continuous hinge installs just below the bottom of the T-track, allowing the T-bolts to clear the slot.

### Now leverage the end process

- 1 Apply finish to the case, legs, top, and fence. (We sprayed three coats of rattle-can lacquer, sanding lightly between coats.)
- 2 Screw the T-tracks to the top (K). Then install the top with a continuous hinge cut to length [Photo I]. Install the latches and handle on the front of the case.
- 3 Cut and apply weatherstrip to the top edges of the shroud (I/J).
- 4 To orient the router in the table, mark the router's front on its subbase and remove it from the router. Place the subbase in the recess in the top (K) with the mark against the wood and facing the latches. Transfer the mounting holes to the top. Drill counter-



**J** Installing or adjusting the trim router is as easy as unlatching and raising the top.

sunk mounting holes and screw the router in place [Photo J].

5 To set up your new router table, slide the legs in place on the table and clamp at least one leg to a solid worksurface [opening photo]. Mount the fence using T-bolts and knobs [Sources] and attach the vacuum hose.

6 To make a cut, install a bit and adjust the bit height as needed. Lock the top in place and you're ready to rout. 🌿

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

## Materials List

| Part          |                     | FINISHED SIZE |      |      | Matl. | Qty. |
|---------------|---------------------|---------------|------|------|-------|------|
|               |                     | T             | W    | L    |       |      |
| Case and legs |                     |               |      |      |       |      |
| A             | bottom              | ½"            | 13"  | 20⅞" | BB    | 1    |
| B             | sides               | ¾"            | 5½"  | 13"  | BB    | 2    |
| C             | front/back          | ¾"            | 5½"  | 21⅝" | BB    | 2    |
| D             | large corner blocks | ¾"            | 1¾"  | 3½"  | BB    | 4    |
| E             | small corner blocks | ¾"            | 1½"  | 3½"  | BB    | 4    |
| F             | long legs           | ¾"            | 1½"  | 10"  | BB    | 4    |
| G             | short legs          | ¾"            | 1½"  | 4½"  | BB    | 4    |
| *H            | leg rails           | ¾"            | 1½"  | 10"  | BB    | 4    |
| I             | shroud sides        | ¾"            | 4⅞"  | 10½" | BB    | 2    |
| J             | shroud front/back   | ¾"            | 4⅞"  | 6"   | BB    | 2    |
| K             | top                 | ½"            | 14½" | 21⅝" | BB    | 2    |
| Fence         |                     |               |      |      |       |      |
| L             | base                | ½"            | 2¾"  | 17"  | BB    | 1    |
| M             | backer              | ¾"            | 1½"  | 17"  | BB    | 1    |
| N             | cap                 | ½"            | 1½"  | 17"  | BB    | 1    |
| O             | inserts             | ¾"            | 2"   | 7⅞"  | BB    | 2    |
| P             | braces              | ½"            | 1¾"  | 1¾"  | BB    | 4    |
| Q             | dust hood           | ½"            | 2½"  | 2⅝"  | BB    | 1    |

\*Parts initially cut oversize. See the instructions.

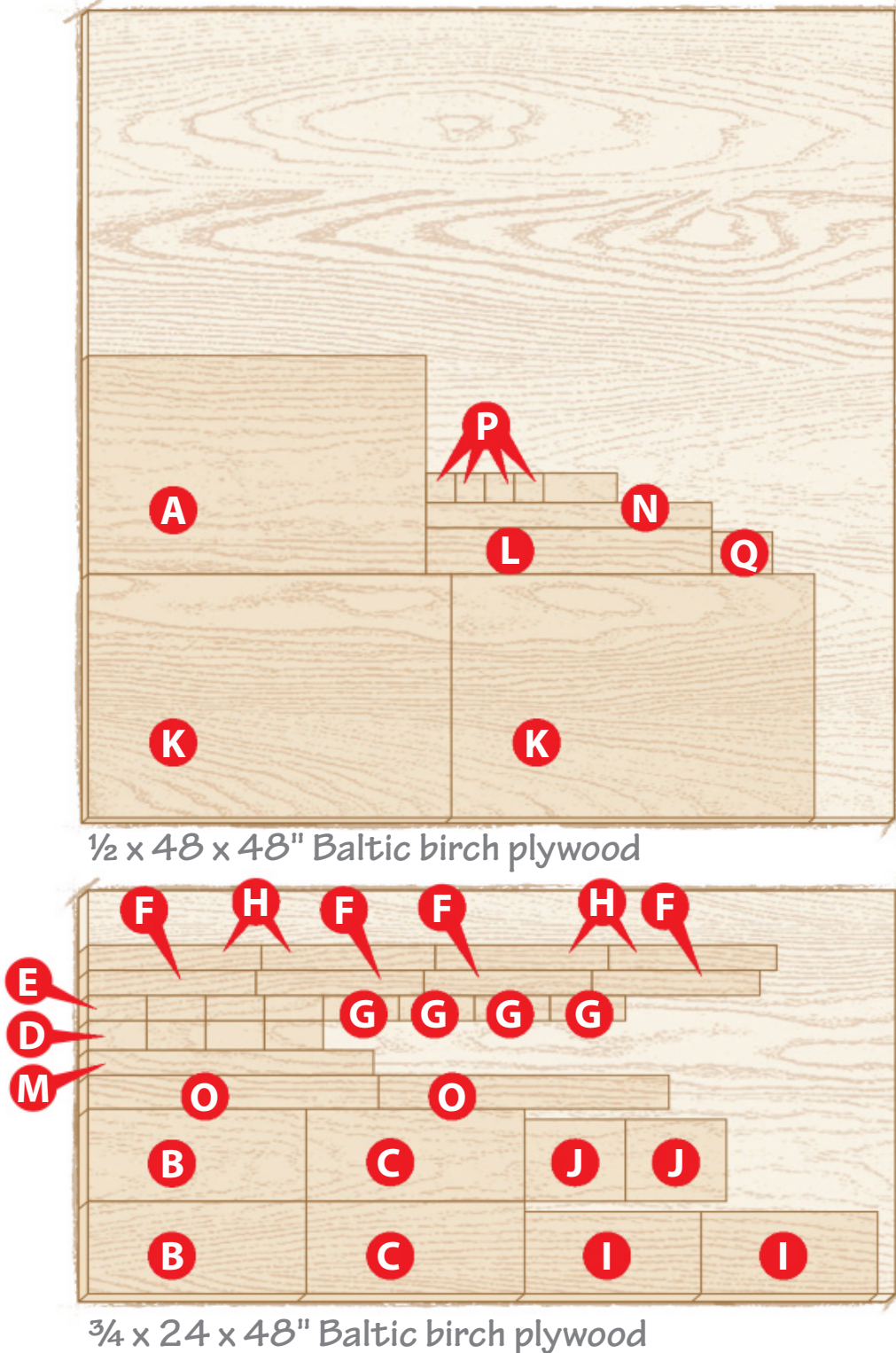
**Materials key:** BB-Baltic birch plywood.

**Supplies:** #6×⅜" flathead screws, #8×1¼" flathead screws, #8×2½" flathead screws.

**Blade and bit:** 22-teeth-per-inch jigsaw blade (or finer); ½"-diameter dado clean-out bit.

**Sources:** Universal T-track no. 22104, \$15; 1¼" T-bolts no. 31969 [pack of 5], \$4; 1"-diam. ¼"-20 knobs (2) no. 58088, \$3; 36×1½" continuous hinge no. 30085, \$17; nickel-plated large catches no. 89913, \$13/pair, Rockler, 800-279-4441, rockler.com. Brainerd 96mm (3¾") stainless steel finish bar pull, no. 875299, \$6.58; Frost King 10'×¾" black rubber foam weatherstrip, no. 96244, \$4, Lowes, lowes.com and local stores.

## Cutting Diagram







# CASTLE TSM-12 Pocket Cutter



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- Bosch 1617 Router with a 3/8" three-flute solid carbide router bit
- Bosch Colt Router with a 9/64" premium drill bit
- Low-angle pockets minimize clamping needs for assembly
- Material thickness range from 1/2" to 1-1/2"
- Pockets with pilot holes are created with one simple clamp/pocket lever motion.

[www.CastleUSA.com](http://www.CastleUSA.com)



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# DIY Tools for the Woodworker

*Not just for honey-do projects around the house, you'll find these crossover tools valuable for woodworking as well.*



**E**ven though you may be more likely to see these tools in the back of a pickup truck than in a woodworking shop, don't be too quick to dismiss them. In our experience, these underappreciated products come in quite handy for specific woodworking tasks.

## Grind your troubles away

Besides smoothing welds and cutting rebar, an angle grinder accepts abrasive discs and wheels for grinding different materials. To shape contours in wood, such as a chair seat, equip your angle grinder with a tungsten-carbide grit disc, as shown *above*.

**Shown:** Milwaukee 4½" angle grinder, no. 6141-30, \$99, [milwaukeeetool.com](http://milwaukeeetool.com); Kutzall shaping wheel, no. DW4120230, \$55, [kutzall.com](http://kutzall.com)



## Workbench on the go

A portable workbench provides additional workspace or a temporary tool stand wherever you need one. Most have work-holding jaws and dogholes to provide options as you cut, drill, or sand. The wide stance of the feet keeps the bench stable. And nearly all models fold down easily for storage or transport.

**A V-shaped notch** running the length of each jaw edge grips cylindrical workpieces, such as dowels, pipes, or metal rods.

**Shown:** Black & Decker Workmate 225, \$72, [blackanddecker.com](http://blackanddecker.com)



**Powered by a small air compressor**, a finish nailer comes in handy for assembling shop projects or jigs.

## Drive fast and avoid the splits

The brad nailer's big brother, a finish nailer shoots larger and longer fasteners, ranging from 1¼" to 2½" in length. Pneumatic nailers dominate the market, but battery-powered versions provide portability without the compressor noise or tail-dragging hose.

Use a finish nailer whenever you require more holding power than brads or pins can offer, such as when installing trim or building shop projects like shelving, carts, or jigs. The fast action of the nailer leads to less splitting of wood and no dimples from an errant hammer blow.

**Shown:** Makita 15-gauge finish nailer, no. AF635, \$184, [makitatools.com](http://makitatools.com)



## Getting out of a tight spot

**Shown:** DeWalt oscillating multitool, no. DCS354D1, \$139, [dewalt.com](http://dewalt.com)

An oscillating multitool cuts or sands with a rapid back-and-forth motion rather than spinning. Detachable heads allow you to use the multitool for sanding, grinding, sawing, scraping, or polishing, making it the Swiss Army knife of portable power tools.

Once you own an oscillating multitool, you'll find all sorts of uses for it, from sanding in hard-to-reach places, like the corner of a cabinet or between chair slats and spindles, to cutting an opening inside a cabinet for wiring.



Equipped with a saw blade, a multitool can plunge-cut an opening in the middle of a panel.

## Supersized layout tool

Essentially a T-square on steroids, this large aluminum square is used by drywall installers to lay out cuts. But it works just as well on plywood or other sheet goods, speeding up the layout process. Store it against the wall where it doesn't take up much space. Some manufacturers offer adjustable squares so you can lay out angles.

**Shown:** Johnson drywall square, no. JTS48, \$16, [johnsonlevel.com](http://johnsonlevel.com)



The 48"-long blade of a drywall square spans the width of a full sheet of plywood, or just short of the 49" width of an MDF sheet.

## A good stud is hard to find

**Shown:** Zircon StudSensor, no. WM5, \$20, [zircon.com](http://zircon.com)

When you need to hang a cabinet or other heavy item on a wall, don't turn the wall into Swiss cheese looking for a stud. Use a stud finder to locate studs for mounting screws, or torsion-box members behind a layer of plywood. It's worth spending the extra money on a model that detects density changes within the wall. Some versions can also help you locate (and avoid) pipes and electrical wires. 🌳



Slide the stud finder along the wall surface until the display lights up, indicating the presence of a stud.





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# 3 Ways to Make Shiplap

*Add pizzazz to your projects and home with this simple, elegant form of joinery.*

**P**opularized by home-renovation TV shows, shiplap is enjoying a renaissance as a wall covering, but has always been a sound choice for door panels or backs for cabinets and bookcases. You can easily make your own with any of the three methods shown here, and even dress up the joint with routed profiles.

**Tip!** When installing shiplap horizontally on a wall, use coins to set a consistent gap that allows for seasonal expansion and contraction. Nail into studs through the lapped joint, using a 15- or 16-gauge finish nail. If you'd prefer to avoid exposed nails, you can either set them and fill the nail holes before painting or finishing, or use construction adhesive on the lap joint and nail only the top (hidden) tongue.





**Cut the rabbets slightly deeper** than half the board thickness, leaving a  $\frac{1}{32}$ " gap between them. Because this is not a glue joint, you don't need a tight fit.

## So, what is shiplap?

Although we could find no credible sources tracing its origin to actual ships, shiplap joinery has commonly been used to create a weather-resistant wallcovering. When shiplap boards are nailed in place rather than glued, the overlapping rabbets maintain lapped coverage as the boards shrink and swell because of seasonal humidity changes.

Your board width dictates the dimensions of the mating rabbets: For workpieces 4" or

narrower, a  $\frac{1}{2}$ " rabbet suffices; for boards between 4–8" wide, make the rabbet  $\frac{3}{4}$ " wide.

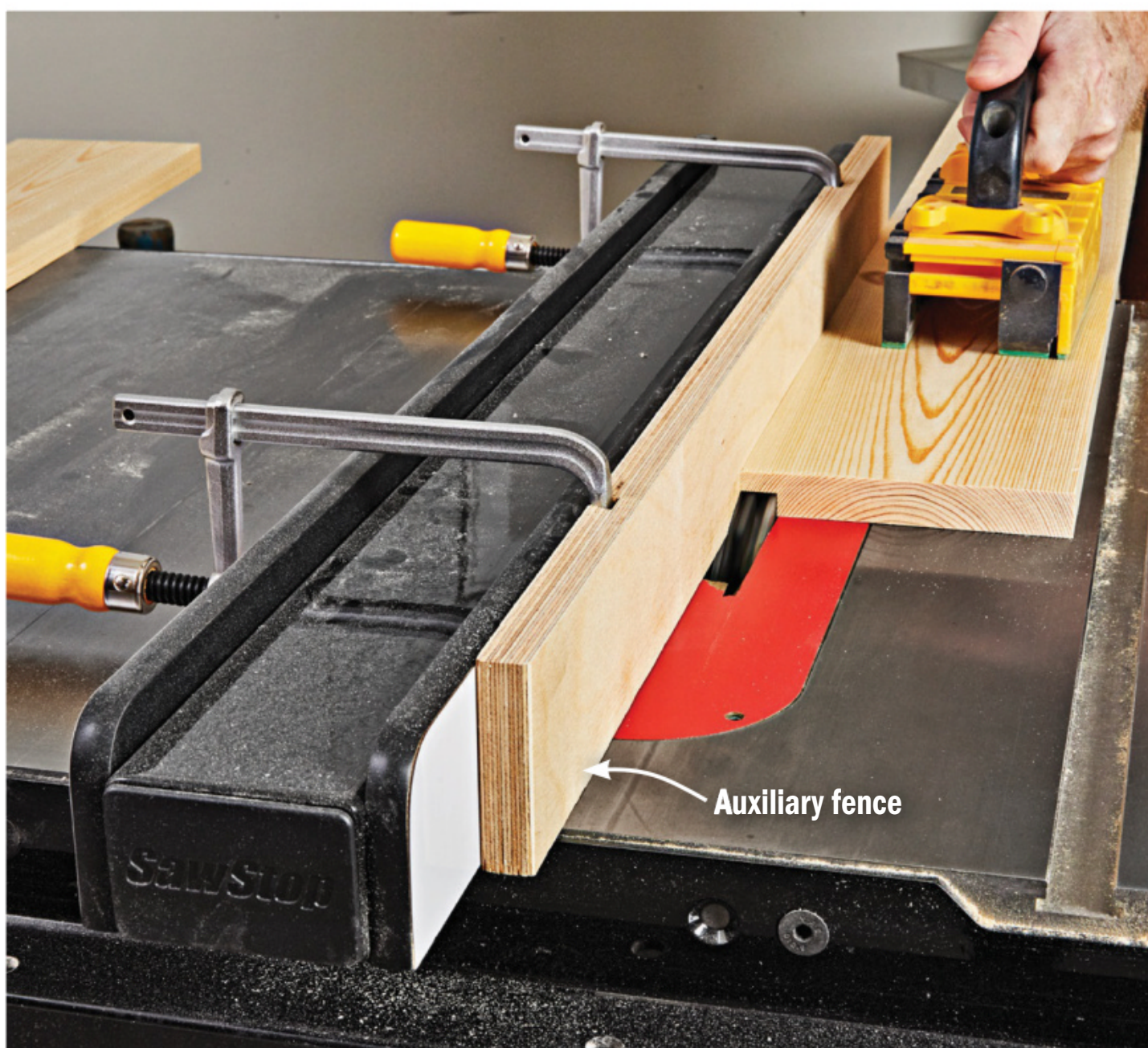
Begin by jointing and planing all stock and a few test pieces flat, square, and to consistent thickness. Then rip the pieces to final width on the tablesaw. You can crosscut to final length now or after milling the shiplap edges. Determine the good/front face of each board and mark it. Then, cut the joinery using one of the following methods.

## Lapping at the tablesaw

► We like MicroJig's MatchFit clamps to secure an auxiliary fence. [woodmagazine.com/matchfit](http://woodmagazine.com/matchfit)

Install on your saw a stacked-dado set a little wider than your planned rabbet so you can cut each rabbet in one pass. To prevent cutting into your saw's rip fence, attach an auxiliary fence, positioned slightly over the

stack. Raise the spinning stack until you reach the desired height. Make test cuts in the extra pieces you prepared. If your saw or dado set won't allow for a wide-enough stack, simply cut the rabbet in two passes.



**Run the board tight against the auxiliary fence** and flat against the tablesaw top.



**For the second cut, flip the board** with the first rabbet facing upward.



# Rabbet with a router

► A rabbeting bit with a bearing set lets one bit cut rabbets of various widths by swapping bearings. [woodmagazine.com/rabbetingbit](http://woodmagazine.com/rabbetingbit)

Although you can rout a rabbet with a straight bit and edge guide, a dedicated rabbeting bit makes the task virtually foolproof. Set the rabbet width by installing the appropriate guide bearing for the width of the desired rabbet. Installing an offset base on your router helps prevent the router from tipping and creating uneven cuts. After getting a perfect fit on your test pieces, rout all rabbets on the keeper boards.



**Rout the rabbet in one pass** to ensure identical cuts in all workpieces. Flip the board and rabbet the other edge.

## Take it to the router table

You can also use a rabbeting bit on a router table—just make sure the fence faces align flush with the bearing. But with the fence as a guide, you can use any straight or spiral bit; we prefer downcut spiral bits on the router table for the cleanest cuts.

Use featherboards as shown *below* to ensure consistent rabbets. For rabbets wider than your bit's diameter, rout the rabbet in two passes, moving the fence away from the bit after routing the first pass on all pieces.



**With featherboards pressing the workpiece against the table**, rout the first rabbet, keeping the stock tight against the fence.



**Flip the board and rout the opposing rabbet** on the other edge.



## Shipshape: Dress it up with details

With the edges rabbeted, your shiplap is ready for installation, but adding a routed profile kicks up the visual interest.

► Buy these bits for your shop:  
[woodmagazine.com/vgroovebit](http://woodmagazine.com/vgroovebit)  
[woodmagazine.com/beadingbit](http://woodmagazine.com/beadingbit)  
[woodmagazine.com/45chamferbit](http://woodmagazine.com/45chamferbit)



**Break up the plain look of wide boards** by centering a V-groove on the front face with a V-grooving bit.



**Add a half-bead profile** with a beading bit. You'll need a tongue at least a  $\frac{3}{8}$ " thick to do this.



**Bevel the overlapping tongue's edge** with a 45° chamfer bit. This draws more attention to the joints.

## Tips for installing shiplap

Secure shiplap with brads or finish nails—no glue. Brads or nails will flex slightly, enough to allow for the expansion and contraction of each board. 🌲

Produced by **Bob Hunter** with **Dave Fish**



**When enclosing the back of a bookcase** or cabinet, rabbet only one edge of the first and last pieces, so they fit gap-free in the rabbet along the case's side.



**Insert coins in the gaps between each piece.** Use pennies or dimes for shiplap less than 4" wide; for wider pieces, use nickels or quarters.



**When installing shiplap vertically**, such as this wainscoting, nail it at the top and bottom, where trim boards will cover the nails. Underlay  $\frac{1}{2}$ " or thicker plywood or oriented-strand board (OSB) on the wall first because you won't be able to nail into a stud with each piece of shiplap.



# Table for Two, Please



**D I M E N S I O N S :**  
Table: 40" Diam. x 30" H  
Chair: 19½" W x 24" D x 34½" H

Approximate  
materials cost:  
**\$300**  
Lumber and  
hardware

**11** legs  
(four for each  
chair and  
three for the  
table)

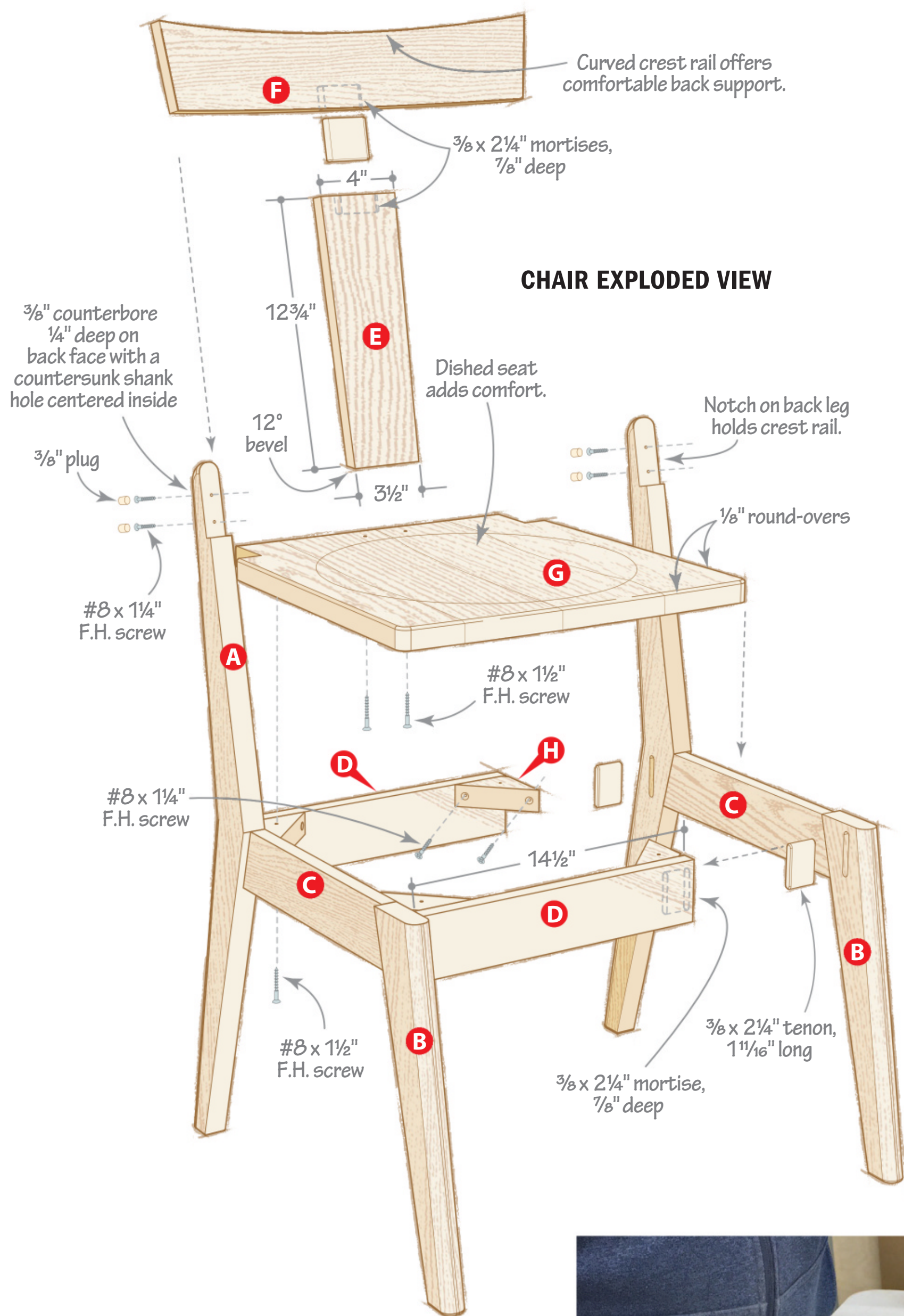


A photograph of a wooden bistro table and chair set. The table is round with a light wood finish and a simple, modern design. The chair is also made of wood, featuring a curved backrest and a simple seat. The set is positioned in a bright room with a large window in the background, showing green foliage outside. To the left of the table, there is a small white side table with a vase of white flowers and a small white bowl. The floor is made of light-colored tiles.

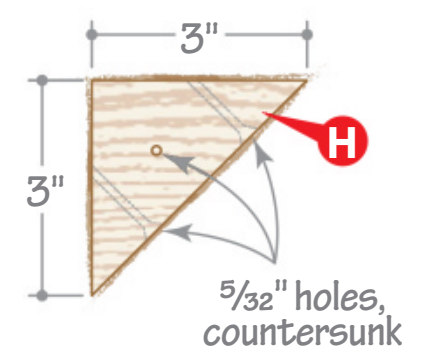
*This bistro table-and-chair set is the perfect size for a breakfast nook or eat-in kitchen.*

**B**uilding a table and set of chairs provides a challenging project, even for experienced woodworkers. But in this case, templates and a few jigs make creating the parts easier. Loose tenons and knock-down hardware speed up the assembly, so you'll be sitting down to your morning cup of joe in no time.





### CORNER BLOCK DETAIL



**Tip!** When making multiples, such as chairs, save time by cutting out the parts and routing joinery in groups. Deal with final fitting during assembly.

## Get a leg up on the chairs

**1** From  $1\frac{1}{8}$ "-thick stock, cut blanks for the back and front legs (A, B) [Chair Exploded View, Materials List]. (We built both the chairs and the table out of cherry.) Make full-size templates for the legs out of  $\frac{1}{4}$ " hardboard [Drawings 1, 2]. Using the templates, trace the outline of the legs onto the blanks.

**2** Bandsaw the legs to shape, staying just outside the layout lines, then flush-trim them at the router table [Photo A]. Determine which will be right legs and which will be left and label them on the inside face.

**3** To align the mortising jigs used on the faces of the legs, mark the centerlines of these mortises. Start by butting a back leg

► Pattern bit or flush-trim bit? Learn how to use both. [woodmagazine.com/template](http://woodmagazine.com/template)



**A** Attach the template to a leg with double-faced tape. Set the bit bearing to ride against the template while cutting the full thickness of the leg.





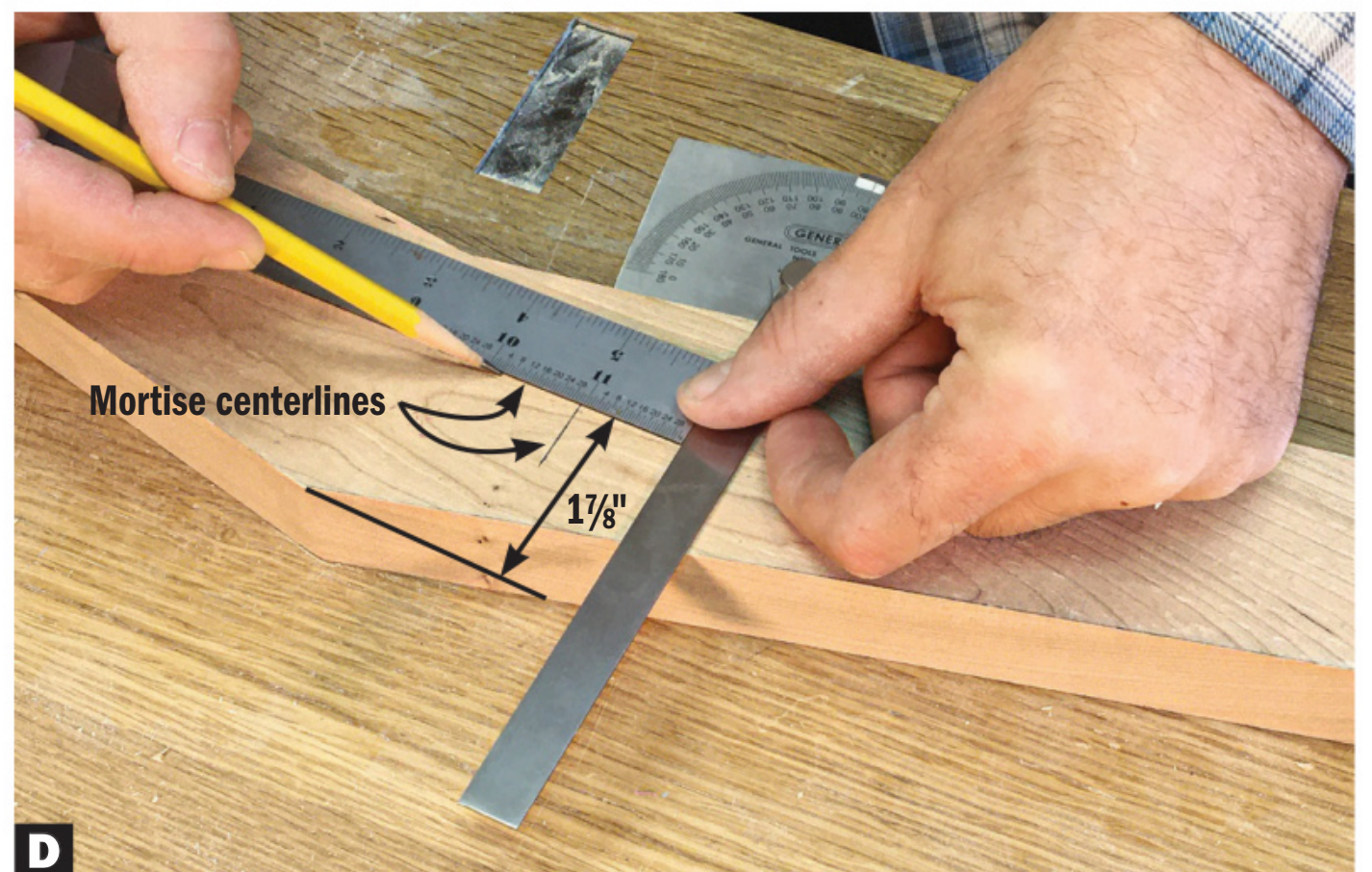
**B**

Measuring from the bottom of the leg (A), mark the center of the mortise length on the inside face.



