

WOOD®

The World's Leading Woodworking Resource

Chest on Chest

p.24

▶ **Drill-press Table** p.33

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Plus 3 FREE plans See p.45

**Choose the Right
Router Lift** p.56



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TAKING MEASURE

Newly sited

When I was in college (way back in the day), my computer programming class involved feeding stacks of punched cards into a distant mainframe computer. Today, I own a computer with more computing capacity than that mainframe, and I can use it to instantly communicate with almost anyone on the planet.

It's my phone.

From email to banking to watching TV on demand to web surfing, you can do pretty much anything on your phone or tablet. Some apps and sites work well on mobile devices, and it frustrates me when I bump into one that doesn't. Until recently, that included our own woodmagazine.com.

But no more.

A few weeks ago, we unveiled the new woodmagazine.com, the first overhaul of our website in nearly 10 years. The latest and greatest iteration features larger photos and illustrations that both inspire and better inform you as you follow the tips and techniques on the pages.

We've added more links to related content, so when you find yourself fascinated by a subject, you'll discover even more articles to deepen your understanding. We've improved our online index of **WOOD**® magazine articles to make it easier to find that project you recall from a few years back. And, of course, the new woodmagazine.com looks, reads, and works great on any mobile device, as well as your desktop or laptop computer.

Lucas Peters, our digital content manager, spearheaded the creation of the new site, and I couldn't be more pleased with his efforts and the fruits of those efforts. I think you'll be pleased, too.

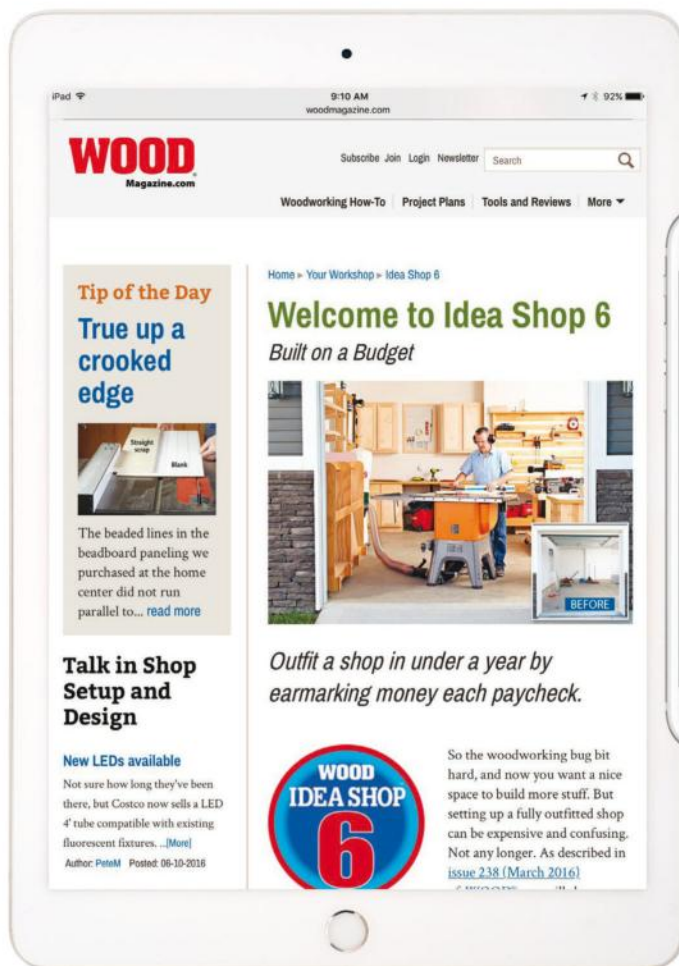
Check it out, and let me know what you think.

See you in the shop!

Dave Campbell

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Facebook and Twitter: @WOODeditor



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INTRODUCING THE ALL-NEW WOODMAGAZINE.COM

The screenshot shows the Wood Magazine website homepage. At the top is the 'WOOD Magazine.com' logo and a navigation bar with links: 'Subscribe', 'Join', 'Login', 'Newsletter', and a search bar. Below the navigation bar are several featured articles and sections:

- Hand-cut dovetails**: Dovetail Joints
- The Complete WOOD Magazine Collection**: Plan Collections
- Log lessons you can use at the lumberyard**: Lumber and Sheet Goods
- Free simple-to-build workbench woodworking plan**: FREE Woodworking Plans
- 11 must-cabinet tools**: Cabinetry and Trim

Below these are two larger featured sections:

- Welcome to Idea Shop 6**: Outfit a shop in under a year by earmarking money each paycheck. (Accompanied by an image of a workshop)
- Tip of the Day**: Shop-made circ-saw guide can't stray. (Accompanied by an image of a circular saw with a guide)

Further down are four columns of content:

- Woodworking How-To**: Includes '42 THINGS EVERY WOODWORKER Should Know' and 'Info that every woodworker should know'.
- Your Workshop**: Includes 'Frame-and-Panel Door Construction', 'Insulation: never easier', and 'Shop Layout Grid and Tool Templates'.
- Project Plans**: Includes 'Tricks for Treated Lumber' and 'Free tablesaw miter sled woodworking plan'.
- Tools and Reviews**: Includes 'Better accuracy from your tablesaw' and 'Why Buy BIG? (When Benchtop Will Do)'.

At the bottom of each column are green buttons labeled 'MORE FROM [SECTION NAME]'.

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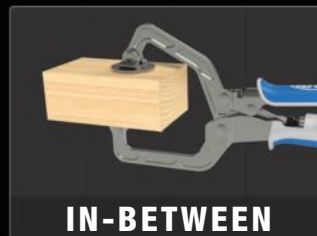
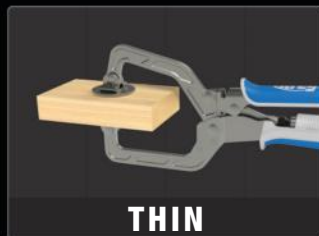
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SOUNDING BOARD

YOUR VOICE

Hard-urned wisdom

I enjoyed the excellent Memorial Box featured in issue 239 (May 2016). Having built funerary boxes for both my mother and my father-in-law, here are a few things I learned in the process:

First, plan for 1 cubic inch of volume per pound of body weight. If the box is going to be displayed, make it as small as practical, or it may quickly end up in a closet.

Second, if the box will be buried, there may be size restrictions. For example, my mother's Florida cemetery required that remains be enclosed in a 1-cubic-foot concrete box, whether encased in an urn or not. In Missouri, where my father-in-law was buried, there were no such requirements.

Finally, I wholeheartedly agree with your advice to choose materials that have significance. I built my mother's box from the remains of a furniture project I made for her in 8th-grade shop class; my father-in-law's, of rosewood (right), which he adored.

—Robert Speir
Falls Church, Va.



Reminder from heaven

My grandfather recently told me that, even though he can't physically work in his shop anymore, he will keep his WOOD® magazine subscription. The reason? My grandmother, who passed more than 20 years ago, gave it to him as a gift, and it still comes in her name: a little reminder of her love for him. Thank you, WOOD!

—Tanya McKnight
Union Grove, Wis., via Facebook



Deep gleaning

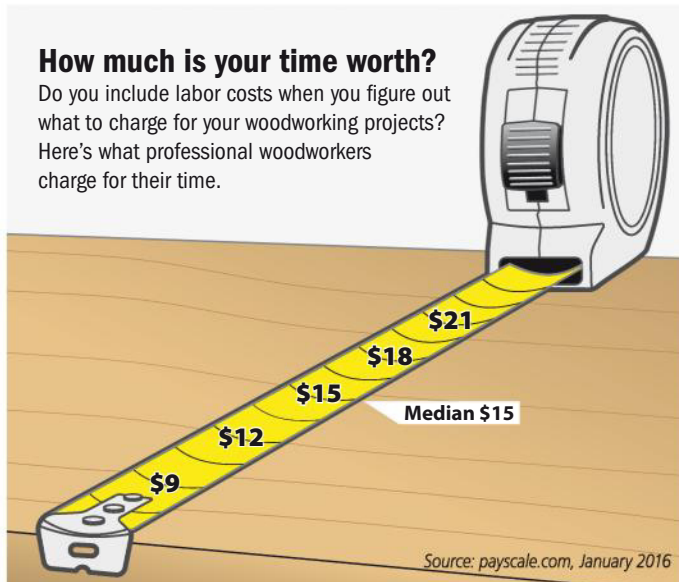
"Everything you haven't touched in a year gets thrown in the trash," she said. It took me nearly 2½ hours to touch all the things in my shop! Whew, that was close!

—Bruce Koster
West Point, Utah, via Facebook

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How much is your time worth?

Do you include labor costs when you figure out what to charge for your woodworking projects? Here's what professional woodworkers charge for their time.



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YOUR PROJECTS

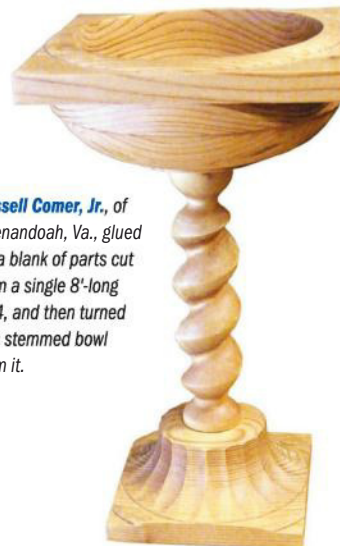
When he's not flipping houses or building porches, **Scott Hoegh** of Hampton, Iowa, crafts custom cribbage boards, such as this natural-edge one, made of walnut from the family farm.



After building the Limbert-style end table from plans in issue 236 (November 2015), **Gerry DeHaven** of Rockford, Ill., topped it with a period-appropriate media player.



Russell Comer, Jr., of Shenandoah, Va., glued up a blank of parts cut from a single 8'-long 2x4, and then turned this stemmed bowl from it.



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.



Ray Pomerleau of Thessalon, Ont., built this beautiful bar from oak he harvested from his own property, then finished it with ebony stain.



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SOUNDING BOARD

YOUR SHOP

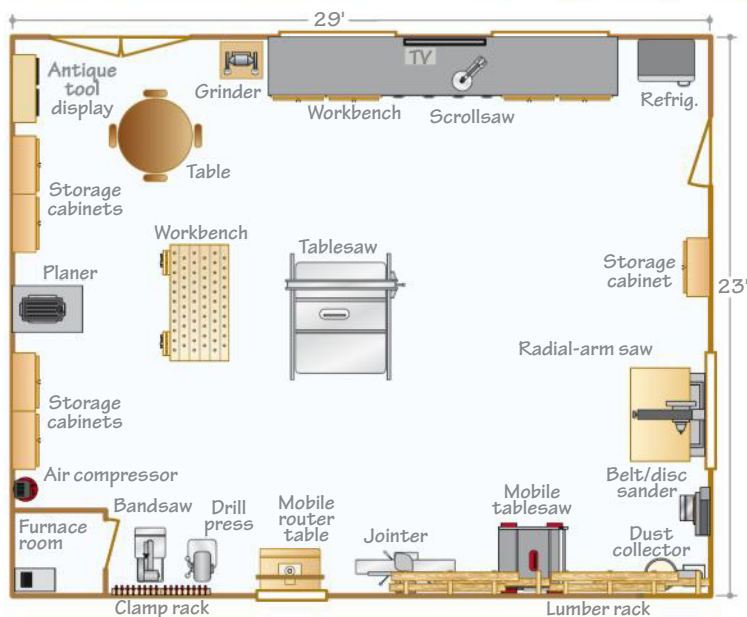


Windows, fluorescent fixtures, and recessed can lights illuminate this warm, welcoming shop. An overstock sale provided deeply discounted ¾" tongue-and-groove oak flooring.

From flooring to drawer pulls, Larry Hesch relied on his keen bargain-hunting skills to outfit his showplace shop at minimal cost. For example, the workbench peppered with dogholes started out as a high school's peg climbing board, and rests on bench legs rescued from the school's science lab. And Larry saved a bundle by purchasing a discontinued 6" jointer at a farm-supply store.

The summer after retiring as a school principal, Larry recruited family members to help him build his dream shop. During construction, Larry bought wisely, but, he says, "Functionality outweighs frugality. I didn't cut corners on the design and construction. For example, I really wanted a tray ceiling with an extra 12" of clearance above my tablesaw. I didn't want to worry about flipping 8'-long stock and damaging my ceiling. And besides, the ceiling and all of the windows just make this shop look better."

Even in Midwest winters, Larry reports that he rarely turns on the furnace (salvaged



from a local home). "We loaded the 2x6 walls with insulation and packed the ceiling with 18 inches of insulation. Through the winter, it's



Larry's shop lies just 25 steps from the back door of his home. The wraparound deck serves as an outdoor entertainment area.



Angled slots provide easy access to sandpaper sheets and make efficient use of drawer space. Labels along each edge help Larry find the right grit quickly.



A 15'-long slate countertop, salvaged from a school science lab, tops shop-made cabinets. The raised panels on the doors were reclaimed from interior entry doors.

easy to maintain 50 degrees overnight. When I walk in and turn up the thermostat, it doesn't take long to get to a comfortable 60 degrees."

And now that the shop is built, family members gather here for Easter brunch. Larry and his wife, Ione, just push the power tools to the side and fill up the shop floor with tables and chairs for a sit-down dinner for 38 family members. An easy-to-maintain slate countertop, above, makes a perfect place for the buffet line. 🌲

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Q **Clogged spray gun? Save it with a solvent bath**

I waited too long to clean my spray gun, and now the lacquer I was using has hardened inside it. Can this gun be salvaged?

—Frank Pruitt, Wichita Falls, Texas

A In most cases, you can rescue your spray equipment, Frank. First, disassemble the gun and wash the parts in the appropriate solvent (lacquer thinner for lacquer, mineral spirits for polyurethane or varnish, denatured alcohol for shellac). Professional painters often soak their guns in lacquer thinner or methyl ethyl ketone (MEK) to loosen paint. If any of these fails to do the trick, try a dedicated spray-gun cleaning solution. Spray-gun cleaner softens oil and latex paint, polyurethanes, and other finishes, and it starts to work in a few minutes. (Don't soak O-rings, gland nuts, or other soft parts.)

What if you were using a catalyzed finish that crosslinks as it cures? At that point, says Bill Boxer of Apollo Sprayers, “Kiss the gun goodbye.” 🌲



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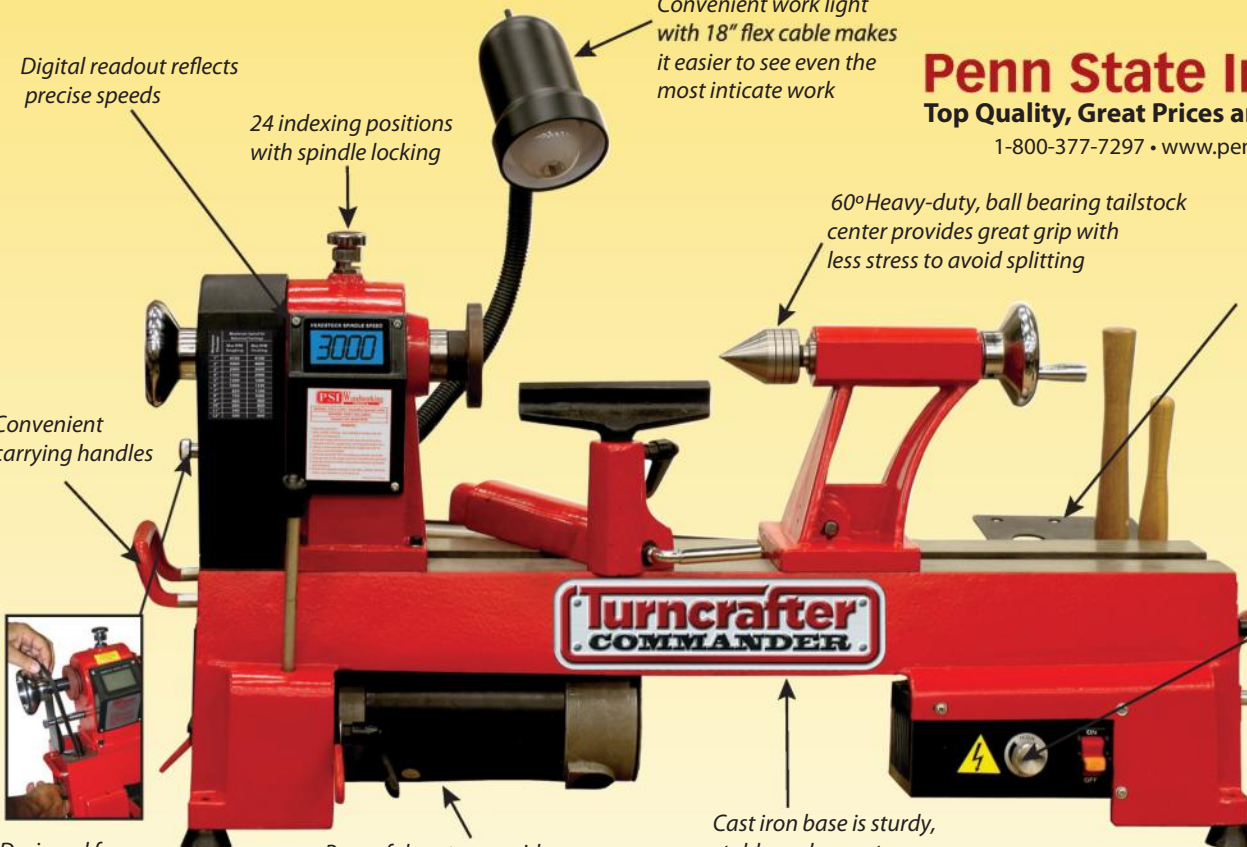


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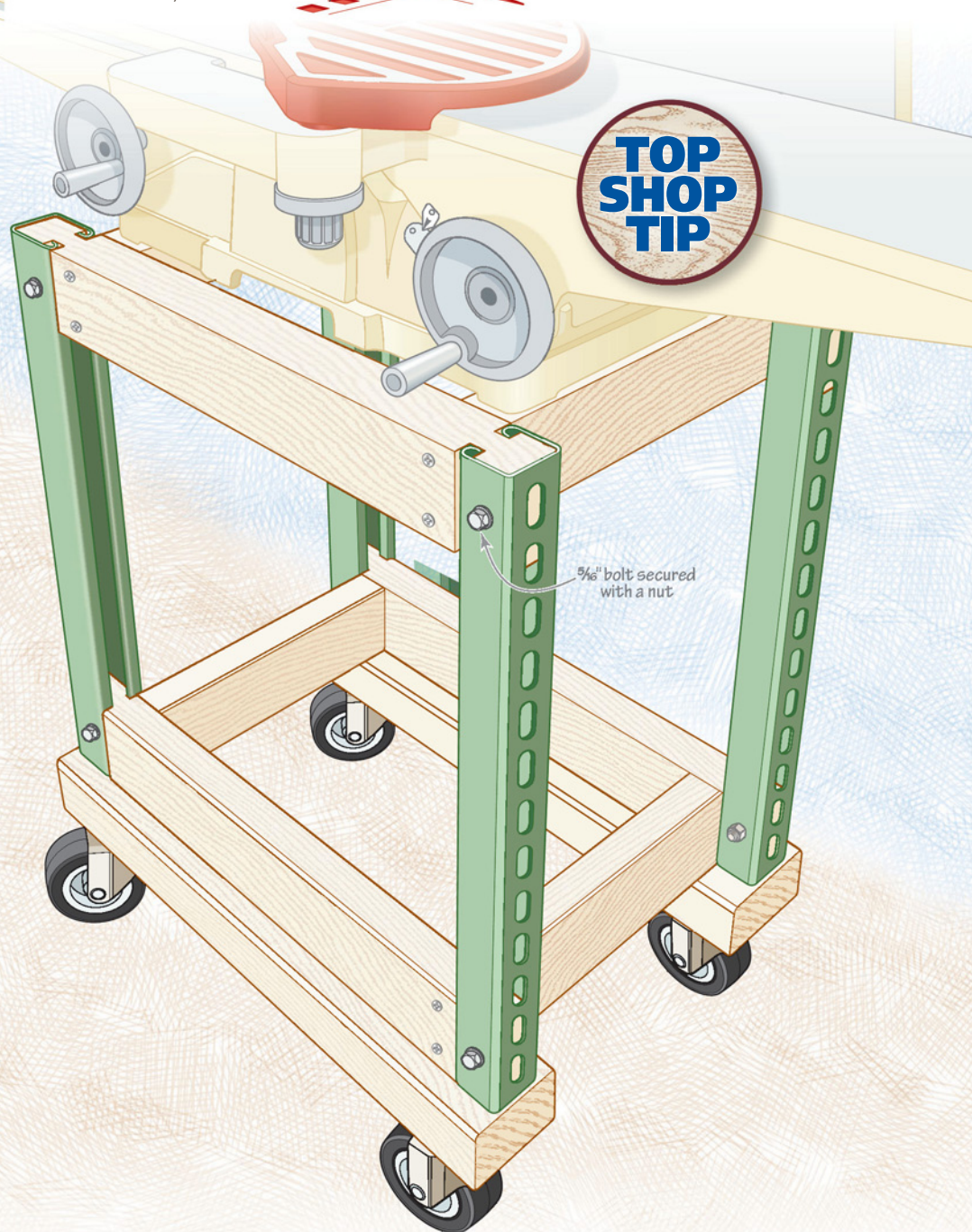
Build sturdy stands using strut

In looking for an affordable way to make rock-solid, good-looking, and eminently functional machinery bases, it occurred to me that steel strut channel, used in the building trades for supporting electrical, plumbing, and mechanical systems, might be worth trying. So I bought a few 10' lengths at a home center (about \$20 for a 12-gauge piece) and soon found that strut makes great legs when joined top and bottom with 2×4 rails. (Pine 2×4s provide plenty of strength for typical machines weighing 100–300 pounds, but for heavier loads, use hardwood.)

To get a sturdy base, prepare the 2×4s for a tight fit to the strut. First, plane the wood to match the inside dimension of the strut, and cut tight-fitting dadoes near the rail ends for holding the curled-in strut edges. Tapping the snug rails into the strut squares up the rigid leg assemblies. Then, drill a $\frac{3}{8}$ " hole completely through each strut-and-rail joint to accommodate a $\frac{5}{16}$ " bolt secured with a nut. Simply screw on the remaining 2×4 pieces and casters to complete the base. The slots in the strut channel come in handy for mounting motors, tool accessories, and organizers.

—Wes Swartout, Spearfish, S.D.

continued on page 18



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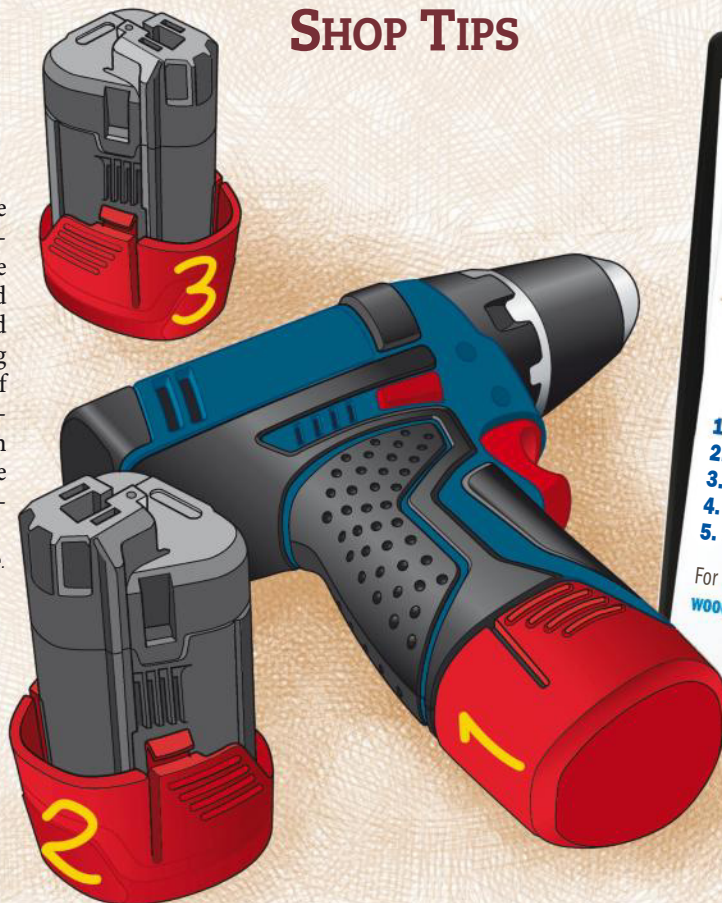
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SHOP TIPS

Number batteries for greater lifespan

To maximize and equalize the longevity of cordless-tool batteries, I like to rotate them so they each get used at the same rate and recharged regularly. Doing that can be a little tricky if you have more than two batteries. By numbering them with a paint pen, you'll be able to keep them in a regular use/recharge rotation.

—Kelly Churchill, Medford, Ore.



Clearly view fine pencil marks on dark woods

Seeing fine pencil lines on dark woods, such as walnut, can be a challenge. Some woodworkers recommend white pencils for that situation, but I find white pencils hard to sharpen and too soft to leave fine lines. Instead, I drag the end of a white or yellow chalk stick across sandpaper to create a wide, angled tip. Dragging that tip across the area of wood to be marked creates a contrasting background for a sharp #2 pencil or mechanical pencil with 0.7 mm lead. The result: an accurate and highly visible mark.

—John Cusimano, Lansdale, Pa.



