

FULL-SIZE PATTERNS INSIDE!

ISSUE 222 NOVEMBER 2013

Better Homes and Gardens®

WOOD



51
Shop Tips
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Plans**

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Sideboard**

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- Max. stock thickness: 3 1/2"
- Min. stock length: 8"
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- Sanding belt: 3" x 70" hook & loop
- Dust collection port: 2 1/2"
- Approximate shipping weight: 160 lbs.



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- Max. depth of cut: 1/8" • Max. rabbeting depth: 1/8"
- Cutterhead diameter: 3"
- Cutterhead speed: 5000 RPM (G0656P); 5350 RPM (G0656PX)
- Cuts per minute: 20,000 (G0656P)
- Cuts per minute: 21,400 (G0656PX)
- Approximate shipping weight: 500 lbs.

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15" PLANERS

- Motor: 3 HP, 220V, single-phase
- Precision-ground cast iron table size: 15" x 20"
- Min. stock thickness: 3/16"
- Min. stock length: 8"
- Max. cutting depth: 1/8"
- Feed rate: 16 FPM & 30 FPM
- Cutterhead speed: 5000 RPM
- Approximate shipping weight: 662 lbs. (G0453P) 666 lbs. (G0453PX)

PRECISION-GROUND CAST IRON BED & INFEEED/OUTFEED TABLES



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- Motor: 5 HP, 240V, single-phase
- Max. cutting width: 20"
- Max. cutting height: 8"
- Min. stock thickness: 3/16"
- Min. stock length: 8"
- Max. cutting depth: 1/8"
- Feed rate: 16 FPM & 20 FPM
- Cutterhead diameter: 3 1/8"
- Cutterhead speed: 4800 RPM
- Feed rolls: solid serrated steel
- Overall dimensions: 55 1/2" L x 39 1/2" W x 45 1/8" H
- Approximate shipping weight: 920 lbs.



BUILT-IN MOBILE BASE

G0454 \$1650.00 SALE \$1595.00

\$179 shipping

14" DELUXE BANDSAW

MADE IN TAIWAN

- Motor: 1 HP, TEFC, 110V/220V, single-phase (prewired 110V)
- Amps: 11 at 110V, 5.5 at 220V
- Blade size: 93 1/2" long (1/8"-3/4" wide)
- Cutting capacity/throat: 13 1/2"
- Max. cutting height: 6"
- Overall size: 27" W x 67 1/2" H x 30" D
- Footprint: 23 1/2" x 16 1/2"
- Table height above floor: 43"
- Table tilt: 45° right, 10° left
- Approximate shipping weight: 247 lbs.



CAST IRON WHEELS



MADE IN AN ISO 9001 FACTORY

\$79 shipping

G0555LX \$545.00 SALE \$445.00

30TH ANNIVERSARY 14" DELUXE BANDSAW

- Motor: 1 HP, TEFC, 110V/220V, single-phase, 1725 RPM
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- Cutting capacity/throat: 13 1/2"
- Max. cutting height: 6"
- Overall size: 27" W x 67 1/2" H x 30" D
- Precision-ground cast iron table size 14" x 14"
- Table height: 43 1/8"
- Tilt: 45° R, 15° L
- Fence construction: Deluxe extruded aluminum
- Blade speeds: 1500 & 3200 FPM
- Blade size: 92 1/2"-93 1/2" (1/8" to 3/4" wide)
- Approx. shipping wt. 205 lbs.

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2 HP DUST COLLECTOR

With Aluminum Impeller

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- Max. static pressure: 11"
- Bag capacity: 5.7 cu. ft.
- Impeller: 12 3/4" balanced cast aluminum
- Height with bags inflated 78"
- Portable base: 21 1/4" x 33 1/2"
- Approximate shipping weight: 122 lbs.



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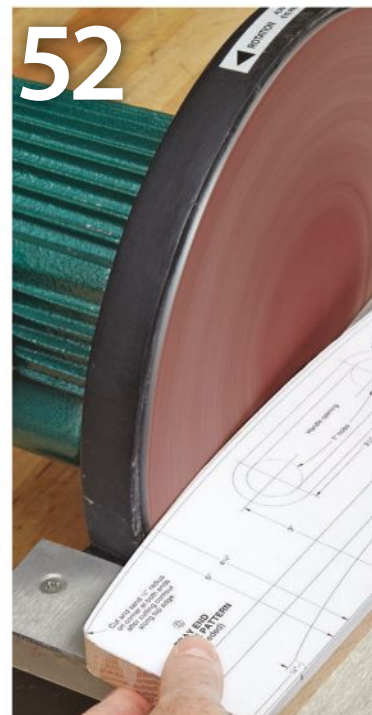
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CHECK OUT THE COOL NEW TOOLS

WOOD magazine editors traveled to the Association of Woodworking & Furnishings Suppliers Fair—the nation's largest woodworking machinery expo—to scout out the latest, greatest tools for your shop. Watch free video reports from the 2013 AWFS Fair at woodmagazine.com/AWFS2013.



UNEARTH CONSTRUCTION TOY PLANS YOU MAY HAVE MISSED

The Construction-grade End Loader on page 32 is the latest in the popular toy series. Find all 12 plans, and handy specialty-part kits, at woodmagazine.com/cgtoys.



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Editor's Angle

To get mad woodworking skills, just ask

I've never been a big fan of "hinting." No, that's not some obscure wood-finishing technique, but it can be just as frustrating, especially among spouses. My philosophy: If you want something, ask for it, and I'll do the same.

Fortunately, my wife thinks along the same lines, and at this time of year, when we're starting our holiday shopping, she'll point to something she likes and say, "You can get me that for Christmas, if you want..." I love it. No guessing. No games. Everybody wins.

So, if what you *really* want this year is to step up your woodworking game with a fun weekend of classes designed just for you, simply ask for it. Open this magazine to the *Weekend With WOOD* info on page 62, and say, "This is what I want for Christmas."

You'll choose from more than 50 up-close-and-personal classes taught in the *WOOD* magazine shops by the world's best instructors. I guarantee, you'll walk away a better woodworker.

Weekend With WOOD is scheduled for May 16-18, 2014, but don't be shy—seating is limited. So register early at woodmagazine.com/weekendwithwood for the best class selection and to assure your place in the fun. 🌲

See you in our shop!



Dave Campbell
dave.campbell@meredith.com



George Vondriska teaches how to create beautiful cathedral raised-panel doors at *Weekend With WOOD* 2013.



After one of his many classes at *Weekend With WOOD* 2013, Marc Adams (left) answers attendees' questions.

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No wine-ing in this classroom

As a subscriber to *WOOD*® magazine and a woodworking teacher, I knew the super-simple wine rack project on the cover of issue 216 (December/January 2012/2013) would be a good fit for my class. (We left off the bottle stops as

suggested in the article, building them as bookshelves instead.) While building 54 of these projects using roughsawn ash, the students learned to calculate board feet and costs, plane and square lumber, glue up panels, lay out arches

and curves, cut mortise and tenon joints, sand, and finish their projects. It's always a joy to see new woodworkers complete their first project, and I appreciate that *WOOD* continues to produce plans that my students find appealing to build.

—Bryan Coutts, Erie, Pa.



McDowell Intermediate High School students in Erie, Pennsylvania, stand with their bookshelf projects.

Making memories mentoring

The Editor's Angle in issue 216 (Dec/Jan 2012/2013) made me smile, because I've been mentoring a new woodworker for some time. This past summer, my five-year-old daughter, Kayleigh, spent many hours working with me in our garage shop.

Mom, of course, was initially worried she'd get hurt. But after Kayleigh's continued interest, I decided to build a workbench for her. Now when I go to the shop, she's close behind with hearing muffs on and a sander in hand, ready to help out. The time I get to spend with her is priceless.

—Matthew Helm, Garrettsville, Ohio



Woodworkers pitch in to surprise their favorite blogger

Steve Ramsey's light-hearted woodworking videos have made him a favorite contributor on WOODTube (woodmagazine.com/woodtube). Fellow WOODTube member Laney Shaughnessy noticed that Steve was still using an old benchtop tablesaw in his shop and promptly organized a surprise to show his and others' appreciation for Steve's work: Putting out a call to fellow woodworkers, Laney raised enough money for a new hybrid tablesaw in less than 24 hours. This overwhelming show of support is just another example of the woodworking community uniting to accomplish great things.

—WOOD magazine Editors



To watch a video of Laney Shaughnessy interviewing Steve Ramsey about his new saw, visit woodmagazine.com/steveramseyinterview.

Avoid steel wool for water-based finishes

In the article titled "Sand for a Perfect Finish" in issue 219 (July 2013) you suggested using steel wool for a fine finish. That's great for oil-based finishes, but when using water-based finish, avoid real steel wool. Any residue left by the steel wool will rust when the finish is applied, and won't be noticed until the finish dries. Stick with synthetic steel wool in that case.

—John Dayton, Kingsport, Tenn.

Article Updates

► Dust-collecting Tool Stand

In issue 218 (May 2013), the cabinet's support stiles (O) should be 13" long.

► Adirondack Chair

In issue 219 (July 2013), the back splats (K) should be 3¼" wide. 🌲



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5 HP SPINDLE SHAPER

- Motor: 5 HP, 220V, single-phase, 25A, 3450 RPM
- Precision ground cast iron table measures 35 1/2" x 28" x 2 3/16"
- Spindle travel: 3 1/4"
- Spindle sizes: 3/4", 1", 1 1/4"
- Spindle capacity: 4 1/4", 4 5/8", 5 1/8"



W1827 5 HP Spindle Shaper

10" TABLE SAWS with Riving Knife

- 3 HP, 220V, single-phase motor
- Cast iron table size:
27" x 40 1/4" (W1819) 53 5/8" w/extension,
(W1820) 74" w/extension
- Max. rip capacity: (W1819) 29 1/2",
(W1820) 50"
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W1819 10" Table Saw

W1820 10" Table Saw w/ Long Ext. Table

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- Static pressure: 7.2"



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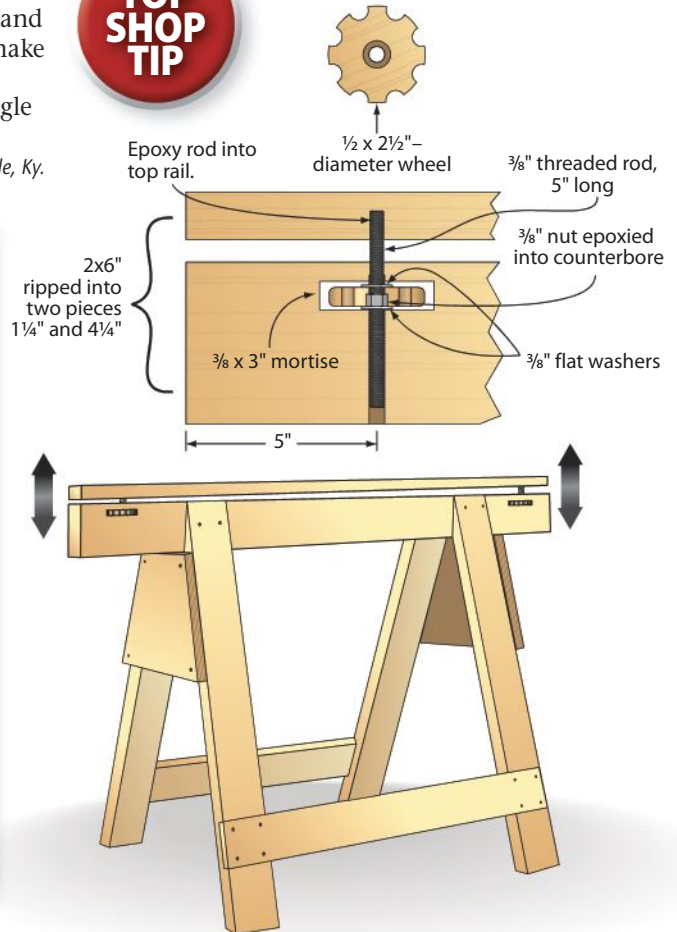
Rip the rail to tweak the top

In my garage shop, I use sawhorses for my tablesaw outfeed supports. But I don't always put the saw in the same spot, and the uneven floor sometimes had me shimming the sawhorse feet to get them flush and level with the tablesaw top. So I added these adjusters to quickly make small leveling adjustments. A few quick twists of the shop-made wheels raises or lowers either end of the top rail and offsets the angle of the floor.

—David McGuffin, Louisville, Ky.



We chose our favorite Shop Tip—now choose yours! Vote online now at woodmagazine.com/shoptipoftheyear.



Photograph by: David McGuffin



For sending this issue's Top Shop Tip, Dave receives a Jet Benchtop Oscillating Spindle Sander worth \$490.

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Shop Tips, WOOD magazine, 1716 Locust St., LS-221, Des Moines, IA 50309-3023.

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Gun Metal shown with refill advanced



24kt Gold shown with refill retracted



Black Enamel with Gun Metal tip and clip



NEW Antique Brass shown with refill advanced

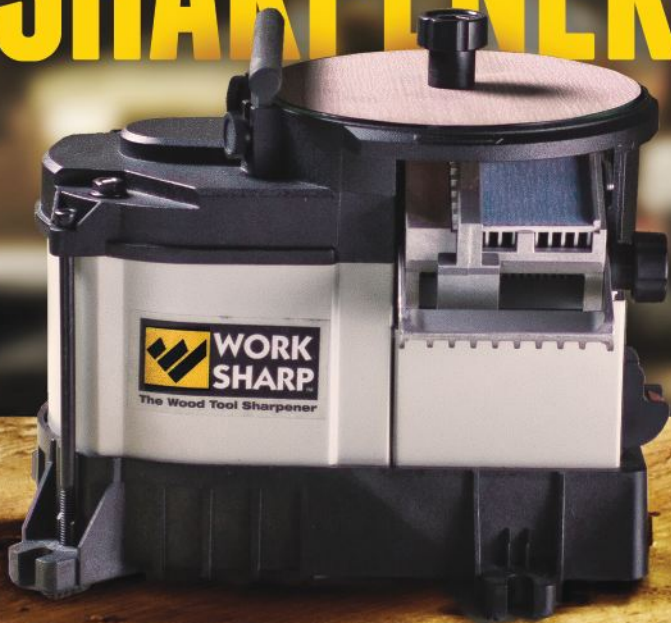
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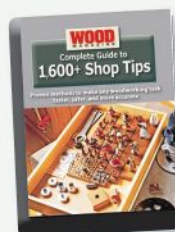
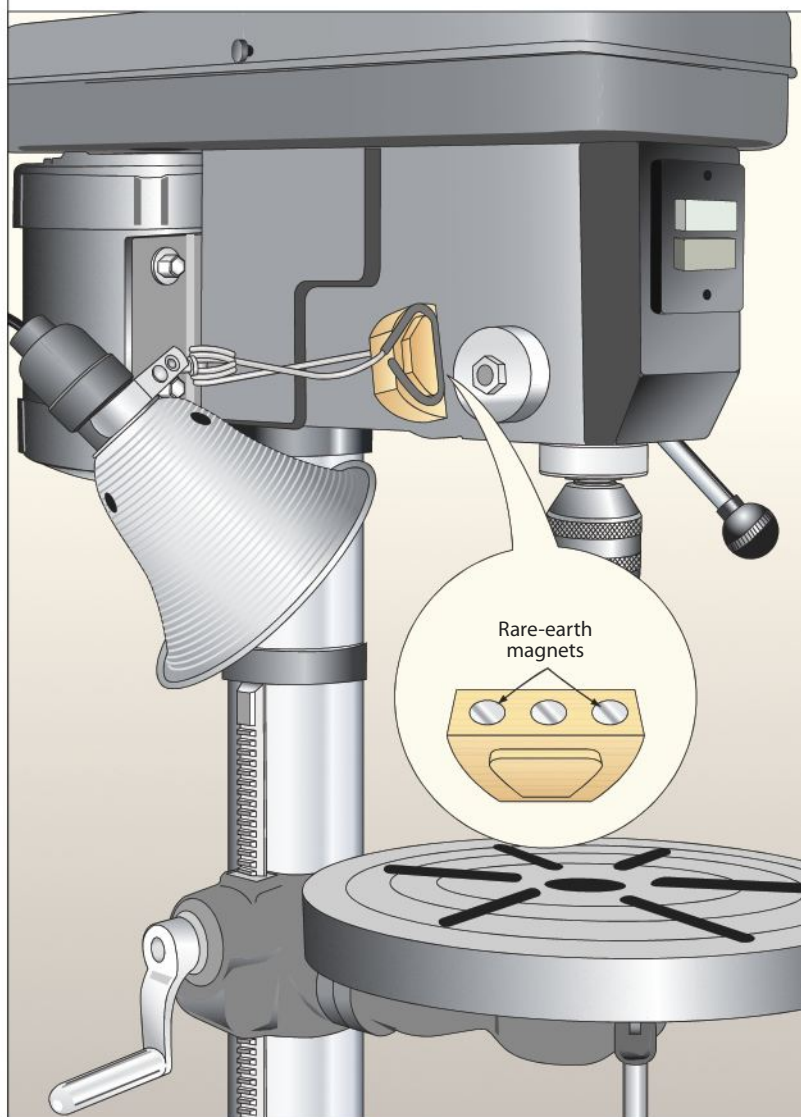
**WATCH
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Shop Tips

Clamp-on light grabs magnetic mount

A clamp-on reflector lamp works great for task lighting, but some machines simply lack a good place to clamp it. To provide a place of purchase, make these simple holders. Make the base from 3/4" stock and epoxy rare-earth magnets into 1/2" counterbores in one edge. Then, cut a profile matching the inside shape of the lamp's clamp in 1/4" stock, and glue it to one face of the base.

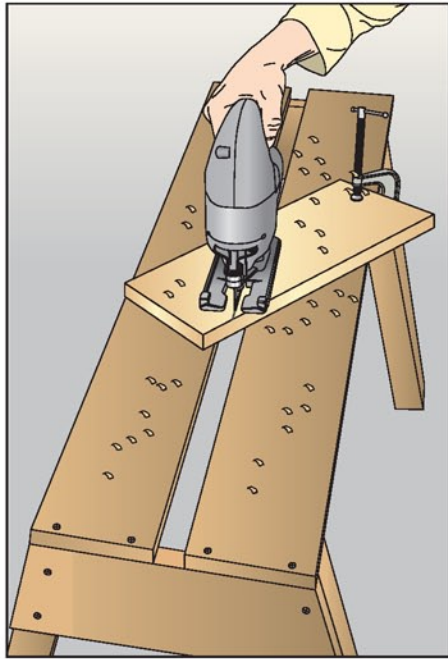
—Jeff Carlson, Mancos, Colo.



More Terrific Shop Tips

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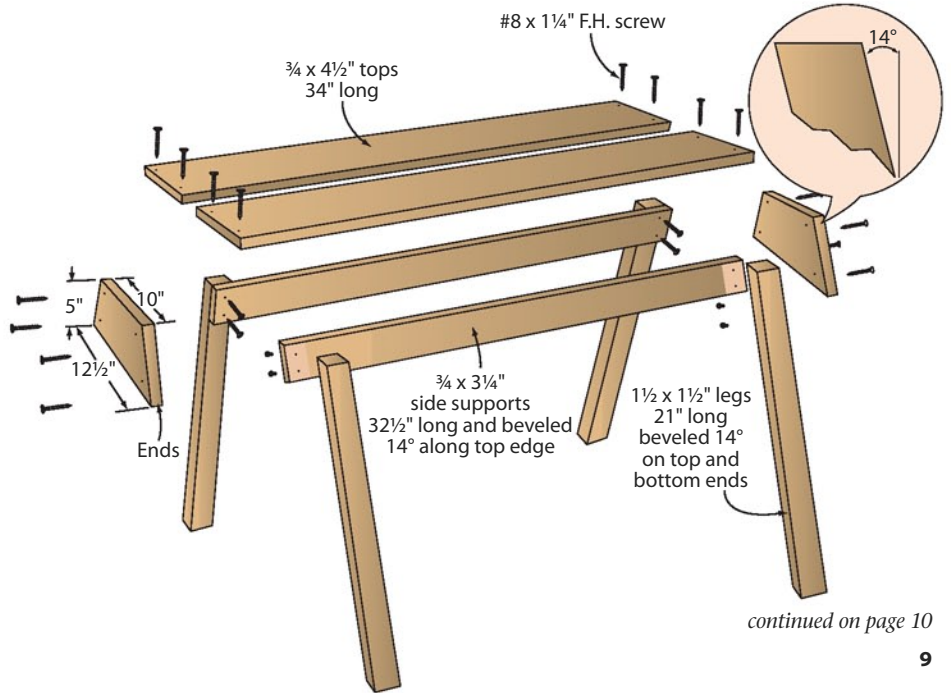


Superwide, split-top sawhorse steps up features

This sawhorse incorporates a simple modification that makes it much more useful. When constructed to the dimensions shown, the extra-wide (10") top makes each horse useful on its own

as a workbench. And the gap between the boards leaves me a place to make well-supported cuts. On top of that, they stack for easy storage.

—Roy Rittenour, Coleman, Mich.



continued on page 10

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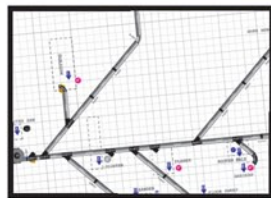
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Shop Tips

Drawer hardware makes a slick slide for bits to ride

To organize your Forstner bits and drilling accessories and make them quick to access, try mounting full-extension drawer slides to the cabinet side for a series of sliding shelves. Each shelf is about 3" wide and holds from six to eight bits in polymer bit holders (1/4" socket bit holders, #16J03.61, \$3.00 per six, 800-267-8767, leevalley.com).

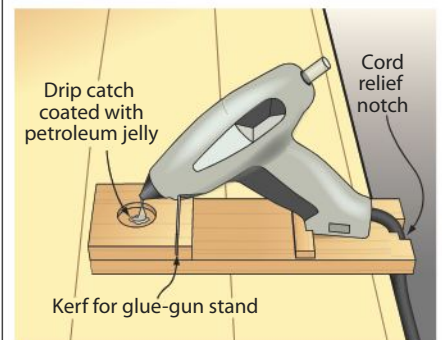
—Brian Simmons, Des Moines, Iowa



Simple stand puts a stop to glue-gun messes

A hot-glue gun comes in handy when a quick-drying, temporary bond is needed, such as when template routing. But it tends to be messy and unsteady when set down. This scrapwood stand holds the gun firmly between uses and catches any glue drippings. Coat the drip catch with a thin layer of petroleum jelly, and dried glue pops out easily.

—Rafael Rubio, Albuquerque, N.M.



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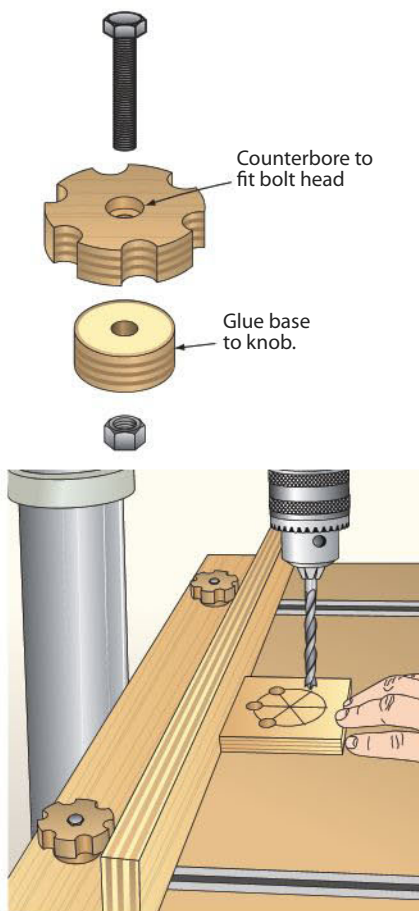
Get a grip with super-simple shop-made knobs

When building jigs, I save a little money and get exactly the size I want by making my own knobs.

On a piece of scrap, lay out a circle as large as you'd like the knob to be. Draw three equally spaced, intersecting lines across the circle's diameter. Then, drill a 1/2" hole where each line meets the circle, as well as a counterbore and through hole in the circle's center (where the lines intersect) for a bolt. Cut along the circle between the holes.

Complete your knob by drawing another circle half the diameter of the first for the knob's base. Drill a counterbore for a nut and a through hole for the bolt in the base's center before cutting it out. Glue the base to the knob's top, drop the bolt in, and lock it in place with the nut. Apply a little epoxy over the bolt head and the nut to keep it from spinning.

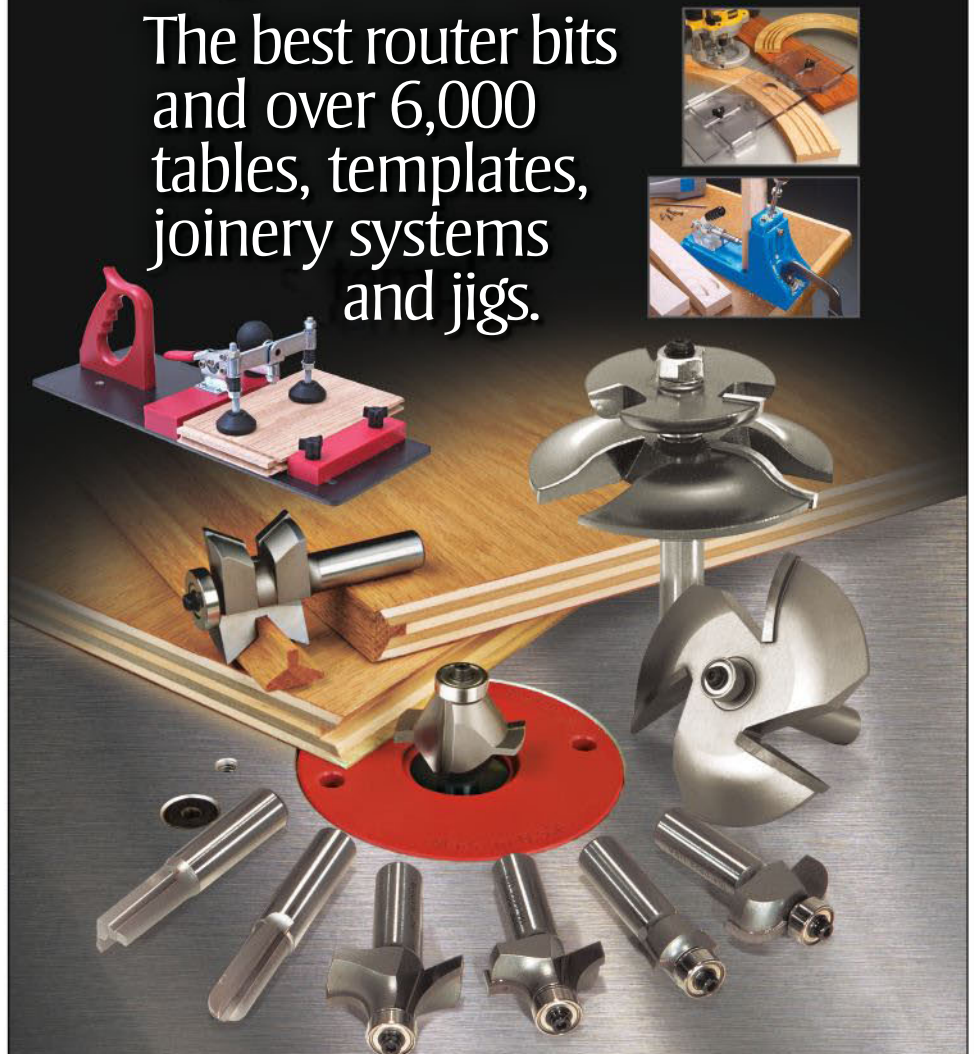
—Wayne Holder, Weeki Wachee, Fla.



continued on page 12

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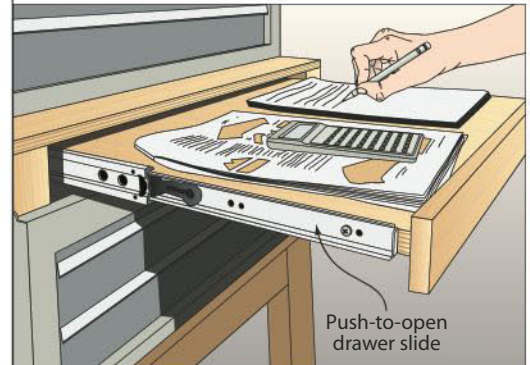
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Shop Tips

A pop-open place for plans

Project plans, cut lists, and notes have a way of cluttering up a workbench, but I still like to keep them close by and on a flat surface. So I built a slide-out plan tray that sandwiches between my tool chests. By mounting the tray with push-to-open drawer slides, a quick bump from a hand or elbow (when hands are full, or gloved and covered with finish) pops the plans into view.