**C**

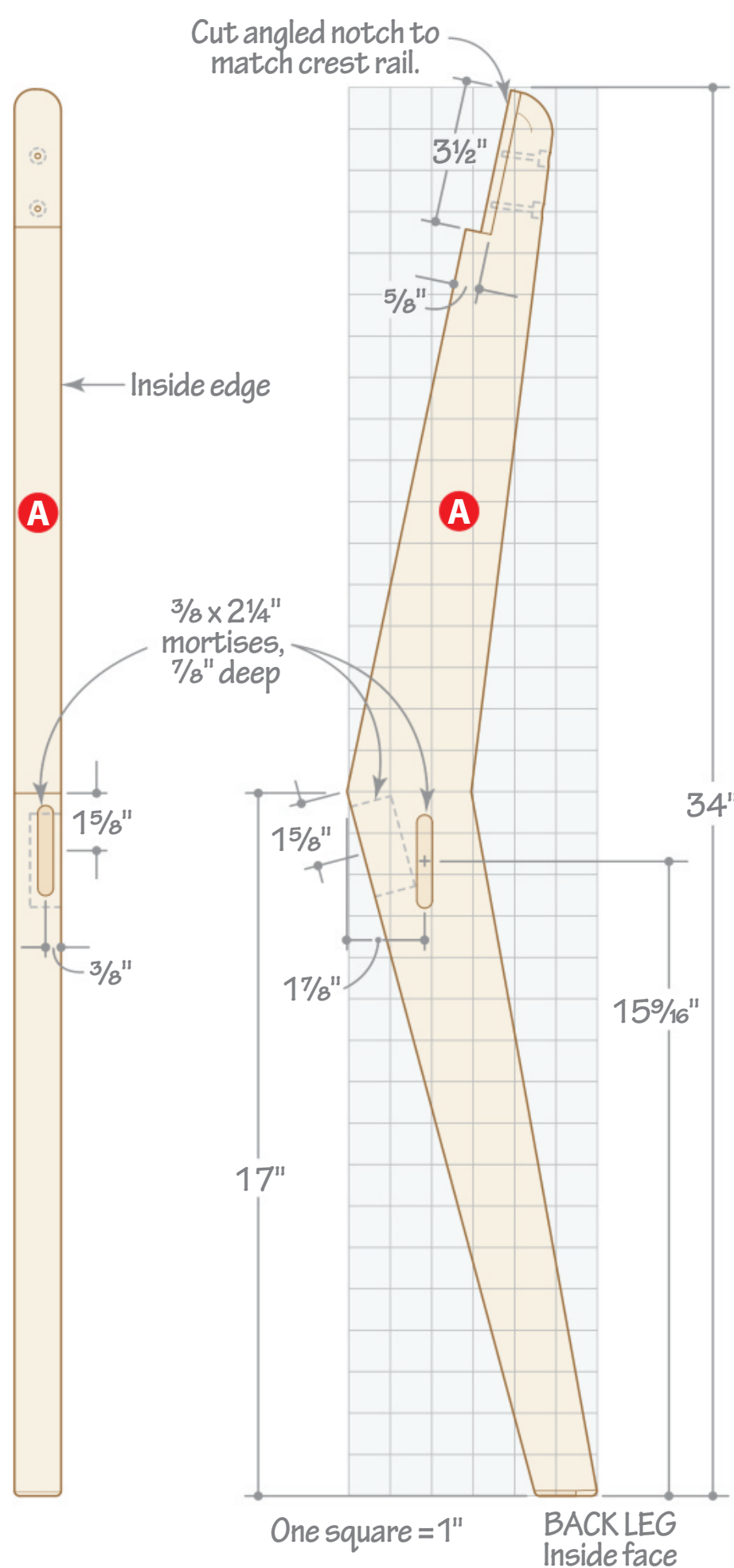
Use the bottom of the leg to set the angle of an adjustable protractor. Then draw a line through the mark you made earlier.



**D**

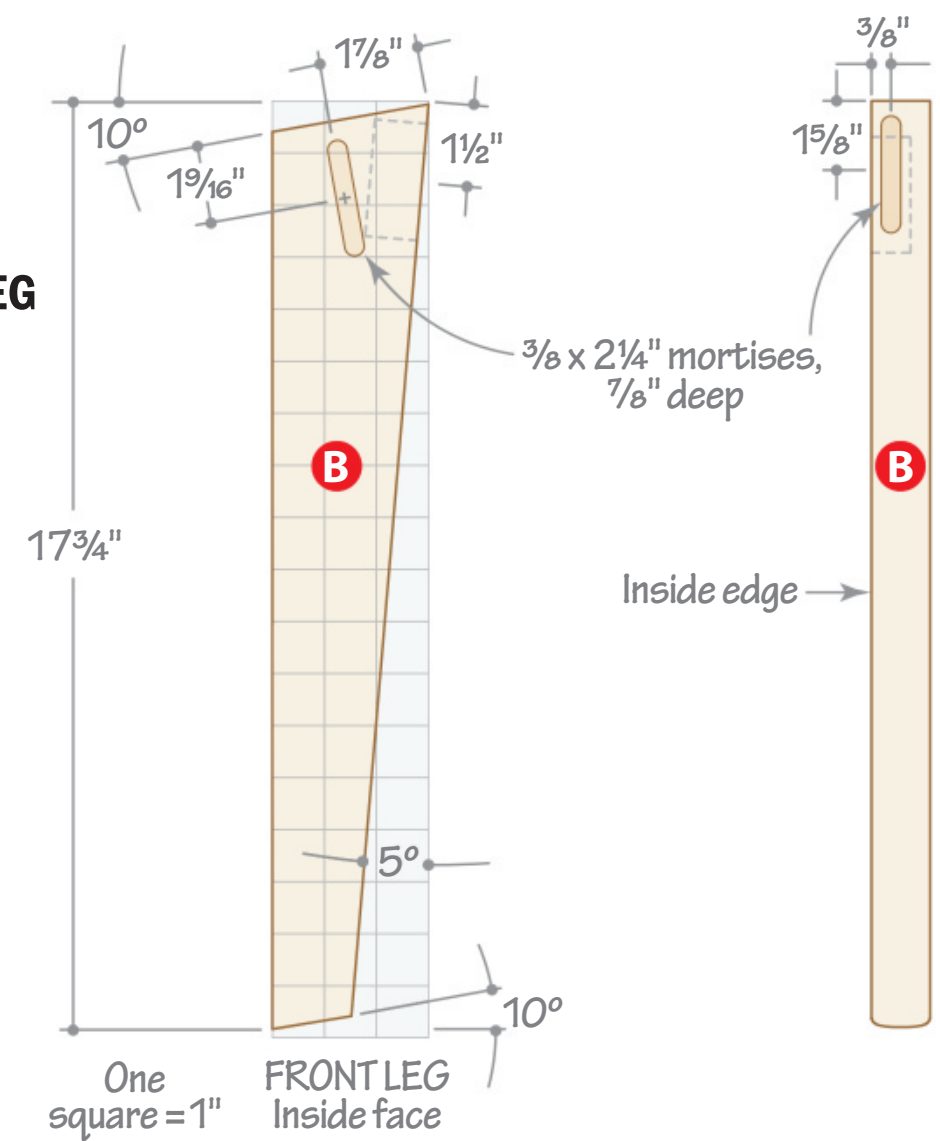
Place the end of your ruler against the protractor and draw a second centerline perpendicular to the first and the length of the mortise.

## 1 BACK LEG



(A) against a straight-edged piece of stock to mark the center height location of the back rail mortise [Photo B, Drawing 1]. At this mark, draw a centerline parallel with the bottom of the leg [Photo C].

## 2 FRONT LEG

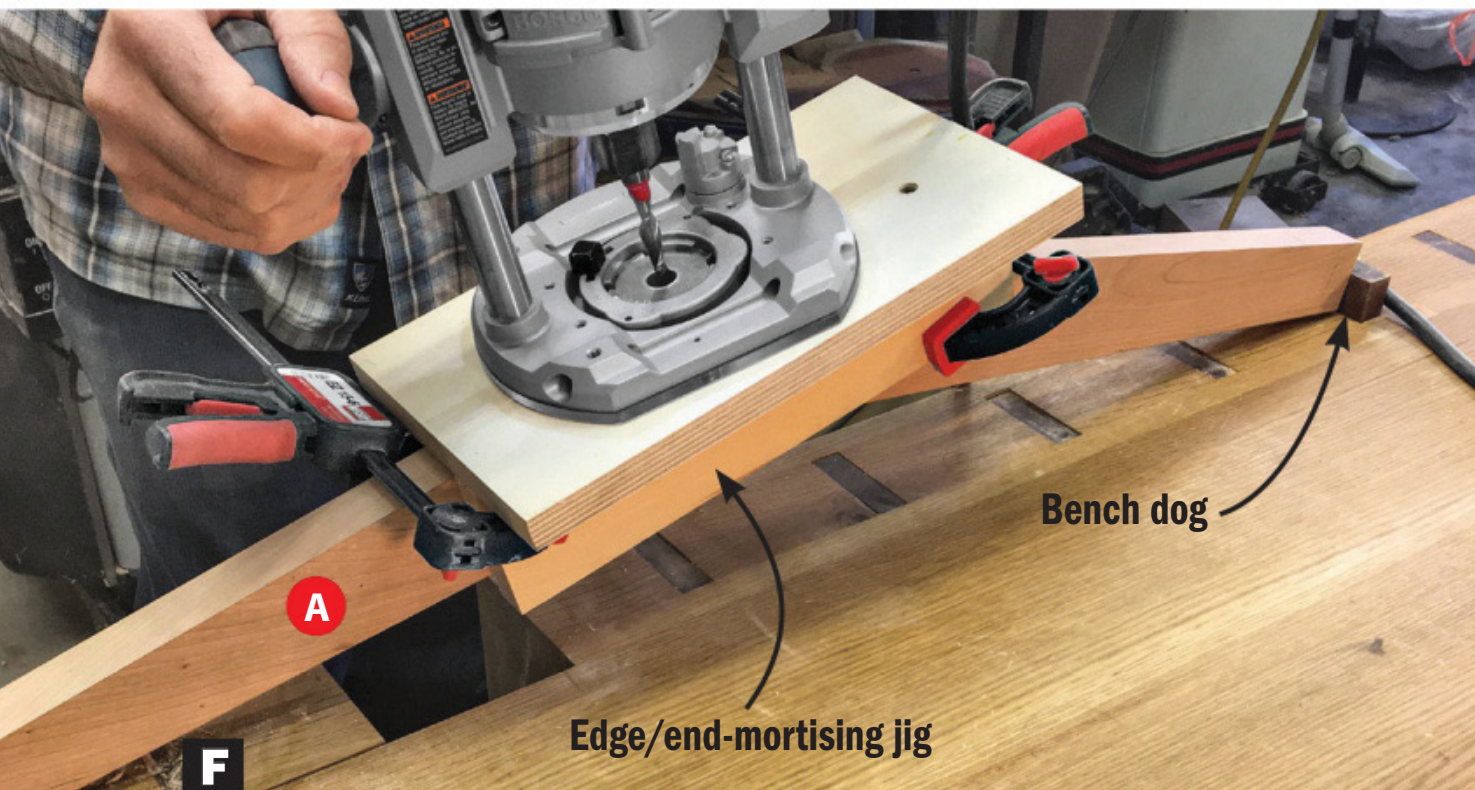


4 Make a mark  $1\frac{7}{8}$ " from the front of the leg and draw a second centerline at this mark [Drawing 1, Photo D]. Repeat this process to lay out the mortise centerlines on the inside faces of the remaining back legs.





**E** In your plunge router, install a  $\frac{3}{8}$ " spiral upcut bit and a  $\frac{5}{8}$ " guide bushing to rout the mortises in the legs.



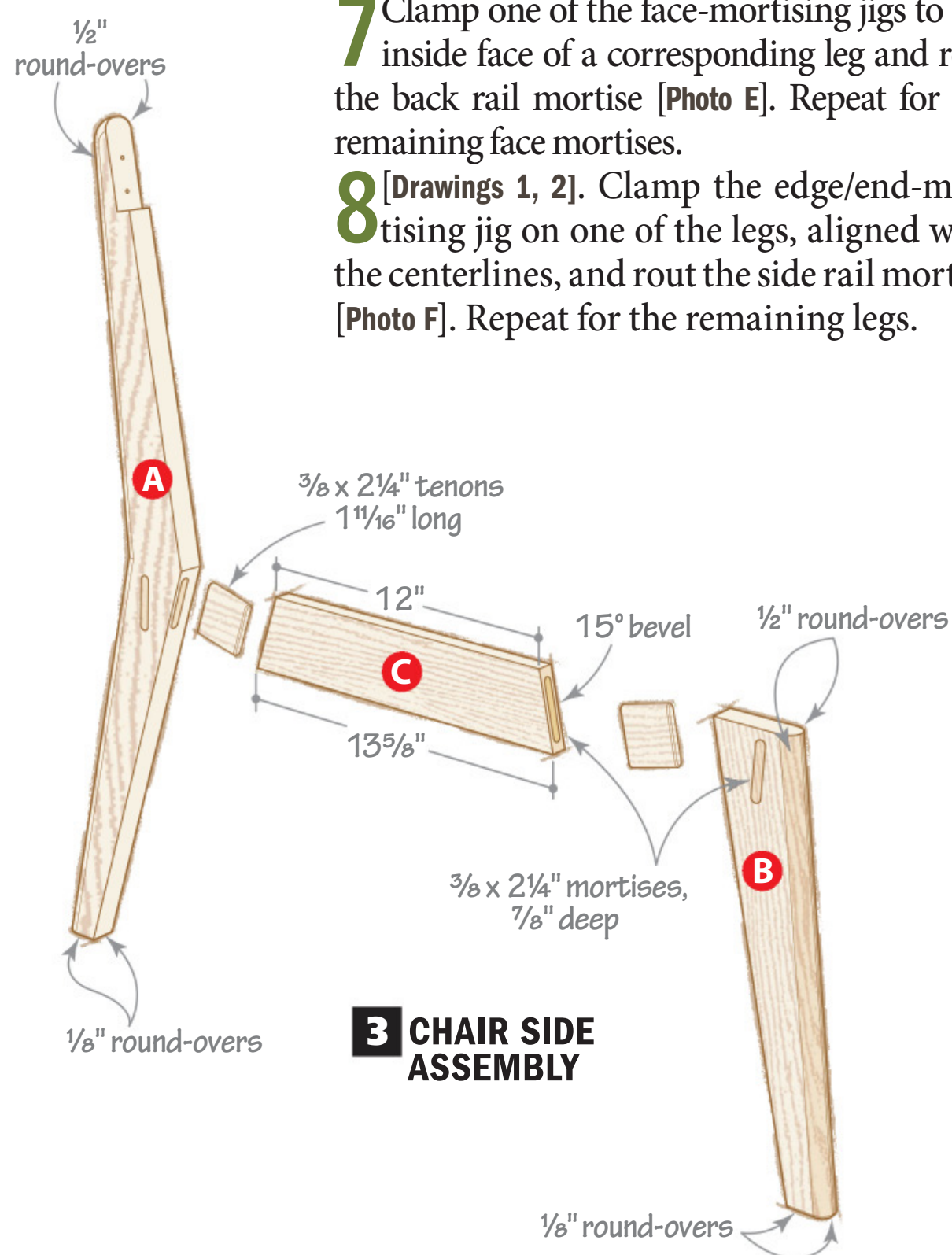
**F** Clamp the leg between bench dogs or in a vise to rout the edge mortises.

**5** Lay out the mortise centerlines on the inside edges of the back legs for the side rails [Drawing 1]. Using a similar procedure, lay out the centerlines for the mortises on the front legs (B) [Drawing 2].

**6** Make a pair of mortising jigs to rout the mortises on the inside faces of the legs [Jigs make mortising a snap].

**7** Clamp one of the face-mortising jigs to the inside face of a corresponding leg and rout the back rail mortise [Photo E]. Repeat for the remaining face mortises.

**8** [Drawings 1, 2]. Clamp the edge/end-mortising jig on one of the legs, aligned with the centerlines, and rout the side rail mortise [Photo F]. Repeat for the remaining legs.



### 3 CHAIR SIDE ASSEMBLY

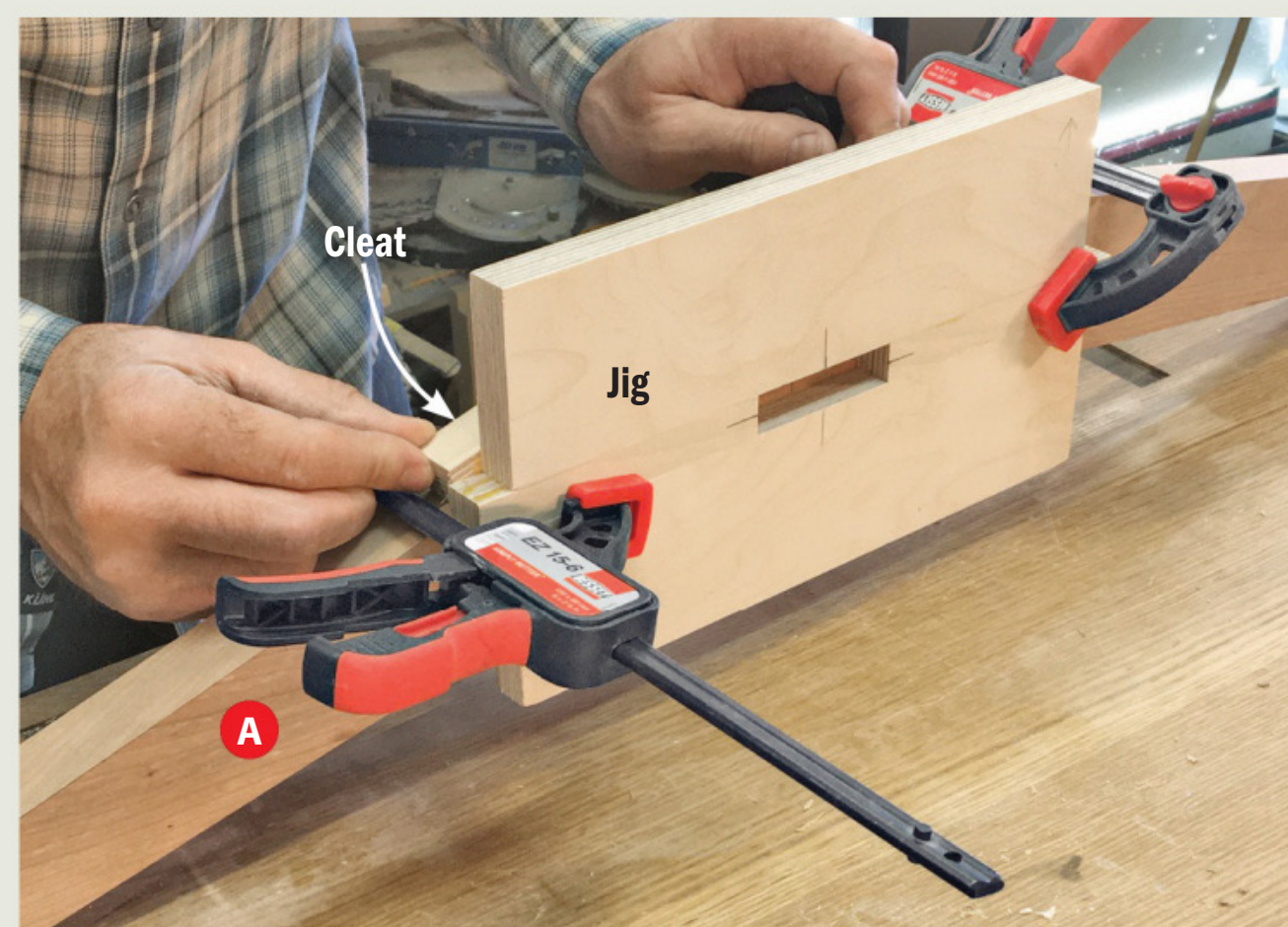
## Jigs make mortising a snap

A set of simple jigs aligns with the mortise layout marks for quick and accurate routing of the leg mortises. For the mortises on the faces of the legs, make a mirrored pair of jigs: one for the back left and front right legs; the other for the back right and front left.

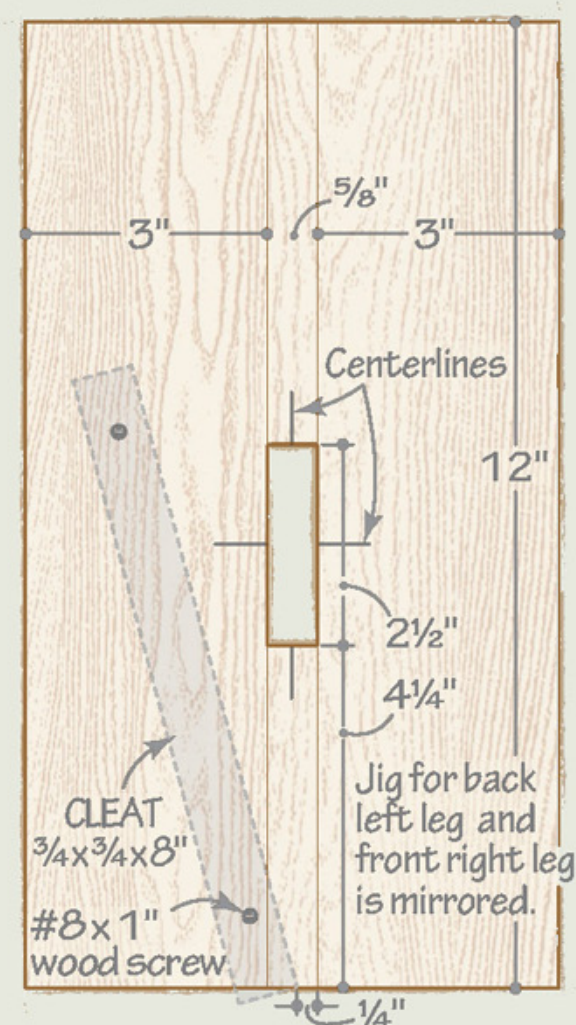
For each jig, glue up four pieces of  $\frac{3}{4}$ " plywood, leaving a  $2\frac{1}{2}$ "-long slot in the center [Jig Drawings]. Mark centerlines on the top of all three jigs and extend them down the inside edges of the slots to make it easier to line up the jig with the centerlines on your workpieces. Cut the cleat for each jig, but don't attach them just yet.

Clamp one of the face-mortising jigs to the inside face of a back right leg, lining up the jig centerlines with those of the mortise. Place a strip of double-faced tape on one of the cleats and attach it to the underside of the jig butted up against the edge of the leg [Photo, below]. Unclamp the jig from the leg and drive a couple of screws through the cleat to secure it. Label the jig according to which legs you'll use it with. Repeat the process for the other jig, but using a back left leg.

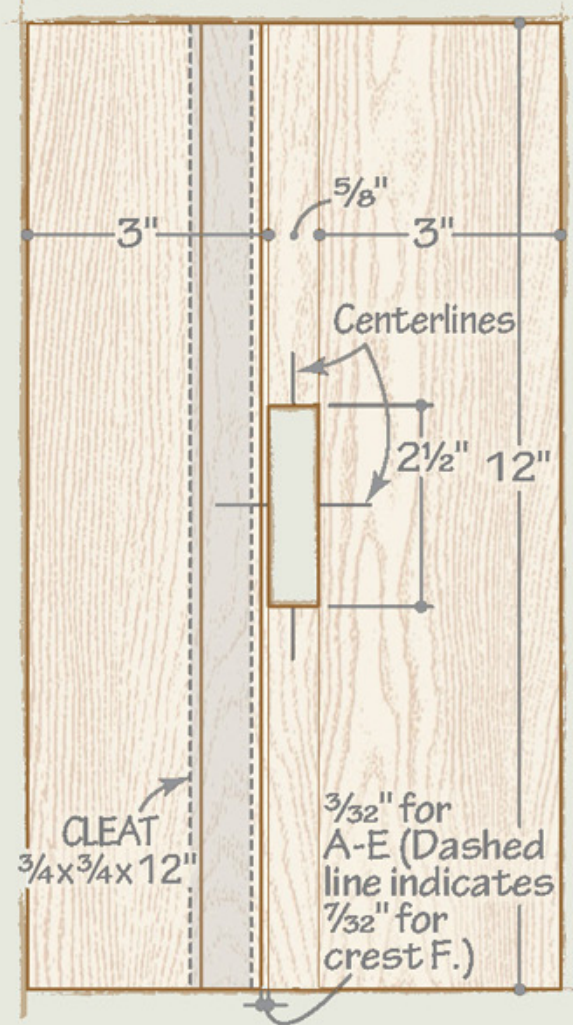
To rout the mortises on the edges of the legs, screw (don't glue) a cleat vertically to the edge/end-mortising jig,  $\frac{3}{32}$ " from the edge of the slot. Use the same jig later to rout the mortises for the back by simply repositioning the cleat [Edge/End-Mortising Jig Drawing].



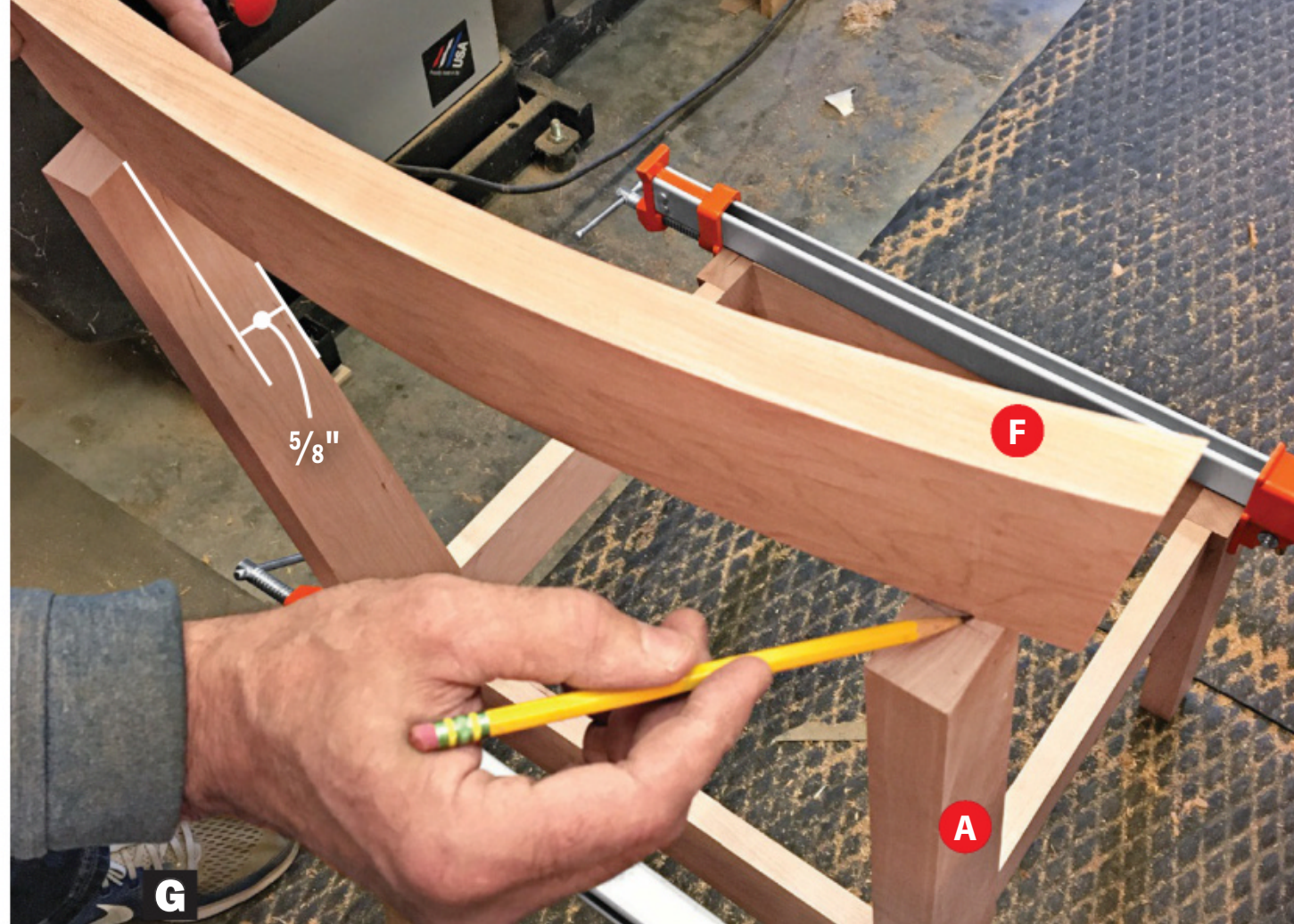
### FACE-MORTISING JIG



### EDGE/END-MORTISING JIG







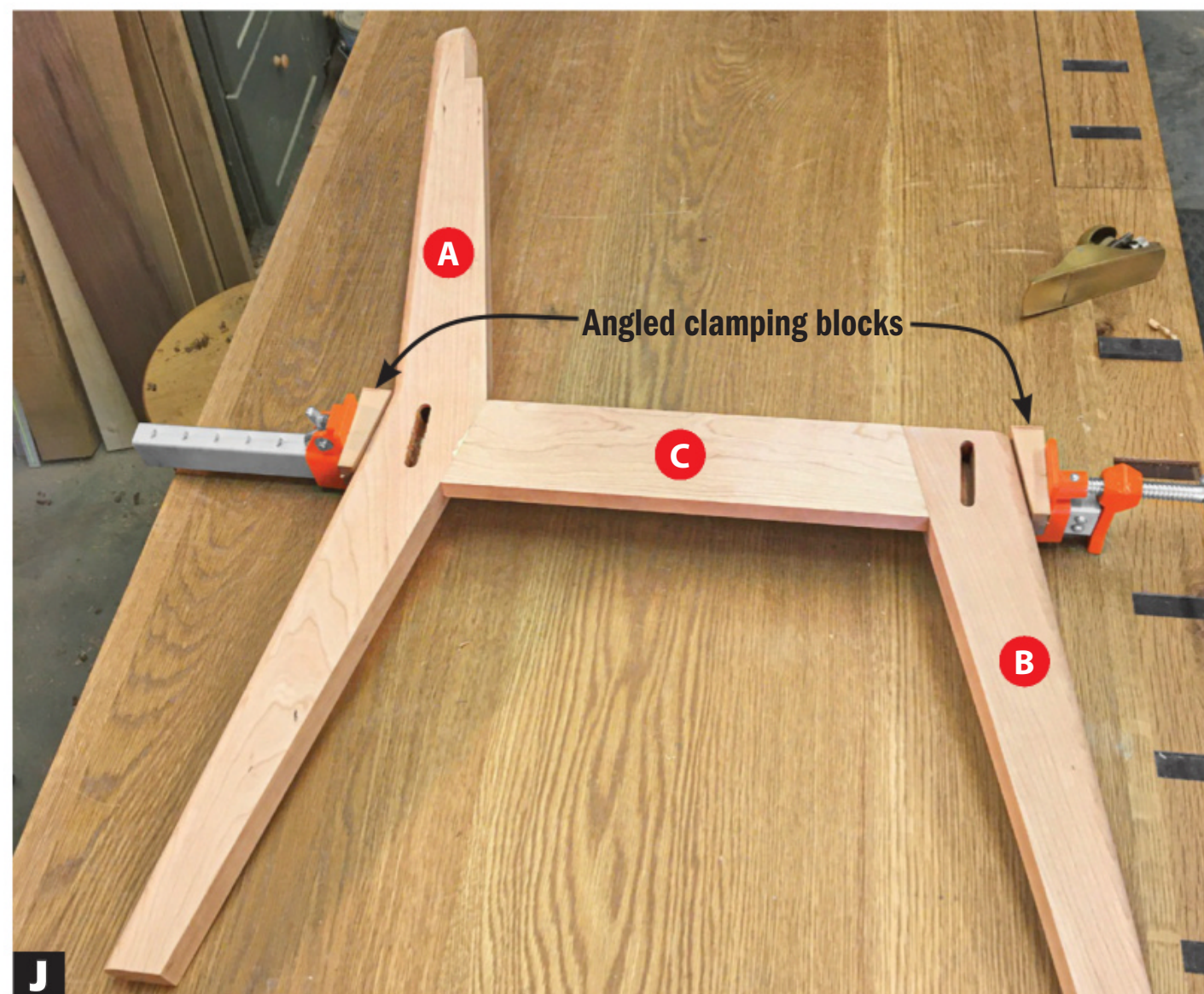
**G** Set the crest rail (F) on top of the back legs,  $\frac{5}{8}$ " back from the front edge. Trace the profile of the rail onto the legs with a pencil.



**I** A handsaw makes quick work of removing the waste and completing the crest-rail notch.



**H** Tilt your bandsaw table to match the scribe mark on top of the leg, then cut the notch.



**J** Cut angled clamping blocks to clamp up the side assemblies. Glue loose tenons into the legs, then add the side rails (C).