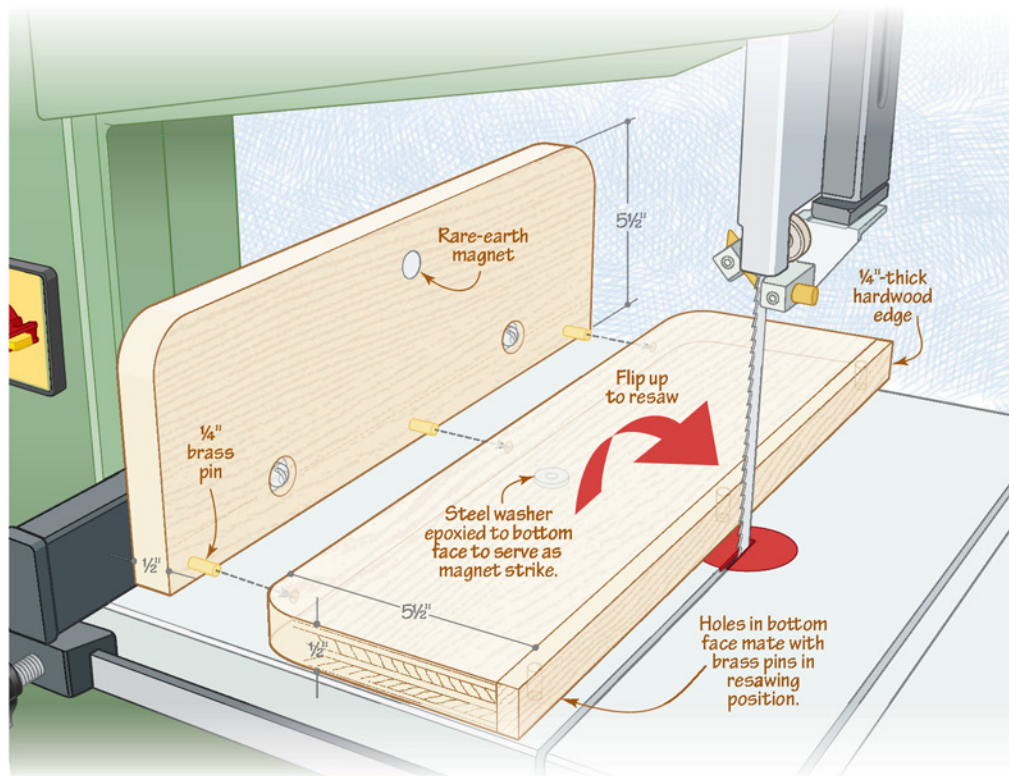
SHOP TIPS

Dual-position fence provides cutting versatility

A typical bandsaw fence isn't tall enough to provide good resawing support, and yet its height can get in the way of the upper guides when cutting thin stock. For a remedy I made this two-piece fence from $\frac{1}{2}$ " plywood. Bolt one half to the saw's fence. Attach the movable half in the vertical (resawing) position by making use of the brass pins and rare-earth magnet. The pins alone hold it in the down position.

The dimensions of the add-on fences make it easy to still use the saw's fence scale: Simply add 1" when resawing and 6" when cutting with the fence in the down position. Cut the movable fence $\frac{1}{2}$ " longer than the fixed fence on each end, and apply wax to the pins for easy removal.

—Father Chrysanthos, Etna, Calif.



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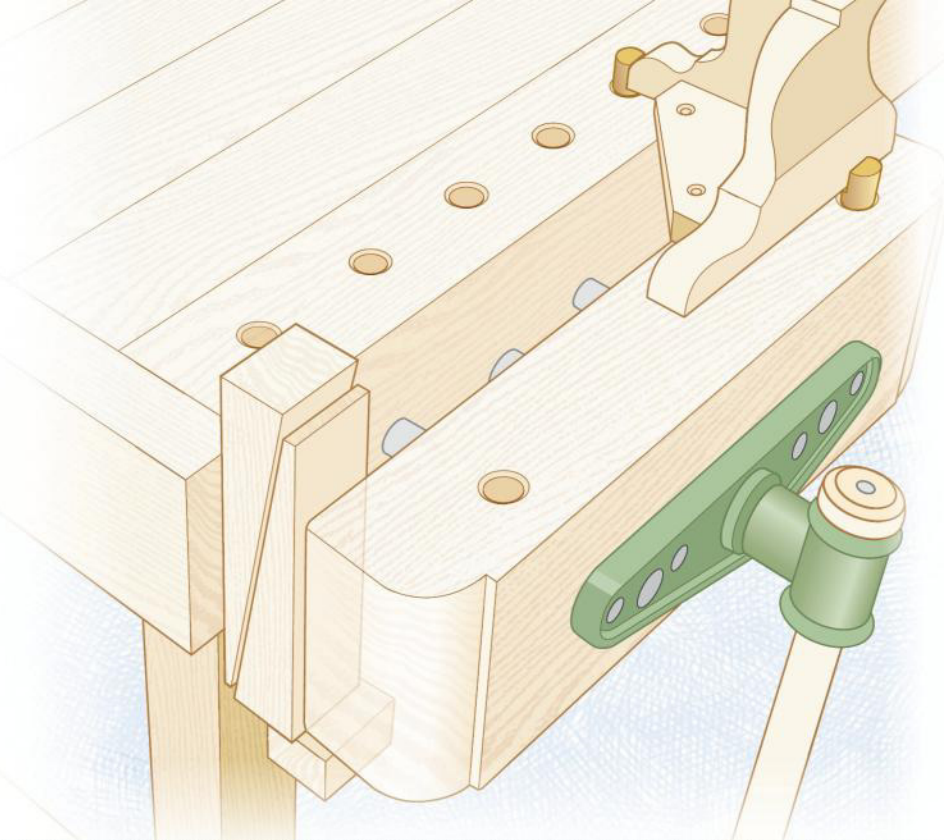
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SHOP TIPS

Beat vise racking with wedges

Wide bench vises tend to stray from parallel when you snug up an object in just one end of the vise. To get the upper hand on that situation, insert a pair of opposing wedges into the other end of the vise. (You may want to add a cleat to the bottom of the vise jaw for one wedge to rest on.) Then, as the vise opens, the opposing wedge slides down to its correct position. Make wedges in pairs of varying sizes to accommodate large and small clamped objects.

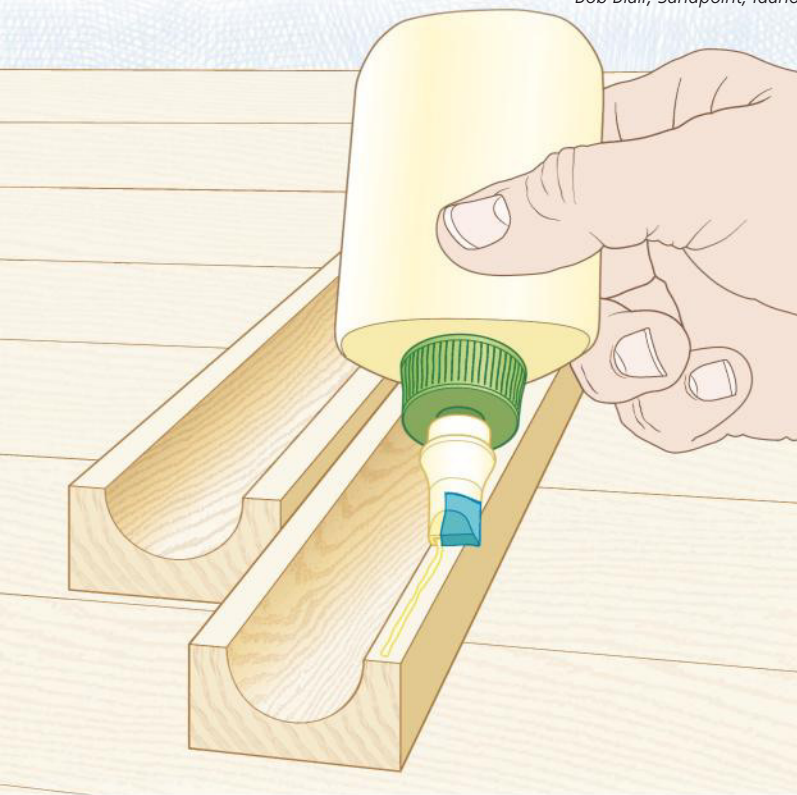
—Matt Olan, Spruce Grove, Alta.



A simple trick for narrow glue beads

While gluing up two halves of a flute blank recently, the snout of my glue bottle was wider than the surface, so glue ran off both edges. As I soon discovered, at such times you don't need separate glue bottles for narrow beads. Simply place tape over the glue-bottle nozzle to get just the bead you need.

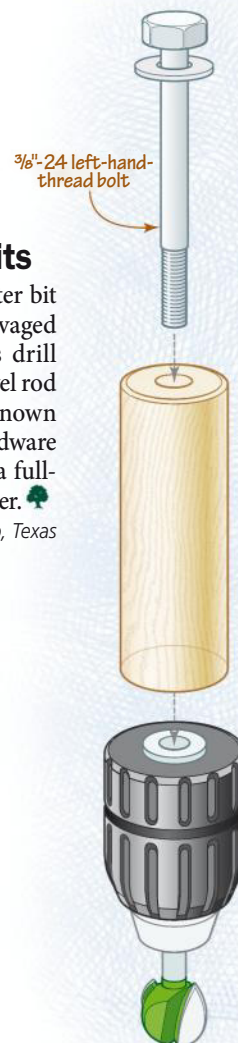
—Bob Blair, Sandpoint, Idaho



Hand-scrape with router bits

I recently needed a way to hold a router bit for scraping custom molding. So I salvaged the chuck from a discarded cordless drill and attached it to a short length of dowel rod using a $\frac{3}{8}$ "-24 left-hand-thread (also known as a reverse-thread) bolt. Most hardware stores don't stock that fastener, so try a full-service auto-parts store or online supplier. 🌲

—Jim Nodler, Bastrop, Texas





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UNVARNISHED

STRAIGHT TALK FROM THE WOOD-WIDE WEB

It's Always Something

by Rob Porcaro

Don't let perceived limitations stop you from creating.

I understand. A great idea for a wood-working project has arisen and taken hold of your creative mind, the concept has become clear, and perhaps you even have made scale drawings. Now this fine thought could come to fruition but, unfortunately, something stands in the way.

Maybe your jointer isn't wide enough to handle the required components. Or maybe your bandsaw doesn't have enough capacity. Maybe the boards you found for the project just don't have the consistent color and figure that you really wanted. Your shop isn't big enough—or you don't have a real shop at all. Anyway, you really don't have the time. And is it worth the effort?

It's always something.

Always, because making real things is done in the real world, with all its disap-

pointing limitations. The wood is never quite right. There is always one more tool that would surely make the work a breeze, but you don't have it yet. A wide belt sander? Sure, that will solve everything. Everything, that is, until the next perceived limitation comes along.

Try this: Make it anyway. It may not be perfect or exactly the way you envisioned it, but it will exist. Until then, it is nothing.

Let's take an example from music history. What do you do if you are an organist renowned throughout Europe, later to be recognized as one of the greatest composers in history, but you are unceremoniously fired and then must move to a place and a position where you don't have access to an organ? That must have been like a woodworker with no planes!

Making real things is done in the real world, with all its disappointing limitations.

Well, if you are Johann Sebastian Bach, you deal with the limitations and use the available resources to make magic, like what you see here—part of a masterwork set of pieces for violin.

So, what then, when you have finished your work? If the piece you made is the product of a sincere effort, it becomes its own point of reference, freed from the maker's expectations, limitations, and nervousness. Whether you see it as excellent or just fair, the piece now has a life of its own.

It is too late to make changes. This is just as well, because now, hopefully, everything seems right unto itself at whatever level the work was done, includ-

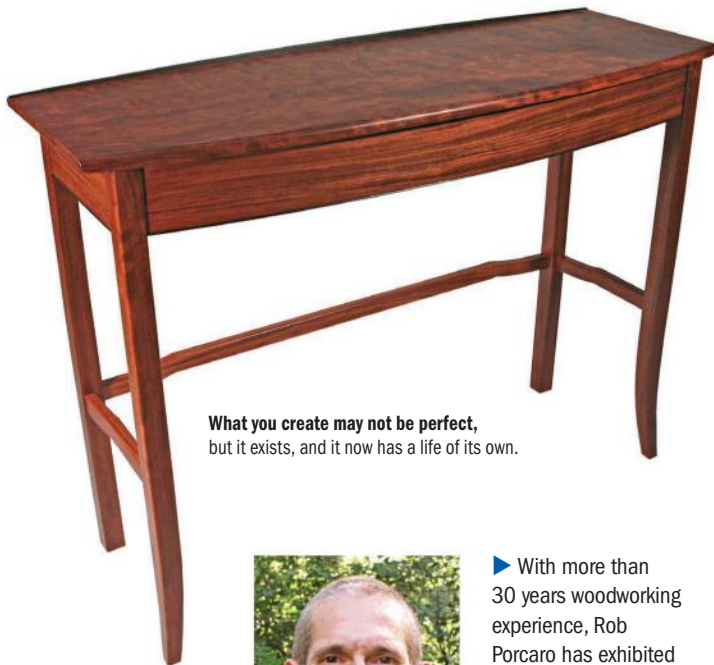


Don't sweat what you don't have. Despite not having access to an organ—the instrument on which he was accomplished—Bach still created some of the most beautiful music the world has ever heard.

ing the imperfections and the doubts, almost as if it was meant to be that way.

Deal with limitations, do the best you can, and accept the result for what it is. But above all, *make* something.

Because it's always something—until the thing that you make is. 🌳



What you create may not be perfect, but it exists, and it now has a life of its own.



▶ With more than 30 years woodworking experience, Rob Porcaro has exhibited works in premier juried artisan shows and fine galleries, and is a widely published writer and teacher. Find his blog, "Heartwood," at rpwoodwork.com/blog.

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Chest on Chest

With seven drawers (including a secret one—shh!) and a spacious cabinet on top, this double-decker perfectly pairs form and function.

D I M E N S I O N S
40" W x 19 1/4" D x 70" H

Approximate materials cost:

\$470

More than

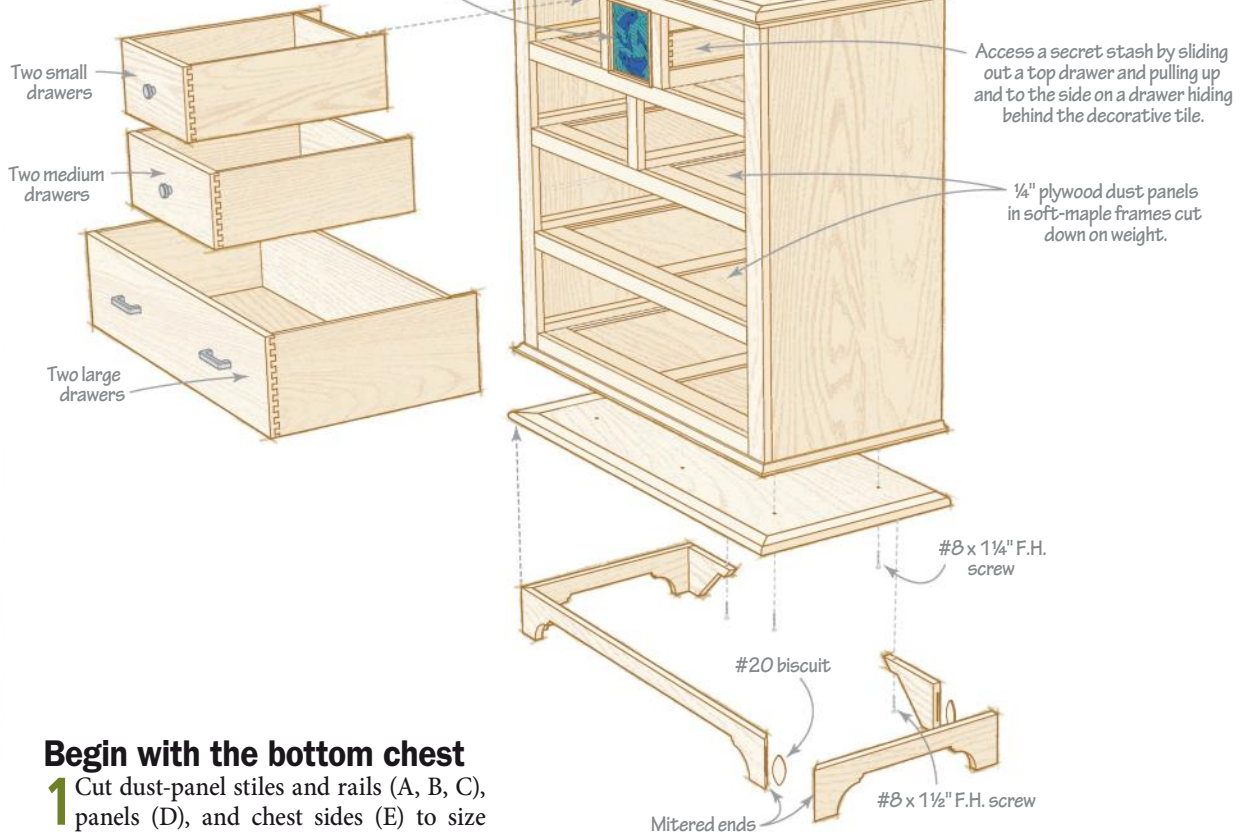
13

cubic feet of storage in chest and top cabinet.

EXPLODED VIEW

Build either the bottom chest or the top chest separately. Each can stand alone.

Choose from various decorative tiles or other materials, such as glass or wood veneer, to reflect your own tastes.



Begin with the bottom chest

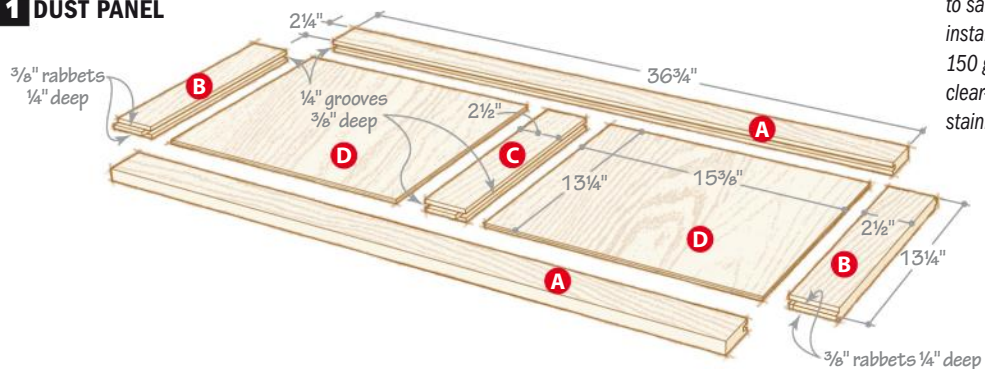
1 Cut dust-panel stiles and rails (A, B, C), panels (D), and chest sides (E) to size [Materials List, page 32]. Form the grooves and rabbets in the stiles and rails [Drawing 1].

2 Assemble and glue five dust panels (A-D) [Drawing 1], measuring their diagonals as you clamp them to ensure square.

3 Machine the dadoes and rabbets in the sides (E) [Drawing 2], creating mirror-image sides. (See the Tip on the next page.)

Tip! Finish-sand components, such as the dust panels, as you complete them; it's easier to sand most parts before installation. We sanded to 150 grit for our clear-finished chest. For staining, go to 220 grit.

1 DUST PANEL



Tip! Size the dados to perfectly fit the thickness of your dust-panel end rails (B). Get a free plan for an exact-fit dado-routing guide. woodmagazine.com/dadojig

4 Glue the dust panels (A–D) to one side (E), flush at the front [Skill Builder, Photo A]. After the glue dries, install the other side (E) [Photo B].

5 Cut the face-frame stiles and rails (F–I), making the outer stiles (F) $\frac{1}{8}$ " wider than listed. Assemble the frame [Drawing 3] with pocket screws and glue, then glue the face frame in place [Photo C].

6 After the glue dries, trim the face-frame stiles (F) flush with the sides (E) [Photo D].

Add the top, bottom, and base

1 Cut the top and bottom (J) to size and the edging (K, L) 1" longer than listed. Round over the outside edges of K and L [Drawing 4].

2 Miter-cut the edging (K, L) to fit the top and bottom panels (J), and glue them in place [Drawing 4].

3 Screw the top assembly (J–L) to the carcass (A–I) [Drawing 4], flush with the back of the carcass and with equal side overhangs. Set the bottom assembly (J–L) aside.

4 From $\frac{3}{4}$ ×4 $\frac{5}{8}$ " stock, cut one blank 39 $\frac{1}{4}$ " long and two 19" long for the base front and sides (M, N) [Drawing 4, Exploded View, Photo E]. Rip a $\frac{1}{8}$ " strip off the edge of each blank, marking everything so you can glue pieces together in their original orientation later.

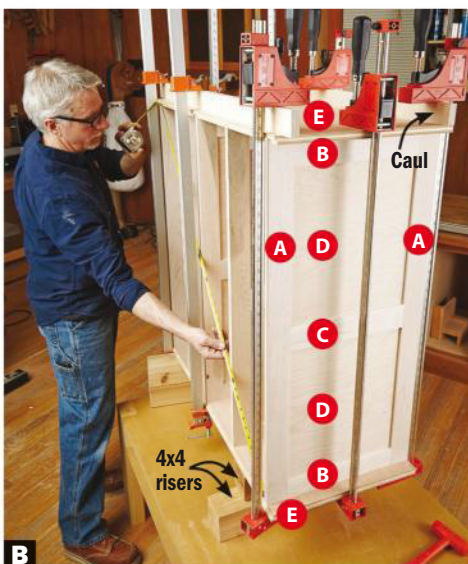
5 Lay out the base profile [Drawing 4a] on $\frac{1}{4}$ " hardboard. Cut out the pattern, sand the curves smooth, and trace onto both ends of the wide piece of each M/N blank.

6 Cut out the ends [Photo E] and sand the sawn edges smooth. Reunite the shaped ends with the appropriate ripped top strip, and glue the parts together to make the base front (M) and sides (N).

7 Miter-cut both ends of the base front (M) and the front end of both base sides (N)



A Install the dust panels one at a time for easier assembly. A squaring brace holds the panel perpendicular to the side while the long bar clamps force it into the side dado.

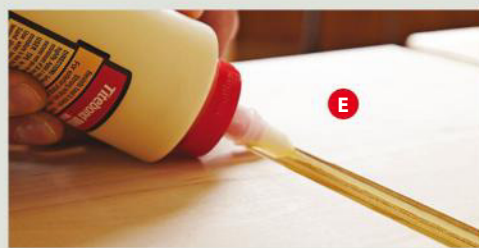


B Measure the diagonals to ensure a square carcass when installing the second side. Cauls equalize clamping pressure to ensure tight joints.

► Make your own squaring braces. woodmagazine.com/clampingbrace

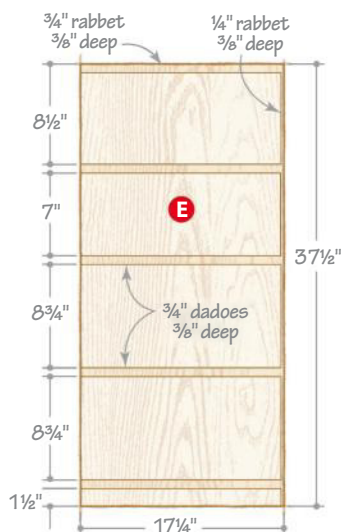
SKILL BUILDER

Glue the dado walls, let the bottom take care of itself

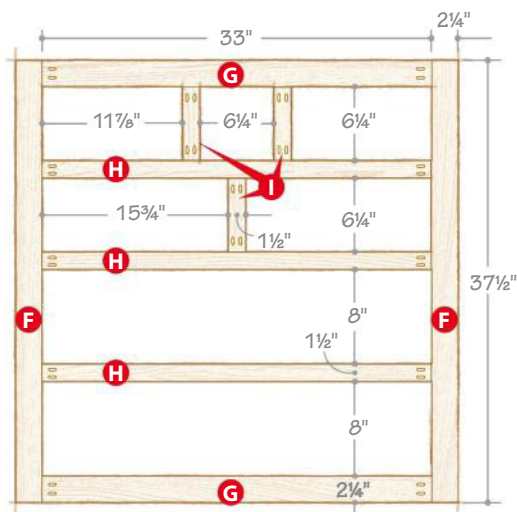


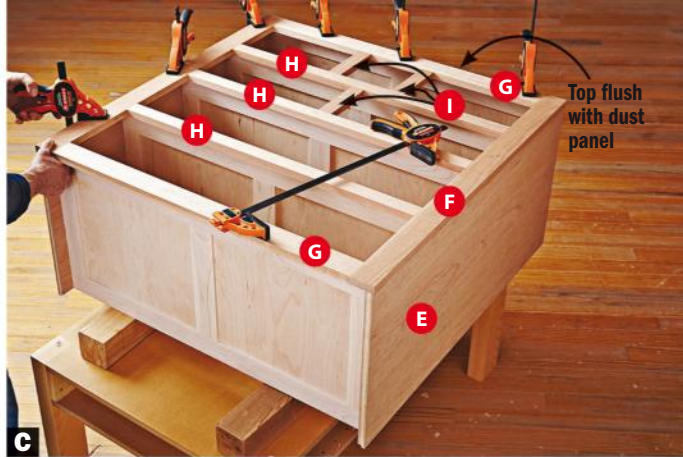
To glue the dust panels into the dados, just apply glue to only the walls of the dados, above. Enough glue will end up on the bottoms as you assemble the parts.

2 BOTTOM CHEST SIDE PANEL (left side shown)



3 BOTTOM CHEST FACE FRAME (rear view)

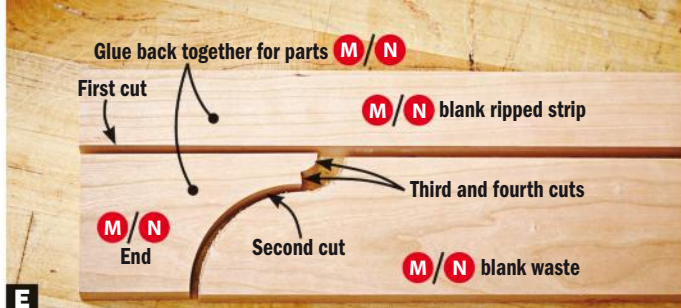




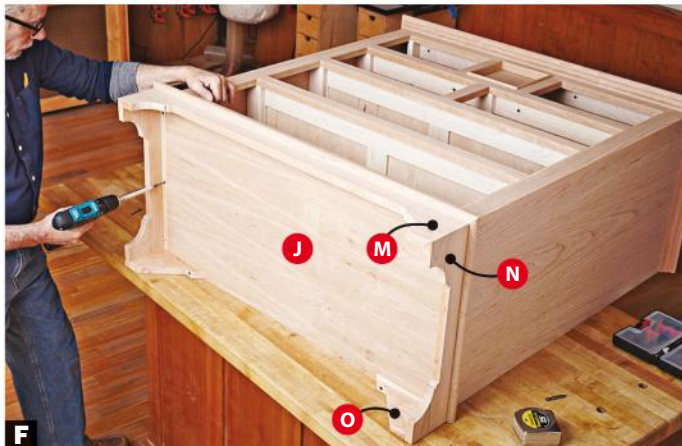
C Place the top edge of the face-frame flush with the surface of the top dust panel (A-D). Equalize the distance from the inside edge of F to the inside face of E on both sides.



D A router with a flush-trim bit helps you level the stile edges with the sides (E). Set the guide bearing close to the joint between the parts and don't let the router tip on the narrow stile.



E Bandsaw slightly on the waste side of the line to contour the feet. Make the sweeping S-curve first; then, go back to shape the fillet and small radius at the top of each end.



