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Easy-to-build **Adirondack Chair** with Footrest

p.20

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great plans:**

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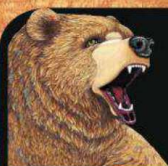
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- Amps: 11 at 110V, 5.5 at 220V
- Cutting capacity/throat: 13 1/2"
- Max. cutting height: 6"
- Footprint: 23 1/2" x 16 1/2"
- Table height above floor: 43"
- Table tilt: 45° right, 10° left
- Frame construction: cast iron
- Precision-ground cast iron table
- 2 blade speeds: 1800 & 3100 FPM
- Blade size: 93 1/2" long
- Blade width range: 1/8" - 3/4" wide
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- Amps: 20A at 110V, 10A at 220V
- Power transfer: Belt drive
- Precision-ground cast iron table
- Table size: 17" x 17" x 1 1/2" thick
- Table tilt: 10° left, 45° right
- Floor to table height: 37 1/2"
- Max. cutting height: 12 1/8"
- Blade size: 131 1/2" long
- Blade width range: 1/8" - 1" wide
- 2 blade speeds: 1700 and 3500 FPM
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The **WOOD®** magazine difference:
We build every project, verify every fact, and test every reviewed tool in our workshop to guarantee your success and complete satisfaction.





FREE PLANS FOR A BETTER BACKYARD

From May 9 to June 20, 2013, download a new outdoor plan every week and don't pay a penny! Just visit the "Build a Better Backyard" page at woodmagazine.com/betterbackyard. You'll also get free how-to articles and videos, deep discounts on other outdoor plans, and more.

Make this planter with or without the attached trellis from plans you can download free May 9–15, 2013.

RED, WHITE, AND BLUE REVIEWS BY REAL WOODWORKERS

- ▶ Woodpeckers router lift (made in North Royalton, Ohio) woodmagazine.com/RWBlift
- ▶ Oneida cyclone dust collector (made in Syracuse, N.Y.) woodmagazine.com/RWBcyclone
- ▶ Blue Spruce wood chisels (made in Oregon City, Ore.) woodmagazine.com/RWBchisels
- ▶ Starrett combination square (made in Athol, Mass.) woodmagazine.com/RWBsquare
- ▶ Jorgensen CabinetMaster clamp (made in Chicago) woodmagazine.com/RWBclamp
- ▶ Lie-Nielsen jack plane (made in Warren, Maine) woodmagazine.com/RWBplane
- ▶ Kreg pocket-hole jig (made in Huxley, Iowa) woodmagazine.com/RWBpocketjig
- ▶ Delta Unisaw (made in Anderson, S.C.) woodmagazine.com/RWBunisaw



TELL US YOUR FAVORITE TIP

WOOD® editors chose the face-frame jig from Edouard Piché on page 6 as this issue's Top Shop Tip. Agree or disagree? Vote for your favorite tip of the issue at woodmagazine.com/shoptipoftheyear. It could be Jet's Shop Tip of the Year!

TOP
SHOP
TIP



WOOD magazine July 2013

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Editor's Angle

So long to the “git-er-by” bedroom

When we moved into our first house 25 years ago, I had big plans to build a bedroom set to replace the cheap hand-me-down stuff I got in college. Small problem: I had few tools and little room for a shop. Plus, all my free time (and money) was gobbled up by home-improvement projects—replacing windows, knocking out a wall here and there, putting in new flooring. So we picked up a mostly mismatched bedroom set at a garage sale just to get us by until I could build the dream set.

Then came the kids.

Long story short, we're still using that cheesy furniture.

That's why the bedroom set that started with the bed in *WOOD*® issue 218 (May 2013) and continues with the dresser and nightstand on *page 42* couldn't have come at a better time. Even with one college tuition in progress and another only a year away, my saintly patient wife may finally get the hand-crafted bedroom suite she deserves. Because, although these pieces glow with the rich look of age-old cherry, we built them from affordable poplar. And their construction is so straightforward, you can even build them in a small shop.

You'll never walk alone. As we review Shop Tips that come in from readers (shoptips@woodmagazine.com), we often get the same tip from multiple readers. (Mustard bottle for wood glue, anyone?) That's because most woodworkers “fly solo” in the shop, and when we run into a problem, we have to puzzle it out by ourselves.

Think of the shop time you could save by bouncing ideas around with others!

On *page 18*, blogger Chris Adkins offers some great solutions in *Unvarnished*. 🌲

See you in the shop!

Dave Campbell
dave.campbell@meredith.com

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Article timing is perfect, naturally

Your article on natural-edge furniture ("How to Work With Natural-Edge Slabs", issue 212, July 2012, page 34) arrived at my house with perfect timing. I had just begun work on a natural-edge coffee table for our den, and the article served as an enormous inspiration to press on and finish the project. I logged some hard hours with the belt sander and had to do a little head-scratching when it came to sizing and leveling the support brackets, but I'm pleased with the way it turned out.

—Stephen Warmath, Tallahassee, Fla.



Stephen built this coffee table from a slab of century-old, water-reclaimed cypress, bolted to brackets of $\frac{3}{16}$ " steel atop a bandsawn cypress base. All wood parts were finished with four coats of tung oil, sanding between coats with a 220-grit sponge.

Forgotten glass panel becomes centerpiece

Last summer, my husband and I discovered in storage a stained-glass window that had once been built into a wall of our century-old historic home in downtown Chicago. Rather than undertake the major work of building it back into the wall, we solicited my uncle, Brad Townsend, to construct an illuminated display. He built the solid mahogany case shown here that

reflects the architectural lines of our home, and equipped it with a panel of LED lights, a light diffuser, and dimmer switch. The case turned out beautifully, and is as much a work of art as the glass panel it holds.

—Kim Danahy, Chicago



Brad assessed the architectural details of the home—both inside and out—before settling on a design that drew upon the dentil work and large pillars on the home's façade.

Honoring veterans one urn at a time

A few months ago, I saw a news report about a veteran who'd been buried in a cardboard box. Dismayed at this treatment of one of our nation's warriors, I suggested to the Woodcrafters Club of Tampa—of which I'm president—that we make and donate cremation urns to families unable to buy one for their fallen loved one. We've since made several urns like those shown here. I hope my fellow woodworkers will offer their skills and service in a similar way.

—Tom Jones, Land O' Lakes, Fla.



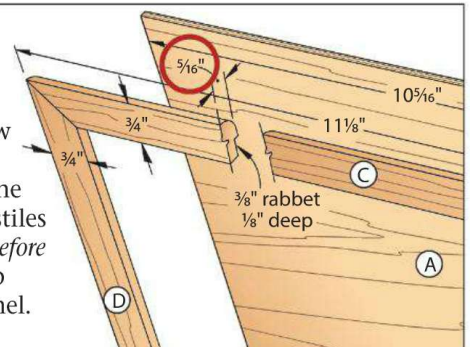
For details, or to make a donation, visit the Woodcrafters Club of Tampa at tampawoodcrafters.org.

—WOOD Editors

Article Updates

► iPad Holder

In issue 214 (October 2012), the exploded-view drawing on page 61 should show the rails (C) and top stiles (D) as $\frac{5}{16}$ " thick *before* cutting a $\frac{1}{8}$ "-deep rabbet for the panel.



► Architectural Box

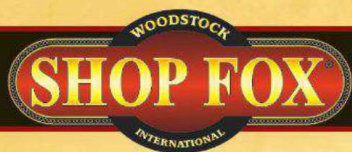
In issue 217 (March 2013), Drawing 2 on page 60 should show the dimension from the end of the sides (A) to the dado for the feet (B) as $\frac{1}{4}$ ".

► Study Desk

In issue 217, the cutting diagram on page 30 should show a 48×48" sheet of oak plywood and a second drawer bottom (T).

► Dust Collectors

In issue 218 (May 2013), the chart on pages 62–63 should show (T) Taiwan as the country of assembly for all models except the Oneida V-System 3000. The steel in the Grizzly G0440 is the heaviest gauge in the test. Penn State's TEMP1425S comes standard with a .3-micron filter, 35-gallon chip-collection bin, and a wall-mounting kit. 🌲



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- ♦ Variable speed feed motor: 1/2 HP
- ♦ Power transfer: cutterhead is belt drive, feed rollers are chain drive
- ♦ Cutterhead speed: 7000 RPM
- ♦ Cuts per minute: 14,000
- ♦ Cuts per inch: 64-300
- ♦ Feed rate: 0-18 FPM
- ♦ Maximum profile depth: 3/4"
- ♦ Maximum profile width: 6 3/4"
- ♦ Planing width: 7"
- ♦ Minimum stock length: 9"
- ♦ Minimum stock thickness: 1/4"
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- ♦ Dust port: 4"
- ♦ CSA certified meeting CSA C22.2 #71.2-10 and UL 987-7th standards.
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- ♦ Approximate shipping weight: 324 lbs.



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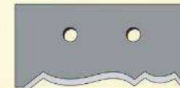
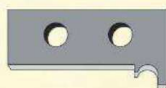
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Big jig keeps face frames flat and square

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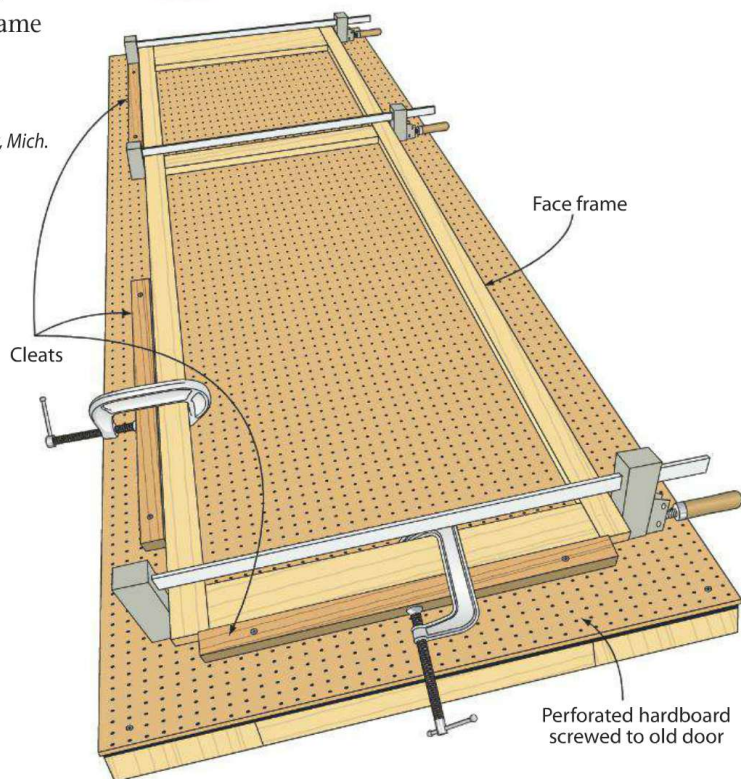
To make the jig, first screw the hardboard to the door. Drill pilot holes centered in the width of the hardwood cleats and screw those to the door, aligning the screws with the hardboard's perforations, as shown. To use the jig, clamp the frame parts to the cleats as you glue up the assembly.

The cleats can be moved easily for new projects, and the door can be tucked against the wall until needed again.

—Edouard Piché, Troy, Mich.



We chose our favorite Shop Tip—
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For sending this issue's Top Shop Tip, Edouard receives a Jet AFS-1000B 3-Speed Air Filtration System worth \$370.



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Shop Tips

Pivot point produces a perfect radius

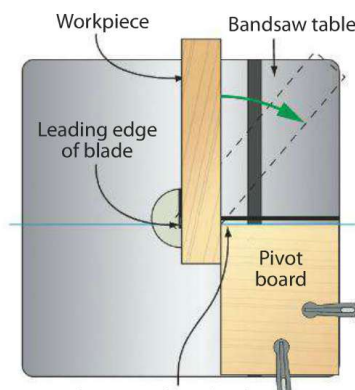
Freehand cutting a radius with a bandsaw can produce inconsistent results. But with this quick trick, you can pivot your way to a perfect radius every time.

Mark the centerpoint of the radius on your workpiece. Sandwich the workpiece between a square pivot board and the bandsaw's blade so the centerpoint rests flush with both the blade's leading edge and the edge of the pivot board.

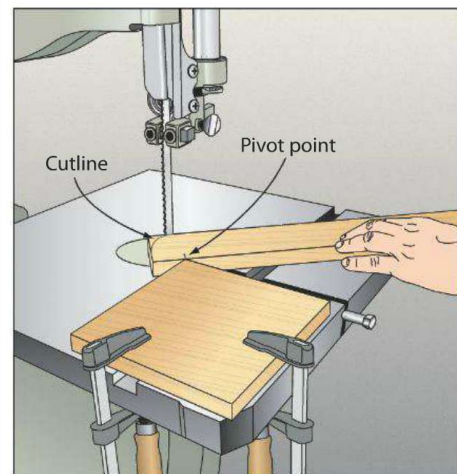
To cut a perfect radius, simply turn on your bandsaw and, careful to keep the pivot mark in contact with the corner of the pivot board, rotate the workpiece until it rests on the pivot board's adjacent edge.

—Serge Duclos, Delson, Que.

TOP VIEW



Align pivot board with
leading edge of blade
and offset the width of
the workpiece.



continued on page 11

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Original Bolt Action Pens



Gun Metal shown with refill advanced



24kt Gold shown with refill retracted



Black Enamel with Gun Metal tip and clip

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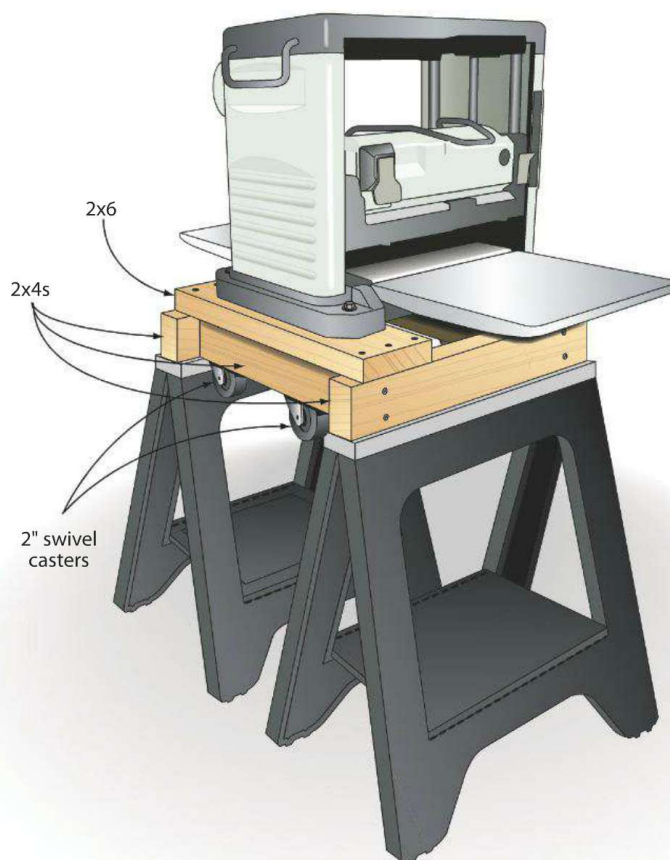
Shop Tips

Planer stand sets up quick, rolls away for easy storage

With limited room in my shop, I needed to stow my planer out of the way, but in such a way as to make getting it out of storage and setting it up on a pair of sawhorses relatively painless.

So I built a frame from 2x4 and 2x6 lumber with 2" swivel casters, as shown, and mounted my planer to it. Because my folding sawhorses were designed to hold 2x4s as sacrificial top rails, the frame drops right in, keeping the planer secure during use. If your sawhorses don't have this feature, just clamp the frame in place for stability. When finished with the planer, set the frame on the floor and roll it smoothly into storage.

—Carl Byrns, Liverpool, N.Y.



continued on page 12

woodmagazine.com

11



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Shop Tips

Corner guards make cheap, slick slides

Small drawers don't usually need to support much weight, so why mount expensive sliding hardware to them? Instead, try acrylic corner guards used to protect drywall. Use high-strength spray adhesive to attach them to the cabinet's insides. They provide a slippery, long-wearing surface for the drawers to ride on.

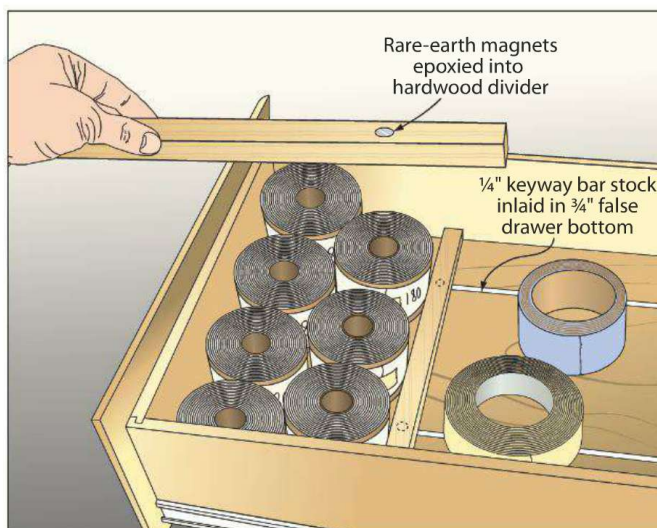
—Bill Seitz, LaPorte, Ind.



Divide and conquer drawer clutter with magnetic organizers

When building drawers for my workbench, I wanted to outfit them with dividers that would hold things in place and keep contents tidy, yet let me reconfigure the layout easily. My solution was to inlay two parallel pieces of 1/4" key stock. Then, I built dividers by epoxying rare-earth magnets into hardwood strips the same distance apart as the key stock. Now, I can keep my tools and supplies organized in the drawer regardless of their size or shape.

—Kenneth Kokkeler, Eugene, Ore.

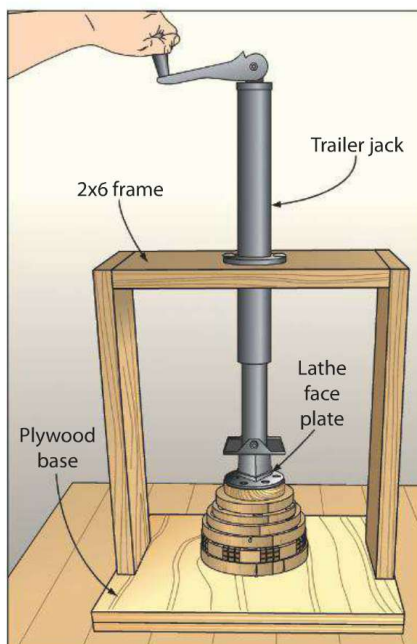


Trailer jack puts the pressure on segmented turnings

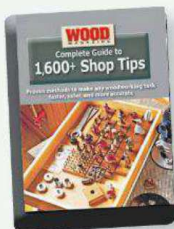
Gluing up a stack of rings for a segmented turning presents unique challenges—such as trying to keep the joints gap-free and the pressure even throughout the unusually shaped glue-up. I solved that issue with this trailer-jack clamping jig.

Start by screwing together a simple 2x6 frame atop a plywood base. Install a trailer jack in the frame's topmost crosspiece. Apply the jack's pressure directly to the lathe's face plate—just enough to get a little glue squeeze-out. This jig works great as a veneer press, too!

—Jerry Livingston, Huntington, Utah



More Terrific Shop Tips



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Sand for a Perfect Finish

After carefully sanding your project prior to finishing, dust nibs, brush strokes, and raised grain can undo all of your prep work. But sanding *between* coats of finish puts you back in control and makes the difference between a so-so surface and one that looks and feels professional.

Start smooth to end smooth

After finish-sanding the bare wood of your project, typically to 220 grit, vacuum the surface to remove embedded dust; then, wipe the surface with a clean rag dipped in mineral spirits. Allow the surface to dry thoroughly.

Apply the first coat of finish to your project and let it dry completely. In a well-lit area, buff out the first coat with 220-grit *stearated* (abrasive loaded with a dry lubricant) or *open-coat* (half the amount of abrasive grain leaves room for the loading of material) abrasive. Use long, straight strokes parallel to the grain, applying light, even pressure and overlapping each stroke. The finish can rub through to bare wood most easily on the edges of the workpiece, so ease up on your pressure when sanding these areas.

After making a complete pass with the abrasive, wipe down the workpiece with a clean rag and feel for smooth-

SHOP TIP

Real (and unreal) steel does the trick

Ordinary sandpaper clogs quickly with gummy finish when buffing between coats, leaving erratic scratches and increasing sanding time. Instead, use steel wool or a synthetic substitute to achieve results similar to sandpaper but without clogging. Just remember that #00 steel wool generally yields similar results to 360-grit sandpaper,

#000 equates to 400 grit, and #0000 equates to 600 grit. Because synthetic steel-wool pads are typically labeled with ambiguous designations such as "ultra fine," "general purpose," and "heavy duty," drawing accurate comparisons to other abrasives is difficult. Try them on a test piece before using them on your workpiece.



ness. Your finish will appear dull or slightly scratched after sanding, but the next coat of finish will restore its luster. Buff out the second coat like the first, using 320-grit paper, then recoat and repeat, ending with 800 grit.

More Resources

- For a small fee, get more information on rubbing out a finish here:
woodmagazine.com/ruboutfinish



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Plug into the woodwork network

Locked away with a pile of sawdust, the woodworker tends to be a solitary creature. But where do you turn when it's time to learn, share, and just talk shop?

Woodworkers often tell me, "I don't know any other woodworkers in my area." It's a common problem because part of the hobby's appeal is escaping from the rest of the world. But as our skills grow, so does the desire to increase our knowledge. Although just being in the shop provides much trial-and-error experience, most of our "lessons learned" have already been discovered many times over by other woodworkers.

So how do you find those elusive, solitary souls, like yourself? Chances are good there's someone just down the street asking the same thing. To ferret them out, try these tips:

► **Start online.** The thriving community of woodworkers engaged in forums, blogs, and social-media platforms (such as Twitter, Facebook, and Google+) number so many that you simply can't keep up with all of them. So find a forum or two where you feel comfortable. You may run into woodworkers from your own area; if not, forum members can still offer advice and point you to contacts.

► **Connect through woodworking classes.** Seek them out at a local trade school, woodworking supply stores, or any number of woodworking shows around the country to find the most eager kindred spirits. Not only will you learn something by taking a class, but more important, you can trade contact info

with other woodworkers interested in learning from one another.

► **Join a club or guild.** A quick search online will tell you of any in your region. If you don't find results, ask around at woodworking-supply stores or trade shows. Stores often provide woodworking clubs a meeting place and benefits, such as discounts. Trade shows sometimes reserve a booth just for local guilds.

► **Can't find a club or guild near you?** Start your own through groups such as the Modern Woodworkers Association

(modernwoodworkersassociation.com) or simply by running an ad in the local paper or an online forum. Include your contact info and let people know that you are interested in organizing a get-together with other local woodworkers. Then, set up a day trip to visit an area lumberyard, hook up at a wood show, or just meet for coffee in your shop. Congratulations! You're the founding president of your local woodworking club! 🌲

Where to find fellow woodworkers...

Online:
WoodTalk Forum
woodtalkonline.com

Lumberjocks
lumberjocks.com

WOOD Online forums
woodmagazine.com/forums

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The Woodworking Shows
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Marc Adams School of Woodworking
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Don't be afraid of the sharp objects and ornery expression. The mission of Chris Adkins, founder of the Modern Woodworkers Association, is to bring online and local woodworkers together for fun, learning, and the advancement of the craft. Chris blogs at highrockwoodworking.com.

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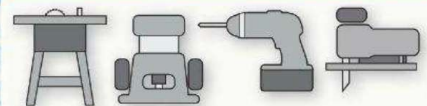
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Adirondack Chair with Footrest

BASIC-BUILT

GREAT PROJECTS MADE SIMPLE.

TOOLS NEEDED



Overall dimensions:
31"W x 37"D x 42½"H
Materials cost: \$80

I grew up in Minnesota—the Land of Ten Thousand Lakes—and have spent more than my fair share of time sitting in Adirondack chairs by the water. So when WOOD® Senior Design Editor Kevin Boyle showed me this design with a built-in footrest, I knew I had to build a set. These chairs are low cost, attractive, and comfortable, and they'll look just as at home on your patio as they would on a beachfront.

Nate

Nate Granzow, General-Interest Editor



The footrest slides out from its storage space under the seat.



The legs swing down and support the footrest.

Start with a solid foundation

Quick Tip! When cutting identical parts from patterns, stick, stack, and saw them to shape at the same time to ensure identical pieces.

1 From 1x6 stock, cut two blanks to 38½" long. Use the gridded pattern of the rear leg (A) [Drawing 6 on page 25] to lay out and cut the two legs to shape.

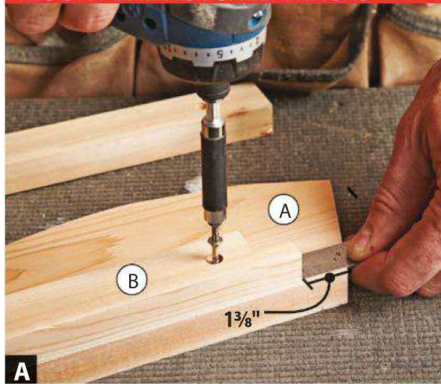
2 Cut the footrest tracks (B) to size [Materials List]. On both bottom footrest tracks, cut a ¾x¾" notch in the front end [Drawing 1].

3 Attach the notched footrest tracks (B) to the inside of the rear legs (A) using 1¼"-long stainless steel screws [Photo A]. **Note:** Before buying screws for this project, refer to the **Shop Tip** found below right.

Quick Tip! To prevent wood splits, drill countersunk ⅛" pilot holes for all screws before driving them.

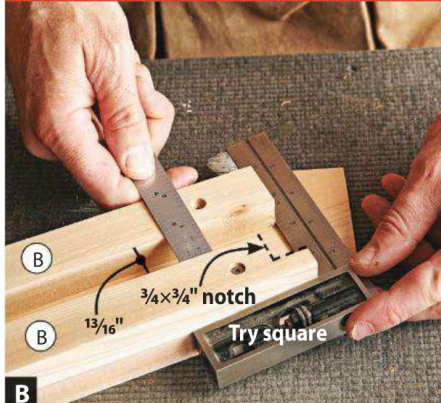
Install an unnotched footrest track above the notched one, as shown [Drawing 1, Photo B], and repeat for the other rear leg.

MOUNT THE NOTCHED TRACKS



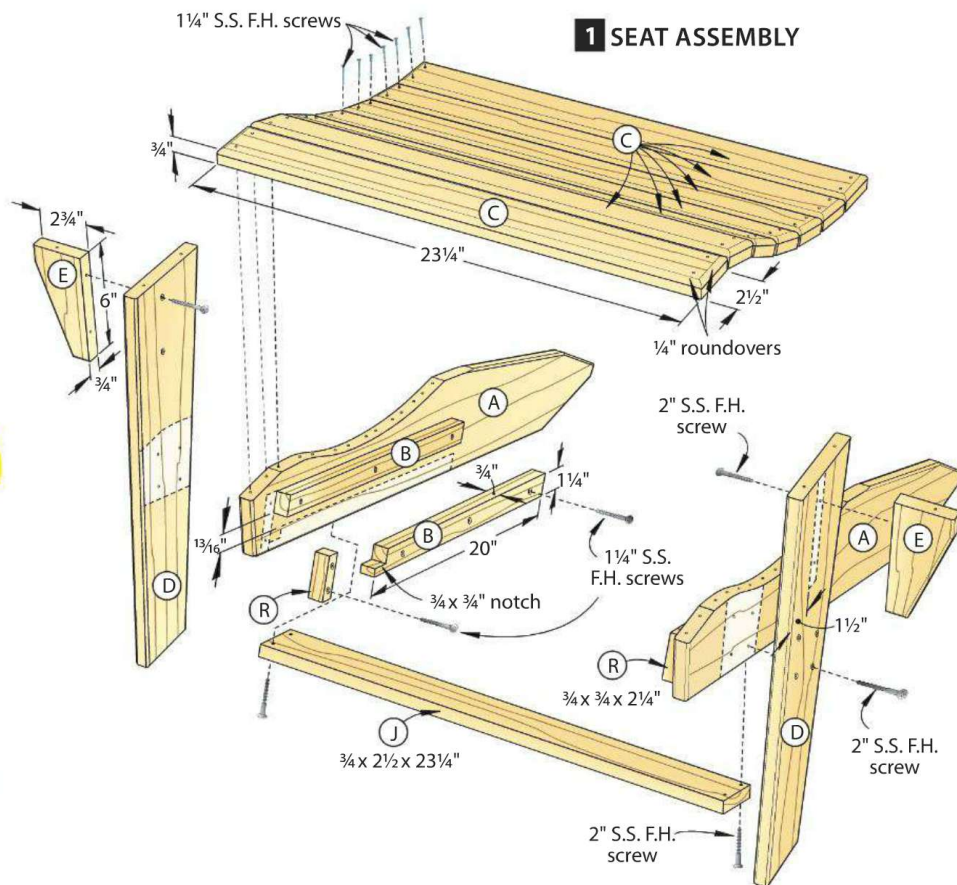
Apply glue to the back of a notched footrest track (B) and screw it in place, flush with the bottom edge of the leg (A) and 1⅜" from the front edge.

KEEP THE TRACKS PARALLEL



Use a try square and rule to keep the footrest tracks (B) parallel to one another and their ends flush.

1 SEAT ASSEMBLY



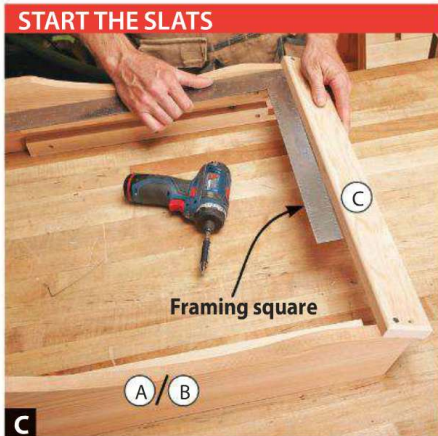
SHOP TIP

Don't screw around when choosing fasteners

Although they cost a little more, we suggest using aluminum (not shown) or stainless steel screws, bolts, washers, and nuts in projects made of cedar and intended for outdoor use—this hardware is nearly impervious to corrosion. Fasteners not meant to be used in outdoor applications, such as untreated steel screws, can cause ugly discoloration in the wood surrounding the fastener as corrosion sets in, eventually failing. Other corrosion-resistant fasteners that work well on outdoor projects include hot-dipped galvanized screws, which have a thick zinc coating to provide rust resistance, and those with proprietary anticorrosion coatings, often color-matched to blend into your project.

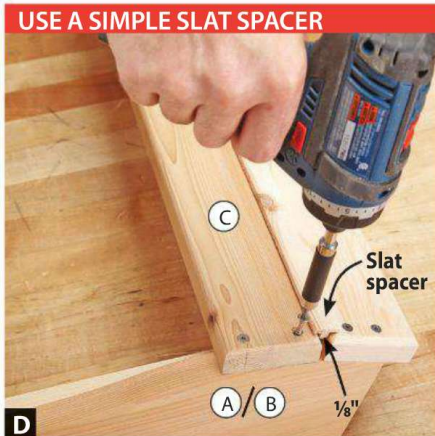


START THE SLATS



Screw the first slat (C) to the leg assemblies (A/B) with only one screw on each side. Square the slat to the leg; then drive the remaining screws.