## Tie it all together

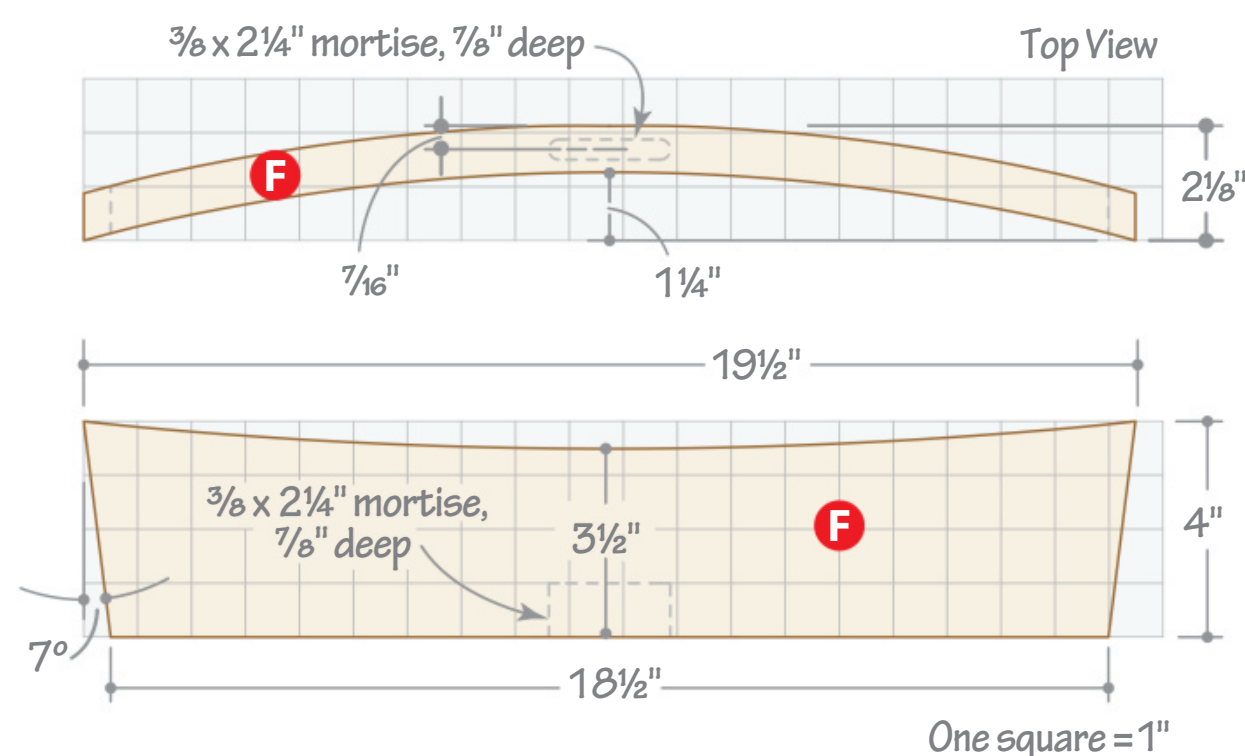
**1** Cut the rails (C, D) to size [Materials List, Exploded View]. Bevel the ends of the side rails (C), then lay out centered mortises on the ends [Drawing 3, Exploded View]. Cut the splats (E), but don't taper the edges yet.

**2** Using the edge/end-mortising jig, rout mortises in both ends of the rails (C, D) and one end of each splat (E) [Exploded View].

**3** From 10/4 stock, cut blanks for the crest rails (F). Lay out the rail profile and the mortise on each blank [Drawing 4].

**Tip!** If you can't locate 10/4 stock, glue up a blank for the crest rail out of  $1\frac{1}{2}$ "- and  $\frac{3}{4}$ "-thick stock. Place the thicker stock in front so you don't see the glue line after cutting the curve.

### 4 CREST-RAIL PATTERNS



**4** Reposition the cleat on the edge/end-mortising jig and attach it to rout the mortises in the crest-rail blanks. Bandsaw the crest rails to rough shape, beginning with the front profile and then the top profile [Drawing 4]. Sand the rails to final shape.

**5** Cut two  $\frac{3}{8} \times 2\frac{1}{4} \times 20$ " blanks for the loose tenons (one blank per chair). Rout  $\frac{3}{16}$ " round-overs on the edges and cut  $1\frac{1}{16}$ "-long tenons from the blank [Exploded View].

**6** Dry-assemble the chairs, and scribe the curve of the crest rail (F) onto the top of the back legs (A) [Photo G]. Extend the marks down the faces of the legs [Drawing 1]. Set the splats and crest rails aside for now.

**7** With the table tilted, bandsaw a notch for the crest rail in each right back leg, stopping at the layout line [Photo H]. Tilt the table in the opposite direction and cut a notch in the facing legs. Cut the end of each notch [Photo I].

**8** Round over the legs where shown [Drawing 3]. Finish-sand the legs and rails, and assemble the sides [Photo J]. With the glue dry, glue the front and back stretchers (D) between the side assemblies.



## Have a seat

**1** From 1"-thick stock, glue up and cut to size blanks for the chair seats (G) [Drawing 5]. Don't round the front edge, taper the sides, or cut the notches yet.

**2** Using a router and shop-built jig, dish the seat blanks [For shaping a seat, this router jig rocks]. Finish-sand the dished area.

**3** Place each seat on a chair frame, centering it from side to side. Transfer the inside edges of the back legs onto the seats [Photo L]. Transfer the notch layout lines around the edge of the seats. When laying out the depth of the notch, note that it is a bevel cut to accept the angle of the back leg [Photos M, N].

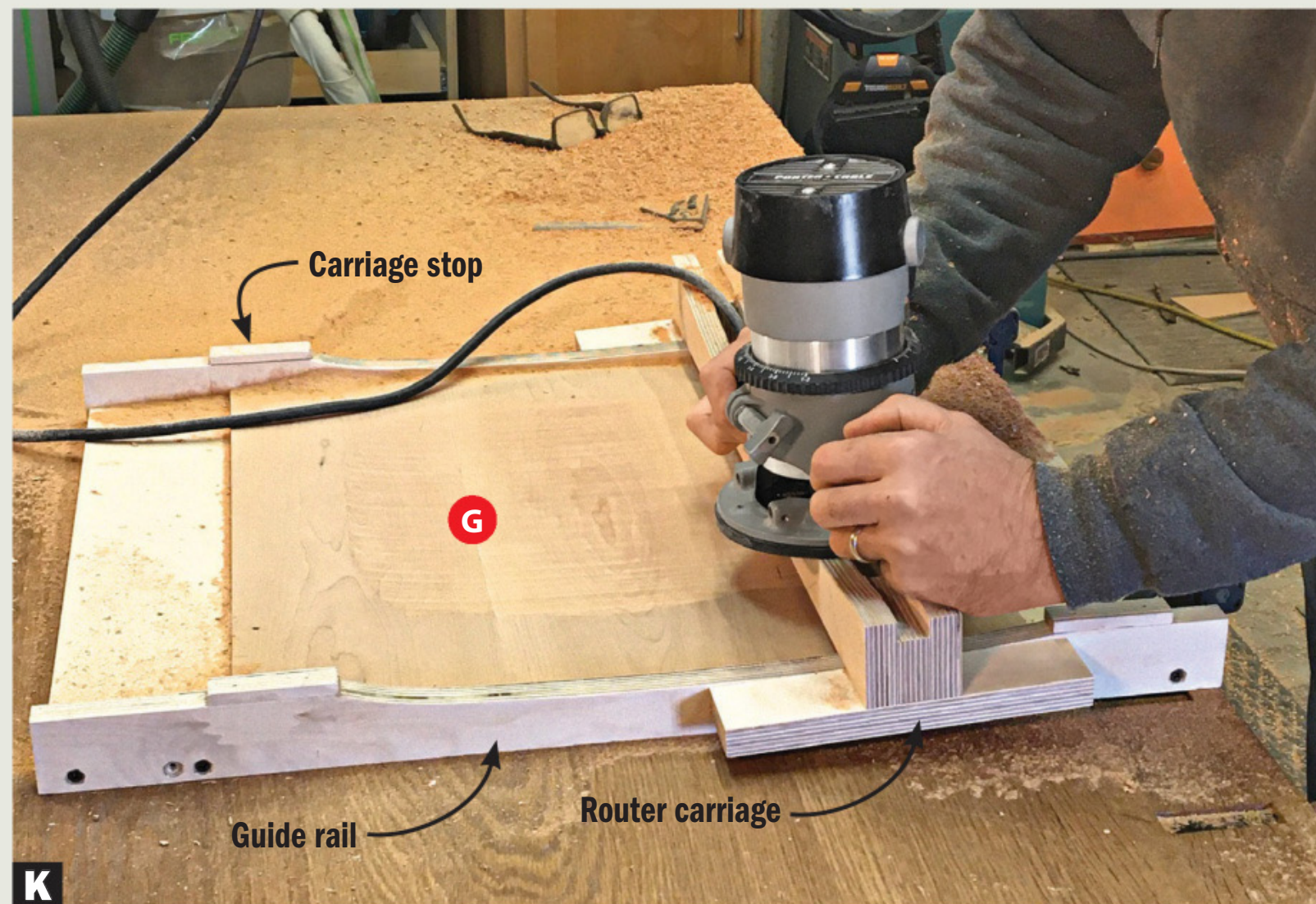
**Tip!** When fitting the seat to the chair, leave a little clearance between the back legs and the seat to allow for wood movement.

## For shaping a seat, this router jig rocks

Dishing a chair seat is traditionally performed with specialized hand tools. But a router and shop-built jig achieve the same results without the steep learning curve. Make the jig out of  $\frac{3}{4}$ " stock. (We used Baltic birch plywood.) It consists of two assemblies: a base and a router carriage that slides on it [Drawing]. Together, these enable the router to shape arcs in two axes, creating an oblong, uniform recess in the seat.

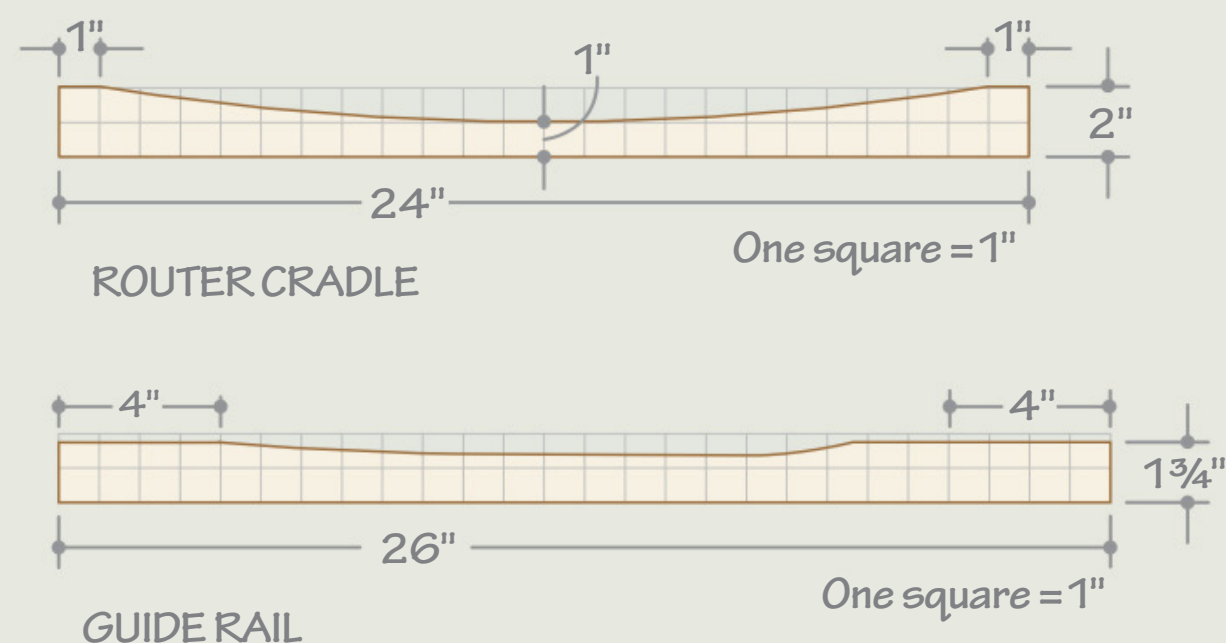
Clamp the jig to your workbench and place the seat (G) between the guide and cross rails. Equip your router with a  $\frac{3}{4}$ "-diameter, top-bearing pattern bit, with a 1" cutting length. Extend the bit  $1\frac{1}{4}$ " beyond the router baseplate. Starting with the router at the far right end of the carriage, turn the router on and push the carriage forward on the guide rails until it contacts the stops. Slide the router over in the carriage  $\frac{3}{4}$ " and make a second pass. Continue to work across the width of the seat blank, making slightly overlapping passes [Photo K], until the router reaches the left end of the carriage.

After the first series of passes, lower the bit to a final depth of  $1\frac{1}{2}$ " and make a second series of passes.

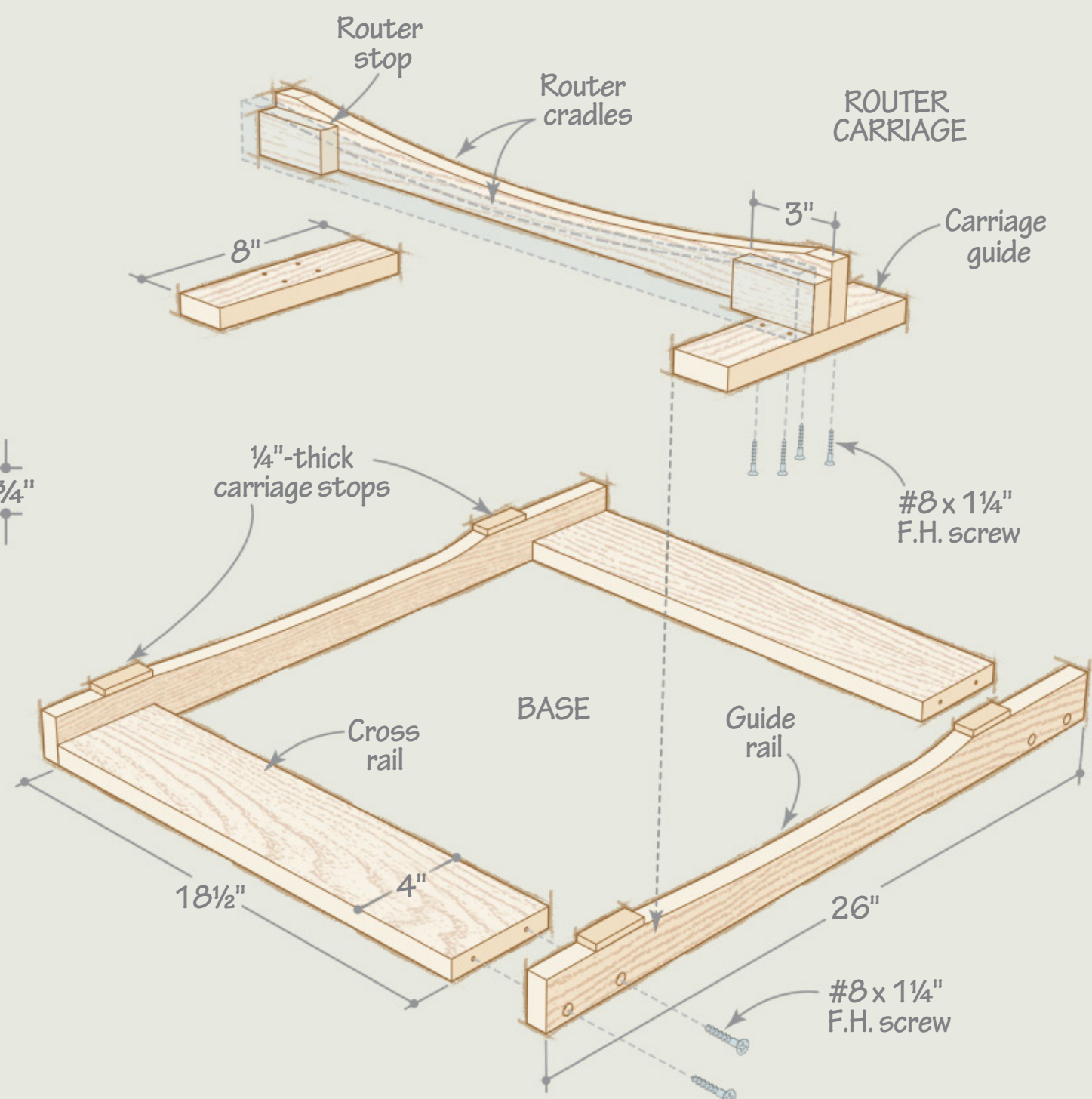


**K** Pushing the router and carriage forward, make a series of overlapping passes. Work across the seat blank from right to left to avoid climb-cutting.

### 8 CHAIR DISHING JIG

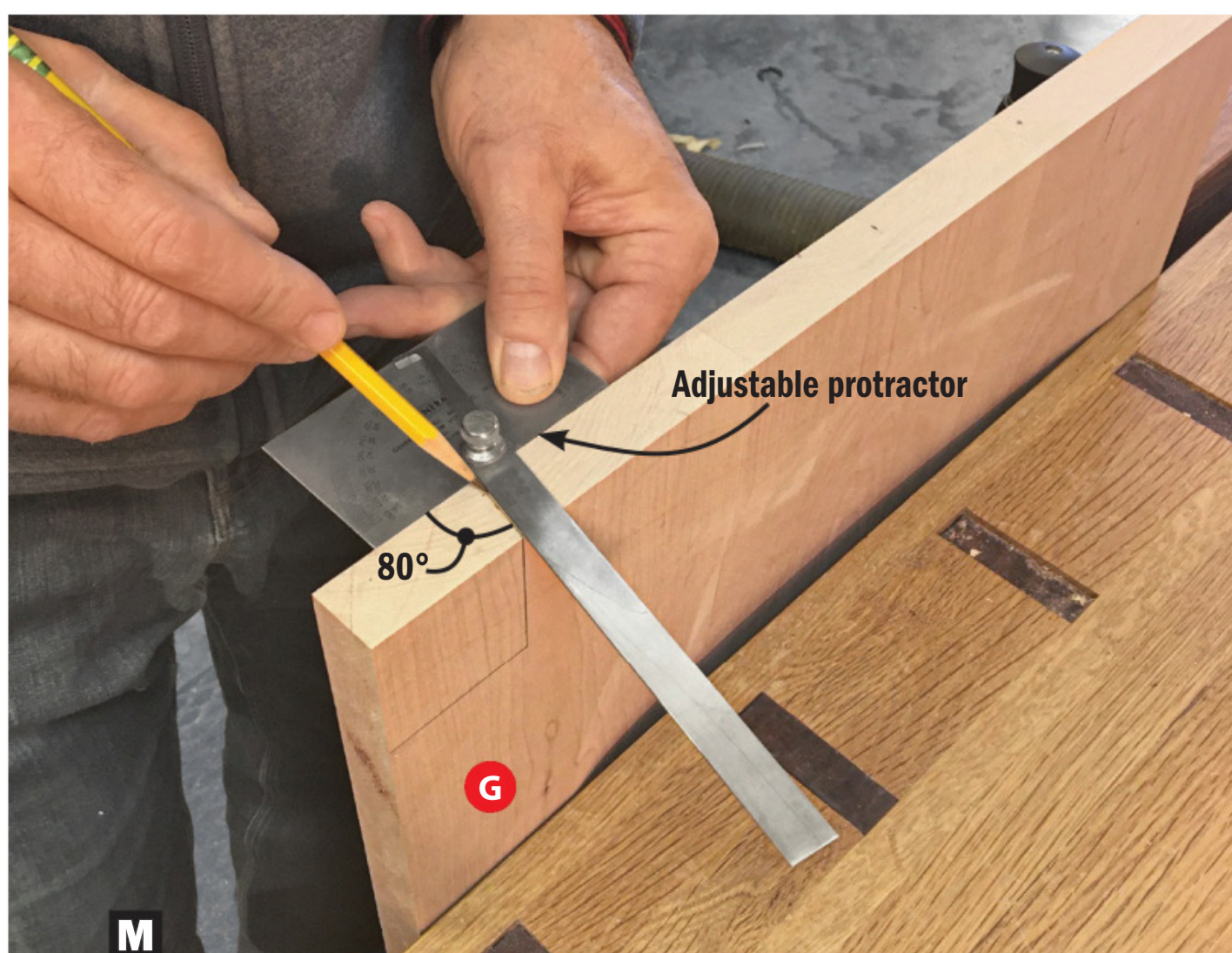
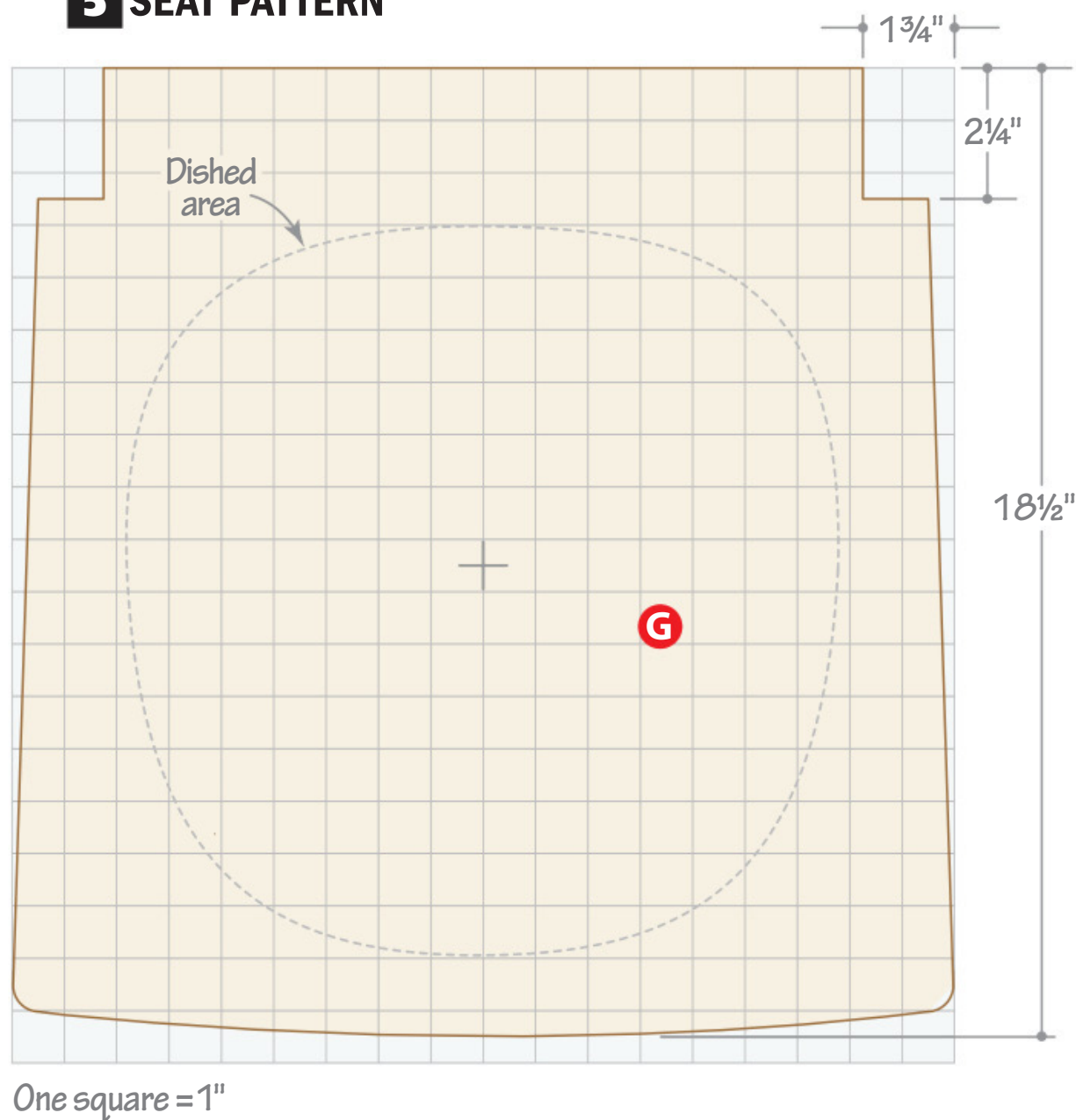


► To watch a video of Kevin dishing the chair seat, point your smartphone's camera at the code below—no app required—or visit [woodmagazine.com/seatdish](http://woodmagazine.com/seatdish)





## 5 SEAT PATTERN



**M** Set an adjustable protractor to lay out the end of the notch on the edge of the seat.

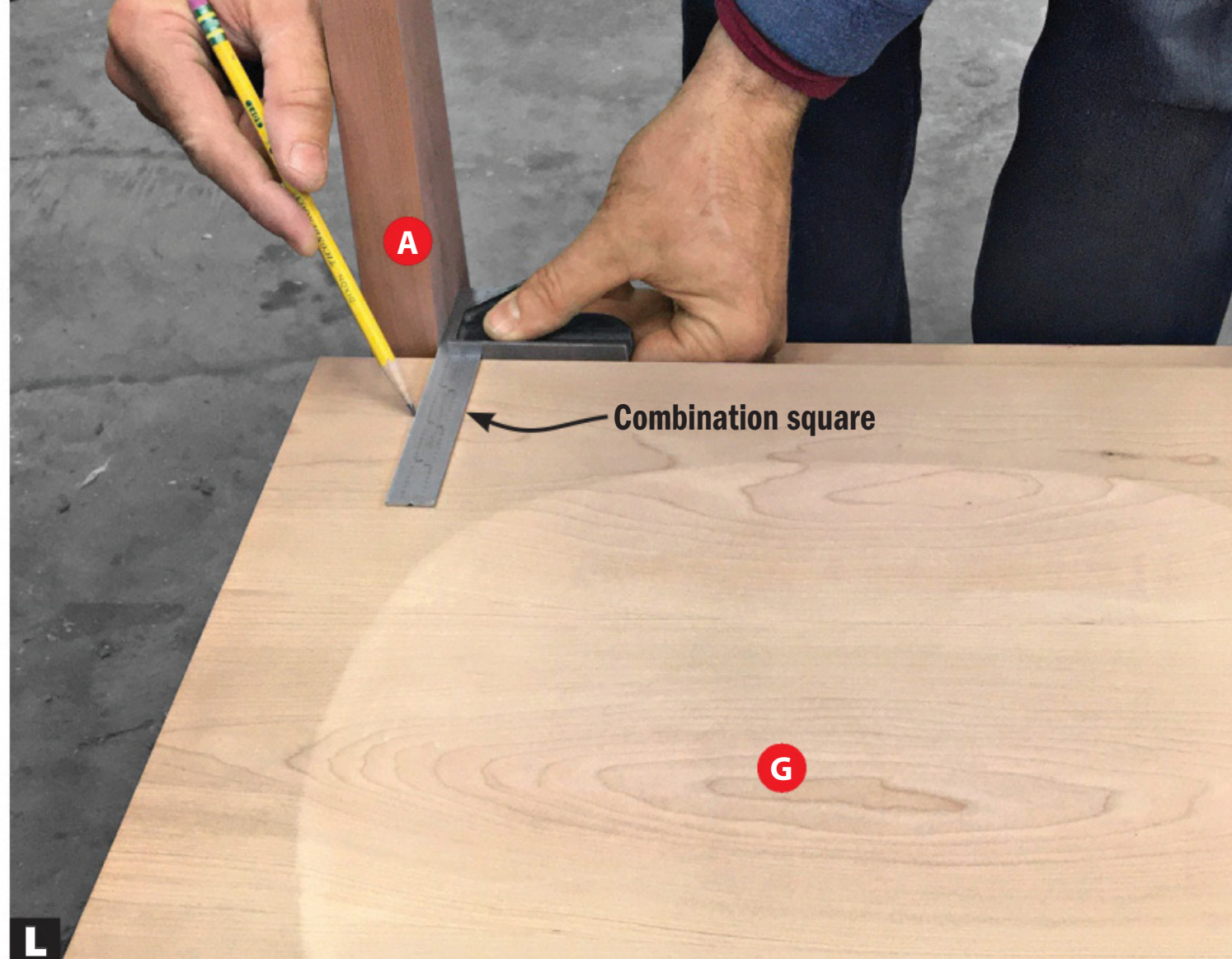
**4** Handsaw the waste from the notches in the corners of the seats, fitting each between the back legs.

### Lean back

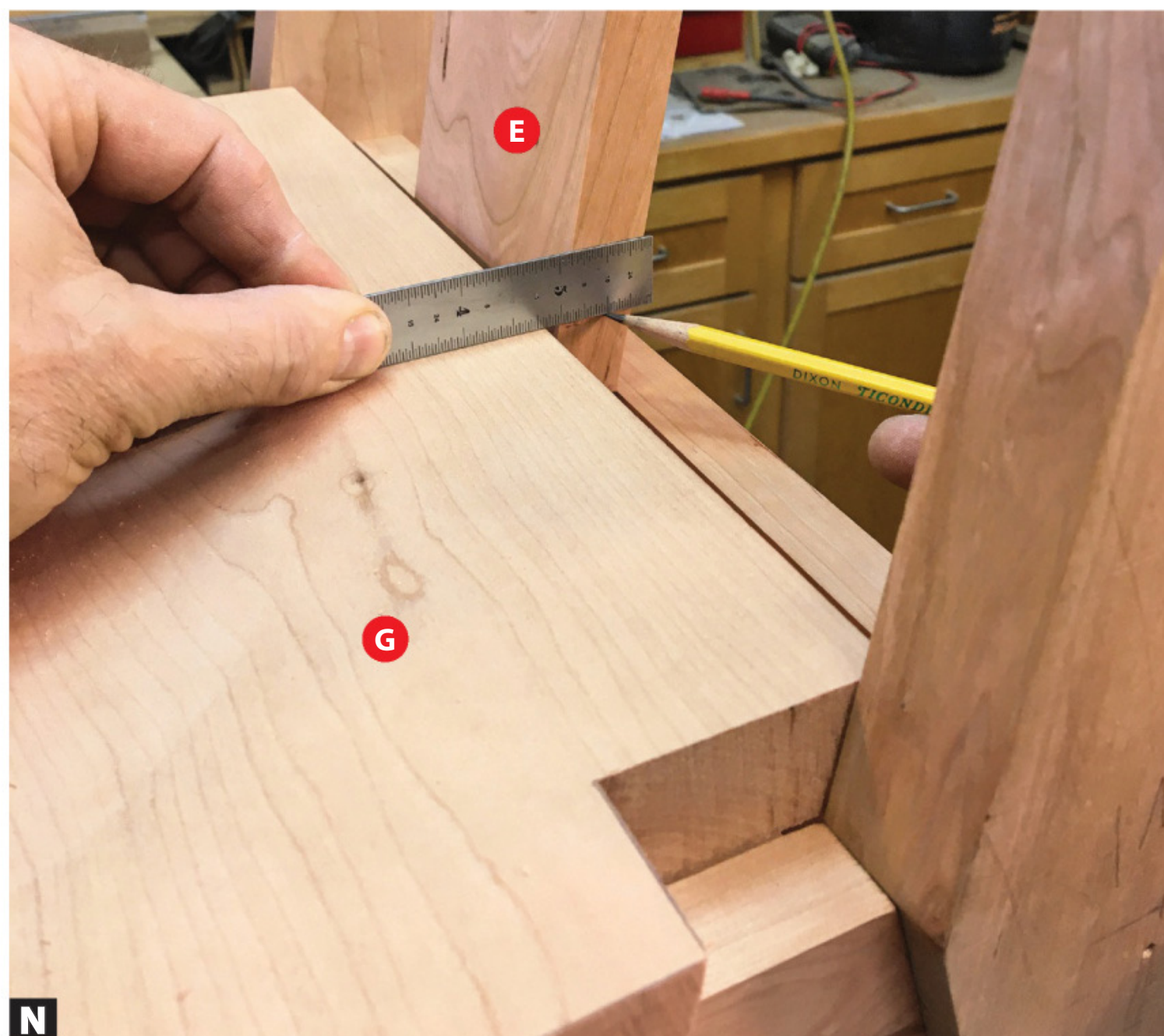
**1** Retrieve the splats (E) and crest rails (F) and dry-assemble them with loose tenons. Place the crest rail in the notches at the top of the back legs (A). Transfer the seat height to the edge of the splat [Photo N]. At the tablesaw, bevel the end of the splat and taper the edges [Exploded View].

**2** Finish-sand the splat and crest rail and glue the two together with a loose tenon.

**3** Lay out the tapers on the sides of the seat blank and the curve on the front [Drawing 5].



**L** Use a small square to mark where the back legs intersect the seat. Extend the marks 2 1/4" to indicate the notch length.



**N** Place a ruler on top of the seat to transfer the seat height to the splat (E) before trimming it to length.

Bandsaw the seat to shape, sand it smooth, and round over the edges [Exploded View].