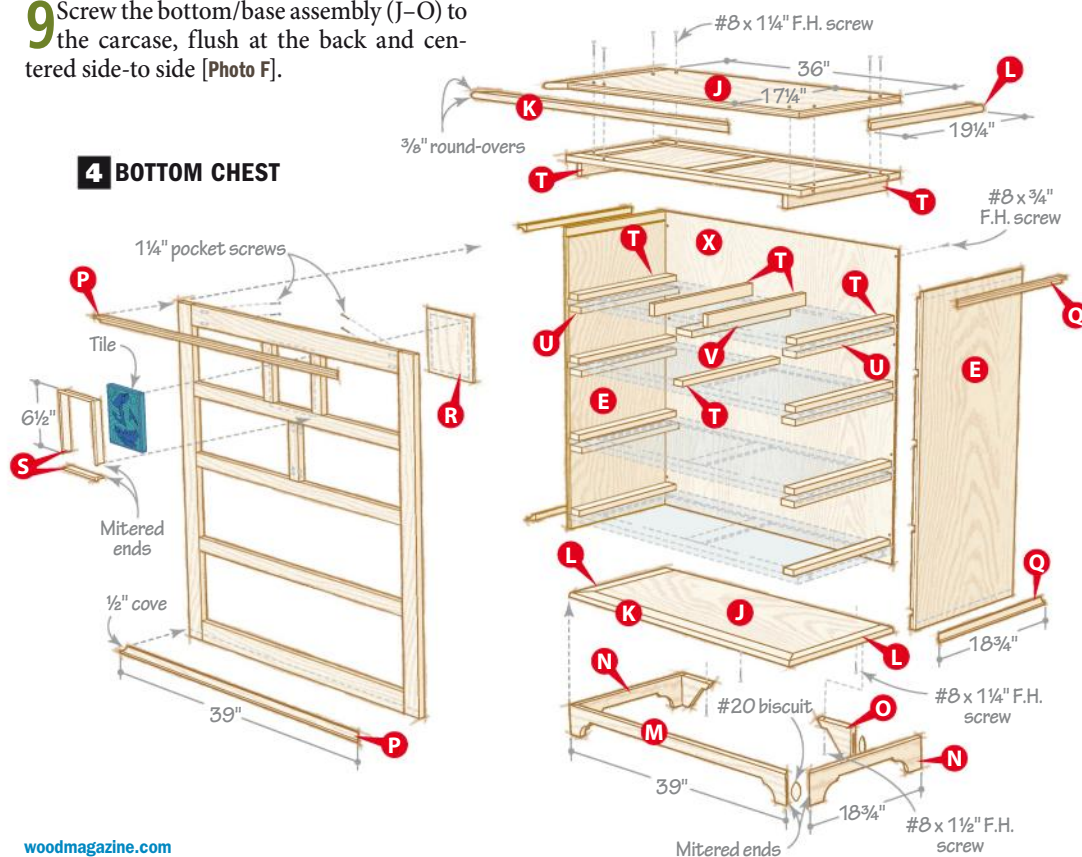
F Drive screws through the bottom (J) into the sides (E) and face-frame bottom rail (G). Screws through the back legs (O) go into the bottom (J).

to finished length. Referring to Drawing 4b, cut the base back legs (O) to shape.

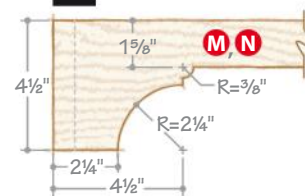
8 Biscuit and glue the base (M-O) together [Drawing 4], squaring the assembly. Glue the base to the bottom (J-L), flush at the back and centered side-to-side.

9 Screw the bottom/base assembly (J-O) to the carcass, flush at the back and centered side-to-side [Photo F].

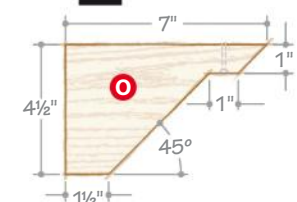
4 BOTTOM CHEST



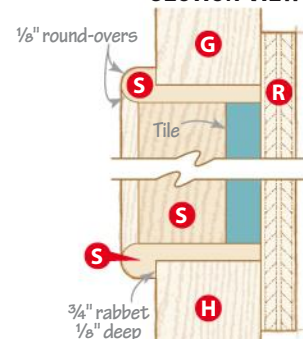
4a BASE PROFILE



4b BASE BACK LEG



4c TILE COVER SECTION VIEW



Tip! Start with stock both wider and longer than the finished trim pieces for easier, safer routing. After routing, rip the cove trim to final width.

Trim out the chest

- 1** Cut pieces about 2" overlength for each cove trim (P, Q) [Drawing 4]. Rout a $\frac{3}{8}$ " cove along one edge of each piece.
- 2** Miter-cut the cove trim to finished length and glue in place [Drawing 4].
- 3** Cut the tile backer (R) to size. Glue it to the back of the face frame, centered over the opening [Drawing 4].
- 4** Make a $\frac{1}{4} \times 1 \times 30$ " blank for the tile frame trim (S). Round over one edge on both faces and rabbet one face [Drawing 4c].

5 Miter-cut the trim to fit inside the opening [Drawing 4c] and glue in place.

6 Cut the drawer guides (T-V) to size. Glue them into position on the dust panels (A-D) [Drawing 4 and Photo G].

7 Cut the drawer stops (W) and the chest back (X) to size. Set these parts aside.

Note: For the decorative tile accent between the two top drawers [Opening photo], buy your tile before cutting trim for the opening, so you can size the opening correctly. You could instead display figured wood or a veneered panel in the opening, or convert the hidden drawer to slide out the front.



G Orientation of the lower drawer guides (T) varies, depending on location. Take measurements to the guides from the inside face of the side (E), not the rabbet.

Note: We cut half-blind dovetails using a dovetail jig with $\frac{7}{8}$ " center-to-center spacing and a router with a $14^\circ, \frac{1}{2}$ " dovetail bit. Learn about setting up the jig and routing dovetails.

woodmagazine.com/halfblind

Watch a video about routing dovetails.

woodmagazine.com/dovetailvid

Build the drawers

1 Cut the drawer fronts and sides (Y-CC) to size [Drawing 5]. If you want to build the hidden drawer [Drawing 6], cut parts GG and HH, too.

2 Machine the grooves and dados in the drawer fronts and sides (Y-CC, GG, HH).

3 Dovetail the fronts (Y-AA, GG) to the sides (BB, CC, HH).

4 Cut the drawer backs (DD-FF) and bottoms (II-LL) to size. Assemble the drawers [Drawings 5 and 6], and check their fit in the chest.

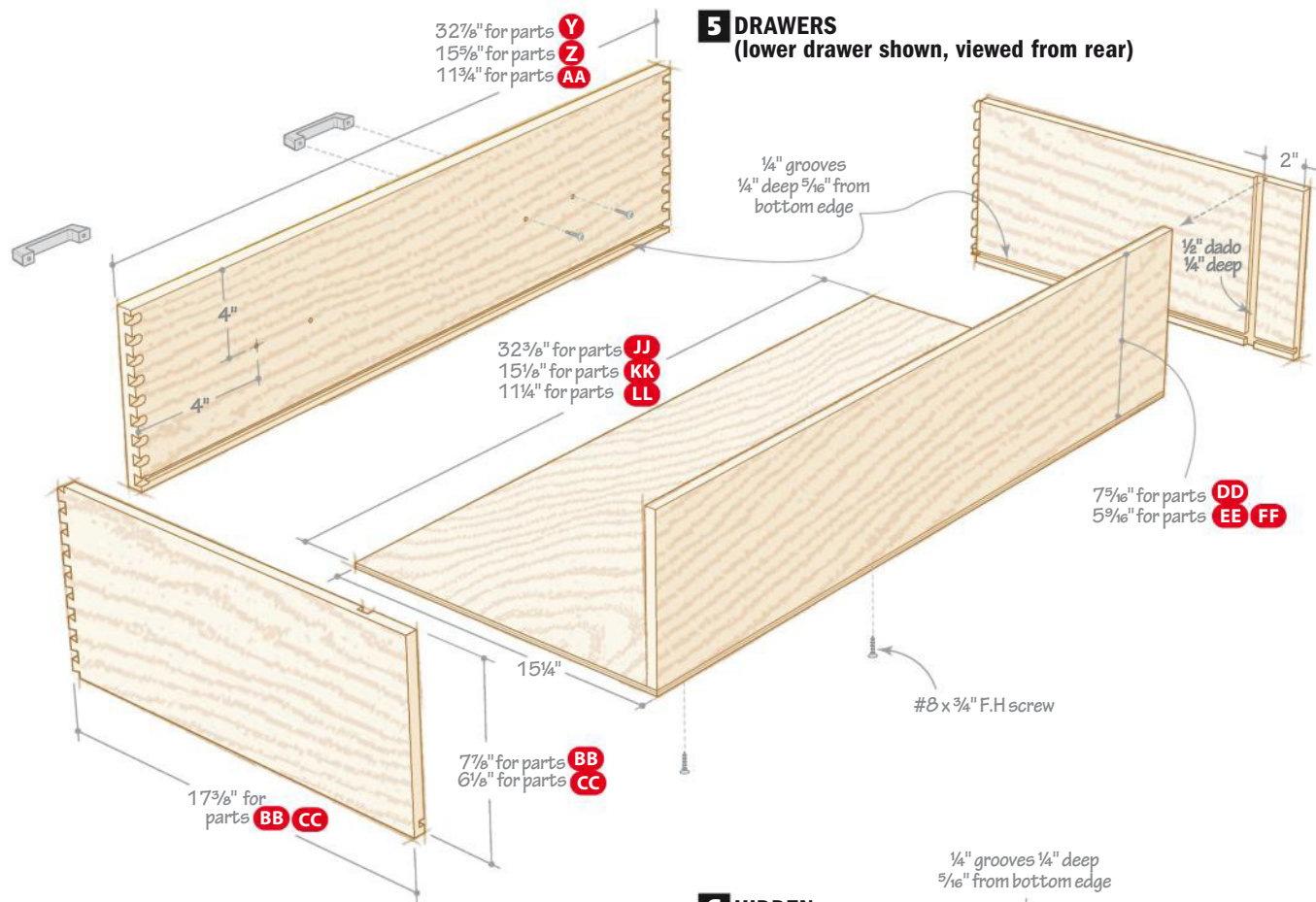
5 Close the drawers, their fronts flush with the front of the chest, and glue the drawer stops (W) in place [Photos G and H].



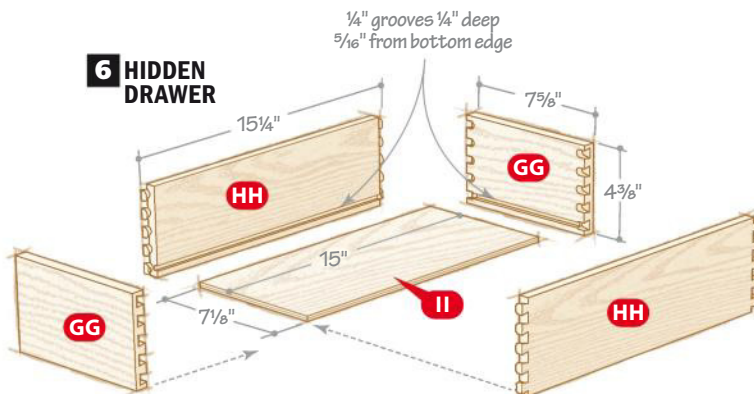
H

Place the drawer stops carefully to create a smooth front. We cut our stops from the waste that remained after bandsawing the base feet.

5 DRAWERS (lower drawer shown, viewed from rear)



6 HIDDEN DRAWER



Construct the top cabinet

1 Cut the sides, top, and bottom (MM, NN) to size [Drawing 7]. Rabbet and dado the sides (MM) and drill the shelf-pin holes [Drawing 8], making sure to create left and right sides.

2 Apply glue to the side dados and join the top and bottom (NN) and sides (MM).

3 Cut the face-frame stiles and rails and the back rails (OO–QQ) to size. Make the stiles about $\frac{1}{8}$ " wider than listed.

4 Assemble the face frame (OO/PP) with pocket screws and glue [Drawing 7]. Glue it to the front of the carcass (MM/NN), centered, and rout the stiles flush with the sides, as you did on the bottom chest.

5 Glue the back rails (QQ) to the top and bottom (NN), flush at the back [Drawing 7].

6 Make cove molding [Drawing 7a] for the top and bottom trim (RR, SS) [Skill Builder, next page]. Miter-cut the trim to fit around the front and sides of the carcass [Drawing 7, Photo I].

7 Cut the shelf and edge (TT, UU) to size, and glue them together [Drawing 7].

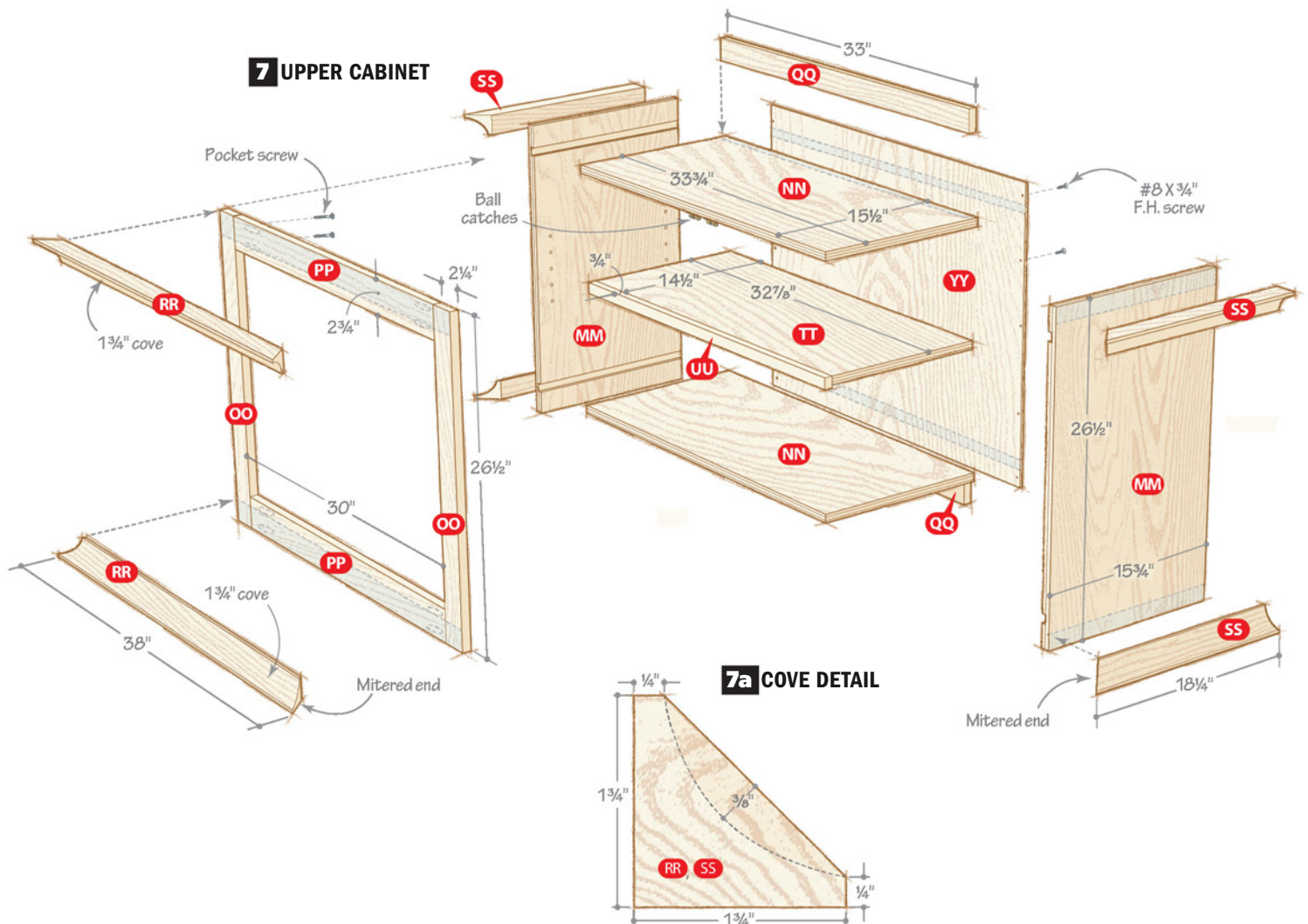
► Watch a video of cutting cove molding on a tablesaw.
woodmagazine.com/cuttingcoves



I To fit the front cove trim (RR) precisely, miter-cut one end and mark the location for the opposite miter with a marking knife. Fit the top and bottom trim pieces individually.

It's time for doors and final touches

1 Cut the door rails, stiles, and panels (VV–XX) to size. Saw or rout the grooves and rabbets in the rails and stiles [Drawing 9], and assemble the doors.



SKILL BUILDER

Cut big coves with your tablesaw

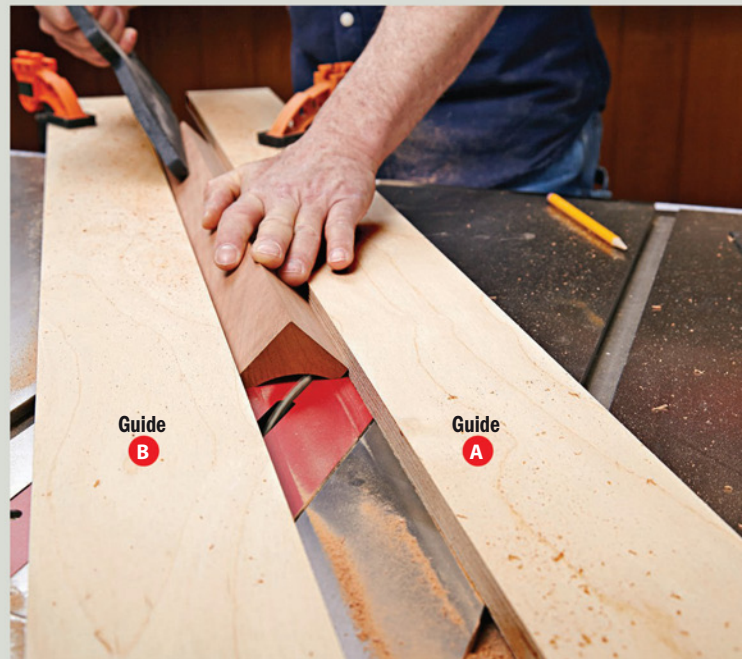
To make the cove trim (RR, SS) for the top cabinet, bevel-rip $1\frac{3}{4}\times1\frac{3}{4}$ " stock to the profile shown in **Drawing 7a**. Cut a piece for each molding a few inches longer than listed.

Then, cut a pair of $\frac{3}{4}\times4$ " guides long enough to span the saw table diagonally front to back, with room for clamping to the table (*below*). Make sure one edge is smooth and true. Equip your saw with a 60- to 80-tooth blade and raise it to $\frac{3}{8}$ ". Then, adjust the miter gauge to 33° and place it near the front of the table.



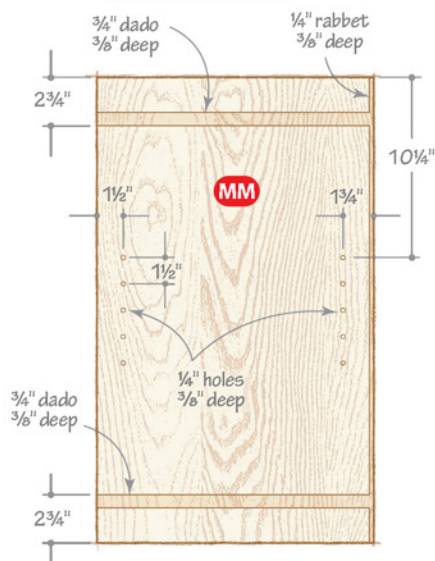
Lay guide A tightly against the miter gauge and position the edge $\frac{1}{4}$ " from the leading blade tooth at the table surface. Clamp the guide in place. Using a molding blank as a spacer, clamp guide B (*below*) in place. Lower the blade and make sure the blanks slide smoothly between the guides.

Set the blade height to $\frac{1}{16}$ " and feed the blank steadily across the blade at a moderate rate. Repeat, raising the blade $\frac{1}{16}$ " for each subsequent pass until you cut a $\frac{3}{8}$ "-deep cove. Sand away the saw marks. (We shaped a foam sanding block to the cove.)

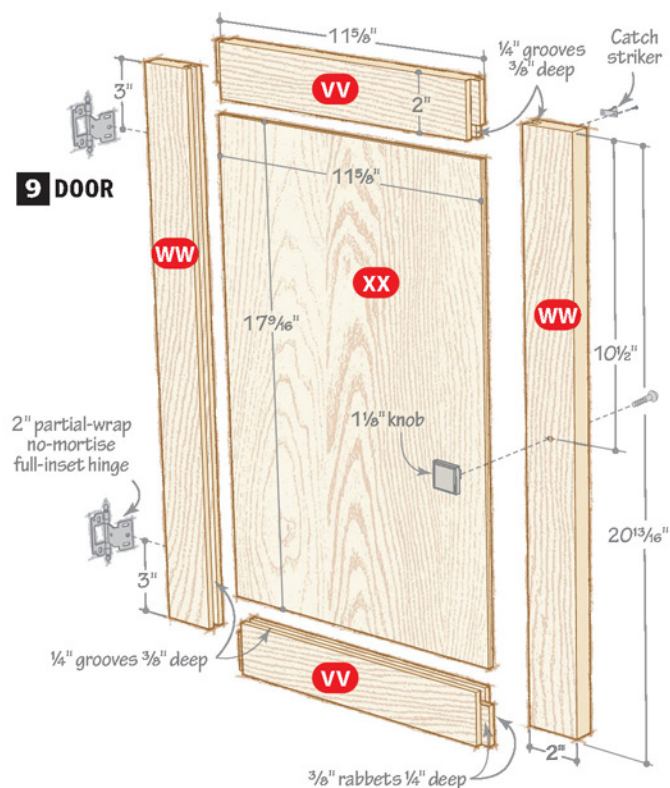


2 Drill holes for the pulls, and attach the hinges [Sources] to the doors. Then, screw the hinges to the face-frame stiles (OO) [Photo J]. Install double-ball catch strikers at the top of the door stiles (WW), close the

8 UPPER CABINET SIDE PANEL (left side shown)



9 DOOR





A combination-square blade supports a door at its correct swing clearance while you attach the hinges to the cabinet face-frame stiles.

doors, and, working from the back, install the catches on the inside cabinet top (NN). Cut the top cabinet back (YY) to size.

3 Remove the hardware, finish-sand any areas needing it, and apply a finish of your choice. (We used General Finishes Enduro-var satin.)

4 Attach the top cabinet back (YY) [Drawing 7]. Reinstall the doors and attach the drawer hardware.

5 Glue the tile into its frame with silicone adhesive/caulk. Slide the drawers in.

6 Attach the bottom-chest back (X). Move the chest to a prominent position in your home and place the top cabinet on it. 🌳

Produced by **Larry Johnston** with **Kevin Boyle**
Project design: **Kevin Boyle**
Illustrations: **Roxanne LeMoine, Lorna Johnson**

Materials List

Part		FINISHED SIZE			Matl.	Qty.
		T	W	L		
Bottom chest						
A	dust panel front/back stiles	¾"	2¼"	36¾"	M	10
B	dust panel end rails	¾"	2½"	13¼"	M	10
C	dust panel center rails	¾"	2½"	13¼"	M	5
D	dust panels	¼"	15⅜"	13¼"	CP	10
E	sides	¾"	17¼"	37½"	CP	2
F*	face frame outer stiles	¾"	2¼"	37½"	C	2
G	face frame top/bottom rails	¾"	2¼"	33"	C	2
H	face frame inner rails	¾"	1½"	33"	C	3
I	face frame inner stiles	¾"	1½"	6¼"	C	3
J	top/bottom	¾"	17¼"	36"	CP	2
K*	front edging	¾"	2"	40"	C	2
L*	side edging	¾"	2"	19¼"	C	4
M*	base front	¾"	4½"	39"	C	1
N*	base sides	¾"	4½"	18¾"	C	2
O	base back legs	¾"	4½"	7"	M	2
P*	front cove trim	¾"	¾"	39"	C	2
Q*	side cove trim	¾"	¾"	18¾"	C	4
R	tile backer	¼"	7"	7¾"	CP	1
S*	tile frame trim	¼"	1"	6½"	C	4
T	lower drawer guides	¾"	1½"	17"	M	13
U	upper drawer guides	¾"	2"	17"	M	6
V	center drawer guide	¾"	2½"	17"	M	1
W	drawer stops	¾"	1⅝"	1½"	C	8
X	back	¼"	36¾"	37½"	CP	1



Drawers					
Y	lower fronts	¾"	7⅞"	32⅞"	C 2
Z	middle fronts	¾"	6⅞"	15⅞"	C 2
AA	top fronts	¾"	6⅞"	11¾"	C 2
BB	lower sides	½"	7⅞"	17⅞"	M 4
CC	middle, top sides	½"	6⅞"	17⅞"	M 8
DD	lower backs	½"	7⅞"	32⅞"	M 2
EE	middle backs	½"	5⅞"	15⅞"	M 2
FF	top backs	½"	5⅞"	11¼"	M 2
GG	hidden front/back	½"	4⅞"	7⅞"	M 2
HH	hidden sides	½"	4⅞"	15¼"	M 2
II	hidden bottom	¼"	7⅞"	15"	CP 1
JJ	lower bottoms	¼"	15¼"	32⅞"	CP 2
KK	middle bottoms	¼"	15¼"	15⅞"	CP 2
LL	top bottoms	¼"	15¼"	11¼"	CP 2
Top cabinet					
MM	sides	¾"	15¾"	26½"	CP 2
NN	top/bottom	¾"	15½"	33¾"	CP 2
OO*	face-frame stiles	¾"	2¼"	26½"	C 2
PP	face-frame rails	¾"	2¾"	30"	C 2
QQ	back rails	¾"	2"	33"	M 2
RR*	front cove trim	1¾"	1¾"	38"	C 2
SS*	side cove trim	1¾"	1¾"	18¼"	C 4
TT	shelf	¾"	14½"	32⅞"	CP 1
UU	shelf edge	¾"	1"	32⅞"	C 1
VV	door rails	¾"	2"	11⅞"	C 4
WW	door stiles	¾"	2"	20⅜"	C 4
XX	door panels	¼"	11⅞"	17⅞"	CP 2
YY	back	¼"	33¾"	26½"	CP 1

*Parts initially cut oversize. See the instructions.

Materials key: M-soft maple, CP-cherry plywood, C-cherry.

Supplies: ¼" shelf pins (4), #8×¾" flathead screws, #8×1¼" flathead screws, #8×1½" flathead screws, #4×½" flathead screws, 1¼" pocket screws, #20 biscuits.