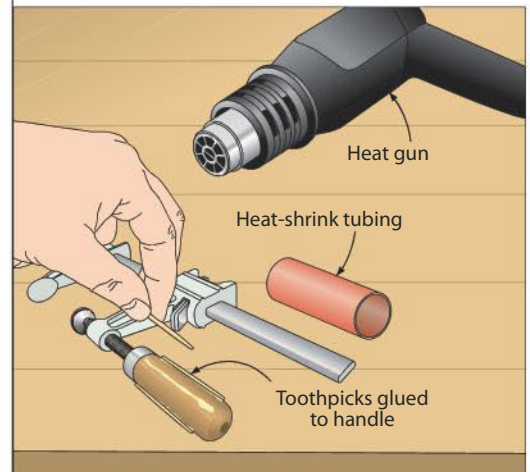
—Kelly Churchill, Medford, Ore.



Toothpicks give a better bite on clamp handles

Here's a way to get a better grip on a smooth wood clamp handle: Glue toothpicks around the diameter of the handle, slip a short length of heat-shrink tubing (available at most home centers) over them, and apply heat with a heat gun. This creates a knurled surface that gives a positive grip.

—Joel Nowland, West Point, Utah



continued on page 14

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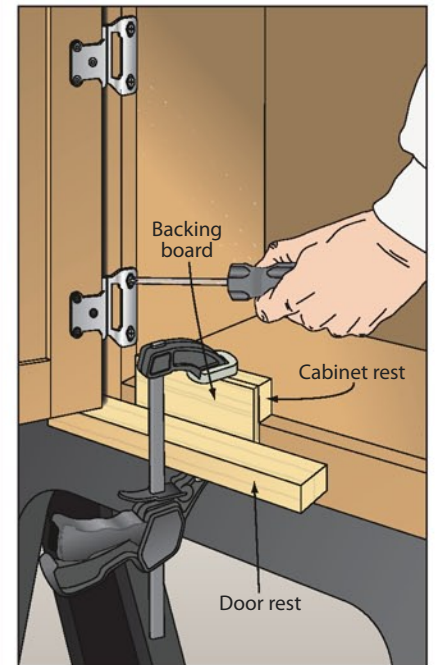
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Shop Tips

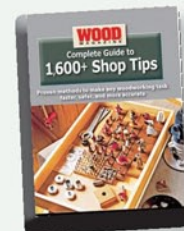
Door-hanging jig frees your mind and hand

Mounting overlay doors on a cabinet seems to take three hands. This simple jig supports the door while you install it. Build the jig as shown from scrapwood, with the door rest offset from the cabinet rest by the amount of the door's overlay. Mount the door rest to the jig's center to form a T-shape and you can use the same jig for both left- and right-hinged doors. Clamp it in place, mount the hinges to the cabinet door, and rest the door on the jig. Drill pilot holes for the hinges in the cabinet and drive the screws. 🍀

—Dan Buss, Viroqua, Wis.



More Terrific Shop Tips



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The first three hand tools for a power-tool woodworker

Ne•an•der•thal \nē'an-dər-thôl—*n* 1: (*Homo neanderthalensis*) a rapidly growing species of knuckle-dragging hominids found in quiet woodworking shops where power tools have been spurned in favor of manual alternatives.

Unless you have been living in a cave, you've noticed all the chatter about hand-tool woodworking these days. Five years ago, I turned off my powered machines and committed completely to the Neanderthal route. (I have four power outlets in my shop, and three of them are for my stereo—which I can now hear.)

But I found that shopping for hand tools involves the same slippery slope as power tools: If you're not careful, you'll end up with a shop full of shiny iron and no money left to purchase wood. If you have a power-tool-centric shop and find yourself hand-tool curious, here are three hand tools that will get your foot in the cave door while perfectly supplementing the power-tool shop.



How long does it take to set up your miter saw to cut a compound angle? With a carcass saw, you can skip the fussing. Simply lay out your line, then saw to it.



While you may not get rid of your stock of sandpaper altogether, a smoothing plane, such as this No. 4 from Lie-Nielsen, will make you think twice about using anything below 220 grit.

Smooth moves with a smoothing plane

You don't need a bevy of bench planes until you want to try your hand at milling rough stock by hand. For now, pick up a decent smoothing plane, *above*. Smoothers can be adjusted to take both light and medium cuts to break a sharp edge, fine-tune an end or angle using a shooting board, or smooth a surface. Two areas where you'll see instant benefits from a smoother: You'll cut your sanding time in half or more. And, with a reliable vise, you'll drop the risk-to-life-and-limb approach to tweaking small parts on the tablesaw and router table.

The all-in-one joinery tool: A carcass saw

Next, pick up a backsaw—more specifically a carcass saw, *below left*. This 12–14" crosscut handsaw cuts boards to length precisely. And with surprisingly

little practice, you'll be cutting any kind of joint you can dream up—from dadoes and half-laps to tenons and dovetails—all without fussing with a shopful of specialized power-tool jigs. With a carcass saw, if you can see the line, you can saw the line.

Chisels are a shop's best friend

Not a single woodworking project leaves my bench that hasn't had multiple touches with a chisel. Of course, I'm cheating a bit, because finding a single chisel to do many jobs is tough. But a small set consisting of 1/4", 3/8", 1/2", and 1 1/2" widths lets you cut many joints or refine a fit after your power tools rough it out. The narrow ones square off routed mortises or clean up tenon shoulders. The wider ones work like planes to smooth tenon cheeks or bust out the meat of a dado *below center*. And they require no jigs, setup, or instruction manual; only a little quiet practice. 🌲



Practice making a dado or rabbet using nothing but a chisel, and you'll learn volumes about just how powerful and efficient this small, all-purpose tool can be.



Among a plethora of other things, Shannon Rogers teaches at his own online woodworking school — handtoolschool.net. Sign up for the school's email list to receive a video series that walks you through making your first three shop projects using your first three hand tools.

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Develop Your Shop Skills

Tame Tricky Clamp-ups

Big assemblies, tiny projects, curves, and angles all make tough work for getting your clamps in place. These quick tips help you overcome many difficult clamping situations.

Note: Before tackling a difficult clamp-up, walk through it first without glue (known as a “dry fit”). This exercise tells you whether you have enough clamps of the right type and size, which parts need more work to fit, and if you need any additional help or accessories. Plus, the dry fit familiarizes you with the assembly process before you find yourself racing against the glue’s setup time.

GIVE LONG-DISTANCE CLAMPING A CAUL

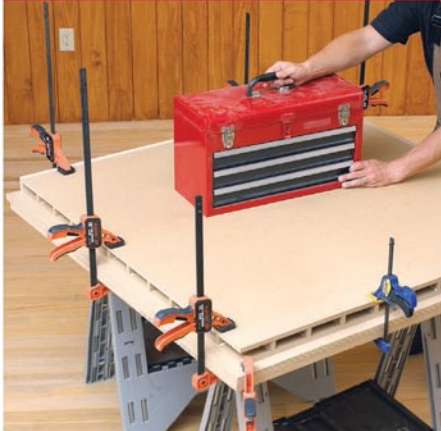


On wide panels, use clamping cauls—shaped slightly thicker in the middle than at the edges—to help distribute pressure evenly across the panel.

Beat the bulk

Large assemblies, such as casework and cabinetry, require loads of clamps, and big ones at that. To apply pressure to areas beyond the reach of the clamp’s jaws, extend their reach with cauls (*below left*), or use a heavy object instead (*below*). If you don’t have enough clamps to complete a glue-up, try making just a few clamps do the same job (*right*).

ANOTHER TRICK FOR YOUR TOOLBOX



If you don’t have a long enough caul, utilize something heavy, such as a toolbox, to apply pressure in the middle of a field.

CLAMP UP A LITTLE AT A TIME



To get more from a limited number of clamps, we glued in half of this bookcase’s shelves, and after they dried, reused the clamps to install the remaining shelves.



continued on page 20

What's The Secret To Flawless Edge Profiles With NO REWORK?

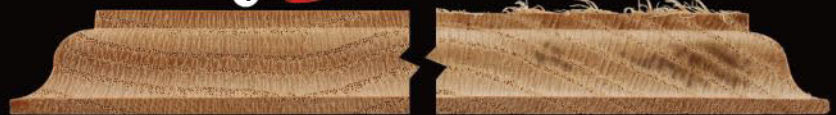
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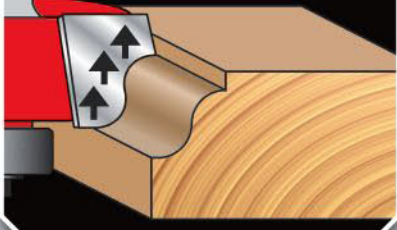
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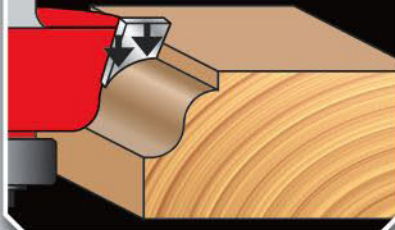
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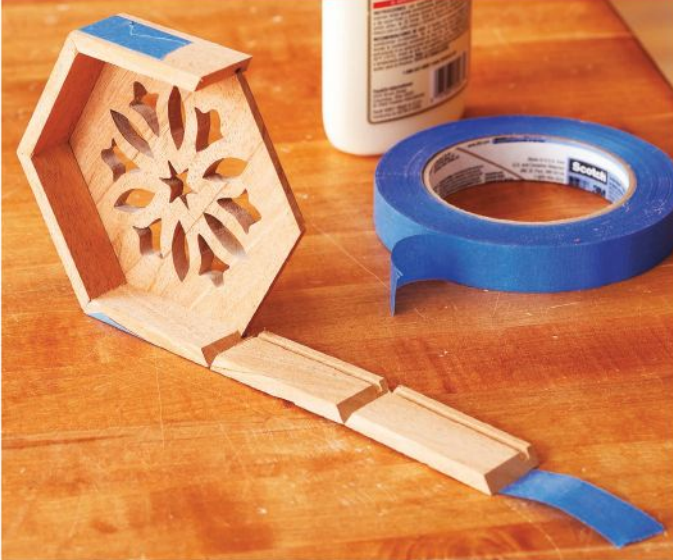
Develop Your Shop Skills

Tackle it with tape

Flexible, disposable, and adjustable, painter's tape—available at most home centers—excels at holding small parts securely. Use it when an assembly lacks

adequate clamping area, has an unusual shape that makes it difficult to get clamps in place without creating a crisscrossed mess (*below left*), or is too delicate for clamps (*below*).

TOO MANY SIDES? SKIP THE CLAMPS



Align mitered box sides tip-to-tip on a long strip of painter's tape; then, roll up the assembly for tightly clamped joints.

TRY TAPE FOR A TENDER TOUCH



On delicate clamp-ups where the weight of the clamp could collapse the assembly, painter's tape offers a light but firm grip.

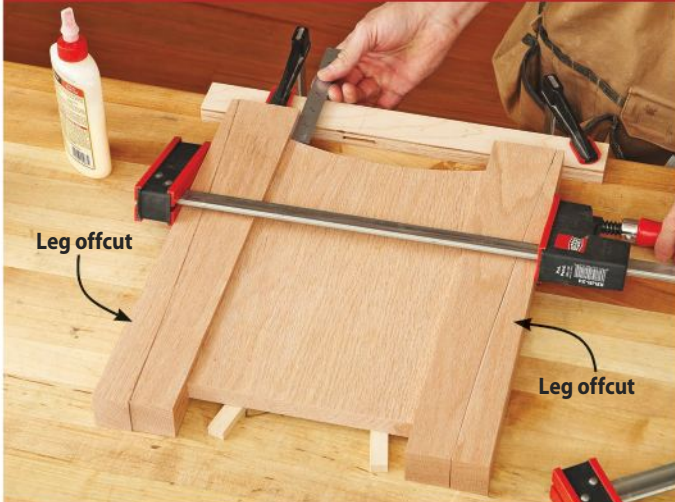
Overcome odd clamp-ups

When you can't clamp directly across a joint, such as in the assembly shown at the top of *page 18*, insert spacers

between the legs to equalize the clamping pressure along the assembly's length. When cutting tapered parts, save the offcuts (*below left*) to use as

cauls. If you find yourself regularly building un-square projects, purchase a band clamp (*below*)—it greatly reduces the hassle of those clamp-ups. 🌲

OFFCUTS SQUARE UP TAPERED PARTS



Fit the offcuts of tapered legs against the legs they were cut from to re-create parallel clamping surfaces. In some cases, you may be able to first assemble the parts when square, and then taper them afterward.

BAND CLAMPS WRAP UP TRICKY JOBS

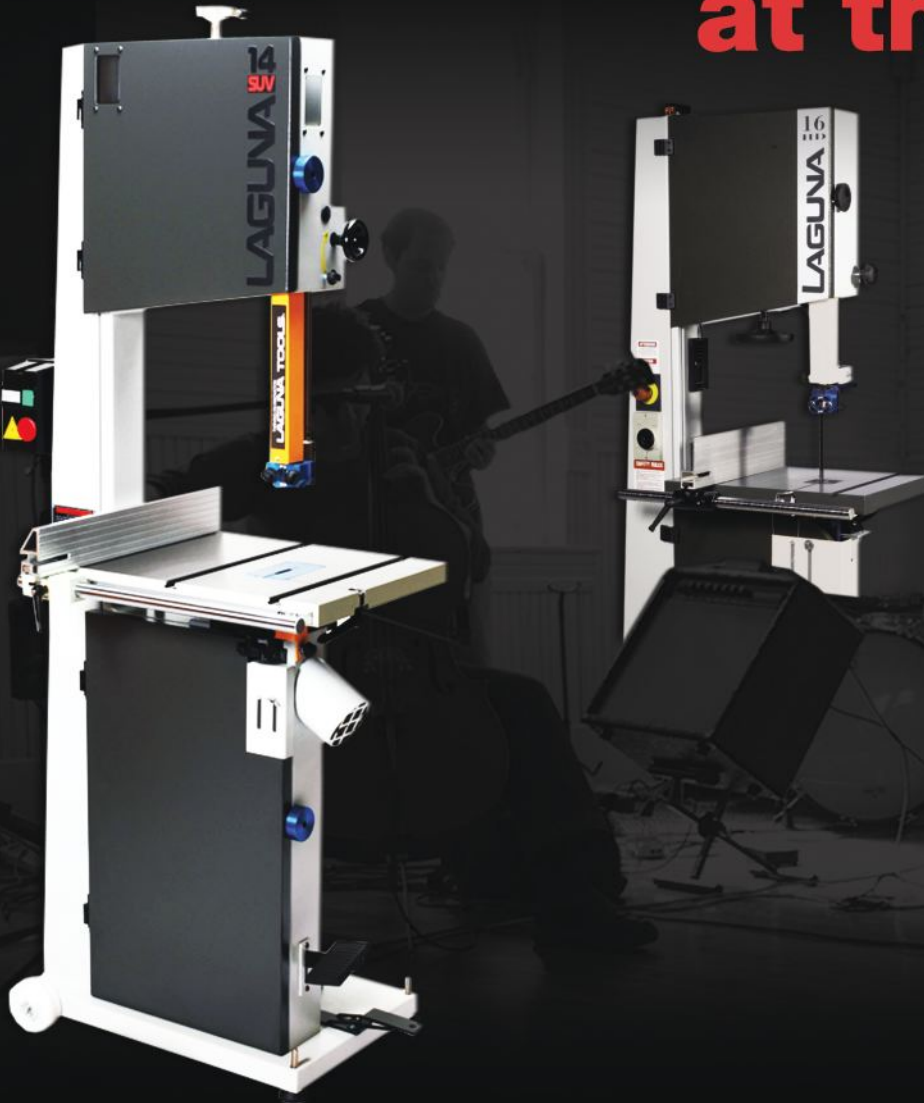


For clamping jobs with out-of-the-ordinary corners, a band clamp applies even pressure to all joints. Many come with corner blocks to prevent crushed corners and keep glue squeeze-out off the strap.

More Resources

- ▶ Watch clamping and sanding tricks for perfectly flat panels at woodmagazine.com/clampflat.
- ▶ Find nine more clamping tips at woodmagazine.com/clamptips.
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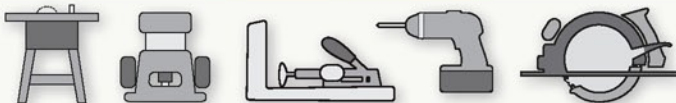


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TOOLS NEEDED



Made without a hint of plywood, this cabinet looks as though it could have been crafted 100 years ago by a highly trained artisan. But today, thanks to a few basic modern tools and fasteners, you need only beginner's skills to build it.

Solid wood expands as it takes on moisture in humid summer months and contracts in the drier winter air. To accommodate those fluctuations and prevent splits in the wood, the boards in this project share the same grain orientation, so they shrink and swell in unison, not in opposition to each other. For example, the grain in the center-shelf assembly runs in the same direction as the cabinets flanking it. Where the grain orientation *opposes* adjoining pieces, such as the back slats, overlapping rabbeted edges (known as shiplaps) are screwed on just one edge, allowing movement while maintaining a gap-free appearance.

First, build the case

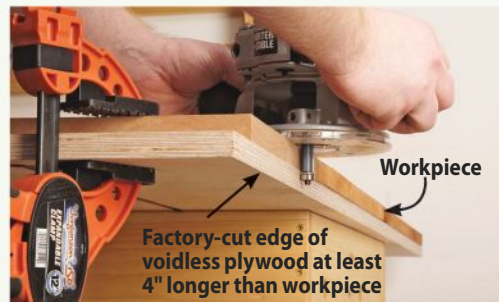
1 From $\frac{3}{4}$ " knotty alder (or pine) glue up panels for the sides (A), top and bottom shelves (B), middle shelves (C), and divider (D). (See the **Shop Tip**, above right, and sidebar "**The secret to gluing up flat panels**," below right.) After the glue dries, cut these parts to width and 1" longer than listed in the **Materials List** on page 28.

2 Cut four strips of $\frac{3}{4} \times 2\frac{1}{2} \times 16$ " plywood and use them to make a dado/cutoff jig [Photo A]. Use the jig to trim the sides (A), shelves (B, C), and divider (D) to finished length [Photo B].

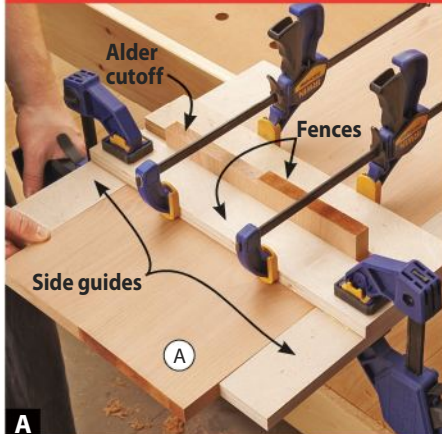
SHOP TIP

Get dead-on straight edges with a router

Good glue joints require dead-straight surfaces, so if you can't rip board edges straight enough, try this trick. Using a piece of quality plywood, clamp its factory-straight edge to within about $\frac{1}{16}$ " of the workpiece's sawn edge, as shown. Outfit your router with a flush-trim bit with a cutting edge at least 1" long. With the bearing riding against the plywood, rout the board flush for a glue-ready edge.



BUILD A DADO/CUTOFF JIG



Clamp the jig's four strips square to a side (A) with a scrap or two of alder sandwiched between the fences, then glue together the strips.

TRIM THE SIDES & SHELVES



Clamp the dado/cutoff jig to parts A, B, and C to cut them squarely to length using a portable circular saw and a 40-tooth finishing-cut blade.

Knotty but nice: Why I chose alder

This project would look just as nice in home-center knotty pine. But my lumber retailer suggested alder—a soft hardwood—and I'm glad he did; it costs about the same as pine and lacks the pitch pockets common to coniferous woods. I found that alder machines nicely without burning, fuzzing, or splintering. It takes a finish well without blotching. But much of the alder on the lumber-store racks was knot-free and bland-looking, so I had to dig for the more-attractive knotty pieces.

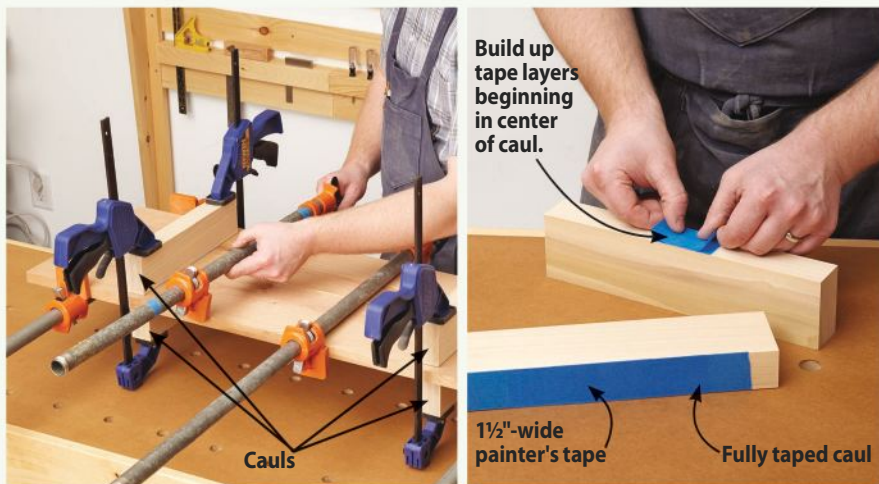
And unlike pine, which commonly comes in boards up to 12" wide, I couldn't locate any alder wider than 6", so I had to glue up several boards edge to edge to get the wide parts for this project.



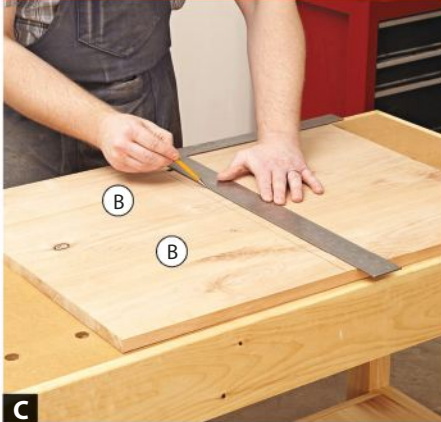
John Olson,
Design Editor

The secret to gluing up flat panels

Before it becomes tacky, wood glue acts like a lubricant, allowing joint edges to slip out of alignment. Cauls (blocks of wood clamped across the width of a glue-up, as shown below left) help keep board faces flush, but become less effective in the middle of wide glue-ups. To create a slightly convex edge that evenly distributes pressure along its length, place a short strip of painter's tape in the center of the caul edges, as shown below. Build that up with additional centered layers of tape, each one 2–3" longer than the one below it, until you cover the edge of the caul to within an inch of the ends. Bonus: The tape also sheds glue. This project requires four $11\frac{1}{2}$ "-long cauls made from 2×4 s.



MARK MATCHING DADOES



C Lay out dado locations on the top and bottom shelves at the same time to ensure the dados line up at assembly time.

3 Mark the dado locations on the top and bottom shelves (B) and divider (D) [Drawing 1, Photo C]. Align one fence of the cutoff jig with a layout mark, clamp it in place, and then rout the $\frac{1}{8}$ "-deep dados [Photo D].

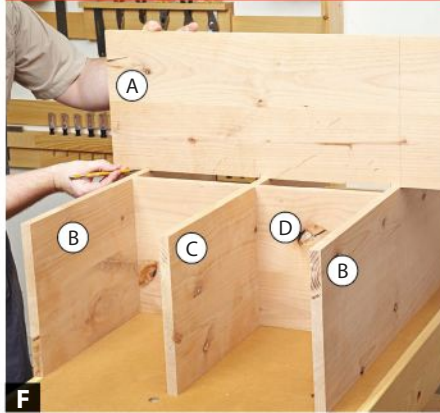
4 Finish-sand the shelves (B, C) and divider (D) to 220 grit. Glue and clamp the divider square to the top and bottom shelves using cauls between the shelves and clamp pads. When dry, glue and clamp one middle shelf (C) [Photo E]. After that dries, glue and clamp the other middle shelf in place. Rout $\frac{1}{8}$ " roundovers along the assembly's front edges.

ROUT EXACT-FIT DADOES



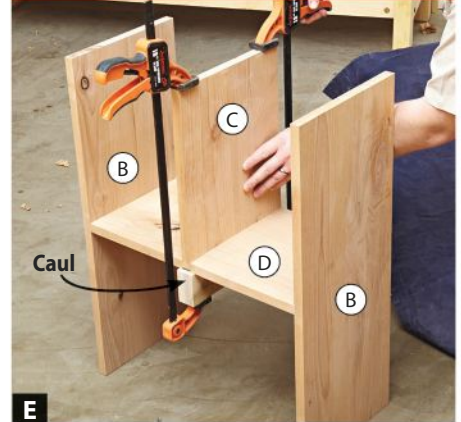
D Run a top-bearing $\frac{1}{2}$ " or $\frac{5}{8}$ " pattern or hinge-mortise bit with a shallow cutter against one side of the jig and then back along the other.

SCRIBE THE SIDES FOR DADOES



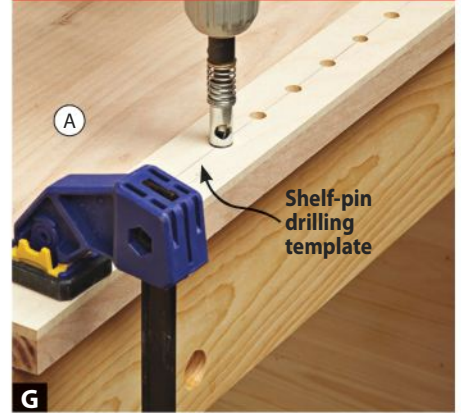
F Working near the divider (D) for accuracy, transfer the bottom and middle shelf locations onto the sides (A).

ATTACH A MIDDLE SHELF



E To best manage the B/C/D assembly, glue and clamp one piece at a time to ensure squareness and satisfactory appearance.

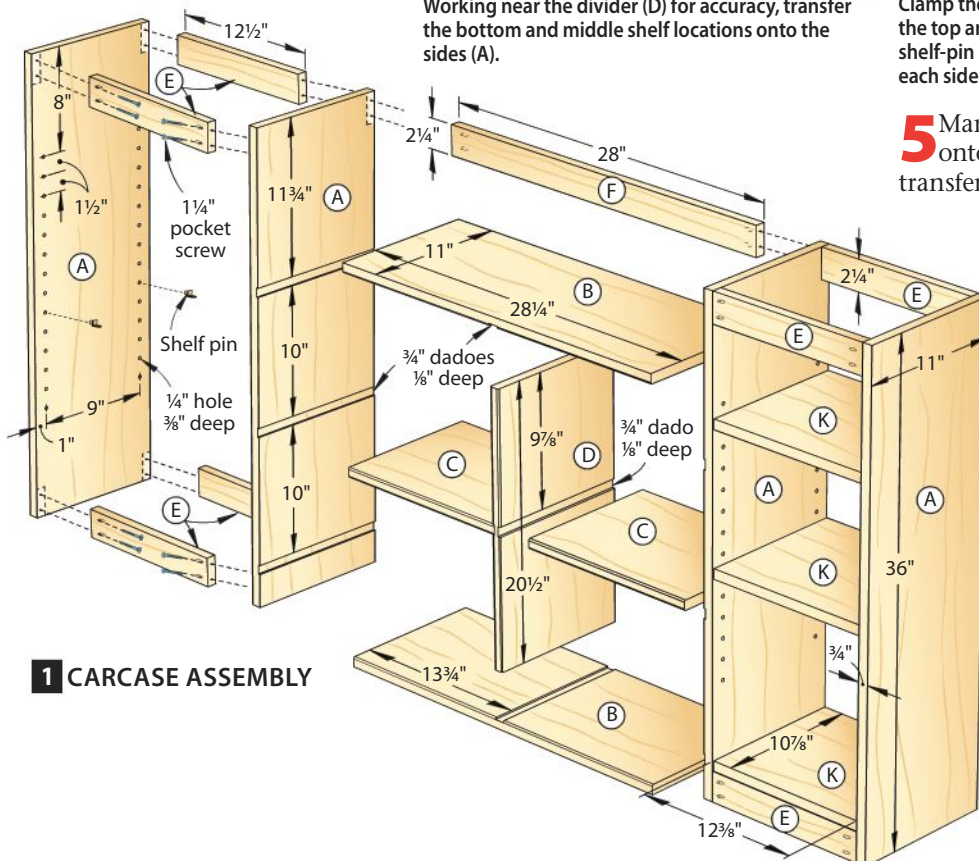
DRILL SHELF-PIN HOLES



G Clamp the shelf-pin drilling template flush with the top and edge of a side (A) and use it to drill $\frac{1}{4}$ " shelf-pin holes $\frac{3}{8}$ " deep. Repeat on both edges of each side.