**4** Cut the corner blocks (H) and glue and screw them into the corners of the chair frame [Exploded View].

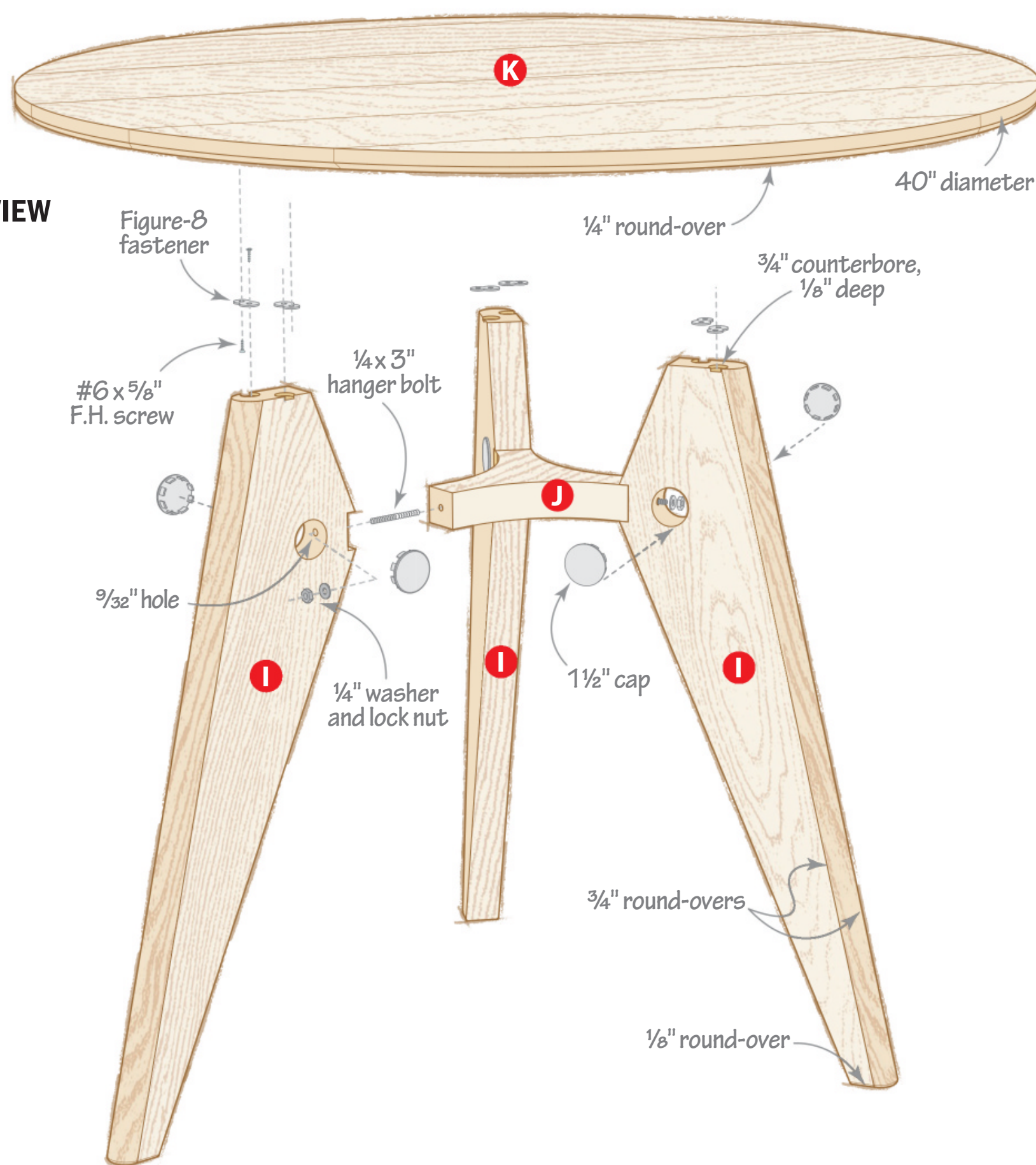
**5** Drill counterbored screw holes in the back legs (A) and glue and screw the crest rail/splat assembly to the chair [Exploded View]. Plug the screw holes.

**6** Apply a finish to the seat and chair frame. (We used a dull-sheen, pre-catalyzed lacquer.) After the finish dries, attach the seat to the frame through the corner blocks. Drive screws at an angle through the bottom of the seat into the splat to secure it.

► Make unsightly screws disappear. [woodmagazine.com/plugscrews](http://woodmagazine.com/plugscrews)



## TABLE EXPLODED VIEW



► Cut circles at the bandsaw or with a router.  
[woodmagazine.com/circles](http://woodmagazine.com/circles)

## Make the table

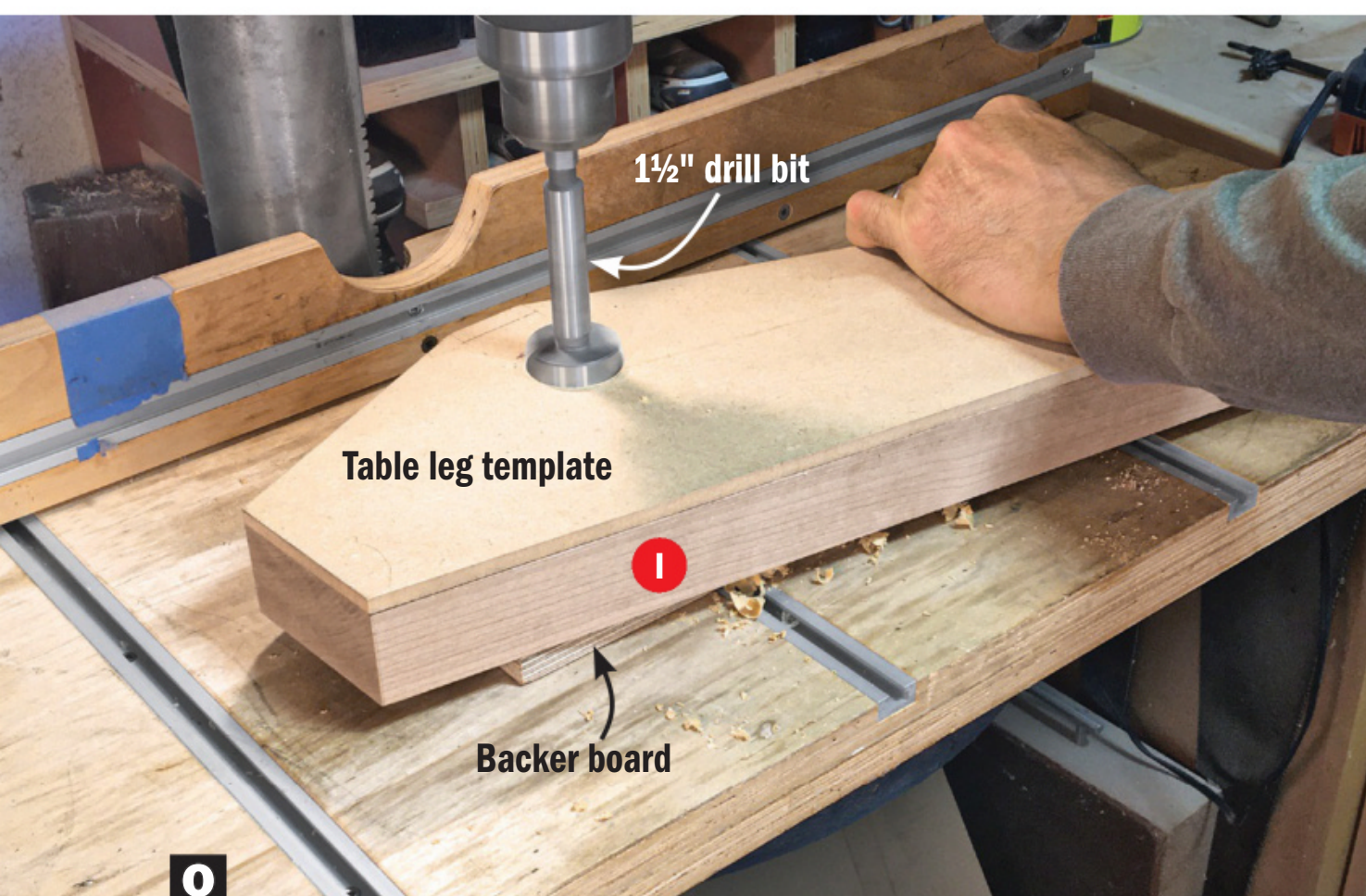
**1** From 1 1/2"-thick stock, cut the blanks for the table legs (I) [Materials List]. Make a full-size template of the leg including the hole [Drawing 6] and trace the leg profile onto the blanks.

**2** Just as with the chair legs, bandsaw and flush-trim the table legs. Drill the hole through each one before removing the template [Photo O].

**3** At the tablesaw, notch the inside edge of each leg while it rests on an angled support block [Drawing 6, Photo P].

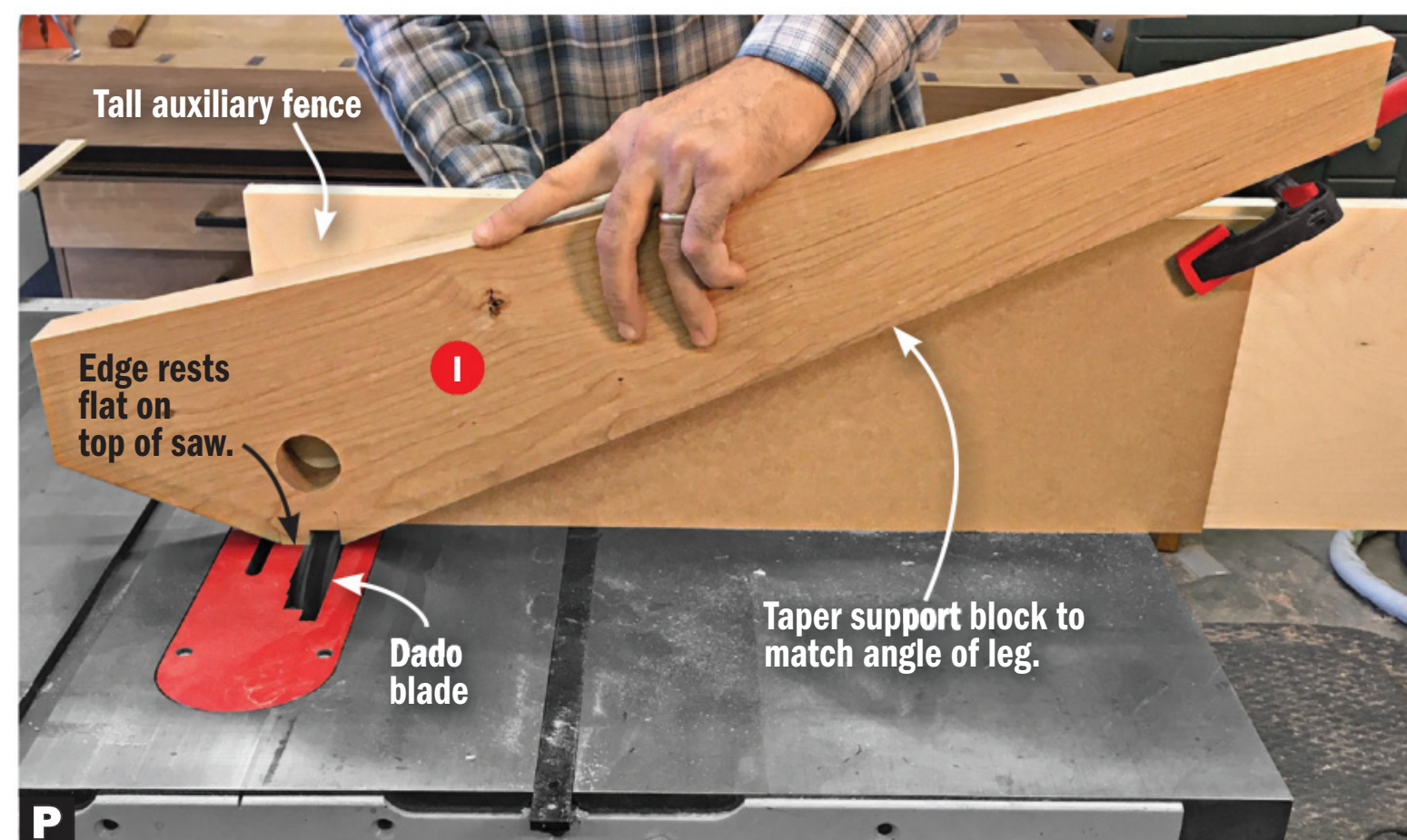
**4** Drill a hole through the center of the notch, connecting it to the larger hole [Table Exploded View]. Drill a shallow hole on the top of each leg for a figure-8 fastener. Finish-sand the legs and round over the outside edges and bottoms.

**Tip!** To make the support block, lay the leg on the tablesaw with the edge to be notched against the rip fence. Use a sliding bevel gauge to transfer the angle between the leg and the fence to a piece of MDF or plywood.



**O**

Use the template as a guide to drill the 1 1/2"-diam. hole in each leg.



**P**

Support the table leg (I) with an angled scrap to make the first cut for the yoke notch. After cutting all three legs, move the support over to complete the notch.



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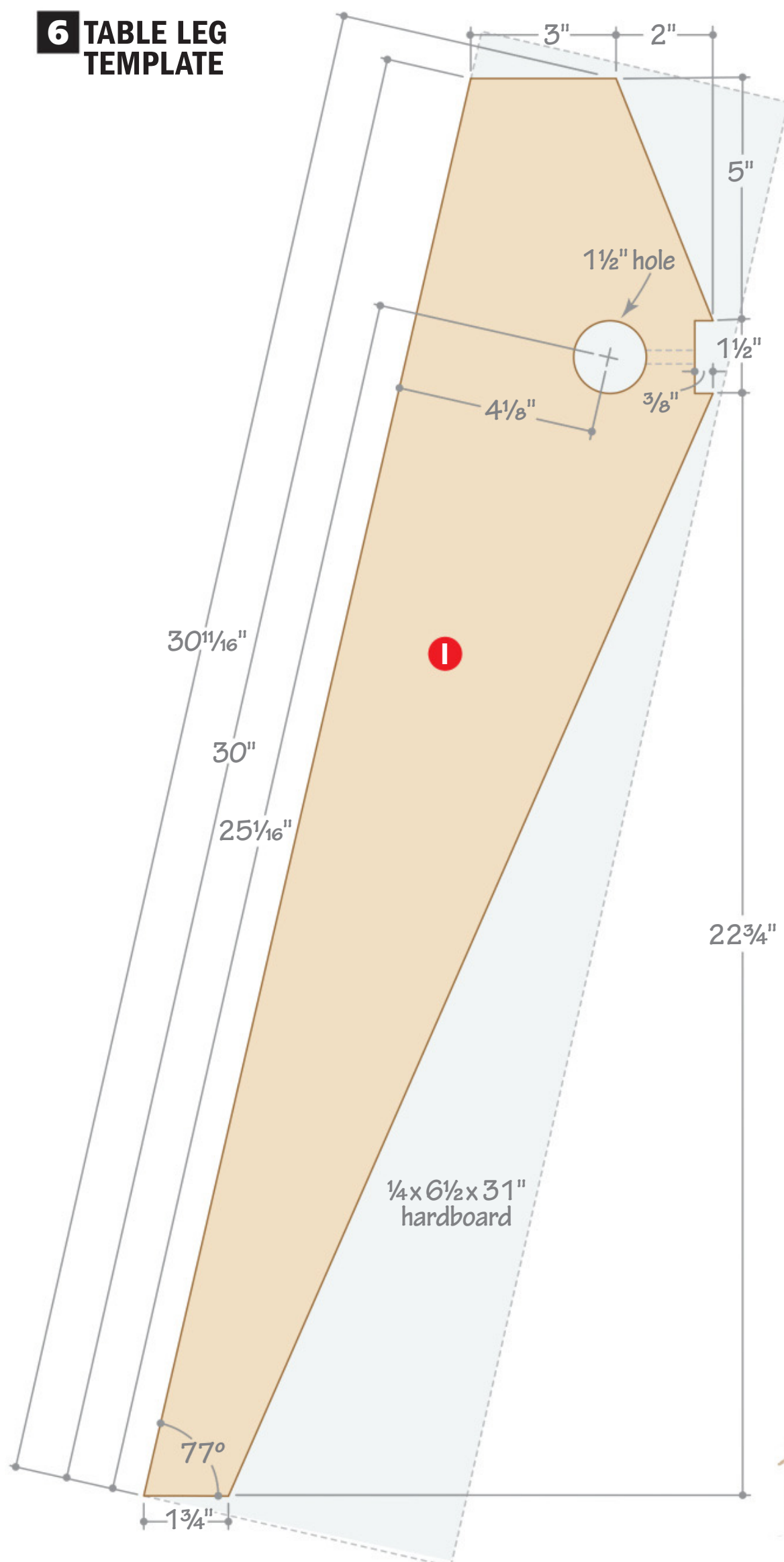
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## 6 TABLE LEG TEMPLATE



5 Lay out the yoke (J) on a piece of 1 1/2"-thick stock [Drawing 7]. Bandsaw it to shape and sand it smooth.

6 Drill a centered pilot hole on the end of each arm of the yoke and install hanger bolts [Exploded View]. Glue the legs to the yoke and secure them with washers and lock nuts.

7 Glue up a blank for the top (K) and bandsaw it to shape.

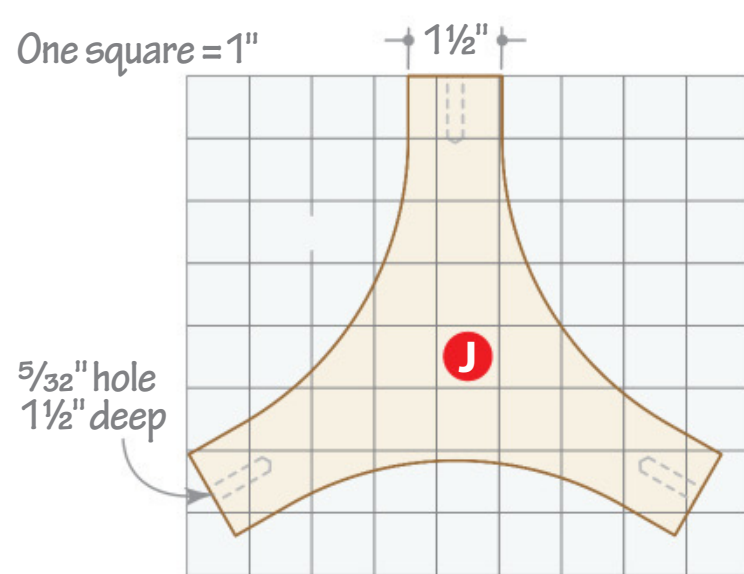
8 Sand the top smooth and round over the edges. Apply a finish to the top and base.

9 With the finish dry, attach the top to the base using figure-8 fasteners. Press metal snap-in plugs [Source] into the holes in the legs. Now slide the chairs up to the table and take a seat. You've earned it. 🌲

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

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## 7 TABLE YOKE PATTERN



## Materials List

| Part   |                  | FINISHED SIZE |           |      | Matl. | Qty.* |
|--------|------------------|---------------|-----------|------|-------|-------|
|        |                  | T             | W         | L    |       |       |
| Chairs |                  |               |           |      |       |       |
| A      | back legs        | 1⅛"           | 6"        | 34"  | C     | 4     |
| B      | front legs       | 1⅛"           | 3"        | 17¾" | C     | 4     |
| C      | side rails       | ¾"            | 3"        | 13⅝" | C     | 4     |
| D      | front/back rails | ¾"            | 3"        | 14½" | C     | 4     |
| E      | splats           | ¾"            | 4"        | 12¾" | C     | 2     |
| F      | crest rails      | 2⅛"           | 4"        | 19½" | C     | 2     |
| G      | seats            | 1"            | 18½"      | 18"  | C     | 2     |
| H      | corner blocks    | 1⅛"           | 3"        | 3"   | C     | 8     |
| Table  |                  |               |           |      |       |       |
| I      | legs             | 1½"           | 6⅜"       | 30⅐" | C     | 3     |
| J      | yoke             | 1½"           | 7⅜"       | 8⅞"  | C     | 1     |
| K      | top              | ¾"            | 40" diam. |      | C     | 1     |

\*Quantities for two chairs.

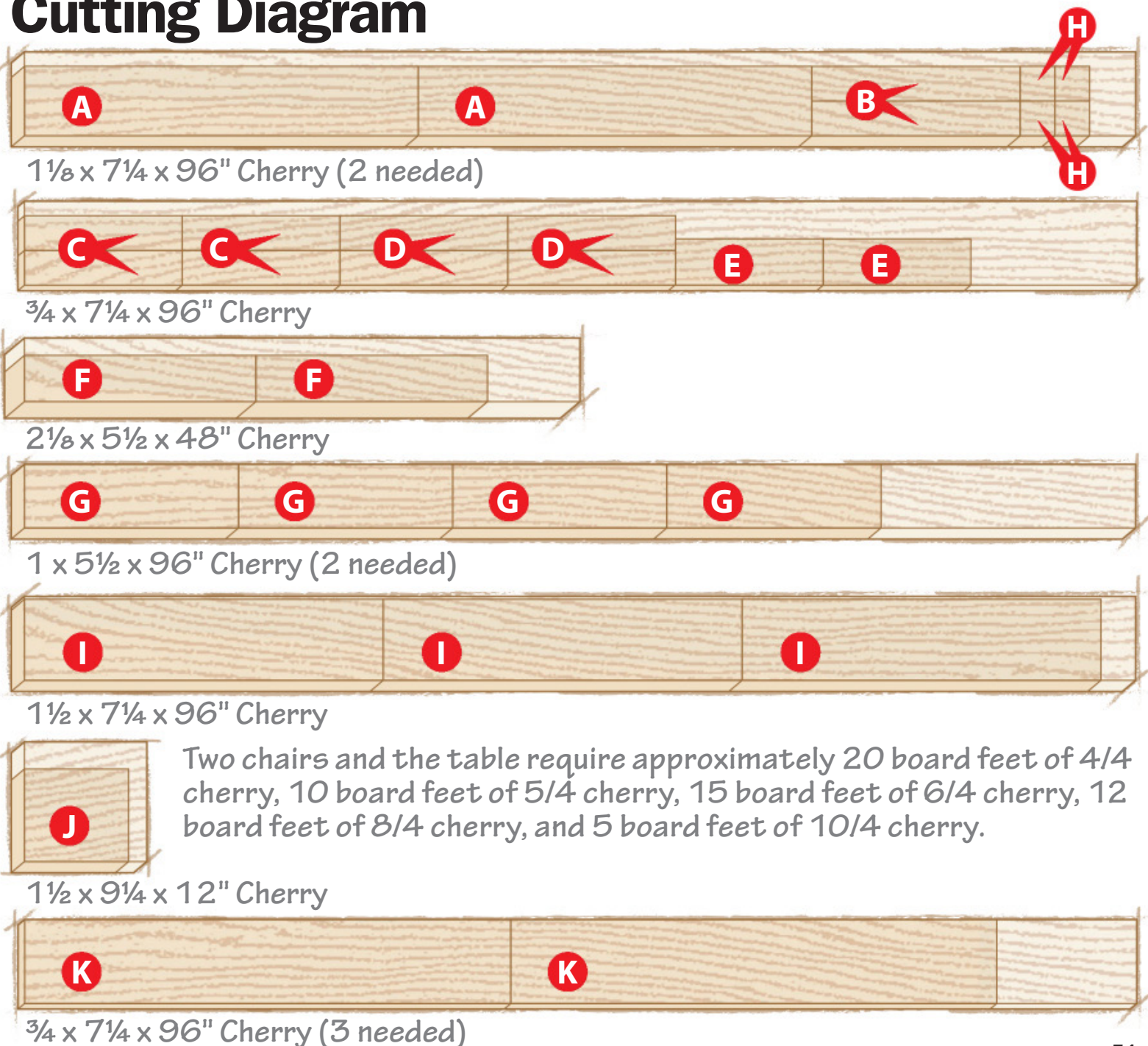
**Materials key:** C=cherry.

**Supplies:** 1/4 x 3" hanger bolts (3), 1/4" washers (3), 1/4" lock nuts (3), figure-8 fasteners (6), #8 x 1 1/4" flathead screws, #8 x 1 1/2" flathead screws, #6 x 5/8" flathead screws.

**Blade and bits:** Dado set; 3/4" top-bearing flush-trim bit, 1/8", 3/16", 1/4", 1/2", and 3/4" round-over router bits, 3/8" spiral upcut bit, 3/8" plug cutter, 1 1/2" drill bit.

**Source:** 1 1/2" nickel-plated caps (6) no. 9563K51 [pack of 25] \$12.51, McMaster-Carr, 562-692-5911, mcmaster.com.

## Cutting Diagram





# Mini-Mittersaws

SHOP TEST

# Mini-Mitersaws

*These compact sliders may be small in stature, but they're big in performance.*

52

WOOD magazine July 2021

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A compact sliding mitersaw might just be the perfect crosscutter for a workshop. Weighing less than 45 pounds, these small-bladed saws accurately crosscut wider workpieces than many of their bigger-bladed non-slider brethren. (Even the “smallest” saw we tested can crosscut a workpiece up to 8" wide and 2<sup>7</sup>/<sub>8</sub>" thick.) Thanks to smaller, thinner blades, the vast majority of these saws run on the same 18- and 20-volt lithium-ion battery packs as your cordless drills. And a couple still have cords. So let's cut to the chase.

## No cord? No problem

To test each saw's power capabilities, we crosscut 2-by pine and 8/4 ash. All but three saws ate through these cuts with gusto. The Metabo HPT C8FSHE(S)—one of two corded saws—and the Craftsman CMCS714M1 and Worx WX845L bogged down a bit in both species, but never stalled.

## Cut all day on one charge

The most pressing question about a battery-powered mitersaw is “How long will it cut on a charge?” To find out, we crosscut pine 2×4s until each battery died. As you can see in the chart, *below*, one saw far outperformed the group in terms of raw runtime. The Makita XSL02Z uses two 18-volt battery packs (not included; we chose 5.0 amp-hour [Ah] packs for our test) to lead the test group with 554 cuts. The Bosch GCM18V-08N14, with an 8.0Ah pack, and the Milwaukee 2733-21, with a 5.0Ah pack, made 350 and 327 cuts each, respectively, to lead the single-pack saws.

So, how do we make sense of these numbers? As shipped, the Bosch saw made the

most cuts on a single charge; but the Milwaukee was actually the most efficient, yielding about 65 cuts per amp-hour, compared to Bosch's 44. If you already have Makita batteries on hand, you may go days or weeks before needing to recharge; if you don't own them, you'll need to bite the bullet and buy batteries and a charger, which added \$240 to our bill.

To warn of impending battery exhaustion, the LED task lights on the Craftsman, DeWalt DCS361M1, and Worx saws flash; Makita indicates a low-battery condition by flashing the battery's charge-level gauge. The Bosch and Milwaukee saws provide no warning before stopping. The battery packs require 30–90 minutes to recharge fully, but a partial charge of 15 minutes helps you finish a job.

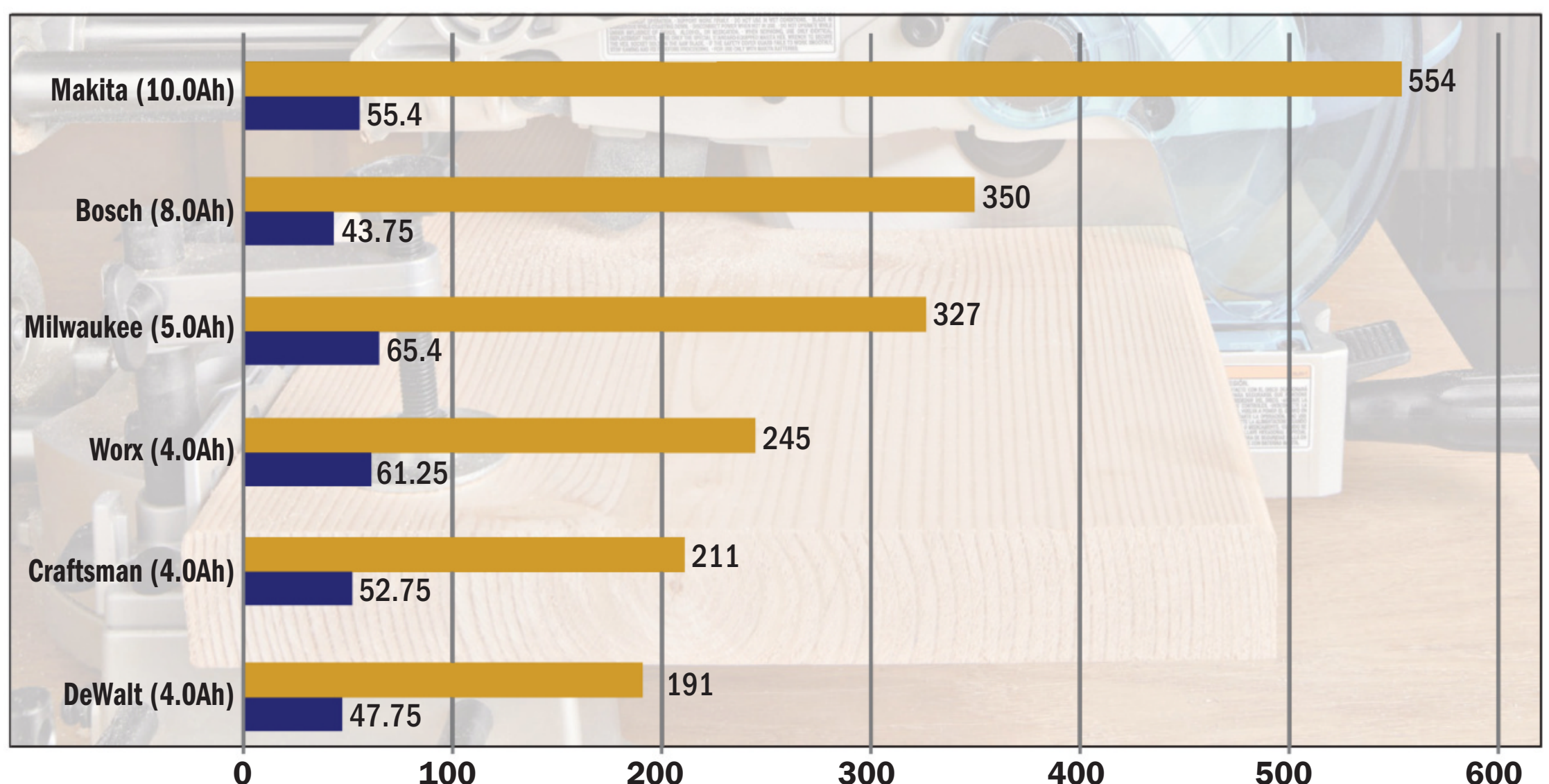
► Learn the basics of using a mitersaw. [woodmagazine.com/mitersawbasicsvid](http://woodmagazine.com/mitersawbasicsvid)

**Note:** Ridgid and Ryobi were in the process of launching new 7<sup>1</sup>/<sub>4</sub>" cordless sliders at the time of our testing. We could not get these models in time to test.



Milwaukee's battery-pack orientation makes it convenient for checking its charge level without removing the pack.

## CORDLESS MITERSAWS MIGHT WEAR YOU OUT



\* Number of crosscuts in pine 2×4s one a full battery charge. Average of three tests.

■ cuts per charge ■ cuts per Ah



## Size doesn't matter, but accuracy does

► **Miter:** Cutting an angle across the face of a workpiece by pivoting the saw blade left or right.

**Bevel:** Cutting an angle along the end or edge of a workpiece by tilting the blade left or right.

**Compound:** Cutting a miter and bevel simultaneously.

We were impressed with how accurately each saw cut miters and bevels at its preset stops without making any adjustments. Should it get out of alignment, we found the adjustable detent plates on the DeWalt and Milwaukee saws, shown *right*, easiest to calibrate. With the other saws, you must adjust the fence square to the blade—a fussier task.

The DeWalt and Milwaukee saws also use lever-style miter locks, which we prefer over the screw-in knobs on the others. A detent override on each saw lets you lock in a miter angle close to a detent without dropping into that detent. Makita's corded LS0815F cuts up to 60° to the right, the most of any test saw. The cordless Makita and Metabo HPT cut up to 57° to the left.

For bevel-cutting, all of the saws tilt left with adjustable stops at 0° and 45°; about half also tilt a few degrees right. Milwaukee's dual-bevel saw tilts as much as 45° right. Metabo HPT's saw tilts up to 50° left, the best among the group. But tilting to any angle in between requires reading the tiny scales. We found DeWalt's bevel scale easiest to read, thanks to its black marks on a bright yellow background.