USE A SIMPLE SLAT SPACER

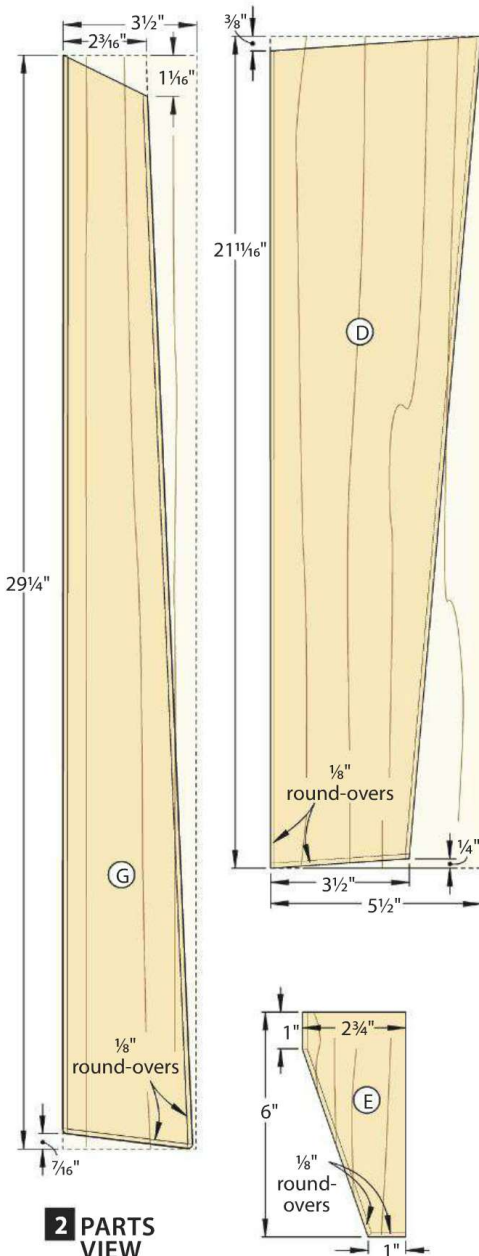


Attach the remaining seat slats using a $\frac{1}{8}$ "-thick spacer to maintain an even gap. Save the spacer for use later.

ATTACH THE FRONT LEGS



Clamp the front legs (D) $2\frac{5}{8}$ " from the front edge of the seat, angled so the bottom of the legs rest flat on the ground.



4 Cut the seat slats (C) to size and rout a $\frac{1}{4}$ " round-over around their tops. Attach the first seat slat as shown in **Photo C**, with its ends flush with the outsides of the leg assemblies (A/B) and $\frac{3}{4}$ " of the slat overhanging the leg assembly's front.

5 Next, make a slat spacer: Rabbet each face of a $\frac{3}{4}$ "x1x23" piece of scrap to create a $\frac{1}{8}$ "x $\frac{1}{8}$ " tenon along the edge. Make a rip cut $\frac{3}{8}$ " from the tenoned shoulder to cut the slat spacer free. Attach the rest of the seat slats [**Photo D**].

6 Cut the front legs (D) to shape [**Drawing 2**] and rout $\frac{1}{8}$ " round-overs along the edges and bottom ends. Lift the seat assembly's front edge until the bottom edges of the rear legs (A) lay flat on the bench. Clamp the front legs in place [**Photo E**] and attach them with 2"-long screws. **Note:** Locate these screws so they go into the footrest tracks (B).

7 Cut the armrest supports (E) to shape [**Drawing 2**] and rout the $\frac{1}{8}$ " round-overs. Screw them to the face of both front legs (D), top edges flush with the legs' tops [**Drawing 1**].

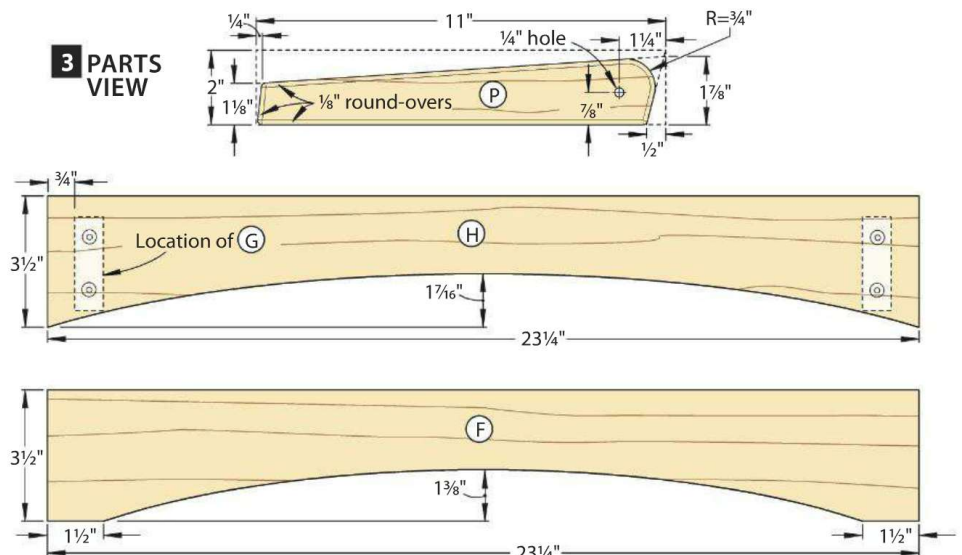
8 Cut the lower backrest (F) to size [**Drawing 3**] and lay out the arch using a fairing stick: a thin strip of wood bent and clamped in place to guide curved layouts. (See **More Resources**.) Jigsaw and sand the curve smooth. Glue and screw the lower backrest to the seat assembly (A-E) so its back edge meets the sloped edge of the rear legs (A) [**Drawing 4**].

9 Cut the back supports (G) to shape [**Drawing 2**] and rout round-overs where shown. Attach one back support to each rear leg (A) [**Photo F**].

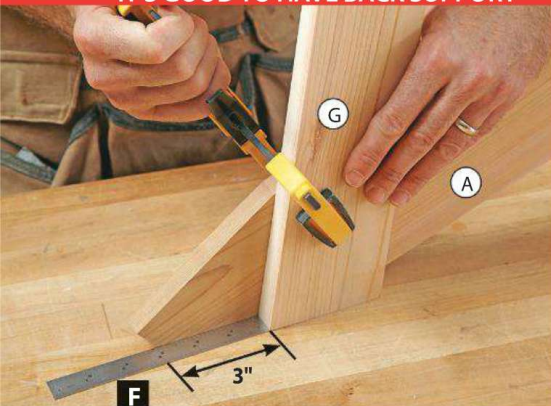
Now, build a strong back

1 Cut the upper backrest (H) to shape [**Drawing 3**]. Screw it to the back sup-

3 PARTS VIEW

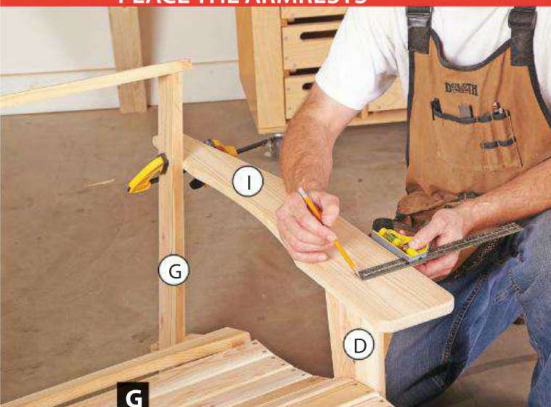


IT'S GOOD TO HAVE BACK SUPPORT



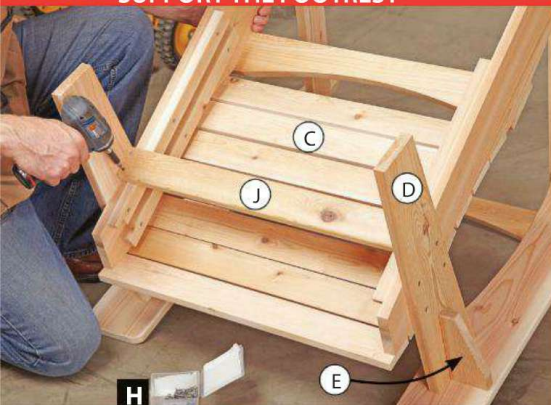
Clamp a back support (G) to a rear leg (A) 3" from the leg's rear edge. Glue and screw the back support with 1¼"-long screws. Repeat for the other side.

PLACE THE ARMRESTS



For optimal strength, lay out three screw holes on the face of both armrests (I) and two on each back support (G).

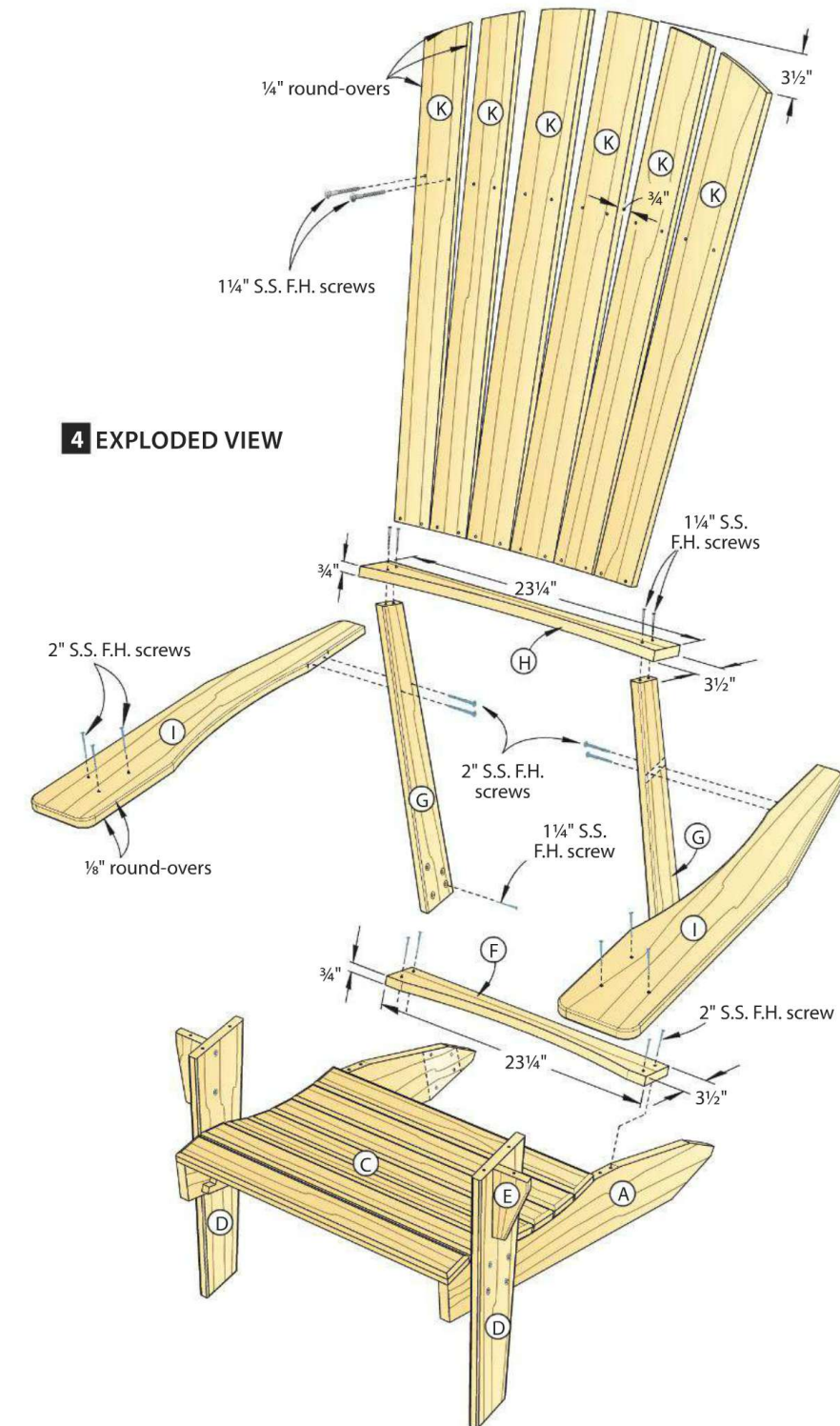
SUPPORT THE FOOTREST



Align the back edge of the footrest support (J) with the back edge of the front legs (D); then attach the footrest support with 2" screws.

ports (G) [Drawing 4], centered end to end and flush with the front edges of the back supports.

2 Cut two blanks for the armrests (I). Following the gridded pattern [Draw-



4 EXPLODED VIEW

ing 7 on page 25], lay out and cut the armrests to shape. Rout round-overs on both faces [Drawing 4]. Place the armrests atop the front legs (D) and armrest supports (E) with a 3" overhang in the front [Photo G]. Screw them in place.

3 Cut the footrest support (J) to fit between the front legs (D). Flip the chair so it rests on its armrests (I) and

screw the support to the bottom edge of the rear legs (A) [Drawing 1, Photo H].

4 Cut six blanks for the back splats (K). Mark the centerline along the length of the upper backrest (H) and the lower backrest (F).

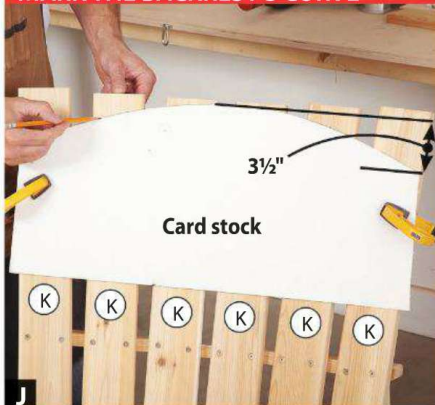
Quick Tip! Save time and effort sanding by marking any centerlines on a piece of masking tape.

USE SCRAP PLY FOR FLUSH BOTTOMS



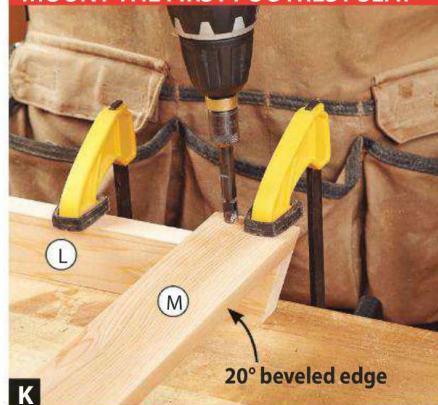
I Slide a scrap of plywood between the footrest tracks (B) and seat slats (C) to support the back splats (K) while securing them.

MARK THE BACKREST'S CURVE



J Center; then clamp the curve pattern to the back splats (K) with the top of the pattern flush with the back splats' top.

MOUNT THE FIRST FOOTREST SLAT



K Align the beveled edge of the first footrest slat (M) flush with the mitered end of the two side rails (L); then attach it with 1 1/4"-long screws.

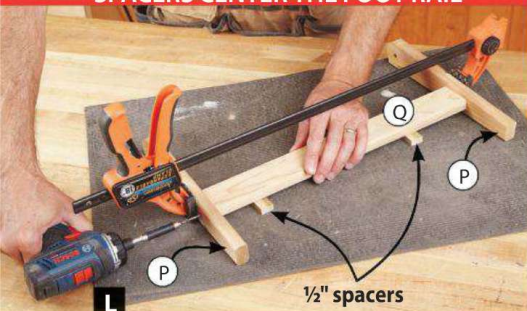
With a 3/4"-thick spacer centered on the upper backrest's line, clamp and screw the two middle back splats in place with edges against the spacer and the bottoms butted together [Photo I]. Repeat this process for the remaining back splats.

5 Cut a piece of card stock at least 8" wide and exactly 25 1/2" long. Mark a centerpoint on one of the card's long edges, and mark two points 3 1/2" down from that edge on each of the card's short edges. Make a fairing stick as before by bending a thin strip of wood until its arc touches all three points and clamp it in place. Trace the curve, cut it, and then transfer the curve to the back splats (K) [Photo J]. Remove the back splats and jigsaw along the marked curves. Rout 1/4" round-overs along all edges and ends, [Drawing 4]. Then, sand the back splats and reattach them.

Finish with the footrest

1 Cut the footrest side rails (L) to size [Drawing 5] with a 20° miter on one end. Bore the guide-pin holes using a 3/4" Forstner bit; then, drill the 5/8" counterbores and holes for the carriage bolts.

SPACERS CENTER THE FOOT RAIL



L To mount the foot rail (Q) on the feet (P), place it atop two 1/2"-thick spacers, clamp the feet in place, and then drive the 2" screws.

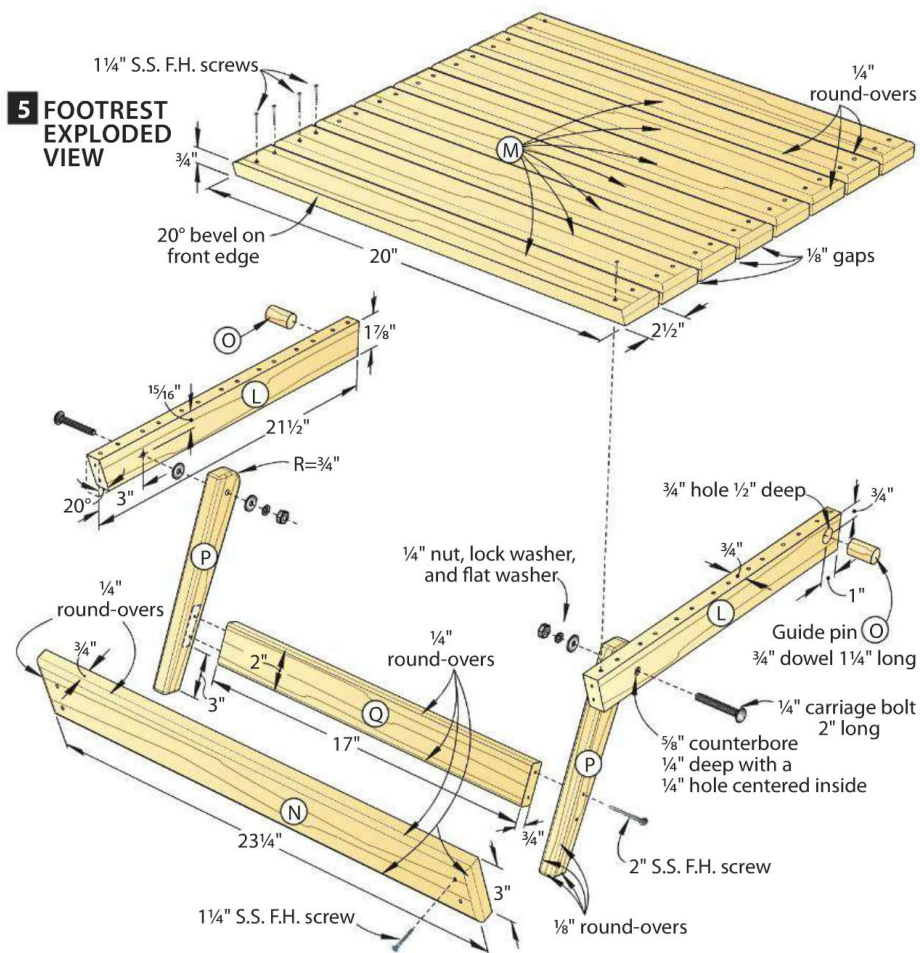
2 Cut the footrest slats (M) and face (N) to size [Drawing 5]. Rip a 20° bevel along the edge of one slat. Rout round-overs where shown and sand the slats.

3 Retrieve the side rails (L) and, starting at the mitered ends, attach the beveled slat (M) [Photo K]. Use the seat-slat spacer from before to create even

gaps as you install each slat. Mount the face (N) to the side rails' mitered ends.

4 Cut two guide pins (O) [Drawing 5] and glue them into the holes on the side rails (L) using waterproof wood or polyurethane wood glue.

5 On two 2x11" blanks, lay out the feet (P) [Drawing 3] and drill the hole for



the carriage bolt where shown. Cut the feet to shape and round over the edges. Cut the foot rail (Q) to size [Drawing 5] and attach it to the feet [Photo L].

6 Attach the foot assembly (Q/P) to the footrest assembly (L-O) [Drawing 5]; then install the footrest by sliding the guide pins (O) between the chair's footrest tracks (B). Cut two track stops (R) to size [Drawing 1] and screw them in place. Check to make sure the footrest slides smoothly. Remove the stops, pull the footrest assembly out, and apply water-repellent preservative to all parts. Reinstall the footrest, find a comfortable spot to park your chair, sit back, and relax. 🌿

Produced by Nate Granzow with Kevin Boyle
Project design: Kevin Boyle
Illustrations: Lorna Johnson

Materials List

Part	Chair	FINISHED SIZE			Matl.	Qty.
		T	W	L		
A*	rear legs	¾"	5½"	38½"	C	2
B	footrest tracks	¾"	1¼"	20"	C	4
C	seat slats	¾"	2½"	23¼"	C	7
D	front legs	¾"	5½"	21½"	C	2
E	armrest supports	¾"	2¾"	6"	C	2
F	lower backrest	¾"	3½"	23¼"	C	1
G	back supports	¾"	3½"	29¼"	C	2
H	upper backrest	¾"	3½"	23¼"	C	1
I	armrests	¾"	5½"	32"	C	2
J	footrest support	¾"	2½"	23¼"	C	1
K*	back splats	¾"	3½"	37"	C	6
Footrest						
L	side rails	¾"	1⅞"	21½"	C	2
M	slats	¾"	2½"	20"	C	8
N	face	¾"	3"	23¼"	C	1
O	guide pins	¾"	diam.	1¼"	CD	2
P	feet	¾"	2"	11"	C	2
Q	foot rail	¾"	2"	17"	C	1
R	track stops	¾"	¾"	2¼"	C	2

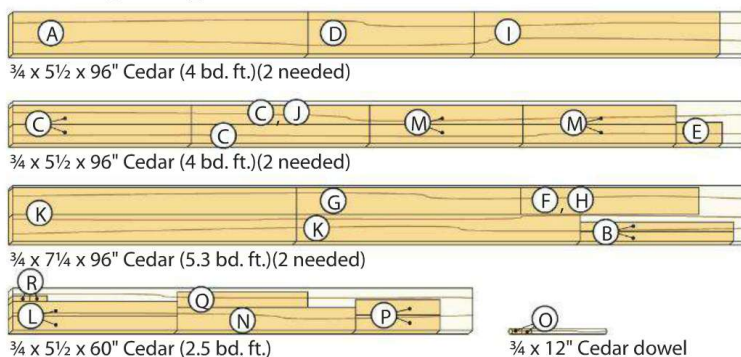
*Parts initially cut oversize. See the instructions.

Material key: C—cedar, CD—cedar dowel

Supplies: 1¼" stainless steel deck screws (116), 2" stainless steel deck screws (34), ¼" carriage bolts 2" long (2), ¼" flat washers (2), ¼" nuts (2), ¼" lock washers (2), 8x26" card stock.

Bits: ⅛", ¼" round-over router bits; ⅛", ¼", ¾", ⅝" drill bits.

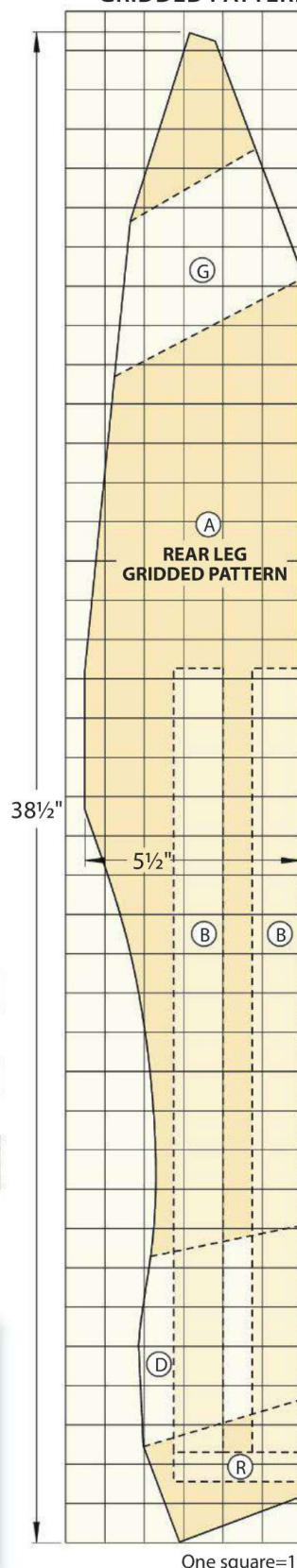
Cutting Diagram



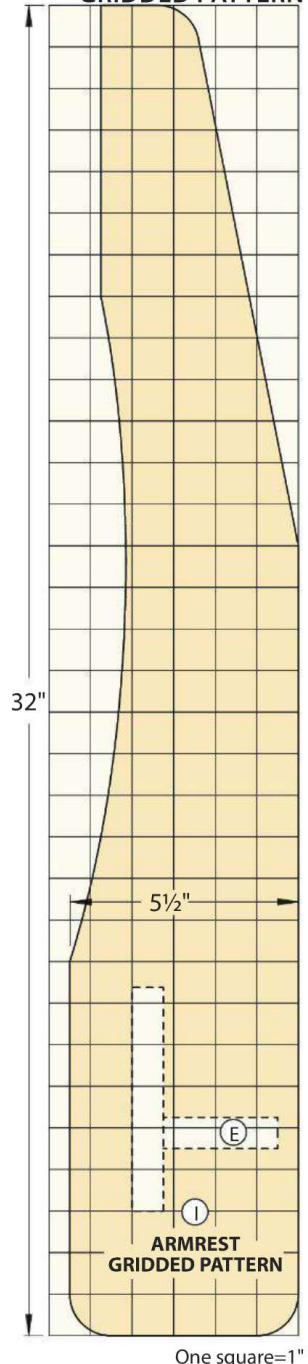
More Resources

- ▶ You can find more information on making and using fairing sticks here: woodmagazine.com/fairing.
- ▶ To learn how to enlarge plans like those featured in this project, visit woodmagazine.com/enlargeplans.
- ▶ For other woods to choose from when building an outdoor project, check out woodmagazine.com/outdoorlumber.

6 REAR LEG GRIDDED PATTERN



7 ARMREST GRIDDED PATTERN





Dimensions: 18½" L × 7¾" W × 6⅞" H

Construction-grade Scraper

Dig this latest addition to our collection of heavy equipment.

The earth (or at least the carpet) moves when this scraper rolls by. Just like on the life-size version, you lift the apron on our scaled-down scraper and pivot the bowl down to scoop up a load. For your convenience, we've assembled a kit [Source, page 31] with the wheels, hardware, and other specialty parts. And if you like this project, check out the nine other models in our Construction-grade series on page 31.

First, the front power unit

1 Prepare a ⅝×6×6⅞" walnut blank for the front chassis (A). Photocopy the **Front-Chassis Pattern** from the **WOOD® Patterns** insert on page 37 and spray-adhere the copy to one face of the blank. Carefully bandsaw the front chassis to shape, and sand away any blade marks. Drill the 1½/32" hole through the blank where shown, centered on the thickness of the blank.

2 Laminate three pieces of ¾" maple for the hood (B) [Materials List]. Affix the **Hood Top-View Pattern** to the top face of the hood. Drill the ¼" hole where shown; then, cut kerfs along one end [Photo A]. Rout the ⅛" and ⅜" chamfers where shown.

3 Laminate two layers of maple to create a 1½×1¾×20" blank for the front and rear fenders (C, L). After the glue dries, attach two copies of each **Front-**

KERFS CREATE THE GRILL



A Cut an outermost kerf first, then rotate the piece edge for edge to cut the opposite kerf. Reset the rip fence and repeat to cut the next pair of kerfs.

AFFIX THE FENDERS



B Apply glue to the inside face of each front fender (C) and align the edges of the wheel well on the fender and the chassis (A).

Fender Pattern and **Rear-Fender Pattern** to one face of the blank. Crosscut each front fender from the blank and set the cutoff aside. Drill the $\frac{3}{8}$ " hole where shown, centered on the blank's thickness [Drawing 1]; then, bandsaw and sand the front fenders to shape. Round over the outside edges and ends where shown, making sure you have a left and right fender.

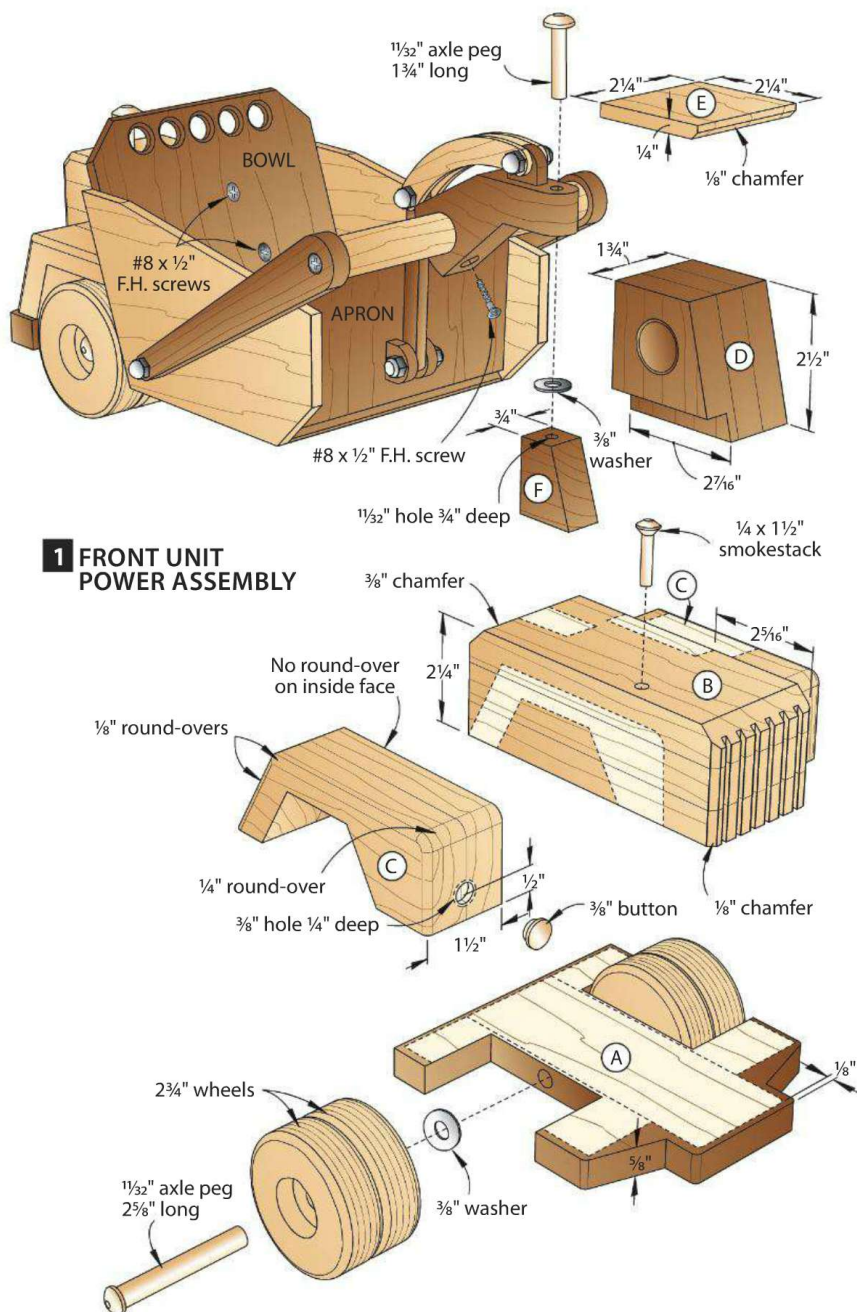
4 Dribble mineral spirits on the patterns for the front chassis (A), hood (B), and front fenders (C) and scrape away the patterns. Finish-sand these parts to 150 grit. Glue the hood to the chassis [Drawing 1]. After the glue dries, glue the front fenders in place [Photo B].