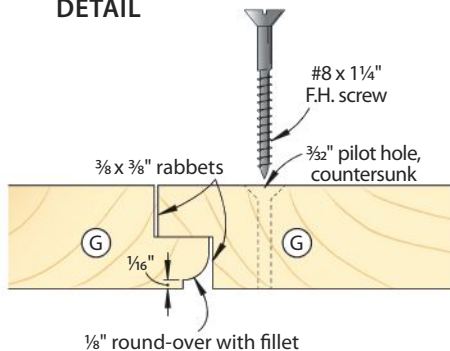
5 Mark the location of the top shelf (B) onto the sides (A) [Drawing 1]. Then transfer the dado locations for the bottom and middle shelves to the sides [Photo F]. As before, rout $\frac{1}{8}$ " dados into the sides.

6 To make a shelf-pin drilling template, cut a 2x32" strip of $\frac{1}{4}$ " plywood and mark a centered line down its length. Starting 8" from one end, mark 14 hole locations spaced $1\frac{1}{2}$ " apart. Drill a $\frac{1}{4}$ " hole at each mark. Use the template to drill shelf-pin holes in the four *inside* faces of the sides [Photo G, Drawing 1]. A special self-centering drill bit [Sources] controls depth and centers the $\frac{1}{4}$ " hole.

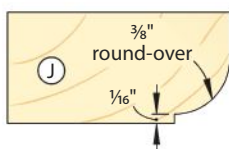


1 CARCASE ASSEMBLY

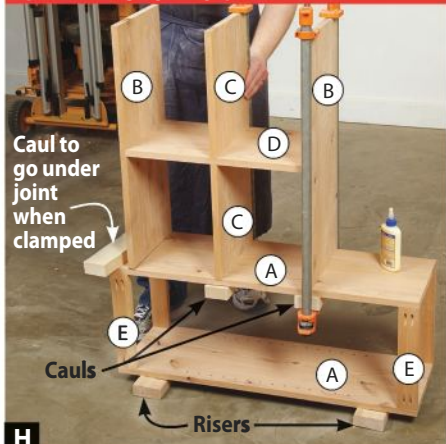
2a BACK SLAT RABBET AND THUMBNAIL DETAIL



2b FACE FRAME THUMBNAIL DETAIL



GET THE CASE TOGETHER



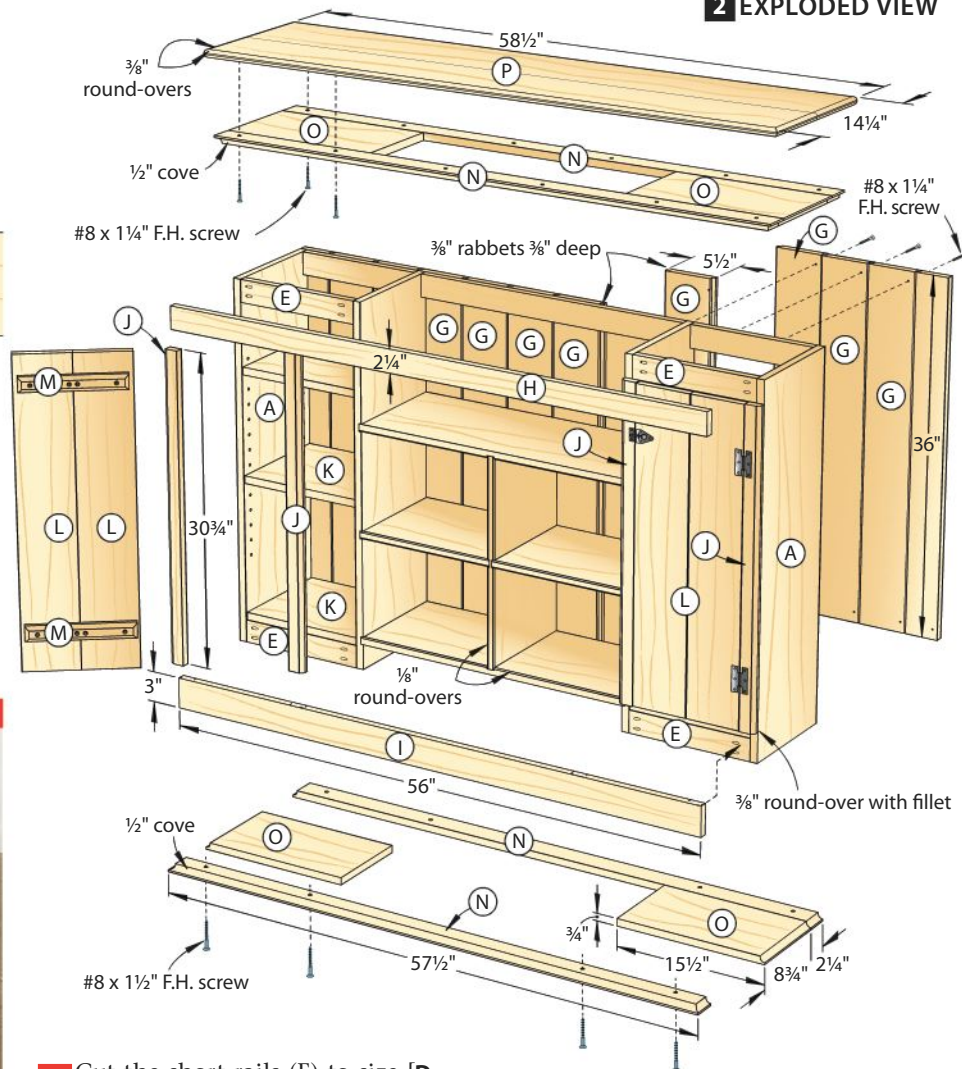
Use three cauls and six 36" clamps to assemble the case. Be sure the shelves bottom out in the dados and sit flush with the front side (A) edges.

RABBET EACH BACK SLAT



Adjust a rabbeting bit for a $\frac{3}{8} \times \frac{3}{8}$ " cut and rout rabbets on opposite faces and edges of all back slats (G).

2 EXPLODED VIEW



7 Cut the short rails (E) to size [Drawing 1]. Drill two pocket holes at both ends of each rail. Finish-sand the inside faces of the sides (A) and short rails. Glue and screw together two sides and four short rails, being careful to keep the top

ends of the sides up so all shelf-pin holes align. Repeat for the other parts A and E. **8** Glue and clamp one side cabinet (A/E) to the center shelf assembly (B/C/D) [Photo H]. After the glue dries attach the other side cabinet.

9 Cut the back rail (F) to fit between the two side cabinets (A/E) [Drawing 1]. Attach it with pocket screws (facing the rear of the assembly), flush at the tops and backs.

Give the case a back and face

1 Cut to size the back slats (G) [Materials List, Drawing 2].

2 Rout $\frac{3}{8}$ " rabbets $\frac{3}{8}$ " deep along both edges of the back slats (G) but on opposite faces [Drawing 2a, Photo I], so that one edge will overlap the adjoining edge of the slat next to it. Then, along the inside face of each slat, rout a thumbnail profile using a $\frac{1}{8}$ " round-over bit [Drawing 2a, Photo J]. Finish-sand the inside faces of all slats to 220 grit.

ADD A DECORATIVE CUT



To create a round-over-with-fillet profile on each back slat simply adjust a $\frac{1}{8}$ " round-over bit so its straight cutting edges cut $\frac{1}{16}$ " deep.

PREFINISH TO SAVE TIME



K Applying finish to the interior surfaces of the case before the access-inhibiting face frame goes on will make your life easier later.

3 Mask off the front edges of the case (A–E) that will receive a face frame later [Photo K], and finish the interior of the case as well as the interior faces and edges of the back slats (G). We applied a coat of boiled linseed oil for color, wiped off the excess, and let it dry for 12 hours. We followed that with three coats of premixed clear shellac thinned one part denatured alcohol to two parts shellac for easier brushing. We scuff-sanded with 320-grit sandpaper between coats.

4 Remove the masking tape from the carcass. Cut the top rail (H), bottom rail (I), and stiles (J) to size [Materials List, Drawing 2]. Glue and clamp the bottom rail in place.

5 Use a $\frac{3}{8}$ " round-over bit to rout a round-over-with-fillet profile along one edge of each stile (J) [Drawing 2b]. Glue and clamp the stiles to the case [Photo L], butted against the bottom rail.

6 Glue and clamp the top rail (H) in place, butted against the stiles (J).

7 Once the glue for the rails and stiles has dried, flip the assembly onto its front, and screw in place the back slats (G) [Drawings 2, 2a; Photo M]. Start on either side of center and use pennies to space the half-laps.

8 The last slats on both ends of the case will overlap the sides (A). Scribe and trim those to fit [Photo N] before screwing them in place.

Make the shelves and doors

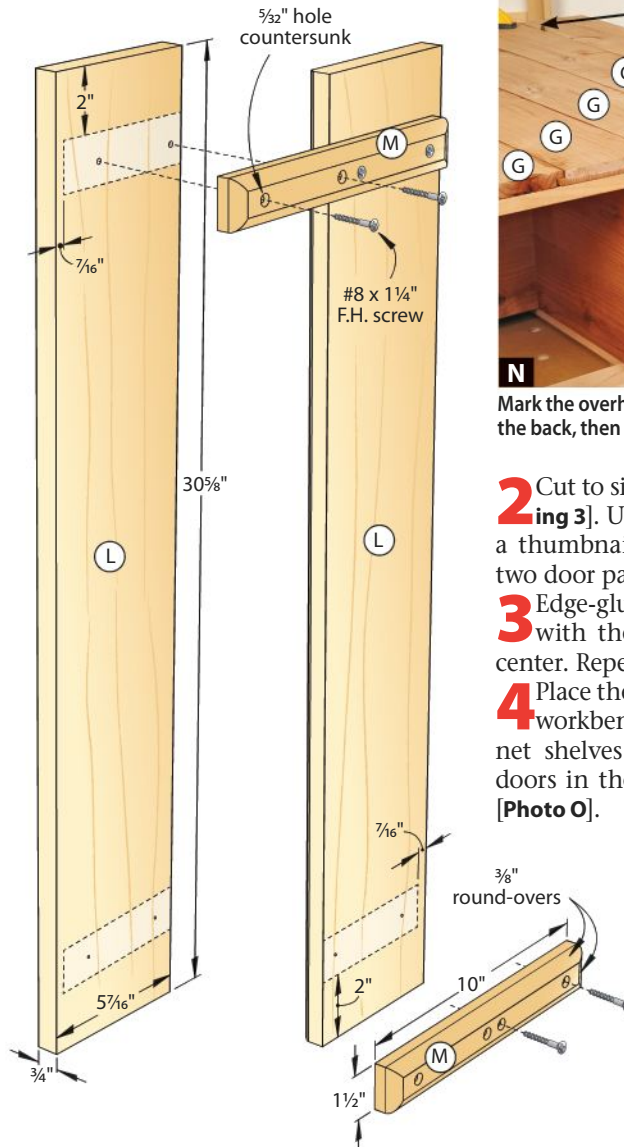
1 Glue up and cut to size six cabinet shelves (K) [Materials List]. Set them aside for now.

CLAMP ON THE STILES

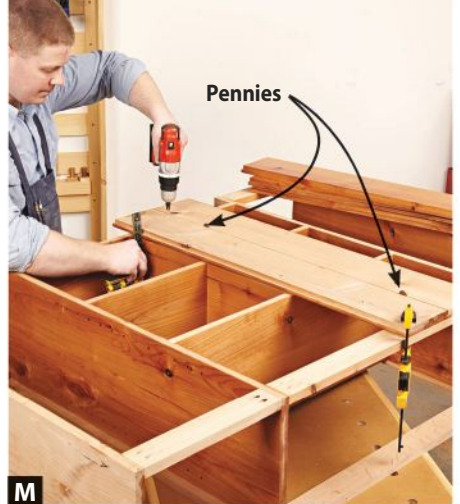


L Align the profiled edge of the stile (J) flush with the outside face of the side (A), and glue and clamp the stile in place.

3 DOOR ASSEMBLY (Viewed from inside)

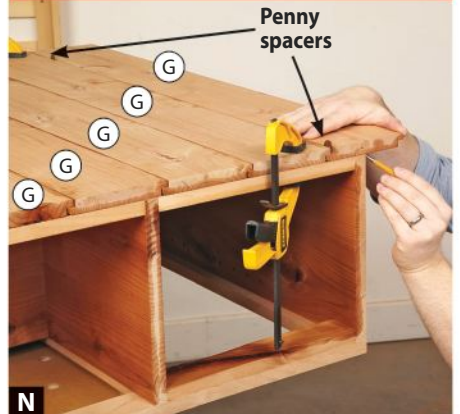


ATTACH THE BACK SLATS



M Use a square to align the first slat (G) flush with the divider (D). Attach the slats with #8x $\frac{1}{4}$ " screws driven just to one side of the shiplap joints.

SCRIBE THE END BACK SLATS



N Mark the overhang of the slats (G) at both ends of the back, then cut them for a flush fit.

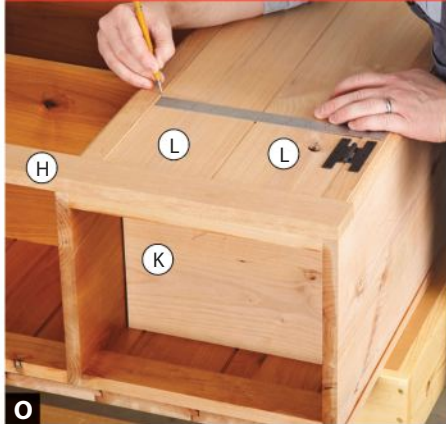
2 Cut to size the door panels (L) [Drawing 3]. Use a $\frac{1}{8}$ " round-over bit to cut a thumbnail profile along one edge of two door panels.

3 Edge-glide together two door panels with the thumbnail profiles in the center. Repeat for the other panels.

4 Place the assembled case (A–J) on the workbench face up. Using the cabinet shelves (K) as supports, place the doors in their openings and trim to fit [Photo O].

5 Locate the hinges [Sources] on the doors 3" from the door tops [Photo O, Drawing 2] and drill the screw holes. Do the same for the latches. Leave the hinges and latches unattached for now.

CHECK FOR AN EVEN REVEAL



Mark and trim the doors for an even $\frac{1}{16}$ " reveal all around. Also, mark and drill the hinge locations at this time.

ATTACH THE SUB-TOP AND -BOTTOM



Apply glue to the N/O assemblies, align them flush with the back of the case, clamp in place, and secure with countersunk screws.

TOP OFF THE CASE



Clamp the top (P) centered on the sub-top and attach with screws from underneath the sub-top. Do not use glue.

6 Cut to size the battens (M) [Materials List] and rout $\frac{3}{8}$ " round-overs on both edges and ends of one face. Drill countersunk $\frac{5}{32}$ " pilot holes where shown in **Drawing 3**. (These are oversized so the screws can move slightly within them as the wood expands/contracts.) Screw—but don't glue—the battens to the backs of the doors.

Assemble the top and bottom

1 Cut to size the rails (N) and spacers (O) for the sub-top and -bottom [Drawing 2, Materials List]. Glue the front

and back rails (N) to the spacers (O) flush at their ends.

2 Rout a $\frac{1}{2}$ " cove profile on the front edge and ends (not the back edge) of the sub-top and -bottom assemblies (N/O) [Drawing 2].

Quick Tip! To avoid grain blow-out when routing across end grain, always clamp a scrap piece to the exit edge of the cut. It supports the wood fibers and prevents them from splintering.

3 Glue, center, and screw the sub-top and -bottom assemblies (N/O) to the case (A–J) [Photo P, Drawing 2].

4 Glue up and cut to size the top (P) [Drawing 2]. Rout $\frac{3}{8}$ " round-overs on both faces of all edges and ends to create a bullnose profile.

5 To secure the top (P), drill countersunk pilot holes from underneath and through the sub-top (N/O) [Photo Q]. Attach with screws [Drawing 2].

Finish it off

1 Apply finish to the parts of the project not finished earlier.

2 Install the door hinges and latches. You did it! 🍀

Give low-dough home-center hinges a high-dollar look

The antique-look mail-order hinges and latches for this project will set you back about \$60. If you would rather keep some of that cash in your wallet, modify inexpensive hinges found at any home center or hardware store to appear aged.

First, buy hinges like the left half of the one shown *near right*. We purchased Schlage "Antique Brass Hinges" (they're actually made of steel) from a home center for less than \$3 per pair. You'll also need a bench grinder (a file will work, but take longer), something hard to pound on (we used the anvil on a machinist's vise), a ball-peen hammer, a centerpunch with its tip ground round to approximate the curved face of the ball-peen hammer, and a countersinking drill bit.

1 Grind the pointed ends off each hinge.

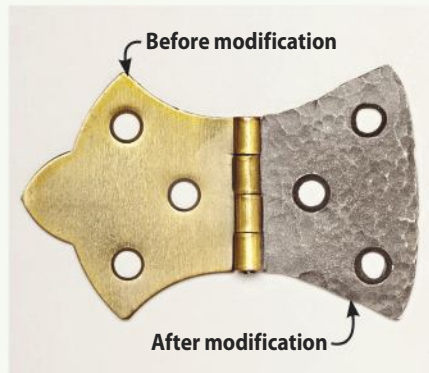
2 With the centerpunch and a hammer repeatedly strike the area near the hinge barrel. Be careful not to accidentally strike the barrel, which might impair the hinge's movement.

3 Using the hammer,peen along the edges of the hinge to stretch the metal toward the corners. It's okay to thin out the material near

the edges to your desired shape because those areas are not critical to the hinge's strength. Then, lightly peen the center of the hinge for a consistent look across the surface.

4 Peening will distort the area around the screw holes; restore their rims with a countersinking bit.

5 Spray-paint the hinge to your desired color. (We applied Rust-Oleum Dark Bronze Metallic.) Let it dry for a few seconds, then wipe off gently to enhance the aged look.



Materials List

Part	FINISHED SIZE			Matl.	Qty.
	T	W	L		
Carcass					
A* sides	¾"	11"	36"	EA	4
B* top and bottom shelves	¾"	11"	28¼"	EA	2
C* middle shelves	¾"	11"	13⅞"	EA	2
D* divider	¾"	11"	20½"	EA	1
E short rails	¾"	2¼"	12½"	A	8
F back rail	¾"	2¼"	28"	A	1
Face frame and back					
G back slats	¾"	5½"	36"	A	12
H top rail	¾"	2¼"	56"	A	1
I bottom rail	¾"	3"	56"	A	1
J stiles	¾"	1½"	30¾"	A	4
Doors and shelves					
K cabinet shelves	¾"	10⅞"	12⅜"	EA	6
L door panels	¾"	5⅞"	30⅞"	A	4
M battens	¾"	1½"	10"	A	4
Tops and bottom					
N sub-top and bottom rails	¾"	2¼"	57½"	A	4
O sub-top and bottom spacers	¾"	8¾"	15½"	A	4
P top	¾"	14¼"	58½"	EA	1

*Parts initially cut oversize. See the instructions.

Materials key: A—knotty alder; EA—edge-glued knotty alder.

Supplies: Masking tape, #8x1¼" flathead screws (52), #8x1½" flathead screws (16), 1¼" coarse-thread pocket screws (36).

Bits: Flush-trim, ½" or ⅝" pattern, ⅜" rabbeting, ⅛" round-over, ⅜" round-over, and ½" cove router bits.

Sources

Hardware: 3x1⅜" smooth flush H-hinge no. 01X35.10 (4), \$10.80 per pair; 1⅜x2⅜" trapped latch no. 01X39.10 (2), \$19.20 each. Lee Valley Hardware, 800-871-8158, leevalley.com.

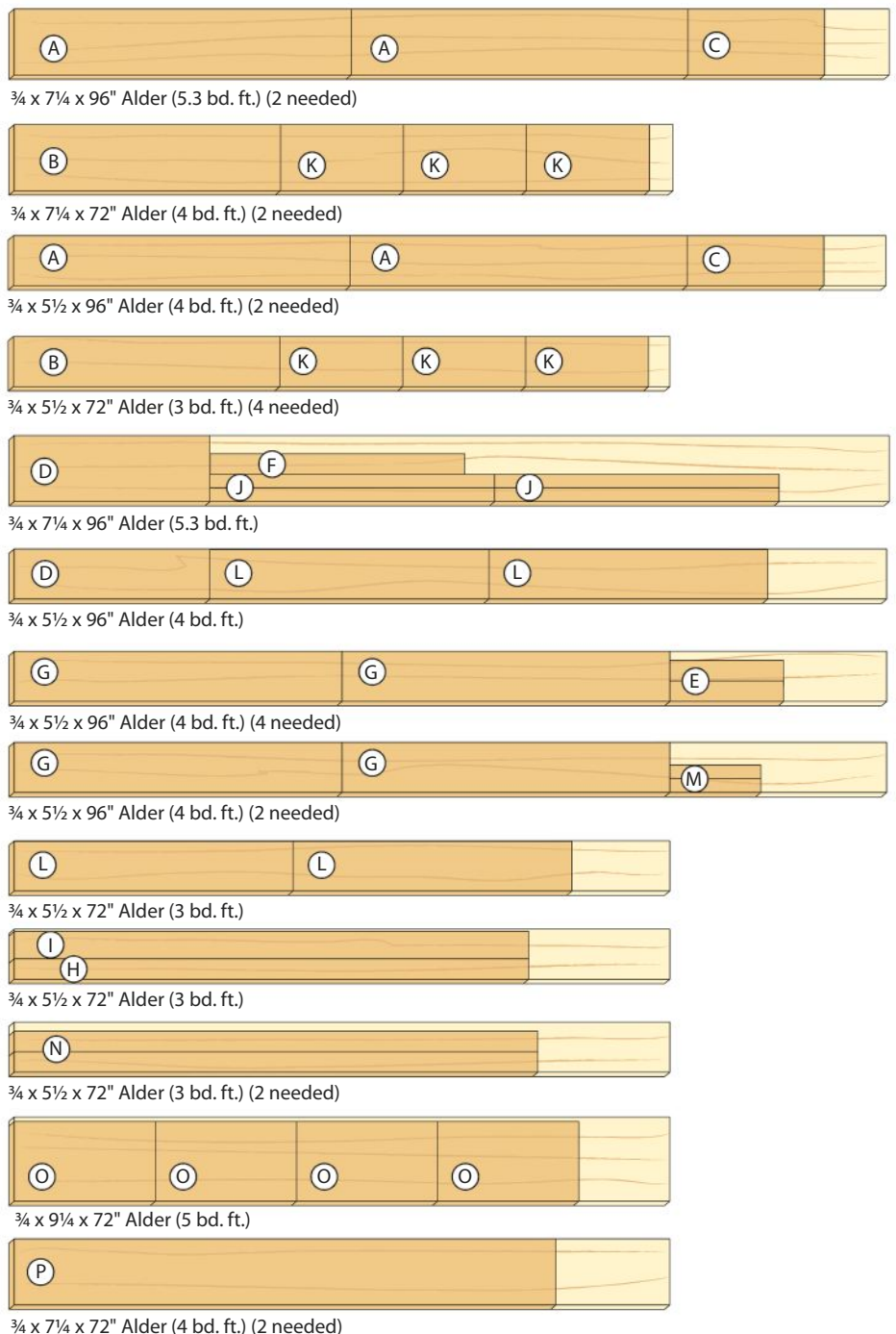
¼" self-centering shelf-pin drill bit: item no. 22567, \$14.99, Rockler, 800-279-4441, rockler.com.

¼" shelf-pin supports: available in brass (30437), antique brass (22765), nickel (22773), or black (22781), packs of 16, \$4.59, Rockler.

More Resources

► Watch a free video showing how to turn new hinges into distressed antique ones at woodmagazine.com/distresshinges.

Cutting Diagram



Written by **Bill Krier**

Produced by **Bob Hunter** with **John Olson**

Project design: **John Olson**

Illustrations: **Lorna Johnson**

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Overall dimensions: 11½" W × 23¼" L × 5⅞" H

It's just a base and a fence

Note: To ensure the sled's cutting accuracy, first adjust your saw blade parallel to the miter-gauge slots. Refer to your saw's owner's manual or go to woodmagazine.com/TStuneupvid for a free video on tuning up a tablesaw.

1 From ¾" plywood, cut the base (A) and fence (B) to size [Materials List]. Using a ¾"-thick dado stack in your tablesaw, cut the ¼"-deep dadoes in the base and fence [Drawings 1 and 1a].

2 From ¼" hardboard, cut the base top (C) and fence front (D) ⅝" wider and longer than listed [Materials List].

3 Glue and clamp the base top (C) and fence front (D) to the dadoed faces of the base (A) and fence (B), with overhangs all around. After the glue dries, use a flush-trim bit in a router to trim the overhanging hardboard edges flush with the plywood [Photo A].

4 With a ¼" dado blade set ⅜" above the table, cut slots in the base top (C) and fence front (D) centered over the ¾" dadoes [Drawing 1a, Photo B]. (The slots and dadoes capture the heads of the ¼" hexhead bolts for the hold-down and stopblock.)

5 From ⅜" hard maple, cut the miter-slot guides (E) to size [Materials List]. Sand the guide edges for a snug but smooth glide in their miter-gauge slots. Position and temporarily attach the base (A/C) to the guides, as shown in

FLUSH-TRIM THE BASE AND FENCE

Set bit height so the bearing rides below the dadoes.

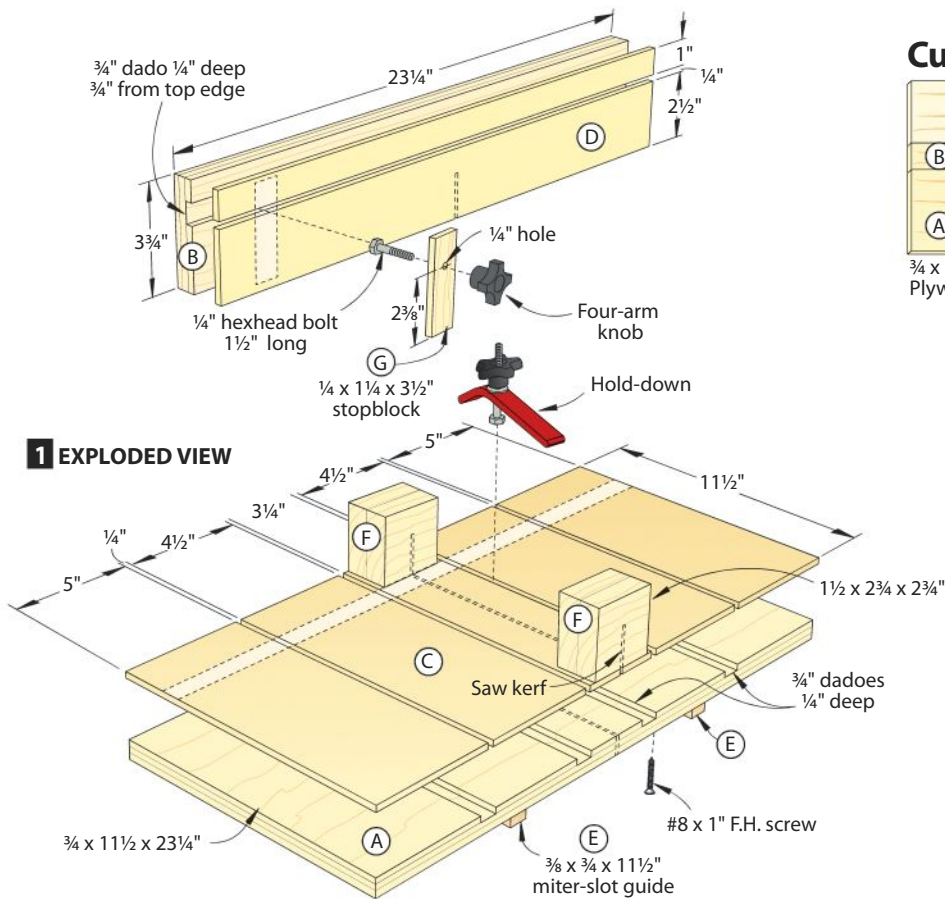


A Using a flush-trim bit, cut the edges of the base top (C) flush to the edges of the base (A). Repeat to trim the fence front (D) flush to the fence (B).