To show precisely where the blade will cut, these saws (with the exception of the Makitas, which lack a cutline indicator) use one of two methods: a laser (Bosch and Metabo HPT) or a shadowline of the blade itself created by the LED task lights (Craftsman, DeWalt, Milwaukee, and Worx). We prefer shadowlines to lasers because they show both edges of the cut reliably, and of

► Maximize your miter saw's accuracy.  
[woodmagazine.com/mstuneup](http://woodmagazine.com/mstuneup)



**To calibrate Milwaukee's miter detents**, simply loosen the steel indicator plate, square the blade to the fence, reposition the plate so the detent tab drops into the 0° notch, and retighten.

these, we like the DeWalt and Milwaukee lights that turn on and off automatically with the blade trigger and manually with a separate switch. Bosch's laser and task light also trigger automatically, as does the task light on the Makita LS0815F.

## Adjustable lumber support

Although they're smaller than those on 10" and 12" miter saws, the tables on these compact sliders provided adequate workpiece support. Five saws include extension wings that lengthen that support. Craftsman, DeWalt, and Milwaukee have no extensions, and thus less support for workpieces. And five



**LED lights shining down both sides of the blade** create a shadow to indicate precisely where the blade will cut.



**Metabo HPT's gooseneck LED task light** adds illumination wherever you wish.



saws (Bosch, Craftsman, both Makitas, and Worx) have an adjustable foot underneath the pivoting miter arm (shown *bottom right*) to prevent the saw from tipping toward you when cutting a wide workpiece.

Because the smaller-diameter blades reduce thickness-cutting capacity, the saws' fences stand shorter than on larger saws. Milwaukee's fence tops the test at 3" tall, and because the motor mounts to the blade at an angle, it requires less clearance when tilting to either side, so the taller fences don't get in the way.

With the other saws, we prefer the models that allow the top portion of the left fence to either slide or rotate out of the way for beveled cuts, while providing better support for the 99 cuts out of 100 that don't require bevels. Fixed low fences on the Craftsman, DeWalt, and Worx saws provide motor clearance when beveling without moving the left fence.

Six saws sport traditional workpiece hold-downs, shown *top right*, that work well. We found the hold-downs on the DeWalt and Worx saws less effective.

## Most dust gets captured

Each saw comes with a dust-collection bag. Bosch and the cordless Makita fared best using the bag, with Milwaukee and Metabo HPT close behind.

Attaching a shop vacuum improved each saw's dust-collection effectiveness, some more than others. For example, the vacuum pressure sucked inward the soft rubber flaps around DeWalt's intake chute, resulting in only a slight improvement. Small ports on the Craftsman and Worx saws clogged up frequently using either the bag or vacuum. Ports on these saws vary in size from 1" to 2", so you might need an adapter to connect your vac hose.

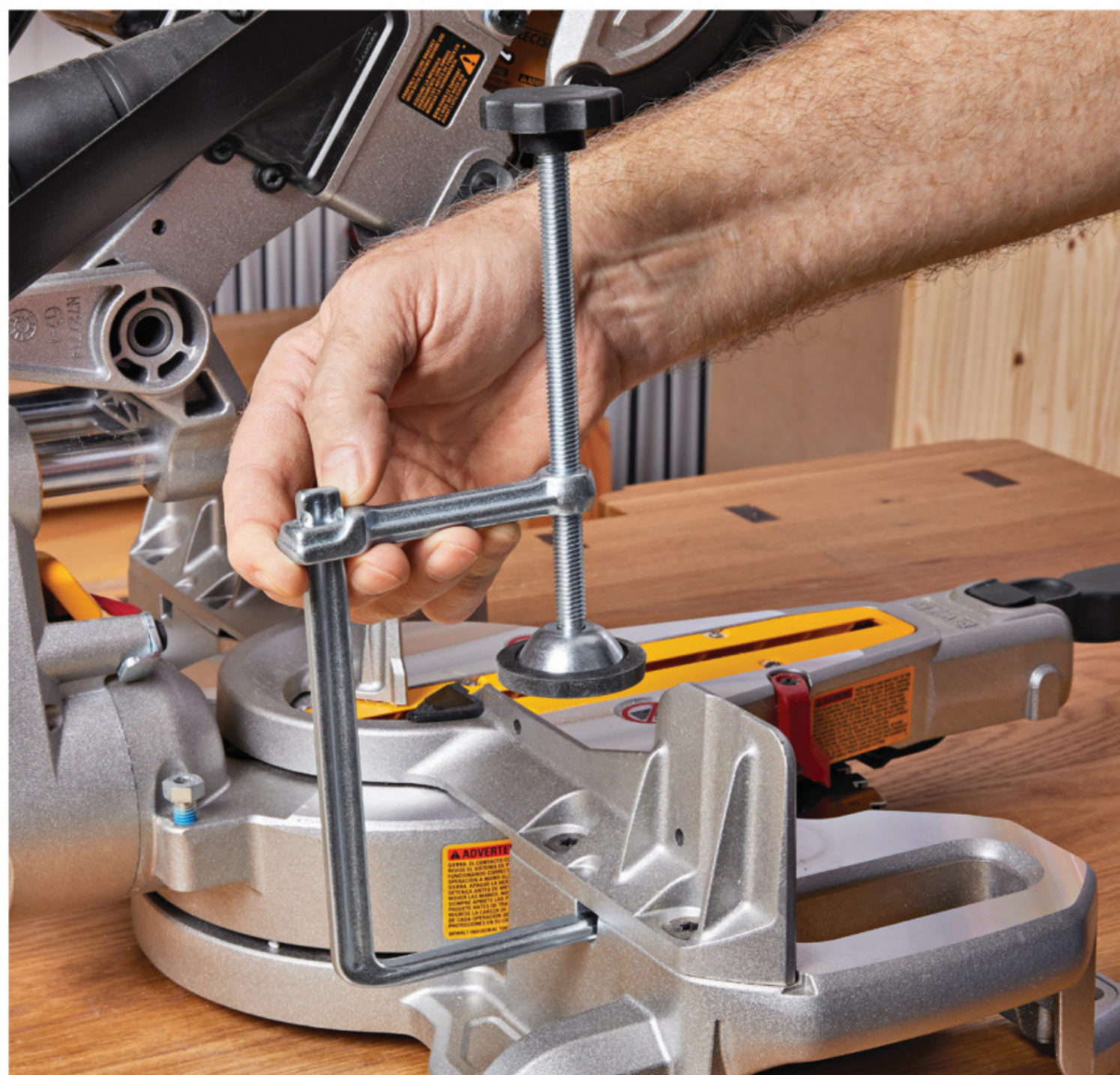
## Blade size, quality matter

Most of the saws come with a clean-cutting 40-tooth 7¼" or 8½" blade, which makes them easy to replace with aftermarket blades when needed. The Bosch and Metabo HPT come with a 24-tooth blade better suited to construction than woodworking. Makita's corded saw comes with a 48-tooth blade that also cuts cleanly, but that company's cordless saw comes with an uncommon 7½" blade. That means when you need a replacement, you'll have to either buy a replacement from Makita or get a 7¼" blade and sacrifice ⅛" of thickness cutting capacity.

We found blade changes easiest on the Bosch and Milwaukee saws. The arbor wrench included with each saw stores on the saw body for all models except Metabo HPT.

► We used a new Diablo 60-tooth blade for each saw in testing.

► All the tested saws employ a brake that stops the blade within a few seconds.



**Hold it, hold it, hold it!** A typical hold-down, *top*, pivots closer to the blade, if necessary, to secure shorter workpieces. DeWalt's fixed hold-down, *middle*, doesn't pivot, and so cannot secure a workpiece less than 7" long. The nonlocking hold-down on the Worx saw, *bottom*, must be held down manually to secure a workpiece. We found it clumsy to use and in the way when not being used. (It removes from the saw easily enough, though.)



Small but mighty compact miter saws make good sense for a workshop

| MODEL                | PERFORMANCE RATINGS (1) |                     |                   |                   |                   |                   |                     |             |                        |                                    |                             |                          | BLADE DIAMETER, INCHES | BATTERY PACK (3) |           | MITER SETTINGS, DEGREES  |                                                        | BEVEL SETTINGS, DEGREES  |                    |  |
|----------------------|-------------------------|---------------------|-------------------|-------------------|-------------------|-------------------|---------------------|-------------|------------------------|------------------------------------|-----------------------------|--------------------------|------------------------|------------------|-----------|--------------------------|--------------------------------------------------------|--------------------------|--------------------|--|
|                      | OBSERVED POWER          | BATTERY RUNTIME (2) | MITER             |                   | BEVEL             |                   |                     |             |                        |                                    |                             |                          |                        |                  |           |                          |                                                        |                          |                    |  |
|                      |                         |                     | ACCURACY OF STOPS | SCALE READABILITY | ACCURACY OF STOPS | SCALE READABILITY | EASE OF USING FENCE | PORTABILITY | EASE OF CHANGING BLADE | DUST COLLECTION, WITH EQUIPPED BAG | DUST COLLECTION WITH VACUUM | HANDLE/SWITCH ERGONOMICS |                        | RATED VOLTAGE    | AMP-HOURS | MAX. ANGLE (LEFT, RIGHT) | STOPS, LEFT AND RIGHT (IN ADDITION TO 0, 15, 22.5, 45) | MAX. ANGLE (LEFT, RIGHT) | STOPS, DEGREES (4) |  |
| CORDLESS             |                         |                     |                   |                   |                   |                   |                     |             |                        |                                    |                             |                          |                        |                  |           |                          |                                                        |                          |                    |  |
| BOSCH GCM18V-08N14   | A                       | A–                  | A                 | A                 | A                 | B                 | A                   | B–          | A                      | A–                                 | A                           | A                        | 8½                     | 18               | 8.0       | 47, 47                   | NONE                                                   | 45, 0                    | 0, 45              |  |
| CRAFTSMAN CMCS714M1  | B                       | B–                  | A                 | B                 | A                 | C                 | B                   | A           | B–                     | D                                  | C                           | B                        | 7¼                     | 20               | 4.0       | 47, 47                   | 31.6                                                   | 47, 3                    | 0, 45              |  |
| DEWALT DCS361M1      | A                       | B–                  | A                 | A                 | A                 | B+                | B                   | B           | B                      | C                                  | C+                          | A–                       | 7¼                     | 20               | 4.0       | 48, 48                   | 10, 31.6, 35.3                                         | 46, 0                    | 0, 45              |  |
| MAKITA XSL02Z        | A                       | A*                  | A                 | A                 | A                 | C–                | A                   | B           | A–                     | A–                                 | A                           | A                        | 7½                     | 36               | N/A       | 57, 47                   | 30                                                     | 45, 5                    | 0, 45              |  |
| MILWAUKEE 2733-21    | A                       | A–                  | A                 | A                 | A                 | B                 | A                   | A           | A                      | B                                  | A                           | A                        | 7¼                     | 18               | 5.0       | 48, 48                   | 31.6                                                   | 45, 45                   | 45, 0, 45*         |  |
| WORX WX845L          | B                       | B                   | A                 | B                 | A                 | C                 | B                   | A           | C+                     | D                                  | C                           | B                        | 7¼                     | 20               | 4.0       | 47, 47                   | 31.6                                                   | 47, 0                    | 0, 45              |  |
| CORDED               |                         |                     |                   |                   |                   |                   |                     |             |                        |                                    |                             |                          |                        |                  |           |                          |                                                        |                          |                    |  |
| MAKITA LS0815F       | A                       | N/A                 | A                 | A                 | A                 | C                 | A                   | C+          | B                      | C+                                 | A                           | A                        | 8½                     | N/A              | N/A       | 50, 60                   | 31.6                                                   | 45, 5                    | 0, 45              |  |
| METABO HPT C8FSHE(S) | B+                      | N/A                 | A                 | B–                | A                 | B                 | A                   | C+          | B                      | B                                  | A                           | B                        | 8½                     | N/A              | N/A       | 57, 45                   | 31.6                                                   | 50, 5                    | 0, 45              |  |

Mitersaw morsels

► Make the most of your miter saw. [woodmagazine.com/maxmitersaw](http://woodmagazine.com/maxmitersaw)

- The Makita LS0815F incorporates a handy cord wrap; the Metabo HPT does not.
- All of the saws utilize a safety switch that must be pressed before pulling the main trigger to power the saw. Left-handers might have difficulty activating the Metabo HPT safety switch.
- You can carry all but the Craftsman and Worx one-handed by a top-mounted handle

(which these two lack). However, Bosch’s hinged handle makes it trickier to carry one-handed.

- The DeWalt and Milwaukee saws lack a depth stop, useful for cutting dadoes and half-laps.
- The pin that locks the cordless Makita’s head down rests beneath the battery packs; we found it difficult to access.

Cordless rules the mini-mitersaw roost

Although the corded saws perform well enough, we like several cordless models better. The Makita XSL02Z cuts longest and has the greatest cut capacities, but its \$550 price tag doesn’t include the two required batteries or a charger. The Milwaukee 2733-21 actually outperforms the Bosch GCM18V-08 on a cuts-per-amp-hour basis and bevels both ways. But Bosch betters the Milwaukee by 2" in width capacity and nearly ½" in thickness, and out of the box delivers more cuts. You can’t go wrong with any of these three, so they share Top Tool honors.

The DeWalt DCS361M1 earns Top Value honors thanks to very good performance for at least \$180 less than the Top Tools. 🌲

Produced by Bob Hunter with Steve Feeney





|  | CUTTING CAPACITIES, INCHES |              |             |              |    | OVERALL DIMENSIONS, WITH TABLE EXTENSIONS<br>AT MAXIMUM REACH (WxDxH) | CUTLINE INDICATOR (5) | ACCESSORIES (6) |                     | NOISE LEVEL, DECIBELS (NO LOAD) | CORD LENGTH, INCHES | WEIGHT (WITH BATTERY), POUNDS | WARRANTY, YEARS (7) | COUNTRY OF ASSEMBLY (8) | SELLING PRICE (9) | CONTACT INFORMATION             |
|--|----------------------------|--------------|-------------|--------------|----|-----------------------------------------------------------------------|-----------------------|-----------------|---------------------|---------------------------------|---------------------|-------------------------------|---------------------|-------------------------|-------------------|---------------------------------|
|  | 0° BEVEL                   |              | 45° BEVEL   |              |    |                                                                       |                       |                 |                     |                                 |                     |                               |                     |                         |                   |                                 |
|  | AT 0° MITER                | AT 45° MITER | AT 0° MITER | AT 45° MITER |    |                                                                       |                       |                 | MAX. DEPTH AT ARBOR |                                 |                     |                               |                     |                         |                   |                                 |
|  | 10⅞                        | 7¾           | 10⅝         | 7½           | 3⅝ | 28⅜ × 35 × 25¼                                                        | L                     | C, D, E, L      | M, S                | 96                              | N/A                 | 32                            | 1                   | C                       | \$600             | 877-267-2499, boschtools.com    |
|  | 8½                         | 6            | 8½          | 6            | 2⅞ | 21⅜ × 29¾ × 20¼                                                       | S                     | C, D, L         | S                   | 85                              | N/A                 | 22                            | 3                   | C                       | \$230             | 888-331-4569, craftsman.com     |
|  | 8                          | 5¾           | 8           | 5⅝           | 2⅞ | 22 × 31¼ × 22¼                                                        | S                     | C, D, L         | S                   | 85                              | N/A                 | 30                            | 3                   | T                       | \$370             | 800-433-9258, dewalt.com        |
|  | 12⅜                        | 8⅝           | 12⅞         | 8½           | 3¼ | 35 × 30¾ × 18                                                         | N/A                   | C, D, E         | H, M, S, T          | 90                              | N/A                 | 33                            | 3                   | U                       | \$550*            | 800-462-5482, makitatools.com   |
|  | 8⅝                         | 7⅞           | 8¼          | 7⅞           | 2⅞ | 21½ × 30⅜ × 21½                                                       | S                     | C, D, L         | S                   | 88                              | N/A                 | 28                            | 5                   | C                       | \$565             | 800-729-3878, milwaukeetool.com |
|  | 8½                         | 6            | 8½          | 5⅞           | 2⅞ | 36 × 30 × 19                                                          | S                     | C, D, E, T      | S                   | 95                              | N/A                 | 21                            | 3                   | C                       | \$300             | 866-354-9679, worx.com          |
|  | 13                         | 9½           | 13          | 9½           | 2⅞ | 35½ × 38¾ × 19½                                                       | N/A                   | C, D, E, L, T   | H, M, S             | 99                              | 81                  | 43                            | 3                   | C                       | \$420             | 800-462-5482, makitatools.com   |
|  | 12⅜                        | 8⅞           | 12⅞         | 8⅞           | 3⅜ | 32 × 39½ × 18¾                                                        | L                     | C, D, E, L      | S                   | 96                              | 71                  | 36                            | 5                   | C                       | \$380             | 800-829-4752, metabo-hpt.com    |

1.

A

B

C

D

N/A

Excellent

Good

Fair

Poor

Not applicable
2.

(\*) We used 5.0 battery packs (not included with saw); performance will vary with different size packs.
3.

(N/A) Battery packs not included with saw
4.

(\*) Tilts left and right, with stops on both sides
5.

(L) Red laser

(S) Blade shadowline
6.

(C) Vertical workpiece clamp

(D) Dust-collection bag

(E) Workpiece extension supports

(H) Horizontal workpiece clamp

(L) LED task light

(M) Crown-molding stops

(S) Collapsible stand

(T) Triangular setup square
7.

Battery packs and charger covered by separate warranty
8.

(C) China

(T) Taiwan

(U) United States
9.

Prices current at time of article production and do not include shipping, where applicable.  
(\*) Does not include battery or charger







**K**ee your tea lover's favored flavors in easy reach without creating counter clutter in this tea box, with its kumiko-panel lid (see *page 62*) and clean, elegant lines. It's a great project that teaches the fundamentals of kumiko and some smart boxmaking techniques.

► I always use a four-corner grain match on boxes. Learn how to create them at [woodmagazine.com/4corner](http://woodmagazine.com/4corner).

► Get a free crosscut sled plan. [woodmagazine.com/crosscutsled](http://woodmagazine.com/crosscutsled)

## Start with the kumiko

**1** The finished size of the kumiko panel dictates the box-part lengths, so make the panel first. Then mill a  $\frac{5}{16} \times 4$ " blank long enough to cut the box ends and sides from it. I used cherry.

**2** The top and bottom panels fit into rabbets in the box sides and ends, so cut the rabbets before cutting these parts to length [Exploded View]. Next, crosscut the box parts to length [Photos A, B] and miter them [Photo C].

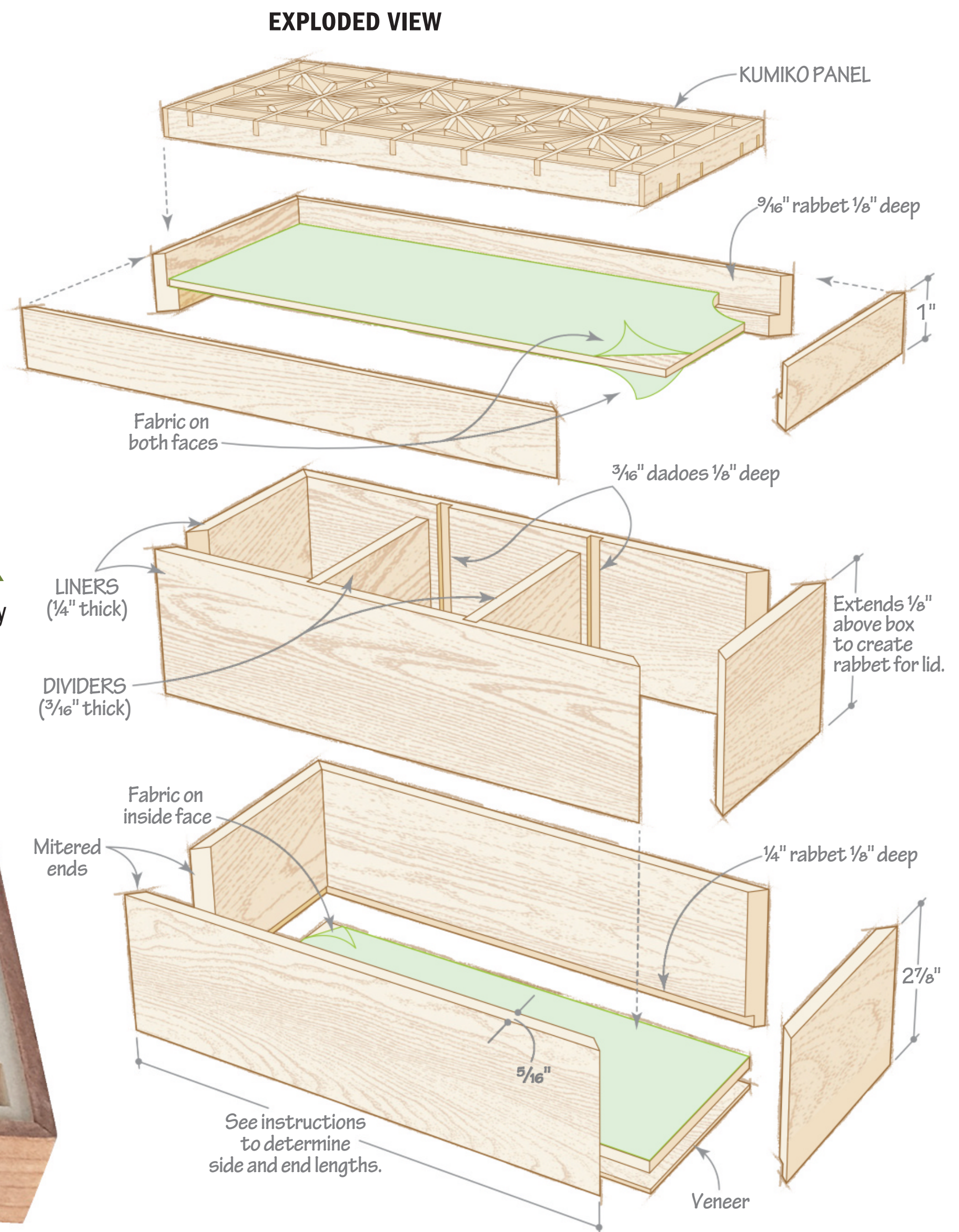


**A** Measure the rabbet's lip and double the dimension. Add that to the kumiko panel's length and width to determine the lengths of the box sides and ends.



# Light and graceful Tea Box

by Matt Kenney



**B**

**Crosscut the sides and ends** to finished length. Use a stopblock to ensure opposing sides end up the same length.



**C**

**To miter the pieces**, bevel-cut the left side of your sled, cutting away a corner of the fence. Align the top corner of a side or end with the angled end of the fence and clamp a stopblock at the opposite end. Miter-cut both ends of the piece.



**3** Lay out the sides and ends in order, outside faces up, with the mitered ends aligned and touching. Apply painter's tape across the three joints. Carefully flip the assembly. Miter joints soak up glue, so apply glue to the miters and let them sit for a few minutes. Then, complete the assembly [Photo D]. Let the box sit for 10–15 minutes, and then remove the squeeze-out.

## Veneer and install the panels

While the glue dries, make the box bottom and lid panel. The ¼" plywood bottom has fabric on the top face, and ⅜"-thick shop-sawn veneer on the bottom, lifting the box slightly from the surface. The ⅛" plywood top panel has fabric on both faces.

**Tip!** When picking fabric, choose one with a color that complements the wood. Greens and blues work well with the cherry I used.

**1** Cut the bottom panel ¼" longer and wider than the distance between the rabbets. Glue the veneer to the bottom [Photo E].

**2** After the glue dries, trim the bottom for a snug fit. Next, glue the fabric to the inside face, trim it flush [Photo F], and glue the bottom into the box, fabric facing up [Photo G]. Let the glue dry for an hour or so.

**3** Cut the lid panel to fit into the rabbet, glue fabric to one face, and trim it flush. Repeat on the other face. I do not glue this panel into the box, because it's really too thin to get a good glue bond. If it fits properly, and the kumiko panel also fits snug, there is no need for glue.

## Cut the lid from the box

**1** I've found that separating the lid from the box at the tablesaw leaves little steps at the corners that require sanding or planing, and the lid never quite sits right on the



**D** Spread additional glue on the miters, and roll the box up, taping across the final joint. Check the box for square by measuring the diagonals.



**E** Spread glue on the bottom panel, making sure it reaches the edges. Apply the veneer, wrap waxed paper around the assembly, then clamp between thick cauls.



**F** Start with an oversize piece of fabric and glue it to the plywood with spray adhesive. Cut it flush to the plywood with a rotary cutter or crafts knife.



**G** Spread glue in the rabbet and press in the bottom. Use a caul on top and bottom and apply clamps. Too much pressure can break apart the joints, so go easy.





**H**

**Run the lid against the saw's fence.** A 3–4 tpi variable-tooth resaw blade provides a clean cut. The fence must sit parallel to the blade's cut. Any drift when making this cut will ruin the box.

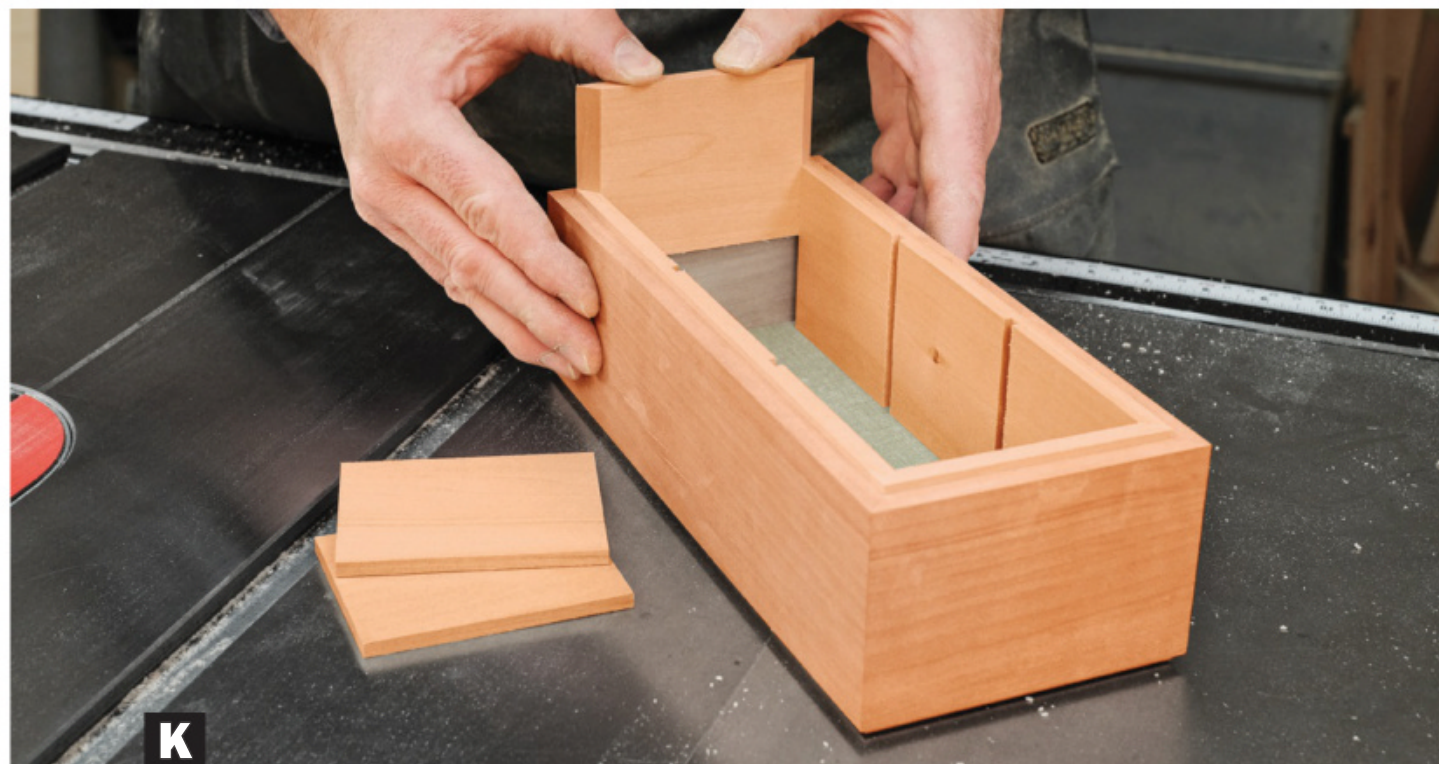
box after that. So, I cut the lid free at the bandsaw [Exploded View, Photo H]. There are no steps at the corners, and the blade marks clean up quickly with sandpaper [Photo I].

## Create divisions

**1** I use basswood for the internal liners and dividers that create cubbies for tea packets. Mill the liners to thickness and cut them wide enough to protrude  $\frac{1}{8}$ " above the box side [Exploded View].

**2** To fit the liners inside the box, first cut them square, with the blade at  $90^\circ$ . Then cut the dadoes that accept the dividers, creating three same-size compartments [Photo J]. I cut these with a standard-kerf rip blade, because it leaves a flat-bottom kerf.

**3** Next, miter the liners and slide them into the box [Photo K]. Mill the dividers to fit the dadoes. I get the thickness close with my planer and then refine the fit with a smoothing plane. Crosscut the dividers to length, dialing in the length with a shooting board and plane, or using a microadjust stop and crosscut sled. Press the dividers into place. With snug-fitting liners and dividers, there is no need to glue anything into the box.



**K**

**Insert the long liners,** then add the end liners. These simply friction-fit in the box—no glue needed.

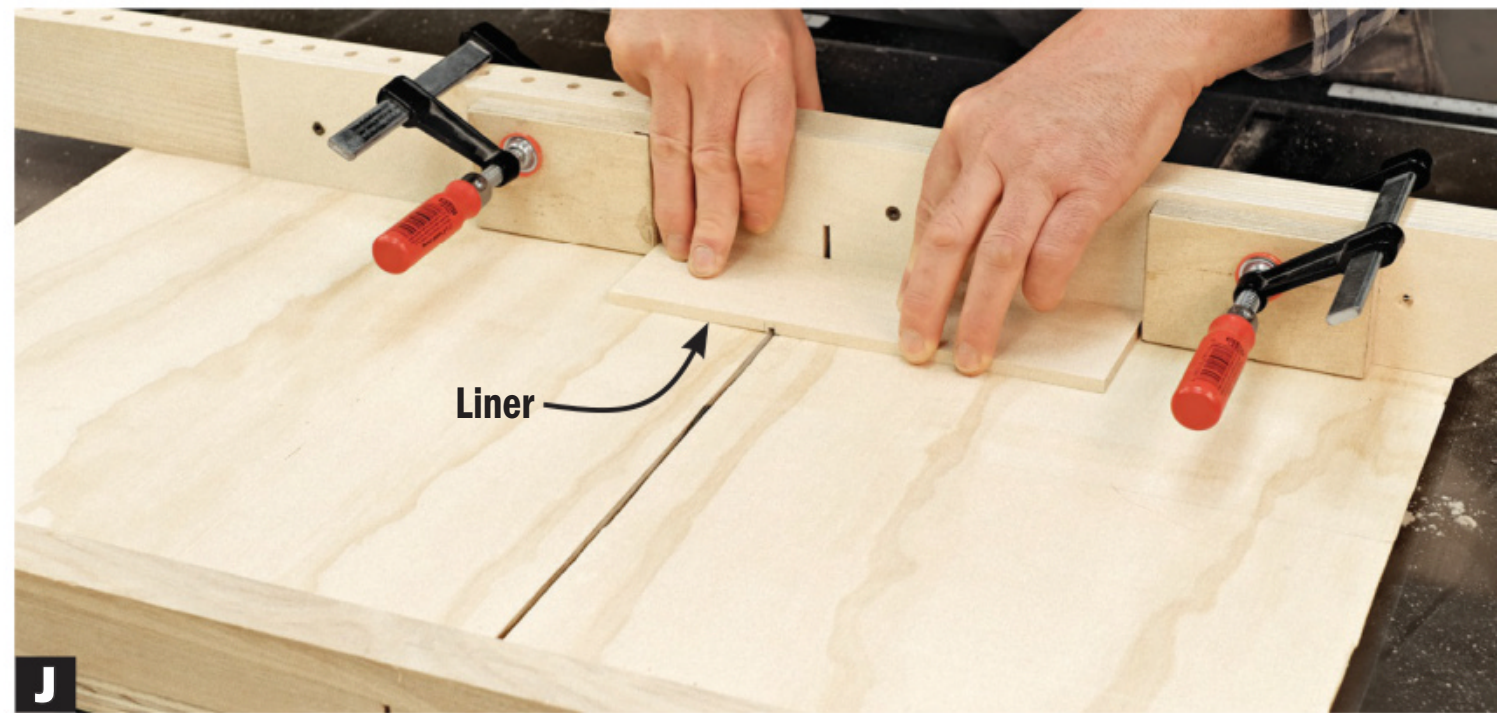


**I**

**Glue two pieces of sandpaper to a flat surface,** such as a piece of MDF, and sand the box in a circular motion. Work from 220 up to 400 grit. Do the same for the lid.