5 Laminate a blank for the cab (D) from three layers of $\frac{3}{4}$ " walnut, and bandsaw the blank to size, sanding away any blade marks [Drawing 1]. Apply the **Cab Side-View Pattern** and cut the rabbet along the bottom. Check that the width of the rabbet allows the cab to rest on both the hood (B) and front fender (C). Bandsaw the taper on the front, and drill and chamfer the hole.

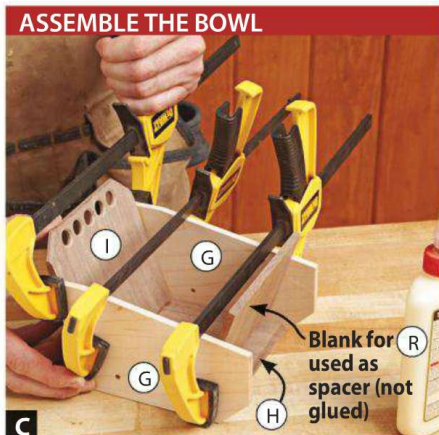
6 Cut the cab roof (E) to size and chamfer the front end [Drawing 1].

7 Spray-adhere a photocopy of the **Pivot-Block Pattern** to a $\frac{3}{4} \times 1\frac{1}{4} \times 1\frac{1}{2}$ " walnut blank. Bandsaw and sand the pivot block (F) to shape. Drill the $\frac{1}{32}$ " hole where shown.

8 Remove the patterns from the cab (D), cab roof (E), and pivot block (F), and finish-sand these pieces. Glue and clamp the cab to the hood (B) [Drawing 1], and allow the glue to dry 15 minutes. Then, glue the cab roof in place, centered on the cab. Glue and clamp the pivot block centered on the width of the hood and flush with the edge of the rear chamfer.

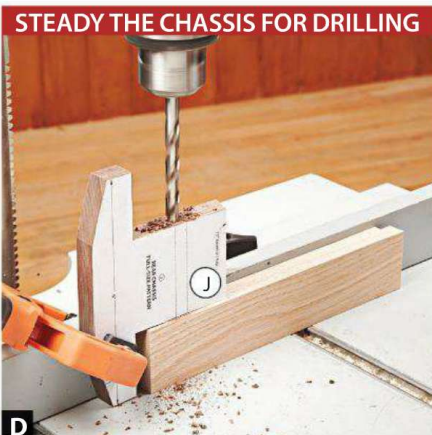


ASSEMBLE THE BOWL



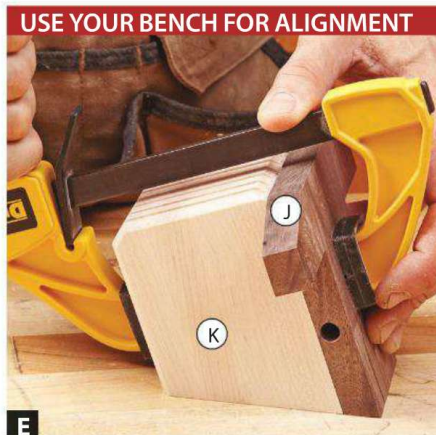
Using the 5½"-wide cutoff as a spacer between the bowl sides (G), glue and clamp the bowl bottom (H) and bowl back (I) between the bowl sides.

STEADY THE CHASSIS FOR DRILLING



Support the chassis (J) on a 1¾"-wide scrap before drilling the 1½" hole for the axles. Drill completely through the chassis from one edge.

USE YOUR BENCH FOR ALIGNMENT



To keep the ends of the rear engine (K) and rear chassis (J) flush, press them against your bench as you tighten the clamp. Keep the edges flush.

Turn to the bowl

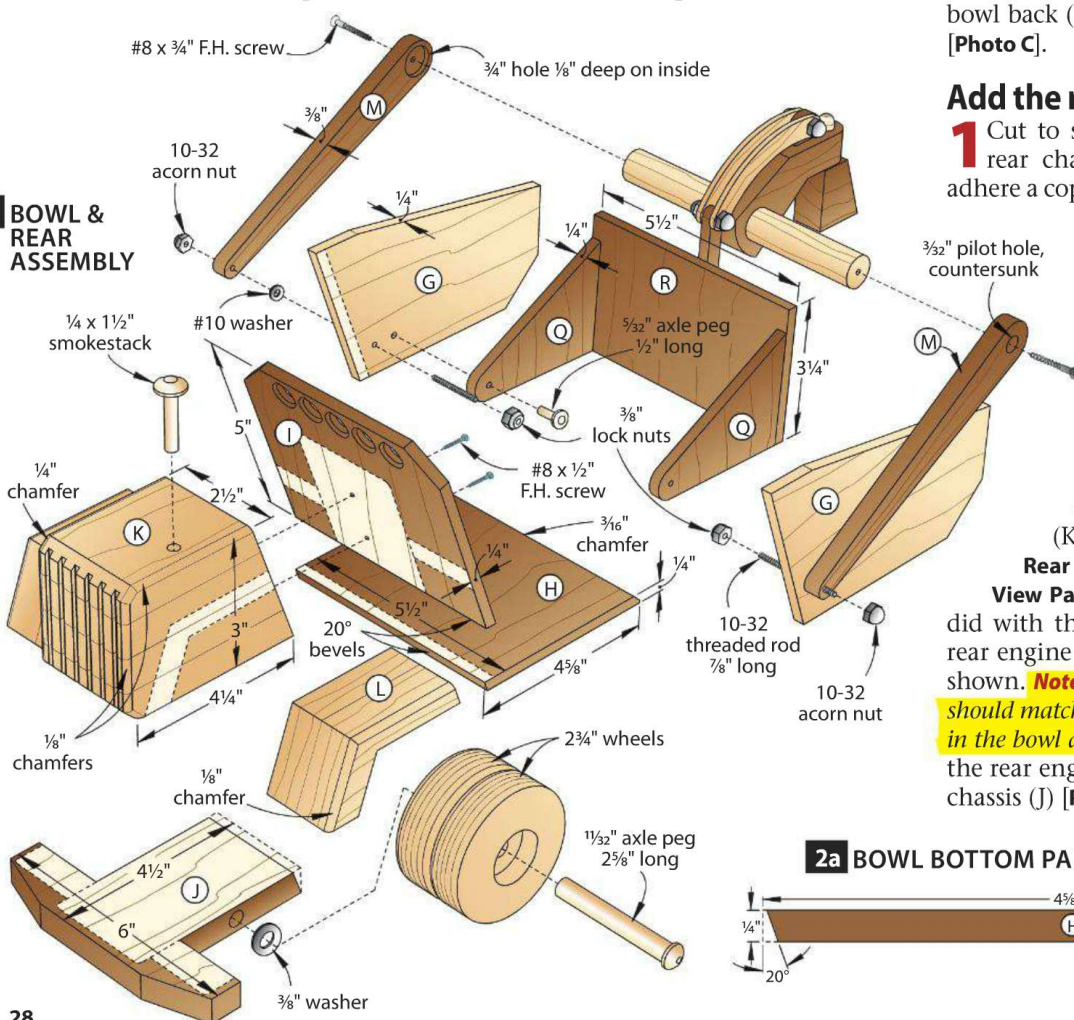
1 From ¼" maple, cut two bowl sides (G) to size [Materials List]. Fasten them together with double-faced tape with their edges and ends flush and spray-adhere a copy of the **Bowl Side-View Pattern** to one face. Bandsaw the bowl sides to shape and drill the holes where shown. Remove the pattern.

2 Prepare a ¼×5½×14" walnut blank. Tilt your tablesaw blade 20° and bevel-cut the bowl bottom (H) from the blank [Drawing 2]. Set the blade back to 90°, and crosscut the bowl back (I) from the remainder of the blank. Set the off-cut aside to use as an assembly spacer later and for the apron (R). Rout a ⅜" chamfer on the square end of the bowl

bottom (H) [Drawing 2a]. Spray-adhere the **Bowl-Back Pattern** flush with an end of the bowl-back blank. Drill and chamfer the holes where shown; then, miter the corners. Remove the pattern, and finish-sand the bowl bottom and back.

3 Apply glue to the edges of the bowl bottom (H), and to the bottom end and bottom ¾" of each edge of the bowl back (I). Clamp the bowl together [Photo C].

2 BOWL & REAR ASSEMBLY

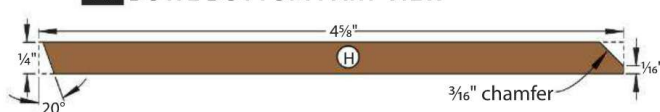


Add the rear power drive

1 Cut to size a walnut blank for the rear chassis (J) [Drawing 2]. Spray-adhere a copy of the **Rear-Chassis Pattern** to the blank, cut a 20° bevel on one end, and bandsaw along the lines. Drill the axle holes as shown in **Photo D**. Remove the pattern and finish-sand the rear chassis.

2 Laminate four layers of ¾" maple to make a blank for the rear engine (K). Spray-adhere a copy of the **Rear Engine Top-View** and **Side-View Patterns** to the blank. As you did with the hood, cut and shape the rear engine (K), drilling the hole where shown. **Note:** The bevel on the rear engine should match the angle of the bowl back (I) in the bowl assembly (G/H/I). Finish-sand the rear engine; then, glue it to the rear chassis (J) [Photo E].

2a BOWL BOTTOM PART VIEW



GLUE THE REAR FENDERS IN PLACE

F

Align the rear fenders (L) with the rear chassis (J) and rear engine (K) as shown. Clamp lightly, check the fender positioning, then tighten the clamp.

Rest the bowl assembly (G/H/I) and the rear assembly (J/K/L) on your bench, drill countersunk pilot holes, and glue and screw the assemblies together.

A hand is shown holding a wooden frame assembly on a workbench. A power drill is shown drilling a hole into the frame. Labels N, O, and M indicate specific parts or steps.

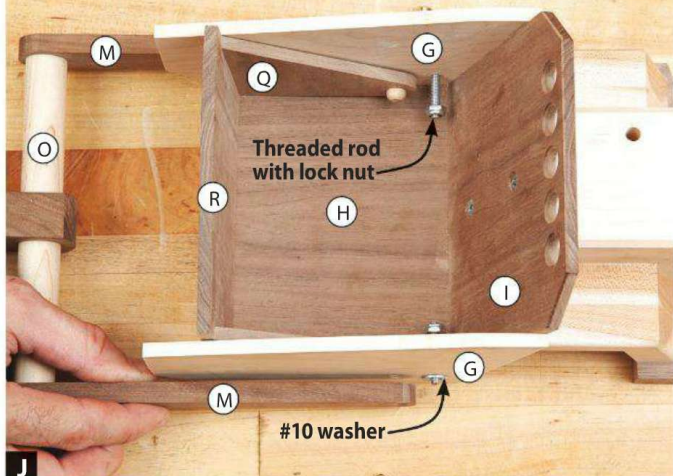
To provide clearance for your drill, elevate the arm assembly (M/N/O) on a $\frac{3}{4}$ "-thick scrap before driving the screws.



Press the bowl arms (M) and upper bowl arm (N) flat to your bench, then drive a #8×½" flathead screw through the upper bowl arm to secure it.

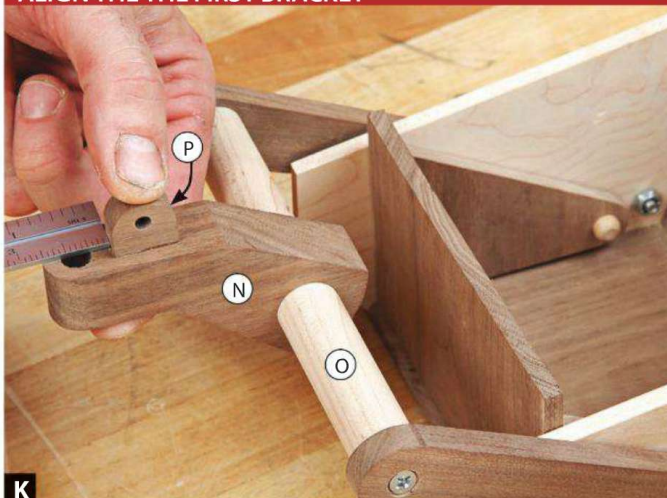
29

BOLT ON THE ARM ASSEMBLY



J A #10 washer between the arm (M) and bowl side (G) allows the arms to pivot without rubbing. Don't overtighten the acorn or lock nuts.

ALIGN THE THE FIRST BRACKET



K Measure $\frac{3}{4}$ " from the front of the upper bowl arm (N). Glue a bracket (P) in place centered from side to side.

3 Attach three copies of the **Bracket Pattern** to a $\frac{1}{4} \times \frac{5}{8} \times 6$ " walnut blank. Drill the holes where shown; then, scrollsaw or bandsaw the brackets (P) to shape and finish-sand them. Set the brackets aside for now.

4 Prepare a $\frac{1}{4} \times 3\frac{3}{8} \times 8$ " walnut blank and crosscut two $2\frac{1}{16}$ "-long apron arms (Q) from it. As you did with the bowl sides (G) earlier, stick the apron arms together and cut them to shape following the **Apron-Arm Pattern**. Separate the pieces, remove the pattern, and finish-sand them.

5 Retrieve the apron (R), and crosscut it to length [Drawing 2]. Making sure you keep the edge square to the ends, sand one edge until the apron fits freely between the bowl sides (G). Finish-sand

the apron; then, one at a time, glue each apron arm (Q) to it, flush with the edges and bottom end [Drawing 2]. This is an awkward assembly to clamp, so just hold each apron arm in place for a few minutes until the glue grabs. Set it aside to dry.

6 Place the apron assembly (Q/R) in the bowl (G/H/I) and secure the apron arms with $1\frac{1}{4}$ " axle pegs [Drawing 3]. Mark the pegs on the outside faces of the bowl sides (G) and cut them on the marks. Temporarily reinstall the apron assembly in the bowl assembly; you'll remove it later before applying a finish.

7 Cut two $\frac{7}{8}$ " lengths of 10-32 threaded rod and thread a lock nut on one end of each. Push the threaded rods through the holes in the bowl assembly (G/H/I) as shown in **Photo J**. Place the arm

assembly (M/N/O) over the threaded rods and secure it with acorn nuts.

8 Retrieve the brackets (P) and glue one to the top of the upper bowl arm (N) [Photo K]. Cut and shape the lift top arms (S) and lift lower arm (T) following the patterns. Drill holes where indicated, and finish-sand the parts. Assemble the lift top arms, lift lower arm, and the two remaining brackets with threaded rod and acorn nuts [Drawing 3]. Attach this assembly to the first bracket. Glue the flat end of the brackets to the apron (R) $\frac{1}{2}$ " from the bottom edge [Photo L].

9 Glue a smokestack in the hood (B) and rear engine (K) [Drawings 1 and 2]. Glue a $\frac{3}{8}$ " button into the hole in each front fender (C). Disassemble the hardware and remove the apron assembly (Q/R). Finish-sand any parts needing it; then, spray on a finish [Shop Tip, left]. (We applied three coats of aerosol lacquer.)

SHOP TIP

Wheel easy way to keep finish off axle ends



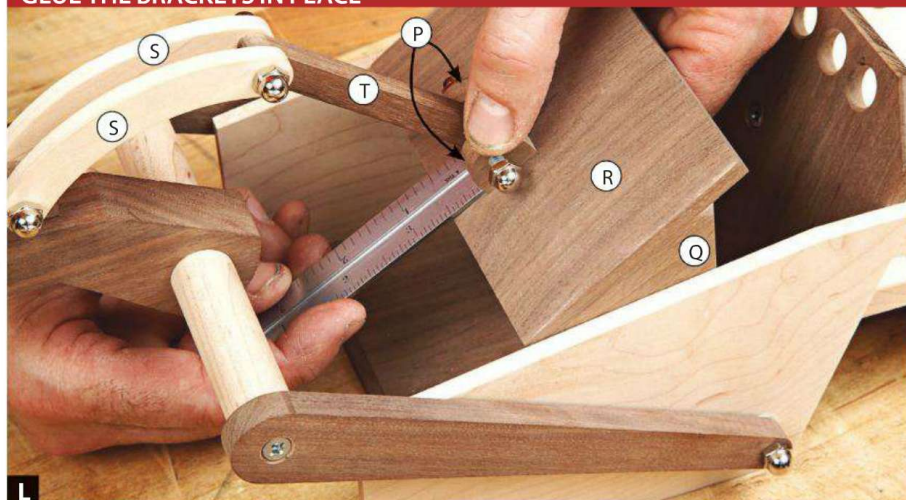
Maintain a good glue surface by preventing finish from settling on the ends of the axle pegs. Simply stand them up in the holes in the wheels while spraying on the finish.

Get it ready to roll

1 Put a drop of glue on the end of a toothpick and insert it from the outside into the pivot holes for the apron arms (Q) in the bowl sides (G); then, insert the cut-off pegs to secure the apron assembly (Q/R) [Drawing 2]. **Note:** To provide a snug fit, yet prevent the apron arms from being glued to the bowl sides, hold the pegs in place while the glue dries and occasionally pivot the apron.

2 Apply a drop of glue in the hole in the pivot block (F), place a $\frac{3}{8}$ " washer over the hole, then attach the upper bowl arm (N) to the pivot block, using a $1\frac{3}{4}$ " axle peg [Drawing 1]. Again, make sure the two units pivot freely.

GLUE THE BRACKETS IN PLACE



Apply glue to the flat faces of the brackets (P). Center the bracket/arm assembly (P/T) on the width of the apron and hold it in place for a few minutes.

3 Reinstall the threaded rods, acorn nuts, and lock nuts. Apply a drop of blue thread locker to the end of the threaded rod as you add the acorn nuts. Snug up all the acorn nuts to provide a slight bit of resistance so that the apron and bowl stay in any given position.

4 Insert an axle peg through two wheels and a $\frac{3}{8}$ " washer [Drawings 1, 2]. Place a drop of glue in each axle hole, working on one at a time; then, insert the axle peg with the washer and wheels. Make sure the wheels spin freely and your scraper is ready to go. 🌲

Produced by **Craig Ruegsegger** with **Kevin Boyle**
Project design: **Kevin Boyle**
Illustrations: **Lorna Johnson**

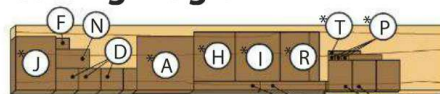
Build the whole crew

With the scraper, our Construction-grade toy collection, shown hard at work *below*, expands to ten pieces. The crane (issue 185, September 2008) lifts and lowers its bucket and spins. Reach out and scoop with the excavator (issue 194, November 2009). Move earth with the bulldozer (issue 199, September 2010), motor grader (issue 208, November 2011), and skid loader (issue 211, May 2012). For heavy hauling, fill the dump truck (issue 215, November 2012). The tractor pulls both the side-dump and lowboy trailers. (Find all three pieces in issue 205, July 2011.)

If you don't own these issues, you can purchase plans and kits for these projects at woodmagazine.com/cgtoys.

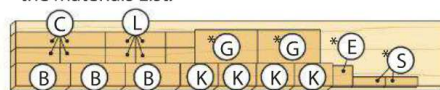
woodmagazine.com

Cutting Diagram



$\frac{3}{4}$ x $7\frac{1}{4}$ x 48" Walnut (2.7 bd. ft.)

*Plane or resaw to thicknesses listed in the Materials List.



$\frac{3}{4}$ x $7\frac{1}{4}$ x 48" Maple (2.7 bd. ft.)

$\frac{3}{4}$ x 12" Maple dowel

Materials List

Part		FINISHED SIZE			Matl.	Qty.
		T	W	L		
Front power unit						
A	front chassis	5⁄8"	6"	63⁄8"	W	1
B	hood	21⁄4"	21⁄2"	61⁄8"	LM	1
C*	front fenders	11⁄2"	13⁄4"	5"	LM	2
D	cab	13⁄4"	271⁄16"	21⁄2"	LW	1
E	cab roof	1⁄4"	21⁄4"	21⁄4"	M	1
F	pivot block	3⁄4"	11⁄4"	11⁄2"	W	1
Bowl						
G	bowl sides	1⁄4"	33⁄4"	7"	M	2
H*	bowl bottom	1⁄4"	51⁄2"	45⁄8"	W	1
I*	bowl back	1⁄4"	51⁄2"	5"	W	1
Rear power unit						
J	rear chassis	5⁄8"	6"	41⁄2"	W	1
K	rear engine	3"	21⁄2"	41⁄4"	LM	1
L*	rear fenders	11⁄2"	13⁄4"	33⁄8"	LM	2
Apron and bowl arms						
M*	bowl arms	3⁄8"	1"	73⁄8"	W	2
N*	upper bowl arm	3⁄4"	21⁄16"	33⁄4"	W	1
O	bowl pivot rod	3⁄4"	diam.	61⁄16"	M	1
P*	brackets	1⁄4"	5⁄8"	3⁄4"	W	3
Q*	apron arms	1⁄4"	33⁄8"	211⁄16"	W	2
R*	apron	1⁄4"	51⁄2"	31⁄4"	W	1
S	lift top arms	1⁄4"	1"	35⁄8"	M	2
T	lift lower arm	1⁄4"	3⁄8"	35⁄8"	W	1

*Parts initially cut oversize. See the instructions.

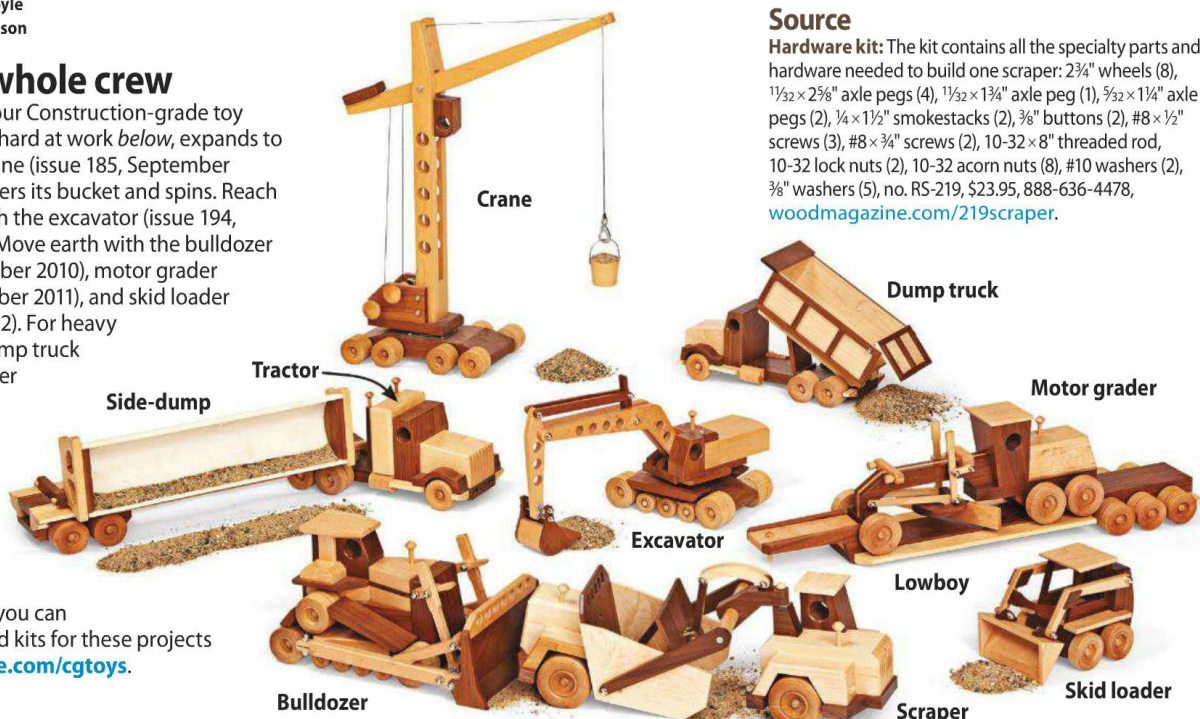
Materials key: W—walnut, LM—laminated maple, LW—laminated walnut, M—maple.

Supplies: Spray adhesive, #8 $\times \frac{1}{2}$ " flathead screws (3), #8 $\times \frac{3}{4}$ " flathead screws (2), blue thread locker.

Blade and bits: #5 scrollsaw blade; $\frac{3}{32}$ ", $\frac{3}{16}$ ", $\frac{7}{32}$ ", $\frac{1}{4}$ ", $\frac{1}{32}$ ", $\frac{3}{8}$ ", $\frac{1}{2}$ ", $\frac{3}{4}$ ", 1" drill bits; 45° chamfer, $\frac{1}{8}$ " and $\frac{1}{4}$ " round-over router bits.

Source

Hardware kit: The kit contains all the specialty parts and hardware needed to build one scraper: $2\frac{3}{4}$ " wheels (8), $\frac{1}{32} \times 2\frac{5}{8}$ " axle pegs (4), $\frac{1}{32} \times 1\frac{1}{4}$ " axle peg (1), $\frac{5}{32} \times 1\frac{1}{4}$ " axle pegs (2), $\frac{1}{4} \times 1\frac{1}{2}$ " smokestacks (2), $\frac{3}{8}$ " buttons (2), #8 $\times \frac{1}{2}$ " screws (3), #8 $\times \frac{3}{4}$ " screws (2), 10-32 $\times$ 8" threaded rod, 10-32 lock nuts (2), 10-32 acorn nuts (8), #10 washers (2), $\frac{3}{8}$ " washers (5), no. RS-219, \$23.95, 888-636-4478, woodmagazine.com/219scraper.





Bit-raising strategies for every budget

Ranging from simply the cost of a router to more than \$1,300, these table-mounted-router options help you rout quickly, accurately, and safely.

When making the raised-panel-bit boxes on page 54, I thanked my lucky stars for the lift-equipped router table in the WOOD® shop that allows me to make uber-precise bit height adjustments without a lot of under-the-table fuss. The rig in our shop is pretty deluxe (read: “more than I can afford for my own shop”), but it occurred to me that woodworkers have several really good—and affordable—options when it comes to router-table adjustments. Here are four methods of making your bits go up and down, from bare-bones to super-convenient.

Bob

Bob Hunter, Tools Editor

OPTION 1

Move the motor within its base

No frills here. Make an oh-so-simple router table by screwing a fixed-base router to a piece of plywood, as shown *below*. To raise or lower the bit, you'll have to reach under the table. Or go one better and mount the router to an insert plate that fits into a tabletop recess, shown *bottom left*. This makes height adjustments easier by lifting the router and plate out of the table.

Pros:

▶ Low cost, with no need to buy anything more than the router (if you don't have one) or insert plate.

- ▶ You can use the router's own dust shields and hoods for effective dust collection below the table.
- ▶ If you have a multibase kit, you can mount one base in a router table (typically the fixed) and remove the motor as needed for handheld use with the other base.
- ▶ If you buy a heavy-duty phenolic or aluminum insert plate, it won't sag under the router's weight, and has leveling screws for flush-mounting to the top. Most come with insert rings and a starter pin, as shown on *page 35*.

Cons:

▶ Because some motors rotate in their fixed bases to set bit height, as shown *bottom right*, adjusting

the height might position the speed control or power switch in a hard-to-reach location.

- ▶ Unless you use an insert plate or removable motor, you make all adjustments and bit changes below the table.
- ▶ Fine adjustments prove tricky because locking the base sometimes changes your bit's height slightly.

Recommended models:

- ▶ **Rockler aluminum insert plates**, predrilled models vary by router, \$60, Rockler, 800-279-4441, rockler.com.
- ▶ **Woodpeckers phenolic insert plate**, no. TLRR1XX, \$65, Woodpeckers, 800-752-0725, woodpeck.com.
- ▶ **Kreg phenolic insert plate**, no. PRS3030, \$70, Kreg Tool Co., 800-447-8638, kregtool.com.

AS BASIC AS IT GETS



To adjust bit height with this setup, you unlock the router's base and move the motor straight up and down. Remove the motor from the base to change bits.

THE BEST SOLUTION FOR A PLUNGER



With no removable base, you adjust a plunge router's bit height by turning the depth-adjustment leadscrew or using a stop rod and turret. Both operations are less awkward when you mount the router to an insert plate.

TWISTING MOTORS: FAST BUT FUSSY



Twist-type routers make large bit-height changes fast, but prove more difficult to fine-tune than those with vertical adjusters (*top photo*), and the locations of the power switch and speed dial change with each adjustment.

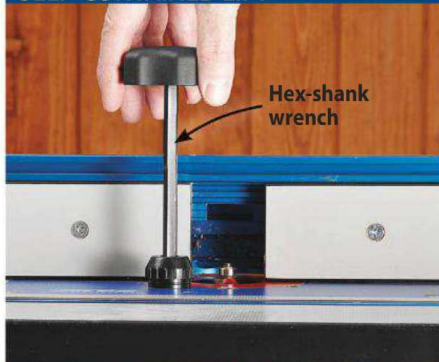
OPTION 2

Choose a router with a built-in lift

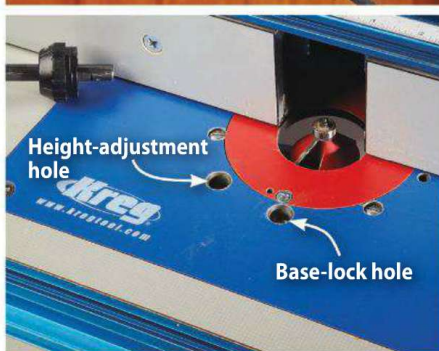
Many of today's routers with 2-hp or larger motors—primarily fixed-base models—have a lift mechanism built right in, so you can set bit height without fumbling below. You simply drill access holes for the provided wrench, mount the router base to the tabletop or insert plate, and you're set. Some of these routers use a leadscrew, a long bolt running the length of the router, to make height adjustments. Leadscrews, especially those with 16 threads per inch (tpi), deliver greater accuracy than the rack-and-pinion systems of other routers.

If your plunge router doesn't have a built-in lift, you can add one with the retrofit kit shown *below right*.

SELF-CONTAINED LIFT



Hex-shank wrench



With this Porter-Cable 890 router, *top*, you insert a hex-shank wrench through the tabletop or insert plate to turn a height-adjusting mechanism in the router base. Use one access hole to unlock the base, then the other to adjust the bit's height.