CUT CENTERED SLOTS

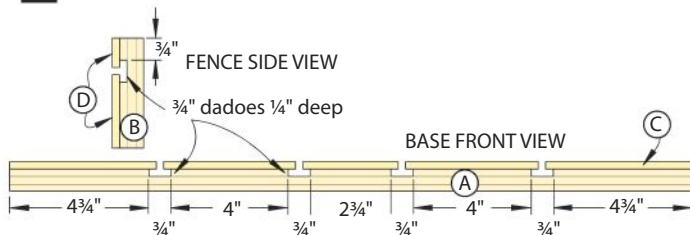


B Using your tablesaw fence to position the base (A/C) and fence (B/D) where required, cut a ¼" slot through only the hardboard centered over each dado.



1 EXPLODED VIEW

1a BASE AND FENCE DETAIL



Photos C and D. Then, carefully remove the assembly, flip it over, and drill countersunk mounting holes for #8x1" flat-head screws through the guides and into the base. Remove the tape and drive the screws.

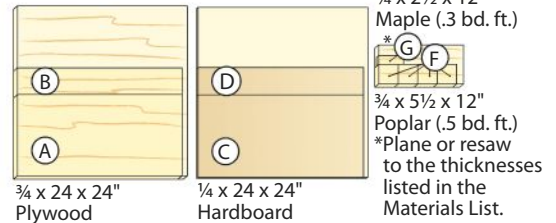
6 To accurately position the fence (B/D) on the base (A/C), cut a 3/4x1 1/2x21 1/2" spacer from scrap. Use it when gluing the fence to the base [Photo E].

7 From poplar glued up to 1 1/2" thickness, cut two cleats (F) to size. Centering the cleats end to end on the base, glue one flush with the front edge and the other flush with the back edge and glued to the fence.

8 From 1/4" poplar, cut the stopblock (G) to size. Drill a 1/4" hole through the stopblock where shown [Drawing 1].

9 Finish-sand the jig to 150 grit and remove the dust. Apply a penetrating finish to protect the jig. (We used General Finishes Arm-R-Seal Oil & Urethane Topcoat, semi-gloss.) Now, fire up your saw and cut away—precisely! 🌲

Cutting Diagram



Materials List

Part	FINISHED SIZE			Matl.	Qty.
	T	W	L		
A base	3/4"	11 1/2"	23 3/4"	PL	1
B fence	3/4"	3 3/4"	23 3/4"	PL	1
C* base top	1/4"	11 1/2"	23 3/4"	H	1
D* fence front	1/4"	3 3/4"	23 3/4"	H	1
E miter-slot guides	3/8"	3/4"	11 1/2"	M	2
F cleats	1 1/2"	2 3/4"	2 3/4"	P	2
G stopblock	1/4"	1 1/4"	3 1/2"	P	1

*Parts initially cut oversize. See the instructions.

Materials key: PL—plywood, H—hardboard, M—maple, P—poplar.

Supplies: Double-faced tape, #8x1" F.H. screws (6), 1/4" hexhead bolt 1 1/2" long, 1/4"-20 four-arm knob (female), hold-down.

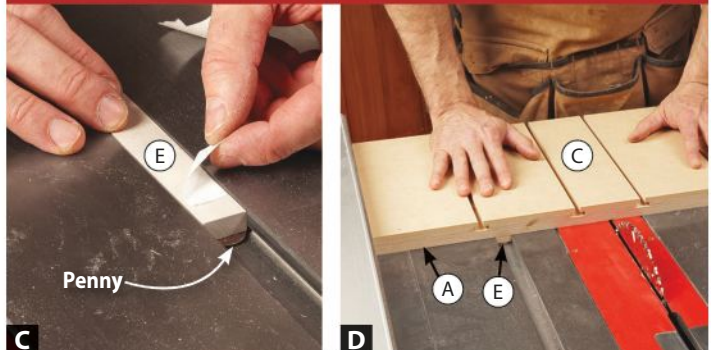
Blade and bit: Dado set, flush-trim router bit.

Source

Hold-down clamp: #86N70.52, \$10.50 each, Lee Valley, 800-871-8158, leevalley.com.

Four-arm knob: #00M55.30, \$2.80 each, Lee Valley.

TAPE AND COMMON "CENTS" LOCATE BASE ON THE GUIDES



C Place pennies under the guides (E) to raise them above the table saw top. Apply two pieces of double-faced tape to the tops of the guides.

D Position the rip fence to center the base to the saw blade. With the guides flush with the back edge of the saw top, press the base firmly onto the guides.

MOUNT THE FENCE TO THE BASE



E With the slot in the fence front (D) toward the top, glue and clamp the fence (B/D) to the base (A/C) tight against a spacer aligned with the base back edge. Check the fence face for square.



Construction-grade End Loader

Dimensions: 7"H x 5¾"W x 14"L

When it's time to fill up a toy dump truck, here's the right machine for the job. With a pivoting body for tight turns, and a bucket that lifts and dumps, this rig

works much like the real thing. Crafted from walnut and maple, it matches our other Construction-grade toys (*pages 34–35*). A kit provides all the specialty parts you need [**Source**, *page 36*].

Shape parts for the rear unit

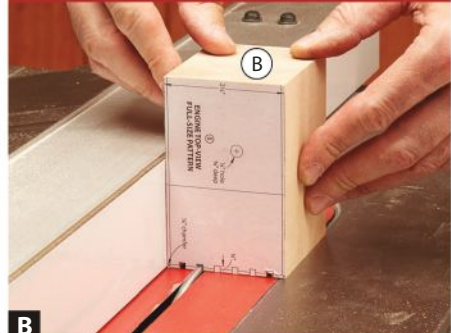
1 Make two photocopies of *page 38* and one photocopy of *pages 37 and 39* of the *WOOD Patterns®* insert. Prepare a ¾x5½x6¾" walnut blank for the rear

SUPPORT THE REAR CHASSIS



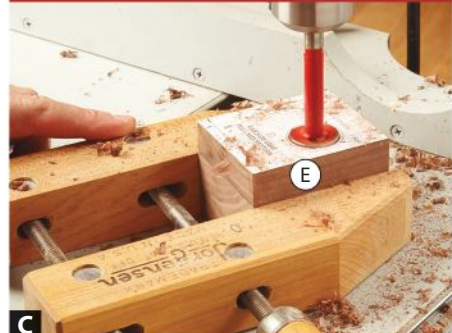
A To position the chassis (A) for drilling the axle hole, rest it on a scrap at least 1½" thick. Clamp the chassis to the fence to prevent it from turning.

CREATE A GRILL



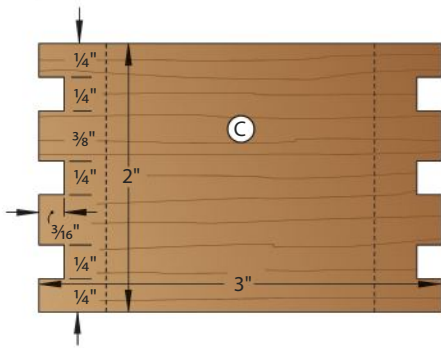
B Make a pass with each edge against the rip fence to cut the two outermost kerfs. Reposition the fence for the next pair of kerfs and repeat.

CLAMP THE CAB AND DRILL



C A handscrew provides a secure grip on the cab (E) while drilling the 1" hole for the window. Back out the bit frequently to clear the chips.

1a STEPS (Front view)



chassis (A). Spray-adhere a copy of the **Rear Chassis Pattern** to the blank, and bandsaw and sand the chassis to shape.

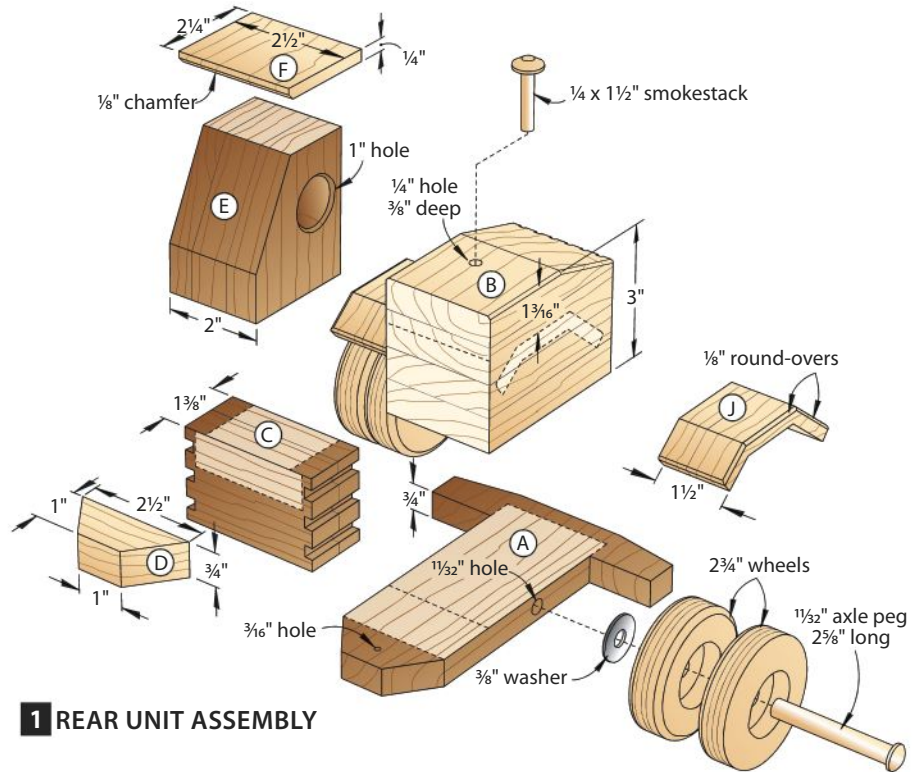
2 Drill the $\frac{1}{32}$ " hole where indicated [Photo A]. Then drill the $\frac{3}{16}$ " through-hole where shown.

3 Laminate four layers of $\frac{3}{4} \times 2\frac{3}{4} \times 4\frac{1}{2}$ " maple for the hood (B) [Drawing 1]. After the glue dries, trim the blank to size [Materials List], and attach copies of the **Hood Side-View** and **Hood Top-View Patterns**. Following the top-view pattern, cut the kerfs for the radiator grill [Photo B]. Then drill the $\frac{1}{4}$ " hole where shown and bandsaw the bevel following the side-view pattern. Chamfer the edges where shown.

4 Laminate two pieces of $\frac{3}{4} \times 2 \times 3$ " walnut for the steps (C). Resaw and sand the blank to $1\frac{3}{8}$ " thick; then, cut the dadoes for the steps [Drawing 1a]. From $\frac{3}{4}$ "-thick maple, lay out and cut the cab support (D) to size [Drawing 1].

5 From a laminated walnut blank, cut the cab (E) to size, and attach a copy of the **Cab Side-View Pattern** to it. Drill the hole for the window [Photo C]; then, chamfer the edges of the window, and cut the bevel along the front of the cab.

6 Cut the maple roof (F) to size [Drawing 1], and chamfer the front edge.



1 REAR UNIT ASSEMBLY

7 Retrieve all of the parts cut to shape so far, moisten the patterns with mineral spirits, and scrape them away. Finish-sand all parts to 220 grit.

Load up for assembly

Assemble the rear unit of the loader as shown in Photos D–H below. Allow the glue to dry at least 20 minutes between steps.

GLUE THE HOOD IN PLACE FIRST



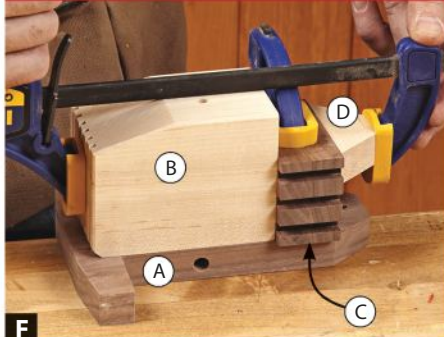
Apply glue to the bottom of the hood (B) and clamp it to the rear chassis (A), flush with the edges and set back $\frac{3}{16}$ " from the wide end of the chassis.

MAKE A PLATFORM FOR THE CAB



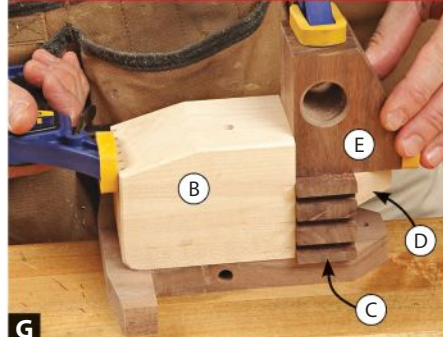
While the hood assembly dries, glue and clamp the cab support (D) flush with the top edge of the steps (C), and centered between the ends.

ATTACH THE STEPS TO THE HOOD



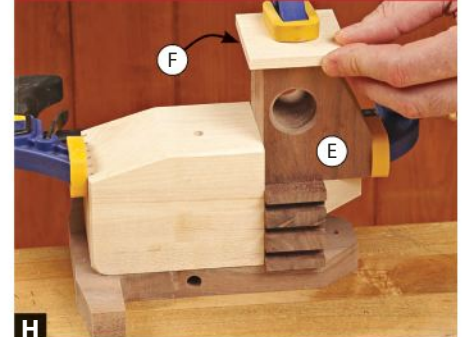
Apply glue to the rear face and bottom of the steps (C) keeping it at least $\frac{1}{4}$ " from the ends. Then center and clamp the steps to the chassis and hood.

ADD THE CAB

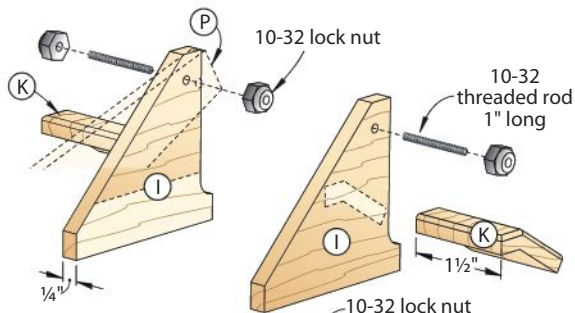


Glue and clamp the cab (E) to the hood (B), steps (C), and cab support (D), centering the cab on the width of the hood.

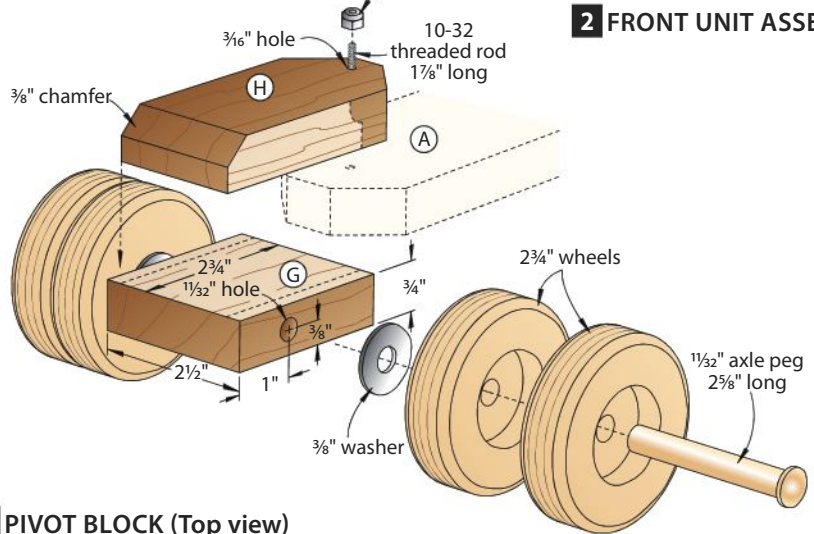
TOP IT WITH THE ROOF



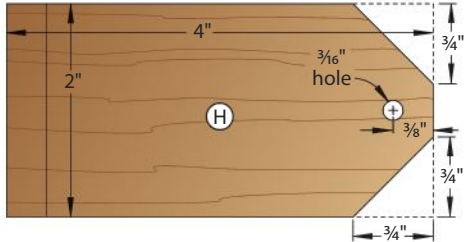
Clamp the chamfered face of the roof (F) to the cab (E), centered from side to side and front to back, with the chamfer facing down and forward.



2 FRONT UNIT ASSEMBLY



2a PIVOT BLOCK (Top view)

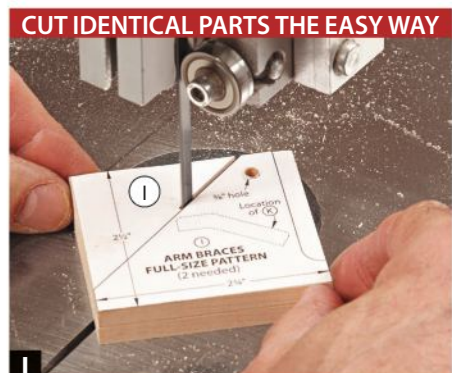


Shape parts for the front unit

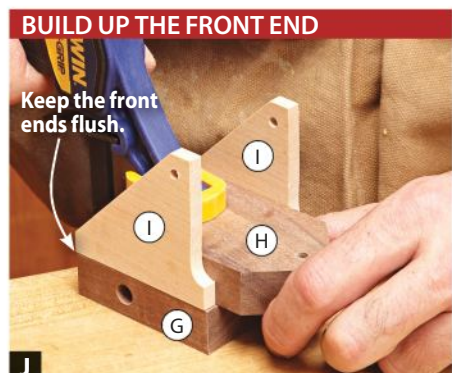
1 Cut the front chassis (G) and pivot block (H) to size [Drawings 2, 2a]. Drill the 3/16" hole in the pivot block and

the 1/32" hole in the chassis where shown. Then rout the chamfer on the end of the pivot block.

2 From 1/4" maple, cut two 2 1/2 x 2 3/4" blanks for the arm braces (I). Stack the blanks together with double-faced tape between them, and their ends and edges flush. Attach the **Arm Braces Pattern** to the stack and drill the 3/16" hole where shown. Then, cut the braces to shape [Photo I] and finish-sand them.



1 By cutting both arm braces (I) at the same time, you guarantee they will be identical. Do the same later with the bucket sides (M) and arms (P).



J Glue the arm brace/pivot block assembly (H/I) to the front chassis (G), clamping the parts to your bench while the glue dries.

3 Glue the arm braces (I) to the edges of the pivot block (H), with their front ends and bottom faces flush. After the glue dries, glue this assembly to the front chassis (G) [Photo J].

4 Laminate maple stock to make a 1 1/2 x 1 1/2 x 12" blank. Spray-adhere two copies each of the **Rear Fender** and **Front Fender Patterns** along one face of the blank. Bandsaw and sand the fenders (J, K) to shape. Remove the patterns



Give the crane (issue 185, September 2008) a spin on its base, and raise and lower its bucket with a crank.

Build the whole crew

Purchase plans and kits for these companion projects at woodmagazine.com/cgtoys.

Reach out and scoop with the excavator (issue 194, November 2009).



For heavy hauling, fill the dump truck (issue 215, November 2012).

Move earth with the bulldozer (issue 199, September 2010).



and rout $\frac{1}{16}$ " round-overs on the outside edges, making sure you end up with mirrored pairs. Finish-sand the fenders.

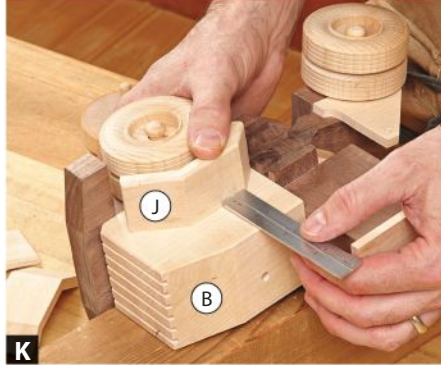
5 Temporarily join the front unit (G/H/I) with the rear unit (A-F) using a length of 10-32 threaded rod and lock nuts. Dry-fit two wheels and an axle peg in the front and rear chassis, then apply glue to the edge of each fender and hold or clamp them in place for a few minutes until the glue grabs [Photos K and L]. After the glue dries, repeat the process for the other side.

Build the bucket and arms

1 Cut the bucket back (L), sides (M), top (N), and bottom (O) to size, beveling the indicated edges of the back, top, and bottom [Drawing 3]. Rout a $\frac{1}{8}$ " chamfer along the top front edge of the bucket bottom.

2 Spray-adhere the **Bucket Top Pattern** to the top (N). Miter the two corners, and drill the holes where shown. Chamfer both faces of the holes and the front edge. Finish-sand pieces L-O to 220 grit

POSITION THE FENDERS



K



L

Align the center section of the rear fenders (J) parallel to and $1\frac{3}{16}$ " below the top of the hood (B). To position the front fenders (K), refer to the location shown on the Arm Braces Pattern.

before assembling the bucket as shown in Photos M, N, and O.

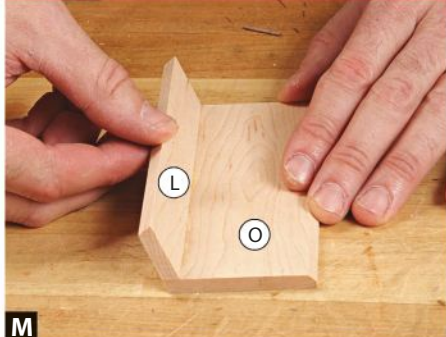
3 From $\frac{1}{4}$ " stock, cut two $2\frac{3}{4} \times 5\frac{1}{8}$ " blanks for the arms (P). Stack the blanks together as you did with the arm braces (I), apply a copy of the **Arm Pattern**, cut and sand them to shape, and drill the holes where shown. Separate the arms and remove the pattern.

4 Cut the arm spacer (Q) to size and finish-sand it. Slide a $2\frac{1}{2}$ " length of

10-32 threaded rod through the holes in the upper ends of the arms (P) to align them, then glue and clamp the arm spacer between the arms [Photo P].

5 Cut the brackets (R) $\frac{1}{8}$ " wider than listed [Materials List]. Apply a **Bracket Pattern** to each bracket and round one edge as shown in Photo Q. Note the grain orientation; the rounded and the opposite square surfaces should be edge grain, not end grain.

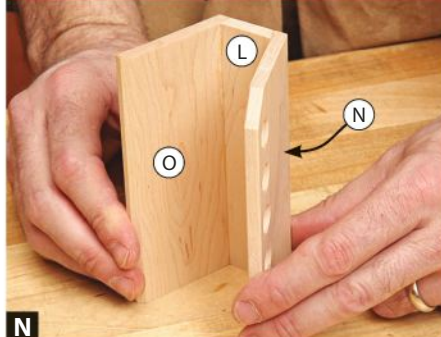
GLUE THE BACK TO THE BOTTOM



M

With the bucket bottom (O) resting on your bench, glue the bucket back (L) to its top face. Hold the pieces in place until the glue grabs.

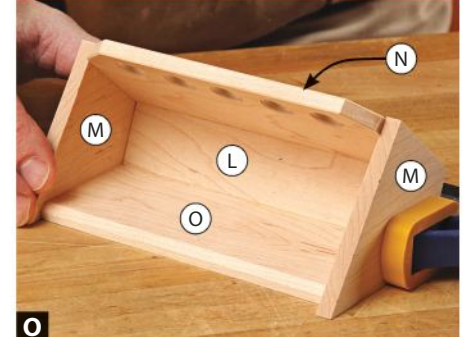
ADD THE BUCKET TOP



N

Stand the bucket back and bottom assembly (L/O) on end and glue the bucket top (N) in place, sandwiching the bucket back.

FINISH OFF THE BUCKET



O

Glue and clamp the bucket sides (M) in place and set the bucket aside to dry while you move on to making the arm assembly.

Put the scraper to work (issue 219, July 2013).



Load and spin with the skid loader (issue 211, May 2012).



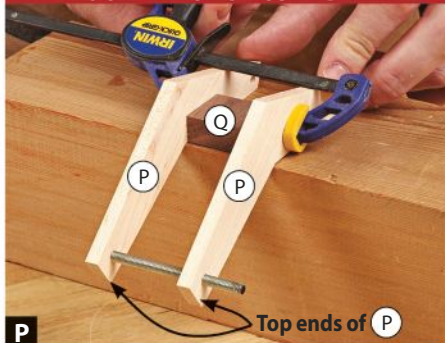
Rev up the motor grader (issue 208, November 2011).



The tractor pulls both the side-dump and lowboy trailers. (Find all three pieces in issue 205, July 2011.)



LIFT YOUR ARMS TO ASSEMBLE THEM



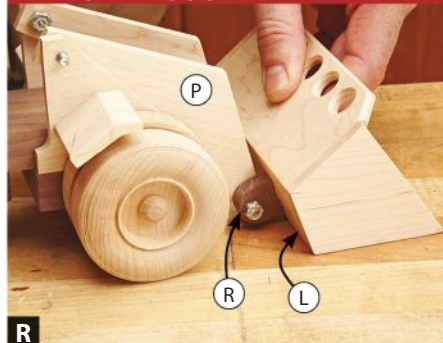
P To align the arms (P) and the arm spacer (Q) during glue-up, rest the pieces on a thick scrap. A length of threaded rod aligns the top ends of the arms.

GIVE SMALL PIECES A HANDLE



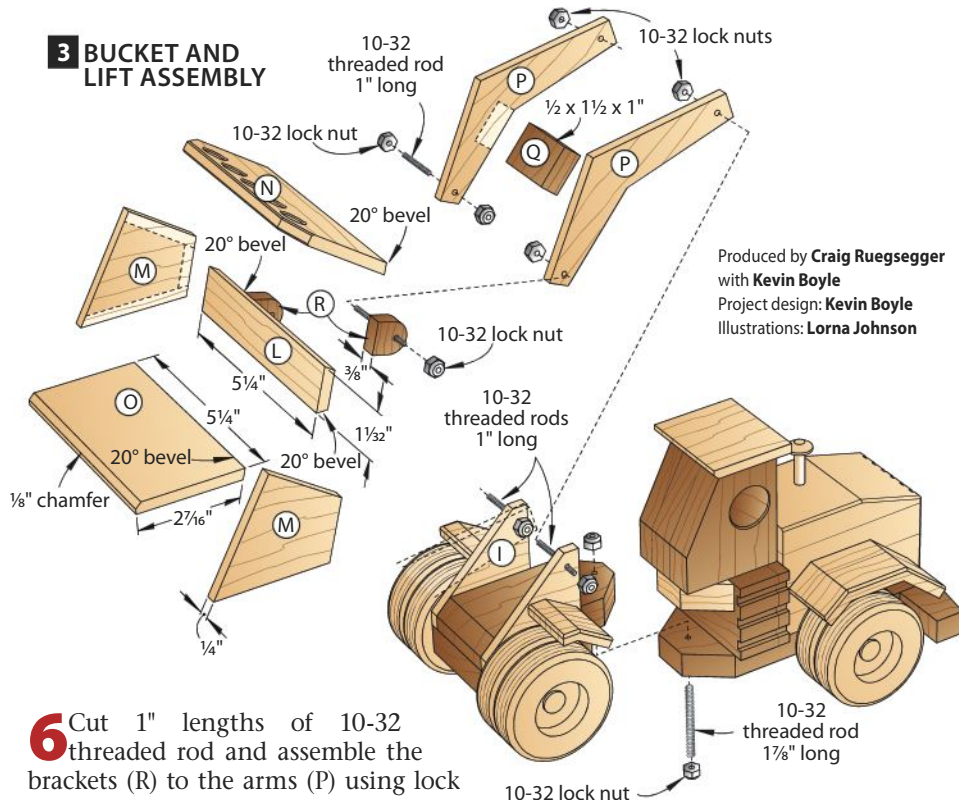
Q To create the radius on the brackets (R), glue each one to a scrap handle. After sanding up to the pattern line, cut the bracket free.

ATTACH THE BUCKET



R With the bucket and the ends of the brackets (R) resting on your bench, press and hold the bucket against the brackets.