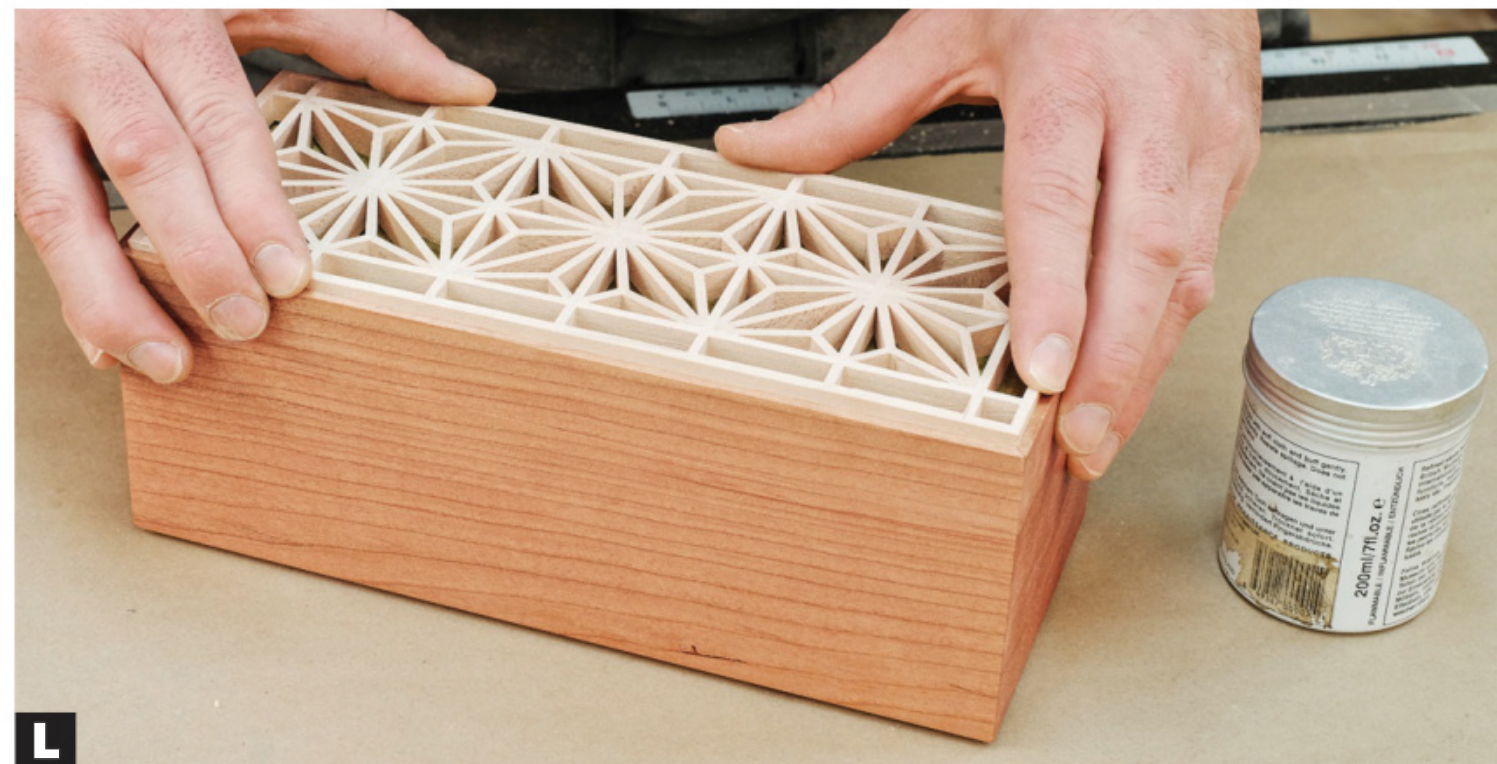
**4** I finish only the exterior of my boxes by wiping on two coats of a 1-pound cut of shellac, then wet-sanding with 800-grit sandpaper, and adding a third coat. Buff the last coat with ultrafine steel wool, wipe away the residue, then polish with wax. A box this size takes about 15 minutes to finish from raw wood to wax, because the shellac dries so quickly.

**5** After completing the finish, press the kumiko panel into the lid [Photo L], load the box up with your favorite teas, and enjoy a nice cuppa! 🌿



**J**

**A pair of stopblocks help locate all four dadoes** the same distance from the liner's ends, guaranteeing that the dividers sit square.



**L**

**Use light pressure and work your way around the panel,** working it in a bit at a time. Do not press in one end and then the other, which could break the panel.



# Crafting a Kumiko Panel

By Matt Kenney

*You can do it with simple jigs, careful cuts, and almost no glue.*





The art of kumiko, practiced in Japan for 1,400 years, decorates shoji screens and transom windows with its geometric grace, beauty, and quiet elegance. The seemingly delicate frames and intricate patterns appear difficult and fussy to make, but the techniques shown here make the process less challenging, ensuring success.

We'll make a small cross-lap panel with the *asa-no-ha* (hemp leaf) pattern [Drawing 1], probably the most widely used in kumiko. This panel adorns the lid of the tea box shown on page 58.

## What you'll need

I used basswood for this panel, but eastern white pine or any other fairly soft, close-grain, light-colored wood works well. Avoid wood with coarse grain or bold patterns as this disrupts kumiko's linear beauty. Cut

one  $\frac{3}{8} \times 5 \times 6$ " blank for the short frame members, and two  $\frac{3}{8} \times 5 \times 15$ " blanks for the long frame members and the infill patterns.

Outfit your tablesaw with a thin-kerf, 40-tooth combination blade, a crosscut sled, and a pair of shop-made cross-lap joint jigs. You'll also need a pair of shop-made guide blocks, a wide chisel, and a dozuki saw. Let's start by making the cross-lap jigs.

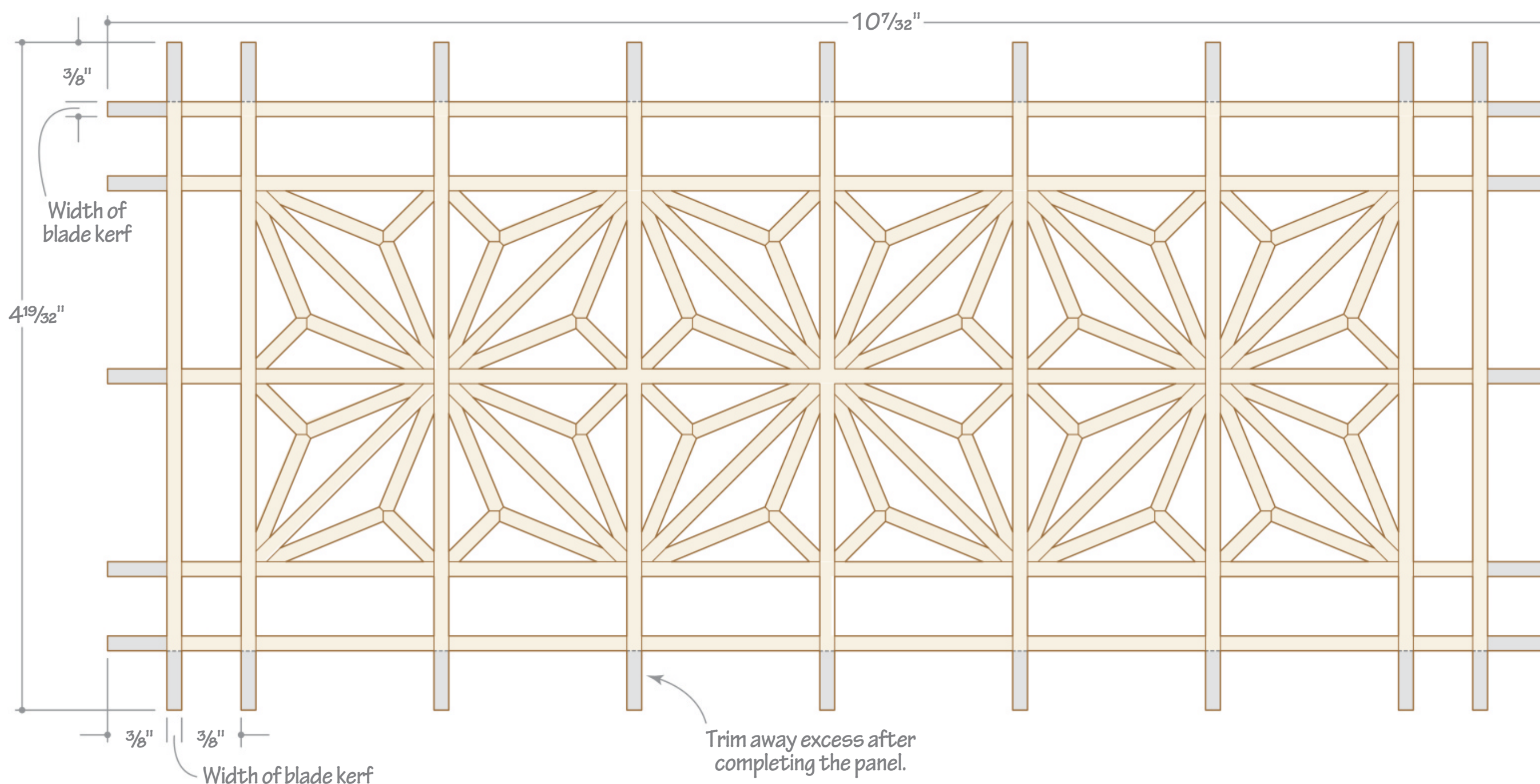
## Jigs mean consistent spacing

For the cross-lap jigs [Drawing 2], cut two  $\frac{1}{2} \times 3$ " pieces of MDF as long as the width of your crosscut sled. Cut a  $\frac{3}{16}$ "-deep saw kerf at the center of each piece. For Jig 1, which controls the spacing of the frame's border members, simply glue the registration pin into the kerf. Screw the jig to your crosscut-sled fence, positioning the pin  $\frac{3}{8}$ " to the left of the blade.

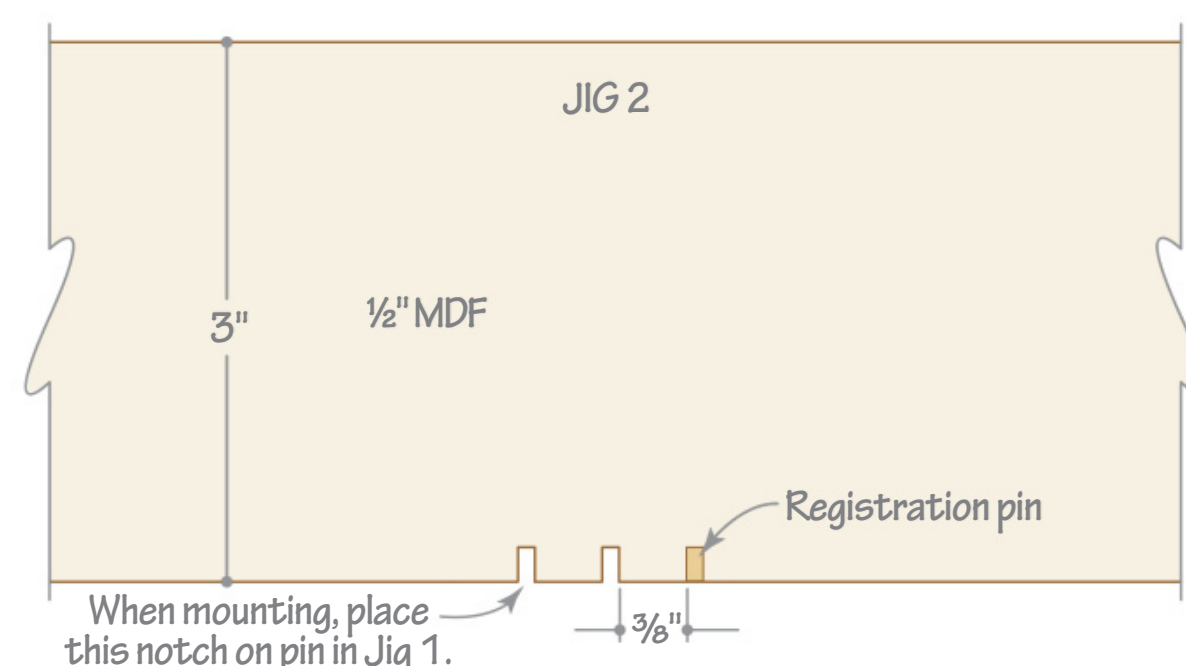
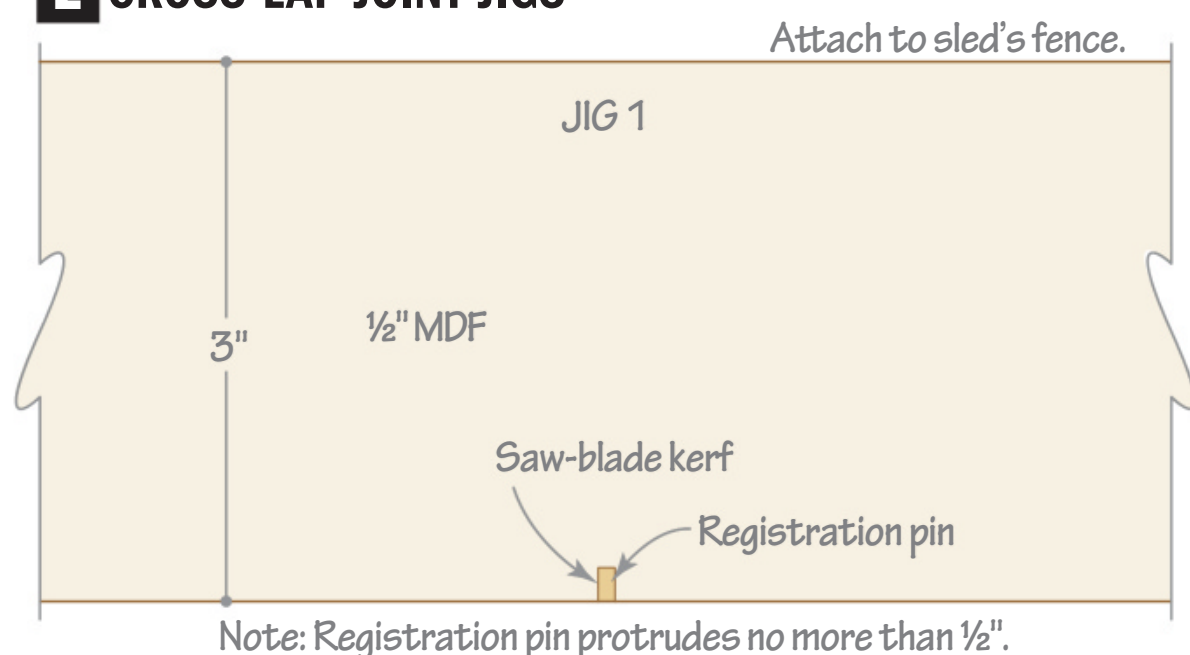
► Learn more about Japanese handsaws. [woodmagazine.com/helpfulhandsaws](http://woodmagazine.com/helpfulhandsaws)

► Even a tiny difference from the  $\frac{3}{8}$ " spacing between the pin and kerf adds up as you build the panel. Making the panel first lets you build the box to fit it.

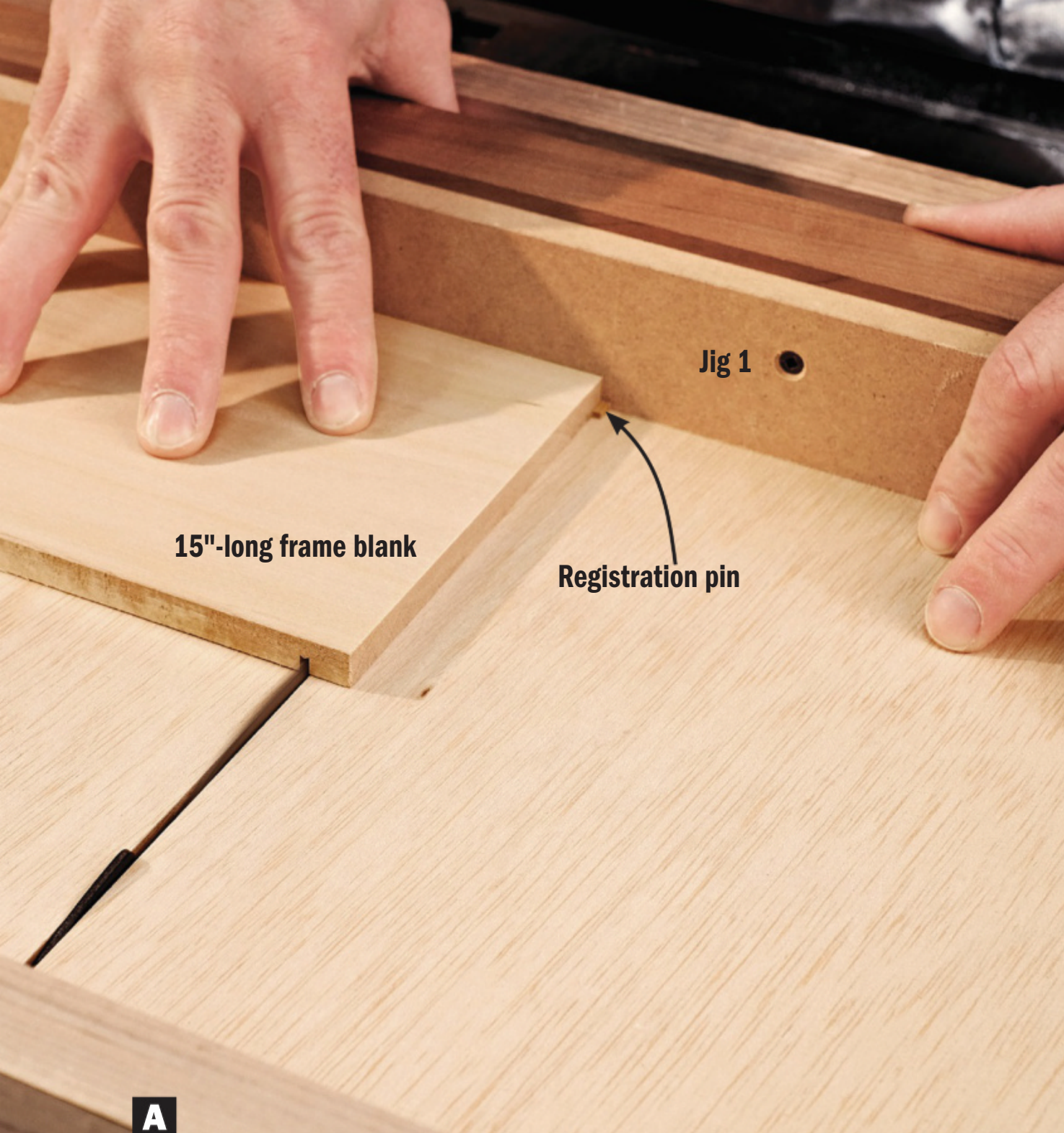
### 1 KUMIKO ASA-NO-HA



### 2 CROSS-LAP JOINT JIGS







**A**

Set the blade to cut slightly over halfway through the blank's thickness. Butt the end against the registration pin, and cut the first dado. Press firmly on the blank to ensure a uniform depth across the width.



**B**

Fit the dado on the pin, hold the board tight against the sled's fence, and cut the second dado.

For **Jig 2**, retrieve the second piece of MDF and fit its kerf over the registration pin of **Jig 1**. Cut a second notch, place this notch on the pin, and repeat until you have three notches. Glue a registration pin into the first kerf you cut. This jig locates the interior square frames holding the asa-no-ha pattern.

## A frame of interlocked dadoes

Using **Jig 1**, cut the first dado in one of the 15"-long blanks [**Photo A**] and in the 6"-long blank. Then, cut a second dado in each blank [**Photo B**]. Register **Jig 2** on the registration pin of **Jig 1** [**Photo C**] and cut the dadoes for the interior squares. Remove **Jig 2** and use **Jig 1** to cut the last dado across each blank.

After cutting all the dadoes, raise the blade, place the last-cut dado on the jig's pin and trim each blank to length.

Next, rip the blanks into strips the same width as the dadoes. First, rip two strips from one of the dadoed boards and press a joint together. You should be able to do this with just finger pressure. Take the joint apart. Look at the strips to see if there is any compression at the joint. A small amount (barely visible to the eye) is acceptable, but a too-tight fit causes the frame to curl up as the notches spread open to accommodate the extra thickness of the mating part. Once you have the thickness dialed in, rip the

► Use the same blade for cutting the dadoes that you used to cut the kerfs in the jigs.

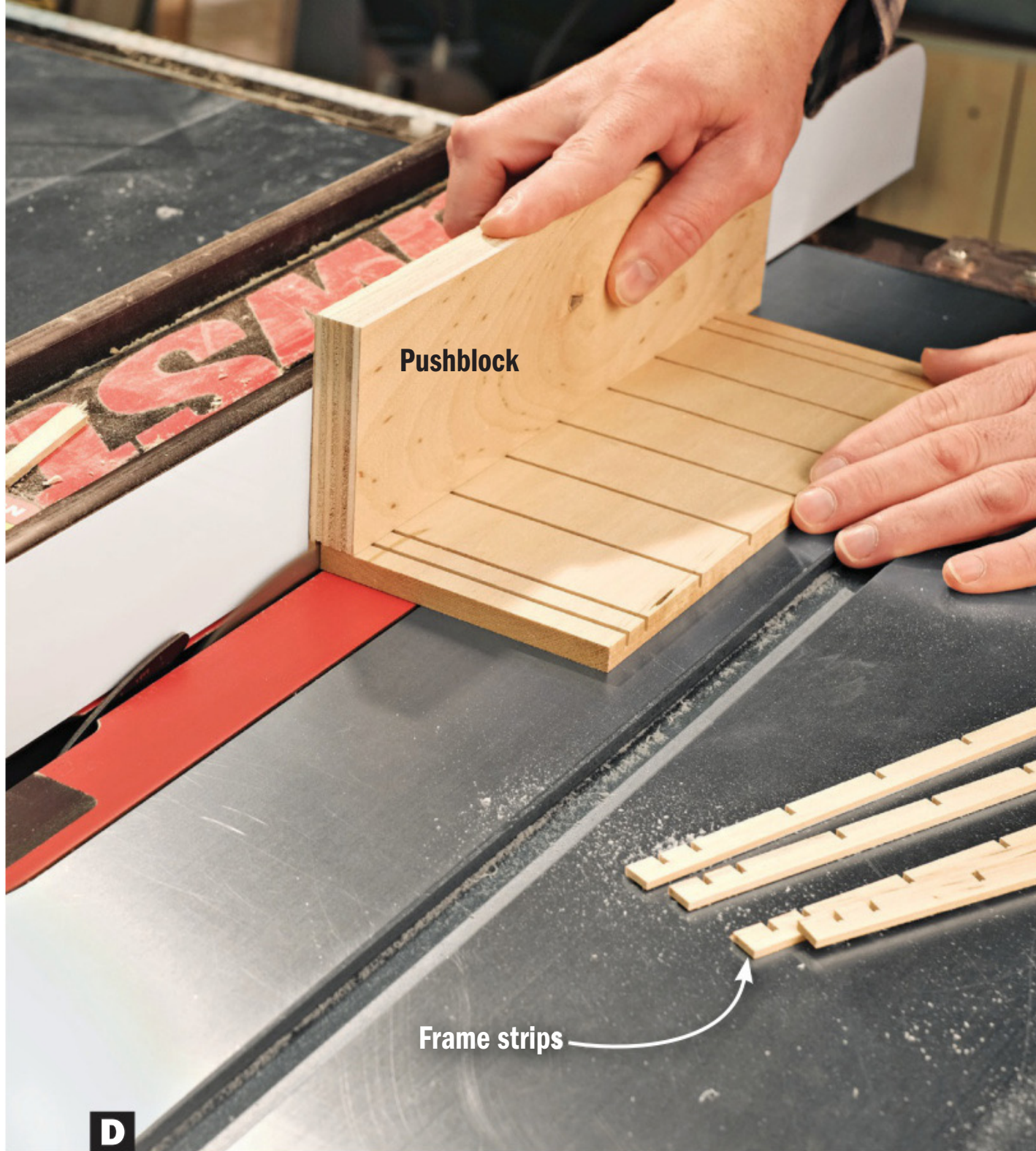


**C**

Secure **Jig 2** to **Jig 1**, seating the indicated kerf on the registration pin. Seat the last-cut kerf in a blank on the **Jig 2** pin, make a cut, and repeat, cutting six dadoes across the 15" blank, and two across the 6" blank.

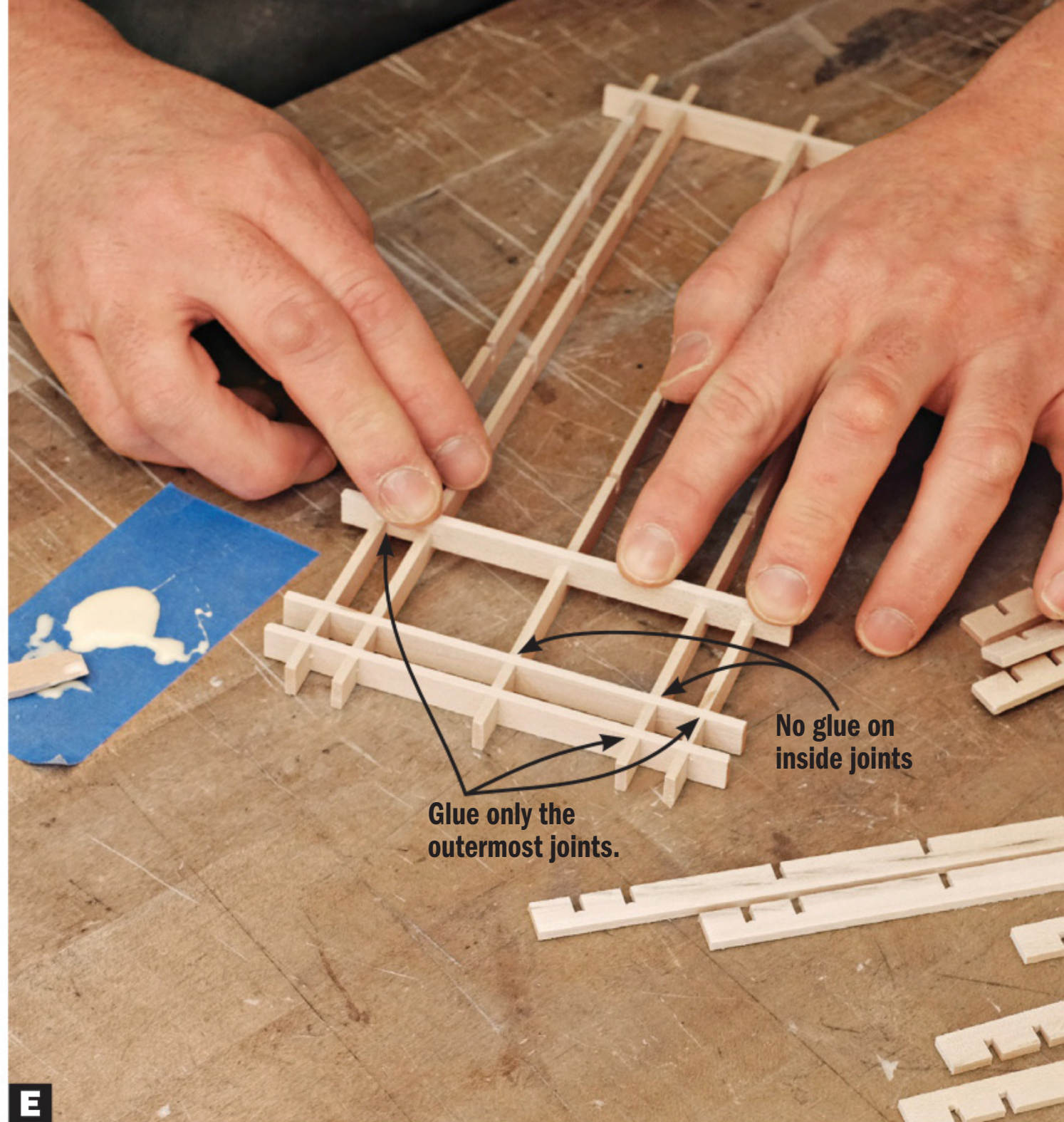
blanks to create the notched strips for the frame [**Photo D**] and the unnotched strips for the asa-no-ha patterns. Then, assemble the frame, using glue only in the joints around the perimeter of the frame [**Photo E**].





**D**

**Rip the strips to match the dado width.** Use a pushblock to hold the blank down and guide it through the blade.



**E**

**Glue the four outer strips together,** then glue in the three remaining long strips. Finally, add the inner short strips. Always apply pressure directly over the joint and work back and forth across the panel until all of the joints seat fully.

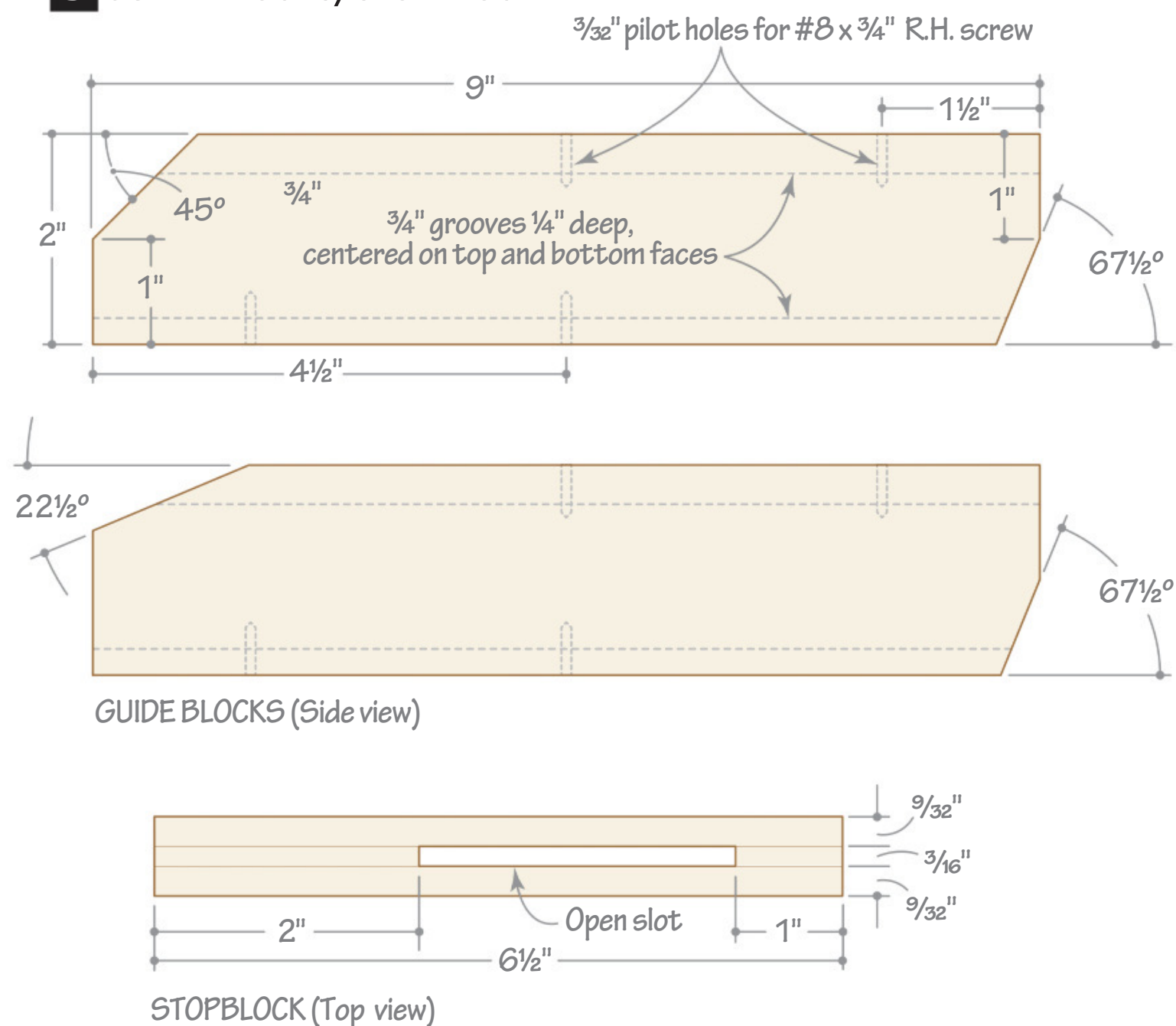
► Having two blocks with  $67\frac{1}{2}^\circ$  bevels allows for two setups later when cutting different-width bevels.