Blade and bits: Dado set; ⅛" and ⅜" round-over, ½" straight, flush-trimming, and ½" 14° dovetail router bits.

Sources:

Hinges: Full-wrap, full-inset, no-mortise, ball-tip hinge, nickel, no. 01H30.42, \$4.30 (4), Lee Valley, 800-871-8158, leevalley.com.

Pulls: Blackrock handle, 96mm, satin chrome, no. 02A17.76, \$6.60 (4), Lee Valley.

Knobs: Blackrock square knob, 1½×1", satin chrome, no. 02A17.71, \$4.50 (6), Lee Valley.

Catches: Extruded double-ball catch, 38mm×7mm, no. 00W12.00, \$1.80 (2), Lee Valley.

Decorative tile: Motawi 6×6" turquoise cobalt fish tile, \$63 plus shipping, no. RS-66FISH, Schlabaugh and Sons, 800-346-9663, schsons.com.

Do-it-all Drill-press Table

Instantly up your hole-making accuracy and convenience with this built-in-a-day attachment.

Most drill-press tables were made for metalworking, not woodworking. Here's your chance to rectify that situation, with a table that:

- ▶ has a top surface big enough to support large workpieces.
- ▶ features an easy-to-adjust fence for lining up repeatedly accurate holes.
- ▶ includes quick-action hold-downs.
- ▶ provides fast-retrieval storage for frequently used accessories.

continued on page 34

DIMENSIONS:
26" L x 14" D x 10 1/4" H

Approximate materials cost:

\$90

Triples the tabletop surface.

Screw in place or let "float" for quick change-out.

Note: We sized this table to fit cast-iron drill-press tables up to 12" in diameter. If your factory-supplied table is larger than that you'll need to lengthen parts A, B, and F.

First, fabricate all the parts

1 From a half sheet (4x4') of $\frac{3}{4}$ " Baltic birch plywood, cut all parts (A–F) to size [Materials List].

2 From two scraps of $\frac{3}{4}$ " solid stock and a piece of $\frac{1}{4}$ " or $\frac{1}{2}$ " plywood, make a dado-cutting jig. Use it to rout dados into the top (A) [Exploded View, Photo A].

Tip! Test the dado cut in scrap material to ensure your T-track fits into it. You may have to cut a full-depth dado, then readjust the jig and widen the dado.

3 Mark centered, half-circle reliefs on one edge of the top (A) and both fence pieces (B) [Exploded View, Drawing 1]. Cut out the reliefs and sand smooth.

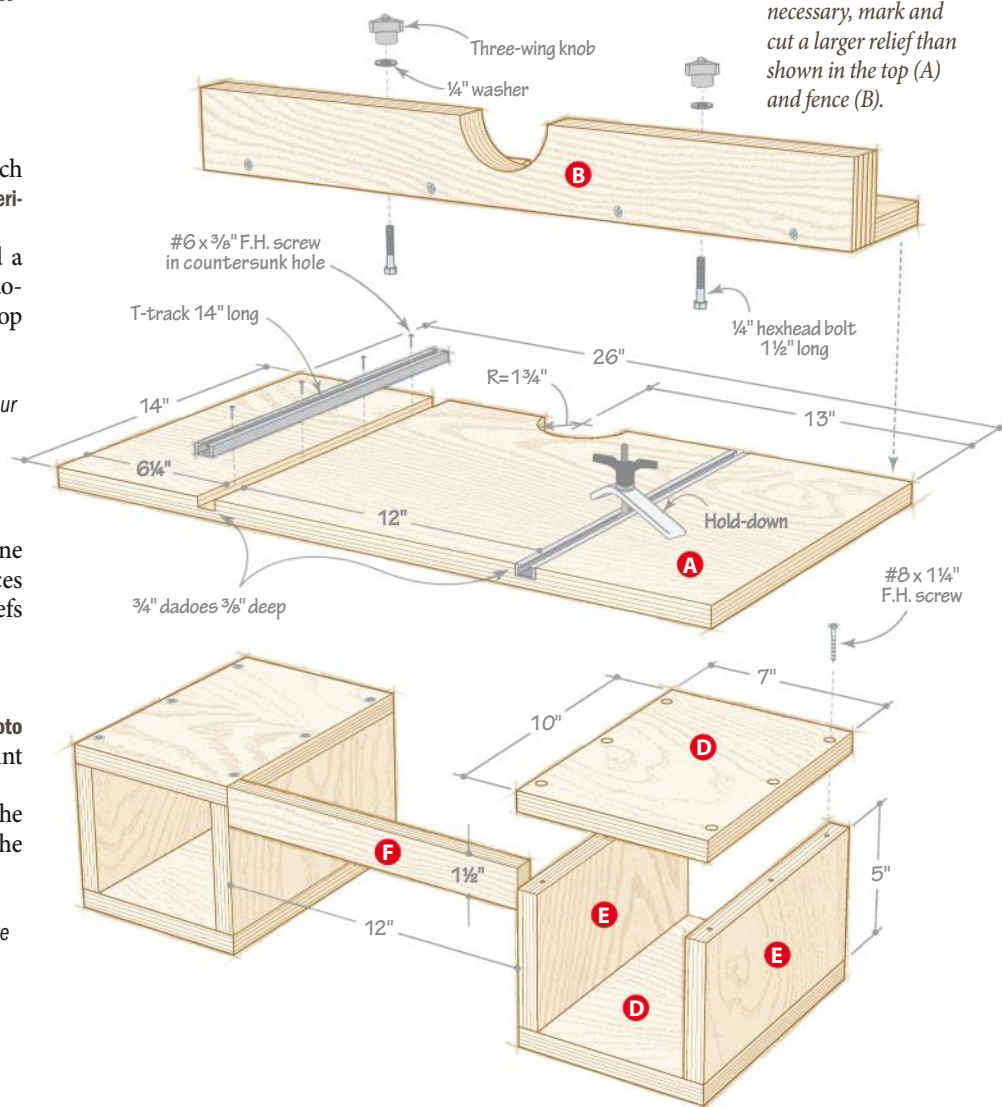
Now assemble the parts

1 Glue and clamp the fence parts (B) [Photo B]. After the glue dries, reinforce the joint with countersunk screws [Drawing 1].

2 Glue and clamp fence braces (C) to the fence assembly [Photo C]. Then drill the $\frac{1}{4}$ " holes.

Tip! To ensure accurate placement of the holes in the fence, measure from center to center between the dados in the top (A).

EXPLODED VIEW



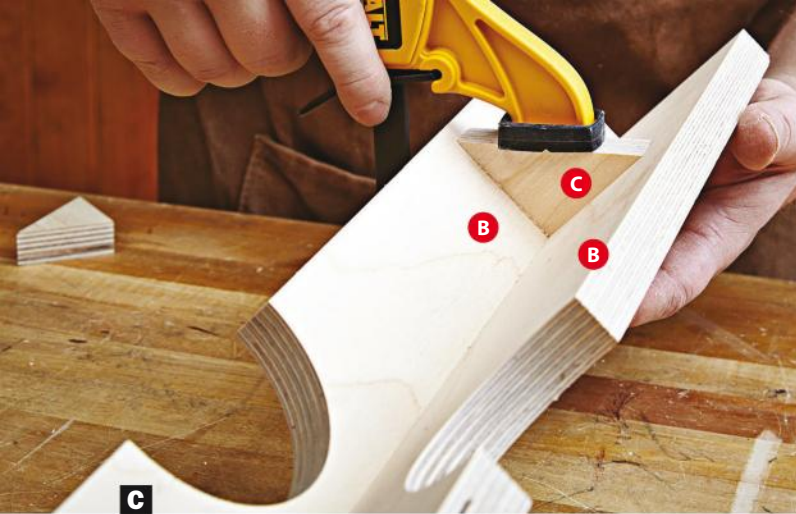
Note: Check the diameter of your drill press' post and, if necessary, mark and cut a larger relief than shown in the top (A) and fence (B).



A Rout dados using a simple jig. In building the jig, use the top (A) as a spacer when gluing and nailing the legs at 90° to the guide. The legs should be snug to the edges of the top.



B Clamp up the fence. It will square itself if the edges were cut square to the faces.



C

Small braces add big strength to the fence. Apply just enough clamping force to press the braces against the fence, producing a bit of squeeze-out at the edges.

3 Assemble the cubbies by first gluing, clamping, and screwing each top/bottom (D) flush to the edge of a side (E) [Exploded View, Photo D]. Likewise, join pairs of those assemblies to make the cubbies.

4 Glue and clamp the front apron (F) between the cubbies [Exploded View]. To that assembly glue on the top (A), flush to the fronts and sides of the cubbies.

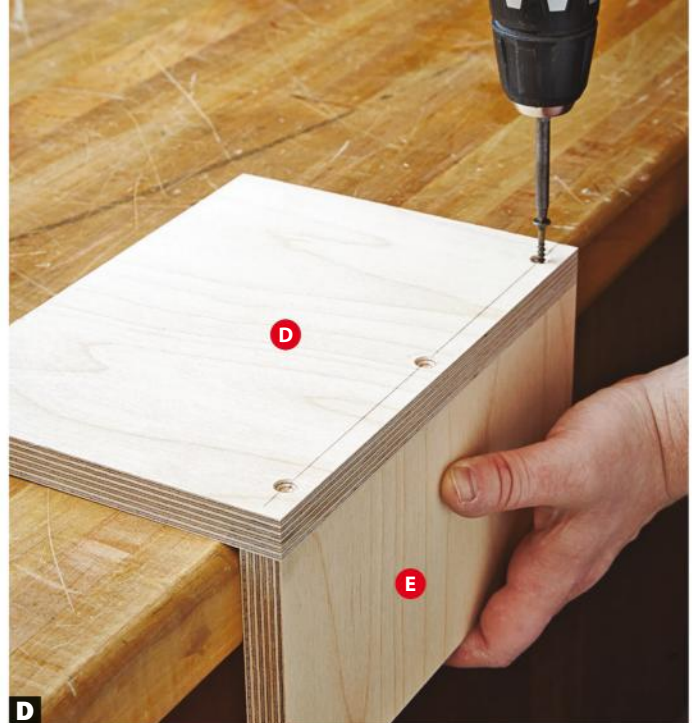
Add the final touches

1 Finish-sand all surfaces to 120 grit. Gently smooth any rough edges.

2 Apply a clear protective finish. We sprayed on three coats of lacquer.

3 Screw on the T-track [Source]. Add bolts, washers, and wing knobs to the fence. Then slide the bolt heads into the T-track.

4 Slide the table into place on your drill press. Lock it down securely using washers and screws through slots in the cast-iron table. If the table has no slots you may have to drill holes through it. 🌲



D

Reinforce the cubby assemblies with countersunk screws after you glue and clamp them together. Make two such assemblies for each cubby.

Materials List

Part	FINISHED SIZE			Matl.	Qty.
	T	W	L		
A top	¾"	14"	26"	BP	1
B fence	¾"	3"	26"	BP	2
C fence braces	¾"	2"	2"	BP	2
D cubby top/bottom	¾"	10"	7"	BP	4
E cubby sides	¾"	10"	5"	BP	4
F front apron	¾"	1½"	12"	BP	1

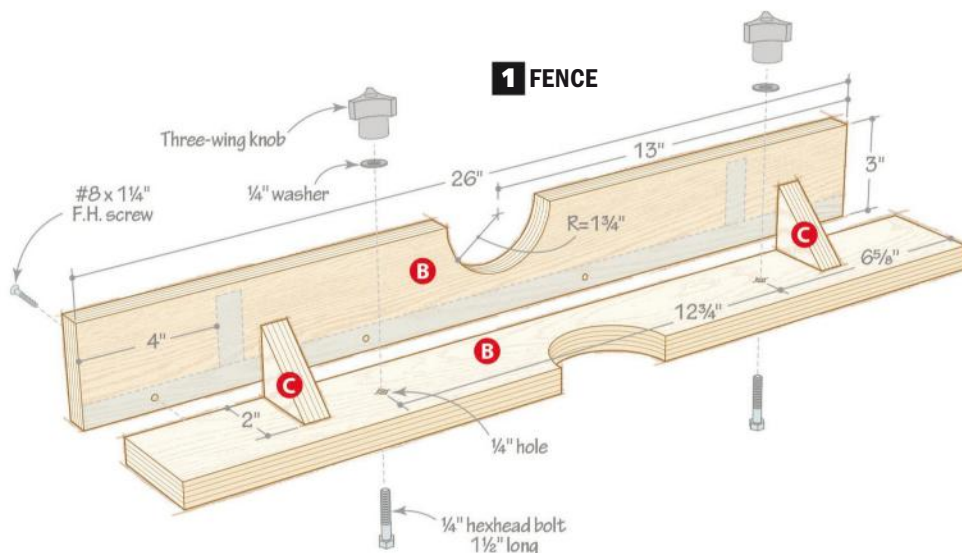
Produced by **Bill Krier** with **John Olson** and **Joshua Steele**
Project design: **Kevin Boyle**
Illustrations: **Roxanne LeMoine**, **Lorna Johnson**

Material key: BP-Baltic birch plywood.

Supplies: ¼" × 20 hexhead bolts 1½" long (2); ¼" washers (2); #8 × 1¼" flathead screws (28), #6 × ¾" flathead screws (8).

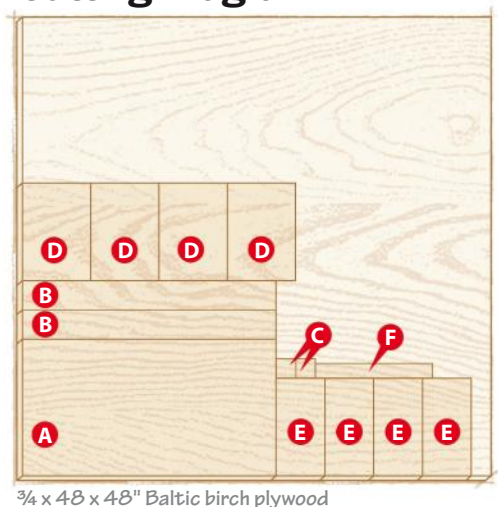
Router bit: ¾" straight.

Source: T-track, 36" long, no. 9471, \$16.95; Three-wing knob (2), no. 9874, \$1.29 each; Hold-down clamp (2), no. 9476, \$8.95 each; MLCS, 800-533-9298, www.mlcswoodworking.com.



1 FENCE

Cutting Diagram



Camp Kitchen

Stash all your cooking gear in one big box that sets up in seconds.



D I M E N S I O N S
23³/₁₆" H x 21¹/₁₆" D x 39⁵/₈" L
(folded for storage – see next page.)

Approximate
materials cost:
\$235
including all
hardware

Fully opened
it measures
46¹/₄" high
and
75¹/₂" long.

You'll build this project from the inside out, beginning with the ½" Baltic birch case that forms the core around which you add doors, windscreen, lids, and a base for it to sit on. Now let's get cookin'!

First served: the case

1 Cut the case sides, shelves, shelf spacers, and gas shelf (A–D) [Materials List, Drawing 1]. Place your gas grill on one of the shelves and mark the center of a 4½"-diameter hole for the gas canister [Photo A]. Stack two shelves together, drill a pilot hole at the



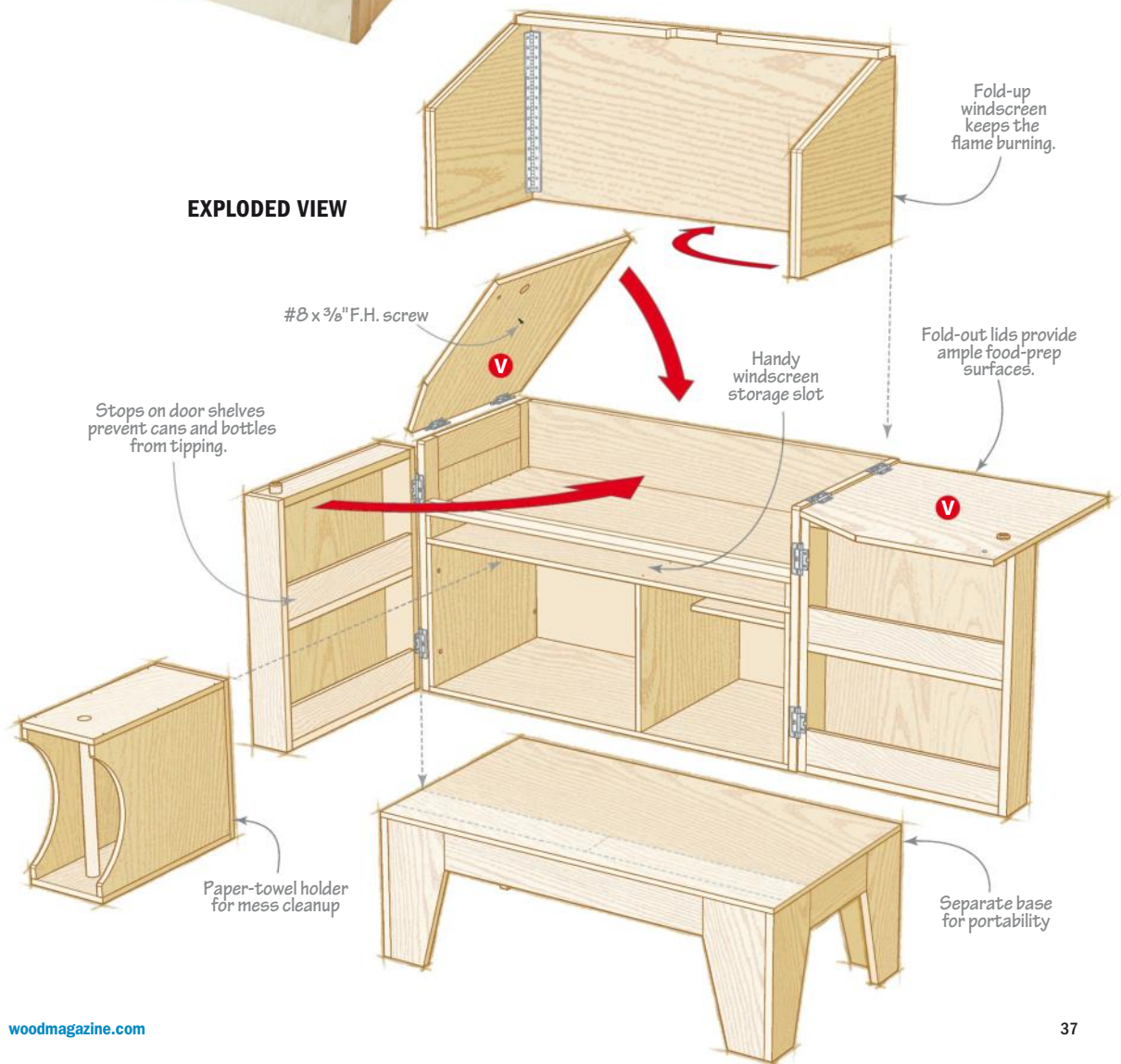
A Mark a hole for the fuel canister by aligning the regulator about 3–4" from the side and back edge of a shelf. Center the hole under the regulator.



For compact storage the base fits over the case.

► Compact camp stoves vary in size, configuration, and fuel requirements. The Rainier stove from Camp Chef shown above [Sources, page 42] gets its fuel from a disposable 16-oz. propane canister or from a larger, refillable cylinder via a hose. Some stoves have onboard gas tanks and require no holes for a tank or hoses.

EXPLODED VIEW



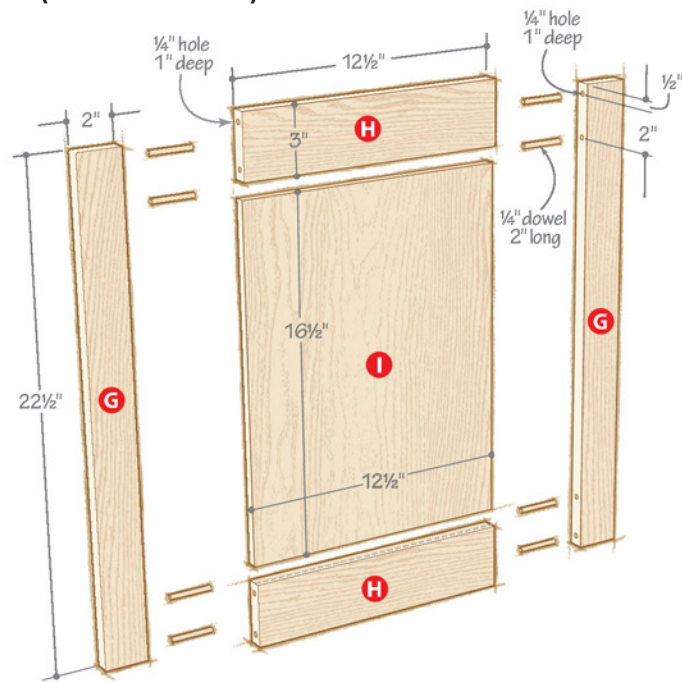
panels (I) to length but $\frac{1}{2}$ " wider than listed [Drawing 2]. Glue and clamp the side rails to the side panels with their inside faces flush [Photo D]. After the glue dries, rip the H/I assembly to $12\frac{1}{2}$ " wide [Photo E].

6 Glue and clamp the side stiles to the rail/panel assemblies, reinforcing the corners with biscuits, pocket screws, or dowels. See *Dead-on dowel joinery using a shop-made jig, below*, for a simple doweling method.

7 Attach the side assemblies (G-I) to the case (A-F) with their edges flush by first reinforcing the joints where the back rail (E) meets the side assemblies (we drilled dowel holes using the back/side jig) [Drawing 1]. Glue and clamp the side assemblies to the case, adding screws from the inside of the case.

8 Cut the shelf rail (J) and glue it to the top shelf (B) [Drawing 1].

2 SIDE PANEL (outside face shown)

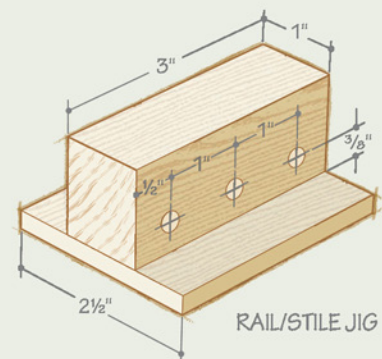
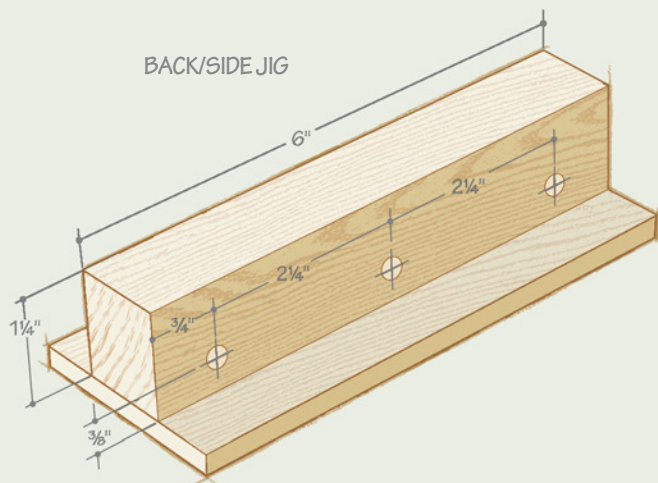


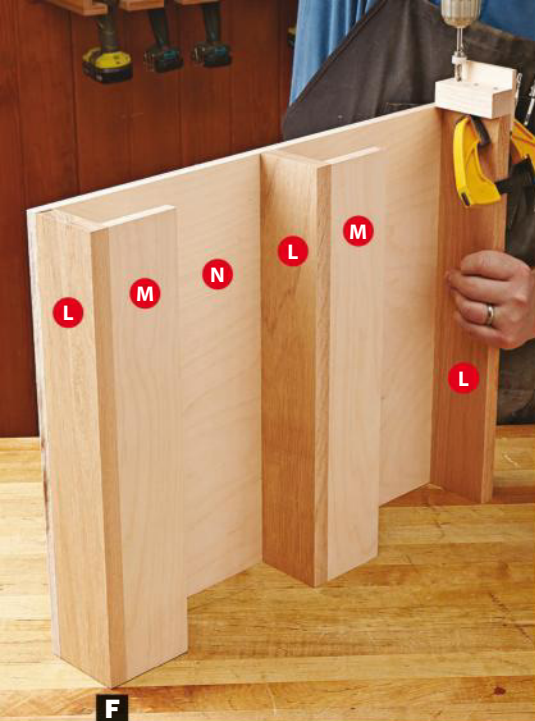
Dead-on dowel joinery using a shop-made jig

If you own a drill press you can easily make two jigs for precisely placing dowel holes throughout this project. You'll also need a $\frac{1}{4}$ " brad-point drill bit with stop collar. Use the rail/stile jig to drill dowel holes in the ends of the side rails and the edge of the side stiles. Two dowels provide sufficient reinforcement for this joint, so use only the outside jig holes. You'll use all three holes for door and base joints in later steps. Use the back/side jig for attaching the back.



Ensure dowel alignment by always indexing the doweling jig from the same face (inside or outside) of the pieces being joined as well as aligning flush the end of the jig with the edge of the rail (H) and the end of the stile (G).

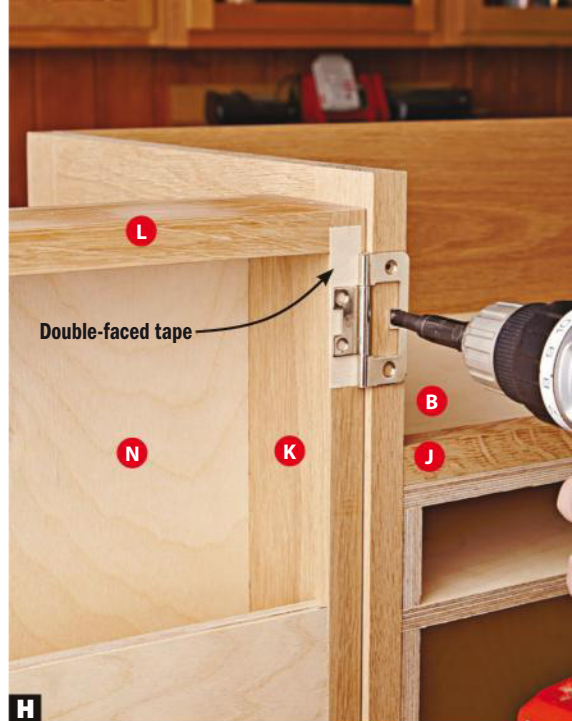




F Join the door sides to the door subassembly by using the rail/stile doweling jig to drill corresponding $\frac{3}{4}$ " holes in the top and bottom shelves (L) and sides (K).