Pros:

- ▶ Although a router with a built-in lift costs more than a comparable router without, it's still the second-most affordable option.
- ▶ You can usually change bits from above the table.
- ▶ Dust shields and hoods designed for effective dust collection with handheld routing typically work as well below the table.
- ▶ If you have a multibase kit, mount the fixed base in a router table and remove the motor as needed for handheld use in the plunge base.

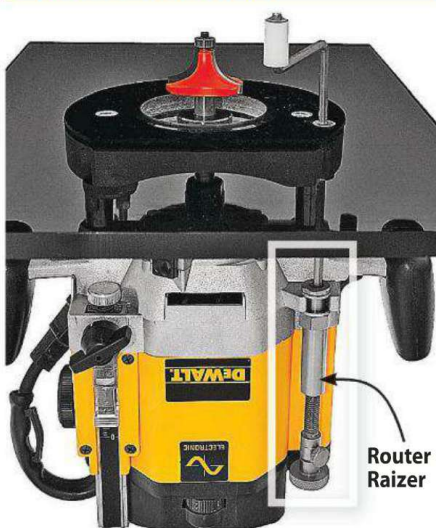
Cons:

- ▶ With some models you still have to reach below the table to lock and unlock the base before and after making height adjustments.
- ▶ Mounting the router with the lift-access holes out front to avoid the fence might place the speed or power controls in hard-to-reach positions.
- ▶ Fine-threaded leadscrews require dozens of wrist-fatiguing half-turns to raise the collet high enough for bit changes and then back down to cutting height again.
- ▶ Locking the base can alter the bit's height slightly, negating ultrafine adjustments.
- ▶ Removing a dedicated plunge router from the table for handheld use requires you to either remove the insert plate and reinstall the router's subbase, or rout with the plate intact.

Recommended models:

- ▶ **Bosch MRC23EVSK 2.3-hp combo kit**, \$300; 877-267-2499, boschtools.com.
- ▶ **Ridgid R2200 2-hp fixed-base router**, \$180, 800-474-3443, ridgid.com.

GIVE A PLUNGER A LIFT



Router Raizer

Add through-the-table height adjustments to a dedicated plunge router by replacing its original height-adjustment leadscrew with the Router Raizer (\$90, 866-266-1293, routertechnologies.com).

OPTION 3

Install a router motor in an insert-plate lift

Combine the advantages of a phenolic or aluminum router-table insert with the leadscrew accuracy of a built-in lift and you get a router lift that can deliver accuracy, convenience, and durability. Look for a lift with a 16-tpi leadscrew for easiest use; lifts with 8 tpi prove more difficult at making fine adjustments, and those with 32 tpi make coarse adjustments tedious.

To use these lifts, you simply remove a router motor from its base, install it in the lift, do a quick calibration, and you're ready to rout. Most lifts let you change bits above the table. (Some shorter motors require one or two angled wrenches to reach into the lift's bit opening to change bits from above.)

FAST AND PRECISE ADJUSTMENTS



Microadjuster

Woodpeckers' Precision Router Lift V2 makes coarse adjustments quickly, and has a micro-adjuster for fine-tuning.

NOT AS FAST, BUT VERY PRECISE

Most router lifts use a leadscrew mechanism to raise and lower the bit accurately. Adjustment speed depends on the leadscrew's thread count.



Leadscrew

Pros:

- ▶ A geared adjustment mechanism delivers accurate bit-height settings, is easier to use than a built-in lift, and raises the motor up fully to change bits from above the table.
- ▶ Lifts come premounted to a heavy-duty phenolic or aluminum insert plate that won't sag under the router's weight, and often have leveling screws for flush-mounting to the top.
- ▶ The motor releases easily from most lifts, allowing you to return it to its original base for handheld work.
- ▶ Lifts grip the motor with pressure pads, letting you position it so you can best reach the speed and power controls.
- ▶ Most lifts include insert rings and a starter pin, as shown *below*.

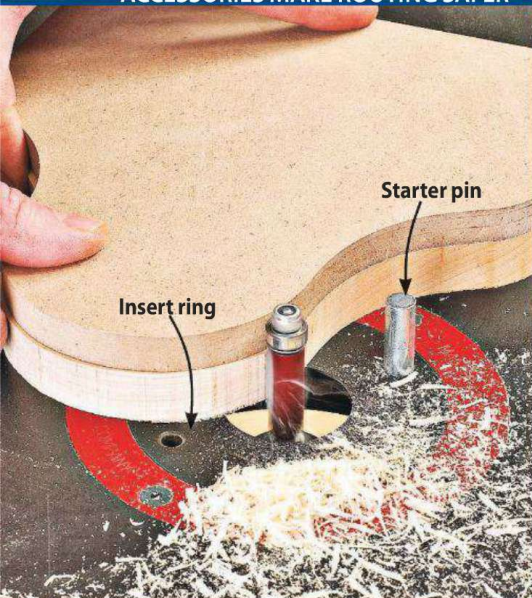
Cons:

- ▶ You can spend more for a lift (from \$170 to \$400) than for your router. And if you change your router, you might also need to get an adapter for the lift or buy a new lift.
- ▶ Only round router motors fit into a lift—dedicated plunge routers will not work.
- ▶ Dust collection below the table proves a challenge.

Recommended models:

- ▶ **JessEm Rout-R-Lift II**, \$180; **Mast-R-Lift II**, \$365; 866-272-7492, jessem.com.
- ▶ **Woodpeckers Precision Router Lift V2**, \$350, 800-752-0725, woodpeck.com.
- ▶ **Bench Dog 40-150 ProLift**, no. 28827, \$350, Rockler, 800-279-4441, rockler.com.

ACCESSORIES MAKE ROUTING SAFER



Insert rings close down the opening around the bit, and a starter pin provides a leverage point for beginning a cut with a bearing-guided bit.

OPTION 4

Go deluxe: Buy a lifted-and-loaded table

If you're looking for the ultimate router table—with a price tag to match—opt for a router-table system with a fully integrated lift. The lift mechanism works similarly to those in Option 3, but comes preassembled as part of the top or as part of a package that includes fence, stand, and other accessories.

Pros:

- ▶ Fully integrated systems, such as the one shown *below*, have a crank on the side or front of the table to make height adjustments and above-the-table bit changes—the easiest system of the four to use.
- ▶ With built-in calibrated scales, these lifts deliver unrivaled accuracy.
- ▶ A deluxe package typically includes a stand, a durable phenolic or cast-iron top with miter slot and T-slot, a fence with independent left and right faces and T-slots for mounting accessories,

dust-collection port on the fence (and sometimes below the table), insert rings, and a starting pin.

- ▶ As with an insert-based lift (Option 3), you position the motor to best access controls, and the motor can be removed easily for handheld work.

Cons:

- ▶ This is the most expensive option, costing from \$700 to \$1,300 for the table package (not including the router motor).
- ▶ Only round router motors fit into these lifts—dedicated plunge routers will not work.

Recommended models:

- ▶ **JessEm Mast-R-Lift Excel II router table package**, \$1,049, 866-272-7492, jessem.com.
- ▶ **Woodpeckers PRP4 router table package**, \$1,100, 800-752-0725, woodpeck.com.
- ▶ **Bench Dog Cast-Iron Router Table** with Pro Router Lift, Pro Fence, & steel cabinet, no. 44020, \$1,250, Rockler, 800-279-4441, rockler.com.

Produced by **Bob Hunter**

FULLY LOADED AND READY FOR ACTION



JessEm's Mast-R-Lift Excel II table system has a phenolic top with an ultrafine-adjustment lift mounted underneath and a lock to avoid accidental shifts in bit height.

More Resources

- ▶ Read editor and user reviews of routers, lifts, and router tables at toolreviews.woodmagazine.com.
- ▶ For complete plans on building a router table, see woodmagazine.com/routertableplans.



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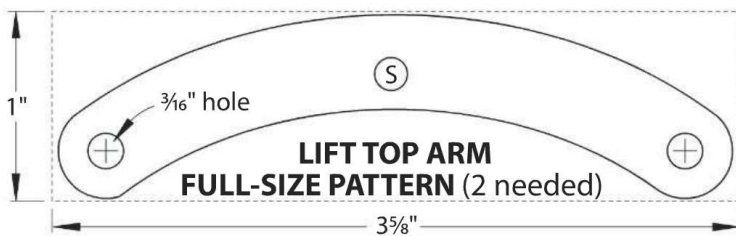
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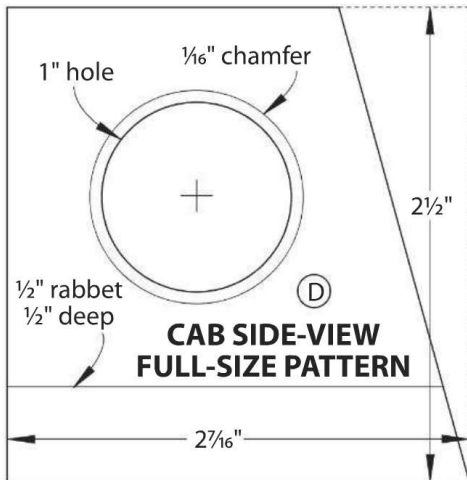
WOOD PATTERNS®

July 2013

Issue 219

Dear Reader: As a service to you, we've included full-size patterns on this insert for irregular-shaped and intricate project parts. You can machine all other project parts using the Materials List and the drawings accompanying the project you're building.

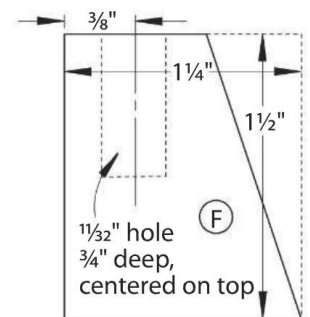
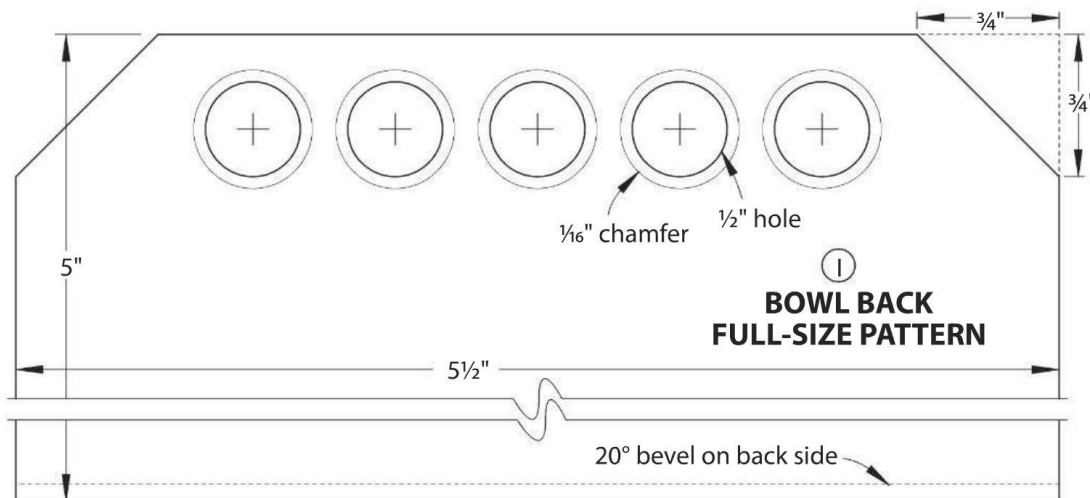
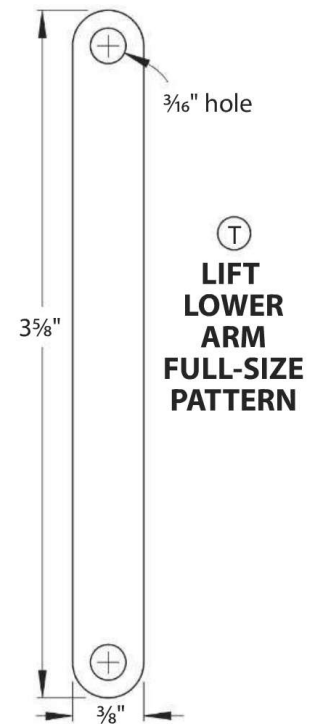
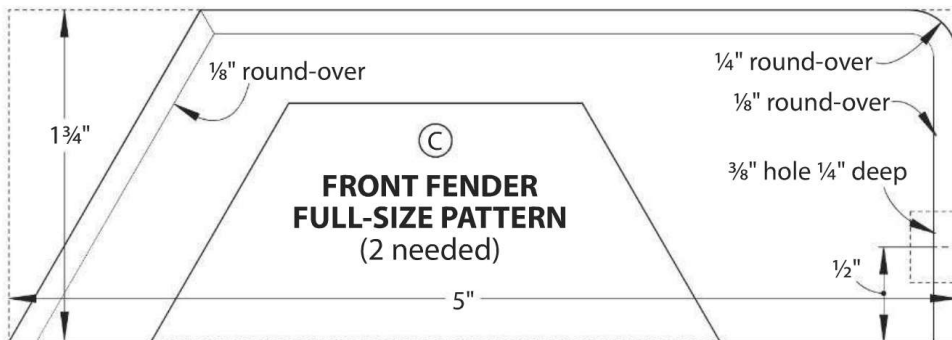
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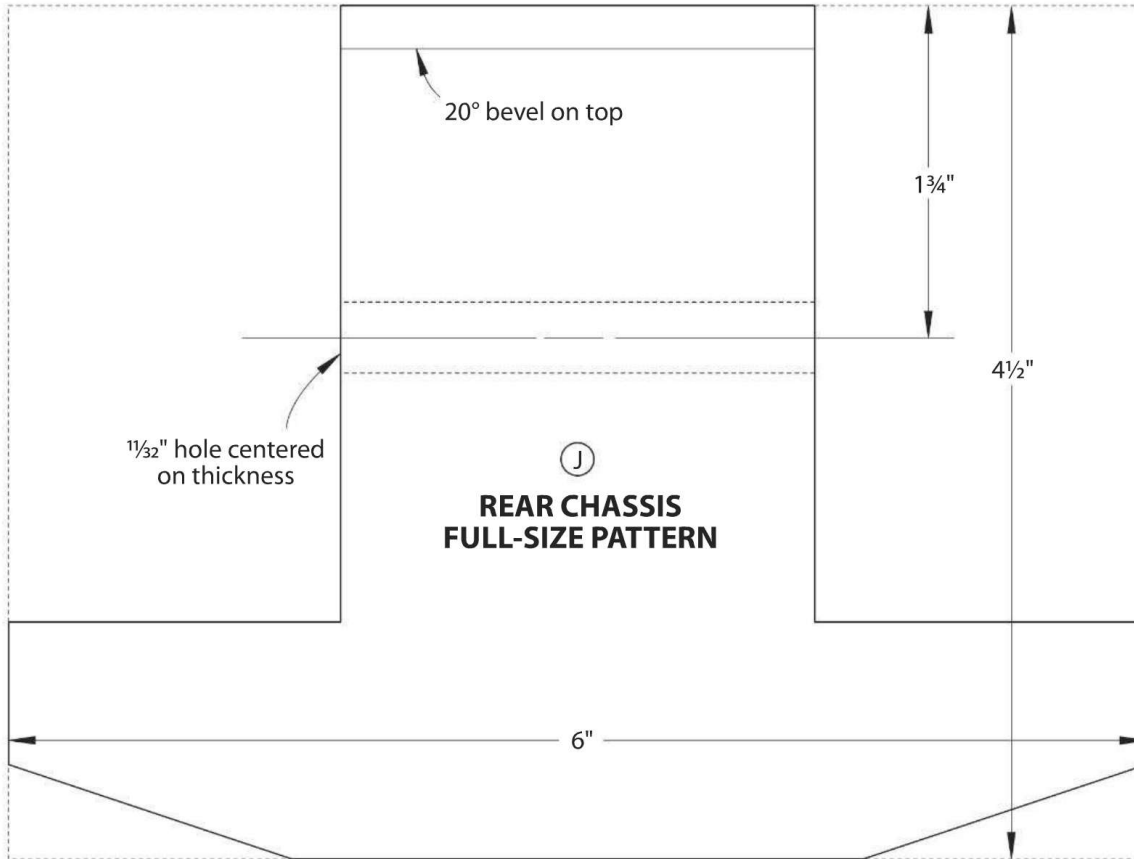
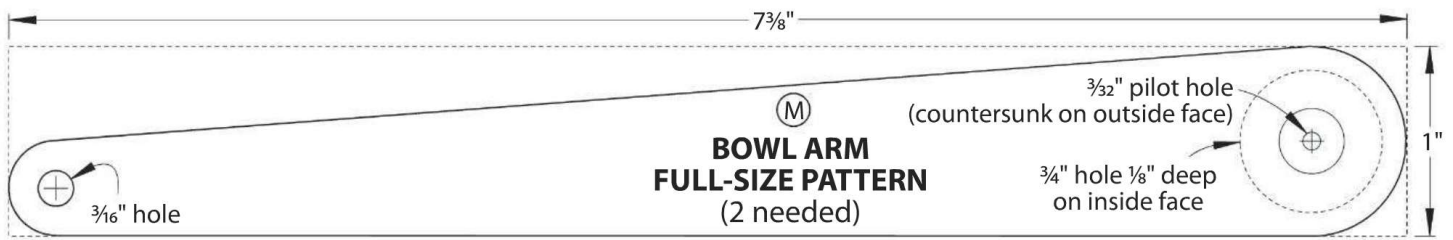
Construction-grade Scraper

Page 26

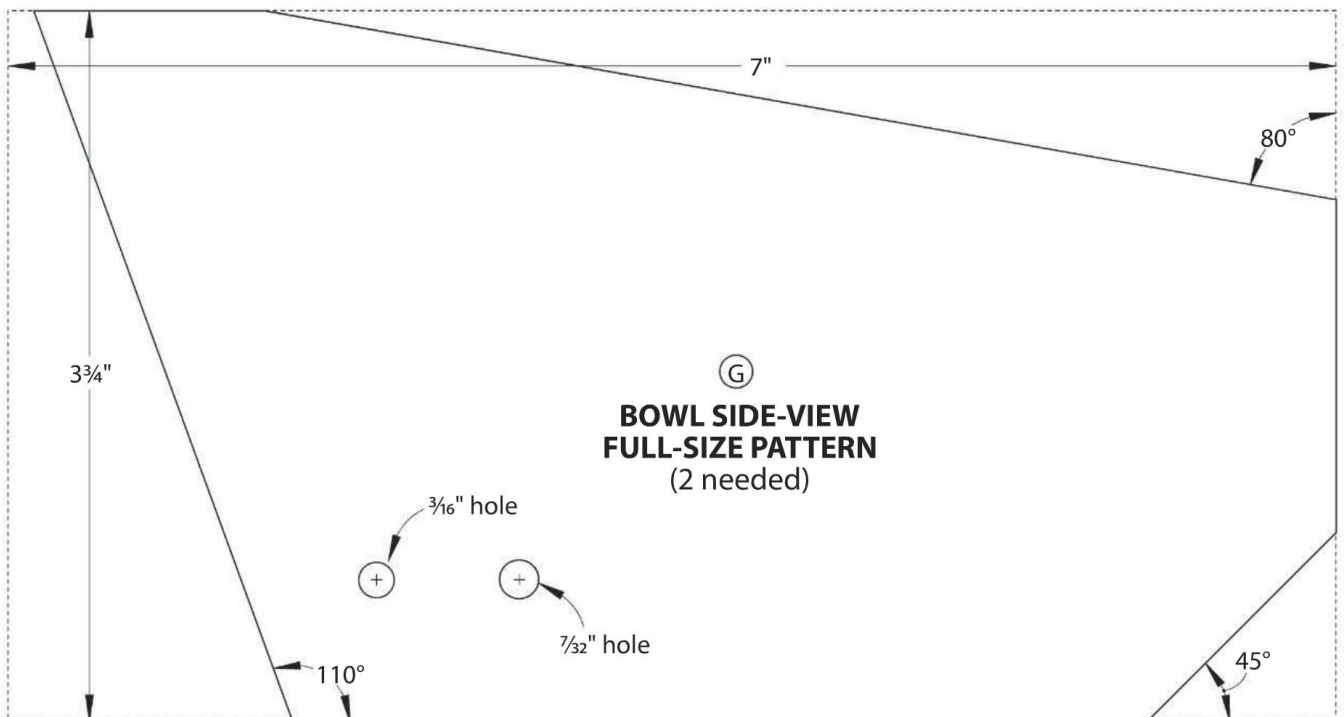
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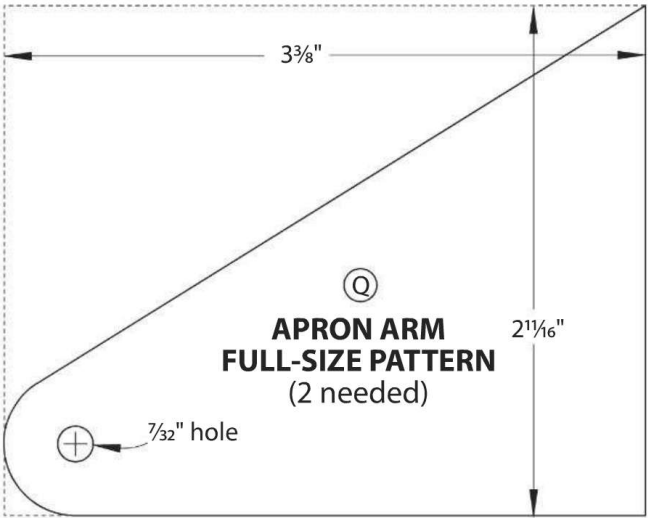
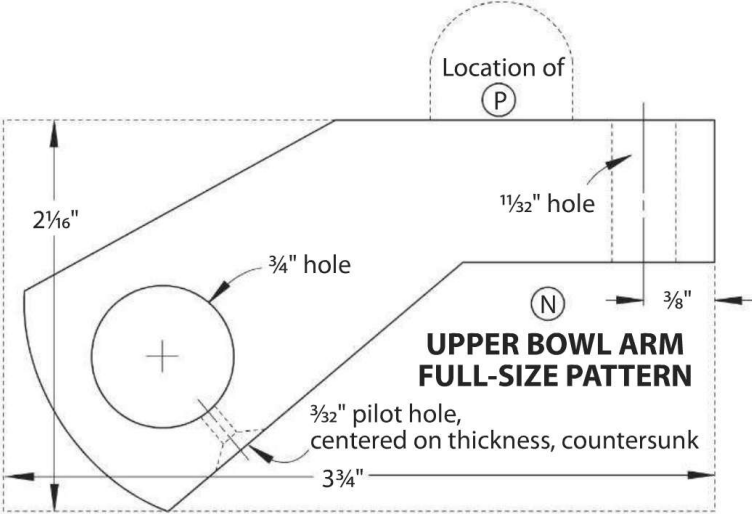
PIVOT BLOCK FULL-SIZE PATTERN



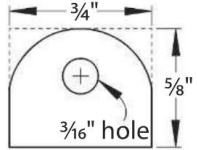
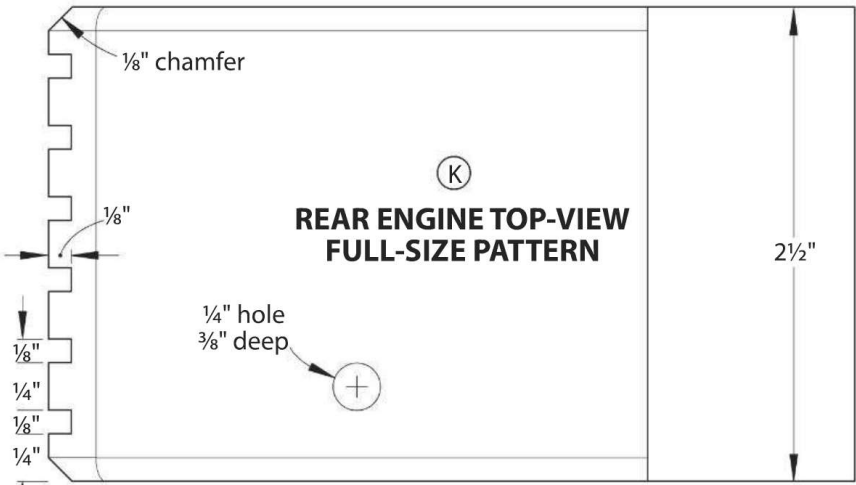
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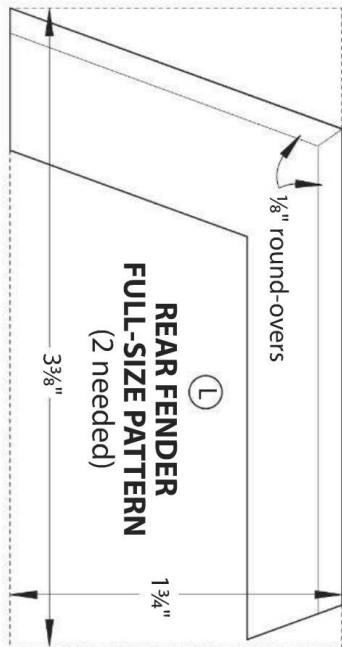
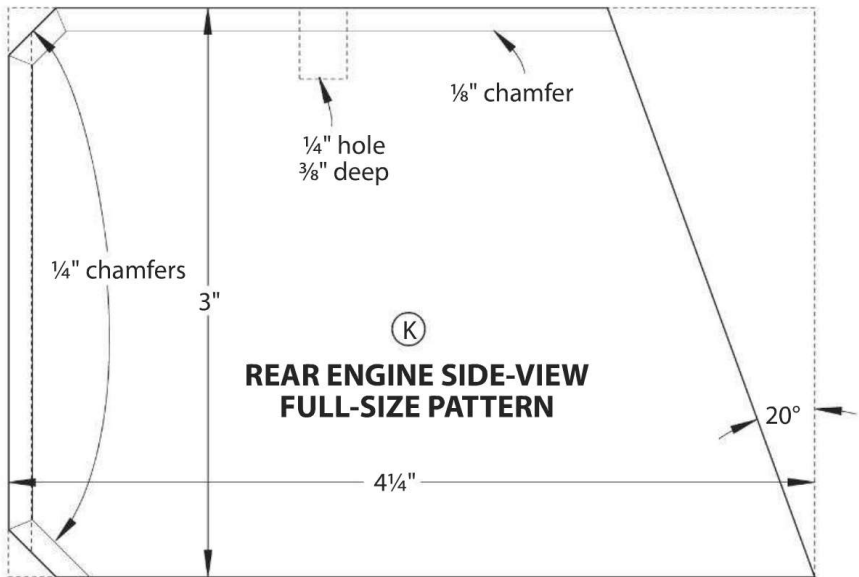
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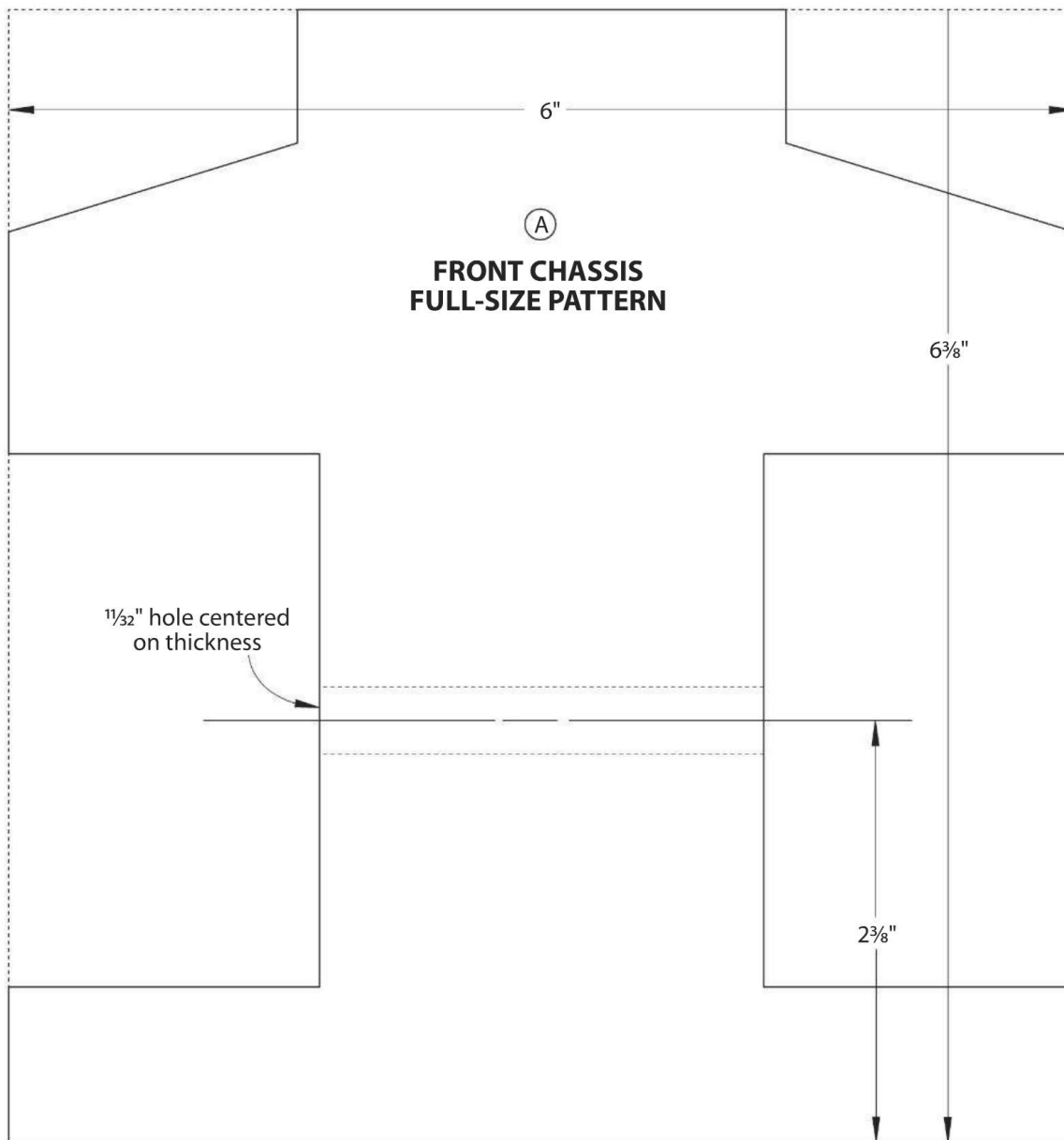


Construction-grade Scraper
Page 26

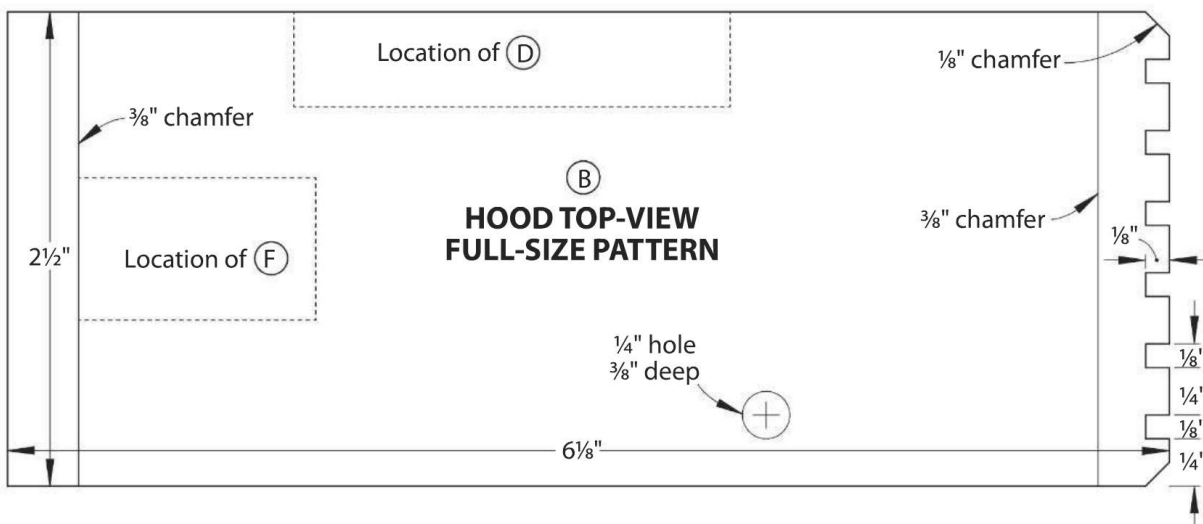


BRACKET
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PATTERN
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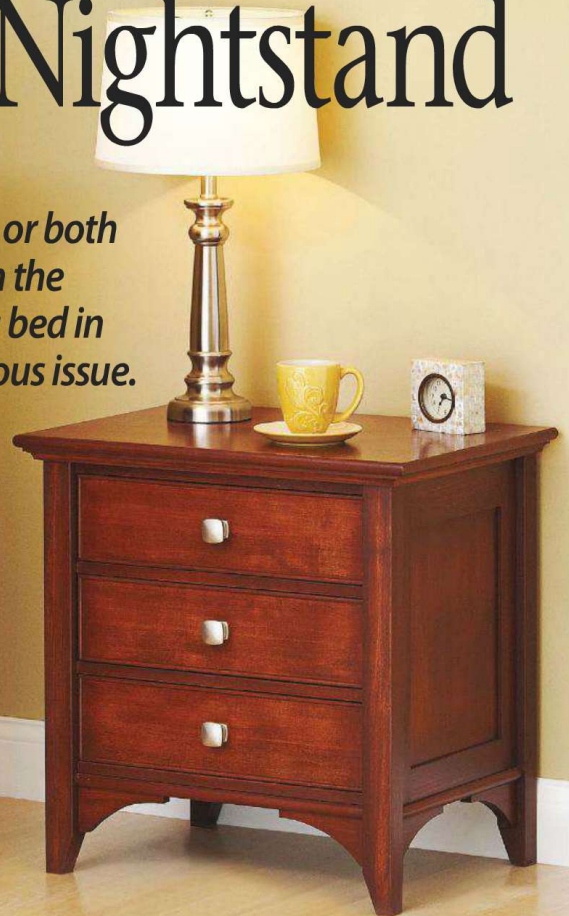
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Perfect Complement Traditional Dresser & Nightstand



Approximate materials cost: \$327
Dresser dimensions: 53½"H × 38⅞"W × 21⅞"D

*Build one or both
to go with the
matching bed in
our previous issue.*



Approximate materials cost: \$130
Nightstand dimensions: 26⅞"H × 26¾"W × 19⅞"D

Building a bedroom set is a big commitment—especially if you have a small shop. In my shop, it's tough finding room to build one project at a time, much less two. However, with these two pieces, the construction is so similar that, if you intend to make both, it makes sense to do them at the same time to avoid repeating machine setups. But how do you accomplish that in a limited space?