## Guide blocks for exact angles

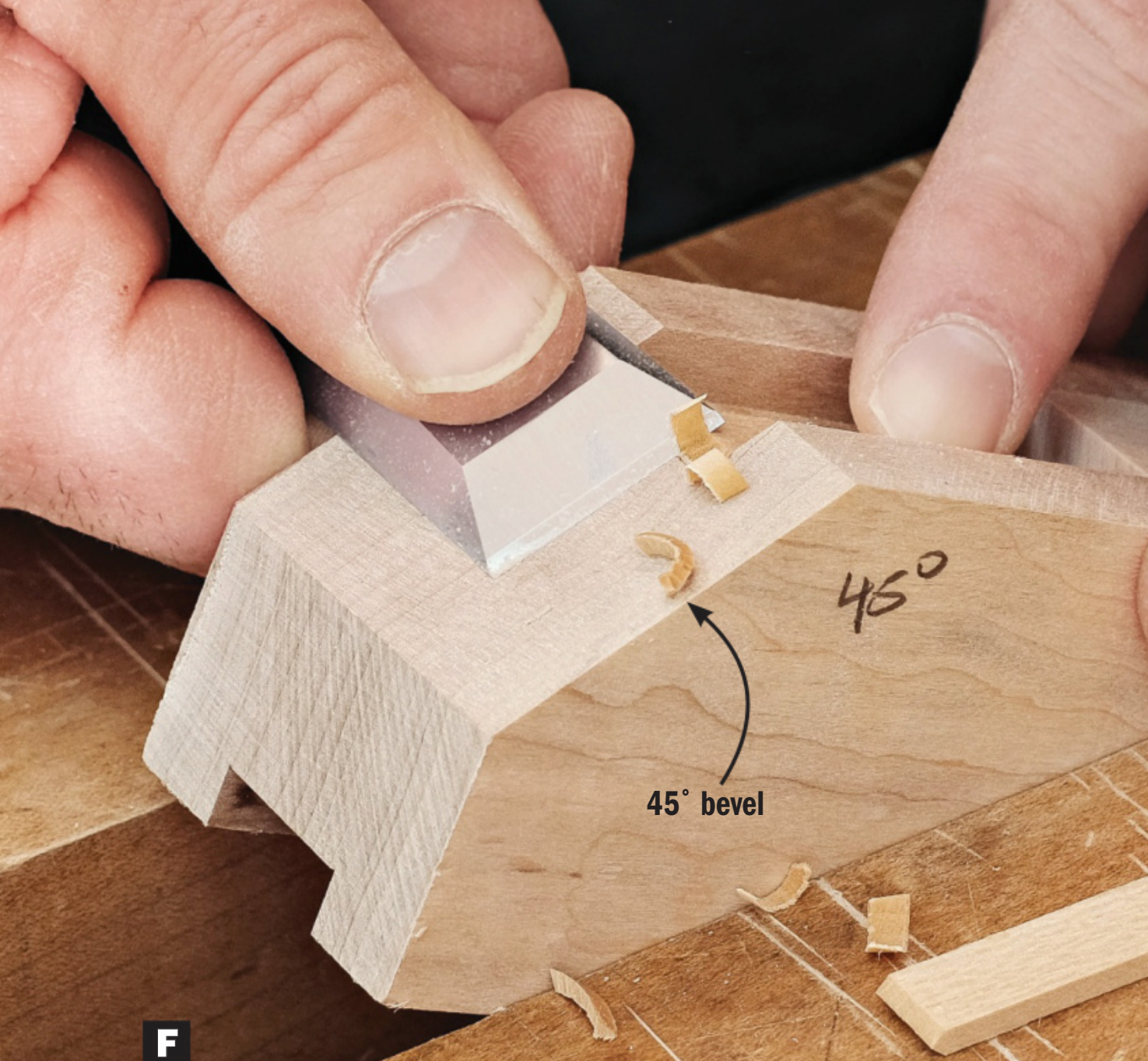
A pair of guide blocks guides a chisel as you bevel the ends of the pattern pieces. One block has  $45^\circ$  and  $67\frac{1}{2}^\circ$  guide surfaces, while the other one has  $22\frac{1}{2}^\circ$  and  $67\frac{1}{2}^\circ$  guide surfaces [Drawing 3]. Make these angles dead-on.

For each block, make a slotted stopblock that fits in its groove [Drawing 3]. You'll secure each stopblock with a washer and round-head screw so you can trim parts to identical length. The slot allows for making small adjustments as you do this.

### 3 GUIDE BLOCKS/STOPBLOCK





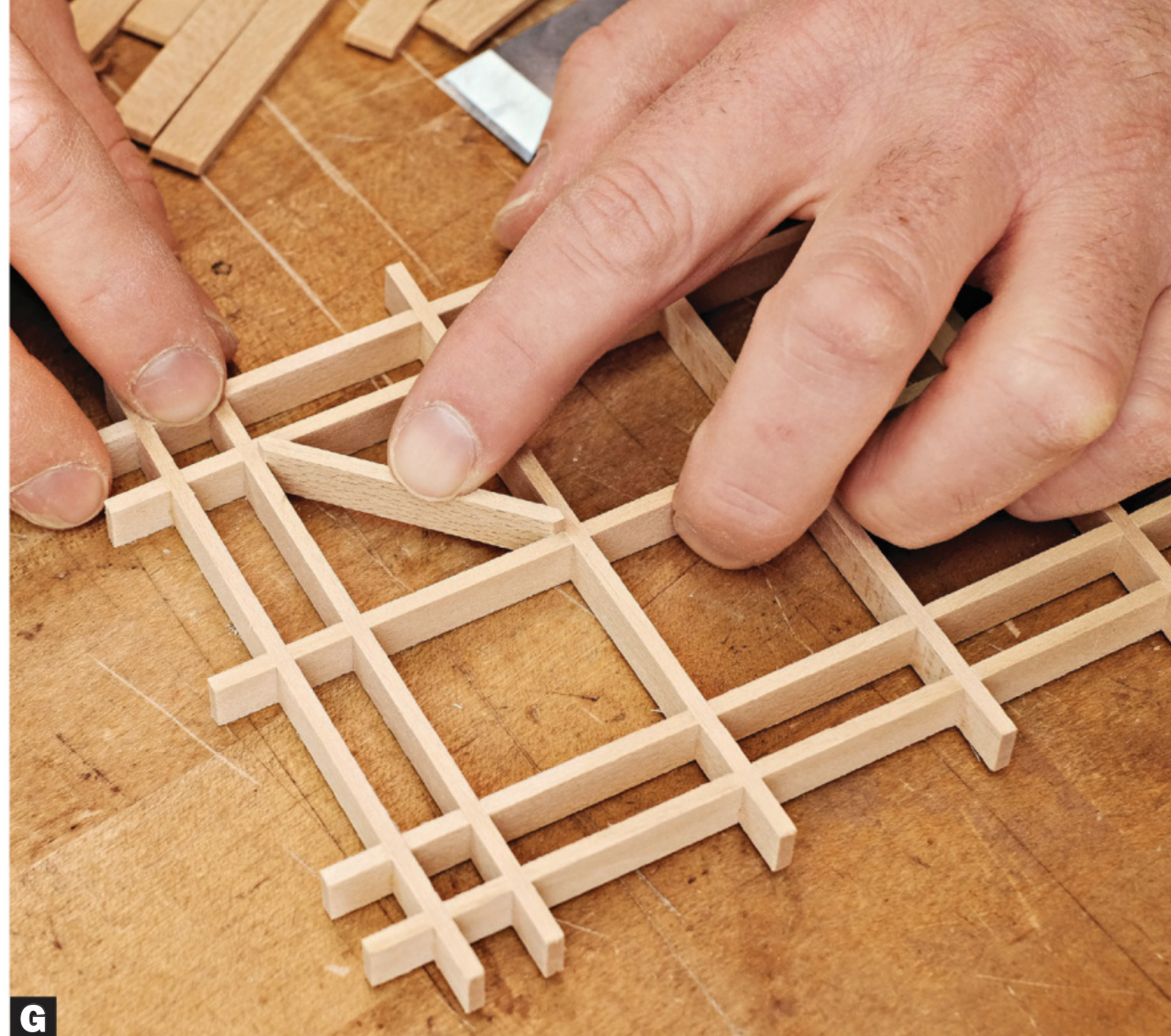


**F** Set the guide's stopblock so that the end of the diagonal piece aligns with the end of the groove. Pare one side, flip the piece over and pare the second side.

## Now, the pattern pieces

Each asa-no-ha consists of four squares in the frame [Drawing 4]. Each square contains one diagonal piece, four hinge pieces, and two locking pieces. Mark the length of each piece directly from the frame, and cut the pieces  $\frac{1}{8}$ " longer to allow for beveling the ends.

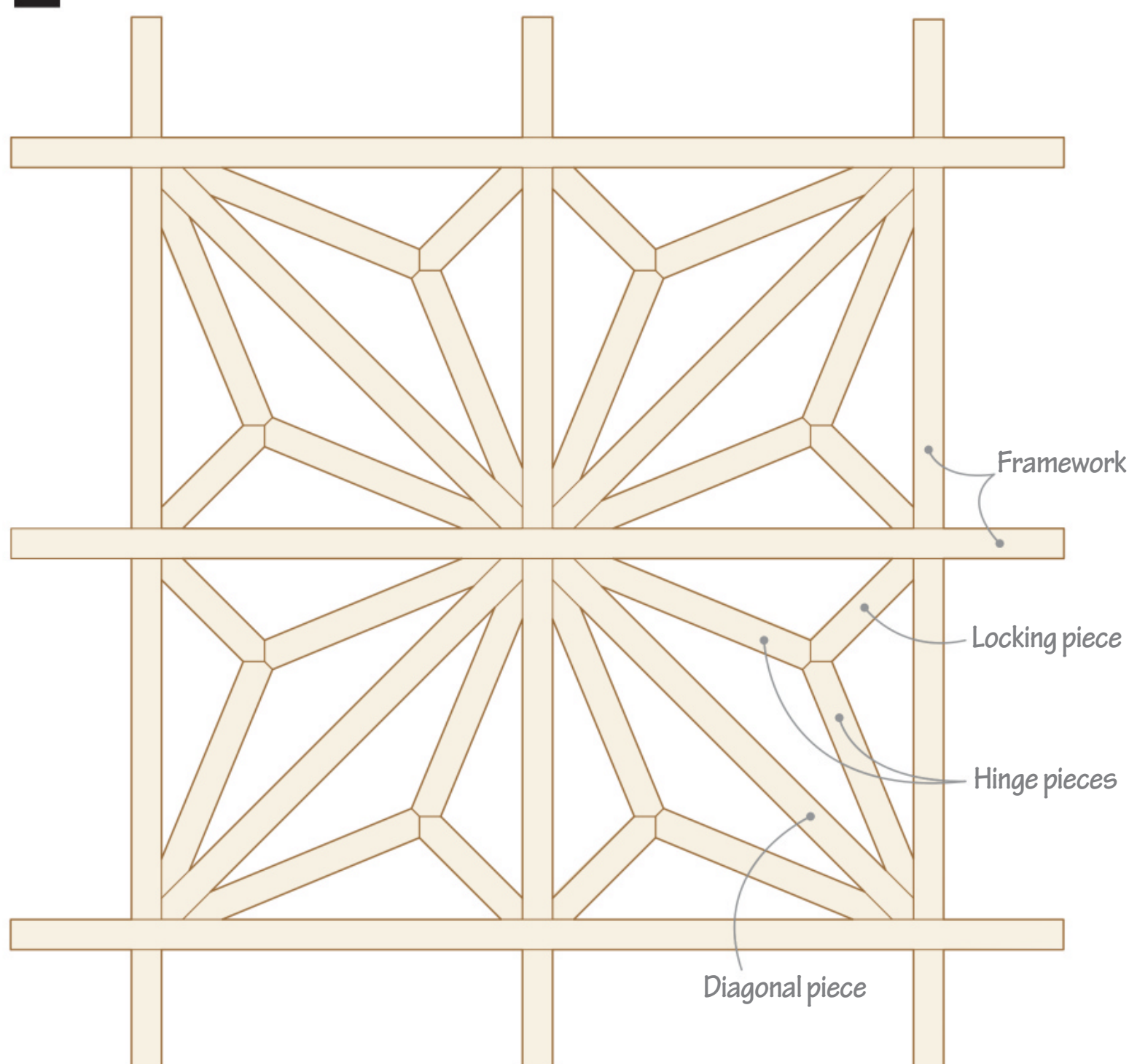
Cut 45° bevels on *one* end of all the diagonal pieces [Photo F]. Adjust the block forward



**G** Test the fit. Pressing the diagonal piece into the frame should require a bit of pressure but not a struggle. If needed, adjust the guide's stop and recut one end of the diagonal. Check the fit and continue to adjust the stop until the piece slides into the frame without deforming it.

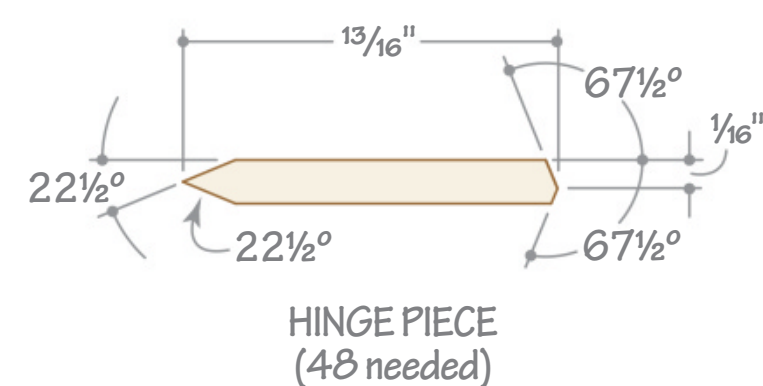
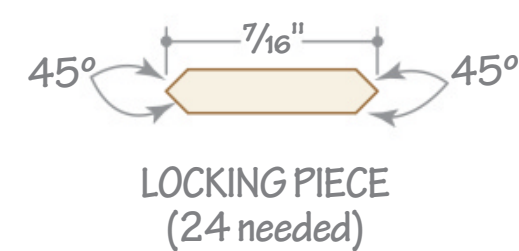
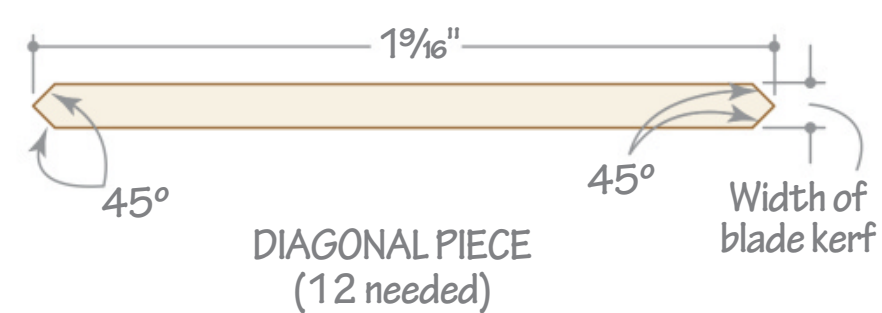
slightly and bevel the opposite end of *one* diagonal. This test piece fits when it slides snugly into the frame without pushing it out of square [Photo G]. Once the test piece fits, bevel the remaining diagonals. The four diagonals for a single *asa-no-ha* form an X in the frame [Drawing 4].

## 4 ONE ASA-NO-HA PATTERN



## 5 PARTS VIEWS

Note: Lengths are approximate.  
See the instructions.







**H**

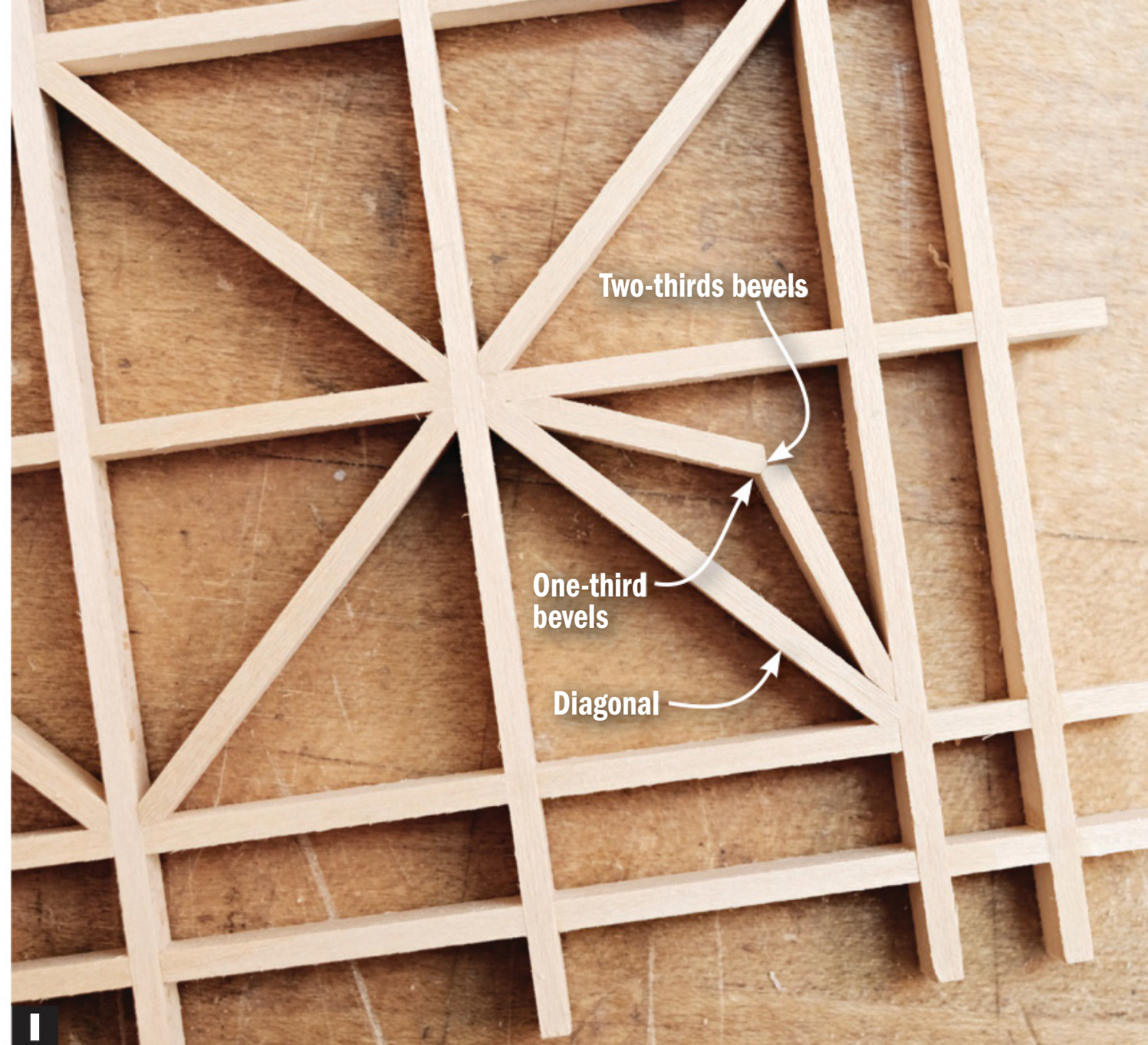
**Cut a bevel across the hinge piece's thickness**, using one  $67\frac{1}{2}^\circ$  guide. Set your second  $67\frac{1}{2}^\circ$  guide block to cut the second bevel.

The hinge pieces prove trickiest to make because at the end where the pieces meet, the bevels are not centered on the piece's thickness [Drawing 5]. Using both  $67\frac{1}{2}^\circ$  guide surfaces, set a stop on one to bevel across the piece's full thickness, and the second to make a bevel that's one-third the part's thickness [Photo H].

Trim these pieces with the  $22\frac{1}{2}^\circ$  guide, sneaking up on the final length until they fit into the frame without gaps [Photo I]. Note that the one-third bevels touch in the center, and the two-thirds bevels create a  $90^\circ$  birdsmouth opening into which one end of the locking piece fits. The locking piece is just a shorter version of the diagonal. Its fit is critical because it holds the entire pattern together [Photo J].

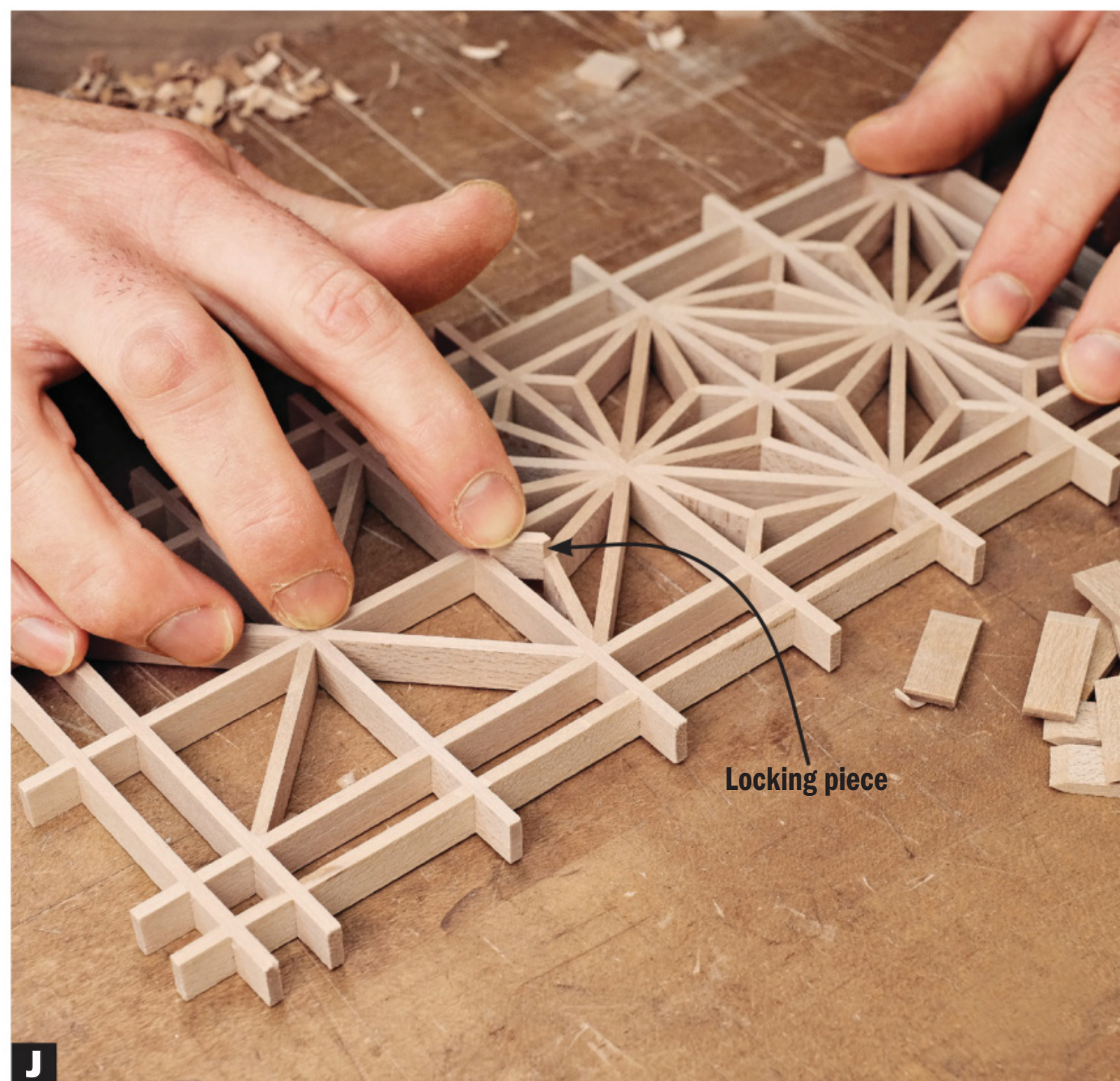
With the frame fully assembled, place it on your saw table and press all the pattern pieces down. Turn the panel over and sand it with a half sheet of 320-grit paper glued to a piece of plywood, moving the sandpaper in a circular motion.

Clamp the frame in your bench vise, and carefully saw and pare the ends of the frame pieces flush with the faces of the frame [Drawing 1]. Fit the panel into the lid of the tea box, use it on another project, or simply display it on its own. 🌲



**I**

**The two hinge pieces fit correctly** when they touch in the middle without gaps at the corners. Remedy a gap between them and the diagonal by shortening the hinge pieces.



**J**

**The locking piece should slide in** without damaging any other parts, but be snug enough so that the pattern becomes stable and a unified whole.



**Matt Kenney** is a professional furnituremaker and woodworking instructor in Connecticut. His second book, *The Art of Kumiko* (Blue Hills Press), was released in 2020. Keep up with what he's making and where he's teaching by following his Instagram, @mekwoodworks.



# Create Multi-layer Projects on a CNC

By Randy Johnson

*Flat images spring to life using these techniques.*

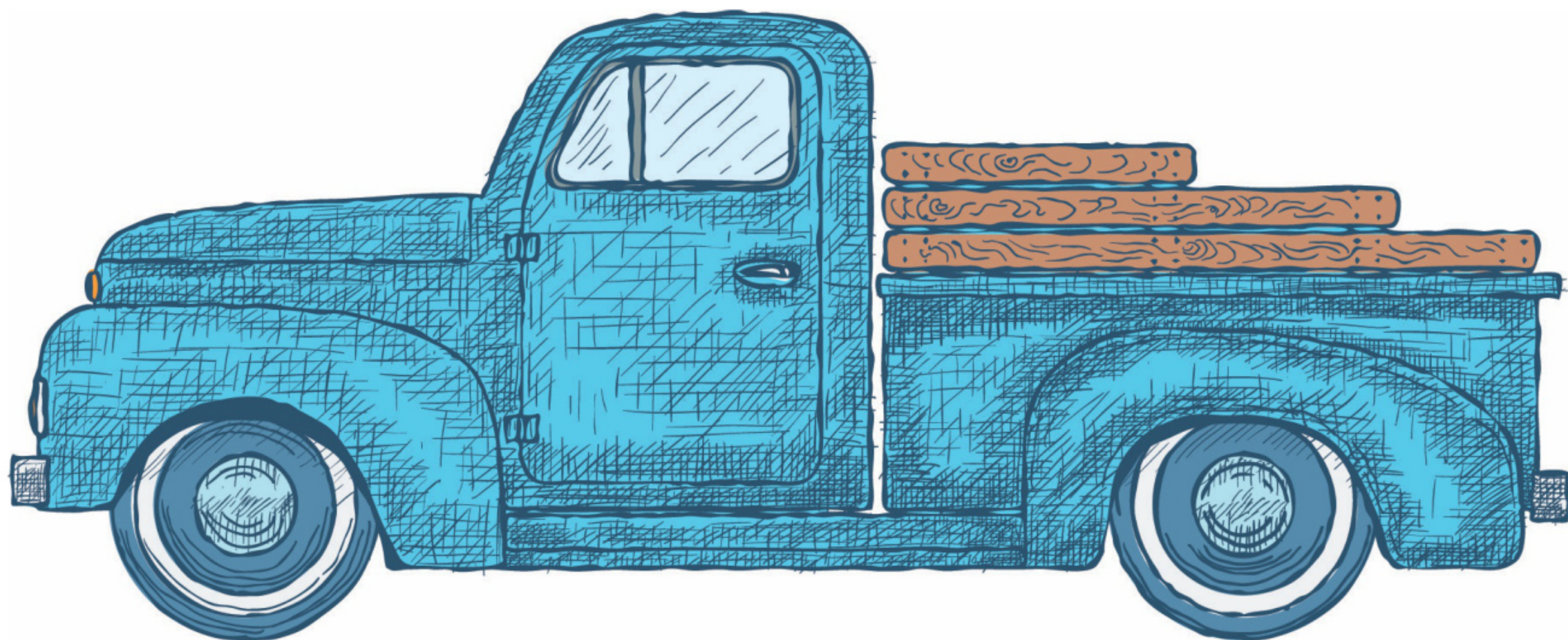


**W**ith CNC, you can duplicate parts with a couple of clicks and make as many as you want. So, customize this project to suit your favorite holiday—or make a set for every occasion. Change colors to red and green with a pine tree in the back to welcome Christmas guests. Paint the truck orange and brown with pumpkins in the bed for Halloween and Thanksgiving. Or make it resemble one of your favorite old vehicles.

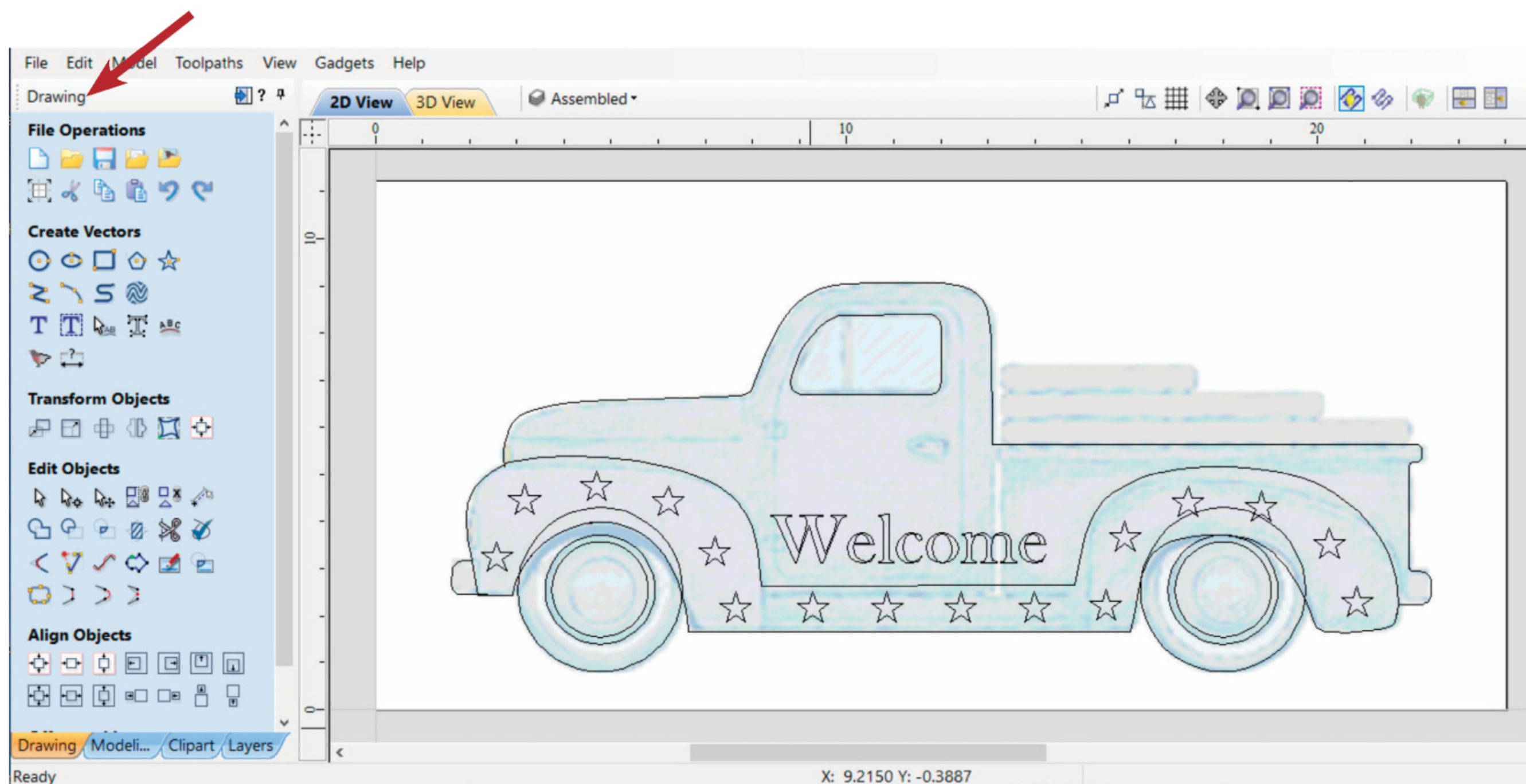
► Get more CNC plans and video.  
[woodmagazine.com/cnc](http://woodmagazine.com/cnc)

Creating the design in Vectric VCarve software goes quickly using a few of the program's basic drawing tools. The simple toolpaths require only three router bits to complete the cutting and carving. Because it paints so well, make the project from standard MDF for display in sheltered areas, or use an exterior grade MDF if the sign will be exposed to the weather.