3 BUCKET AND LIFT ASSEMBLY

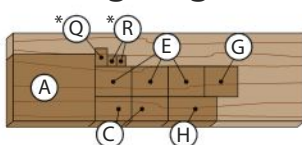


Produced by **Craig Rueggeger**
with **Kevin Boyle**
Project design: **Kevin Boyle**
Illustrations: **Lorna Johnson**

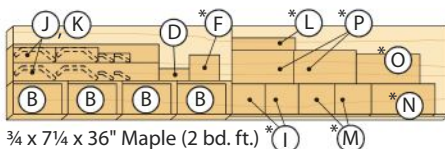
6 Cut 1" lengths of 10-32 threaded rod and assemble the brackets (R) to the arms (P) using lock nuts [Drawing 3]. Retrieve the bucket (L-O) and finish-sand it. Then apply glue to the square edges of the brackets and glue them to the bucket back (L) [Photo R]. Allow the glue to dry.

7 Glue the smokestack [Source] into the hole in the hood (B) [Drawing 1]. Remove the hardware and apply a finish. (We sprayed on three coats of satin aerosol lacquer.) Join the front and rear chassis with a 1 7/8" length of 10-32 threaded rod and lock nuts [Drawing 3]. Secure the wheels with axle pegs glued into the chassis (A, G) [Drawings 1 and 2], trapping the 3/8" washers. Finally, attach the bucket arms (P) to the arm braces (I) and brackets (R) with threaded rod and lock nuts [Drawing 3]. Your loader is ready to fill that truck! 🌲

Cutting Diagram



3/4 x 7 1/4 x 24" Walnut (1.3 bd. ft.)
*Plane or resaw to thicknesses listed in the Materials List.



Materials List

Part	FINISHED SIZE			Matl.	Qty.
	T	W	L		
Rear and front units					
A rear chassis	3/4"	5 1/2"	6 3/4"	W	1
B* hood	3"	2 1/2"	4"	LM	1
C steps	1 3/8"	2"	3"	LW	1
D cab support	3/4"	1"	2 1/2"	M	1
E cab	2"	2 1/2"	3"	LW	1
F roof	1/4"	2 1/2"	2 1/4"	M	1
G front chassis	3/4"	2 1/2"	2 3/4"	W	1
H pivot block	3/4"	2"	4"	W	1
I arm braces	1/4"	2 1/2"	2 3/4"	M	2
J rear fenders	1 1/2"	1 1/4"	3 1/2"	LM	2
K front fenders	1 1/2"	3/4"	1 1/16"	LM	2
Bucket and lift					
L bucket back	1/4"	1 1/2"	5 1/4"	M	1
M bucket sides	1/4"	2 1/2"	3"	M	2
N bucket top	1/4"	2 1/2"	5 1/4"	M	1
O bucket bottom	1/4"	2 7/16"	5 1/4"	M	1
P arms	1/4"	2 3/4"	5 1/8"	M	2
Q arm spacer	1/2"	1 1/2"	1"	W	1
R* brackets	3/8"	3/4"	3/4"	W	2

*Parts initially cut oversize. See the instructions.

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

Supplies: Double-faced tape, spray adhesive.

Bits: 3/16", 1/4", 1 1/32", 1/2", 1" drill bits; 1/8" round-over, 45° chamfer router bits.

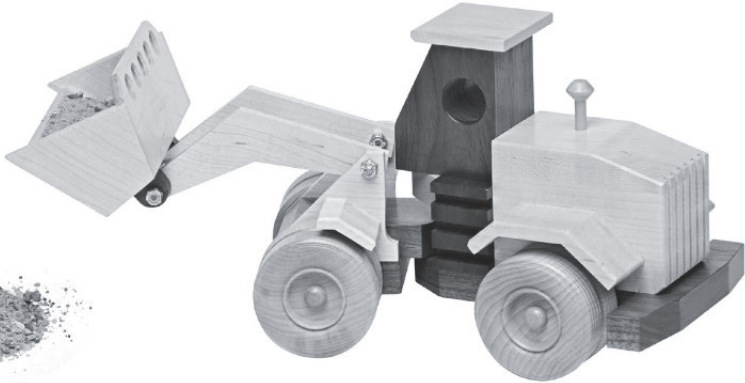
Source

Hardware kit: The kit contains all the specialty parts (wheels, axle pegs, and smokestack) and hardware (no lumber) needed to build one end loader. Order kit no. RS-00988, \$19.95+shipping, 888-636-4478, woodmagazine.com/loader.

More Resources

- ▶ Fellow WOOD® readers inspire creativity with toys of their own at woodmagazine.com/toygallery.
- ▶ Prefer slightly larger big-boy toys? Check out some 1/2-scale versions at woodmagazine.com/bigmodels.

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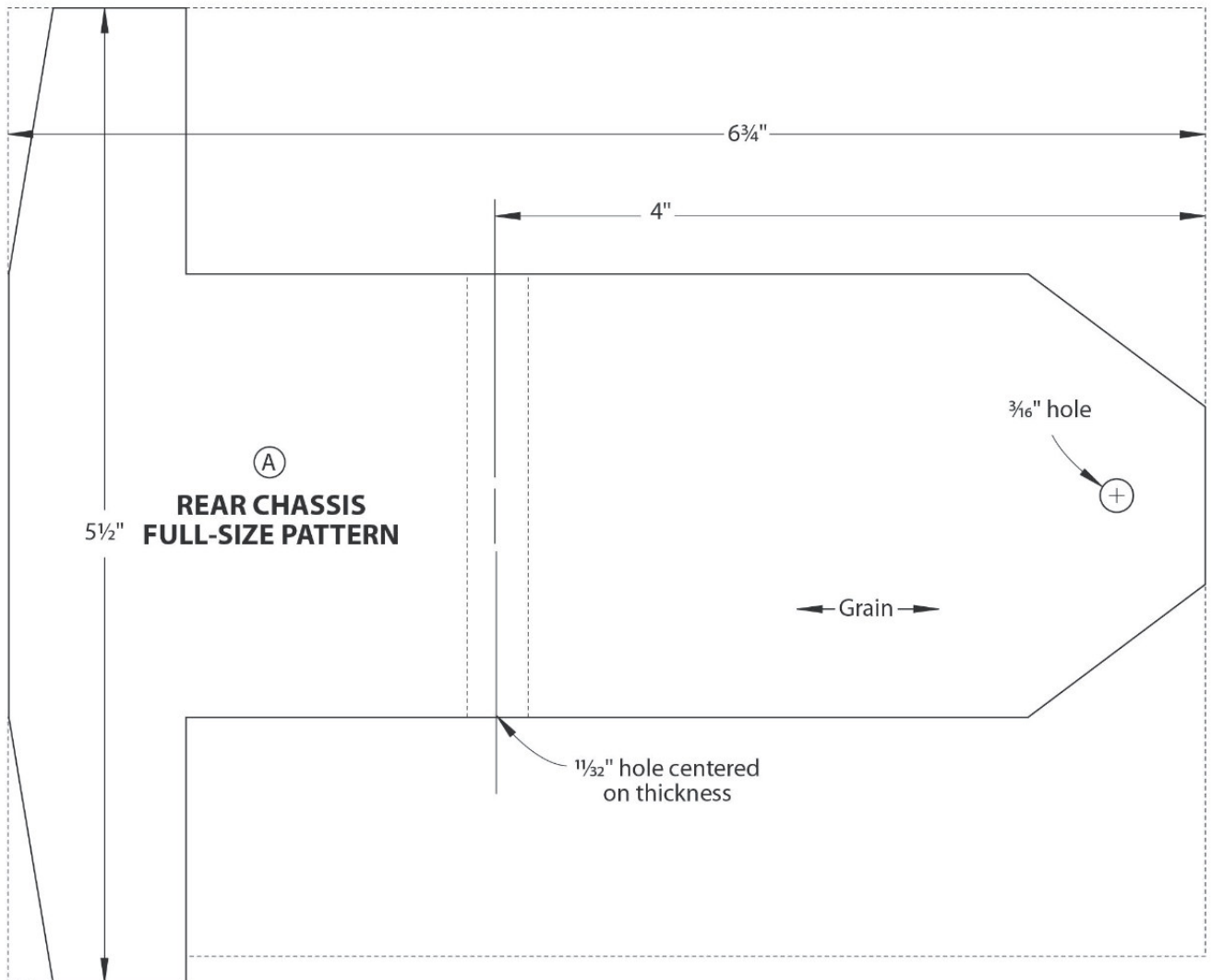
November 2013

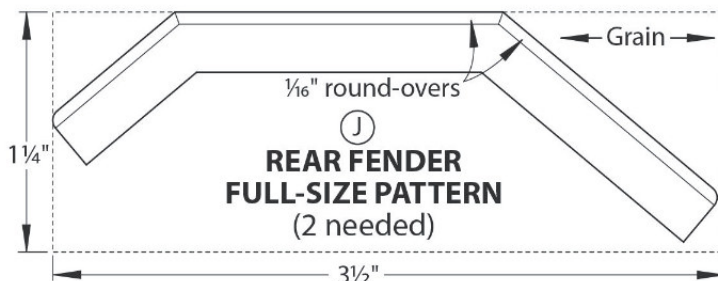
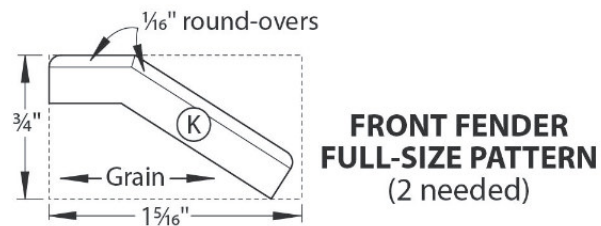
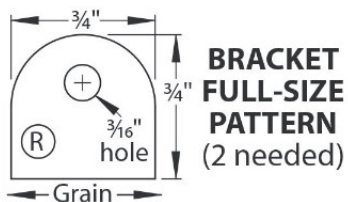
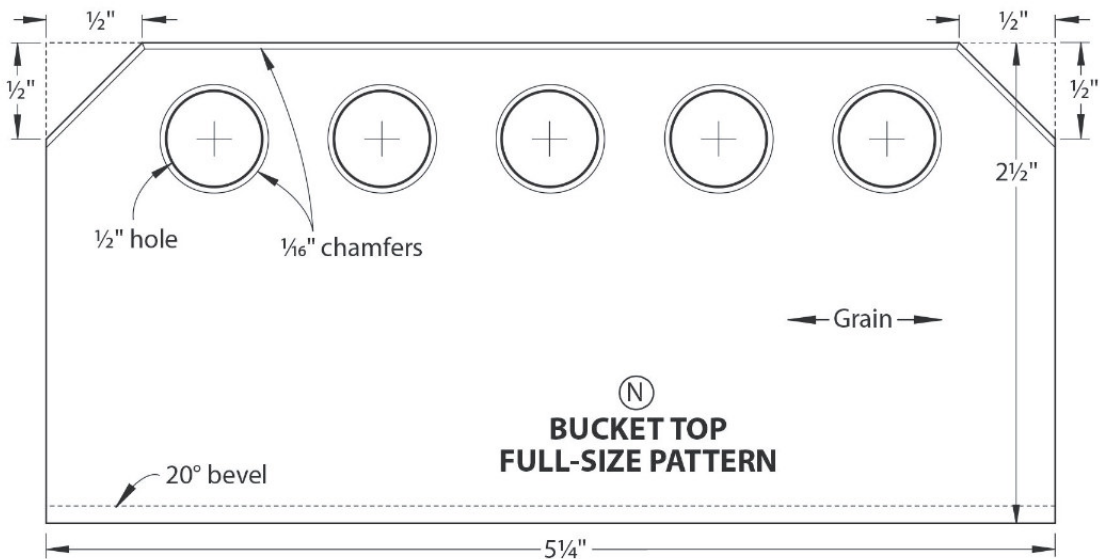
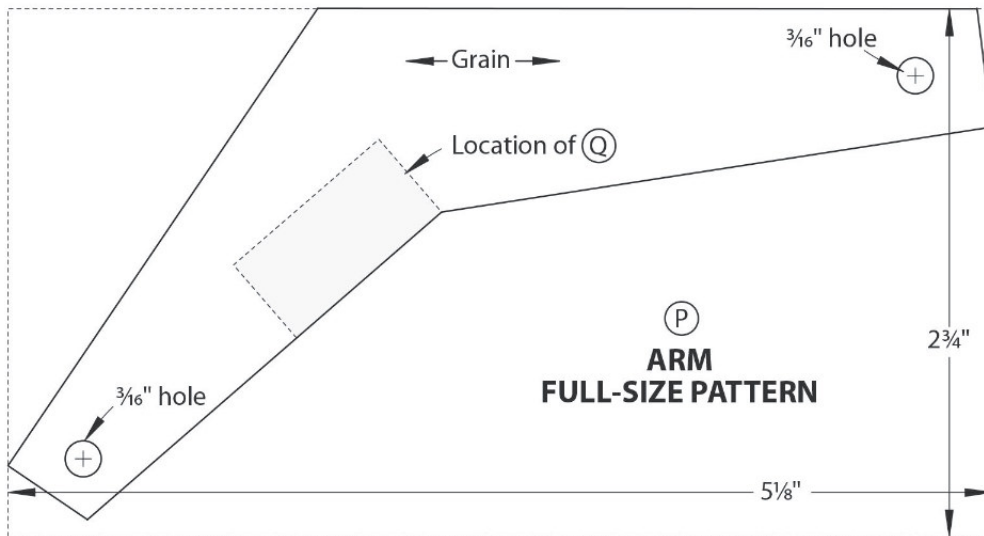
Issue 222

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.

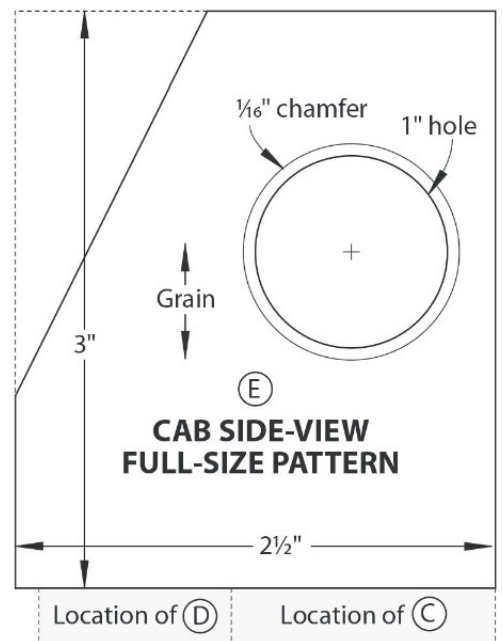
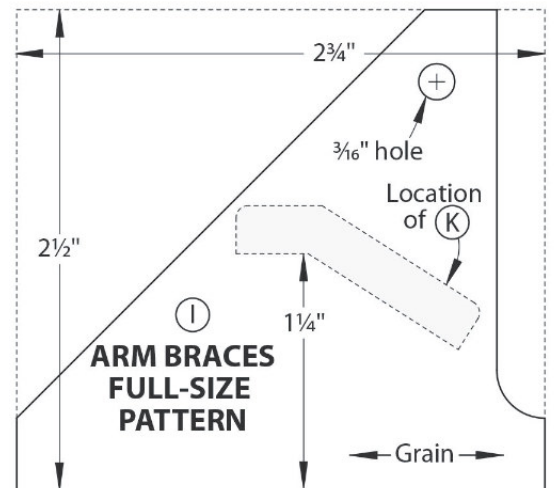
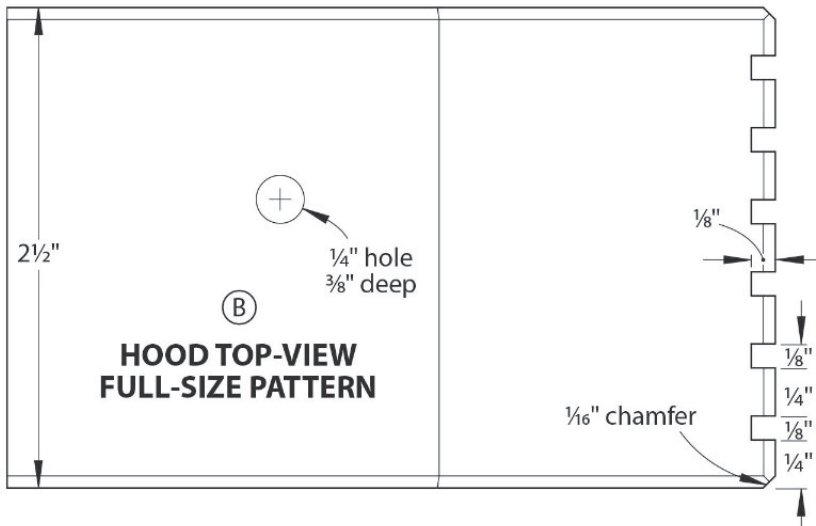
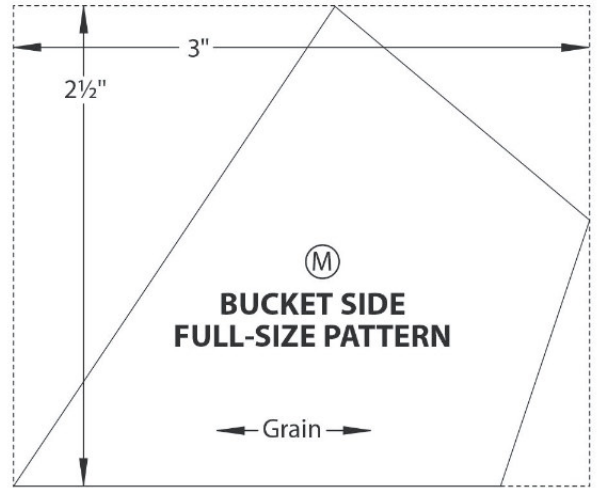
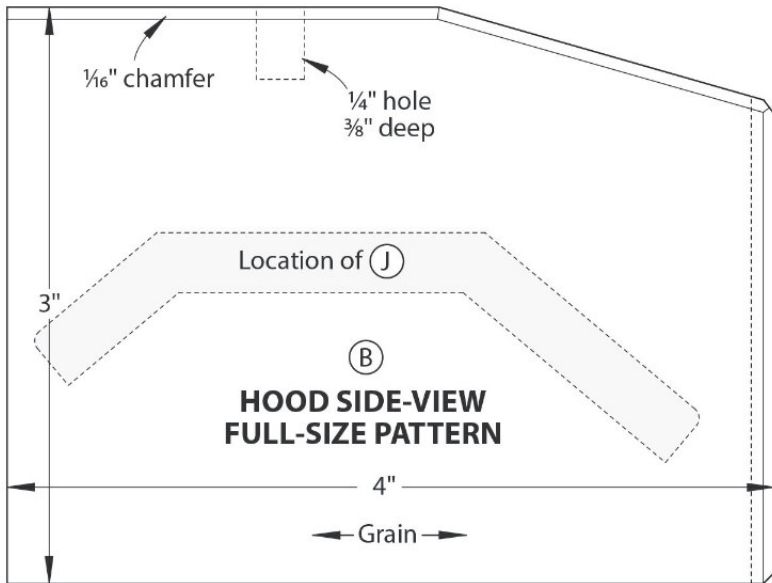
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Construction-grade Loader
Page 32

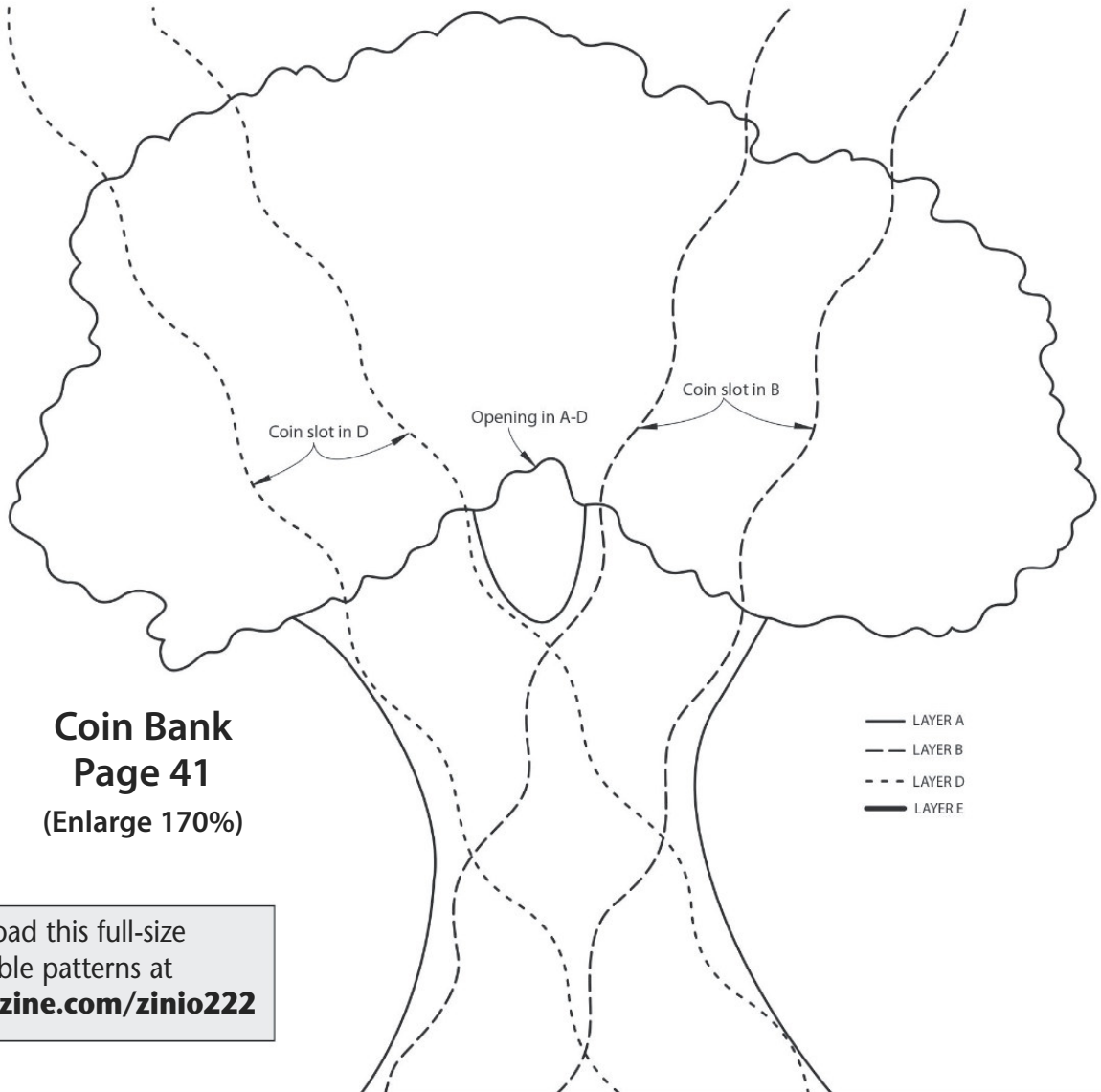




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**Coin Bank
Page 41**

(Enlarge 170%)

- LAYER A
- - LAYER B
- . . . LAYER D
- LAYER E

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The Prosperi-tree Coin Bank

Who says money doesn't grow on trees? Plant this coin bank in a fertile location and feed its roots often for a bountiful harvest.

I wanted to have fun with the "money tree" metaphor for this scrollsawn coin bank, so I decided to really push the design elements to reflect that. Coins rain through the leaves in unexpected paths to "water" the roots of the underground vault. And an easy scribing technique creates a three-dimensional "growing" effect from a single pattern. I think it makes saving fun and I hope you will too.

John Olson, Design Editor



Turn wood back into a tree

1 From $\frac{1}{8}$ " cherry plywood, cut four 11×11 " blanks for the front four tree layers (A–D). From $\frac{1}{4}$ " cherry plywood (or laminated $\frac{1}{8}$ " plywood), cut an 11×16 " blank for the back tree layer (E).

2 Make three photocopies of the full-size **Tree Pattern** on the **WOOD Patterns®** insert. Cut the root pattern

away from all the trees and discard all but one root pattern. Spray-adhere one tree pattern to an 11×11 " blank (A), aligning the base of the trunk with one end. Set the other patterns aside for now.

3 Using a #2 blade, scrollsaw the tree around the solid outline. Cut the leaf canopy away from the trunk. Cut out and discard the canopy opening.

Note: The first tree layer (A) is the only one where you'll cut the canopy away from the trunk. Separating them now makes it easier to avoid bleeding when you stain the trunk later.

4 Tape the canopy and trunk (A) back together, position the tree on the next 11×11 " blank (B), and use a small flat washer (ours was a $\#4 \times \frac{5}{16}$ " O.D. washer) to scribe a slightly larger tree shape onto the blank [Photo A]. Be sure

to scribe the canopy opening, too. Scrollsaw layer B, drilling a $\frac{1}{16}$ " blade-start hole to cut the canopy opening.

Quick Tip: Alternate the grain direction of the tree layers for an additional highlight to the tree canopy. A characteristic of wood grain called "chatoyance" causes variations in sheen as light reflects from the two different angles.

5 Retrieve one of the tree patterns, cut apart the pattern's right side including layer B's coin slot, and spray-adhere it to layer B [Photo B], positioning the smaller pattern evenly spaced within the larger tree layer. Scrollsaw only the coin slot from layer B. Then, tape layer B back together, coin-slot waste piece included. Repeat the enlarging and scrollsawing process for layers C and D in the remaining $\frac{1}{8}$ " blanks. Use the final tree pattern to cut the coin slot for layer D, and tape D back together.

6 Retrieve the root pattern and spray adhere it to the bottom of the $\frac{1}{4}$ " blank. Align layer D along the top edge of the root pattern, centered side to side, and use the washer to enlarge the tree a final time.

Note: The canopy opening will be too small to reduce a final time. Instead, position layer C in layer E's outline and trace the cutout without the washer. Drill blade start holes in layer E's root and canopy cutouts and scrollsaw layer E to shape. Remove the patterns from all pieces.

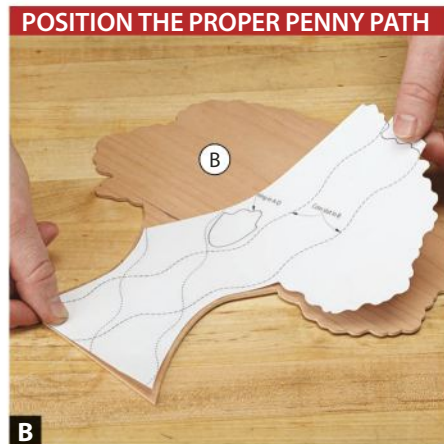
7 Carefully spread a thin layer of white glue (chosen because it dries clear) on the backs of the two pieces of layer D, keeping the glue about $\frac{1}{8}$ " away from the edges to prevent squeeze-out. Position and lightly clamp layer D to layer E using the coin-slot waste piece to aid in positioning [Drawing]. Discard the coin-slot waste piece and allow the glue to set. Then, repeat with layers C, B, and A and allow the glue to dry.