Here's an idea: Even if you don't have room to assemble both at once, you can still mill many similar parts for both projects, such as those for the side assemblies (parts A through J) and the top (parts W through Z), at the same time. Then stack parts for one project aside. After completing one piece, begin work on the second, with many of the parts ready to be assembled, and with the techniques still fresh in your mind.



Craig

Craig Ruegsegger
Deputy Editor

These projects share construction techniques, such as simple tongue-and-groove and loose-tenon joints, so with this one set of instructions, you can build both pieces. Drawings specific to the dresser are noted as **D1**, **D2**, and **D3**, and those specific to the nightstand are **N1**, **N2**, and **N3**. Find **Materials Lists** for the projects on pages 52 and 53.

Start with the sides

1 From eight pieces of ¾" poplar slightly wider and longer than the finished sizes shown in the **Materials List**, laminate blanks for four legs (A). Saw and plane the legs to finished size.

A close-up photograph of a wooden block with three circular holes labeled A, B, and C. A red plastic tool is positioned below the block, and a metal rod is inserted into hole A.

Using a full-kerf blade, make a $\frac{3}{8}$ "-deep cut slightly off center. Flip the piece end for end and make a second cut as shown. Check the fit of the plywood.

A close-up photograph of the auxiliary miter-gauge extension assembly. The assembly consists of a wooden block with a metal extension piece attached to its side. The extension piece is secured with a blue-handled screwdriver. The assembly is positioned on a red surface, likely a workbench or a piece of equipment. The text "Auxiliary miter-gauge extension" is printed in the upper right corner. Two circular callouts, labeled "C" and "D", point to specific parts of the assembly: "C" points to the metal extension piece, and "D" points to the wooden block.

Make $\frac{3}{8}$ "-wide, $\frac{1}{4}$ "-deep cuts in both faces on both ends of each rail (C, D) to create tenons that fit the panel grooves in the side stiles (B).

You'll save yourself sore fingertips and get a better finished appearance if you sand pieces to 220 grit before assembling them. For example, finish-sand all of the panels before putting them in their frames. The same goes for the drawer faces and doors—sand those before wrapping them with bead trim. And always sand drawer parts before assembling them. Sanding the legs, side stiles, brackets, and top trim before assembly makes a lot of sense, too.

2 Arrange the legs so the best face grain is on the front of the front legs and the best edge grain faces outward. Label the top ends of the legs so you

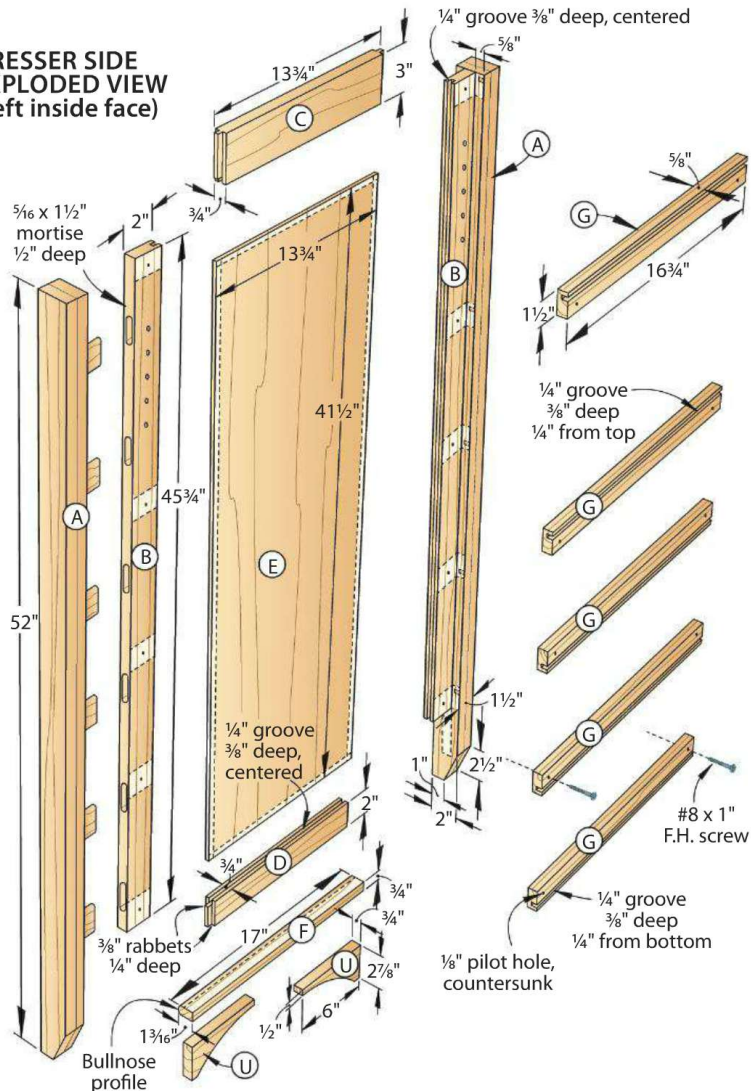
keep them properly oriented during construction. With a bandsaw, cut the tapers at the leg bottoms [**Drawings D1, N1**]. Sand the tapers flat and smooth.

3 Cut to size the side stiles (B), side top rails (C), and side bottom rails (D) according to the **Materials List**. In the edges of the rails and stiles saw $\frac{1}{4}$ " grooves $\frac{3}{8}$ " deep [**Photo A, Drawings D1, N1**]. The groove should snugly hold the $\frac{1}{4}$ " plywood you'll use to make the side panels (E) in **Step 7**.

4 Install in your tablesaw a $\frac{3}{8}$ " dado set and raise it $\frac{1}{4}$ " above the table. Attach an auxiliary wood face to your saw's rip fence and adjust the fence so the auxiliary face just touches the blade. Cut tenons on the ends of the rails [Photo B, Drawing 1a].

5 For the Dresser only (Nightstand: Skip to Step 6): Build the shelf-pin-hole jig

D1 DRESSER SIDE
EXPLODED VIEW
(Left inside face)



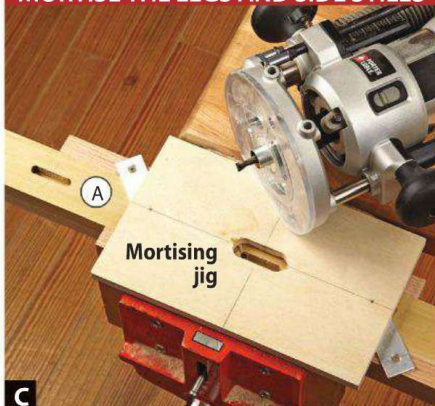
Technical drawing of a wooden joint showing dimensions: $\frac{3}{8}$ " (width of top flange), $\frac{1}{4}$ " (width of top flange), $2\frac{5}{8}$ " (height of vertical stile), 3 " (height of vertical stile), $\frac{3}{8}$ " (width of bottom flange), and $\frac{1}{4}$ " groove $\frac{3}{8}$ " deep (width and depth of bottom flange).

[**Shop Tip, right**] and use it to drill $\frac{1}{4}$ " shelf-pin holes $\frac{1}{2}$ " deep in the inside faces of the dresser side stiles (B) [**Drawing D2**]. Save the jig for use again later.

6 Cut centered mortises in the legs (A) and side stiles (B) using the mortising jig described on page 52 in *WOOD*® issue 218 (May 2013) [**Drawings D2, N2, Photo C**]. (You can also find a free copy of the article at woodmagazine.com/218loosetenon.) Now make loose tenons sized $\frac{5}{16} \times 1\frac{1}{2} \times \frac{7}{8}$ " using the methods also described in that article. (Make 16 tenons for the nightstand and 24 for the dresser.) Glue the tenons in the legs and then glue and clamp these assemblies to the stiles.

7 Cut to size two side panels (E). Then glue and clamp the side top rails (C) and side bottom rails (D) to the side panels [**Drawings D1, N1, Photo D**].

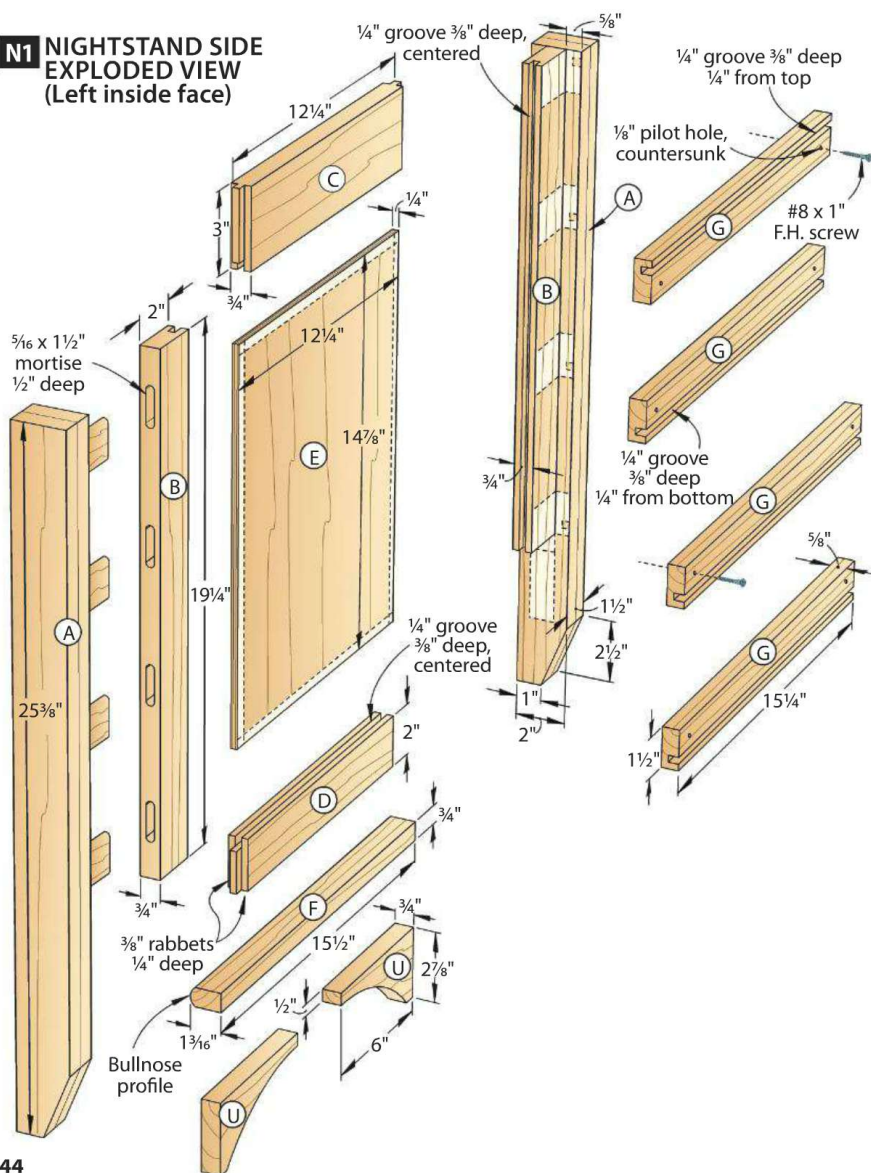
MORTISE THE LEGS AND SIDE STILES



C Precisely mark the centerlines of the mortises and center the mortising jig on the lines. Clamp the jig in place; then, rout the mortises.

8 Glue and clamp the leg/side stile assemblies (A/B) to the rail/panel assemblies (C/D/E).

N1 NIGHTSTAND SIDE EXPLODED VIEW (Left inside face)

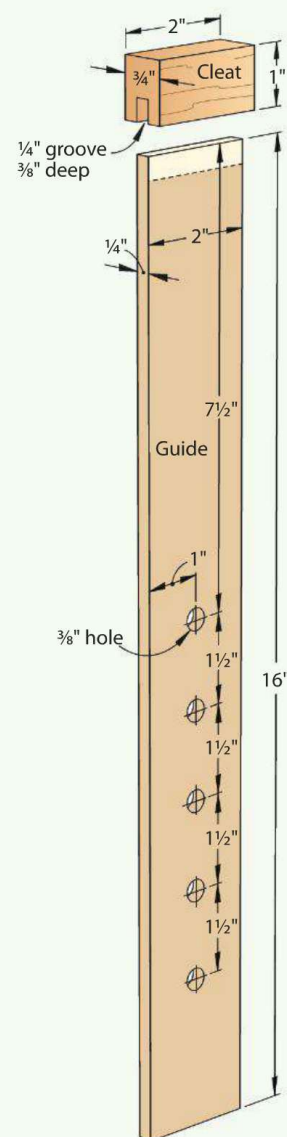
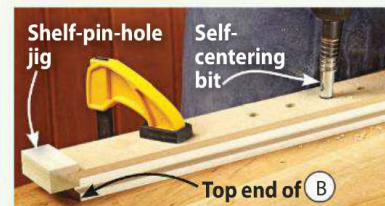


SHOP TIP

A simple jig aligns the holes

Build this jig from $\frac{1}{4}$ " hardboard and a piece of scrap for the cleat. Drill the holes at the drill press registering the guide against a fence for consistent spacing from the edge.

The cleat on the end registers the jig so that the shelf-pin holes align perfectly in the dresser. A $\frac{1}{4}$ " self-centering bit [Supplies on Demand, page 52] fits snugly inside the $\frac{3}{8}$ " holes.



9 Cut a piece of $\frac{3}{4} \times 2\frac{1}{2}$ " poplar, 18" long for the dresser, 16" long for the nightstand. With a $\frac{1}{2}$ " round-over bit extended $\frac{5}{16}$ " beyond your router's sub-base, rout a bullnose on both edges [Drawing 1b]. Sand the edges to blend the profiles. Rip two $1\frac{3}{16}$ "-wide pieces of side bottom trim (F) from the blank and cut those pieces to length [Drawings D1, N1]. Glue and clamp the trim to the bottom edges of the side assemblies (A–E), aligning the square edge of the trim with the inside face of the bottom rail (D).

Connect the sides with dust panels

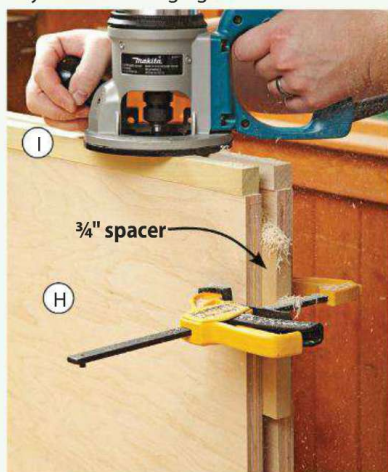
1 Cut to size the dust-panel cleats (G) [Materials List] and in each mill a $\frac{1}{4}$ " groove [Drawings D1, N1]. Glue and screw a dust-panel cleat flush with the top of each side assembly (A–F), butted against the front leg (A), and with the groove toward the top [Drawings D2, N2]. Leave a $\frac{1}{4}$ " gap between the cleat and back leg to accept the back later. Use scrap spacers to position the rest of the cleats [Photo E] using the spacing shown in Drawings D2

SHOP TIP

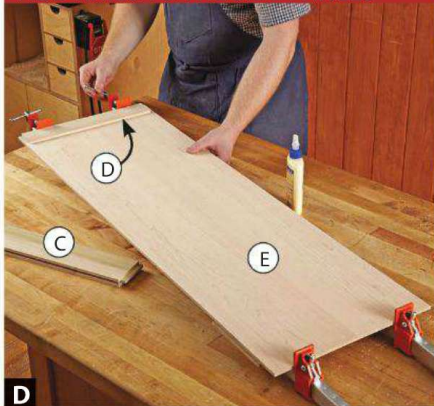
Double up panels for fast and steady edge trimming

If a handheld router tips or rocks while you're flush-trimming edging, the results can be less than pretty. Here's how to get clean cuts while speeding up the process.

Clamp two panels, edging up, face to face with $\frac{3}{4}$ " spacers between them. Hold that assembly upright in a bench vise or other work support, with the edging level and on the same plane. Equip your router with a $\frac{1}{2}$ " flush-trim bit and use the edging on both sheets to support the router base as you trim the edging flush.



ADD RAILS TO THE SIDE PANELS

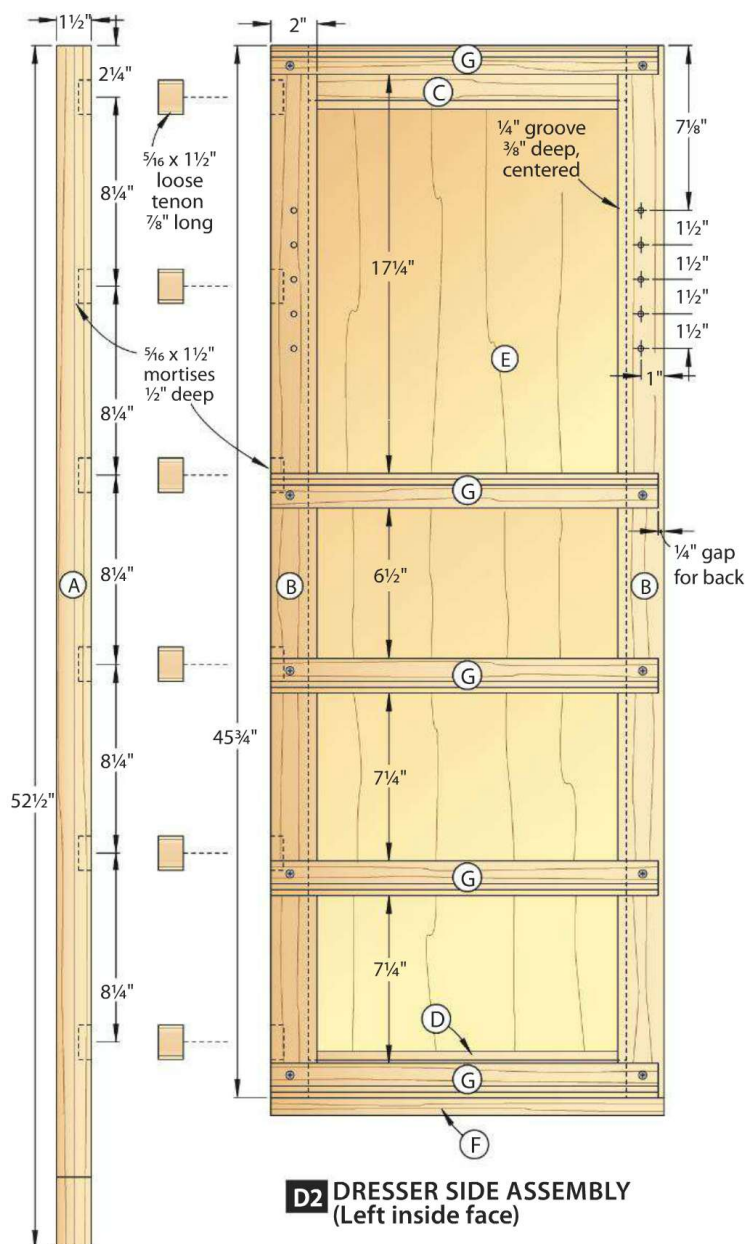


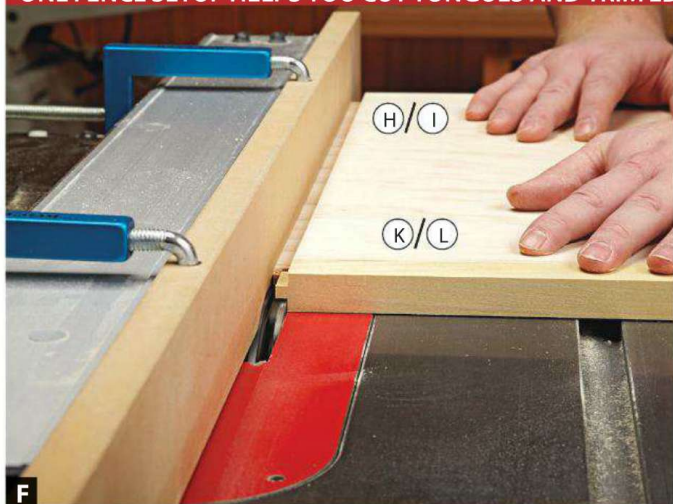
Carefully align the edges of the panel (E) with the ends of the stub tenons on the top and bottom rails (C, D) when gluing them together.

ATTACH THE DUST-PANEL CLEATS

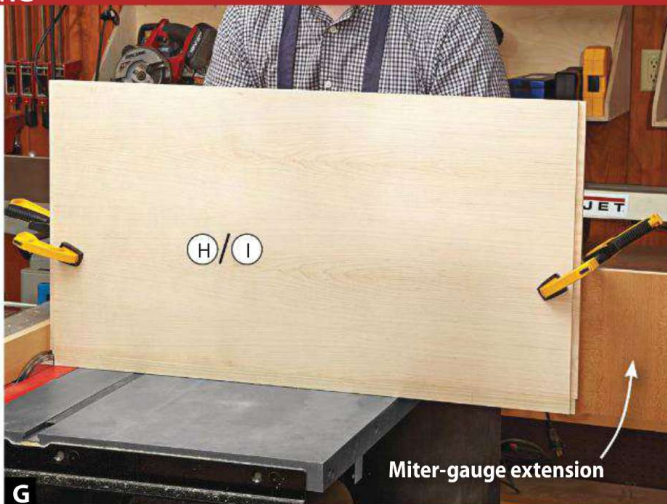


Position the cleats accurately using spacers—three lengths for the dresser, two lengths for the nightstand. Glue and screw the cleats in place.





F With a $\frac{3}{8}$ " dado set raised $\frac{1}{4}$ ", cut tongues on the ends of the dust panel and divider assemblies (H/I, K/L), left. To trim the edging flush with the shoulders of the tongues, raise the dado set to $\frac{7}{8}$ " high, stand the panels on edge, and clamp them to a tall miter-gauge extension (above). Run the edging through the dado set.



Miter-gauge extension

and **N2** and noting the orientation of the grooves [Drawings D1, N1]. On the dresser, the edge of the cleat nearest the groove faces up with the two upper cleats. On both projects, the groove is toward the bottom on the three lower cleats.

2 From $\frac{3}{4}$ " maple plywood, cut to size the dust panels (H) [Materials List, Drawings D3, N3].

Dresser only: Cut a door divider (K) to size, and mill a $\frac{1}{4}$ " dado centered on one face of two dust panels [Drawing D3].

3 From $\frac{3}{4}$ " poplar, cut the dust-panel edging (I) and front bottom trim (J) to width but $\frac{1}{2}$ " longer than listed [Materials List]. (For the dresser only, also cut the door-divider edging [L] overlength.) Glue the $\frac{3}{4}$ "-wide edge of the dust-panel edging to the dust panels (H) (and for the dresser, glue the door-divider edging to the door divider [K]). Leave the edging ends just short of the ends of the panels and divider. Flush-trim the edging as shown in the **Shop Tip** on page 45.

4 Repeat the tablesaw setup described in **Step 4** of the previous section. Then, follow the steps in **Photos F and G** to cut tongues centered on the ends of the dust-panel assemblies (H/I) and door-divider assembly (K/L), and to trim the ends of the edging.

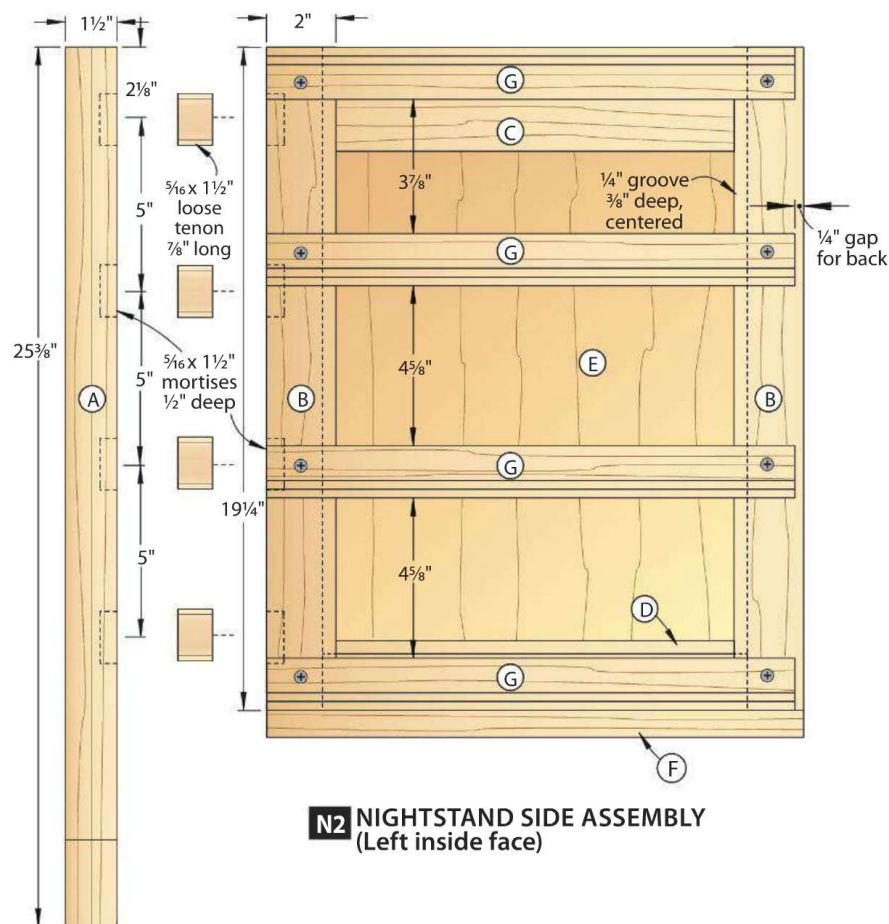
5 Now begin assembling the carcasses. For the dresser, glue and clamp the three dust-panel assemblies (H/I) without dadoes to one of the side assemblies. (For the nightstand, glue in all four dust panels. Then, attach the remaining side assembly.) Use assembly squares [Photo H] to help align and steady the parts.

Note: You can easily make your own assembly squares (see **More Resources** on page 53) or buy them (see **Supplies on Demand** on page 52).

Nightstand: Skip to **Step 8**.

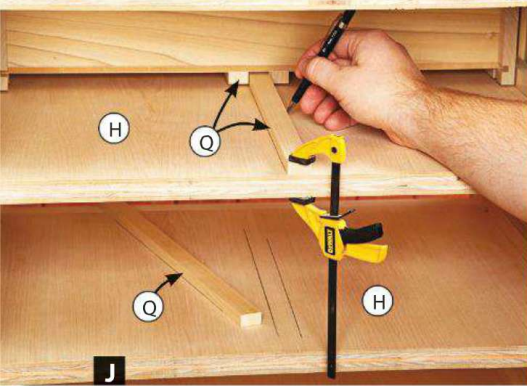
6 Dresser only: Glue and clamp the door-divider assembly (K/L) to one of the remaining dust-panel assemblies (H/I). After the glue dries, attach the other dust-panel assembly [Photo I].

7 Dresser only: Glue and clamp the door divider/dust panels assembly (H/I/K/L) to one side assembly (A–G).



N2 NIGHTSTAND SIDE ASSEMBLY
(Left inside face)

MARK THE GUIDE LOCATIONS



Working from the rear, slide a loose drawer guide (Q) between the drawer's guides. Push the drawer forward, clamp the guide, and mark its location.