G Check the vertical position of each door by placing a scrap of $\frac{1}{2}$ " plywood on top of the door and a hinge [Source] on top of the case side stiles (G). If there's a gap between the hinge barrel and scrap then shim the door up. If the hinge barrel prevents the hinge leaves from lying flat, then sand down the door top and/or bottom.



H Attach each hinge using double-faced tape on one leaf to hold the hinge in place while you drill pilot holes. Remove the tape and drive the screws.

Next on the menu: doors

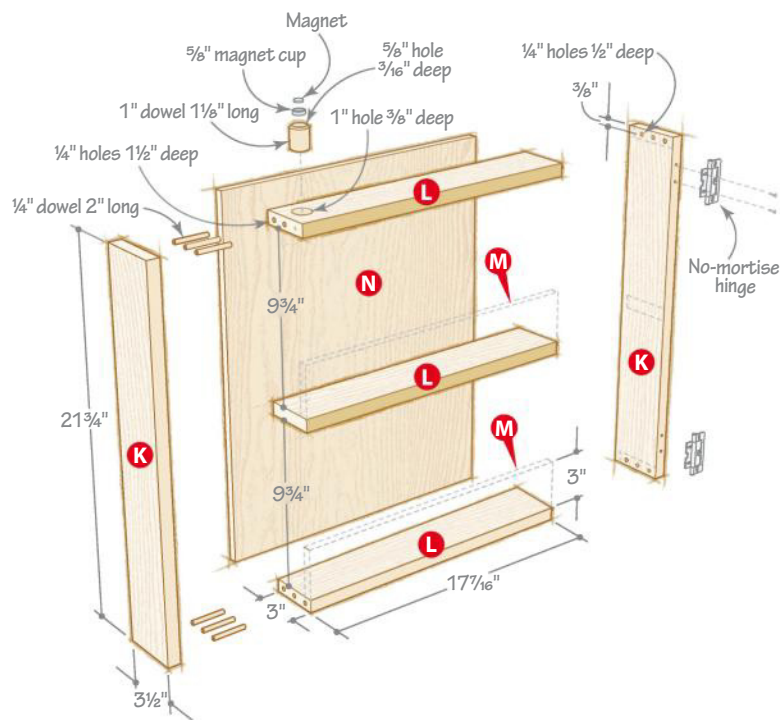
1 Cut to size the door parts (K–N) [Drawing 3]. Glue the shelf stops (M) to four shelves (L). After the glue dries, glue those assemblies and the two remaining shelves to the door panels (N).

2 Drill dowel holes in the top and bottom shelves (L) [Photo F] and the inside faces of

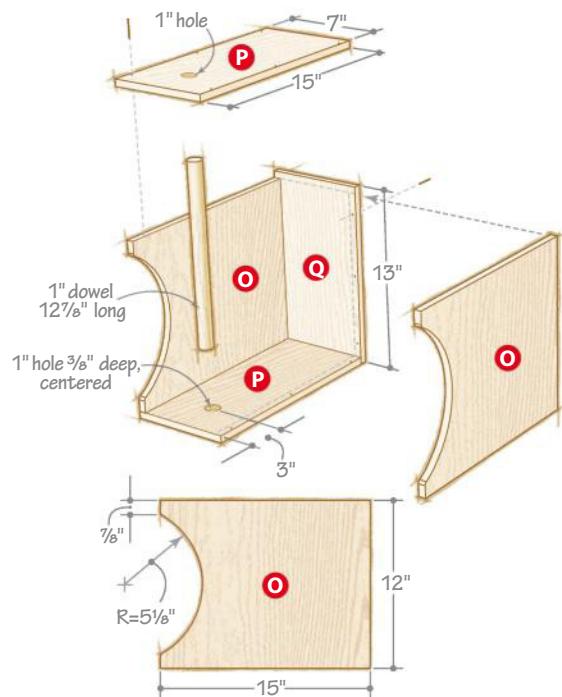
the sides (K). Glue the sides to the door-panel assemblies (L–N).

3 Clamp the doors to the case in the fully open position and flush at the bottom. Check the vertical position of the door on the case [Photo G]. Then attach the hinges [Photo H].

3 DOOR (left door shown)



4 PAPER TOWEL HOLDER



Coming right up: towel holder, windscreen, and more

1 Cut to size the paper-towel holder sides (O), top/bottom (P), and back (Q) [Drawing 4]. Stack the top and bottom and drill a 1" hole through the top and partially through the bottom. Mark and cut the radius on each side, then glue and nail the sides between the top and bottom, and the back to this assembly. Cut a 1" dowel to fit.

2 Cut the windscreen outer sides (R), inner sides (S), back (T), and handle (U) [Drawing 5]. Laminate the outer and inner sides,

flush at the front, top, and bottom edges. After the glue dries, jigsaw the angled edge.

3 Cut the handhold into the handle (U). Glue and brad the handle to the top of the windscreen back (T).

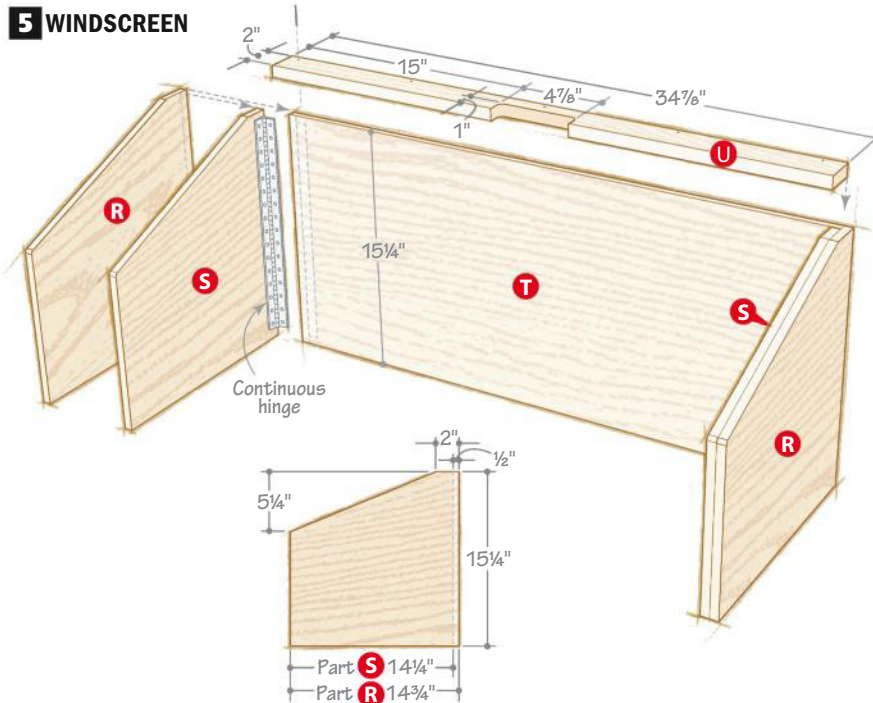
4 Place the back (T/U) and side (R/S) assemblies atop the case and check for fit. Attach continuous hinges [Source] to the windscreen assembly. Then fold up the windscreen and make sure it fits into the slot under the top shelf of the case.

5 Cut the lids (V) to size and shape, install the screw on each bottom face, and drill

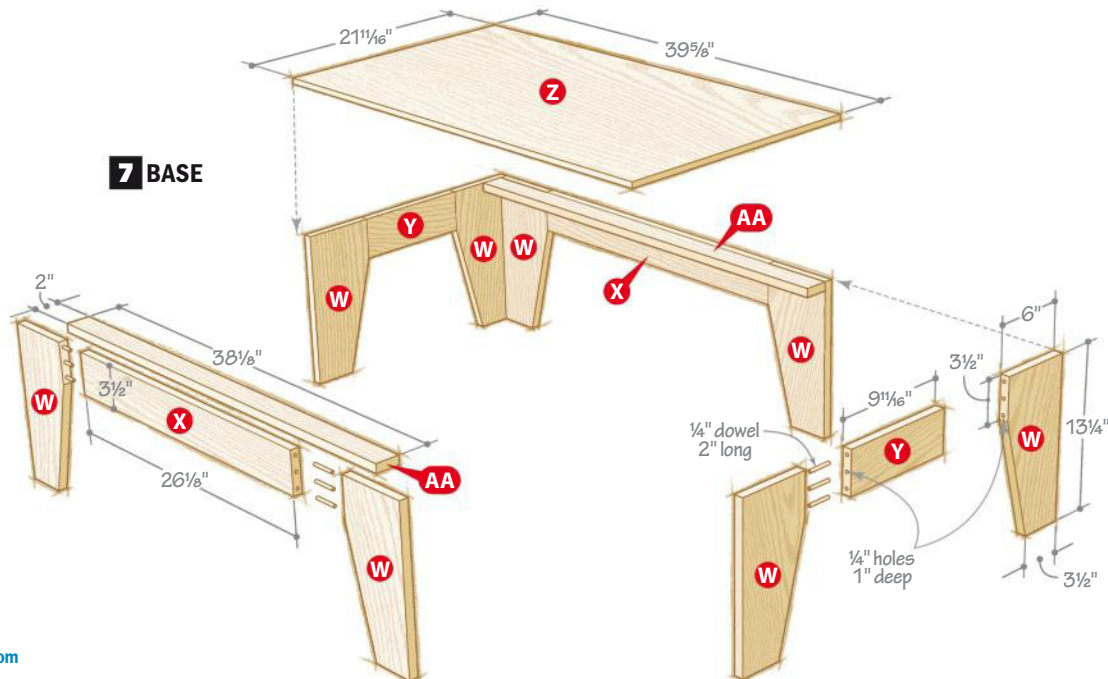
the 1" hole in each [Drawing 6]. Attach the lids to the top edge of the case [Exploded View] with no-mortise hinges. You may have to file down any screw tips that penetrate the 1/2" plywood.

6 Transfer the 1" hole locations in the lids to the top of each door, then drill a dowel hole at each location [Drawing 3]. Glue in the dowel and drill a centered hole in its top for a magnet cup and magnet [Source]. Check that the lids fold down and lock onto the doors. You may have to sand the holes and/or the dowel ends.

5 WINDSCREEN



7 BASE

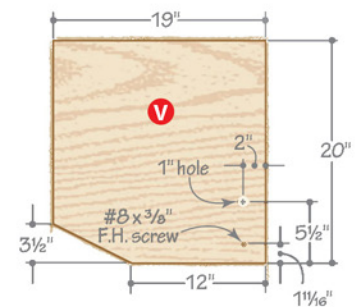


Final course: make the base and apply a finish

1 Cut to size the base parts (W-AA) [Drawing 7]. Mark, then cut the leg tapers using a jigsaw; save the offcuts. Smooth each taper with a hand plane.

2 Drill corresponding dowel holes in the rails (X, Y) and legs (W). Glue and clamp a leg to both ends of each rail. Attach a base cleat (AA) to the top inside face of both leg/side rail (W/X) assemblies.

6 LID (right inside face shown, left is mirror image)





I



J

Leg-taper cutoff

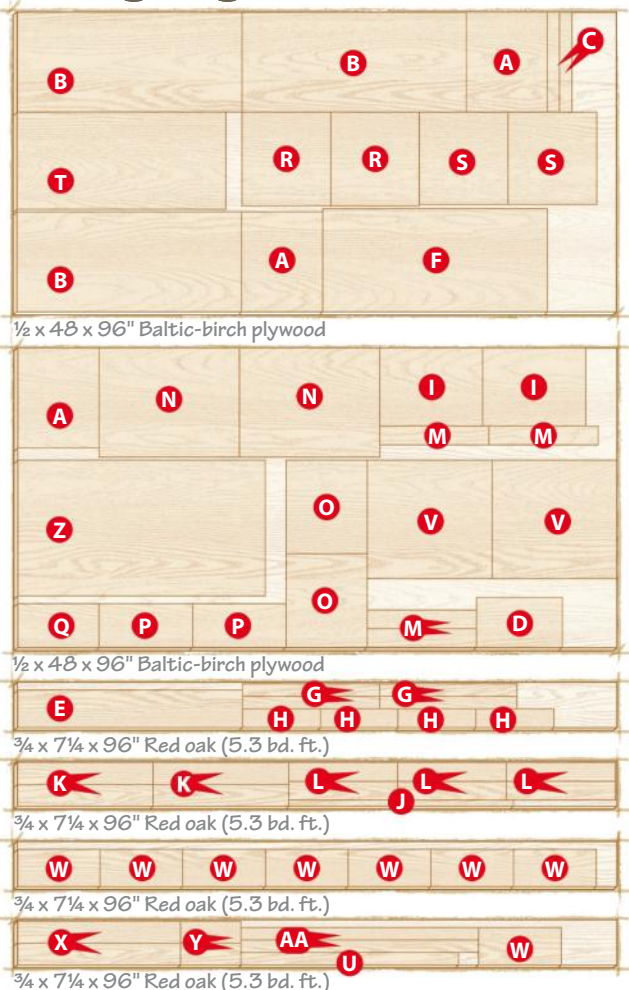
Join the base assemblies on a flat work surface using glue and clamps. Ease the clamp-up by utilizing the leg-taper cutoffs you saved earlier to provide a parallel surface for the clamp jaws to gain solid purchase.

3 Dry-fit the leg assemblies and check that the case fits on the base with the doors closed and the lids folded in. Then glue and clamp the leg assemblies [Photos I, J], and glue on the top (Z).

4 Brush or spray on a tough, water-resistant, film-forming finish that will protect the

project and provide an easy-to-clean surface. Good choices include polyurethane, spar varnish, or pre-catalyzed lacquer. Finally, open the doors and position the handles [Sources] as close to each door as possible. Now start planning that next camping trip or tailgate party and the great meals you'll enjoy. 🌲

Cutting Diagram



Materials List

Part	FINISHED SIZE			Matl.	Qty.	
	T	W	L			
Case						
A	sides	½"	16"	13"	BP	3
B	shelves	½"	16"	36"	BP	3
C	shelf spacers	½"	16"	2"	BP	2
D	gas shelf	½"	8"	13¾"	BP	1
E	back rail	¾"	6"	36"	O	1
F	back panel	½"	16½"	36"	BP	1
G	side stiles	¾"	2"	22½"	O	4
H*	side rails	¾"	3"	12½"	O	4
I*	side panels	½"	12½"	16½"	BP	2
J	shelf rail	¾"	1"	36"	O	1
Doors						
K	sides	¾"	3½"	21¾"	O	4
L	shelves	¾"	3"	17⅙"	O	6
M	shelf stops	½"	3"	17⅙"	BP	4
N	panels	½"	17⅙"	21¾"	BP	2
Paper-towel holder						
O	sides	½"	15"	12"	BP	2
P	top/bottom	½"	7"	15"	BP	2
Q	back	½"	7"	13"	BP	1
Windscreen						
R	outer sides	½"	14¾"	15¼"	BP	2
S	inner sides	½"	14¼"	15¼"	BP	2
T	back	½"	15¼"	34⅞"	BP	1
U	handle	¾"	2"	34⅞"	O	1
V	lids	½"	19"	20"	BP	2
Base						
W	legs	¾"	6"	13¾"	O	8
X	side rails	¾"	3½"	26⅙"	O	2
Y	end rails	¾"	3½"	9⅛"	O	2
Z	top	½"	21⅛"	39⅞"	BP	1
AA	cleats	¾"	2"	38⅙"	O	2

*Parts initially cut oversize. See the instructions.

Materials key: BP-Baltic birch plywood, O-oak.

Supplies: No-mortise hinges (8), 36" continuous hinge, Toolbox handles (2), #10-24 zinc-plated flathead machine screws 1 $\frac{1}{4}$ " long with nuts (8), $\frac{5}{8}$ "-dia. cupped magnet set (2), 16"-long 1" dowel rod, 2"-long $\frac{1}{4}$ " dowels (70), #8x1" flathead screws (8), #8x $\frac{3}{8}$ " flathead screws (2), #16x1 $\frac{1}{4}$ " brad nails.

Bits: $\frac{1}{4}$ " brad-point bit, 1" Forstner or spade bit.

Sources

No-mortise hinges, no. 00H51.33, 2 $\frac{1}{2}$ x $\frac{3}{4}$ ", nickel-plated, \$2.50/pair (4 pairs). Lee Valley Tools, 800-871-8158, leevalley.com.

Screws, no. 01Z11.63, #6x $\frac{3}{4}$ " nickel-plated, \$2.80/100 count (required for hinges listed above), Lee Valley.

Toolbox handles, no. 00S03.10, \$3.90 each (2), Lee Valley.

$\frac{5}{8}$ " cupped magnet set, no. 99K39.04, \$2.60 each (2), Lee Valley.

Camp Chef Rainier 2 camp stove, model MS2GR, woodmagazine.com/campstove.

Produced by **Bill Krier** with **John Olson**

Project design: **John Olson**

Illustrations: **Roxanne Lemoine; Kurt Schultz**

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Idea Shop 6:

Spend a little, save a lot

The next two sets of four paychecks outfit your shop with a pair of machines that expand the wood species you can use in projects. Instead of settling for the limited (and pricey) selection of home-center lumber, a jointer and planer enable you to purchase boards from a hardwood dealer or mill. That's because these machines help you process rough-sawn boards by jointing the faces flat and edges square, and then planing the boards to uniform thickness. But both tools are substantial investments, so you'll acquire the jointer first, then the planer after replenishing the bank with a few more checks.



► Learn how a jointer and planer work together to save you serious money on lumber. woodmagazine.com/jointplane



► Watch a video of the shop growing, updated with each paycheck. woodmagazine.com/is6progress

Learn through this series of Idea Shop 6 articles how to set up a shop by working within a budget of \$150 every two weeks over 26 pay periods. Coinciding with each paycheck, we provide online a collection of related articles, plans, and videos. To get an e-mail reminder of that posting, sign up for our newsletter at woodmagazine.com/newsletter. The first article in this series appeared in WOOD® 238 (March 2016). Catch up with previous installments at woodmagazine.com/ideashop6.

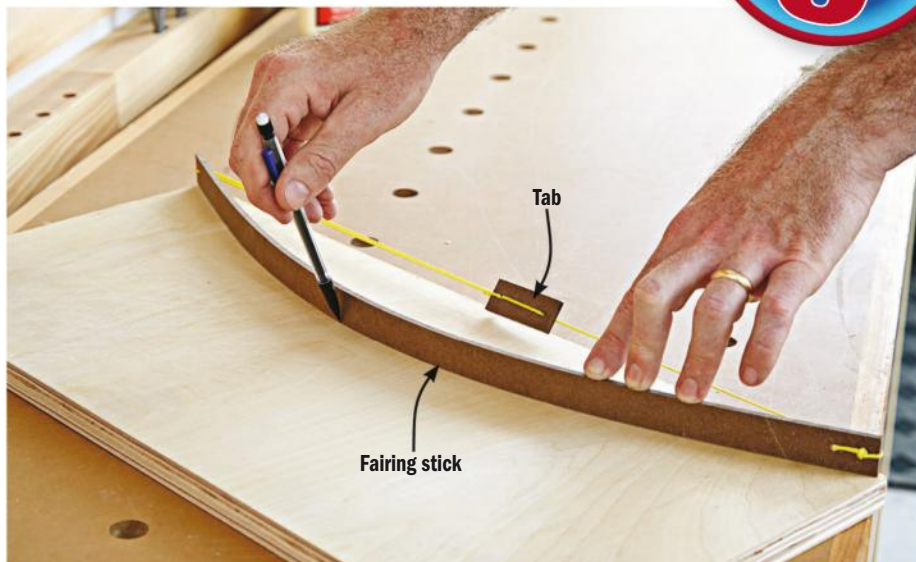


Paycheck 17

When woodworking plans throw you a curve, reach for a fairing stick. This simple device flexes and holds its shape allowing you to trace a curve along it. A string on this version pulls the ends toward each other, then a sliding tab locks the string in position. Build fairing sticks in several lengths to help you draw arcs of all sizes. By using the tip *below*, you can sock away all (or nearly all) of this check.

► Find free plans for all the jigs and fixtures shown.
woodmagazine.com/ideashop6

Tip! Want cheap (or even free) hardboard? Ask your lumberyard if they have any “dunnage” laying around. Dunnage is sacrificial hardboard used to protect other sheet goods.



Create smooth, even arcs with a fairing stick. Cinch up the string to bow the hardboard body, then hold the stick in place on the workpiece while you trace along the curve.

Paycheck 18

This check and some of your savings purchase the first half of your one-two punch for dressing lumber. With a jointer, you can easily flatten the face of a board, and then square one or both edges to that face. Starting with square surfaces simplifies joinery,

measuring, and assembly. While a jointer can flatten a face, it can't make opposite faces parallel. That's the planer's function, and you'll acquire that essential machine three paychecks down the road.

► Learn how a jointer works and how to use it.
woodmagazine.com/jointerpointers

Run a board face-down across the cutterhead to flatten the face. Then press the freshly flattened face against the fence to square an adjacent edge to the face.



► A jointer is classified by the widest board it can surface. The benchtop model we chose (Porter-Cable no. PC-160JT) joints boards up to 6" wide.





As you acquire benchtop tools, this flip-top bench makes possible storing and using several of them in the same space. Casters allow you to move the bench as needed to feed stock into tools.

Paycheck 19

With this paycheck, purchase the lumber and hardware for building an innovative flip-top bench, *above*. As your tool collection grows, simply rotate the top and bolt new acquisitions to the opposite face. Or leave one side empty to use as a worksurface.

A length of black pipe sandwiched between the benchtops serves as a pivot. Cutoff bolts inserted through each end secure the benchtop for work.

If you have a few bucks left over, stash them in your bank.

LAGU

THE DUSTY



A | FLUX
TBA

B | FLUX:1
\$499

C | FLUX:1
\$1099

C | FLUX:2
\$1399

C | FLUX:3
\$1799

P | FLUX:1
\$1499

P | FLUX:2
\$1999

HEPA

HEPA



Paycheck 20

Build versatile wall storage, *left*, using perforated hardboard (one brand is Pegboard). Hung from the same type of beveled French cleat as the clamp rack, you can make, move, and arrange several panels to suit your needs. Hooks and hangers, *right*, come in a variety of sizes and functions. For example, short hooks accept wrenches, and you can make a shelf by resting a piece of scrap stock on a pair of longer hooks with supports. To bank enough money to buy the planer later, we made just one panel for now. 🌱

Easily reconfigure perforated hardboard panels as your storage needs change. Hardwood edging stiffens the 24x48" panel and provides clearance on the back face for the hooks.

Tip! Secure loose hooks with a dollop of hot-melt glue in the holes. Peel off the glue if you need to reposition the hook later.

Produced by Craig Rueggsegger with Lucas Peters



VA AIR

AS SET



P|FLUX:3
\$2299
HEPA



T|FLUX:5
\$3499



T|FLUX:10
\$4999



X|FLUX:10
\$9999

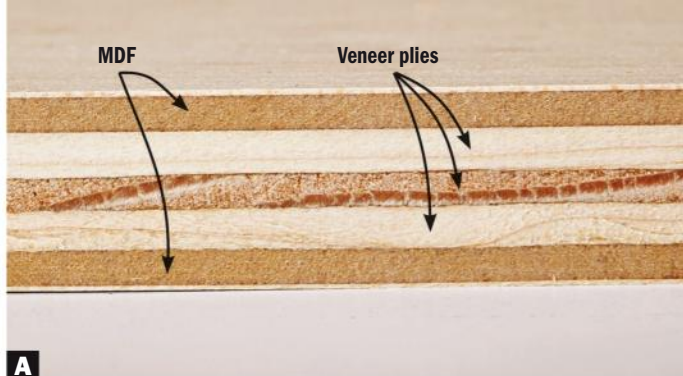
Stack-on Washer/dryer Stand



DIMENSIONS:
18" H x 28" D x 60" W

Approximate
materials cost:
\$200

15+
cubic feet of
storage
space



A

Your plywood may not be what it appears. Our plywood measured exactly $\frac{3}{4}$ " because we bought Combi-Core plywood, a blend of veneer plies and MDF. Other plywood may be thinner. Size your grooves and dados to fit.



B

Before cutting the grooves in the top and bottom, set up an outfeed support. Use push pads to press each workpiece flat as it passes over the blade.

Few rooms in the house get as messy as the laundry room. To help cut the clutter without taking up valuable floor space, and to raise your front-load machines to a more accessible height, build this washer/dryer stand. The two large, slide-out drawers afford plenty of space for laundry baskets, detergent, and dryer sheets.

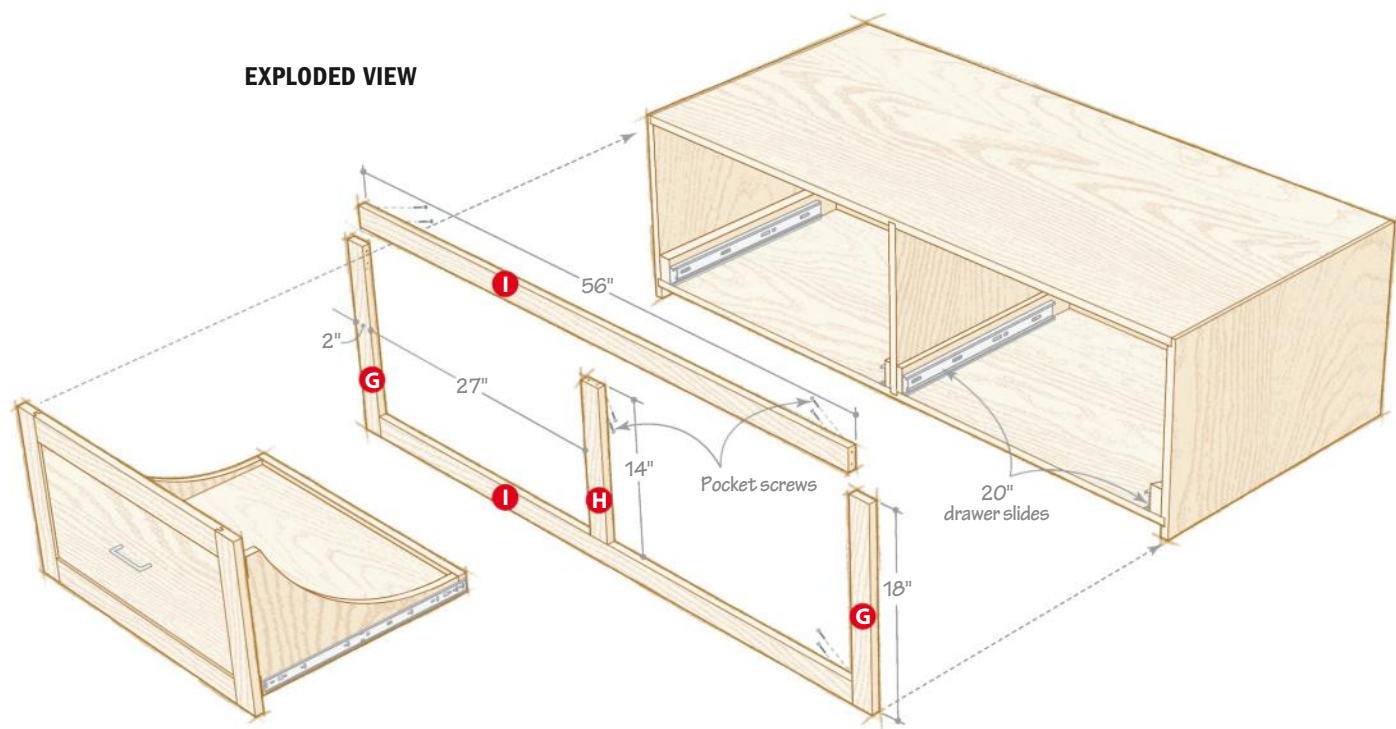
► Learn to make better cuts in plywood.
woodmagazine.com/plywoodcuts

Begin with a box

1 Cut to size the case top/bottom (A), sides (B), divider (C), and back (D) [Materials List, Cutting Diagram]. Using a dado blade sized to cut a groove to fit your plywood [Photo A], cut $\frac{3}{8}$ "-deep grooves for the back in the top, bottom, and sides [Drawing 1, Photo B]. After cutting the grooves, center a dado across the top and bottom to accept the case divider.