Give the branch office a vault

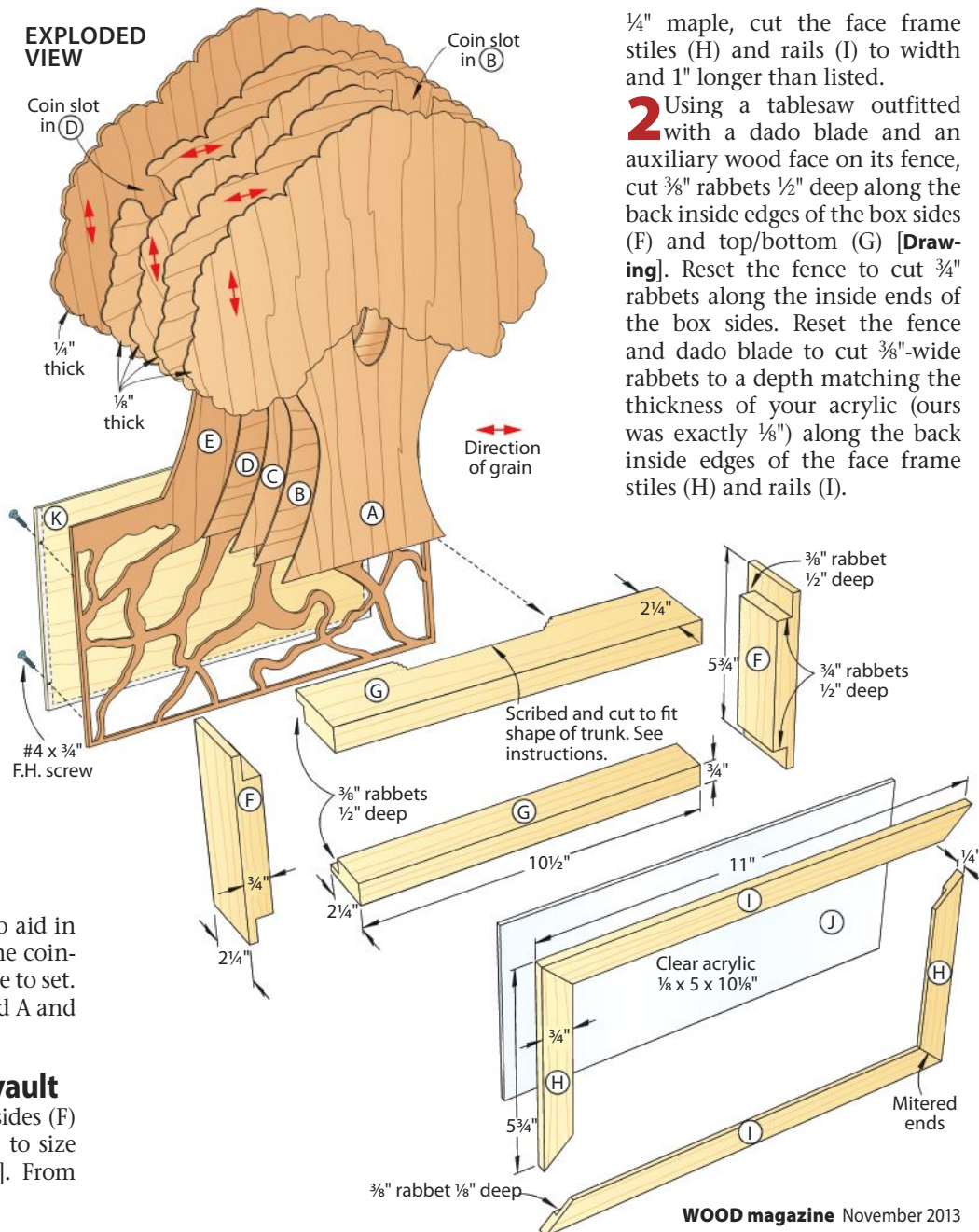
1 From $\frac{3}{4}$ " maple, cut the box sides (F) and box top and bottom (G) to size [Materials List, page 43, Drawing]. From



A Butt the pencil lead against the interior of a small washer and use it to trace the tree. The washer acts as a spacer, enlarging the tree's outline.



B As a precaution, use only the side of the pattern with the correct coin slot. This eliminates confusion and potentially wasted wood.



$\frac{1}{4}$ " maple, cut the face frame stiles (H) and rails (I) to width and 1" longer than listed.

2 Using a tablesaw outfitted with a dado blade and an auxiliary wood face on its fence, cut $\frac{3}{8}$ " rabbets $\frac{1}{2}$ " deep along the back inside edges of the box sides (F) and top/bottom (G) [Drawing]. Reset the fence to cut $\frac{3}{4}$ " rabbets along the inside ends of the box sides. Reset the fence and dado blade to cut $\frac{3}{8}$ "-wide rabbets to a depth matching the thickness of your acrylic (ours was exactly $\frac{1}{8}$ ") along the back inside edges of the face frame stiles (H) and rails (I).

3 Adjust a compass so that the gap between the lead and the point is $\frac{1}{2}$ ". Lay the tree (A–E) face up on a work surface and hold the box top (G) in position, butted against the bottoms of the tree layers. Scribe the shape of the tree trunk onto the box top [Photo C]. Then, scrollsaw the opening in the box top and double check the fit, making any necessary adjustments. Glue and assemble the box top, bottom, and sides (F)

4 Miter-cut the face frame stiles (H) and rails (I) to fit the box (F/G). Glue, then clamp, the face frame together and allow the glue to dry. Measure the rabbeted opening in the back of the face frame and cut the viewing window (J) to fit from $\frac{1}{8}$ " clear acrylic. Glue the face frame (H/I) to

the front of the box, trapping the viewing window between the two.

5 Measure the rabbeted opening in the back of the box (F/G/H/I) and cut the backer board (K) to fit from $\frac{1}{4}$ " birch plywood. Drill countersunk screw holes in the backer board [Drawing].

Add a clear coat, then coins

1 Carefully stain the tree trunk and roots. We used General Finishes Antique Cherry oil-based stain. Allow the stain to dry.

Quick Tip: To prevent the stain from bleeding from the trunk to the canopy on layers B–E, make scoring cuts in the plywood veneer with a crafts knife, delineating the border between the two.

SHOP TIP

Install a screw security system

Quadruple the "security" on your coin bank and confound would-be burglars with a variety of screw-heads. By using one Phillips, one slotted, one Torx, and one square-drive screw to attach the backer board, designer John Olson ensured that not just any thief (or editor) with a screwdriver is getting into his spare change.

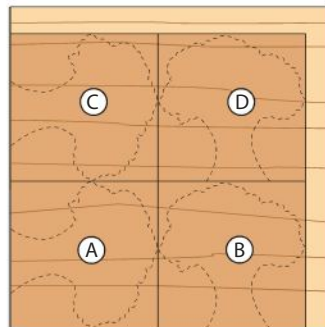


More Resources

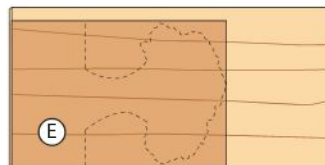
- ▶ Find 8 shop-tested scrollsaw tips at woodmagazine.com/8scrollsawtips.
- ▶ Shop for dozens of scrollsaw plans at woodmagazine.com/scrollsawplans.



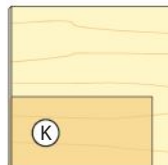
Cutting Diagram



$\frac{1}{8}$ x 24 x 24" Cherry plywood



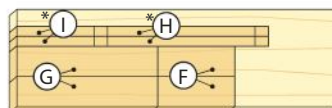
$\frac{1}{4}$ x 12 x 24" Cherry plywood



$\frac{1}{4}$ x 12 x 24" Birch plywood



$\frac{1}{8}$ x 6 x 12" Clear acrylic



$\frac{3}{4}$ x $7\frac{1}{4}$ x 24" Maple (1.3 bd. ft.)

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

SCRIBE A PERFECT FIT



Keep the compass point and lead aligned perpendicular to the worksurface as you move the point along the contours.

2 Mask off the acrylic viewing window (J) and apply a clear finish to all the parts. We sprayed three coats of satin aerosol lacquer, sanding to 320 grit between coats.

3 After the finish dries completely, assemble the box with screws (see Shop Tip, left), trapping the tree's roots between the box and the backer board. Now empty your pockets and watch your savings grow. 🌳

Produced by **Lucas Peters** and **John Olson**

Project design: **John Olson**

Illustrations: **Lorna Johnson**

Materials List

Part	FINISHED SIZE			Matl.	Qty.
	T	W	L		
A* layer A	$\frac{1}{8}$ "	11"	11"	CP	1
B* layer B	$\frac{1}{8}$ "	11"	11"	CP	1
C* layer C	$\frac{1}{8}$ "	11"	11"	CP	1
D* layer D	$\frac{1}{8}$ "	11"	11"	CP	1
E* layer E	$\frac{1}{4}$ "	11"	16"	CP	1
F box sides	$\frac{3}{4}$ "	2 $\frac{1}{4}$ "	5 $\frac{3}{4}$ "	M	2
G box top and bottom	$\frac{3}{4}$ "	2 $\frac{1}{4}$ "	10 $\frac{1}{2}$ "	M	2
H** face frame stiles	$\frac{1}{4}$ "	$\frac{3}{4}$ "	5 $\frac{3}{4}$ "	M	2
I** face frame rail	$\frac{1}{4}$ "	$\frac{3}{4}$ "	11"	M	2
J viewing window	$\frac{1}{8}$ "	5"	10 $\frac{1}{8}$ "	CA	1
K backer board	$\frac{1}{4}$ "	5 $\frac{1}{4}$ "	10 $\frac{1}{2}$ "	BP	1

*Part dimensions are for blanks to be scrollsawn.

**Parts initially cut oversize. See the instructions.

Materials key: CP—cherry plywood, M—maple, CA—clear acrylic, BP—birch plywood.

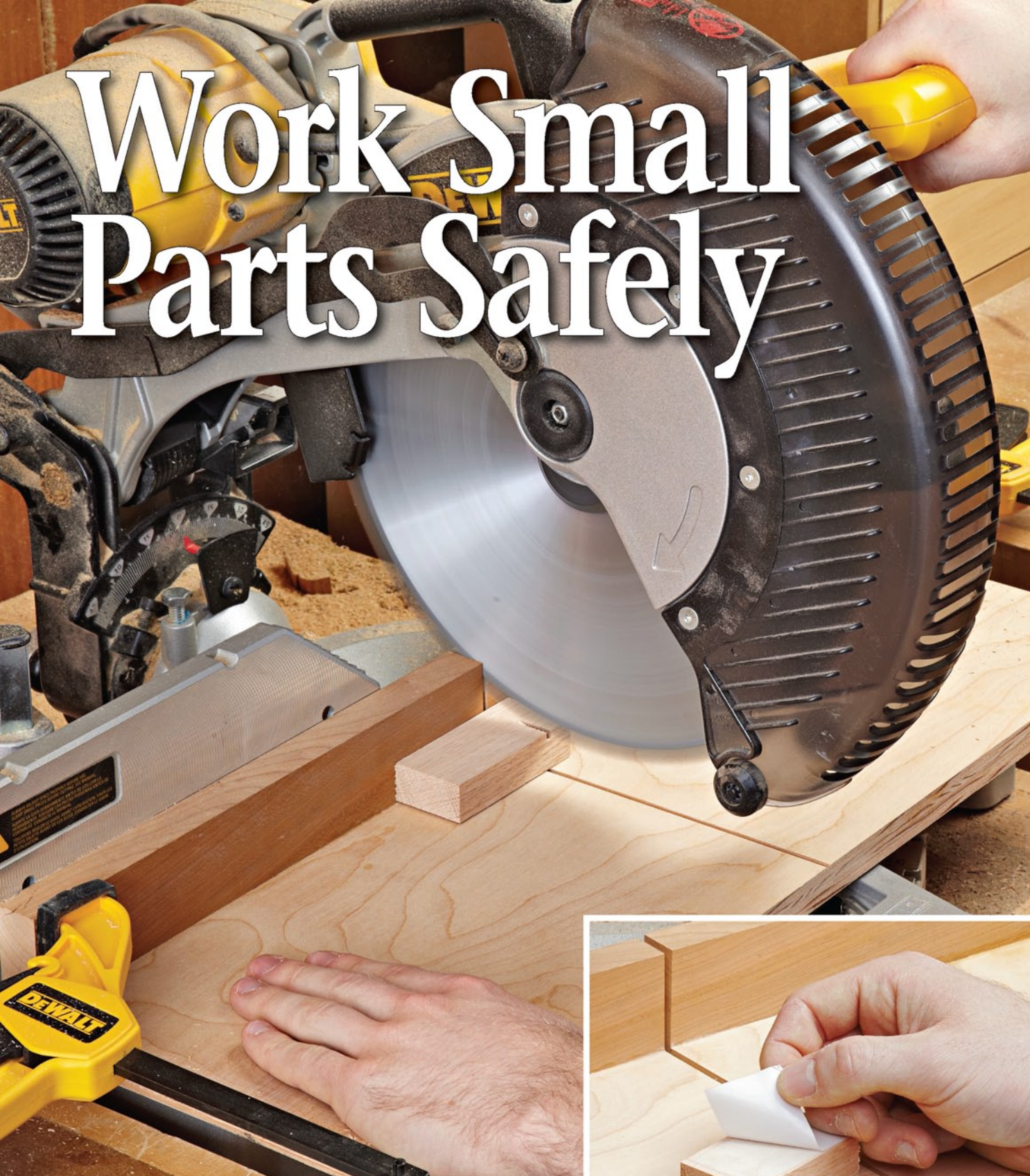
Supplies: Spray adhesive, #4x $\frac{3}{16}$ " O.D. flat washer (1), white glue, #4x $\frac{3}{4}$ " flathead screws (4).

Blades and bit: #2 scrollsaw blade, $\frac{1}{16}$ " drill bit, dado set.

Supplies on Demand

You can quickly and easily order supplies needed for this project at woodmagazine.com/treebank. Simply delete any supplies you already have on hand before checkout.

Work Small Parts Safely



This zero-clearance miter saw table supports small parts during crosscuts. Double-faced tape holds your workpiece in place.

When cutting and shaping petite pieces, regardless of what tool you use, one universal rule applies: Keep your fingers a safe distance from the machine's cutting edges. Not only will your digits thank you, you'll also improve accuracy by better controlling your workpiece during the cut. Here's how.

Complete close cuts

The force a big blade applies to a small part can make the workpiece difficult to control. Regain command by adding accessories that grip the workpiece firmly—such as the zero-clearance mitersaw table *on the previous page*—while your hands remain a safe distance from the blade. By gluing a hard-

wood scrap to a piece of plywood, you create a platform that closes the gaps in both the fence and the table, preventing a workpiece or offcut from falling into them. The tablesaw sled *on page 30* provides the same benefits. Here are some other solutions for cutting narrow, short, and thin stock safely.

SMALL-PIECE JOINTER UNPLUGGED



Clamp a hand plane and a rabbeted scrapwood fence into your bench vise to square up a tiny piece or remove a thin layer of material.

SLICE SMALL AND THIN PIECES SAFELY



Cut multiple thin pieces without stopping to reset using this setup. Stick the blank to the carrier in front of the blade after each cut.

DOWEL-CUTTING CRADLE FOR BANDSAW



Build this carrier with the 2x4 extending just past the blade; then, run it through to cut it flush and provide a reference edge for aligning cutlines on the

Drill even diminutive parts

The drill press may not be as intimidating as a tablesaw or router, but can still be dangerous if the workpiece isn't properly secured. If the force securing the piece isn't as strong as

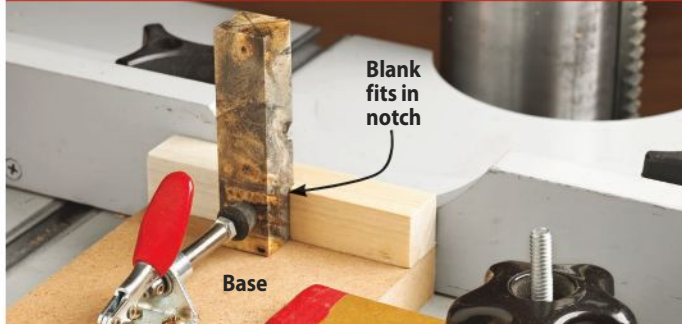
the torque from the spinning drill bit, the bit may grab the workpiece and rip it from your hands. Prevent that from happening with these techniques.

"FLATTEN" ROUNDED KNOBS WITH A STICKY NICHE



In scrap, drill a shallow hole, cover it with double-faced tape *above left*, and press the knob into the hole. Clamp the scrap beneath the bit and drill slowly.

NOTCHED JIG CAPTURES NARROW PARTS



Notch a scrap to fit your workpiece, glue the scrap to a base, and mount an in-line clamp to hold the workpiece tightly in place.

"V" IS FOR "VICTORY" WHEN DRILLING



A V-shaped notch bandsawn into one jaw of a handscrew captures a dowel, keeping it from spinning during drilling.

Rout the runts

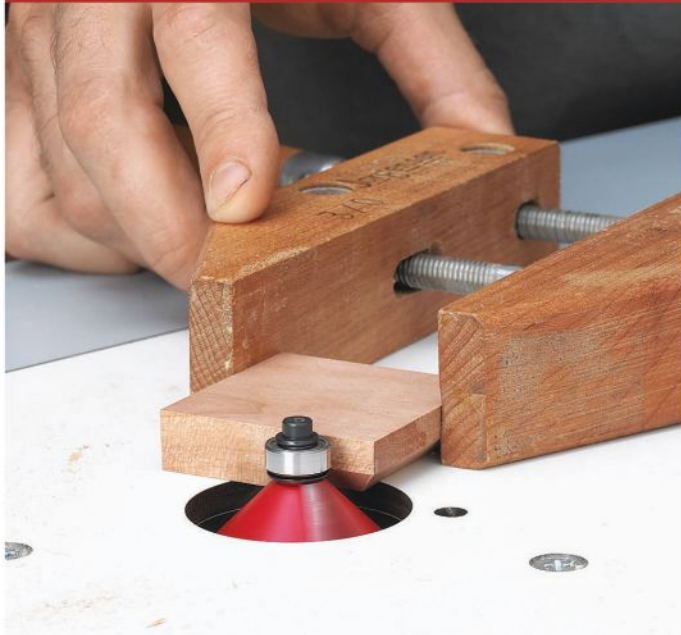
When adding an edge treatment to a small workpiece, keep it from being flung across the shop with these simple tricks.

ROUT FIRST, AND THEN RIP



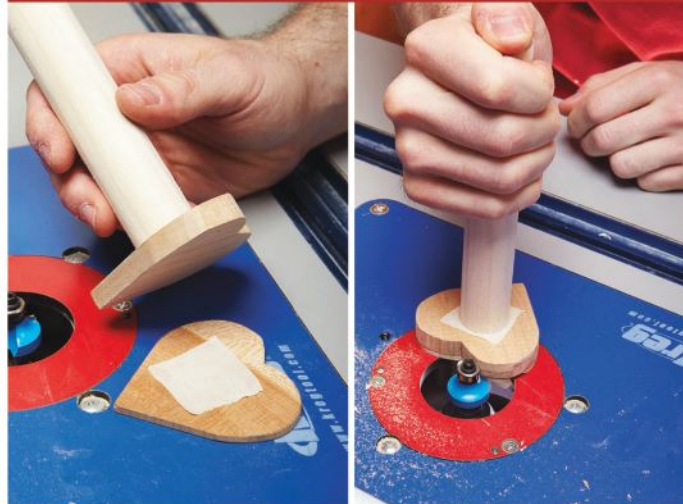
To make narrow moldings, rout a profile on a wide and stable blank; then, rip away the molding. For multiples, rout both edges before ripping.

HANDSCREW PROTECTS YOUR HANDS



Clamp square or rectangular parts into a handscrew, flat against the router table's top. The handscrew's wood jaws won't cause damage if they touch the bit.

EMPLOY A TEMP TO GET A GRIP



For thin workpieces, an extra layer of wood adds thickness to reach the router bit's bearing. Tape on a jobber stick to help control the workpiece.



When routing narrow or irregular-shaped pieces, hot-glue on a scrapwood extension, and, after routing, cut it away.

TAKE THIS PART AND STICK IT



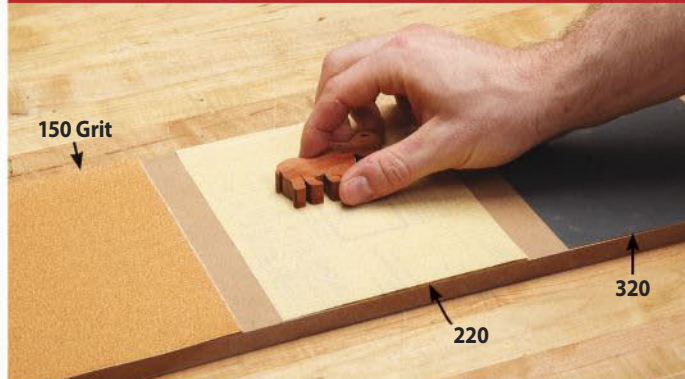
Don't have a router table? Tape the workpiece to a benchtop before routing. A trim router provides better visibility and control when working small pieces.

Sand on a small scale

Most power sanders have broad abrasive surfaces better suited to working with large workpieces, so using these tools to sand small parts safely presents a challenge. Try these easy-to-build

scrapwood jigs and sanding tricks better suited for use with small workpieces to keep edges crisp and parts intact without risk to your fingertips. 🌲

HAND-SAND FOR PREDICTABLE RESULTS



Spray adhere sheets of sandpaper—of progressively finer grits—to a scrap of flat sheet goods. Hand-sand the workpiece through the grit sequence.

PUT YOUR SMALL PIECE INTO ORBIT



For faster stock removal, adhere the workpiece to a random-orbit sander pad with double-faced tape. A touch on each grit sands it to finish-ready.

SAND EVENLY WITH A SCRAP CARRIER



To keep the edges of your small parts square, tape the workpiece to a carrier with scraps of equal thickness on either side and place it on your belt sander.

A FAIR IDEA: WORKPIECE ON A STICK



A thin piece of scrap flexes enough to apply pressure to the taped-on workpiece while keeping your hand a safe distance from the abrasive.

DRILL AND DROP FOR MORE CONTROL



To keep small parts from flying off your belt sander, drill a hole the size of your workpiece in $\frac{1}{4}$ " scrap. Rest the sled against the sander's fence during use.

More Resources

- ▶ Double-check your shop safety with the small-shop safety checklist at woodmagazine.com/shopsafety.
- ▶ Learn a slick trick for ripping thin strips at woodmagazine.com/thinstrips.



Curvaceous Keepsake Box

An elegant treasure as easy to build as it is breathtaking to behold



Dimensions: 11½" W × 7½"D × 3"H

Splines have been used for centuries to increase the strength of miter joints. The long-grain-to-long-grain contact between the splines and box sides provides a far stronger glue bond than the end grain of a miter joint. For this box, I played up the decorative element of the splines, using wenge because it contrasts nicely against the lighter cherry of the box. (Find sources for the wenge and the spalted maple used for the lid on *page 57*.) If you've never tried splined miter joints before, don't worry—a super-simple tablesaw jig makes cutting the spline slots quite easy.

Kevin

Kevin Boyle, Senior Design Editor



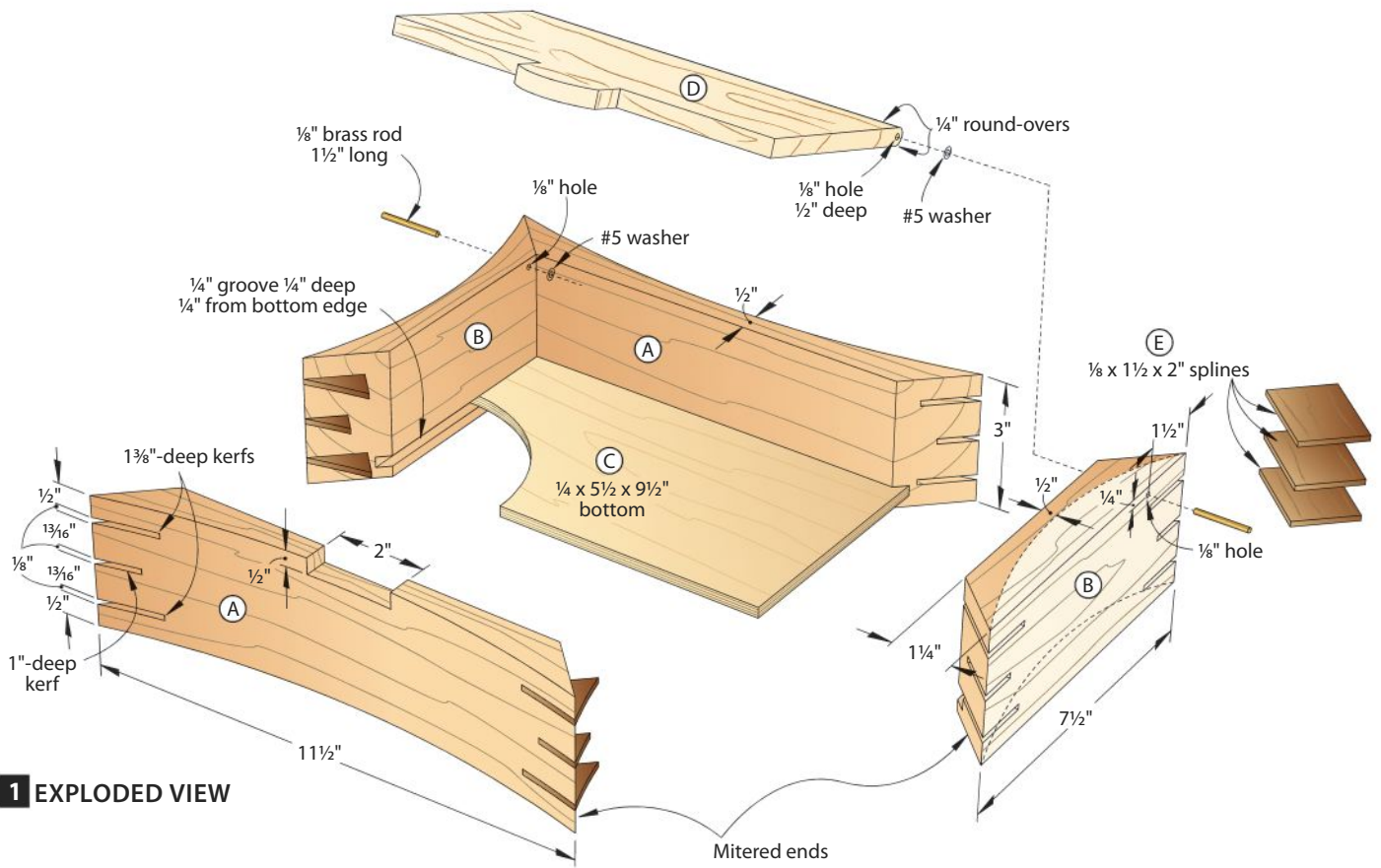
Cut and assemble the box

1 From 1¼" cherry, cut two 3×20½" blanks for the front/back (A) and sides (B). Cut a groove to fit the thickness of the plywood bottom (C) ¼" deep and ¼" from the bottom edge of the two blanks [**Drawing 1**].

2 From one blank, cut the front (A) and one side (B) to finished length [**Materials List**], mitering their ends at 45°. Likewise, miter-cut the back (A) and other side from the remaining blank; then cut the 2"-wide notch centered along the top of the front [**Drawing 1**].

3 Cut the plywood bottom (C) to size [**Materials List**]. Sand the inside faces of the front/back (A), sides (B), and bottom (C) to 150 grit.

4 Apply glue to the miters and in the ¼" grooves, then insert the bottom (C) into the grooves and assemble the box



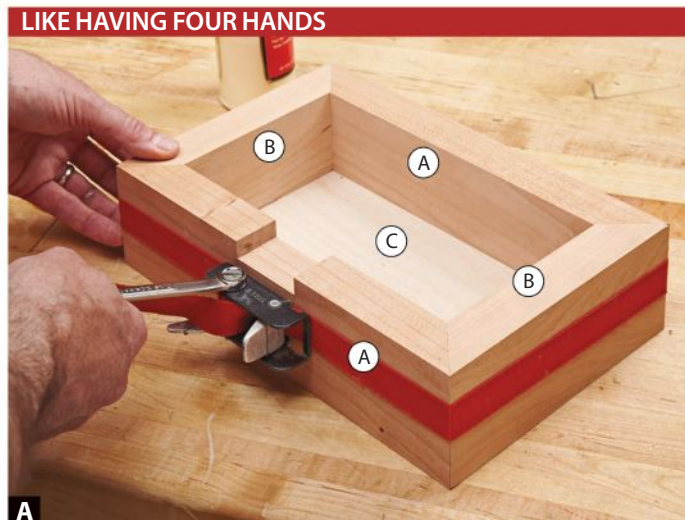
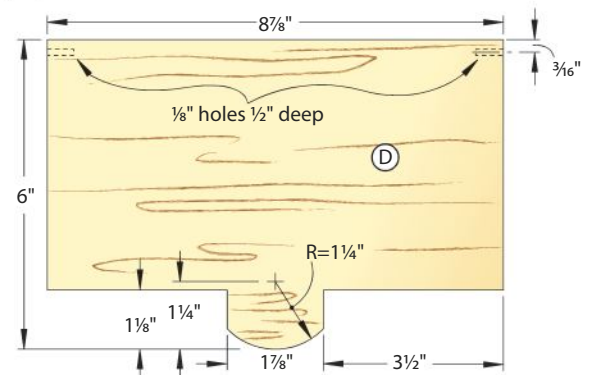
using a band clamp to hold the parts together [Photo A]. Check for square as you tighten the band clamp and place a bar clamp across the longest diagonal, if necessary, to tweak the box into square.