Build and install the drawers

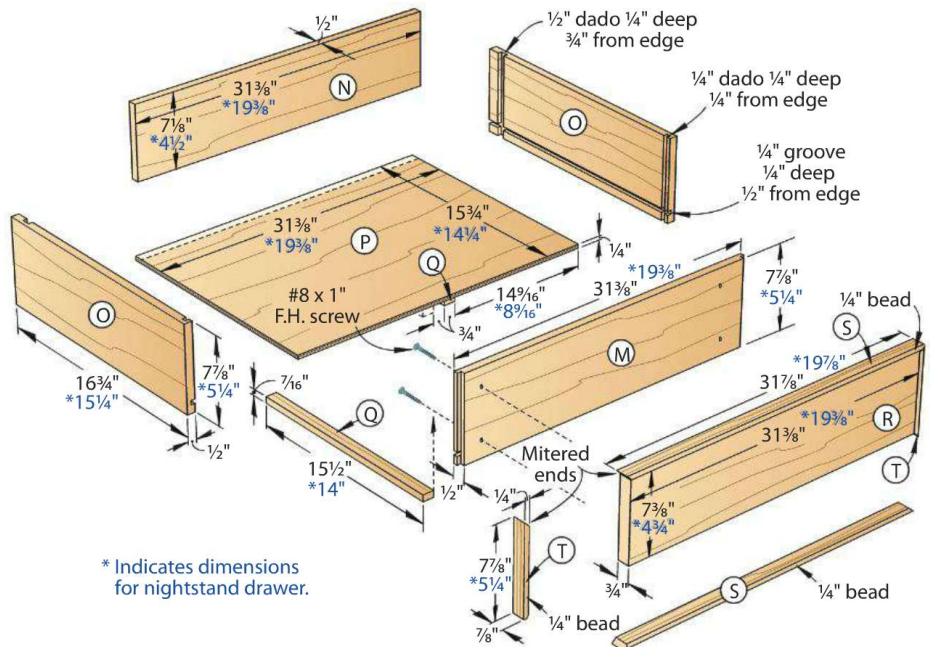
1 Cut to size the drawer fronts (M), backs (N), and sides (O) [Materials List, Drawing 4]. With a $\frac{1}{4}$ " dado blade, cut the dados, grooves, and rabbets as described in the **Shop Tip** below.

2 From $\frac{1}{4}$ " plywood cut the drawer bottoms (P) to size [Materials List].

3 Cut nine drawer guides (Q) [Materials List]. Set three aside for later use. Glue a pair of drawer guides to the bottom of each drawer bottom (P) [Drawing 4], parallel with the ends of the bottoms, flush with the back edge, and centered with enough space for another guide to slide smoothly between them.

4 Glue a drawer bottom/guides assembly (P/Q) to each drawer front (M).

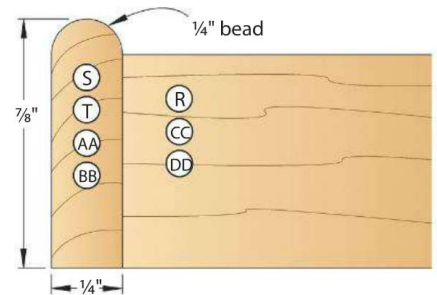
4 DRAWER Nightstand and Dresser



Then glue the drawer sides (O) and backs (N) to the drawer bottom/front assemblies, keeping everything square.

5 To mount the remaining drawer guides (Q) to the dust panels (H) [Drawings D3, N3], slide a drawer into an opening, center it side-to-side and mark the location for the guide [Photo J]. Identify the drawer to keep it matched with the opening. Repeat to mark the guide locations for the other drawers.

4a BEAD DETAIL



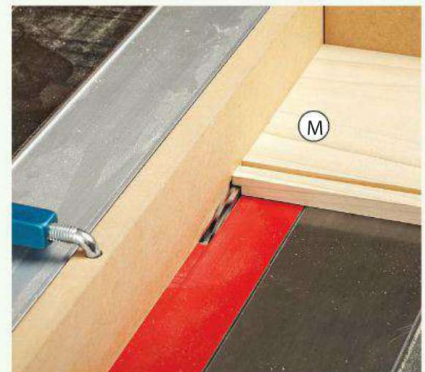
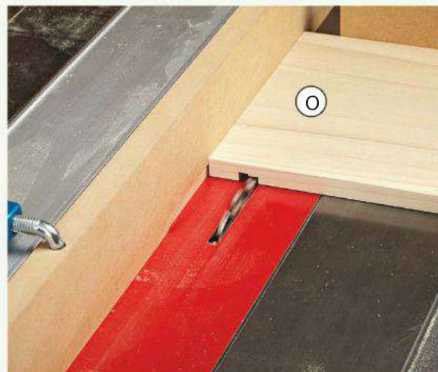
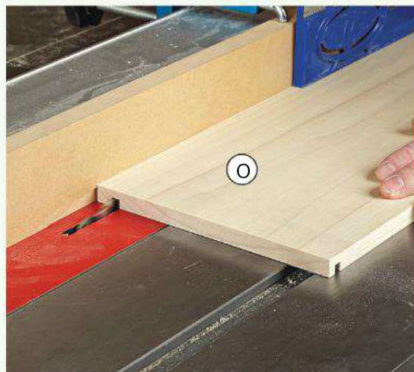
SHOP TIP

Easy tablesaw drawer joinery in $\frac{1}{4}$ " increments

With a $\frac{1}{4}$ " dado blade set for a $\frac{1}{4}$ "-deep cut, and an auxiliary face on your tablesaw's rip fence, you can quickly and efficiently cut the grooves, dados, and rabbets in the drawer fronts (M) and sides (O).

First, set the auxiliary face $\frac{1}{4}$ " from the blade. Cut the dado toward the front end of each drawer side. Move the fence away from the blade $\frac{1}{4}$ ", then cut the grooves to accept the drawer bottom (P) in the

inside faces of the drawer sides and fronts, *below left photo*. To cut the $\frac{1}{2}$ " dados in the drawer sides for the drawer back (N) move the fence $\frac{1}{4}$ " to the right, and make a cut. Then move the fence another $\frac{1}{4}$ " to the right and make another cut, *center photo*. Finally, move the auxiliary fence up against the dado set to cut the rabbets on the drawer fronts, *right photo*.



Quick Tip! Double-check the positioning of the guide and drawer movement by temporarily adhering the guide to the dust panel with double-faced tape.

Glue and clamp the guides to the panels. **6** Cut to size the drawer faces (R). Cut and rout enough $\frac{1}{4}$ " poplar to make drawer top, bottom, and side beads (S, T). Round over the top and bottom faces of one edge using a $\frac{1}{8}$ " round-over bit [Drawing 4a]. Cut the beads to fit as described in the sidebar *below*, and wrap the drawer faces.

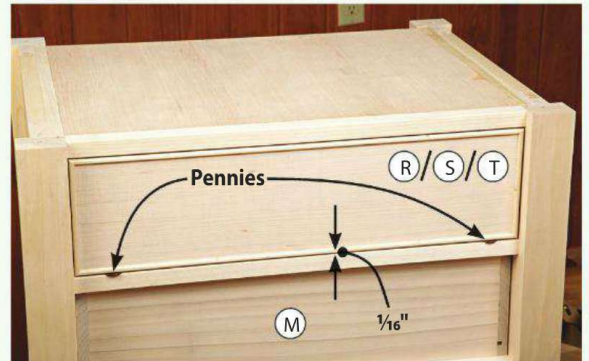
7 To position and mount the drawer faces (R/S/T) to the drawers (M-Q), slide the drawers into the openings. Apply a couple pieces of double-faced tape to each drawer front (M). Center the faces in the openings to create a $\frac{1}{16}$ " gap all around [Shop Tip, above], and press the faces firmly against the fronts.

8 Remove the drawers. Drill and countersink $\frac{1}{8}$ " pilot holes through the inside faces of the drawer fronts (M) and into the drawer faces (R) [Drawing 4]. Drill $\frac{1}{8}$ "-deep counterbores and $\frac{5}{32}$ " shank

SHOP TIP

A two-cent trick to center a drawer face

Holding a drawer face (R/S/T) centered in its opening while adhering it to a drawer with double-faced tape can be tricky. To simplify things, insert a penny under the drawer face near each end to center it top to bottom. Then center the drawer side-to-side and press it against the drawer front (M).



holes for the pulls. Separate the drawer fronts and faces, and remove the tape.

Note: For the nightstand, skip to Add the brackets, back, and top on page 50. Dresser instructions continue in the next step. To maintain consistent part letters between similar parts on the dresser and nightstand, part letters for the dresser doors and shelves jump ahead beginning with (AA).

Swing over to the dresser doors and shelves

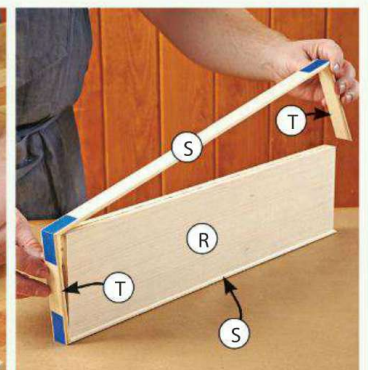
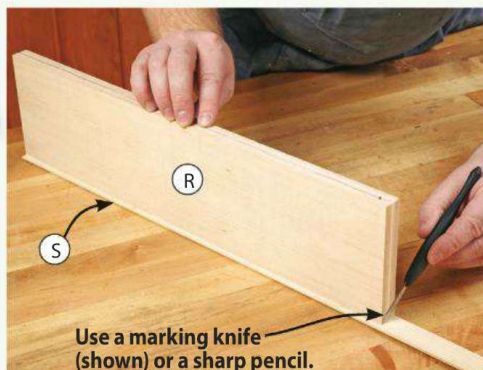
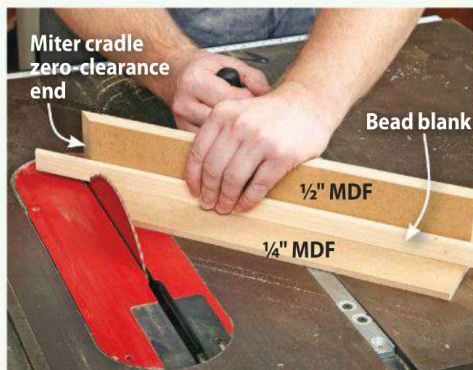
1 From $\frac{1}{4}$ " poplar cut $\frac{7}{8}$ "-wide strips 1" longer than the lengths listed in the Materials List for the door side bead (AA) and door top and bottom bead (BB) [Drawing 5]. Rout $\frac{1}{8}$ " round-overs along both faces of one edge to create the bead profile [Drawing 4a].

Precisely mitered trim relies on precision marking and cutting

It's typically the small details that tell the world how well something is built, and for the dresser and nightstand, that detail is the fit of the bead trim surrounding the drawer faces and doors. For spot-on results try this surefire process that works whenever you have to wrap a panel with mitered trim:

- First, set your miter gauge to exactly 45° and make test cuts in scrap to confirm its accuracy. Then, glue together an L-shaped miter cradle like the one shown *below left*. Attach the cradle to the miter gauge with the end extending past the blade. Trim the end of the cradle.
- To check the accuracy of your miter gauge, miter-cut four pieces of 1" or wider scrap to identical lengths. Dry-fit the four pieces to create a frame. Gap-free joints at each corner indicate your miter gauge is set precisely. If you see gaps, make a slight adjustment to the gauge and repeat the test.
- Miter-cut one end of a top/bottom bead (S). Align the heel of the miter with the corner of a drawer face (R) and mark the opposite end for length, *below center*.

- Miter-cut the end, erring on the piece being a hair long—you can always trim it during the dry-fitting process.
- Temporarily secure that bead piece to the drawer face with masking tape. Miter-cut one end of a drawer side bead (T), tape it in place, and mark the opposite end of the side bead at the corner of the drawer face. Cut a miter at your mark. Repeat these steps for the two remaining pieces. Be patient and take light mitering cuts.
- Number the mitered pieces and adjoining edges of the drawer face and remove the bead. Lay the bead pieces in a line, in numbered order, on a flat surface with the heels of their miters down. Tape the pieces together and wrap this assembly around the drawer face, *below right*. Double-check for a good fit.
- Apply glue sparingly to the miters and on the edges of the drawer face to avoid squeeze-out. Set the drawer face on a flat surface with its front face up, and wrap the bead around the drawer front. Secure the open corner with tape. With the back of the bead flush with the back of the drawer face, clamp the bead in place.



MEASURE EXACT DOOR SIZE



Stack two pieces of door side bead (AA) to help you determine the length of the door stiles (CC). Subtract $\frac{1}{8}$ " to allow for a $\frac{1}{16}$ " gap above and below.

SHORTEN THE SHELF-PIN-HOLE JIG FOR DRILLING THE DOOR DIVIDER



Use the top of the dresser carcass for quickly marking $\frac{3}{4}$ " down from the cleat on the shelf-pin-hole jig, above left. Saw the jig at that mark. Clamp the jig to the door divider (K), above right, and drill a matching set of shelf-pin holes on both sides at its front and back.



2 Measure for the door stiles (CC) [Photo K]. Do likewise for the door rails (DD); with the beads against the leg (A), measure to the center of the door divider edging (L); then, subtract $\frac{3}{4}$ ". Cut the rails and stiles to length; then, cut grooves and stub tenons [Drawing 5].

3 Dry-fit the door stiles (CC) and rails (DD) and measure for the door panels (EE). Cut the panels to size.

4 Glue and clamp together the door stiles, rails, and panels to make two doors. Attach the door bead (AA, BB) as you did for the drawer fronts.

5 Drill two $1\frac{3}{8}$ " holes $\frac{5}{8}$ " deep in each door for the hinge cups [Drawing 5]. Set the doors aside.

6 Cut to size two shelves (FF) and the shelf edging (GG) [Materials List,

Drawing 6]. Glue and clamp the edging to the front edges of the shelves. Trim flush the edging faces and ends as you did with the dust-panel assemblies.

7 Mark and trim the shelf-pin-hole jig [Photo L]. Position the jig as shown in Photo M and drill shelf-pin holes $\frac{3}{8}$ " deep on both sides of the door divider (K) to match those already in the side stiles (B).

8 Cut the top and bottom hinge blocks (HH, II) to size [Materials List] and glue them in place: the bottom hinge blocks resting on the dust panel (H/I), the top hinge blocks against the side top rails (C), and all four tight to the rear face of the leg (A) [Drawing 6].

9 Build the hinge-plate jig [Photo N] and use it to help drill holes for the hinge plates in the hinge blocks (HH, II).

Install the plates on the hinge blocks and the hinges in the doors. Check the fit of the doors in the carcass; then, remove the hardware.

Add the brackets, back, and top

1 Make copies of the **Bracket Pattern** from page 53 and cut six brackets (U) to shape. Remove the patterns and glue the brackets to the side and front bottom trim (F, J) [Drawings D3, N3].

2 Cut to size the back (V) [Materials List]. Slide it into the gap between the back legs (A) and the dust-panel cleats (G), then secure it with brads.

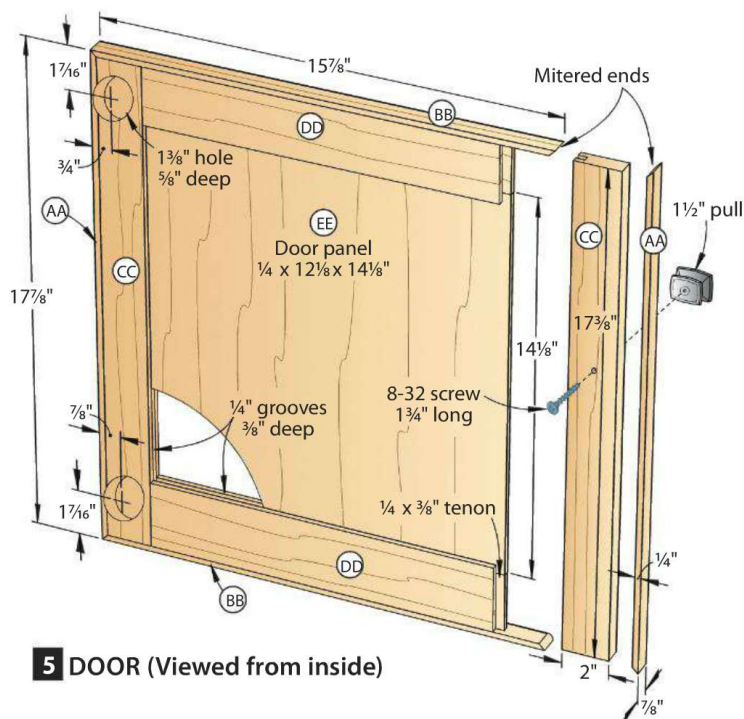
3 Cut the top front trim (W) and top side trim (X) 2" longer than listed in the **Materials List**. Cut the top back trim (Y) to finished size [Drawings N3, 6].

4 Rout a $\frac{1}{2}$ " cove profile in the edges of the top front (W) and top side trim (X) [Drawings N3, 6]. Miter both ends of the top front trim and one end of the top side trim. Dry-fit the front and side trim [Photo O], fit the back trim (Y), and check for square. Unclamp, cut #10 biscuit slots, and drill the slots toward the back end of the side trim. Apply glue and biscuits and clamp together.

5 Edge-join an oversize blank for the top (Z). After the glue dries, cut it to final size, then rout a partial round-over on its front and side edges as you did on the side and front bottom trim (F, J).

6 Screw the top trim assembly (W/X/Y) to the top (Z). Be sure to place the side trims' back screws in the center of the slots to allow the top to expand and contract across its width with seasonal changes in humidity.

7 With an $\frac{1}{16}$ " Forstner bit, drill $\frac{1}{8}$ "-deep counterbores in the tops of the



5 DOOR (Viewed from inside)

Dresser Materials List

Part	FINISHED SIZE			Matl.	Qty.	
	T	W	L			
Carcase						
A	legs	1½"	2"	52"	LP	4
B	side stiles	¾"	2"	45¾"	P	4
C	side top rails	¾"	3"	13¾"	P	2
D	side bottom rails	¾"	2"	13¾"	P	2
E	side panels	¼"	13¾"	41½"	MP	2
F*	side bottom trim	¾"	1¾"	17"	P	2
G	dust panel cleats	⅝"	1½"	16¾"	P	10
H	dust panels	¾"	16¾"	32¾"	MP	5
I*	dust-panel edging	¾"	⅞"	32"	P	5
J*	front bottom trim	¾"	1¾"	32"	P	1
K	door divider	¾"	16½"	18¾"	MP	1
L*	door divider edging	¾"	¾"	18"	P	1

Drawers

M fronts	½"	7⅞"	31⅞"	P	3
N backs	½"	7⅞"	31⅞"	P	3
O sides	½"	7⅞"	16¾"	P	6
P bottoms	¼"	15¾"	31⅞"	MP	3
Q guides	¾"	7⅞"	15½"	P	9
R faces	¾"	7⅞"	31⅞"	P	3
S* drawer top and bottom beads	¼"	⅞"	31⅞"	P	6
T* drawer side beads	¼"	⅞"	7⅞"	P	6

Trim, back, and top

U brackets	¾"	2⅞"	6"	P	6
V back	¼"	33¼"	45¾"	MP	1
W* top front trim	¾"	3"	37¾"	P	1
X* top side trim	¾"	3"	20⅞"	P	2
Y top back trim	¾"	3"	31⅞"	P	1
Z* top	¾"	21⅞"	38⅞"	EP	1

Doors and shelves

AA* door side bead	¼"	⅞"	17⅞"	P	4
BB* door top and bottom bead	¼"	⅞"	15⅞"	P	4
CC door stiles	¾"	2"	17⅞"	P	4
DD door rails	¾"	2"	12⅞"	P	4
EE door panels	¼"	12⅞"	14⅞"	MP	2
FF shelves	¾"	15⅞"	16⅞"	MP	2
GG shelf edging	¾"	¾"	16⅞"	P	2
HH top hinge blocks	⅝"	2¾"	2"	P	2
II bottom hinge blocks	⅝"	2¾"	2¾"	P	2

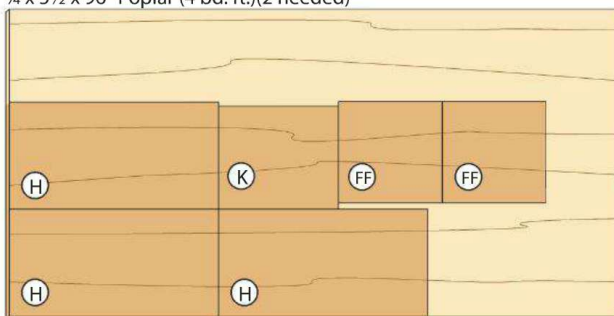
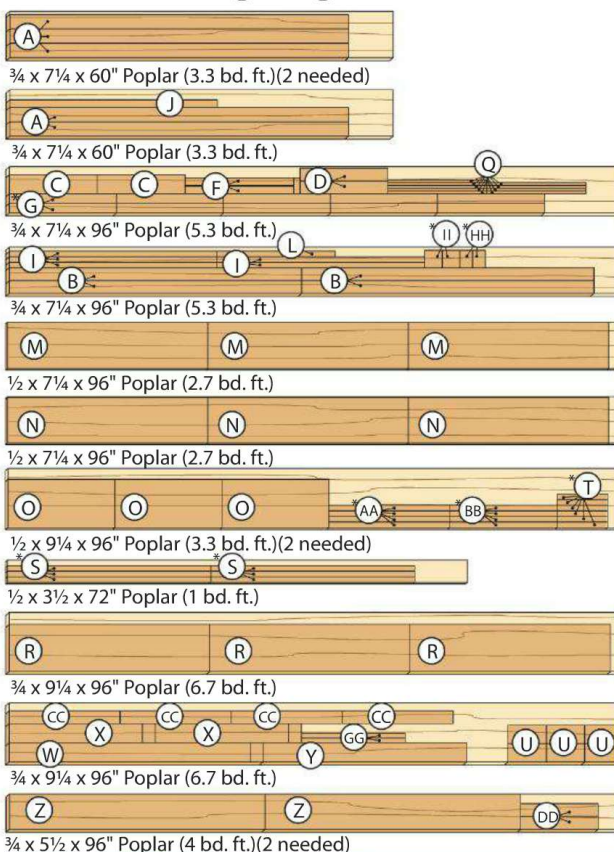
*Parts initially cut oversize. See the instructions.

Dresser supplies: Double-faced tape, #6x⅝" flathead screws (8), #8x1" flathead screws (32), #8x1¼" flathead screws (8), 8-32x1¾" machine screws (6), #10 biscuits (4), ¼" shelf pins (8), figure-8 fasteners (4), #17x1" brads.

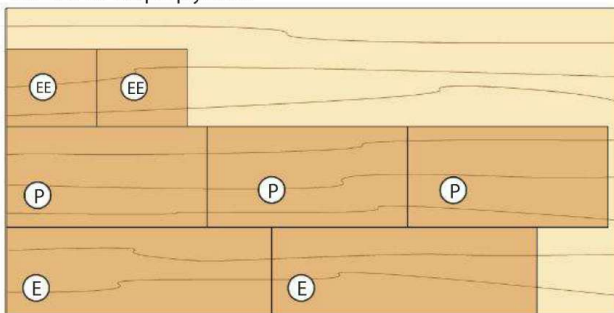
Materials key: LP—laminated poplar, P—poplar, MP—maple plywood, EP—edge-joined poplar.

Blade and bits: Dado set; ⅝", ⅝½" drill bits, ¼" self-centering drill bit, 1⅞" Forstner bit; ⅝" upcut spiral, ⅞" and ½" round-over, flush-trim, ½" cove router bits. For dresser only: ⅝½" drill bit, 1⅞" Forstner bit.

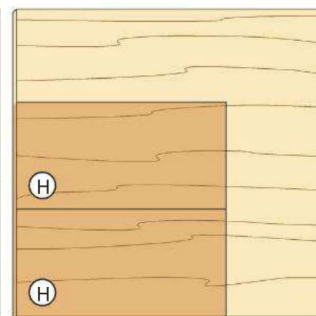
Dresser Cutting Diagram



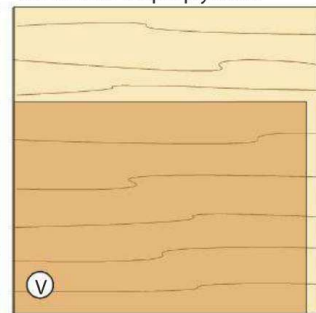
¾ x 48 x 96" Maple plywood



¼ x 48 x 96" Maple plywood



¾ x 48 x 48" Maple plywood



¼ x 48 x 48" Maple plywood

Sources

Drawer and door pulls: 1½" knobs (8 for dresser, 3 for nightstand), no. P2163, \$5.19, Woodworker's Hardware, 800-383-0130, www.hardware.com.

Hinges: 94°, soft-close, inset hinges, no. SAC2P8PD9, \$4.54 (4); mounting plates, no. SABAR3R39, \$1.46 (4), Woodworker's Hardware.

¼" **self-centering bit:** no. 22567, \$22.99, Rockler, 800-279-4441, rockler.com.

Clamp-it assembly square: no. 29190, \$12.99, Rockler.

UHMW ("slick") tape: 1" x 18 yards, \$17.28, amazon.com.

Supplies on Demand:

Order the ¼" self-centering drill bit, two Clamp-it assembly squares, and a 1" x 18 yd. roll of nylon slick tape at woodmagazine.com/219dresser. Simply delete any unwanted items from your cart before checkout.

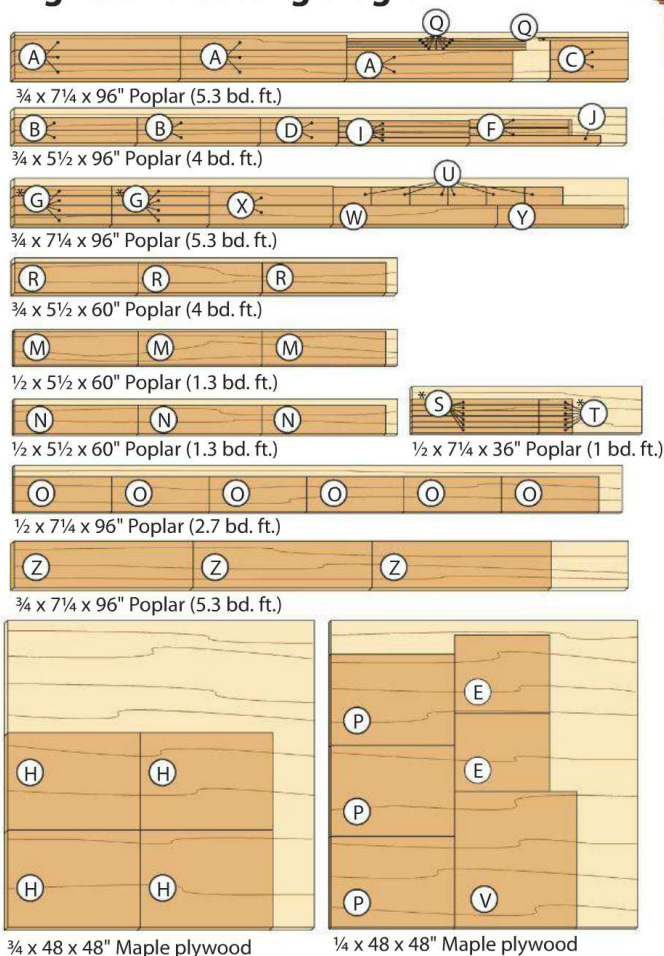
Nightstand Materials List

Part	FINISHED SIZE			Matl.	Qty.	
	T	W	L			
Carcase						
A	legs	1½"	2"	25¾"	LP	4
B	side stiles	¾"	2"	19¼"	P	4
C	side top rails	¾"	3"	12¼"	P	2
D	side bottom rails	¾"	2"	12¼"	P	2
E	side panels	¼"	12¼"	14⅞"	MP	2
F*	side bottom trim	¾"	1⅜"	15½"	P	2
G	dust panel cleats	⅝"	1½"	15¼"	P	8
H	dust panels	¾"	15¼"	20¾"	MP	4
I*	dust panel edging	¾"	⅞"	20"	P	4
J*	front bottom trim	¾"	1⅜"	20"	P	1
Note: Parts K and L not used for the nightstand.						
Drawers						
M	fronts	½"	5¼"	19⅜"	P	3
N	backs	½"	4½"	19⅜"	P	3
O	sides	½"	5¼"	15¼"	P	6
P	bottoms	¼"	14¼"	19⅜"	MP	3
Q	guides	¾"	⅞"	14"	P	9
R	faces	¾"	4¾"	19⅜"	P	3
S*	drawer top and bottom beads	¼"	⅞"	19⅞"	P	6
T*	drawer side beads	¼"	⅞"	5¼"	P	6
Trim, back, and top						
U	brackets	¾"	2⅞"	6"	P	6
V	back	¼"	21¼"	19⅞"	MP	1
W*	top front trim	¾"	3"	25¾"	P	1
X*	top side trim	¾"	3"	19⅜"	P	2
Y	top back trim	¾"	3"	19¾"	P	1
Z*	top	¾"	19⅞"	26¾"	EP	1

*Parts initially cut oversize. See the instructions.

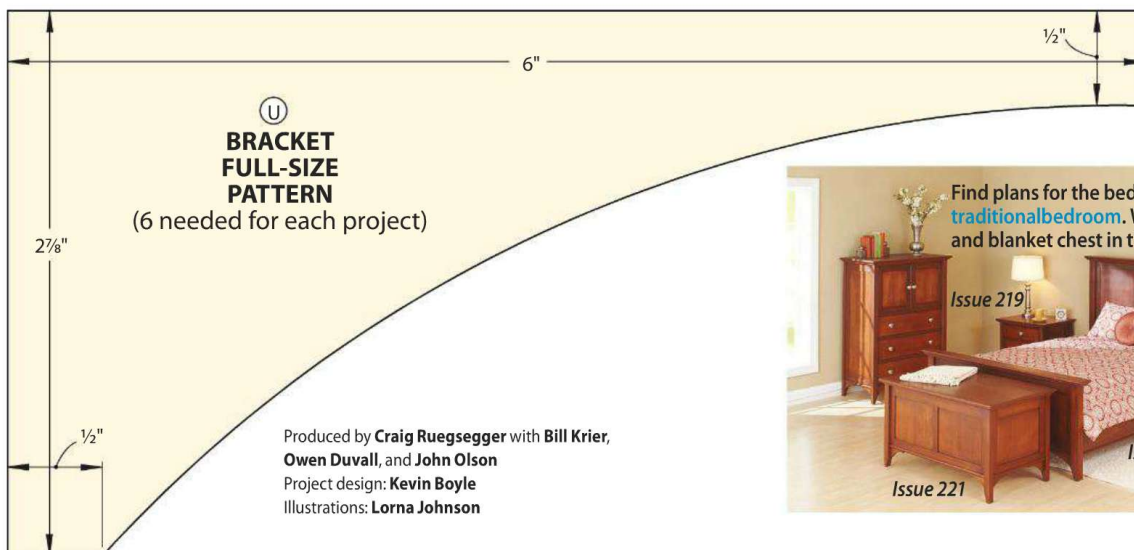
Nightstand supplies: Double-faced tape, #6×⅝" flathead screws (8), #8×1" flathead screws (28), #8×1¼" flathead screws (7), 8-32×1¾" machine screws (3), #10 biscuits (4), figure-8 fasteners (4), #17×1" brads.