1 Start with a photo or drawing of your favorite old pickup truck, car, or other vehicle. A straight-on side view, as shown here, works best.



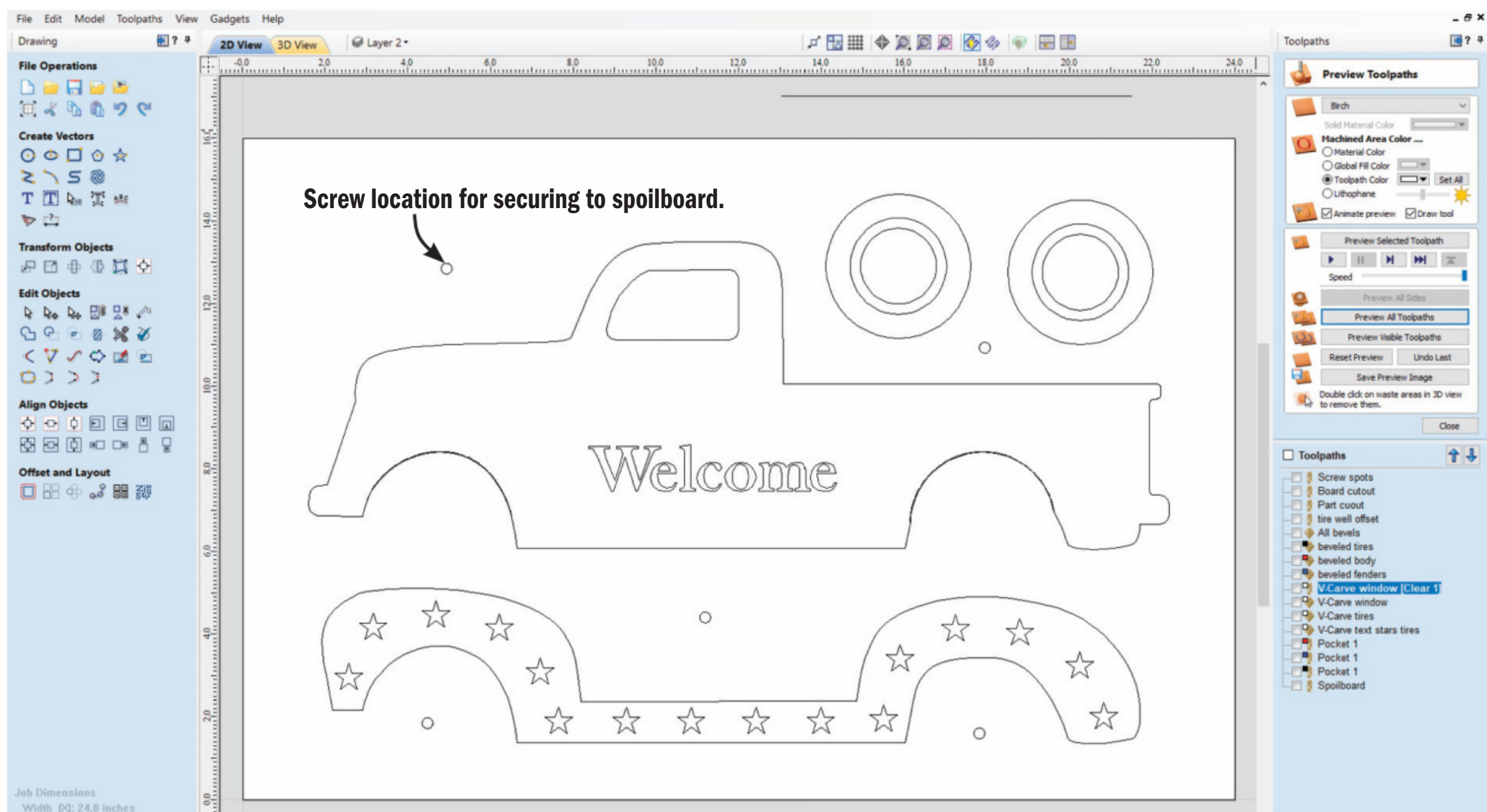
► Watch Randy design this project in VCarve.  
[woodmagazine.com/cncdraw](http://woodmagazine.com/cncdraw)

2 After setting up your job dimensions, import the image into the VCarve software. Use the tracing and drawing tools (described *at right*) to create vector lines around the major parts of the image. For this truck, that includes the main body, the fenders and running board, the tires and wheels, and the side window. (I left off the sideboards on the bed.) Keep the parts bold and basic—think of them as simple puzzle pieces. Note that even though the tires tuck behind the fenders, I made them fully round because they'll be visible when glued in place. Add the text and stars, or customize the design to fit your décor or holiday.

## Know Your Drawing Tools

- Use the **Draw Curve** tool to freehand-trace lines of the image.
- The **Draw an Arc** tool gives you precision control when creating curves.
- To create straight lines and shapes, choose the **Draw Polyline** tool.
- The **Node Editing** tool cleans up and refines lines and curves you've already drawn.
- Use the various **Join/Close Vector** tools to connect the endpoints of lines and curves into a unified shape.





**3** Separate the parts in the drawing and arrange them in the layout. Leave enough space around the parts so the waste area remains together as one piece. This waste material serves as a clamping jig for the parts in a later step.

Add the cutout toolpaths around the parts including tabs to hold the parts in place while cutting. I use a 1/4" upcut spiral bit for the outlines, and added a .25"-deep bevel that gets cut with a 60° V-bit around the fenders, tires, and the top half of the truck

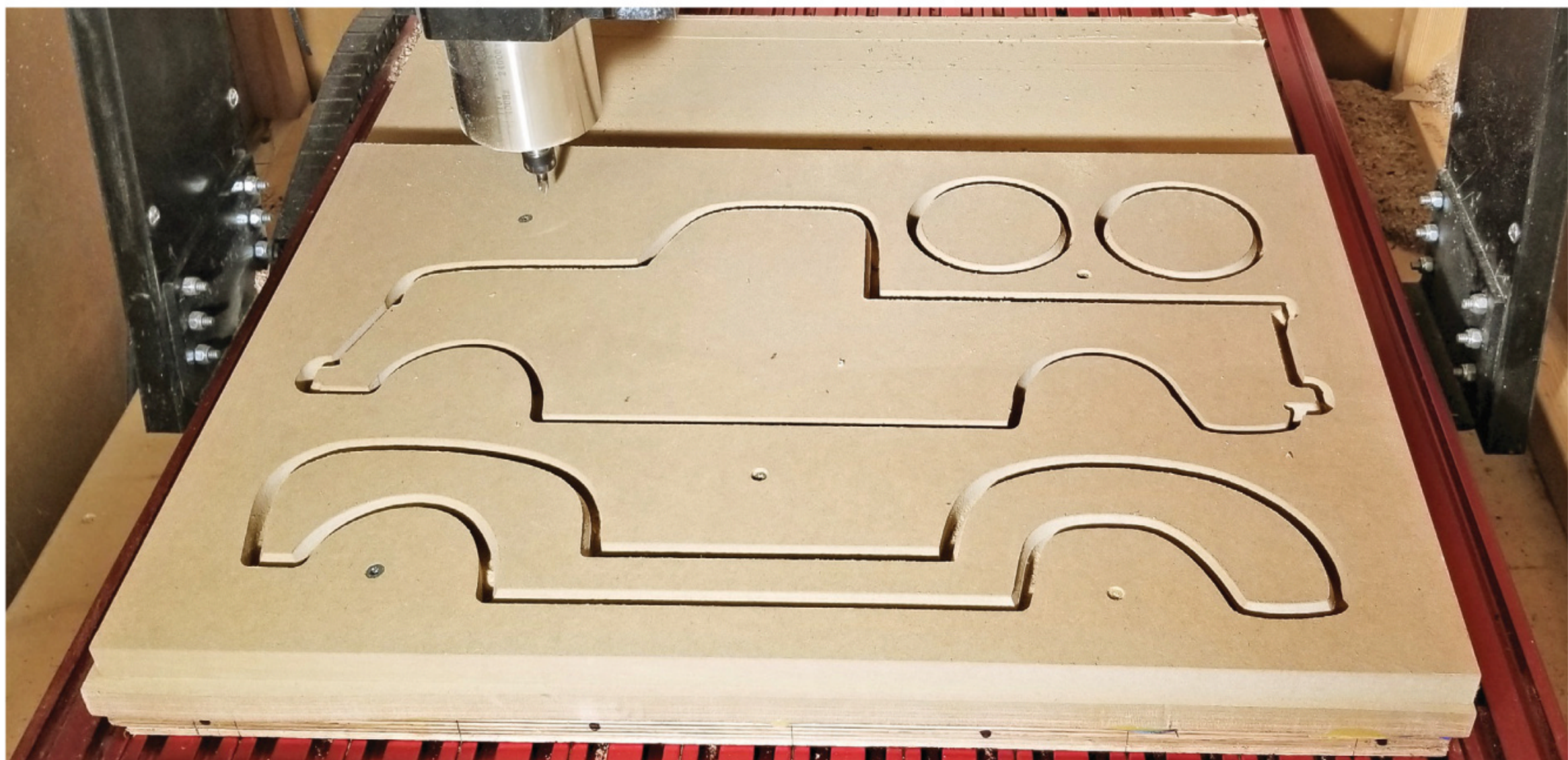
body. The bevel softens the edges and adds contour to the parts.

## Know Your Cuts

- **Profile cut:** This cut follows a line similar to a tablesaw or bandsaw and can cut slots, grooves, and dadoes.
- **Pocket cut:** This removes the material inside an area, similar to mortising, but the area can be square, round, or irregular, and any size.
- **VCarve cut:** Use this with a V-bit to cut a V groove. It's often used to create incised lettering. Combined with pocket cuts, it adds a beveled edge profile to almost any design.

**4** After cutting the parts, separate them from the waste, but leave the waste attached to your CNC spoilboard. If you need to take the waste part off your machine, drill some registration dowel holes through the waste and into

the spoilboard so you can accurately place the waste back on your machine for the V-carving step later. Drill the hole in the truck side for the flagpole [opening photo], if desired, using your drill press or a handheld drill.



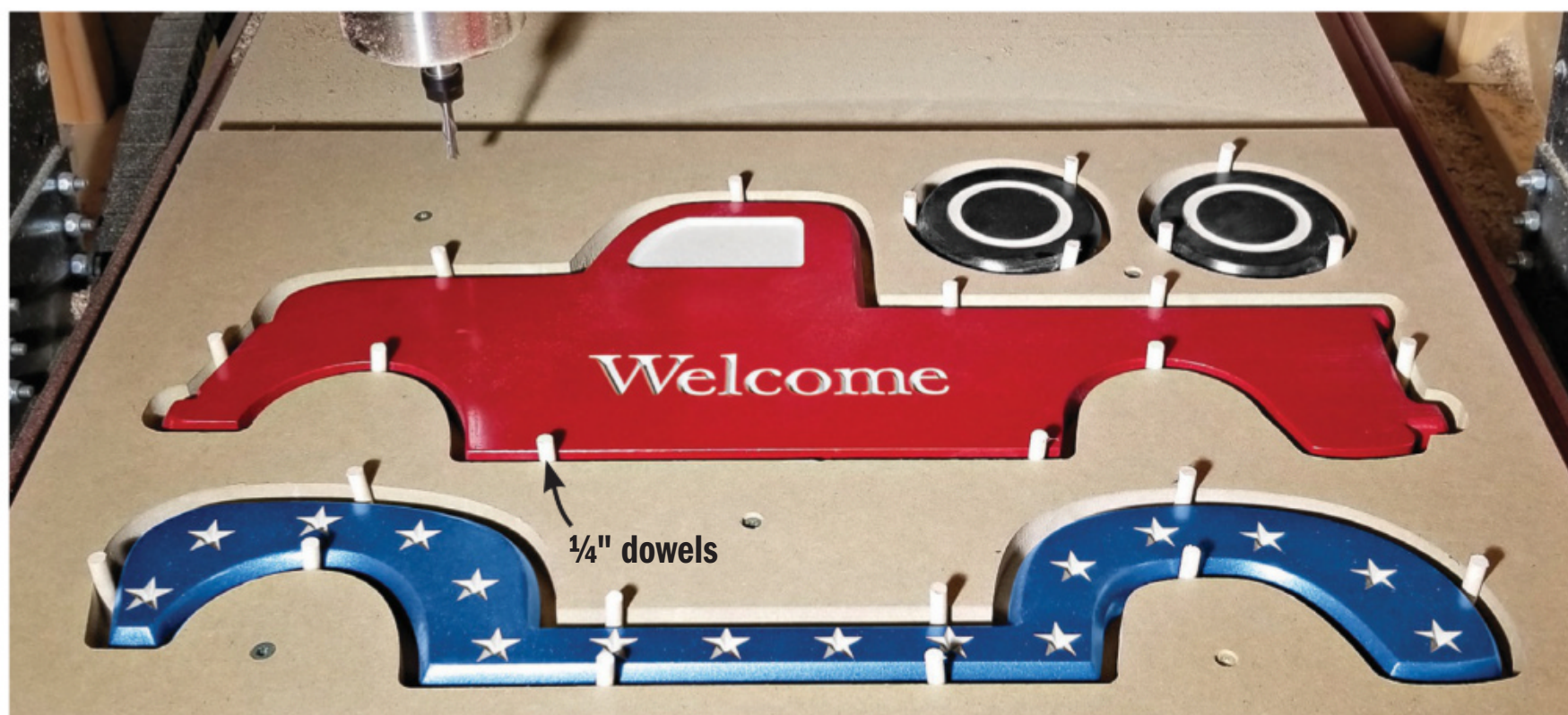


**5** Ease the sharp corners and sand smooth the machined edges of the MDF. Seal the parts with a couple coats of thin shellac and sand smooth with 180-grit paper. Then, spray on the paint. For this truck, I used a gloss metallic red and blue, and semi-gloss black. Let the parts sit for a couple days so the paint cures fully.



**6** To create the details, put the parts back on the CNC, wedging them in place with 1/4" dowels in the kerfs. To get a snug fit, enlarge the dowels, if needed, by applying masking tape or reduce them by sanding. Then,

V-carve full-depth the stars, text, and tires with a 60° V-bit. Make a pocket cut using the downcut spiral bit to clear the middle area of the window to 1/8" depth, followed by the 60° V-bit around the window's edge at 1/8" depth.



**7** Carefully brush white latex paint into the newly carved details and wipe off any excess paint from surrounding areas with a damp cloth. Let dry and apply additional coats as needed.



**8** Assemble the parts using an all-purpose gap-filling glue that sticks to painted surfaces. I used Loctite Go2 glue with good results. Add a picture hanger or garden stake to the back and display where guests can enjoy your handiwork. 🌲



Randy Johnson is the author of "CNC Router Essentials." He teaches CNC woodworking at Weekend with WOOD, Marc Adams School of Woodworking, and online at [NextWaveCNC.com/randyjohnson](http://NextWaveCNC.com/randyjohnson).





## Take the plunge

Bigger may often be better, but we're in love with smaller routers, represented by the current plethora of nimble compact and trim routers, both corded and cordless. The only downside: They typically come only in fixed-base versions. But during the past couple of years, four manufacturers have started offering optional plunge bases that increase the versatility of these mini-mights. Here's what we learned about them in our shop tests.

### Milwaukee 48-10-5601, \$110

- Fits Milwaukee 18-volt router no. 2723-20
- Turret: 6 steps in  $\frac{1}{8}$ " increments
- Plunge travel: 2"
- Bit opening in subbase: 2"

**Pluses:** With large, ergonomic handles, an intuitive plunge lever lock, and silky-smooth plunge action, this base works well. It also comes with a detachable dust-collection hood.

**Minuses:** We found the small triangular locking knob on the depth-stop rod difficult to grip and turn.

800-729-3878, milwaukeetool.com



► Read our review of trim and compact routers.  
[woodmagazine.com/trimrouterpower](http://woodmagazine.com/trimrouterpower)

### DeWalt DNP612, \$85

- Fits DeWalt 20-volt router no. DCW600B, and 1½-hp corded router no. DWP611
- Turret: 5 steps in  $\frac{1}{4}$ " increments (one step adjustable)
- Plunge travel:  $2\frac{3}{8}$ "
- Bit opening in subbase:  $1\frac{3}{16}$ "

**Pluses:** The stepped bit opening accepts two-piece guide bushings—the only one to do so. We can't imagine using a bit bigger than this opening, so we appreciate the extra subbase support. Excellent plunge lock and movement.

**Minuses:** The  $\frac{1}{4}$ " steps on the turret sometimes result in routing deeper increments than we like with a router in this class.

800-433-9258, dewalt.com



### Bosch PR011, \$100

- Fits Bosch Colt 1-hp corded router no. PR20EVS
- Turret: 7 steps in  $\frac{1}{8}$ " increments (2 steps adjustable)
- Plunge travel:  $2\frac{1}{4}$ "
- Bit opening in subbase:  $2\frac{3}{8}$ "

**Pluses:** Its plunge action, lock, and turret all work smoothly, and the handles grip nicely.

**Minuses:** None

877-267-2499, boschtools.com



### Bosch PR111, \$100

- Fits Bosch Colt 1½-hp corded router no. GKF125CEN
- Turret: 7 steps in  $\frac{1}{8}$ " increments (2 steps adjustable)
- Plunge travel:  $2\frac{1}{4}$ "
- Bit opening in subbase:  $2\frac{3}{8}$ "

**Pluses:** Similar in many ways to the PR011, this model shares its strengths.

**Minuses:** None

877-267-2499, boschtools.com



### Makita 196094-2, \$100

- Fits Makita 18-volt router no. XTR01Z and 1½-hp corded router no. RT0701C
- Turret: 3 steps (all adjustable)
- Plunge travel:  $1\frac{1}{2}$ "
- Bit opening in subbase:  $2\frac{1}{2}$ "

**Pluses:** Nice handles and smooth plunge action

**Minuses:** The short plunge-lock lever defaults to free plunge—the others default to locked—so you have to press down on the lever to lock it, an awkward setup. We found the depth rod clumsy to use, and we'd prefer more turret stops. The large bit opening reduces the amount of subbase contact when routing on small or narrow workpieces.

800-462-5482, makitatools.com





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## Compressor suppresses the noise that annoys

3-gallon Quiet Series air compressor, no. MAC320Q, \$260  
Because my home workshop resides in the basement, I'm always looking for ways to reduce noise—and keep my wife happy. This oil-free compressor purrs along at an astonishingly low 66 decibels, quieter than all my other machines, except the drill press. The reason: Rather than the traditional single-cylinder, 3,450-rpm pump of most oil-free compressors, the MAC320Q compresses with two cylinders running at half that speed. The 3-gallon tank provides plenty of air: I fired 39 1½" brads with my nailer before the pump kicked on to refill. And it has two quick-connect ports, in case I ever need to operate two nailers at the same time. The gauges read easily from a standing position, and the large hose-pressure adjuster turns easily. It weighs 52 pounds, but it's not a burden to carry.

—Tested by Jan Svec

Makita  
800-462-5482, makitatools.com



## You and your wallet can both breathe easier

Air Stealth Lite Pro half-mask respirator, no. STE/LP/ML, \$10

I make every effort possible to prevent breathing dust in my shop, including using direct and ambient dust-collection machines. And now I also wear this Trend respirator. The Air Stealth Lite Pro adjusts to fit snugly over my nose and mouth, with a cushiony rubber gasket that seals against my face to prevent dust from getting in. I found I could breathe easily through the replaceable filter without fogging up my safety glasses, thanks to the one-way valve that exhausts the air down and away from my face. After a day's use, I saw no evidence of dust having penetrated the filter. So it works perfectly, fits comfortably, and costs very little. (Replacement filters sell in a 5-pack [no. STE/LP/ML/5] for \$40.) What more could you want?

—Tested by Bob Hunter, Tools Editor

Trend  
877-918-7363, trend-usa.com



continued on page 78

WOOD magazine July 2021



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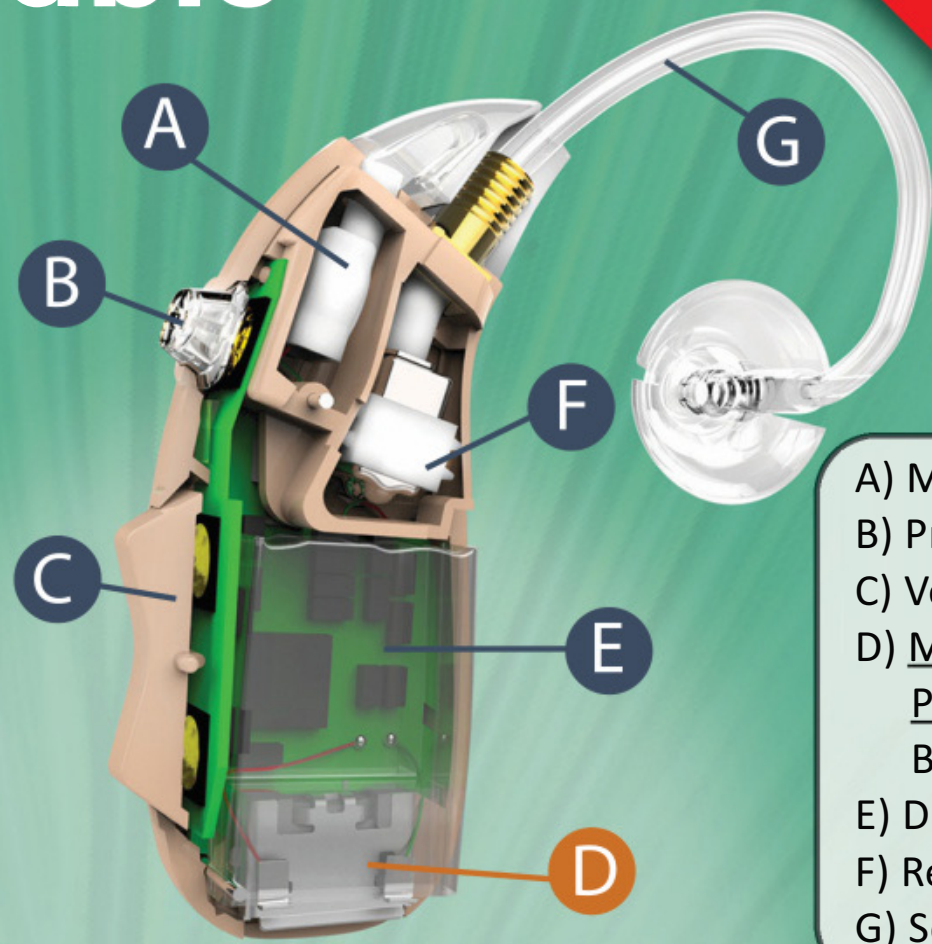
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In celebration of its 100th year of making woodworking machinery, Powermatic is offering seven machines with a special Centennial Collection

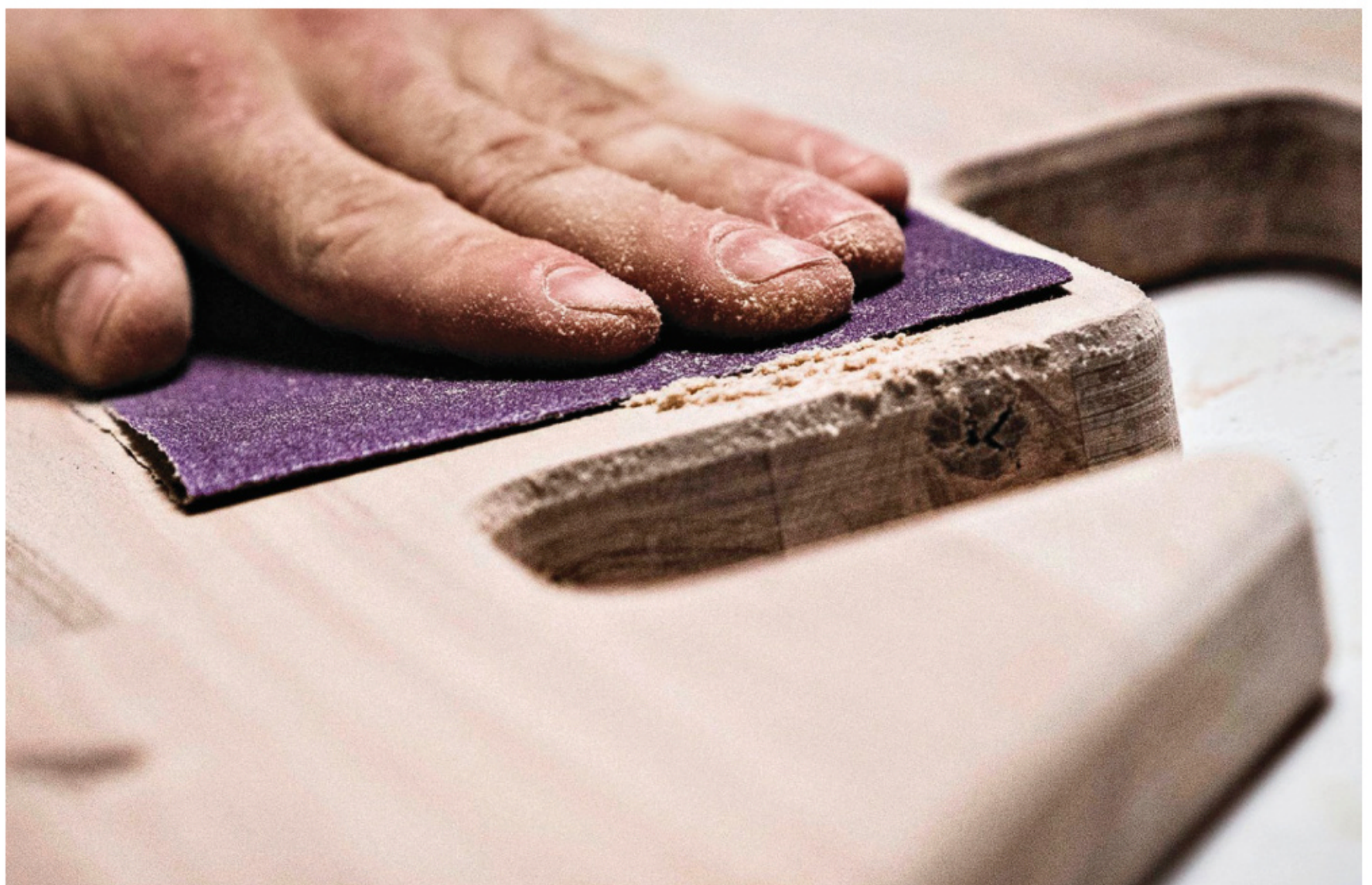
black-and-gold paint scheme. These machines are available only while supplies last, and come with Powermatic's 5-year warranty. Powermatic began in 1921 in McMinnville, Tenn.; the company's headquarters is now located in LaVergne, Tenn.

Powermatic  
800-274-6848, [powermatic.com](http://powermatic.com)

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3M says the sanding abrasive on these sheets resists clogging, resulting in longer life. When folded, the tacky No-Slip Grip backing grips itself to prevent the paper from shifting in your hand, the company says. Sheets come in 60-, 80-, 100-, 120-, 150-, 180-, 220-, 320-, and 400-grit abrasive in 9×11" and 3×11" sizes. 🌲

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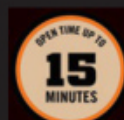


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# WHAT'S AHEAD

A GLIMPSE INSIDE THE SEPTEMBER ISSUE (ON SALE JULY 2)



## Mid-century dresser

The skills and setups you'll use to build this beauty will prep you for the headboard and nightstand in the next issue.



## Shop test: Deluxe 14" bandsaws

Sometimes considered the “starter” class of stationary bandsaws, this group is anything but bare-bones.



## Ripping strips

Learn five ways, from handsaws to power saws, to safely cut thin strips.



## Pleated table

The coved and tapered parts of the end panels mimic folded fabric. We've ironed out all the step-by-step details to make the process as smooth as silk for you.



## Beginner's guide to clamps

You can never have too many, but you have to start somewhere. We'll explain the ones you should buy first and why.



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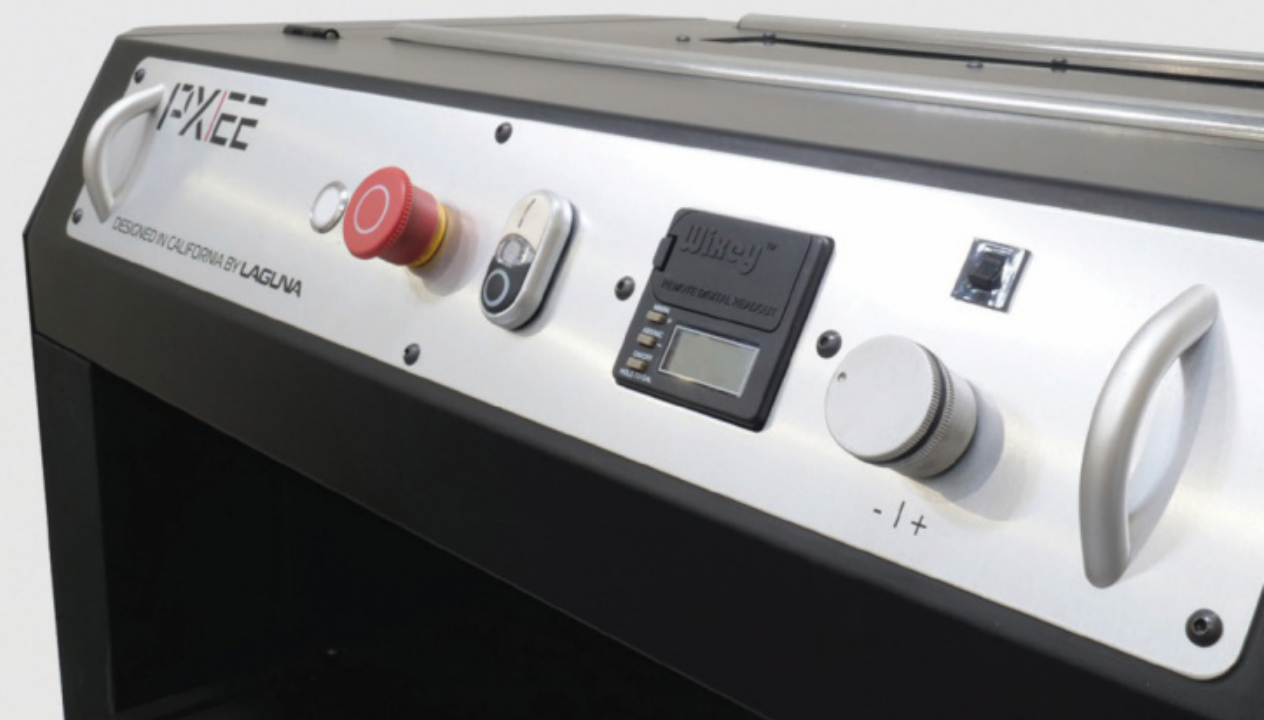
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