5 After the glue dries, mark the two hinge-pin locations in the sides (B) [Drawing 1]. Then use a drill press and 1/8" bit to drill the holes [Photo B].

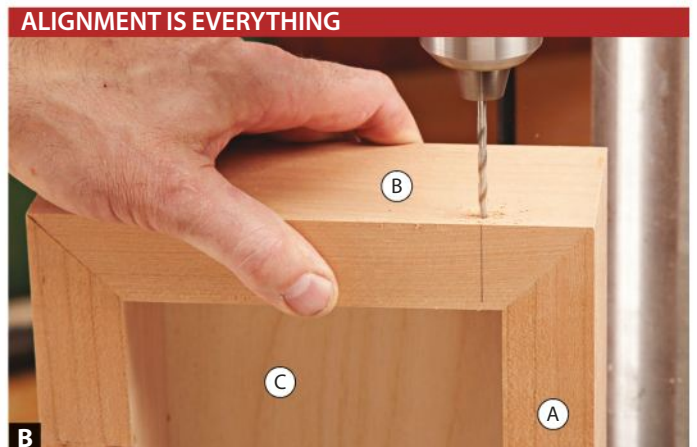
Make and install the lid

1 To select the best grain for the lid (D) from the spalted maple, cut a cardboard mask with inner dimensions matching the lid size [Drawing 1a]. Move it around the stock

1a LID (Top view)



A band clamp consists of a ratcheting mechanism that tightens a strap of webbing, applying even clamping pressure all around the box.



Mark the hinge-pin locations with a fine-point pencil for accurate bit placement. If you don't have a drill press, a drill guide will work.

GRAIN, GRAIN EVERYWHERE



C When choosing the right grain from a large piece of decorative or exotic stock, a cardboard mask helps your eyes see the smaller picture.

until you find what you like [Photo C]. Mark around the inside of the mask; then, crosscut the lid to finished length and rip it just over finished width.

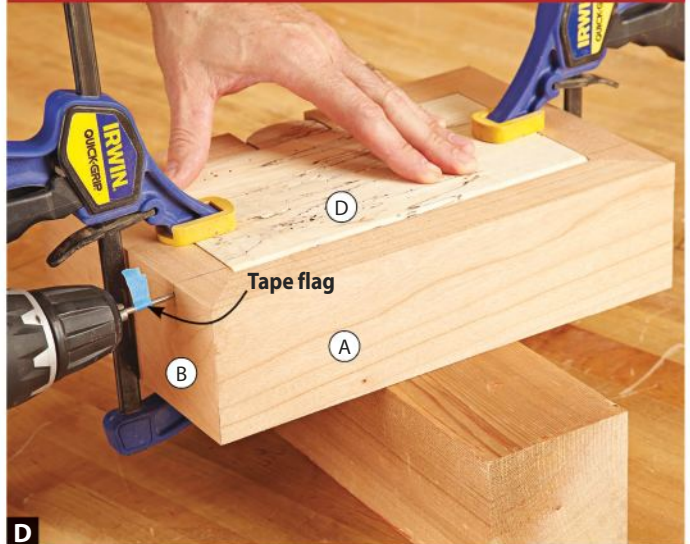
2 Lay out the shape of the handle on the lid (D) [Drawing 1a]; then, bandsaw and sand the lid to finished shape.

3 Using a router table outfitted with a 1/4" round-over bit, form a bullnose on the back edge of the lid (D) [Drawing 1].

4 Make two 2"-tall spacer blocks and place them inside the box against the sides (B). Center the lid (D) in its opening—allow an equal reveal between the lid and the sides and a 1/16"-wide reveal between the back edge of the lid and the back (A); then clamp the lid in place.

5 Using the holes you previously drilled in the sides (B) as guides, drill two 1/8" holes 1/2" deep that will serve as hinge points in the lid [Photo D]. Save the spacer blocks for use later.

KEEP THE LID ALIGNED



D Clamp the lid (D) in place to prevent it from shifting when you drill the holes for the hinge pins. Note the tape on the bit that serves as a depth gauge.

Kerf, cut, and complete

1 Lay out on the box the locations of the 1/8"-wide kerfs for the decorative corner splines [Drawing 1]. Then build a jig to hold the box while cutting kerfs for the splines. (See **How to build a kerfing jig**, below left.) Draw 1" and 1 3/8" depth reference lines on one corner of the bottom of the box to help set the tablesaw blade height [Photo E]. Cut the two outer kerfs 1 3/8" deep in each corner first [Photo F]; then lower the blade and cut the center 1"-deep kerf. See the **Shop Tip**, below, to ensure flat-bottomed kerfs.

2 Use a fairing stick [More Resources] to lay out the curves on the top edges of the front/back (A) and the sides (B) [Photo G, Drawing 1]. Don't cut the curves yet.

SHOP TIP

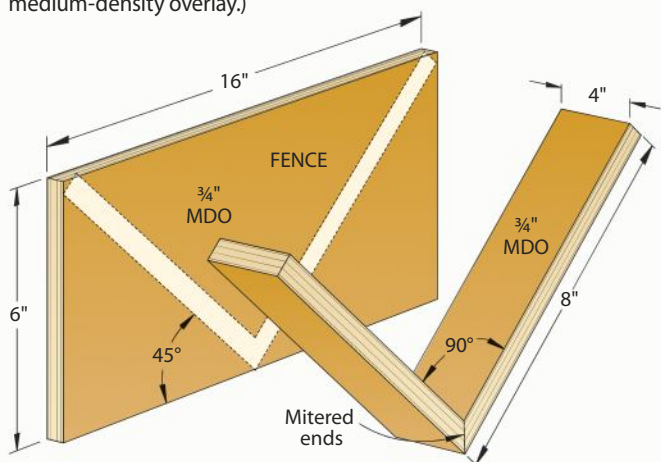
Flatten kerfs for fine-fitting splines

If you cut kerfs using an alternating top bevel (ATB) blade, V-shaped notches will show at the bottom of the kerfs. To fix this problem, cut a piece of scrap slightly thinner than the kerf. Place its edge down on adhesive-backed sandpaper and cut a strip the same width as the scrap. Use this sanding block to flatten the kerf bottoms.

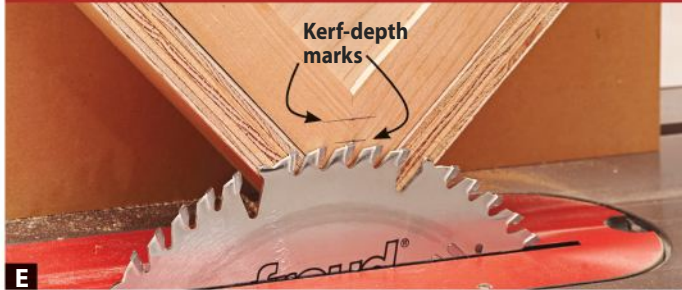


How to build a kerfing jig

This simple jig cradles the box while carrying it over the blade. Build it from three pieces of glued-together 3/4" sheet goods. (We used medium-density overlay.)

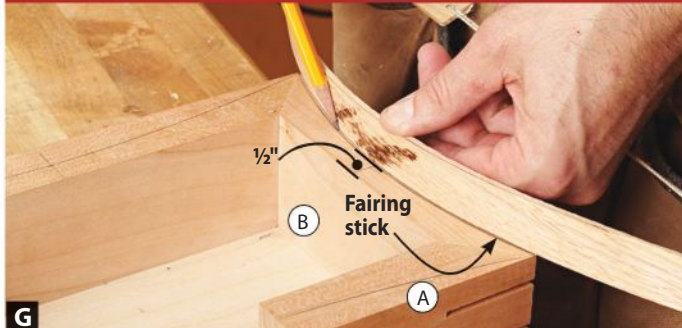


SET THE BLADE TO MATCH THE MARKS



E Place the kerfing jig in position between the table saw's fence and blade, set the box in the jig, and raise the blade to a kerf-depth mark.

TRACE THE CURVES



G When laying out the curves, create a profile that begins at each corner and leaves $\frac{1}{2}$ " of material at the center of the curve.

WATCH OUT FOR THE BLADE



F When using the kerfing jig, keep your hands high on the box to avoid the blade. Apply steady pressure both down and forward.

CUT THE CURVES AND SPLINES



H Work slowly as you feed the box into the bandsaw blade. Pushing too fast leaves a rougher surface and causes the blade to deflect.

3 Plane or resaw wenge slightly thicker than the width of the kerfs in the corners. Cut the splines (E) to size [Materials List], sand them to fit the kerfs, and glue them in place, making sure they seat on the kerf bottoms. After the glue dries, bandsaw and sand the box to shape [Photo H]. Finish-sand all box and lid surfaces that still need it with 220-grit abrasive.

4 To attach the lid (D) to the box, first cut two $1\frac{1}{2}$ "-long pieces of $\frac{1}{8}$ " brass rod (available at craft stores) for hinge pins and roughen them with 100-grit sandpaper. Set inside the box the two spacer blocks you previously used to align the lid, resting against each side (B). Insert the hinge pins into the sides so they slightly protrude on the inside; then place a #5 washer onto each of the pins on the inside of the box. Mix a very small amount of two-part epoxy, dribble it into the two hinge-pin holes in the lid, and carefully wipe away any excess. Set the lid in position on the spacer blocks and press the rods into place so they seat fully in the lid.

5 After the epoxy cures, cut the rods flush and sand their ends and any remaining rough areas of the box. Then apply a finish of your choice. (We wiped on three coats of penetrating oil, sanding lightly between coats with 400-grit abrasive.)

More Resources

- ▶ Learn how to make and use a fairing stick to lay out curves at woodmagazine.com/fairing.
- ▶ What in the world is spalted wood? Find out at woodmagazine.com/spalt.
- ▶ Shop for box plans in dozens of sizes and styles at woodmagazine.com/boxes.

Materials List

Part	FINISHED SIZE			Matl.	Qty.
	T	W	L		
A* front/back	$1\frac{1}{4}$ "	3"	$11\frac{1}{2}$ "	C	2
B* sides	$1\frac{1}{4}$ "	3"	$7\frac{1}{2}$ "	C	2
C bottom	$\frac{1}{4}$ "	$5\frac{1}{2}$ "	$9\frac{1}{2}$ "	BP	1
D* lid	$\frac{1}{2}$ "	6"	$8\frac{7}{8}$ "	SM	1
E splines	$\frac{1}{8}$ "	$1\frac{1}{2}$ "	2"	W	12

*Parts initially cut oversize. See the instructions.

Materials key: C—cherry, BP—birch plywood, SM—spalted maple, W—wenge.

Supplies: $\frac{1}{8}$ " x $1\frac{1}{2}$ " brass rod (2), #5 washers (2), two-part epoxy.

Blade and bits: $\frac{1}{4}$ " dado blade; $\frac{1}{4}$ " round-over router bit; $\frac{1}{8}$ " drill bit.

Sources

Wood: $\frac{1}{8}$ " wenge, Rockler, no. 16451, 800-223-4441, rockler.com; Spalted maple, Spirit of the Woods, 207-668-2163, spaltedmaplelumber.com, no. SEMPLK-3.

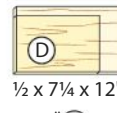
Cutting Diagram



$1\frac{1}{2}$ x $3\frac{1}{2}$ x 48" Cherry (2.7 bd. ft.) *Plane or resaw to the thicknesses listed in the Materials List.



$\frac{1}{4}$ x 12 x 12" Birch plywood



$\frac{1}{2}$ x $7\frac{1}{4}$ x 12" Spalted maple (.3 bd. ft.)



$\frac{1}{4}$ x $3\frac{1}{2}$ x 16" Wenge (.1 bd. ft.)

Written by **Mike Berger**
Produced by **Craig Rueggegger** with **Kevin Boyle**
Project design: **Kevin Boyle**
Illustrations: **Roxanne LeMoine; Lorna Johnson**

SHOP TESTED



12" Disc Sanders

These benchtop beasts bring both muscle and finesse to sanding chores.

When you need to quickly and precisely sand outside curves, or fine-tune miters and crosscuts, nothing beats a dedicated 12" disc sander. Its table accepts a miter gauge to deftly sand precise angles for joinery. Yet the heavy disc behind the abrasive makes it aggressive when you need to hog away waste quickly. We took six 12" disc sanders for a test spin, essentially all

benchtop machines (though one has an open-leg stand) and priced within reach of the home woodworker. Read on to learn how they fared.

Six important features to look for in a disc sander

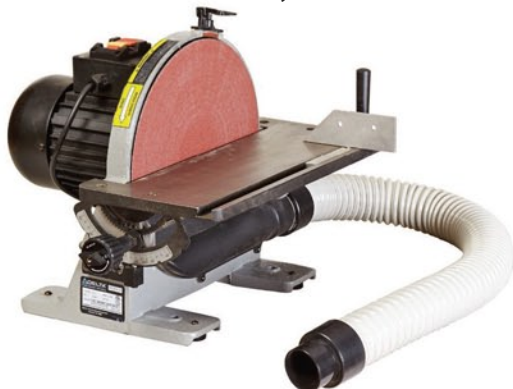
1. Ample power If you have a need for speed in completing your work, a sander must have the power to handle aggres-

sive stock removal without bogging down. To test this, we installed a new 80-grit Klingspor disc on each machine and sanded away 1/2" from the end of 6"-wide pine and oak boards with as much force as each sander could handle.

Of the four sanders with 1-hp-rated motors, the Grizzly G0702 and Jet JDS-120S demonstrated the most actual power in our testing. The 1/2-hp-rated

Delta 31-140, \$250

800-223-7278, deltamachinery.com



Grizzly G0702, \$415

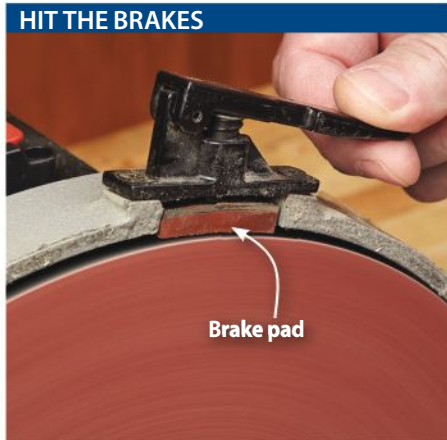
800-523-4777, grizzly.com



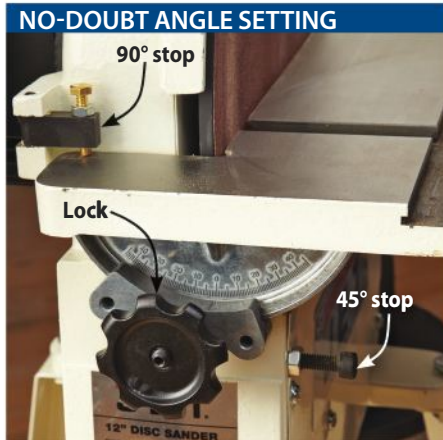
Grizzly G7297, \$170

800-523-4777, grizzly.com

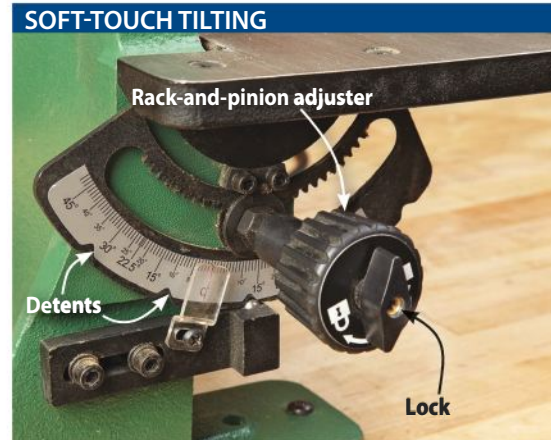




For sanders so equipped, push down on the brake lever to press the brake pad into the edge of the spinning platen to bring it to a stop quickly.



Adjustable stops on Jet's table ensure spot-on 45° and 90° angles to the disc (90° shown as 0° on the scale). Dual locks hold the table securely.



Ball-bearing detents (at 0°, 22.5°, and 45°) on the Rikon (shown) and Delta units engaged so subtly we had to visually double-check each adjustment.

motors on the nearly identical Delta 31-140 and Rikon 51-200 bogged down easily; backing off the stock-removal rate, though, allowed these two machines to sand capably.

2. A flat platen The *platen* is the metal disc that holds the abrasive. All six sanders' platens proved flat, ran with no runout (wobble), and delivered accurate results when sanding 45° miters and 90° crosscuts. (Although getting the tables and miter gauges to do that proved more

of a challenge. Read points 4 and 5 to learn why.)

Because the platens develop so much inertia when running, it's nice to have a brake to stop them rather than risk an injury or workpiece damage by letting them coast to a stop. (Without braking, the cast-iron and steel platens spin for more than two minutes before coasting to a stop; the aluminum platens, about 30–45 seconds.) The Grizzly G0702 has an automatic brake that stops its platen in three seconds; and the Delta, Jet, and Rikon units have manual brakes, shown *above left*.

3. Effective dust collection Because you make nothing but fine dust with these sanders, it's critical to have effective dust control. All six units, when hooked to a typical 12-gallon tub-style shop vacuum, did a superb job of evacuating dust. We give the Jet bonus points for having a fan-assist built into its dust shroud, and a 2-micron canister filter, *left*, that traps dust well without needing a vacuum.

4. A heavy, easy-tilt table A disc sander's table must resist vibration, tilt easily and accurately, and have a slot for registering a

miter gauge and other jigs. All but one tested sander have cast-iron tables that provide a solid surface and resist vibration during use. The Grizzly G7297's aluminum table vibrated steadily as the disc rotated. It did not affect sanding quality, but left our tester's arms tingling afterward. A large table, such as that on the Grizzly G0702, provides more support for large workpieces, but we found the smaller tables proved adequate for most jobs.

Tilting the table proved easiest on the Jet, and rock-solid 45° and 90° stops, shown *above center*, ensured quick, accurate results for the two most common settings. The Delta and Rikon units use a rack-and-pinion geared mechanism, shown *above*. The other tables use free-sliding adjustments with no positive stops and unreliable scales.

Only the tables on the Delta, Jet, and Rikon sanders have a standard $\frac{3}{8} \times \frac{3}{4}$ " miter slot, so you can use your tablesaw's miter gauge or build a jig with a store-bought miter bar. The Grizzly G0702 and Jet, shown *left* and on the *next page*, have intersecting (X-Y) miter slots that give you more workholding options.

Jet JDS-120S, \$560

800-274-6848, jettools.com



Rikon 51-200, \$240

877-884-5167, rikontools.com



Shop Fox W1828, \$256

800-840-8420, shopfox.biz



CRISSCROSSED MITER SLOTS TURN OUT PERFECT CIRCLES

5. Easy-to-use miter gauge To sand an angle accurately, you need something to hold the workpiece steady, and a miter gauge is the natural choice. Each machine comes with a miter gauge, shown *below right*, but, unfortunately, none of them have positive stops for common angles, such as 90° and 45°, and their scales proved unreliable. We found it best to set angles using a drafting triangle or reliable combination square rather than rely on the miter-gauge scale. And if we had one of the three sanders with a standard $\frac{3}{8} \times \frac{3}{4}$ " miter slot, we'd swap the included miter gauge for a more accurate aftermarket model or the one from our tablesaw, or build a jig for that purpose.

6. Easy sanding-disc changes Eventually, you'll wear out the sanding disc that came with the machine and need to replace it. (Learn how on the *next page*.) All the test models use pressure-sensitive adhesive (PSA) discs that stick onto the platen. We found it easiest to remove worn discs from the steel-platen Jet. Removing worn discs from Grizzly's cast-iron platen proved most pesky, with aluminum platens somewhere in between. You must remove a shield from the G0702 before changing discs, the only test model with this hiccup.



Pivot point



A miter slot perpendicular to the platen on the Jet lets you sand diameters up to 20" using the included pivot-point jig. Simply secure the jig in the slot with its two setscrews, center the rough-cut workpiece onto the pointed pin, and rotate it against the spinning disc to sand a perfect circle.

MINIMAL MITER GAUGES



The sanders we tested come with small miter gauges, ranging from toyish plastic ones to aluminum ones of varying usefulness.

THE STRAIGHT SPIN ON 12" DISC SANDERS

BRAND	MODEL	PERFORMANCE RATINGS (1)					PLATEN MATERIAL (2)	TYPE OF DISC BRAKE (3)	TABLE			OVERALL DIMENSIONS (WxDxH), INCHES	DUST-COLLECTION PORT DIAMETER, INCHES	STANDARD ACCESSORIES (4)	CORD LENGTH	WEIGHT, LBS	WARRANTY, YEARS	COUNTRY OF ASSEMBLY (5)	SELLING PRICE (6)	
		POWER	DUST COLLECTION	EASE OF ADJUSTING TABLE	QUALITY OF MITER GAUGE	EASE OF CHANGING DISCS			DIMENSIONS (DxW), INCHES	MATERIAL (2)	TILT RANGE, UP/DOWN, DEGREES									$\frac{3}{8} \times \frac{3}{4}$ " MITER SLOT? (YES/NO)
DELTA	31-140	B-	A-	B+	C	B	C	M	8 $\frac{3}{8}$ × 17 $\frac{1}{8}$	C	48/48	Y	19 $\frac{1}{4}$ × 17 $\frac{1}{4}$ × 15	2 $\frac{1}{4}$	D,H,M	6'10"	72	5	C	\$250
GRIZZLY	G0702	A	A-	B-	B-	B-	C	A	15 $\frac{1}{2}$ × 14 $\frac{3}{4}$	C	15/45	N	16 $\frac{1}{2}$ × 27 × 16	2 $\frac{1}{2}$	D,M	5'	84	1	T	415
	G7297	B	A-	C	C-	B+	A	N	8 $\frac{1}{4}$ × 17 $\frac{1}{8}$	A	45/45	N	17 $\frac{1}{8}$ × 17 $\frac{1}{2}$ × 14 $\frac{1}{2}$	2	D,M	5'6"	66	1	C	170
JET	JDS-120S	A	A	A	B+	A	S	M	12 $\frac{5}{8}$ × 16 $\frac{1}{2}$	C	15/45	Y	16 $\frac{3}{4}$ × 22 × 42	4	C,D,F,M,S	6'	100	5	T	560*
RIKON	51-200	B-	A-	B+	C	B	C	M	8 $\frac{3}{8}$ × 17 $\frac{1}{8}$	C	48/48	Y	19 $\frac{1}{4}$ × 17 $\frac{1}{4}$ × 15	2 $\frac{1}{4}$	D,M	6'10"	72	5	C	240
SHOP FOX	W1828	B	A-	C	C-	B+	A	N	7 × 15 $\frac{3}{4}$	C	45/45	N	19 $\frac{1}{2}$ × 16 $\frac{1}{4}$ × 14 $\frac{1}{2}$	2	D,M	6'	68	2	C	256

1. **A** Excellent 2. (A) Aluminum (C) Cast iron (S) Steel 3. (A) Automatic (M) Manual (N) No brake 4. (C) Circle-sanding jig (D) Sanding disc (F) Canister filter (H) Dust-collection hose (M) Miter gauge (S) Stand 5. (C) China (T) Taiwan 6. Prices current at time of article production and do not include shipping, where applicable. (*) Available without stand and filter for \$500 (model JDS-12B)

The top spinners

As you might expect, the higher-priced Jet JDS-12OS outperformed the other machines in many aspects: It earns our Top Tool award. This stand-mounted machine has power to spare, built-in dust collection, a user-friendly cast-iron table with X-Y miter slots, a circle-sanding jig, and the easiest abrasive changes of our test group. It also comes with a five-year warranty. But if the \$560 price tag proves too much for your wallet, you can buy the sander without stand and filter (model JDS-12B) for \$500.

Produced by **Bob Hunter** with **Bob Saunders**

More Resources

- ▶ Post your own review of these sanders and read reviews from other woodworkers at toolreviews.woodmagazine.com
- ▶ Sand perfect circles on your disc sander. Learn how at woodmagazine.com/circlesander
- ▶ Need to chamfer dowels? Your disc sander does that, too: woodmagazine.com/dowelchamfer

How to replace a PSA disc in four easy steps

Pressure-sensitive adhesive (PSA) discs develop a stronger bond with the sander's platen over time, so it can be frustrating replacing

a disc that's been in place for months (or, gulp, years). Follow these step-by-step instructions to take the hassle out of this sticky job.



1 Use a heat gun or blow dryer to soften the disc's adhesive through the abrasive. Then peel the disc away from the platen with a putty knife and your fingers while still applying heat.



2 With the disc removed, soften the remaining adhesive with a solvent, such as lacquer thinner, and scrape it off with a putty knife. Wipe the platen clean with more solvent.



3 Once the platen is clean and dry, peel back half the backing on a new disc and fold it over the other half. Insert the disc between the table and platen as shown, and press the top half in place.



4 Rotate the platen a half-turn, remove the remaining backer, and firmly press the disc to the platen. Rotate and press the disc securely in place. 🌱

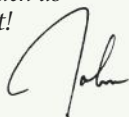
Sit 'n' Store Toy Box and Bench

Lift the lid to reveal ample space including five cubby drawers (and a bonus secret drawer).

Dimensions: 28½" W × 20½" D × 22½" H
Materials and hinges: \$93

My main goal with this design was to take the "box" out of "toy box." I wanted something unique without sacrificing simplicity. To achieve that, I incorporated a theme of contrasting elements: Curved ends contrast with angled drawers. The industrial feel of exposed-edge plywood contrasts with the polished brass hardware. The contrasting walnut drawer faces add a visual surprise upon opening the lid, while the secret drawer adds a literal one. I hope you enjoy building it as much as I did designing it!

John Olson,
Design Editor




Start with some box parts

1 Cut the box front (A), back (B), and blanks for the sides (C) to size [Materials List, page 59, Drawings 1 and 2]. Saw a 10° bevel on the bottom edge of the back and parallel 10° bevels on the top and bottom edges of the front. Rout ⅜" round-overs along the top edge of both faces of the back.

2 Lay out the tapered edges on the sides (C) [Drawing 2]. Use a ¼×¾×30" fairing stick to lay out the curved top [Photo A] on the sides and the feet details on the sides, front (A), and back (B). Cut the front, back, and sides to shape. Then, pair and clamp the parts to sand the curves smooth and uniform.

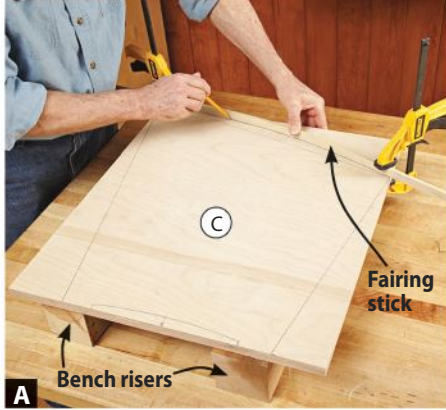
3 Cut the box lid (D) and caddy top (E) to size. Bevel the back edge of the



caddy top 10° and rout ⅜" round-overs on both faces of the front edge of the box lid [Drawings 1 and 3].

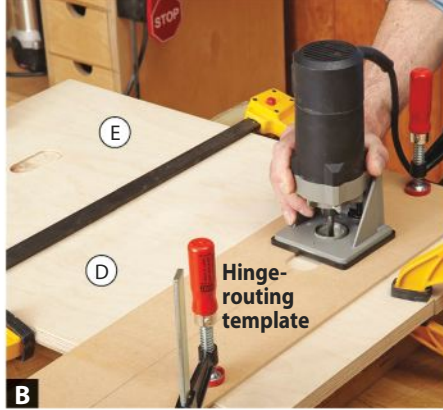
4 Arrange the box lid (D) and caddy top (E) on bench risers with the square-cut edges butted together and each end of the caddy top overhanging the ends of the box lid by ⅛". Clamp the parts to the risers, center the hinge barrels on the joint line, and mark the hinge locations [Drawing 1].

STICK TO THE CURVE



Clamp a fairing stick at the top front and back corners of each side (C) and pull the center to the midway point marked on Drawing 2. Trace along the stick.

ROUT THE HINGE MORTISES



Keep the hinge-routing template square to the mating edges of the box lid (D) and caddy top (E) and rout equal-sized mortises on both parts.