Nightstand Cutting Diagram



More Resources

- To learn about loose-tenon joinery, how to build a mortise-cutting jig, and how to make loose tenons, see the article "Loose-Tenon Joinery" in issue 218 (May 2013) of *WOOD*, or download a free copy at woodmagazine.com/218loosetenons.
- For a free article on how to build an assembly square go to: woodmagazine.com/clampingbrace.



Produced by **Craig Ruegsegger** with **Bill Krier**, **Owen Duvall**, and **John Olson**
Project design: **Kevin Boyle**
Illustrations: **Lorna Johnson**



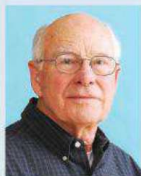
Raised-panel-bit Boxes

Cove-cut box
11¼" L × 8" W × 5" H

Double-ogee box
10¾" L × 6¾" W × 3¾" H

Your raised-panel router bits should be making dust, not gathering it sitting on a shelf. Put them to work crafting beautiful boxes with this unique technique.

While shooting the breeze with **WOOD**® magazine contributing craftsman Erv Roberts in his shop recently, we started talking about our love/hate relationship with raised-panel router bits. Nothing makes cabinet-door panels as efficiently, but the cost of a good bit—as high as \$130—makes it hard to justify unless you're going to make a lot of doors. As the conversation went on, I could see the wheels turning in Erv's head, and a week later he dropped by the office with a bunch of stunning boxes he had just made using his raised-panel bits. Our staff liked them so much, we talked Erv into sharing his technique with you.



Erv Roberts

Bob

—Bob Hunter, Tools Editor

Small boxes—whether for storing jewelry, photos, keys, or keepsakes—provide a perfect opportunity to get creative with wood selection. If you have a special board or two set aside, or cutoffs from a previous project, here's a great opportunity to put them to good use.

We made the two boxes shown here from combinations of complementary wood species: ash and mahogany for the

cove-cut box (*above left*), and Douglas fir and maple for the double-ogee box. Rather than provide dimensioned plans for each box, we lead you through the step-by-step process for making them. We give key dimensions or proportions when needed, but allow you to design and build to suit your taste, tools, or materials. You can substitute your own bits to create different profiles.

A few tidbits about using raised-panel bits

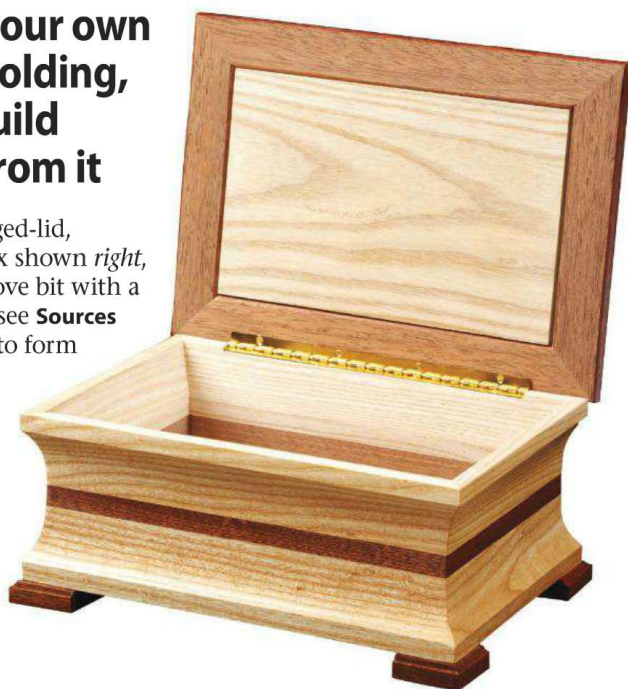
- ▶ Choose a bit with a ½" shank for less chatter and a cleaner cut compared to one with a ¼" shank.
- ▶ Use a table-mounted router—never a handheld one—with at least a 2¼-hp, variable-speed motor.
- ▶ Run the router at about 10,000–12,000 rpm when spinning a raised-panel bit.
- ▶ Fix either the fence location (our preference) or maximum bit height before routing, and then leave it alone. You'll make incremental adjustments to the other as you rout the profile in steps.

- ▶ Always rout end grain (if any) first, then progress around the workpiece, alternating ends and edges.
- ▶ If your raised-panel bit has a backcutter, as shown *below*, remove the cutter, nut, and washers before routing box profiles. (The backcutter cuts raised-panel "tongues" to exact thickness for fitting into the rail and stile grooves on cabinet doors, but gets in the way for box-making.)



Make your own cove molding, then build a box from it

For the hinged-lid, cove-cut box shown *right*, we used a cove bit with a 1½" radius (see **Sources** on page 59) to form the profile for the box sides and lid panel.



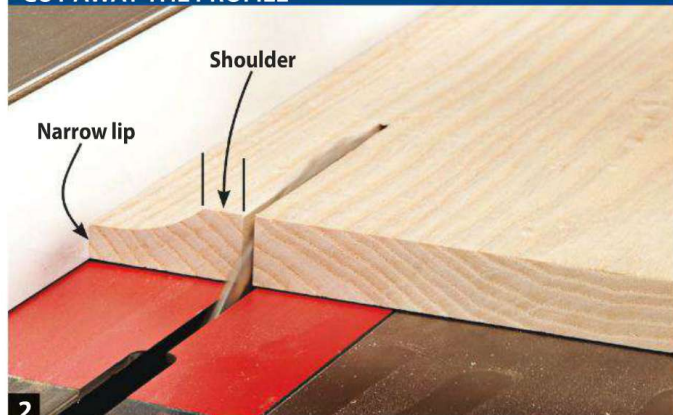
ROUT THE COVE PROFILE



1

Start with two blanks ¾" thick, at least 4" wide, and about 2' long to make four cove moldings. With the fence set flush with the bit's bearing, raise the bit in increments of ⅛" or less as you rout the profile to minimize strain on your router and tear-out to the wood. Stop routing when the narrow lip is about ⅜" thick.

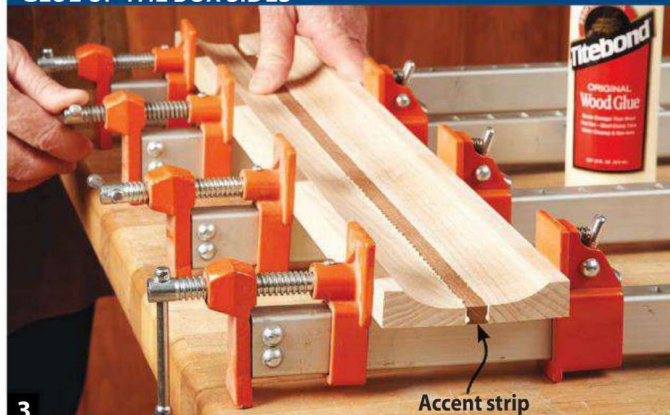
CUT AWAY THE PROFILE



2

Rip the cove molding from your blank at the tablesaw. Keep the shoulder width equal to ¼ or ⅓ that of the routed profile for good proportion.

GLUE UP THE BOX SIDES



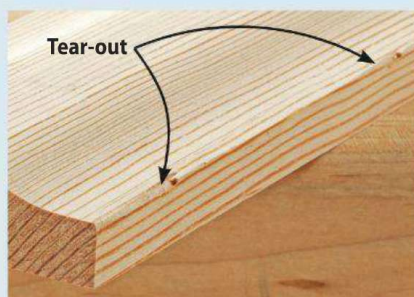
3

Glue and clamp two pieces of profile molding with an accent strip equal in thickness to the narrow lip, and no wider than ½" to avoid a broad flat area in the box profile. Make sure all three pieces rest flat against the clamp bars as you tighten. Sand smooth when dry.

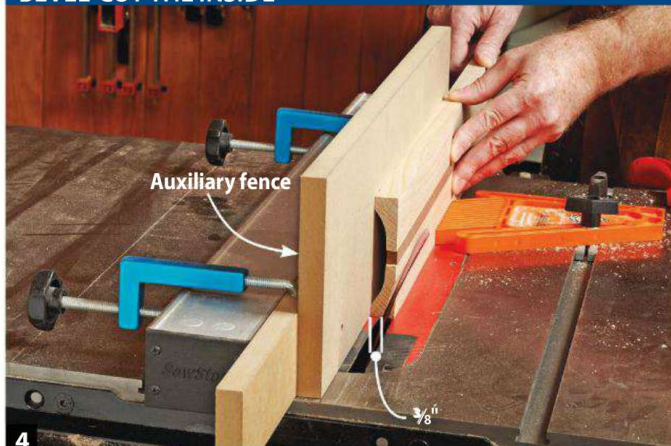
Thwart bit tear-out with a quick, preventive cut

Some wood species—especially figured woods with interlocking grain—simply prove more susceptible to tear-out when routing edge profiles. For example, the riftsawn Douglas fir blanks we used for the double-ogee box kept splintering as we routed the profiles for the sides and lid, as shown *below left*, even when running the router at the

appropriate speed, taking a shallow cut, and feeding the wood slowly. To prevent this, rip a shallow groove along the edge at the tablesaw, *below center and right*, establishing the final thickness of the profile's low point. Then continue routing in shallow increments (⅛" just to be safe) until the saw kerf disappears.

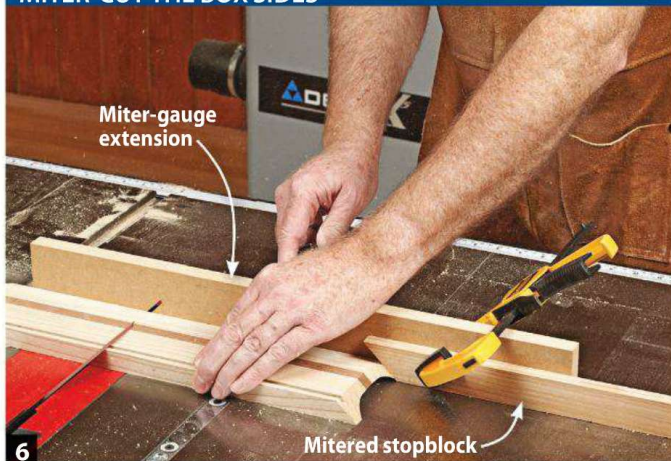


BEVEL-CUT THE INSIDE



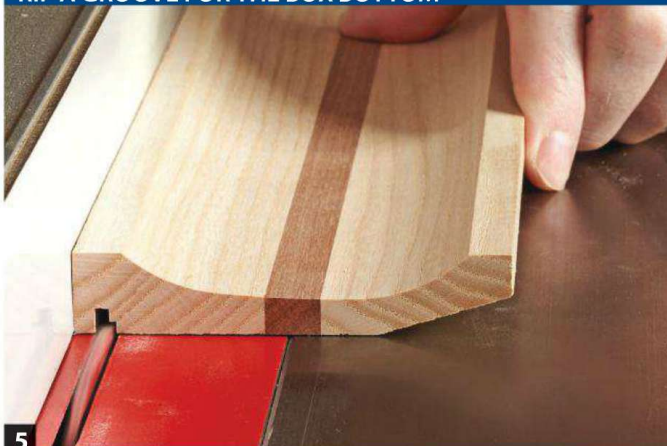
4 Attach an auxiliary fence—taller than the width of your box-side blank—to the rip fence. Then, rip a 15° bevel along only the top inside face to lighten the look. Leave the remaining wall thickness at least $\frac{3}{8}$ " to avoid weakening it.

MITER-CUT THE BOX SIDES



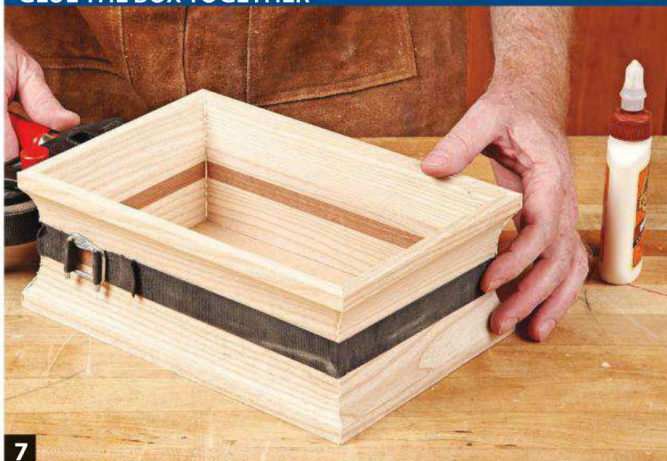
6 With a crosscut blade (60–80 teeth) tilted to 45°, cut a miter on each end of both box-side blanks. Clamp a mitered stopblock to a miter-gauge extension, and cut the long sides to length. Reset the stopblock and cut the shorter sides.

RIP A GROOVE FOR THE BOX BOTTOM



5 Cut a $\frac{1}{4}$ "-deep groove for the bottom. Make this cut in two passes, if needed, testing the fit with the bottom panel—we used $\frac{1}{4}$ " plywood—while setting up the second pass.

GLUE THE BOX TOGETHER



7 Cut the bottom panel to size and do a dry-fit clamp-up to ensure all joints fit tightly. Finish-sand the inside surfaces. Apply glue liberally to each miter—end grain soaks up a lot—and clamp the assembly with a band clamp.

Now craft a raised-panel framed lid

In addition to the raised-panel bit you used in making the box sides, you'll need a $\frac{3}{4}$ " straight or $\frac{1}{2}$ " spiral bit and a $\frac{1}{8}$ " round-

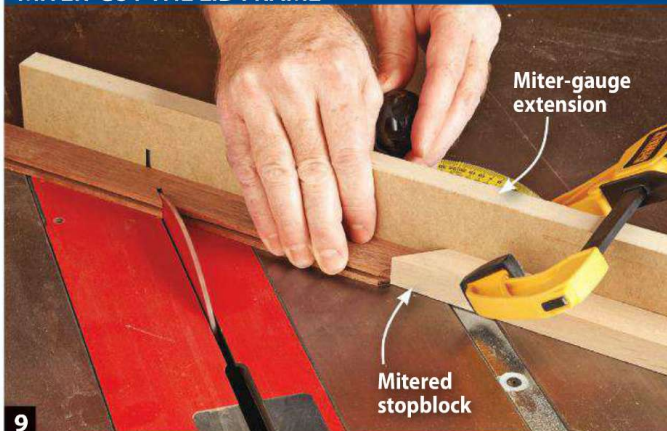
over to make the lid, which consists of a mitered frame with a solid-wood panel contained within.

RIP THE PANEL GROOVE



8 From the same wood as the accent strips, machine two $\frac{3}{8}$ " $\times$ $\frac{1}{4}$ " $\times$ 2' lid-frame blanks. Cut a centered $\frac{1}{8}$ " groove $\frac{1}{4}$ " deep along one edge of each blank to hold the lid's raised panel. Rout $\frac{1}{8}$ " round-overs on all edges.

MITER-CUT THE LID FRAME



9 With the miter gauge turned to 45° and the frame blank's grooved edge forward, cut a miter at each end. Next, use a mitered stopblock to ensure equal lengths for matching parts, and miter-cut the lid-frame pieces to length.

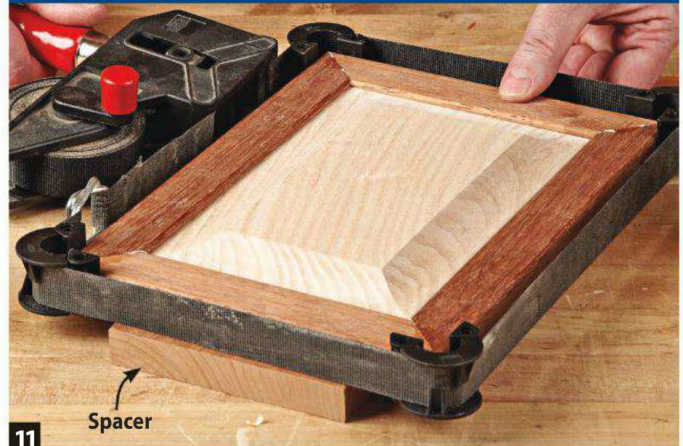
FORM THE LID PANEL



10

After cutting the lid panel to fit the frame, rout the cove profile with the raised-panel bit. Then, using a $\frac{3}{4}$ " straight bit, rout a rabbet in the back side, leaving a "tongue" that fits into the lid-frame groove.

GLUE UP THE LID



11

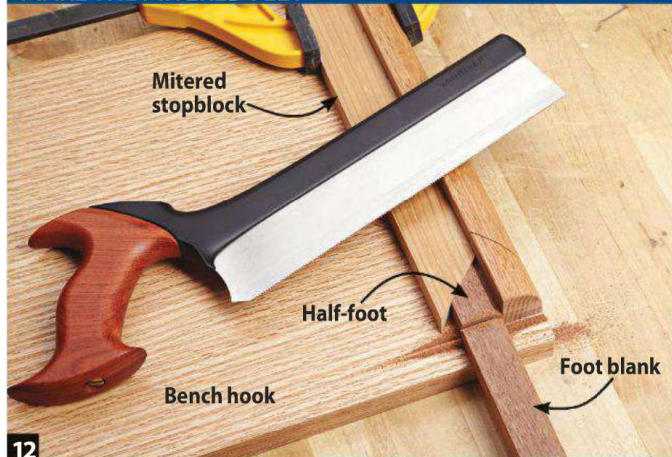
Finish-sand all parts, then glue and clamp together the lid frame with the raised panel floating unglued in the grooves. To better support and center our $\frac{3}{8}$ "-thick frame in the band clamp, we elevated it on a scrapwood spacer.

Add the feet, hinge, and finish

To match the lid and box, and to avoid showing end grain, we glued together short, mitered pieces for the feet. You'll need a

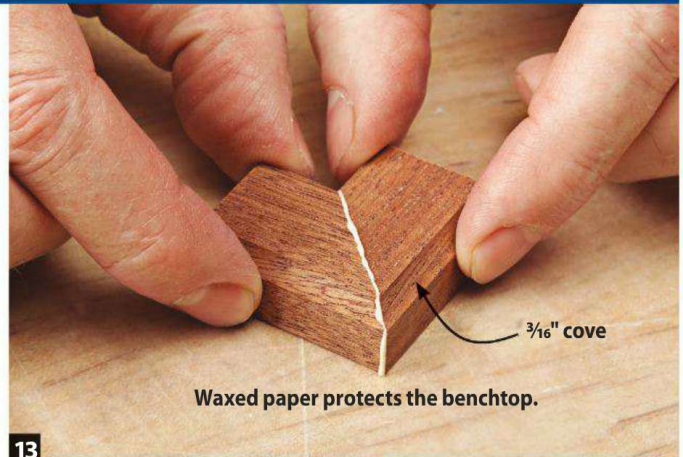
$\frac{3}{16}$ " cove bit or a $\frac{3}{8}$ " round-nose bit to rout the profile. Then, we attached the lid with a continuous hinge [Sources].

MAKE THE MITERED FEET



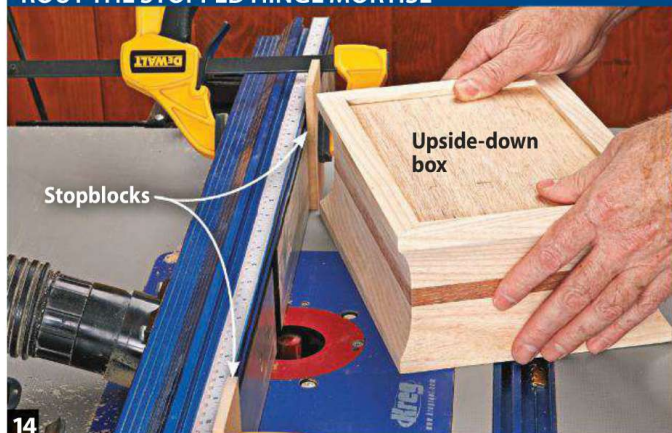
12

From the accent wood, make an 18"-long blank $\frac{1}{2}$ " thick and about 1" wide. Rout a $\frac{3}{16}$ " cove onto one edge. After miter-cutting one end on the tablesaw, use a crosscut handsaw to cut a half-foot to length. (We used a bench hook with fence to guide the saw.) Miter-cut the end again, and repeat the process to make eight half-feet. Apply glue to the miters of mating foot pieces, and then, on waxed paper, rub the pieces together until they align and "grab."



13

ROUT THE STOPPED HINGE MORTISE



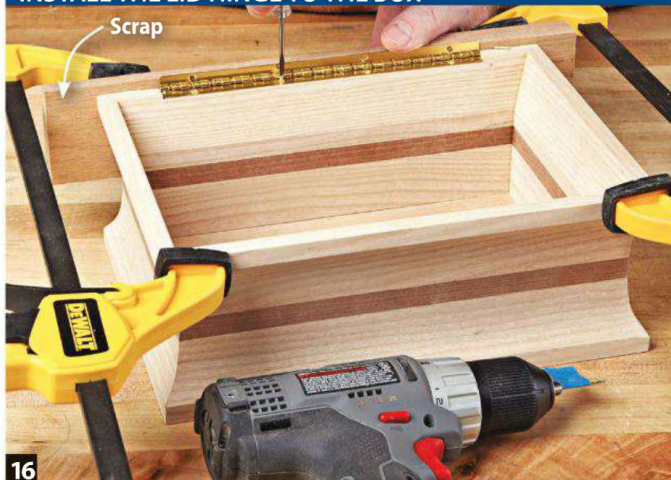
14

To make the hinge mortise on the top back edge, install a $\frac{3}{4}$ " straight bit in your router table and set its height equal to the thickness of the closed hinge. Set the fence to cut a rabbet the width of the closed hinge. Attach stopblocks for the beginning and ending points of the cut. Anchor the box against the right block, pivot it into the bit, and then run it along the fence until it contacts the left block. Square up the rounded ends of the mortise with a chisel.



15

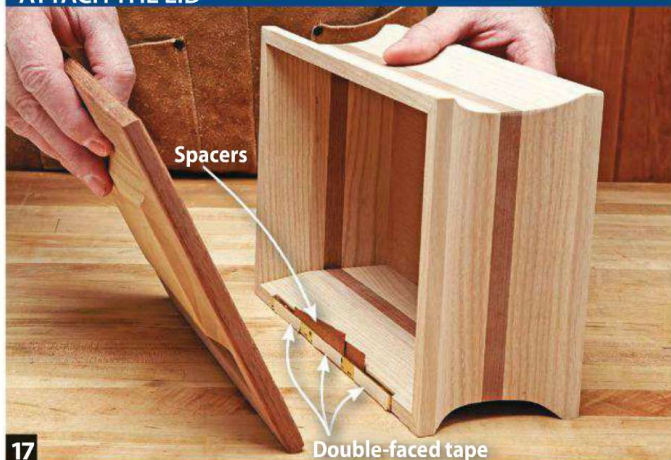
INSTALL THE LID HINGE TO THE BOX



16

With a scrap clamped against the back of the box, position the hinge in the mortise against the scrap. Drill pilot holes and secure with #1× $\frac{3}{8}$ " brass screws in the outer holes only. (You'll remove the hinge before finishing.)

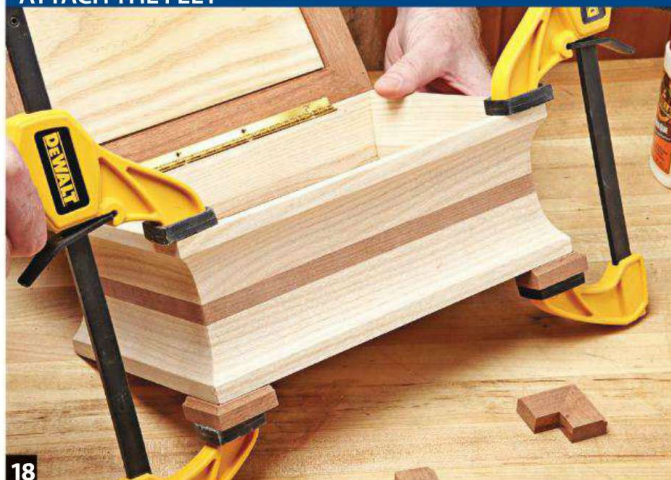
ATTACH THE LID



17

Shim between the hinge leaves with veneer to keep the top leaf level with the box edge. Attach double-faced tape to the lid side of the hinge, press the lid firmly against the tape, carefully open the lid, and then drill all pilot holes and attach the lid with two screws.

ATTACH THE FEET



18

Finally, apply glue to the corners of the box's bottom edges, rub the feet into place, and then clamp tightly, making sure all feet line up evenly. When dry, finish-sand any areas needing it, remove the hinge, and apply a finish of your choice. Reinstall the hinge when the finish has dried.

Double up the profile for a curvy, mirrored look

With this design, you simply rout the same profile along each edge of your side blanks, leaving a raised middle section. One advantage to this box design: You create the box and lid pieces at the same time with only one router-table setup. We used an ogee bit with a $\frac{1}{2}$ " radius

[Sources] for the box-side and lid profiles. You'll also need a $\frac{3}{4}$ " straight bit.



ROUT OGEES ON BOTH EDGES



1

Beginning with three $\frac{3}{4}$ "× $3\frac{1}{2}$ "×2" blanks, rout the ogee profile along both edges in $\frac{1}{8}$ "-deep increments. We used double-faced tape to secure a 15°-beveled spacer to the router table to help support the tippy blank; use one that fits your routed profile. Move the spacer closer to the fence with each cut.

SHOP TIP

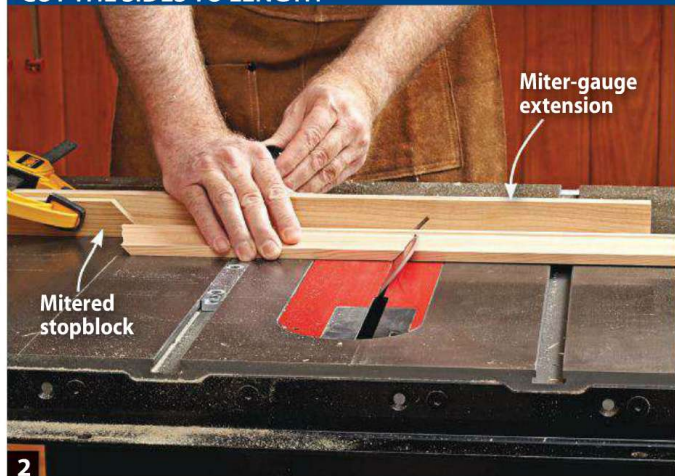
Search out or make your own unique panels

When building small boxes such as these with thin lid and bottom panels, it's best to use $\frac{1}{4}$ " or thinner sheet stock:

- ▶ Check out the paneling section at a home center. The Douglas fir and maple box shown *below* features a lid panel with bird's-eye maple veneer, which we discovered on the back of common beadboard paneling. What a find for \$12!
- ▶ Buy $\frac{1}{8}$ " hardboard and glue on your own veneer. This way you can get the look you want for a low cost. To prevent warping, apply veneer to both sides of the panel.

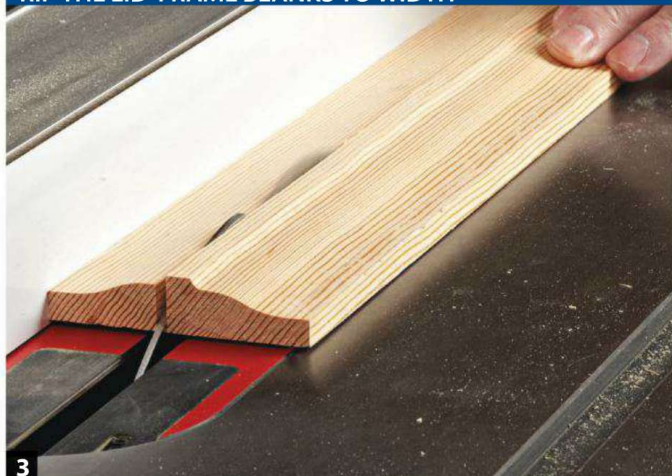


CUT THE SIDES TO LENGTH



2 Saw a groove on the bottom inside face of two blanks to accept the box bottom panel. Next, because you must rest the flat *inside* of the box-side blank on the tablesaw top, put the miter gauge in a slot so the blade tilts *away* from the stopblock at a 45° angle. Cut the box sides to length. After cutting the bottom panel to fit and sanding the inside surfaces, glue the box together.

RIP THE LID-FRAME BLANKS TO WIDTH



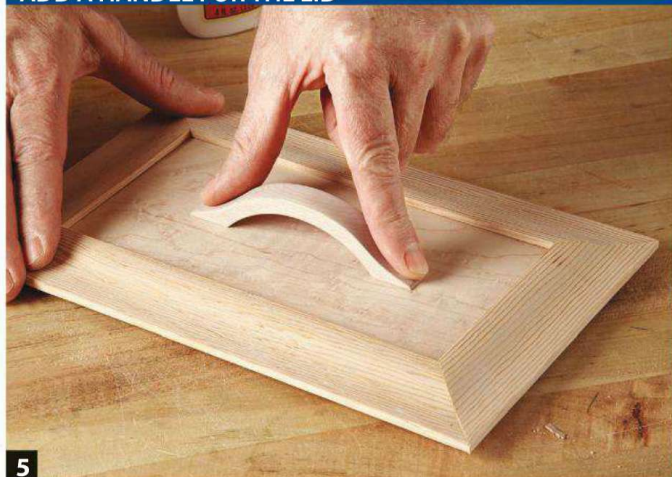
3 From the remaining profile blank, rip away the raised center section, leaving two profiled lid-frame blanks. Cut a ¼"-deep lid-panel groove along the thicker edge of each blank ⅛" from the top, and miter-cut the frame pieces to match the box length and width. Cut a panel to fit. We used ¼" beadboard [Shop Tip on page 58]. Sand all the pieces, and glue the lid together.

RABBET THE LID TO FIT THE BOX



4 After the lid has dried, sand smooth any uneven miters. Next, using a straight bit, rout a rabbet on the underneath side, sneaking up on the width until the lid fits into the box.

ADD A HANDLE FOR THE LID



5 Cut a handle to suit your taste, sand it smooth, and glue it to the lid panel. Glue on simple square feet made from ¼"-thick stock—end grain will show on this box. Finish-sand and apply a finish.

Sources

Raised-panel bits: Freud Quadra-Cut cove bit, no. 99-518, \$105; Freud Quadra-Cut ogee bit, no. 99-520, \$105; 800-334-4107, freudtools.com.

8" (200 mm) brass stop hinge: no. 00D80.05, \$2.90, Lee Valley, 800-871-8158, leevalley.com.
#1×¾" F.H. brass screws: no. 91Z01.02X, \$90 per 10-pack, Lee Valley.

More Resources

- ▶ If you're investing in a raised-panel bit to make boxes, learn about using them to make cabinet doors at woodmagazine.com/raisedpanel.
- ▶ Need a powerful router for these bits? Find reviews at toolreviews.woodmagazine.com.
- ▶ Learn veneering skills to make your own panels at woodmagazine.com/veneering.
- ▶ For more beautiful box plans, visit woodmagazine.com/boxes.

Produced by Bob Hunter with Erv Roberts



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FREE!
WITH MINIMUM PURCHASE OF \$9.99

3-1/2" SUPER BRIGHT NINE LED ALUMINUM FLASHLIGHT
Item 65020 shown
REG. PRICE \$6.99

LIMIT 1 - Only available with qualifying minimum purchase (excludes gift value). Coupon good at our stores or website or by phone. Cannot be used with other discount, coupon or prior purchase. Offer good while supplies last. Shipping & Handling charges may apply if not picked up in-store. Original coupon must be presented. Non-transferable. Valid through 9/7/13. Limit one coupon per customer per day.