► Set up your dado set for perfect dados and grooves.
woodmagazine.com/perfectdado

EXPLODED VIEW

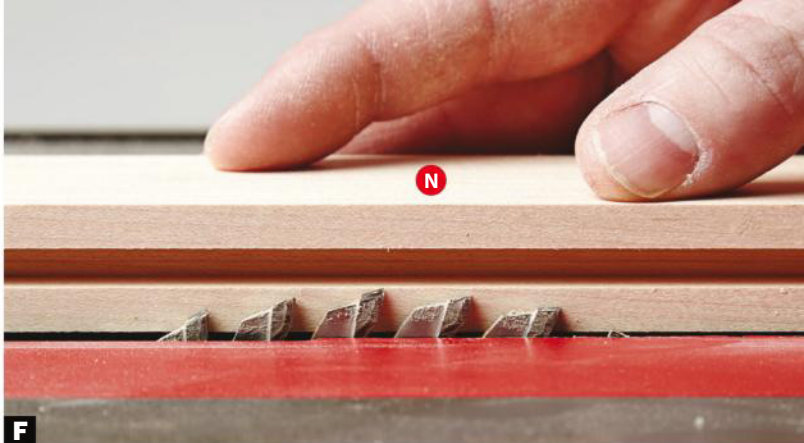


C

Start with the dado for the case bottom (A). Then, add an auxiliary fence face and mill the rabbets for the case top (A).



D



Set your blade height so the highest tooth just touches the groove [Photo F]. After doing so, cut $\frac{3}{8}$ "-long tenons on the drawer rails (N) [Photo G]. Check for fit and square by dry-assembling the frames.

Rip, then flip. To perfectly center the $\frac{1}{4}$ " grooves on the thickness of the drawer stiles (M) and rails (N), set your fence $\frac{3}{8}$ " from the inside edge of the blade, make a pass, then flip the workpiece around and cut again.

► Gluing up the case will require long clamps. Or, try this trick.
woodmagazine.com/clampstretcher

2 Next, cut the dados and rabbets in the sides (B) [Drawing 1, Photos C, D]. Glue the case together. Start by gluing the case divider (C) and back (D) to the bottom (A), then add the top. With those parts together, glue on the sides.

3 Cut the side cleats (E) and center cleats (F) to size. Glue and screw them inside the case where shown [Drawing 1].

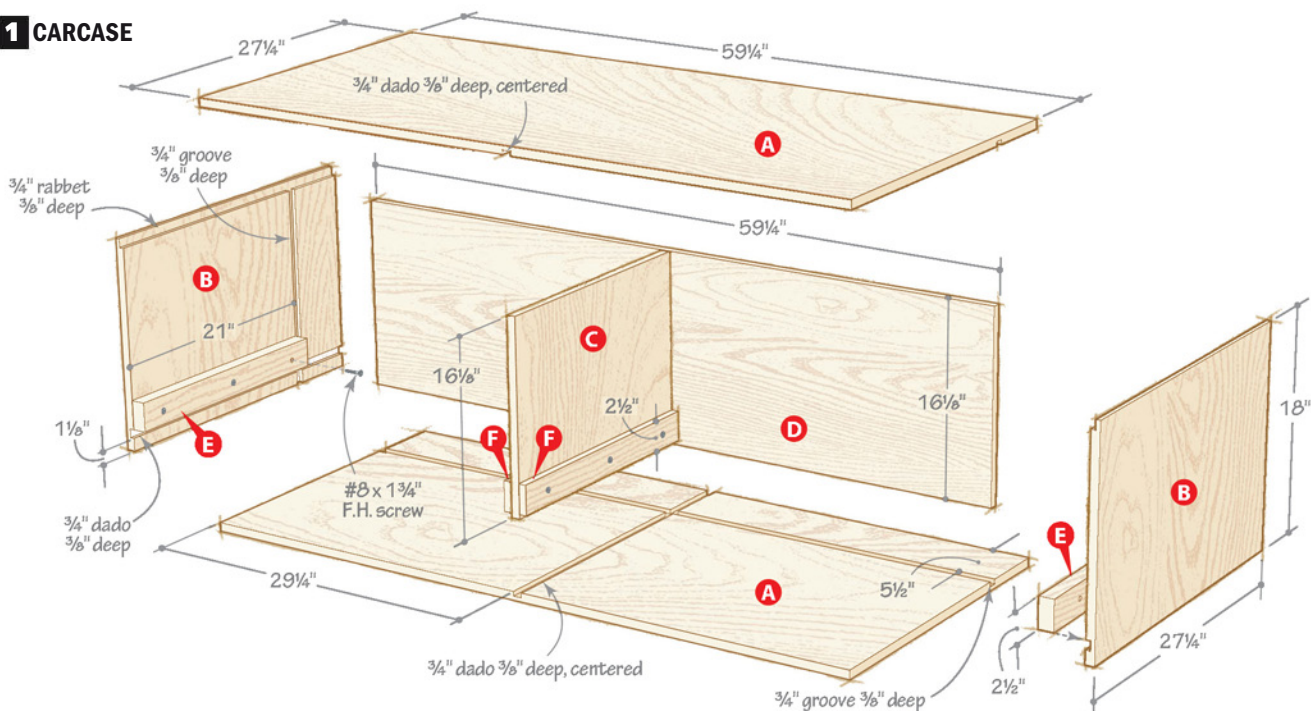
Fashion the face frame

► Try these pocket-hole joinery tips.
woodmagazine.com/pocketpointers

1 From $\frac{3}{4}$ " hard maple, cut the face frame stiles (G, H) and rails (I) to size. Mark the locations of the stiles on the rails, then drill pocket holes in the ends of the rails and in the center stile [Exploded View]. Glue and screw the face frame together.

2 Glue the face frame (G-I) to the plywood case. Finish-sand the face frame after the glue has dried.

1 CARCASE





Start with the case sides. Separate the two mating parts of each drawer slide and screw the halves with the ball bearings to the side (E) and center (F) cleats, elevating them with $\frac{1}{4}$ "-thick shims and mounting them flush with the front of the case. Screw the remaining halves of the drawer slides to the drawer sides, flush to the front but also elevated with $\frac{1}{4}$ "-thick shims.

Double down on drawers

1 From $\frac{3}{4}$ " maple plywood, cut the drawer sides (J) and bottoms (K) to size. Cut the drawer stretchers (L) to size from $\frac{3}{4}$ " solid stock. Bandsaw or jigsaw the corner notches and curve [Drawing 2a], then sand these parts to 220 grit.

2 Glue and screw a drawer bottom (K) between two sides (J), then add the stretchers (L) [Drawing 2]. Repeat for the other drawer.

3 Cut the drawer stiles (M), rails (N), and panels (O) to size. Machine the inside edges of the stiles and rails to fit the panels [Photo E].

4 Cut tenons on the ends of the drawer rails (N) [Drawing 2b, Photos F and G]. Glue the drawer front assemblies (M–O) together.

Tip! Finish the front panels (O) prior to gluing them in place, as seasonal humidity change may expose more of the panel than you can finish after assembly.

Finish first, then mount the drawers

1 Finish-sand any unsanded areas of the carcass and drawers to 220 grit, being careful not to sand through the plywood veneer. Apply a finish. We used pre-catalyzed lacquer, which looks great on bare maple.

2 With the finish dry, mount the drawer slides [Photos H and I]. Slide the drawers into place, then check their operation and alignment. Make adjustments as necessary.

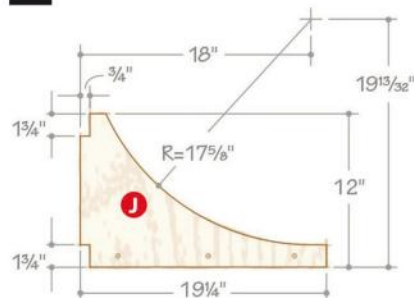
3 Screw the drawer front assemblies (M–O) to the drawer boxes (J–L). Mount the drawer pulls. Now, the fun part: Convince your neighbor to come over and help you lift the washer and dryer onto the stand. 🌲

► Hide sanded-through spots.

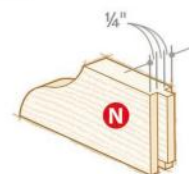
woodmagazine.com/sandedthrough

Produced by **Nate Granzow** with **Joshua Steele**
Project design: **Kevin Boyle**
Illustrations: **Roxanne LeMoine, Lorna Johnson**

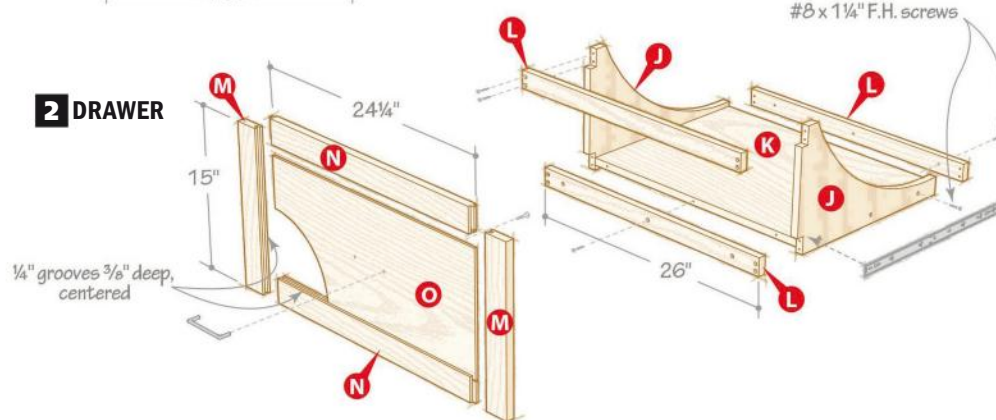
2a DRAWER SIDE DETAIL



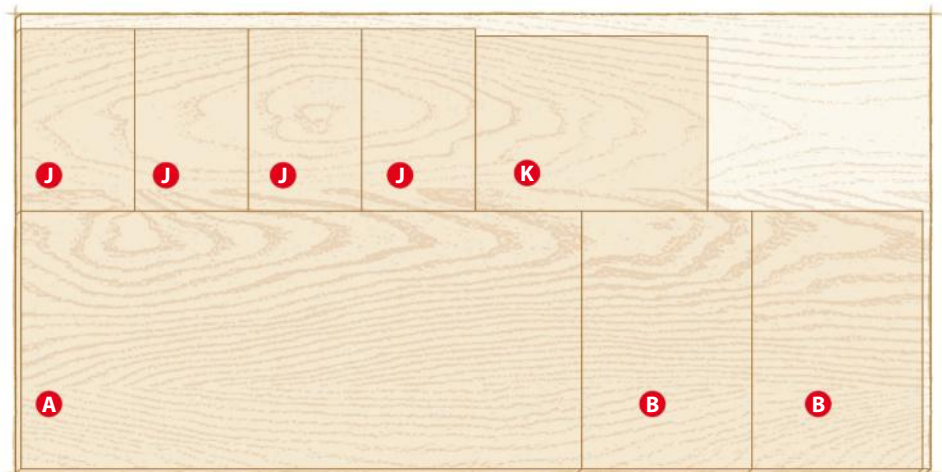
2b RAIL TENON



2 DRAWER



Cutting Diagram



3/4 x 48 x 96" Maple plywood



3/4 x 48 x 96" Maple plywood



1/4 x 24 x 48" Maple plywood



3/4 x 7 1/4 x 96" Maple



3/4 x 7 1/4 x 96" Maple



1 1/4 x 5 1/2 x 48" Poplar *Plane or resaw to the thickness listed in the Materials List.



Materials List

Part	FINISHED SIZE			Matl.	Qty.
	T	W	L		
A case top/bottom	3/4"	27 1/4"	59 1/4"	Ply	2
B case sides	3/4"	27 1/4"	18"	Ply	2
C case divider	3/4"	21"	16 1/8"	Ply	1
D case back	3/4"	16 1/8"	59 1/4"	Ply	1
E side cleats	1 1/4"	2 1/2"	21"	P	2
F center cleats	5/8"	2 1/2"	21"	P	2
G face-frame outer stiles	3/4"	2"	18"	M	2
H face-frame center stile	3/4"	2"	14"	M	1
I face-frame rails	3/4"	2"	56"	M	2
J drawer sides	3/4"	19 1/4"	12"	Ply	4
K drawer bottoms	3/4"	18 1/2"	24 1/2"	Ply	2
L drawer stretchers	3/4"	1 3/4"	26"	M	6
M drawer stiles	3/4"	2 1/4"	15"	M	4
N drawer rails	3/4"	2 1/4"	24 1/4"	M	4
O drawer panels	1/4"	11 1/8"	24 1/8"	Ply	2

Materials key: Ply-maple plywood, P-poplar, M-maple.
Supplies: #8x1" flathead screws, #8x1 3/4" flathead screws, #8x1 1/4" fine-thread pocket screws.
Blades: Dado set.
Sources: 100-lb. zinc over-travel 20" drawer slides, no. 45953, \$15 per pair (2 pair); Amerock Allison Value Hardware satin nickel pull, no. 1007960, \$4 (2), Rockler Woodworking and Hardware, 800-279-4441, rockler.com

Woodpeckers® Inc.

MIGHTY MINI-SCRAPER

Carbide Blade Features Four Sharp, Long-Lasting Edges

Mini-Scraper – You'll Wonder How You Ever Got Along Without It.

It's a perfect example of applying existing cutting-edge technology to an entirely new purpose.

Fasten a carbide insert to a comfortable handle and "Voilà", you have Woodpeckers latest tool, a super-handy mini-sized wood scraper. This tool excels at glue removal and is an effective wood scraper that gets into tight places regular scrapers can't reach.

Our Solid Carbide Blade Starts Sharp, Stays Sharp.

Woodworkers know carbide tooling holds a sharp edge for a long time. Some years ago, carbide insert tooling was first used on spiral cutter heads for jointers and planers. This tooling offered four sharp edges on each insert. The Mini-Scraper delivers the same reusable convenience.

Our standard insert's edges are ground with a slight camber to help prevent marring your wood surface. We also offer an optional, perfectly square insert for getting into square corners.

Scrapes Wet Or Dry Glue, Works Great In Tight Corners, Won't Rust. The Mini-Scraper's rugged carbide blade will pop the toughest dried glue right off your work. When you find dreaded dried glue in a tight corner, the Mini-Scraper removes it with ease.

You can scrape dry wood using a pushing motion at a low angle for an aggressive, bulldozer-like cut. To produce a finish quality cut, use a pulling motion with the handle held at a high angle.

You can easily clean wet glue on your scraper with a wet rag and the tool won't rust. That's because carbide steels are free of iron and the handle is a super-tough, polycarbonate plastic.

Woodpeckers new Mini-Scraper is the latest addition to our regular product line. Like all Woodpeckers tools, the Mini-Scraper is made in the U.S.A.

NEW!

Order Today!



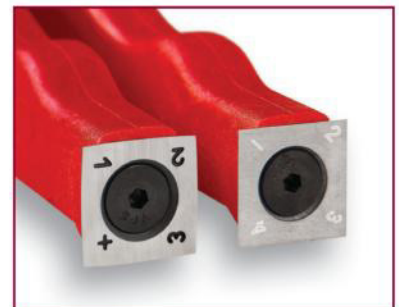
Carbide blade easily removes dried glue from your work.



Just loosen the screw and rotate the blade and you have a sharp, fresh edge.



Get a finish quality cut using a pulling motion with the Mini-Scraper at a high angle.



Our standard blade (left) has cambered edges to prevent gouging the work. An optional square blade (right) gets into square corners.

Woodpeckers® Inc.

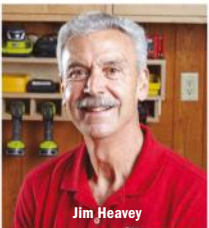
See our full line of American made precision
woodworking tools at woodpeck.com
Strongsville, Ohio (800) 752-0725



Sanding basics

Get the best finish by prepping the wood carefully.

By Jim Heavey



There will never be a project in your shop that doesn't require sanding prior to applying a finish. But without an understanding of the process, or with poor technique, your efforts at creating that perfectly smooth surface may prove frustrating. So let's review some basics.

Start rough, finish smooth

The rough surface on a board's face caused by mill marks [Photo A], scratches, or an uneven grain can be flattened by a plane, scraper, or sandpaper. But the plane and scraper require regular sharpening to produce a consistent surface smoothness. Fresh-out-of-the-box sandpaper, however, uses standard grits that make it easy for any woodworker to follow an orderly process for success.



A **Planing is not enough.** A board may show signs of the planer used at the sawmill. You'll need to remove these ripples prior to finishing.



B **Sandpaper doesn't last forever.** The species of wood and the quality of the paper determine how long a sheet lasts. When a paper's grit no longer has a "catch" when you rub your finger along it, the paper has lost its sharp cutting edge and will only burnish the surface. Replace it.



C **Pencil-in this sanding trick.** Removing a light pencil mark on a board's surface indicates uniform sanding. This method also shows when to switch to the next grit.

Choose the true grit

Because sandpaper scratches a surface to smooth it [Photo B], it's important to begin with the right grit based on the condition of the wood's surface and whether a stain or a topcoat of finish will be applied. Sandpaper can commonly be found in 80, 100, 120, 150, 180, and 220 grit. Grits below 80 are generally used in paint removal, and those above 220 are for sanding between coats of finish.

The coarse grits of 80–100 make quick work of removing mill marks and deep scratches, but still leave behind visible marks. Sanding with 150-grit paper provides a good surface for staining since the very faint scratches create places for pigment in stains to lodge.

► Learn the ins and outs of the grit grading system.
woodmagazine.com/sandinggrits

When applying a finish without staining, work up to 220-grit paper. The scratch pattern is not visible to the naked eye, yet still provides the "grip" a top coat needs for good adhesion.

I've found it more efficient to not skip any grits. As an example, if I plan to stain a board with pronounced mill marks or surface imperfections, I begin with 80 grit and progress through 100, 120, and finally 150. Each successive grit gradually removes the previous grit's scratches.

Turn on the power

Random-orbit sanders make sanding a lot easier, and with the right technique, more consistent. To use one most effectively, slowly move the sander in the direction of the grain without pausing to remove specific spots, which can cause dips in the surface. Make sure you sand evenly [Photo C]. Repeated sweeps across the entire surface at a rate of 6–12" per second will evenly remove

surface flaws. Use a sander with dust collection, preferably hooked to a vacuum [Photo D].

Random-orbit sanders operate most efficiently when only the weight of the sander bears on the workpiece. Applying excessive pressure not only slows the rotation of the pad (and thus, the sanding process) but can also cause swirl marks or elliptical thumb-nail-scratch patterns.

Because these sanders can't get into corners and may leave swirls, hand-sand the final grit [Photo E], moving the abrasive in the direction of the grain. This process doesn't take long because the power sander has done most of the hard work. But it gives the entire project a consistent sanded surface, leading to an even stain or finish. 🌲

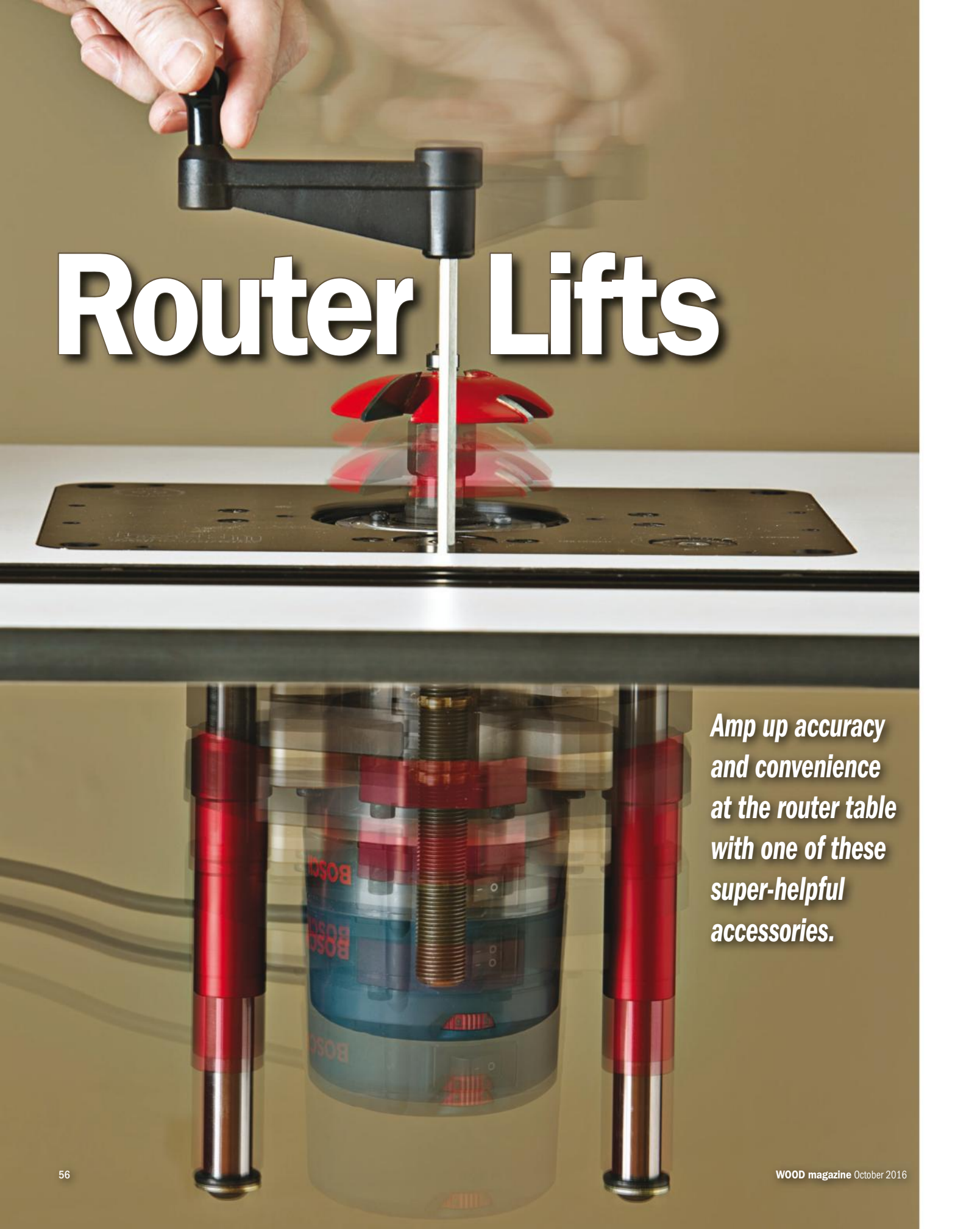
► From aluminum oxide to silicon carbide, there are a number of distinct types of sandpaper. Learn more here:
woodmagazine.com/abrasivetypes



D **Hook up a vacuum** to protect your lungs from inhaling fine dust and also to remove the minute pieces of loose grit from between the sander and the workpiece. Those pieces, if not collected, can create irregular scratches that stand out on your workpiece's surface.



E **Sand by hand.** Just as there are a number of sandpaper manufacturers, there are also many types of hand sanders. Your choices can range from a simple shop-made pad to a commercially made one like this.

A hand is shown adjusting a black router lift handle. The lift is positioned over a red router bit that is mounted on a black router table. The router table has a metal plate with several holes. The background is a plain, light-colored surface.

Router Lifts

Amp up accuracy and convenience at the router table with one of these super-helpful accessories.

►The first plate-mounted router lift was invented by JessEm's Darrin Smith and brought to the market in 1999.

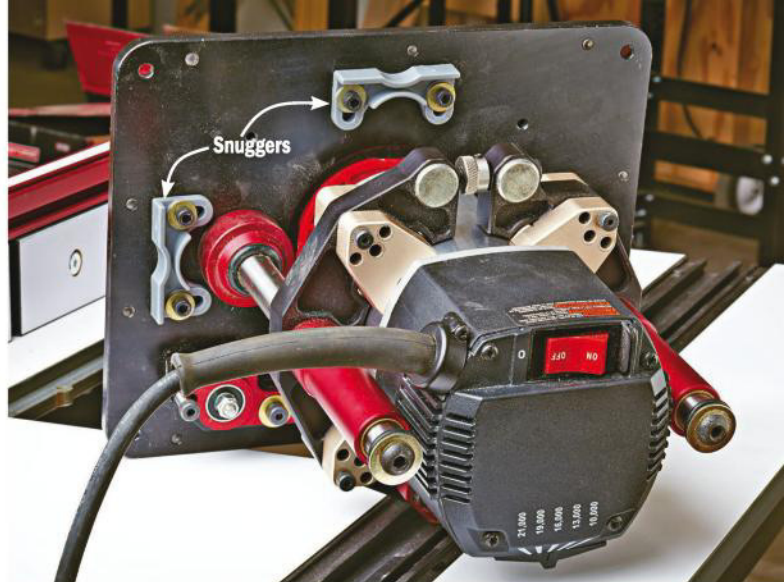
Today's router tables make it possible to cut joinery and edge treatments, such as rail-and-stile frames, raised panels, and lock miters, that used to be done primarily with handheld routers or costly, hulking shapers. One big reason for the growing versatility of router tables: router lifts. With one of these devices, you install a router motor in the carriage, drop the lift into a table, and proceed to easily and precisely raise and lower the router—while it stays *in* the table.

Although many routers now have lift mechanisms built into their bases, those can't equal the precision, reliability, and ease of use of a good router lift. Matching a lift to a table and router requires some research before buying. So we'll first guide you through the process of properly pairing up those components. Then, you'll learn what happened when we tested seven leading lifts head-to-head.