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HAULMASTER MOVER'S DOLLY
LOT NO. 93888/60497

SAVE 46%
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1000 LB. CAPACITY
REG. PRICE \$14.99
\$7.99

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4 PIECE WOOD CHISEL SET
LOT NO. 42429/69471

SAVE 41%
Item 42429 shown
1" 3/4" 1/2" 1/4"
REG. PRICE \$7.99
\$4.69

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6" DIGITAL CALIPER PITTSBURGH
LOT NO. 47257/61230

SAVE 66%
Includes two 1.5V button cell batteries.
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REG. PRICE \$29.99
\$9.99

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drillmaster ORBITAL PALM SANDER
LOT NO. 40070/61311

SAVE 55%
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12,000 OPM
REG. PRICE \$19.99
\$8.99

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SUPER COUPON!



3 GALLON 100 PSI OILLESS HOT DOG STYLE AIR COMPRESSOR
LOT NO. 97080/69269

SAVE 50%
Item 97080 shown
CENTRAL PNEUMATIC
REG. PRICE \$79.99
\$39.99

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14" OSCILLATING SPINDLE SANDER
LOT NO. 95088/69527

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Item 95088 shown
CENTRAL MACHINERY
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\$89.99

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WIRELESS DRIVEWAY ALERT SYSTEM
LOT NO. 93068/69590

SAVE 56%
Requires one 9 volt and three C batteries (sold separately).
Item 93068 shown
Bunker Hill Security
REG. PRICE \$29.99
\$12.99

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3 PIECE TITANIUM NITRIDE COATED HIGH SPEED STEEL STEP DRILLS
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2 HP INDUSTRIAL 5 MICRON DUST COLLECTOR
LOT NO. 97869

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ALUMINUM OXIDE SANDING SPONGES - PACK OF 10
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3 TON HEAVY DUTY JACK STANDS
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SUPER COUPON!



8" x 12" BENCH TOP WOOD LATHE
LOT NO. 95607

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REG. PRICE \$149.99
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12" RATCHET BAR CLAMP/SPREADER
PITTSBURGH
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AUTO-DARKENING WELDING HELMET WITH BLUE FLAME DESIGN
LOT NO. 91214

SAVE 50%
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CHICAGO ELECTRIC WELDING
REG. PRICE \$79.99
\$39.99

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CHICAGO ELECTRIC WELDING

MIG-FLUX WELDING CART

LOT NO. 90305/60790/69340

Welder and accessories sold separately.

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SAVE 41%

\$34.99 REG. PRICE \$59.99

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24" CLAMP AND CUT EDGE GUIDE

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US★GENERAL

580 LB. CAPACITY FOUR DRAWER TOOL CART

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830 LB. CAPACITY 26", 8 DRAWER ROLLER CABINET WITH 8 DRAWER TOP CHEST

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\$329.99 REG. PRICE \$499.99

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SUPER COUPON!

CHICAGO ELECTRIC POWER TOOLS

ELECTRIC CHAIN SAW SHARPENER

4-1/4" GRINDING WHEEL INCLUDED

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LOT NO. 68221/93213

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41652632

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PITTSBURGH

12" COMBINATION SQUARE SET

LOT NO. 92471

SAVE 50%

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10688609

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SUPER COUPON!

CHICAGO ELECTRIC POWER TOOLS

10" SLIDING COMPOUND MITER SAW

SAVE \$70

LOT NO. 98199

\$79.99 REG. PRICE \$149.99

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SUPER COUPON!

HaulMaster

SUPER-WIDE TRI-FOLD LOADING RAMP

Item 90018 shown

LOT NO. 90018/69595/60334

SAVE \$65

\$79.99 REG. PRICE \$144.99

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5 MIL. THICKNESS

Item 68498 shown

YOUR CHOICE!

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80655347

MEDIUM LOT NO. 68496
LARGE LOT NO. 68497/97582
X-LARGE LOT NO. 68498/37052/97583

SAVE 45%

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SUPER COUPON!

GENERAL MACHINERY

4" x 36" BELT/6" DISC SANDER

LOT NO. 97181/93981

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\$54.99 REG. PRICE \$99.99

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SUPER COUPON!

HaulMaster

500 LB. CAPACITY ALUMINUM CARGO CARRIER

LOT NO. 92655/69688/60771

Item 92655 shown

SAVE \$60

\$69.99 REG. PRICE \$129.99

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SUPER COUPON!

WINDSOR DESIGN

60" WORKBENCH WITH FOUR DRAWERS

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PITTSBURGH AUTOMOTIVE

PNEUMATIC ADJUSTABLE ROLLER SEAT

Item 46319 shown

LOT NO. 46319/61160

SAVE 33%

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463274344

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SUPER COUPON!

Bunker Hill Security

36 LED SOLAR SECURITY LIGHT

Item 69644 shown

SAVE 28%

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Whip warp in home-center wood

It seems like every pine board I buy from the home center soon warps and becomes almost unusable. How can I stop this?

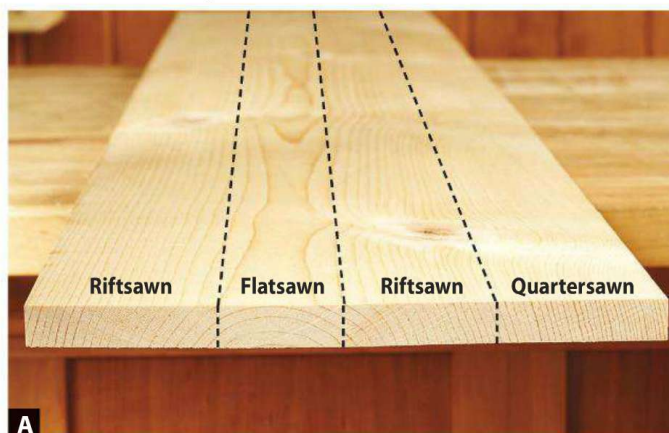
—Gary Olsen, Duluth, Minn.

The mills that process dimensional lumber (pine, fir, etc.) kiln-dry softwoods to higher moisture content than for hardwoods. In other words, softwoods leave the mill “wetter” than hardwoods. Those softwood boards then ship to the home center in tight bundles that prevent both additional drying and the warping that can result from it. Freed from those bundles in the drier climate of your shop, the boards typically begin to bend and twist. So, you can’t really stop warpage, Gary, but careful stock selection—both before you buy and after you get it home—can minimize its effects.

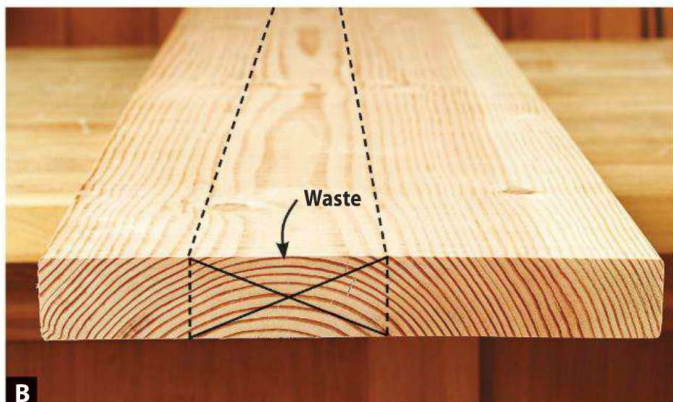
Begin by choosing boards with as much quartersawn or riftsawn grain [**Photos A and B**] as possible; they will be more stable. Minimize flatsawn grain and accept that unstable portion of the board as waste; avoid working with 2×4s [**Photo C**] when possible. Also, thicker and wider boards usually hold a higher percentage of usable stock. For example, about ⅔ of the grain in the 2×12 shown in **Photo B** is riftsawn. This typically happens with wide 2-by stock to meet building strength standards for floor joists, rafters, and stairs.

Once you bring the wood home, break it down right away to minimize any movement. (It’s easier to remove warp, if

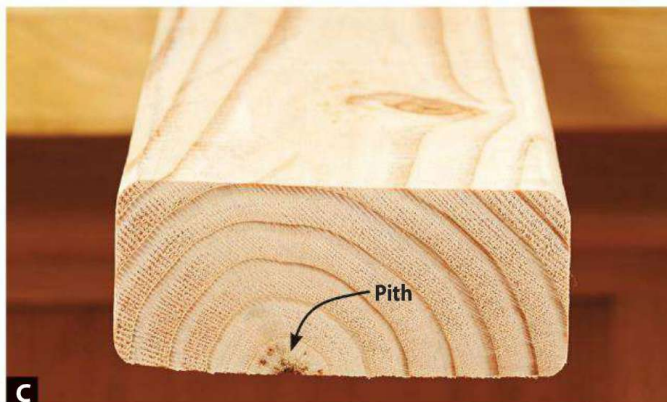
necessary later on, from smaller boards than longer, wider ones.) If you’re building a specific project and know the parts dimensions, rough-cut those parts about ½" to 1" longer and wider. This will leave you some wiggle room later. For now, do not alter the thickness. If you don’t have specific part sizes in mind, cut away the waste areas to create manageable-size workpieces for later, such as the board shown at *bottom*. With that done, let the boards acclimate for at least a week before final dimensioning. 🌲



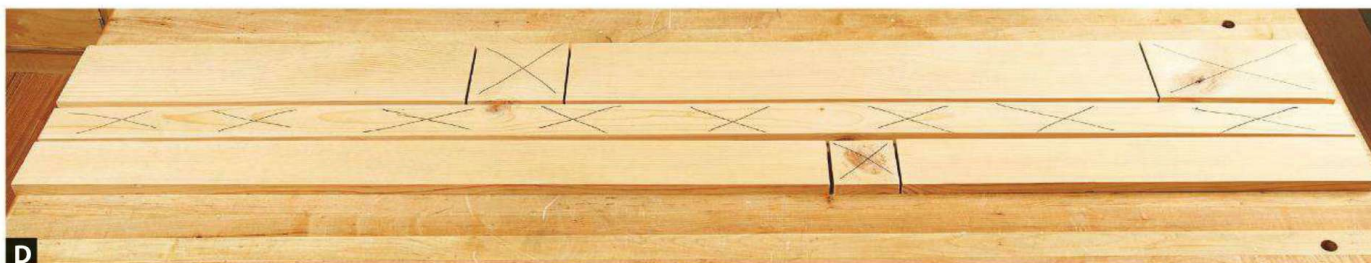
A Looking at the end grain of this 1×12 shows the unstable flatsawn grain, and more stable riftsawn and quartersawn grain.



B To get the best yield from this 2×12, rip away the less-stable flatsawn section. Edge-glue the remaining pieces together or resaw them into thinner boards.



C The wide, flatsawn grain on this 2×4—especially near the pith—has already caused this board to cup and twist, which will only worsen as it dries.



D We cut this 6'-long 1×12 into stable, workable sections right after purchasing it, cutting away flatsawn portions that would inevitably warp.

The facts are hard to ignore.

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Shorter Open Time	✓	
Doesn't Stain Skin	✓	✓
Bonds Most Materials	✓	✓
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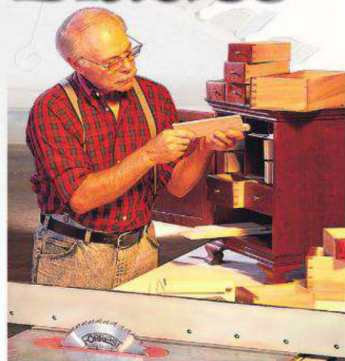
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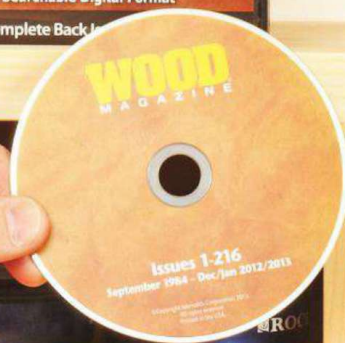
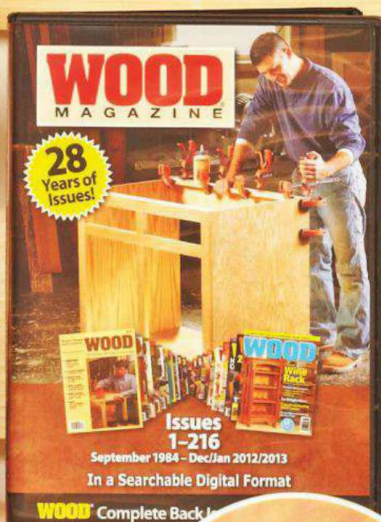
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We test hundreds of tools and accessories, but only those that earn at least three stars for performance make the final cut and appear in this section of our magazine. The products shown here, and those that don't make the cut, are also reviewed at toolreviews.woodmagazine.com. Prices shown are current at the time of article production and do not include shipping, where applicable.

The best of the best in jigsaws

If you need a jigsaw that makes spot-on perpendicular cuts, even in thick woods and tight turns, then get the top-handle Bosch JS572EN. What makes this jigsaw so special? Two roller blade guides surround the blade to keep it cutting perfectly straight up and down. (Most other saws have only one guide, if any.) I used this saw to cut sweeping and tight curves in multiple species and thicknesses of solid wood and plywood, and the blade never deflected from 90°. Impressive. That cuts down on time (and abrasive) spent sanding edges with a spindle sander. In fact, when used with Bosch's Extra-Clean For Wood jigsaw blades, the JS572EN delivered such clean edges, they needed only a light hand-sanding.

I also appreciate the LED light that illuminates the cutline—another first for jigsaws—making it easier to see and cut accurately. Other great features on this premium saw: a tool-free adjustment for tilting the footplate, tool-free blade ejection (so you don't grab a hot blade), low vibration, and a handy 13' rubber power cord with a swiveling mounting boot to prevent kinking.

Buy it in a kit (JS572EL) for \$299, and you'll also get a sturdy storage box, dust-collection attachment, blade shroud, and hard-wearing steel shoe for the plastic-coated footplate. Bosch also makes this saw in a barrel-grip version at the same prices as the top handle.

—Tested by Bob Hunter,
Tools Editor



7.2-amp jigsaw (JS572EN)

Performance ★★★★★

Price \$239

Bosch
877-267-2499; boschtools.com



This easy-pour spout keeps finish cans cleaner

Not a lot of fancy stuff here: Just pop this plastic spout onto the rim of a gallon can of finish or paint. Pour the liquid into your spray cup or roller pan, and you avoid drips running down the side of the bucket. When you're done, the rim remains clean, letting you reseal the lid without worry of it being stuck the next time. One cautionary note: Don't pour too fast, or the liquid can flow around the spout's flanges and create the very mess you hoped to avoid.

—Tested by John Olson,
Design Editor

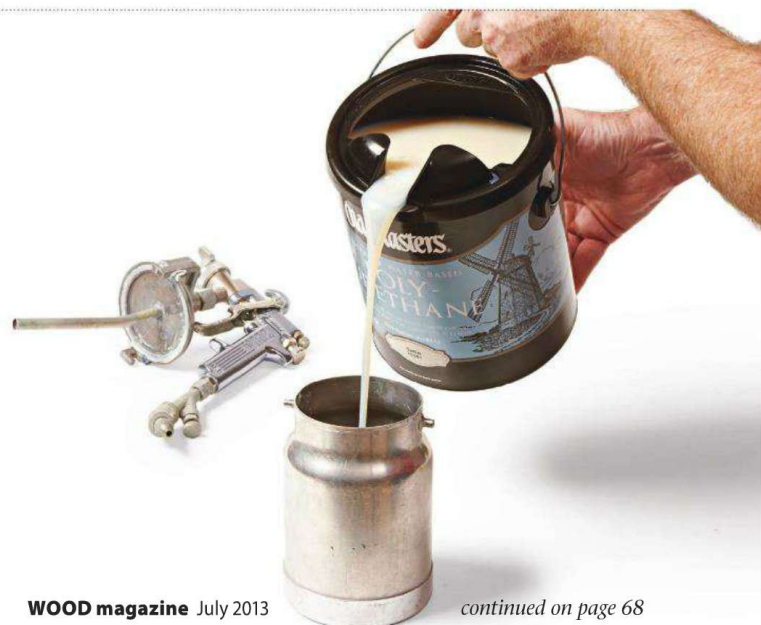


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Performance ★★★★★

Price \$6

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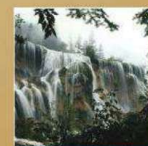
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A long-needed update well worth the wait

Makita's PJ7000 biscuit joiner improves on the performance of its predecessor (model 3901) as detailed in my review of biscuit joiners in *WOOD*® issue 205 (July 2011):

- ▶ Though the PJ7000's fence appears similar, it locks securely and parallel to the workpiece every time, making it much easier to align multiple slots on mating workpieces.
- ▶ The redesigned depth-stop turret holds its place when plunging multiple times, ensuring slots of equal depth.
- ▶ Better-gripping rubber bumpers on the nose keep the tool from slipping sideways during cuts.
- ▶ A streamlined, swiveling dust chute improves dust collection when using the included bag. And it easily connects directly to a 1" shop-vacuum hose.
- ▶ The slide power switch operates smoothly and can be reached more easily without changing your grip on the tool's body.

However, the scale for positioning the fence height above the blade proved inaccurate by about $\frac{1}{16}$ ", with no way to adjust the scale. I worked around it by marking the slot centerline on the workpiece, eyeballing that mark to the blade centerline on the tool, and then locking the fence in place. (We tested two additional models, and their scales were off by $\frac{1}{32}$ ". Makita's Wayne Hart said the company is looking into resolving this.)



—Tested by Matt Seiler

Biscuit joiner (PJ7000)

Performance	★★★★☆
Price	\$189

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continued on page 70



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Better ergonomics, nose make this nailer a winner

Grex's Green Buddy brad nailer has more heft than the nailer I regularly use on jobsites as a trim carpenter, but it fires with less kickback. So after firing a hundred or so brads my hand and arm aren't as tired. This tool's nose profile—smaller than most brad nailers—helped me precisely place fasteners, even in tight quarters, while trimming out a kitchen remodel. Its dry-fire lockout prevents damaging the drive pin when empty.

The Green Buddy's fit and finish are excellent, which I expect from a nailer at this price. The tool fires brads from ½" to 2" long, and I really like the extruded aluminum side-loading magazine that makes it easy to add them. There's also a window that shows when it's getting low on nails. 🌱

—Tested by Dave Fish



Green Buddy 18-gauge brad nailer (1850GB)

Performance	★★★★
Price	\$200

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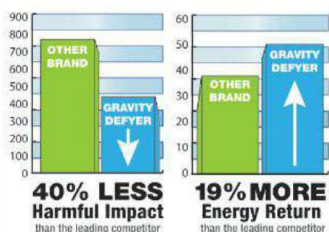
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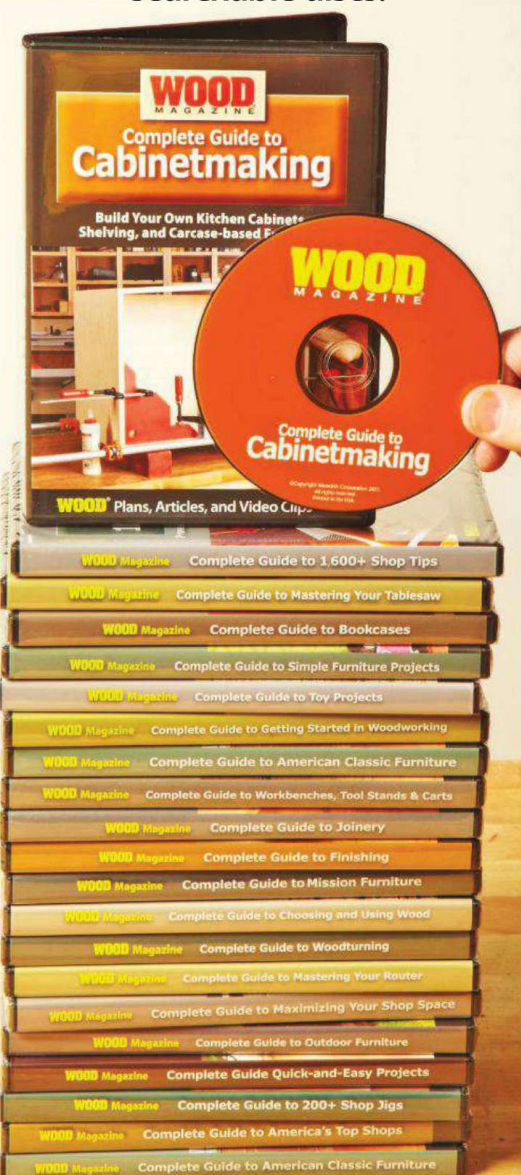


SHOCK ABSORPTION STUDY HPW Biomechanics, 2012

*Shock absorption: Measurement of maximum pressure (KPa). Energy return: Measurement of energy returned (Joules).

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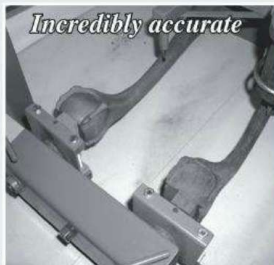
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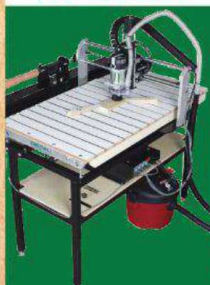
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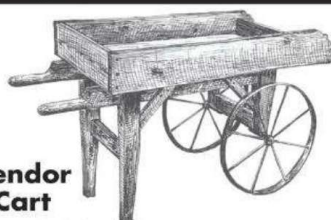
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What's Ahead

A glimpse inside the
September issue (on sale July 2)

Lingerie dresser

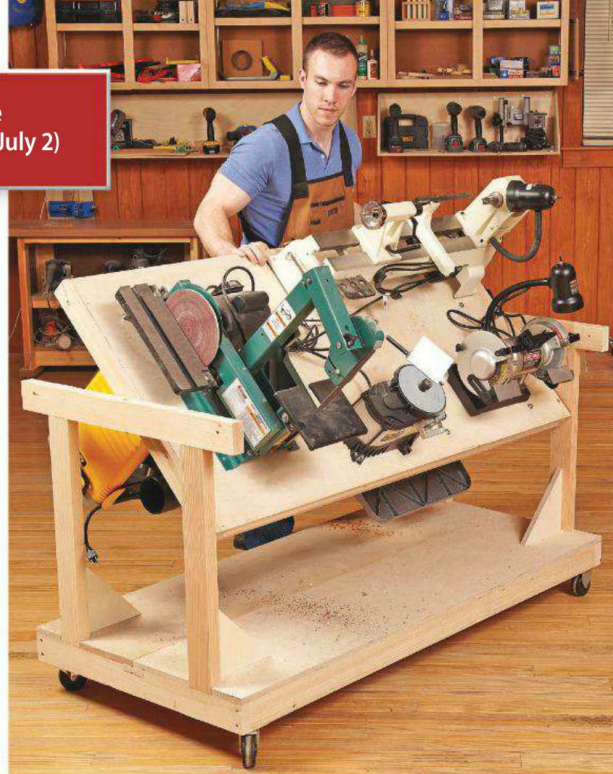
Add on to your bedroom set with this tall, elegant companion to the dresser and nightstand on *page 42*, and the bed from issue 218 (May 2013).

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Flip-top tool bench

Take your benchtop tools for a spin with this inexpensive, innovative workbench that doubles the functionality of your workspace.



SHOP TEST

Miter gauges and crosscut sleds

Every table saw needs an accurate accessory for making miter- and crosscuts. We test 14 aftermarket models to find the best.



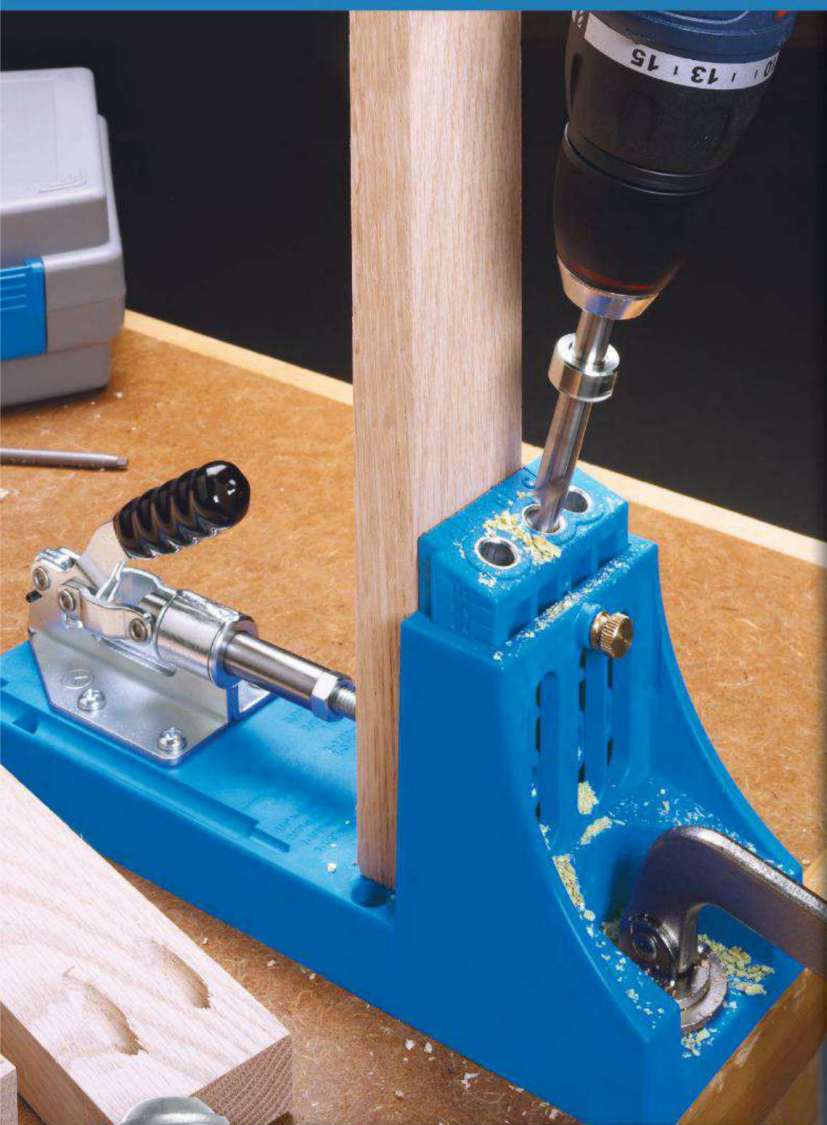
Classic tailgating game

These simple-to-build game boards lock together for easy transport and storage. We'll show how to add your favorite team's colors and logo, too.



Complete your Kreg Jig®

Check out these great accessories designed to help you get the most out of the handiest tool in your shop, the Kreg Jig®! Whether you want more precision, more speed, or just a few new project ideas, you'll find everything you need at kregtool.com!



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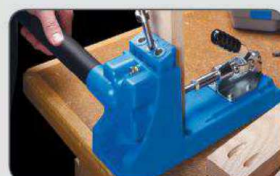
Portable Base

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Clamps

Face Clamp™: keeps joints flush.
Bench Klamp™: workbench flexibility.
Right Angle Clamp: 90° made easy.
Corner Clamp: quick box assembly.

A Cut Above!

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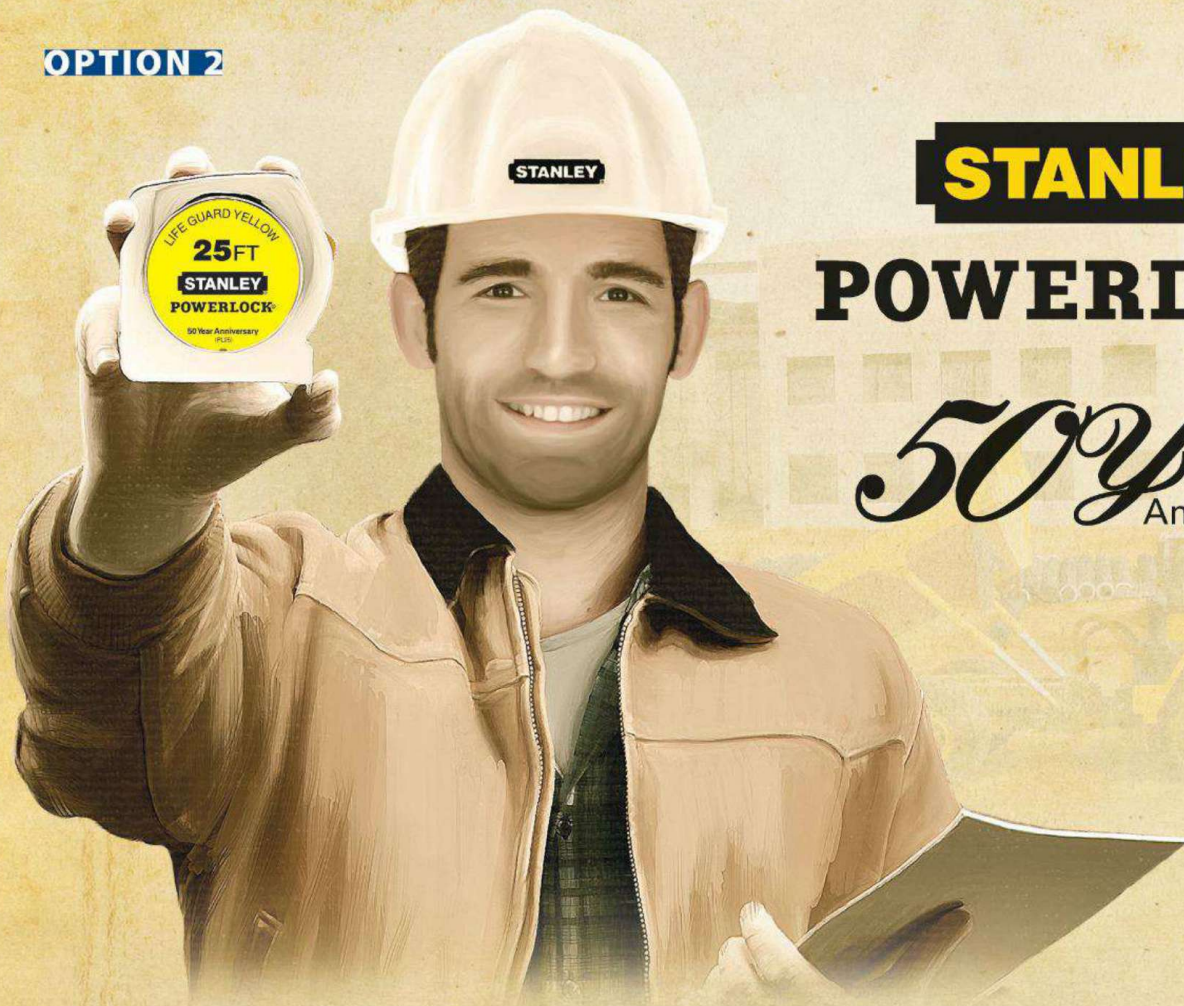
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