Step 1: Fit the lift to a table

Because a router lift replaces your table's insert plate, you need to first match the dimensions of the lift's plate to the opening in your table. (See the chart on *page 61* for the dimensions of each test model's plate.)

To level a lift with the table's surface, you adjust setscrews in either the lift or table. Four lifts have built-in leveling screws: the JessEm Rout-R-Lift II, JessEm Mast-R-Lift II, Woodpeckers PRL-V2, and MLCS U-Turn 2. And the JessEm and Woodpeckers models also adjust slightly to fit the openings, shown *above*. All the lifts have countersunk holes in the corners of their plates to let you screw them to a table (via threaded inserts in the table's rabbeted recess); these tend to match only tables of the same brand as the lift.



Snug fit. The JessEm Mast-R-Lift II has snuggers that slide to tighten the plate's fit to the rabbeted recess in the table opening.

Step 2: Get the right router

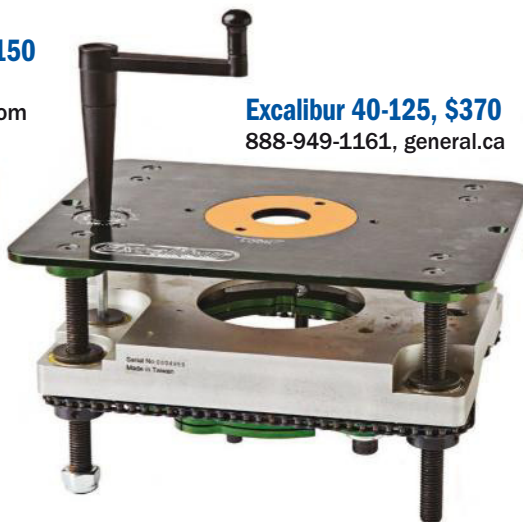
Whether you get the lift or the router first, it's critical that they're compatible, because not all router motors work in every lift. So we tested each lift with 12 popular routers to check not only their fit, but also how each performed. The good news: All the routers we tested have the power to handle any job, but the two 3-hp motors (Milwaukee 5625-20 and Porter-Cable 7518) better tackle deeper, aggressive cuts—fewer cutting passes for you—than the midsize motors.

Only the JessEm Mast-R-Lift II accommodates all 12 routers, thanks to built-in adapters. (See the the chart on the *next page* to learn which routers fit which lifts.) The JessEm Rout-R-Lift II works with all but two routers, but because it sells in five different versions made to fit specific-size motors, you must get the model that matches your router. The Rockler Router Lift FX fits all six 3½" router motors without requiring adapters, but no others.



Bench Dog ProLift 40-150
\$350

800-279-4441, rockler.com



Excalibur 40-125, \$370

888-949-1161, general.ca



JessEm Rout-R-Lift II
\$180

866-272-7492, jesseem.com

Make sure your lift matches your router

ROUTER	Price	Motor diameter (inches)	ROUTER LIFT							COMMENTS
			Bench Dog ProLift 40-150	Excalibur 40-125	JessEm Rout-R-Lift II †	JessEm Mast-R-Lift II	MLCS U-Turn 2	Rockler Router Lift FX	Woodpeckers PRL-V2 ‡	
Bosch 1617EVS	\$170	3.5	Y*	Y*	Y	Y	Y*	Y	Y	Two wrenches make for easy bit changes. The power switch and variable-speed adjuster are side-by-side for convenient access in a lift.
Craftsman 27683	\$190	3.5	Y*	Y*	Y	Y	Y*	Y	Y	It's difficult to engage the spindle lock for one-wrench bit changes above the table. The variable-speed dial numbers are difficult to read when mounted in the lift.
Craftsman 27680	\$200	3.5	Y*	Y*	Y	Y	Y*	Y	Y	It's difficult to engage the spindle lock for one-wrench bit changes above the table. The variable-speed dial numbers are difficult to read when mounted in the lift.
DeWalt DW618	\$150	3.5	Y*	Y*	Y	Y	Y*	Y	Y	It's difficult to engage the spindle lock for one-wrench bit changes above the table.
Hitachi M12VC	\$125	3.28	N	Y*	Y	Y	N	N	N	Two wrenches make for easy bit changes.
Makita RF1101	\$180	3.22	Y*	Y*	Y	Y	Y*	N	N	Two wrenches make for easy bit changes.
Milwaukee 5616-20	\$180	3.32	N	N	Y	Y	N	N	N	Two wrenches make for easy bit changes. The leadscrew—mounted to the motor rather than the base—can limit motor orientation in a lift.
Milwaukee 5625-20	\$310	4.14	N	Y*	N	Y	Y	N	Y	Two wrenches make for easy bit changes. The leadscrew—mounted to the motor rather than the base—can limit motor orientation in a lift. It does not come with a 3/4" collet.
Porter-Cable 690LR	\$130	3.5	Y*	Y*	Y	Y	Y*	Y	Y	Two wrenches make for easy bit changes. Sold primarily as a single-speed model, but some variable-speed models can be found.
Porter-Cable 892	\$180	3.5	Y*	Y*	Y	Y	Y*	Y	Y	It's difficult to engage the spindle lock for one-wrench bit changes above the table.
Porter-Cable 7518	\$350	4.2	Y	Y	N	Y	Y	N	Y	Two wrenches make for easy bit changes. The speed-selection slide switch is difficult to read on the bottom of the inverted motor. It does not come with a 3/4" collet. You can buy the router motor alone for \$300.
Ridgid R2200	\$160	3.62	N	N	Y	Y	N	N	N	The power switch and variable-speed adjuster are side-by-side for convenient access in a lift.

- Y** Fits as is or with included adapter
- Y*** Requires optional adapter
- N** Does not fit

† = Five versions made to fit different motors; specify diameter when purchasing.

‡ = Comes with one set of adapters; specify router motor when purchasing.

► Read router reviews at reviewatool.com/routers.

Tip! Rather than reaching for the motor's power switch each time, add an auxiliary power switch to the router table. Plug the router into this switch, leave the motor switch on, and you've always got control at the table.



JessEm Mast-R-Lift II
\$350
866-272-7492, jessem.com



MLCS U-Turn 2
\$300
800-533-9298,
mlcswoodworking.com



A custom fit. Adapters, such as these shown on the Woodpeckers lift, are sized to fit specific-diameter motors.



Put a ring on it. Some lifts, such as this Excalibur, use reducing-ring adapters to fit different routers.



Limited mounting choices. Milwaukee's two router motors have leadscrews attached, and they often determine the mounting position for matching lifts. This MLCS lift has a predrilled hole specifically for this 3-hp motor.

The Woodpeckers lift comes with a set of adapters, shown *above*, but you must specify the diameter of your router motor when purchasing to get the correct adapters. The remaining lifts fit one or two routers out of the box, but you can buy optional adapters for other routers, shown *above center*.

Some router motors have features that limit their orientation in a lift, such as that shown *above right*. Why does that matter? With most routers, the power switch and variable-speed control are on opposite sides of the router, so you must orient the motor so that you have the best access to these controls.

And if you elect to remove your router motor from the lift for handheld use in its base, Rockler's quick-release mount makes doing that easiest, as shown *right*. The other lifts require loosening one or more screws to remove the router.

The lift openings make bit changes difficult with router motors that use one wrench and a slide-style collet lock, shown *far right*. For simpler bit changes, we prefer routers that use two wrenches.



Quick release. Rockler's Router Lift FX uses a simple cam lock to secure a router motor, providing a quick way to free up the router for handheld use.



A tight squeeze. This router's collet lock becomes difficult to reach with a finger within the lift opening. We had to use a screwdriver to engage the slide-style lock on some models.



Rockler Router Lift FX
\$200
800-279-4441, rockler.com



Woodpeckers PRL-V2
\$370
800-752-0725, woodpeck.com



Step 3: Choose a good lift

After narrowing the field to the lifts compatible with your table and router, the best lift depends largely on two criteria:

► Ease of changing bits above the table.

All the lifts raise the routers enough to allow easy access to the spindle and collet nut for changing bits without reaching beneath the table. Hands down, bit changes are quickest on the Woodpeckers lift. It uses a spring-loaded wrench to bypass the lift's leadscrew, shown *right*. With all but this and the MLCS lifts, you insert a speed wrench through the insert plate and crank the leadscrew. The MLCS model instead uses a crank that extends out the side; bevel gears engage (rather clumsily, we found) the leadscrew, which raises the carriage well enough.

All the lifts have bit openings wide enough to accommodate a 3½" panel-raiser bit, and each comes with at least one reducer ring (shown *below*) to close up the opening around smaller diameter bits, adding workpiece support. But you must remove these rings to change bits, typically with an included wrench. The Bench Dog ProLift 40-150 and Rockler lifts require a bit more work.

► Precision of setting bit height.

All the lifts provide at least 3" of vertical travel, and that's sufficient. But more important, the leadscrew determines how quickly and precisely you can move a bit up and down.

The tested lifts have four different thread counts on their leadscrews. Our favorites use a 16-threads-per-inch (tpi) leadscrew because it's the best compromise between



Up and down in a hurry. With the Woodpeckers lift, you compress, twist, and lift with the wrench to disengage the lift system for large adjustments. You then fine-tune the setting with the thumbwheel.

speed and finesse. (A 16-tpi leadscrew raises or lowers the bit ⅛" per rotation.) Models with this size leadscrew are both JessEms, MLCS, and Rockler. The Excalibur 40-125's 12-tpi leadscrew works well, too. Woodpeckers' 32-tpi leadscrew and thumbwheel work great for fine-tuning bit height, but get tedious if you have to raise or lower the bit



Easy on and off. Insert the spanner wrench's prongs into this insert ring and rotate for quick removal.



A little more tedious. To remove this insert (shown on the Rockler lift, but also on the Bench Dog) you must first back out three tiny screws.

more than 1/8" or so. Conversely, Bench Dog's 8-tpi leadscrew is too coarse for making fine adjustments easily. The Bench Dog, both JessEm's, and the Woodpeckers lifts have locks to prevent carriage movement once you've dialed in a setting.

Backlash can frustrate you as you try to dial in a bit's height, especially when all you need is a few thousandths of an inch. All lifts except the Excalibur and Woodpeckers have adjusters to minimize backlash. We measured .003" or less backlash—an acceptable amount—on all but the Bench Dog, which had twice that amount. The Bench Dog also uses a common socket-and-nut interface, and the sloppy fit between the socket and nut adds to the adjustment issues.

On each lift, a height-adjustment dial helps you track changes. They can all be zeroed out, but not all are easy to read or adjust. We prefer the JessEm dials for their smoothness of adjustment and easy-to-read markings.

► **Backlash:** a brief lack of lift-carriage movement when reversing height-adjuster rotation.

► Read more reviews of router lifts, routers, router tables, and accessories. reviewatool.com

Raise a toast to these uplifting lifters

The JessEm Mast-R-Lift II stands out from this field and earns our Top Tool award. It works with any router motor, demonstrated the least amount of backlash (.001"), has the smoothest adjustments, comes with a sturdy aluminum plate, and fits easily in most router tables.

And its sibling, the JessEm Rout-R-Lift II, grabs our Top Value award. Sporting a dead-flat phenolic plate, this lift's \$180 price tag is lowest in the test, but it's also our second-favorite lift overall. 🌳

Produced by **Bob Hunter** with **Tom Brumback**

► Incra Tools sells two router lifts identical to the JessEm Mast-R-Lift II and the Woodpeckers PRL-V2, with the only difference being magnetically attached steel insert rings rather than plastic twist-ons. They work well.

Give yourself (and your router) a raise

MODEL	PERFORMANCE RATINGS (1)						INSERT PLATE				CARRIAGE, INCHES		ACCESSORIES (3)		WARRANTY, YEARS	COUNTRY OF ASSEMBLY (4)	SELLING PRICE (5)
	EASE OF ADJUSTING BIT HEIGHT	ABSENCE OF BACKLASH	EASE OF CHANGING BITS	EASE OF USING ADJUSTMENT SCALE	EASE OF FITTING/LEVELING INSERT PLATE	EASE OF INSTALLING/REMOVING ROUTER MOTOR	MATERIAL (2)	INCHES			THREAD PITCH (HEIGHT CHANGE PER LEADSCREW REVOLUTION)	MAXIMUM VERTICAL TRAVEL	STANDARD	OPTIONAL			
								DIMENSIONS, T × W × D	MAXIMUM BIT OPENING	INCLUDED REDUCER-RING BIT OPENINGS							
BENCH DOG PROLIFT 40-150	C	B	C	A	C	B	C	$11/32 \times 11\frac{3}{4} \times 8\frac{1}{4}$	$3\frac{11}{16}$	$1\frac{1}{2}$	$1/8$	$5\frac{3}{32}$	C, R, S	A, R	2	T	\$350
EXCALIBUR 40-125	B	A	A	A	C	A	A	$1/4 \times 11\frac{3}{4} \times 9\frac{1}{4}$	$3\frac{9}{16}$	$1\frac{1}{2}$	$1/12$	$3\frac{1}{2}$	C, R, S, W	A, R	Lifetime (2 years for pro use)	T	\$380
JESSEM ROUT-R-LIFT II	A	A	A	A	A	A	P	$3/8 \times 11\frac{3}{4} \times 9\frac{1}{4}$	$3\frac{9}{16}$	2	$1/16$	$3\frac{1}{32}$	C, R, S, W	R	1	CA	\$180
JESSEM MAST-R-LIFT II	A	A	A	A	A	A	A	$3/8 \times 11\frac{3}{4} \times 9\frac{1}{4}$	$3\frac{9}{16}$	2	$1/16$	$3\frac{1}{2}$	A, C, R, S, W	R	1	CA	\$350
MLCS U-TURN 2	C	A	A	A	B	A	A	$3/8 \times 11\frac{3}{4} \times 9\frac{1}{4}$	$3\frac{9}{16}$	2	$1/16$	$3\frac{7}{8}$	C, R, S, W	A, R	3	C	\$300
ROCKLER ROUTER LIFT FX	A	A	C	A	C	A	A	$11/32 \times 11\frac{3}{4} \times 8\frac{1}{4}$	$3\frac{11}{16}$	$1\frac{1}{2}$	$1/16$	3	C, R, S	R	90 days	T	\$200
WOODPECKERS PRL-V2	A	A	A	B	A	B	A	$3/8 \times 11\frac{3}{4} \times 9\frac{1}{4}$	$3\frac{5}{8}$	1, $1\frac{13}{16}$ (for guide bushings), $2\frac{5}{8}$	$1/32$	$3\frac{3}{8}$	A, C, R, S, W	R	1	U	\$370

1. **A** Excellent
B Good
C Fair

2. (A) Aluminum
(P) Phenolic
(C) Cast iron

3. (A) Router-motor adapters
(C) Height-adjustment crank
(R) Bit-opening reducer rings
(S) Starter pin
(W) Reducer-ring spanner wrench

4. (CA) Canada
(C) China
(T) Taiwan
(U) United States

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

Enter the Makerspace

Shop class doesn't have to end in high school.



Don't have space or money for a shop of your own? Or maybe you need one-time use of a special tool, or some insights on a new technique. Makerspaces—community workshops filled with tools and experts—offer affordable ways to begin or continue woodworking; refine skills or learn a new one, such as glassblowing or metalworking; and collaborate with other woodworkers.

What a makerspace offers

Makerspaces include businesses, co-ops, and nonprofits. So what, specifically, do these shops offer?

► Training and support

Besides advice and assistance provided by technicians and staffers, some makerspaces offer one-on-one training. Sam Watts, cofounder of the American Workshop, a woodworking-specific shop in Burnsville, Minnesota, says, “We have experts on staff who can help anyone with any project. Sometimes customers need just a little guidance and sometimes they need us for the whole project.”

Many makerspaces offer classes that provide opportunities to meet other woodworkers and develop new skills. John Blunt of IsGood Woodworks Collective in Seattle, Washington, says, “My beginning classes serve to break the ice for people who might like to build something but are unsure of their abilities. The classes become an opening to everything else that we do here,” [Photo A].

► Machines you don't have

Some machines, such as 3D printers, CNC routers, laser engravers/cutters, and large drum sanders, cost more to purchase than many recreational users can justify. Fortunately, a makerspace may have these available [Photo B]. Perhaps your bandsaw doesn't have the capacity to resaw an 18"-wide board. A

► “Our goal is for everyone to complete their projects with or without our help.

Because once you complete a project, you gain confidence.

And when you become confident in your skills, you can truly enjoy working with your hands.”

—Sam Watts,
American Workshop



A

A little help can go a long way. One of John Blunt's students built this beautiful credenza. Before joining IsGood Woodworks, this student's prior woodworking experience was limited to a single class he'd taken in high school.

community shop may be able to help, but be aware that the more popular a machine, the longer the wait time can be to use it.

Try a machine before you buy. If you're entertaining the thought of purchasing a new machine—such as this edge-belt sander—a makerspace offers the opportunity to familiarize yourself with features and operations before you go shopping.



B



C

Try something other than woodworking. Many makerspaces offer unique disciplines. Here, several of John Blunt's students build a tiny house on a trailer, learning to work with fiberglass and mastering bent lamination for the roof.

► Access to other disciplines

Some makerspaces offer instruction on using other materials, such as glass, metal, or leather, and crafts as diverse as photography and sewing. John says, "One of my clients teaches a gourd banjo class, and will be teaching the timber-frame section of a tiny-house build" [Photo C].

► A sense of community

Woodworkers tend to work alone in their shops, but makerspaces foster a sense of

community by making the shop a shared space. New woodworkers learn from those with more experience, and the veterans gain the satisfaction of passing on their hard-earned knowledge. "Community-building is the key to everything we do," John says. "Despite our large number of customers, I make a point of getting to know something about what they do and what interests them, and I am not shy about letting them know that we are building together" [Photo D].

Tip! If you join a makerspace that doesn't have a tool or class you need, speak up. "We've implemented changes in our shop based on customer suggestions," Sam Watts says.



D

Sometimes, even instructors need help. John Blunt once called upon the expertise of his students for a project. "I was inspired by a lucky find of hollow logs to build a series of tables. I brought six of my former and current students together to each contribute their own specialty to the project: log milling, glass shaping, metalworking, woodworking, and finishing."



E

It always takes longer than you think. Sam Watts says, “One thing that surprises a lot of our customers is just how long it takes to build something. A lot of people are new to woodworking, and their only exposure to the craft are shows on cable TV,” where projects seem to be accomplished in 30 or 60 minutes.

Shopping for a makerspace

Think of a makerspace as a health club for those interested in building something other than muscles. Just like the services offered, pricing varies wildly. Many community shops offer hourly and daily rates to those just needing to use a tool, make a few cuts, or build a small project. For those requiring more shop time, most makerspaces offer monthly and annual memberships. “There is a fairly balanced mix of people doing one-off projects and those pursuing an ongoing learning experience,” John says. “We offer short-term rentals [pay by use] and subscriptions for a given number of hours a month. Mostly, customers choose short term for projects, and subscriptions for ongoing learning.”

Expect to pay anywhere from \$50 to \$400 per month for a standard membership giving you access to the shop. Or, if the makerspace charges hourly rates, expect to pay

anywhere from \$10 to \$30 an hour. One-on-one instructor time and classes may require additional fees.

Some shops limit your access to a fixed number of hours per week or month, while others stay open 24/7 and allow you to work as long as you like. Expect also to have to pay for an initial safety certification, an initiation fee, locker or storage rental fees, and possibly a fee for use of a workbench. Need supplies such as fasteners or lumber? The shop may have them on hand, but expect to pay for those, too.

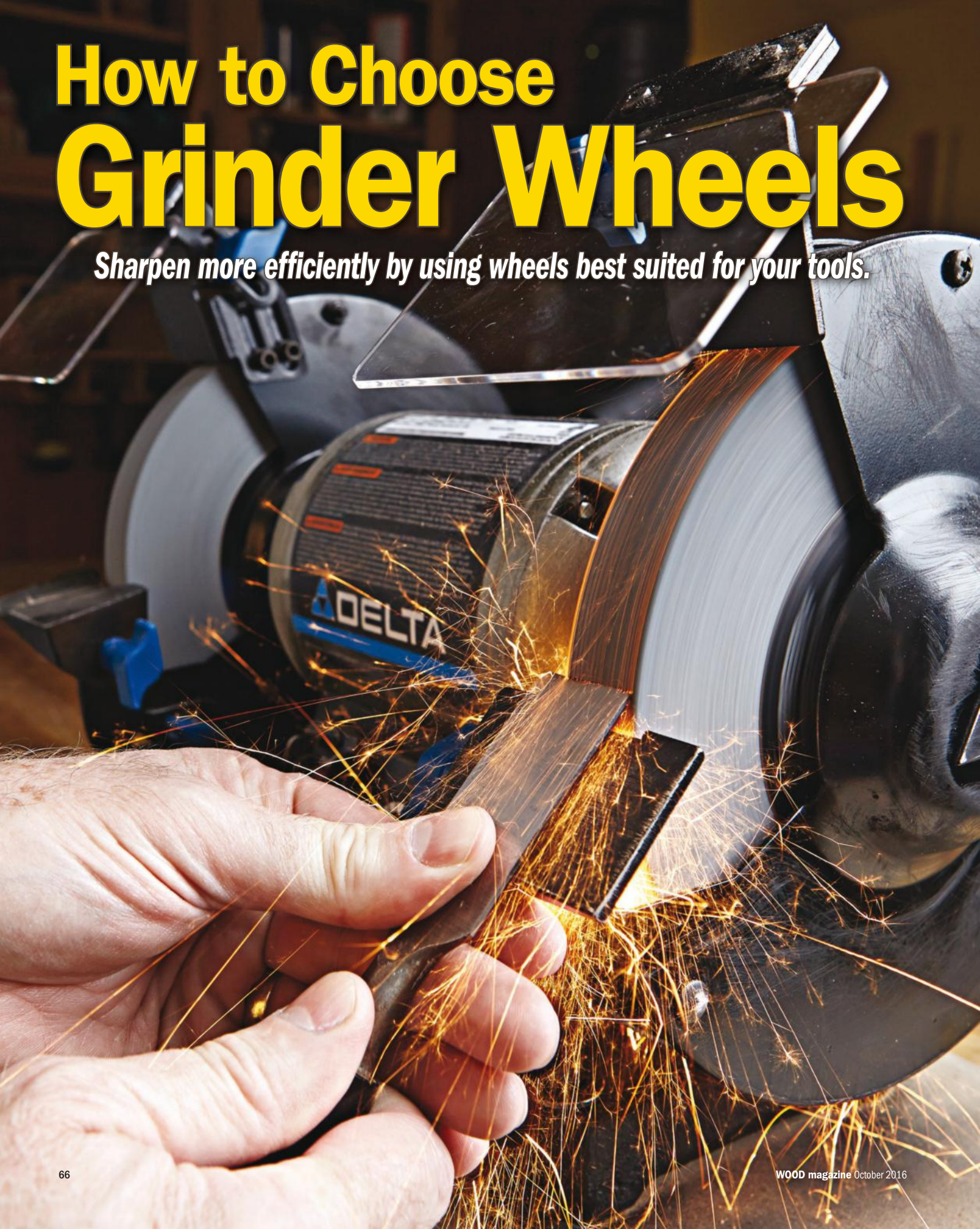
Sam suggests that less-experienced woodworkers plan on spending longer on a project than they might initially anticipate [Photo E]. Even experienced woodworkers should budget a few extra hours for their projects. Seldom does a project go exactly as planned, or finish ahead of schedule.

How do I find one?

The makerspace movement has spread throughout the country, but you’ll find most makerspaces in larger metros where the population can support them. Retirement communities, too, frequently offer community workshops for residents. To find a shop in your area, conduct a web search for terms such as “makerspace,” “community workshop,” “tool co-op,” and “tool-lending library.” After finding a makerspace, ask for a tour of the facility. Then, carefully assess resources and ask questions regarding rates and rules before signing on the dotted line. 🌲

How to Choose Grinder Wheels

Sharpen more efficiently by using wheels best suited for your tools.



Whether you're replacing a worn-out grinder wheel or simply upgrading one that doesn't meet your needs, it's important to get the right one to minimize sharpening time and maximize the life of your tools and grinder wheels. Manufacturers make grinder wheels from different abrasives to work best with specific types of metals.

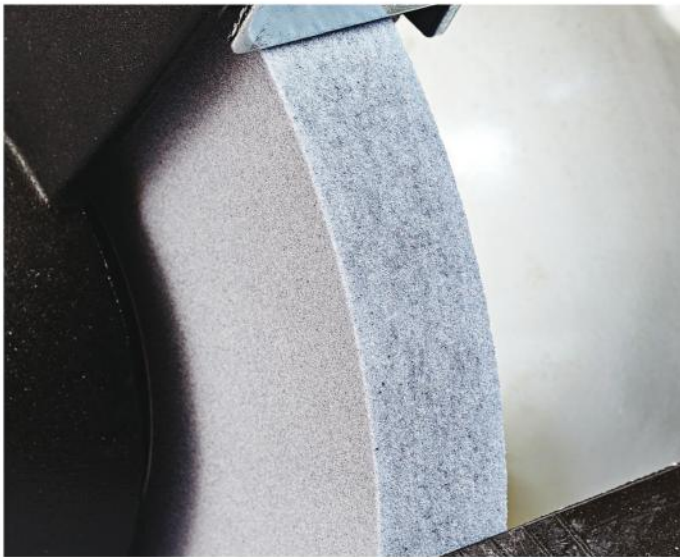
Types of abrasive wheels



► **Silicon carbide.** This low-cost wheel works best with non-ferrous metals, such as aluminum, brass, or copper, and carbide. It's typically dark gray to bronze in color. Although they used to come standard on most bench grinders, they're becoming less common as more manufacturers switch to aluminum oxide wheels.



► **Aluminum oxide.** Priced at 20–30 percent more than silicon-carbide, these general-purpose wheels come in two grades. The lower-cost version, usually gray or brown, works best with carbon-steel tools (the most common steel, usually associated with low-cost tools). The white version typically sells at a slightly higher price, but cuts faster while heating the tool less. It breaks down quicker than “regular” aluminum oxide to continually expose a fresh cutting surface, which means replacing it more frequently. This premium blend also works with carbon steel, but it's best with harder steel alloys.



► **Ceramic/aluminum oxide.** Most often pale blue, this abrasive has a fast cutting action with the least amount of tool burn. It's more durable than the white blends (and about 25 percent higher in price), and it's ideal for hard steel alloys, such as high-speed steel (HSS).

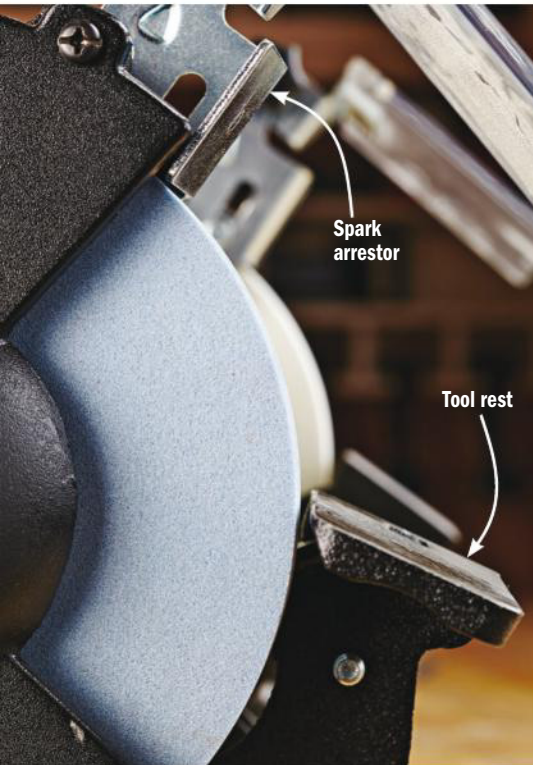


► **Cubic boron nitride.** This abrasive is bonded to a steel wheel. Use it only for hard steel alloys and carbide tools; carbon steel will damage the abrasive. Sold in multiple grits, it costs 4–5 times that of aluminum-oxide wheels.

When to change wheels

Replace a wheel on your grinder if any of the following apply:

- the gap between the wheel and tool rest (*below*) cannot be closed to $\frac{1}{8}$ " or less;
- the gap between the wheel and spark arrestors cannot be closed to $\frac{1}{4}$ ";
- the wheel shows any indications of damage (*bottom*).



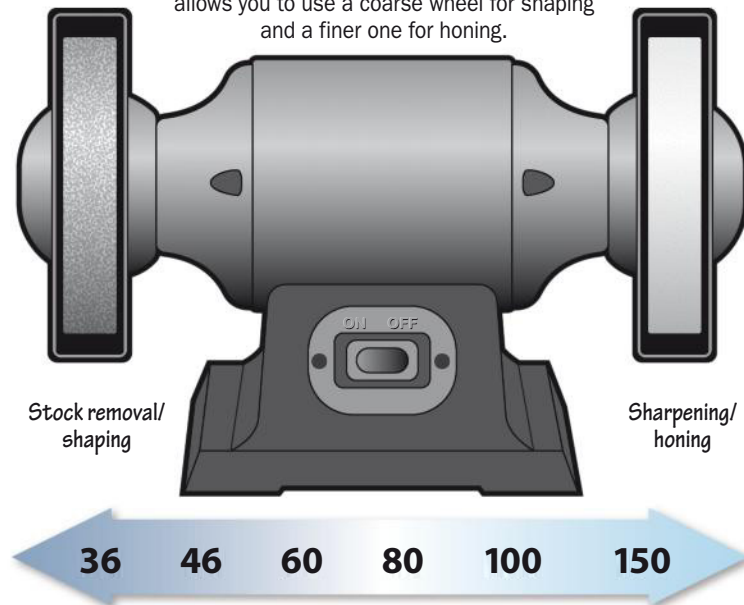
The tool rest needs to be close to the grinder wheel to prevent tools from getting caught between them. A spark arrestor limits sparks that follow the wheel's airstream from pouring down on your hands.



Check a grinder wheel's integrity by tapping on its side with the handle of a screwdriver in 4 or 5 places. A bell-like "ping" indicates all is well; a dull thunk means a problem and the wheel should be replaced.

How to get the right grit

A grinder with two abrasive wheels (versus one with a single abrasive wheel and a wire wheel) allows you to use a coarse wheel for shaping and a finer one for honing.



2 quick tips for better grinder wheel performance



Because grinders have different diameter arbors, most wheels come with bushings to ensure a perfect fit. Tighten the arbor nut only to "snug"—overtightening can fracture the wheel.



Sharpening and grinding clogs abrasive wheels with metal filings and slows their cutting action. So refresh your wheels regularly, for about 10–20 seconds, with a dressing tool, such as the diamond or star-wheel dressers shown. (Watch a video showing how to use a dressing tool at woodmagazine.com/dressingtool.)



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Body Mechanics: Tablesaw Rips

Whether you're ripping a board for the first time, or have been making that cut for years, it pays to review the fundamentals.

Get ready to rip

- 1 Set up outfeed support if needed to prevent the workpiece and offcut from falling to the floor.
- 2 Position the rip fence for the desired workpiece width and lock the fence securely.
- 3 Position a pushblock or pushstick on or to the right of the fence, within easy reach.
- 4 Stand to the left of an imaginary line drawn through the blade, with your left foot forward.
- 5 Place the workpiece flat on the table with the edge pressed against the fence and the leading end at least 3" from the blade.
- 6 Turn on the saw, and push the workpiece forward while simultaneously pressing it against the fence. Watch the areas in front of the blade and along the rip fence to make sure fingers stay well away from the blade and that the workpiece remains in full contact with the fence.

continued on page 72

5
Begin the cut with the end of the workpiece here.

6
Keep eyes on this area.

3

2

4

If your saw has a large paddle "off" switch, stand so you can bump the switch with your leg while keeping both hands on the workpiece.

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Finishing touches

⑦ When the trailing end of the board reaches the near edge of the saw table, push with your left hand while reaching for the pushstick with your right. Center the pushstick between the blade and fence and use the pushstick to move the workpiece forward until the board clears the blade. Turn off the saw, allow the blade to stop, then retrieve the workpiece and cutoff. Never lean over a spinning blade. 🌲



Hooking a couple of fingers over the fence helps keep all digits away from the blade.



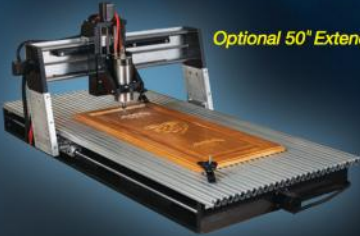


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Butternut	4/4	2C	2.50	1C	3.25	8/4	1C	3.75		4/4	\$100.00	8/4	\$129.00
Cedar	4/4	1C+Btr	2.00			8/4				4/4	\$87.00	8/4	NA
Cherry	4/4	1C	2.75	Select	4.80	8/4		5.75		4/4	\$126.00	8/4	\$139.00
Cypress	4/4			Select	3.00	8/4		4.00		4/4	\$99.00	8/4	\$109.00
Hickory-Pecan	4/4	1C	2.00	Select	3.00	8/4	Select	3.50		4/4	\$110.00	8/4	\$137.00
Mahogany (African)	4/4			Select	5.25	8/4		5.55		4/4	\$124.00	8/4	\$127.00
Maple (Hard)	4/4	Select (N)	3.00	Select (W)	3.65	8/4	Select	4.50		4/4	\$118.00	8/4	\$126.00
Maple (Soft)	4/4			Select	2.60	8/4		3.00		4/4	\$97.00	8/4	\$107.00
Oak (Red)	4/4	1C	2.10	Select	2.80	8/4	Select	3.95		4/4	\$107.00	8/4	\$129.00
Oak (White)	4/4	1C	2.20	Select	2.80	8/4	Select	4.95		4/4	\$107.00	8/4	\$135.00
Poplar	4/4	1C	1.30	Select	1.80	8/4	Select	2.00		4/4	\$87.00	8/4	\$91.00
Walnut	4/4	1C	3.25	Select	6.25	8/4	Select	7.00		4/4	\$129.00	8/4	\$149.00
White Pine (Soft)	4/4	F.G.	1.40			8/4	FG	1.80		4/4	\$80.00	8/4	\$86.00
Yellow Pine (Soft)	4/4	Clear	2.20			8/4	Clear	2.60		4/4	\$92.00	8/4	\$99.00
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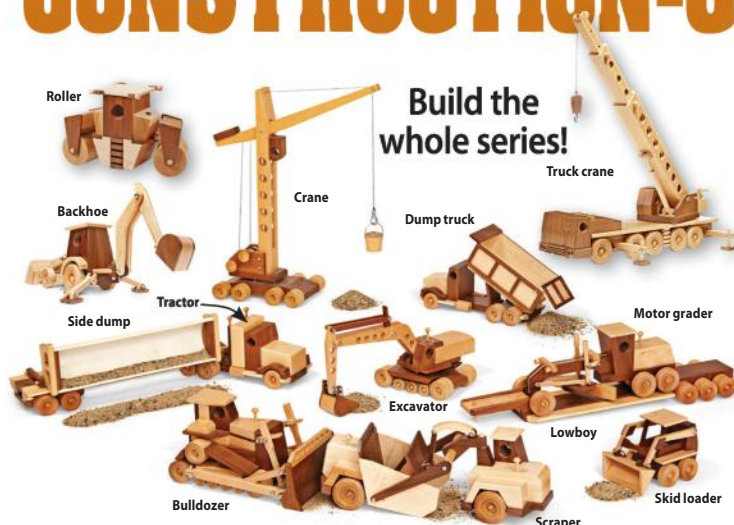
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SCISSOR **SUPER COUPON**

DOVETAIL JIG
WINDSOR DESIGN

LOT 34102
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comp at \$53.77



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LOT 69703 shown
61683 shown



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LOT

69805 shown
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10" 12 SPEED BENCHTOP DRILL PRESS

LOT 62408 shown
60237 shown



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LOT 95559 shown
61634/61952
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SCISSOR **SUPER COUPON**

4-1/2" ANGLE GRINDER
drillmaster

LOT 60625 shown
95578/69845



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SCISSOR **SUPER COUPON**

11 PIECE WOOD CARVING SET
WINDSOR DESIGN

LOT 60655 shown
62673 shown

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comp at \$8.99



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SCISSOR **SUPER COUPON**

90 AMP FLUX WIRE WELDER

LOT 61849 shown
62877 shown

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Accidental blade contact with this finger-saver saw leaves you with a barely detectable nick.

REAXX 10" portable tablesaw with stand, no. GTS1041A-09, \$1,499 (without stand, no. GTS1041A, \$1,299)

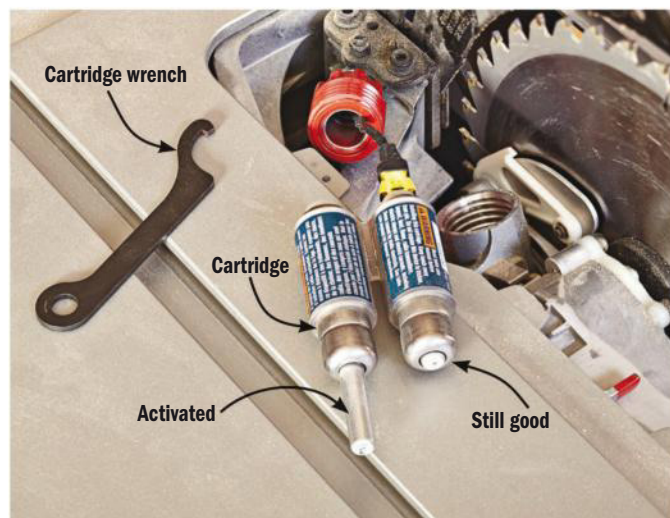
Anytime a new tool delivers a safer way of working without losing functionality, I'm all for it. And this new tablesaw from Bosch does exactly that. The REAXX saw has flesh-detecting technology that, when activated by a body part contacting the blade, immediately drops the blade beneath the table and kills the power, letting the saw coast to a stop. It happens so quickly you won't see it occur. And after an activation, you simply flip the two-shot cartridge (\$99, shown below) or replace it with a new one. Then lift the arbor assembly back into place to resume cutting—no need to replace the blade.

I activated this safety feature multiple times in testing (using a stunt hot dog in place of my finger), and it worked every time, even with a dado stack. Resetting the saw takes just a minute or two. After doing this, I recommend checking the blade's alignment to the miter slots—some activations knocked the arbor assembly out of alignment by .007"–.010". Thankfully, realigning the blade is a cinch thanks to the four trunnion bolts recessed in the top. The rip fence also proved easy to align with a pair of top-mounted adjustment bolts.

The 110-volt universal motor provides plenty of power. I ripped 2"-thick oak and hard maple without bogging it down. When hooked to a vacuum, dust collection proved sufficient. And the the stand-mounted model only) is a welcome feature.

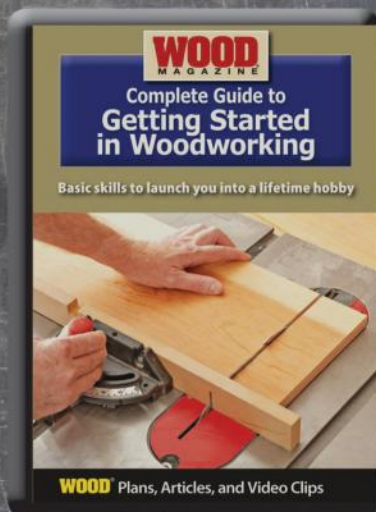
—Tested by Bob Hunter, Tools Editor

Bosch, 877-267-2499, boschtools.com

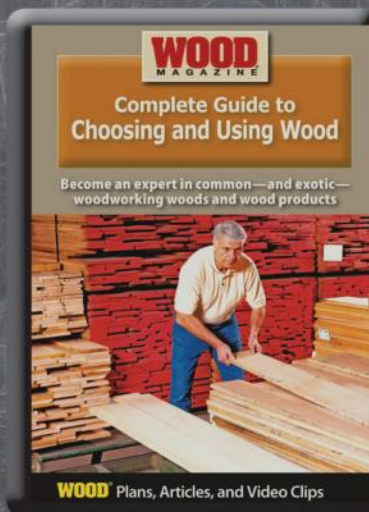


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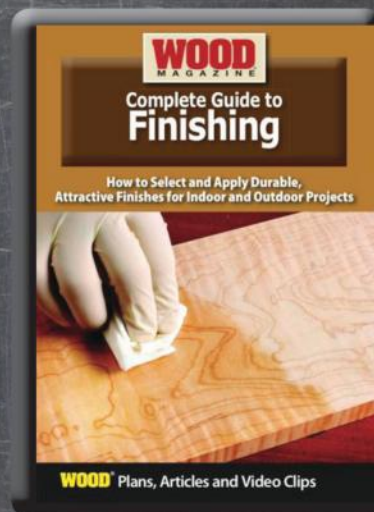
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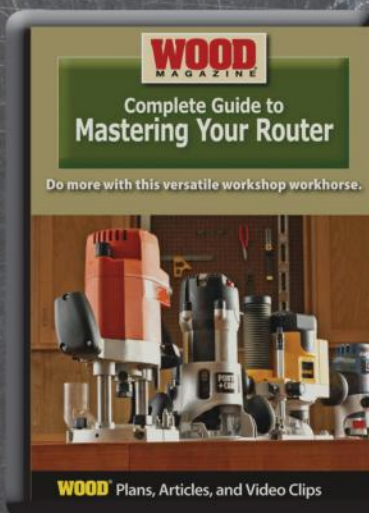
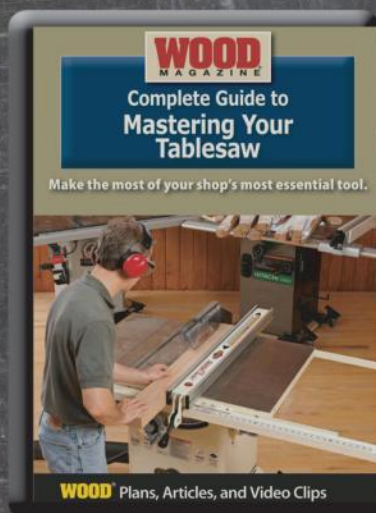
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SawStop sliding crosscut table, no.TSA-SA48, \$1,000

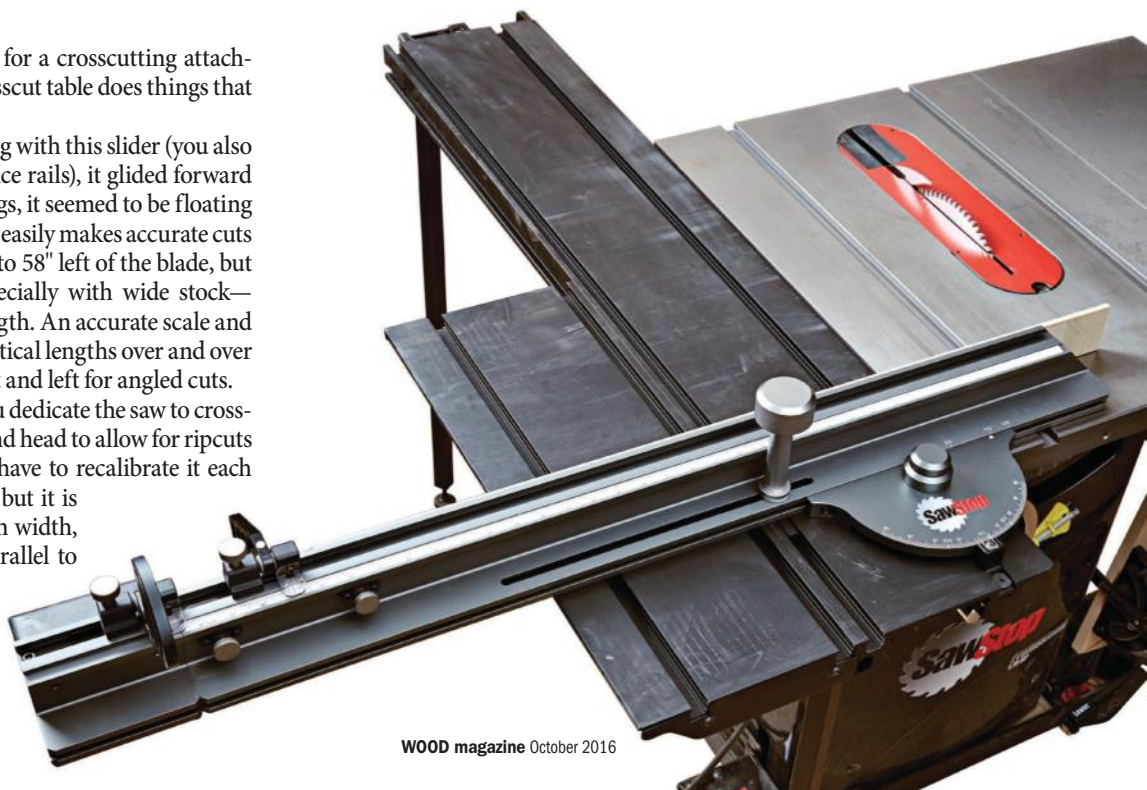
SawStop, 866-729-7867, sawstop.com

Yes, \$1,000 is a daunting investment for a crosscutting attachment; we get that. But this sliding crosscut table does things that no miter gauge or sled can do.

After we replaced our saw's left wing with this slider (you also have to remove or shorten the rip-fence rails), it glided forward and back so smoothly on silky bearings, it seemed to be floating on air. And its crosscut capacity of 48" easily makes accurate cuts in sheet goods. The fence extends up to 58" left of the blade, but you'll need workpiece support—especially with wide stock—when you get beyond about 40" in length. An accurate scale and two flip-stops let you cut stock to identical lengths over and over again. And, the fence rotates 60° right and left for angled cuts.

This accessory works best when you dedicate the saw to crosscutting. You must remove the fence and head to allow for ripcuts with offcuts wider than 8", and you have to recalibrate it each time you replace it. It's not difficult, but it is annoying. (For rip offcuts 8" or less in width, simply rotate the fence 90° so it's parallel to the miter slots and out of the way.)

—Tested by Kevin Boyle and John Olson,
Design Editors



80

WOOD magazine October 2016

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Doweling jig, no. 08350K, \$200

JessEm, 866-272-7492, jesseem.com

JessEm's Doweling Jig solves one of the age-old problems with dowel joints (and doweling jigs): hole misalignment in mating workpieces. Here's how it works. First, lay out and drill dowel holes in one of the workpieces. The jig's fence registers along the body by way of self-indexing notches in $\frac{1}{8}$ " increments; for centered holes, you set it based on half the workpiece thickness. The drill guides are spaced in equal increments (clearly etched into the guide holder, with different holders for each size hole) so you can drill those you want without moving the jig.

With one workpiece drilled, you insert a dowel into one hole, and then clamp the mating workpieces together so you can drill the mating one. Fit the jig's slotted guide around the dowel (right) and clamp it to both pieces. Drill a hole using the guide directly in line with the dowel (far right), and then any others that align with those already drilled. Done!

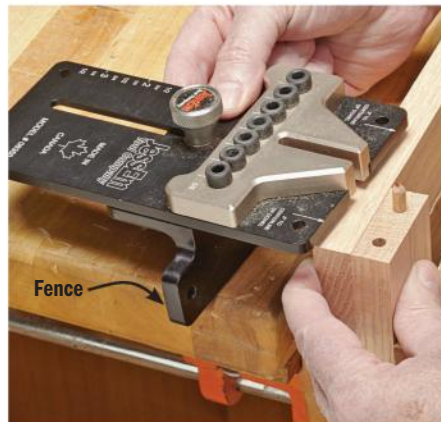
On my first attempt, I drilled a dozen randomly spaced holes along the edges of two boards, and the two fit together perfectly. I still can't believe it's this easy.

The Master Kit comes with drill guides, bits, and stop collars for making $\frac{1}{4}$ ", $\frac{3}{8}$ ", and $\frac{1}{2}$ " dowel holes, as well as an indexing pin for

each size that lets you step-and-repeat by registering off a drilled hole. Don't need the whole kit? Buy the $\frac{3}{8}$ " jig for \$130. If you later need the other sizes, get them for \$40 each.

—Tested by Craig Ruegsegger,
Deputy Editor

continued on page 82



woodmagazine.com

81

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Rikon 8" wet-wheel sharpener

no. 82-100, \$250

A water bath keeps the 220-grit aluminum-oxide wheel on this sharpener lubricated, letting you shape and sharpen tools without heat buildup. The 115-rpm machine also has a leather-strop wheel for honing an edge, and comes with a straightedge tool-holding jig, bevel gauge, and honing compound for the leather strop.

Rikon Power Tools

877-884-5167, rikontools.com



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Lie-Nielsen honing guide

no. 1-HG, \$125

Made of noncorrosive stainless steel and brass components, this honing guide's side-clamping jaws hold chisels, plane irons, and other edge tools as you roll it back and forth on your sharpening stones. Its standard jaws hold most plane irons and bevel-edge chisels from 1/4" to 3/4" wide. You can buy optional jaws (\$35 per pair) for holding other edge tools.

Lie-Nielsen Toolworks

800-327-2520, lie-nielsen.com



WorkSharp sharpening guide

Guided Sharpening System, no. WSGSS-BX, \$60

This benchtop system for sharpening knives, scissors, hedge trimmers, axes, and hatchets comes with coarse (320 grit) and fine (600) diamond-stone plates, as well as multiple ceramic honing rods. The angle guides help you establish 17° and 20° bevels, and the plate pivots as you stroke the knife or tool to keep contact along the full edge. You can also buy optional extra-coarse (220 grit) and extra-fine (800) diamond plates, a leather honing plate, and a 25° angle guide in a kit for \$35.

WorkSharp Tools

800-597-6170, worksharptools.com



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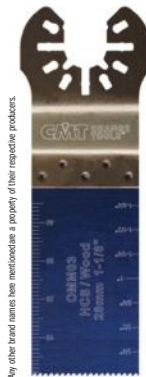
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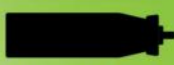
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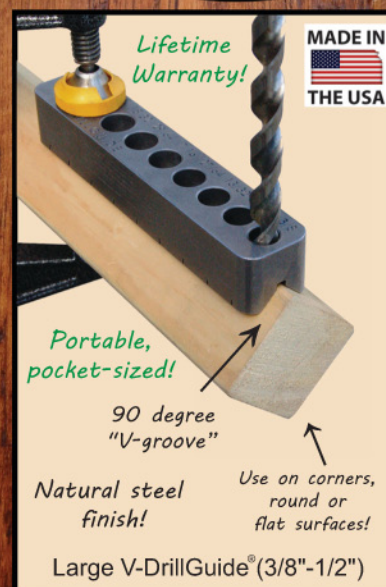
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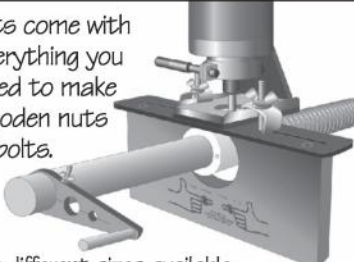


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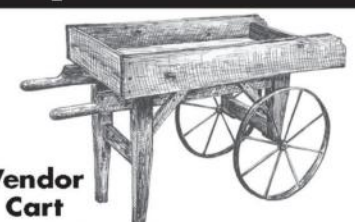
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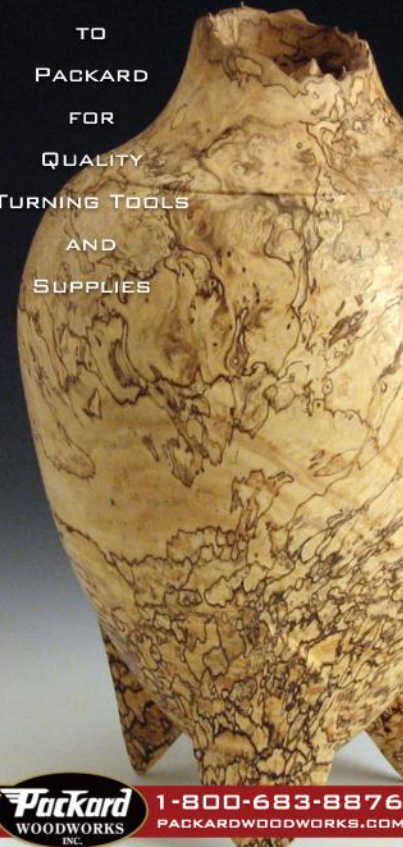


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WHAT'S AHEAD

A GLIMPSE INSIDE THE NOVEMBER ISSUE
(ON SALE OCTOBER 4)



Mackintosh-inspired table

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Finishing your finish

At the end of the day, it's what you do *after* the finish that makes your project stand out.



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"Made in small batches in Pittsburgh, Pennsylvania, our paint line includes a true black and white, affording the ability to mix custom tints and shades." – Mike Whiteside, on right

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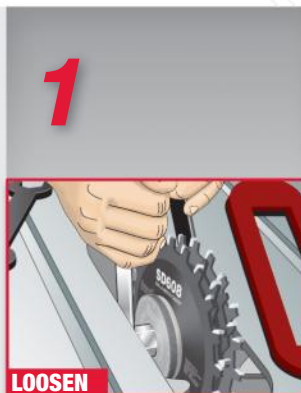
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