GIVE THE HINGE BARRELS SOME RELIEF



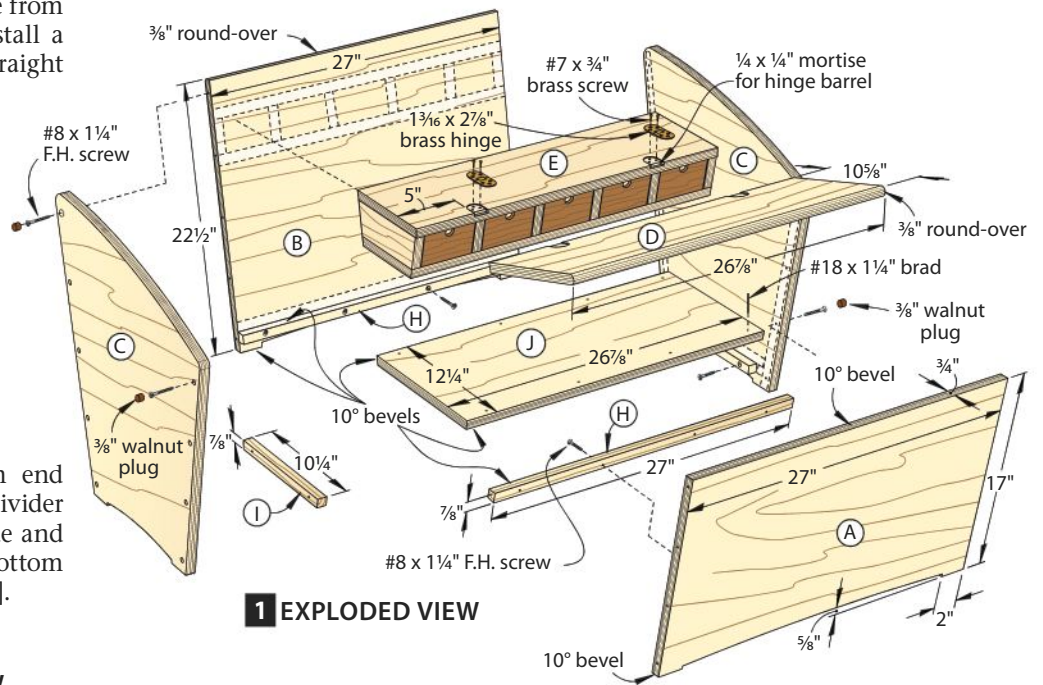
Chisel the edge of each mortise to accommodate the hinge barrel. Gauge the depth and width with the hinges you're using.

5 Make a hinge-routing template from $\frac{1}{4}$ " hardboard [Drawing 4]. Install a $\frac{7}{16}$ " O.D. guide bushing and $\frac{1}{4}$ " straight bit in your handheld router. Adjust the cutting depth to the thickness of the hinge leaf plus the template and rout the mortises [Photo B]. Cut barrel reliefs with a chisel [Photo C].

Assemble the drawer caddy

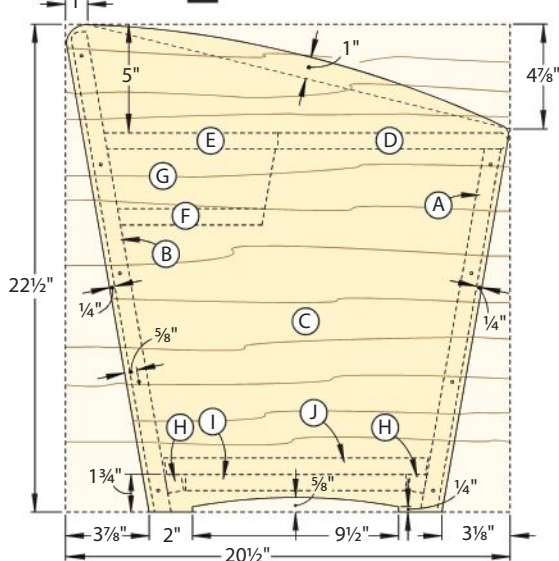
1 Cut the caddy bottom (F) to size. Bevel the front and back edges [Drawing 3].

2 Cut the dividers (G) to size with 10° miter cuts on each end making the top edge of each divider longer than the bottom edge. Glue and nail the dividers to the caddy bottom (F), starting at the ends [Drawing 3].

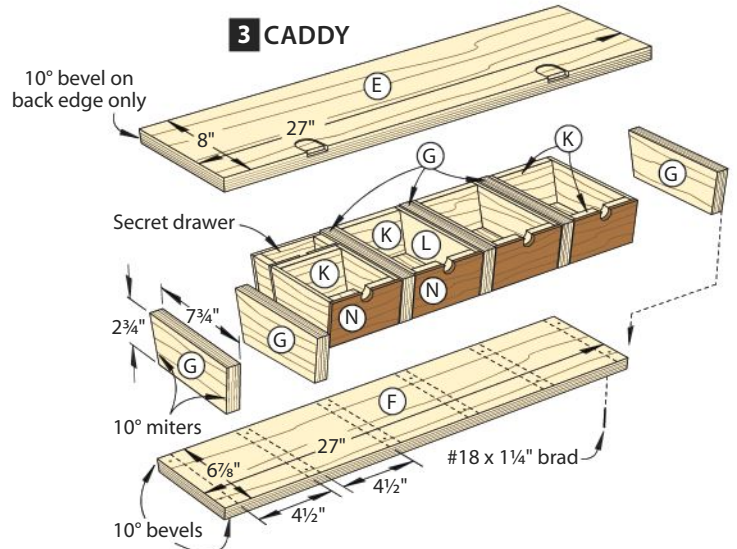


1 EXPLODED VIEW

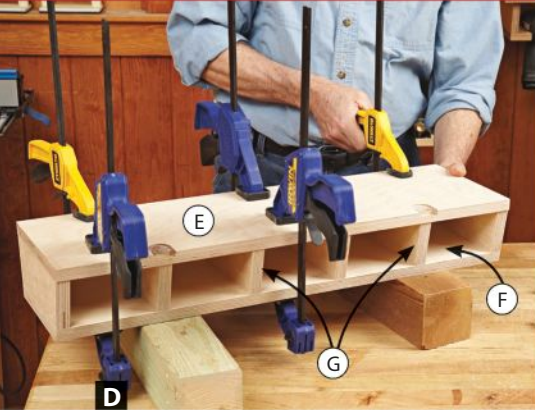
2 BOX SIDE VIEW



3 CADDY

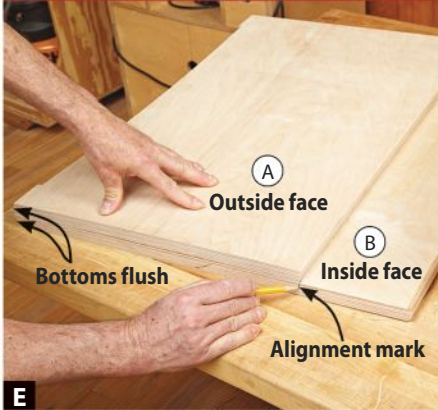


ATTACH THE CADDY TOP



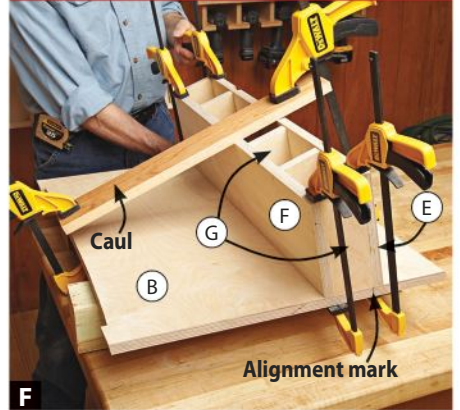
Glue and clamp the caddy top (E) to the assembled bottom and dividers, aligning it so it's flush at both ends and along the back ends of the dividers (G).

MARK THE FRONT HEIGHT ON THE BACK



With the inside face of the box back (B) and the outside face of the box front (A) up, mark each edge of the box back at the top of the box front.

JOIN THE CADDY TO THE BACK



Lay the box back (B) on bench risers to glue on the caddy (E/F/G). A piece of scrap stock serves as a caul to clamp the middle of the caddy.

3 Glue the caddy top (E) to the divider assembly (G) [Photo D].

4 Lay the box back (B) on your workbench. Then, place the box front (A) on it, with the edges and bottoms flush. Mark the top of the box front on both edges of the box back [Photo E].

5 Glue the caddy (E/F/G) to the box back (B), aligning the *bottom* surface of the caddy top (E) with the marks on the edges of the box back (B) [Photo F].

Build the box

1 Lay the box back/caddy assembly (B/E/F/G) on 1/4" spacers. With the

help of a squaring brace, glue and clamp one side (C) in position [Photo G]. Drill counterbores and countersink screw holes and drive #8x1 1/4" flathead screws. Repeat for the other side. Flip the assembly over and glue and screw the box front (A) in place, following the same procedure.

2 From scraps of 3/4" walnut stock, cut face-grain plugs for the counterbores and glue them in place. Trim the plugs flush; then, sand them smooth.

3 Cut the long cleats (H) and short cleats (I) to size, ripping a 10° bevel on the top edges of the long cleats. Glue and screw the cleats in place where shown in Drawings 1 and 2.

4 Cut the box bottom (J) to size, beveling the long edges [Drawing 1]. Apply glue to the top edges of the cleats (H, I) and lay the bottom in position. Secure it with brads.

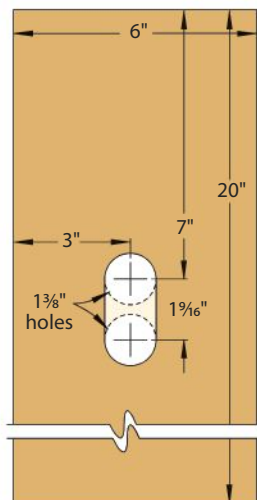
(L) to size [Drawings 5 and 6]. Trim two sides to 5 3/8" long to accommodate the secret drawer. Bevel the parts where shown [Drawing 6]. Assemble the fronts and backs (K) and sides (L) [Photo H].

2 Cut the drawer bottoms (M) 1/8" larger than shown [Materials List, Drawing 6] in each direction. Center the bottoms on the drawer assemblies (K/L) and glue and nail them in place. Sand the bottoms flush with the fronts, backs, and sides for a perfect fit.

3 Cut the false fronts (N) to size and glue one to the front of each drawer. (We made the false fronts of walnut for contrast with the birch plywood.)

4 Cut the secret-drawer front and back (O) and sides (P) to size [Drawing 7]. Make the bottom (Q) 1/8" oversize. Assemble the secret drawer and sand the bottom flush.

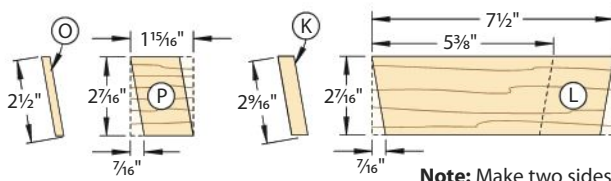
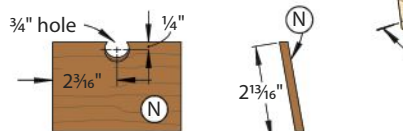
4 HINGE-ROUTING TEMPLATE



Add drawers to finish it up

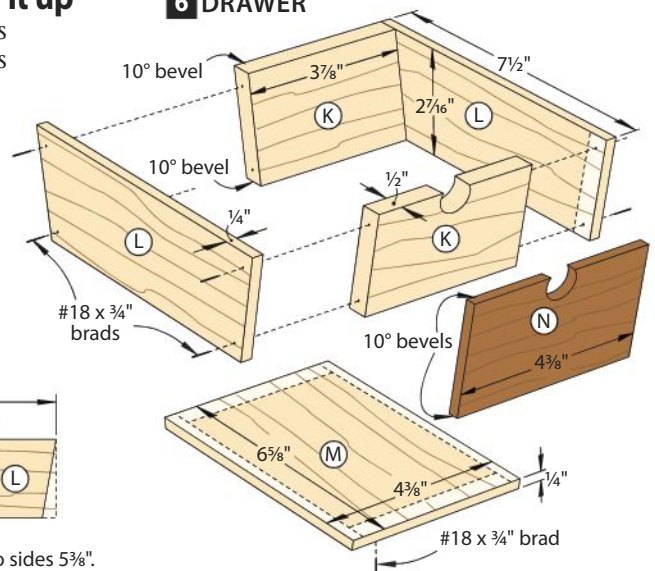
1 Cut the drawer fronts and backs (K) and sides

5 DRAWER PARTS VIEW

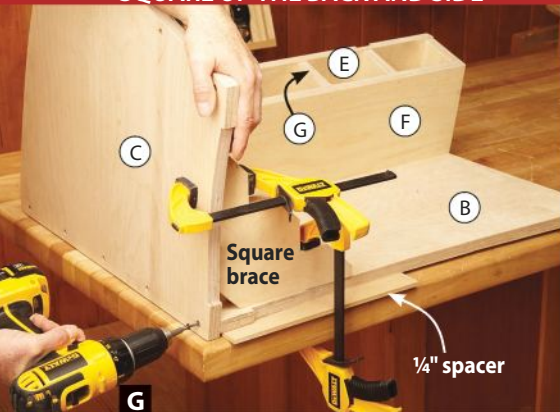


Note: Make two sides 5 3/8".

6 DRAWER



SQUARE UP THE BACK AND SIDE



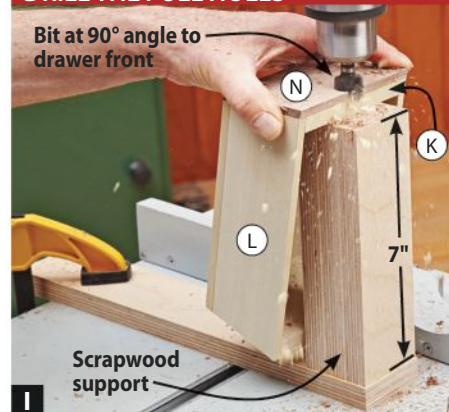
Hold the side (C) square to the back/caddy assembly (B/E/F/G) as you attach it. Get a free plan for the brace at woodmagazine.com/brace.

ASSEMBLE THE DRAWERS



Glue the drawer sides (L) to the fronts and backs (K) and reinforce the joints with brads. A pneumatic brad nailer gives you great control over the job.

DRILL THE PULL HOLES



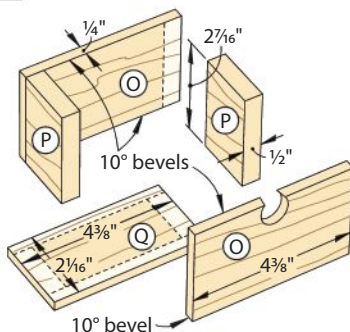
Rest the drawer front on a scrapwood support to bore the pull hole. A $\frac{3}{4}$ " Forstner bit makes a clean cut for the holes, which break out of the top edge.

5 Drill a $\frac{3}{4}$ " drawer-pull hole where shown in each drawer [Drawing 5], making the holes perpendicular to the drawer fronts [Photo I].

6 Soften any sharp edges by sanding. Finish-sand the box and drawers to 220 grit. Apply paint or a clear finish. (We applied several coats of satin polyurethane, sanding lightly with 320-grit paper between coats.)

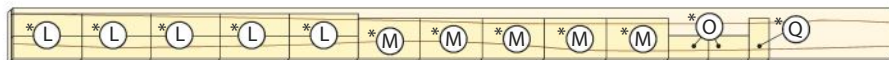
7 Attach the lid with two hinges. Then, slide the drawers into the caddy and start loading the box up with all your toys. 🌲

7 SECRET DRAWER



Produced by **Lucas Peters**
Written by **Larry Johnston**
Project design: **John Olson**
Builder: **Brian Bergstrom**
Illustrations: **Lorna Johnson**

Cutting Diagram



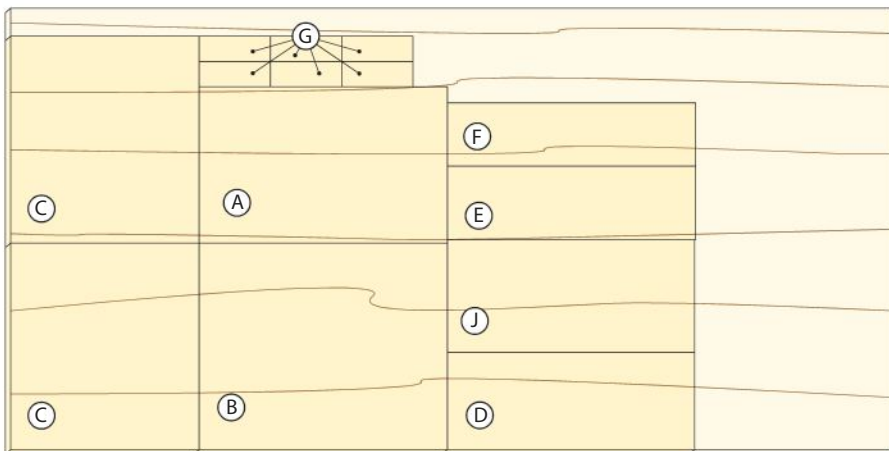
$\frac{3}{4}$ x $5\frac{1}{2}$ x 96" Poplar (4 bd. ft.) *Plane or resaw to the thicknesses listed in the Materials List.



$\frac{3}{4}$ x $7\frac{1}{4}$ x 36" Poplar (2 bd. ft.)



$\frac{1}{4}$ x $3\frac{1}{2}$ x 24" Walnut (.17 bd. ft.)



$\frac{3}{4}$ x 48 x 96" Birch plywood

Materials List

Part	FINISHED SIZE			Matl.	Qty.	
	T	W	L			
A	box front	$\frac{3}{4}$ "	17"	27"	BP	1
B	box back	$\frac{3}{4}$ "	22 $\frac{1}{2}$ "	27"	BP	1
C	box sides	$\frac{3}{4}$ "	22 $\frac{1}{2}$ "	20 $\frac{1}{2}$ "	BP	2
D	box lid	$\frac{3}{4}$ "	10 $\frac{5}{8}$ "	26 $\frac{7}{8}$ "	BP	1
E	caddy top	$\frac{3}{4}$ "	8"	27"	BP	1
F	caddy bottom	$\frac{3}{4}$ "	6 $\frac{7}{8}$ "	27"	BP	1
G	caddy dividers	$\frac{3}{4}$ "	2 $\frac{3}{4}$ "	7 $\frac{3}{4}$ "	BP	6
H	long cleats	$\frac{3}{4}$ "	$\frac{7}{8}$ "	27"	P	2
I	short cleats	$\frac{3}{4}$ "	$\frac{7}{8}$ "	10 $\frac{1}{4}$ "	P	2
J	box bottom	$\frac{3}{4}$ "	12 $\frac{1}{4}$ "	26 $\frac{7}{8}$ "	BP	1
K	drawer fronts and backs	$\frac{1}{2}$ "	2 $\frac{1}{16}$ "	37"	P	10
L	drawer sides	$\frac{1}{4}$ "	2 $\frac{7}{16}$ "	7 $\frac{1}{2}$ "	P	10
M*	drawer bottoms	$\frac{1}{4}$ "	4 $\frac{3}{8}$ "	6 $\frac{5}{8}$ "	P	5
N	false fronts	$\frac{1}{4}$ "	2 $\frac{13}{16}$ "	4 $\frac{3}{8}$ "	W	5
O	secret-drawer front and back	$\frac{1}{4}$ "	2 $\frac{1}{2}$ "	4 $\frac{3}{8}$ "	P	2
P	secret-drawer sides	$\frac{1}{2}$ "	2 $\frac{7}{16}$ "	1 $\frac{15}{16}$ "	P	2
Q*	secret-drawer bottom	$\frac{1}{4}$ "	4 $\frac{3}{8}$ "	2 $\frac{1}{16}$ "	P	1

*Parts initially cut oversize. See the instructions.

Materials key: BP—birch plywood, P—poplar, W—walnut.
Supplies: $1\frac{1}{16}$ x $2\frac{7}{8}$ " brass hinges, item no. 00W23.01, leevalley.com, 800-871-8158 (1 pair needed); #7 x $\frac{3}{4}$ " F.H. brass screws (12 for hinges); #8 x $1\frac{1}{4}$ " F.H. screws (30); #18 x $\frac{3}{4}$ " and $1\frac{1}{4}$ " brads.

Bits: $\frac{3}{8}$ " round-over bit, $\frac{1}{4}$ " straight router bit, $\frac{7}{16}$ " O.D. guide bushing, $\frac{3}{4}$ " Forstner bit, $\frac{3}{8}$ " plug cutter.

More Resources

► Shop for dozens of toy plans that you can use to fill this toy box at woodmagazine.com/toys or purchase over 200 toy plans on a single disc at woodmagazine.com/toycollection.

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A sawmill or portable mill might be closer than you think

I've got some downed trees that I'd like to have sawn into lumber, but don't own a sawmill. How can I locate a mill in my area—preferably a portable one that can come to my place and cut the logs on-site?

—Darrell Jones, Batesville, Miss.

First, Darrell, check your local phone directory's business pages under "Sawyers," "Lumber," and "Logging." Second, log on to the websites of bandsaw mill manufacturers, such as

Wood-Mizer, TimberKing, and Norwood, and search their owner databases for nearby sawyers who do custom milling. Finally, browse websites dedicated to milling lumber. We recommend the following:

- forestryforum.com
- woodfinder.com
- sawmilltrader.com

Before contacting a sawyer, be ready to discuss the following:

- the species, diameter, and length of the log portions of the trees; will he

have to cut the logs to length;

- how long the trees have been down;
- where the trees are currently lying, and what kind of access the sawyer can expect;
- if you'll bring the logs to a mill, how you will transport them;
- how you want the logs sawn (quartersawing makes the best furniture-grade lumber, but requires more effort and costs more);
- whether you'll want to assist in or provide direction during the milling.



More variability gives you greater control of your jigsaw

I've noticed that a lot of top-handle jigsaws have both a variable-speed dial and a variable-speed trigger. Isn't one control enough?

—Carisa Anderson, Newport News, Va.

Think of these dual controls in terms of a car, Carisa: The trigger works as the accelerator, and the dial as the gear. You squeeze the trigger to control the blade speed during a cut, feathering it as needed to follow a line. Manufacturers recognize this as the best way to connect your focus to the blade's cutting action. But just as a gear limits a car to a certain speed range, the variable-speed dial limits the top-end speed for each setting. This allows you to squeeze the trigger fully and not exceed your desired speed.

(continued on page 63)



The facts are hard to ignore.

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Reference Guide

Glue comparison

What woodworkers need to know!

	Titebond III	Polyurethane Glues
Higher Bond Strength	✓	✓
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Easy Water Cleanup	✓	
Much Safer To Use	✓	
Shorter Clamp Time	✓	
No Foam - Less Mess	✓	
Shorter Open Time	✓	✓
Doesn't Stain Skin	✓	✓
Bonds Most Materials	✓	
Bonds Oily / Exotic Woods	✓	
Lower Cost - Better Value	✓	
Longer Usable Shelf Life	✓	

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As the leader in wood glues, we want you to know the truth about polyurethane glue and woodworking. A straightforward comparison between Titebond® III Ultimate Wood Glue and polyurethane glue tells the story.

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*“...didn’t want
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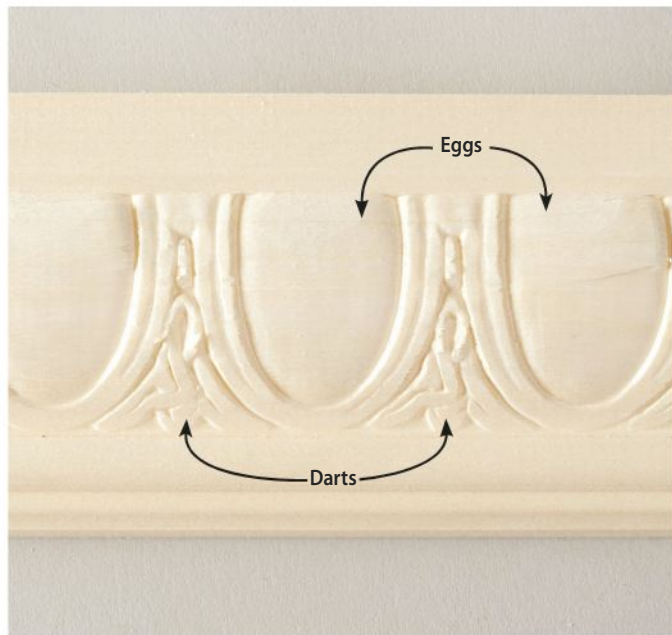
What is egg-and-dart molding?

I'm looking to restore a 100-plus-year-old home to a look true to that period. Without photos of the original interior, I'm relying on advice from friends. One of them suggested egg-and-dart moldings, but I'm not sure what that is. Can you help?

—Peter Hammond, Columbia, Md.

That classic architectural embellishment dates back to at least ancient Greece, Peter, and some experts believe it's derived from even earlier Egyptian designs. In the modern age, it shows up most often in crown molding for high-end interiors or built-in cabinets.

An egg-and-dart design is almost always along the length of an ovolo profile (a convex quarter circle or ellipse similar to quarter-round molding). Not all ovolo designs, however, have egg-and-dart features. "Eggs" (half ovals with the rounded ends down) alternate with pointed "darts" (any shape resembling arrows, anchors, or tongues). This feature can stand alone as the primary focus of a molding, shown *below*, or be used in conjunction with other shapes to make up a wider molding, *bottom*.



continued on page 64

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Ask WOOD

Avoid a tight squeeze: Start with clamps you'll use most

Having just bought a house with a three-car garage, I'm looking to set up a woodworking shop. I already own a few basic tools, but when it comes to clamps I'm not sure where to start, and have a limited budget. Can you help me invest wisely in clamps I'll need?

—Gordon Dennett, Philadelphia

You're in luck, Gordon, because a good starter set will set you back only a few hundred dollars, and you can find all you need at a local home center or hardware store. First, get eight ¾" pipe-clamp fixtures (about \$15 each), such as those shown *below*. Then buy ¾" black pipe in 24" and 48" lengths (four of each), threaded on both ends. Throw in four couplers and you can join any two pipes together to make longer clamps. These will handle any panel or case glue-ups you attempt.

Next, get yourself four 12"-long one-handed ratcheting bar clamps, such as those shown at *bottom*. These work great for any quick clamping task, such as securing a workpiece to a bench, or small assemblies, such as gluing up a jewelry box.

As your skills and projects grow, add more clamps to this collection as needed. That could include different lengths of one-handed bar clamps, band clamps for mitered frames and boxes, and hand-spring clamps for light-duty jobs. 🌲



Pipe-clamp fixture



One-handed ratcheting bar clamp

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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. 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.

Value-priced track saw cuts like a champ

Rail-guided track saws work great for cutting up sheet goods because they deliver accurate, splinter-free cuts safely. Until now, you couldn't buy one for less than \$500, but Grizzly's T25552 provides all that precision at half the price.

The saw powered through cuts in veneered plywood and melamine-coated particleboard without bogging down, and left edges free of tear-out, thanks to the 48-tooth carbide blade and the zero-clearance edge on the rail. The saw glides smoothly along the rail, and it plunges nicely for cuts up to 2" deep.

The T25552 kit also includes a 55" rail, two clamps, a stabilizer bar (to secure the saw to the rail during bevel cuts), and a connector for linking together an optional second rail for longer workpieces.

—Tested by Dean Fiene



Portable track saw master pack (T25552)

Performance ★★★★★
Price \$245

Grizzly Industrial
800-523-4777; grizzly.com



Folding sawhorses deliver strength and convenience

I know what you're thinking: I can make my own sawhorses. Fair point, but can you make them rock solid *and* so they fold up compactly for easy transport and storage? Made from 1-by-pine, HideAHorse's folding sawhorses are stronger than they appear; the manufacturer says each will support 1,100 lbs, and although we never got anywhere near that total, they did hold nicely under heavy loads of plywood and dimensional lumber without wobbling. The legs fold out and lock into dados, shown *below*, for quick setup. To take them down, simply reverse the steps and wrap the legs with the included strap.

When folded up, each weighs just over 7 lbs for easy carrying.

—Tested by Kevin Boyle,
Senior Design Editor



Folding sawhorses

Performance ★★★★★
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continued on page 68

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After routing the profile, you cut a rabbet on the back for the picture and glass. The five profile bits shown come as a set, or sell for \$40–\$45 apiece.

—Tested by Bob Hunter,
Tools Editor



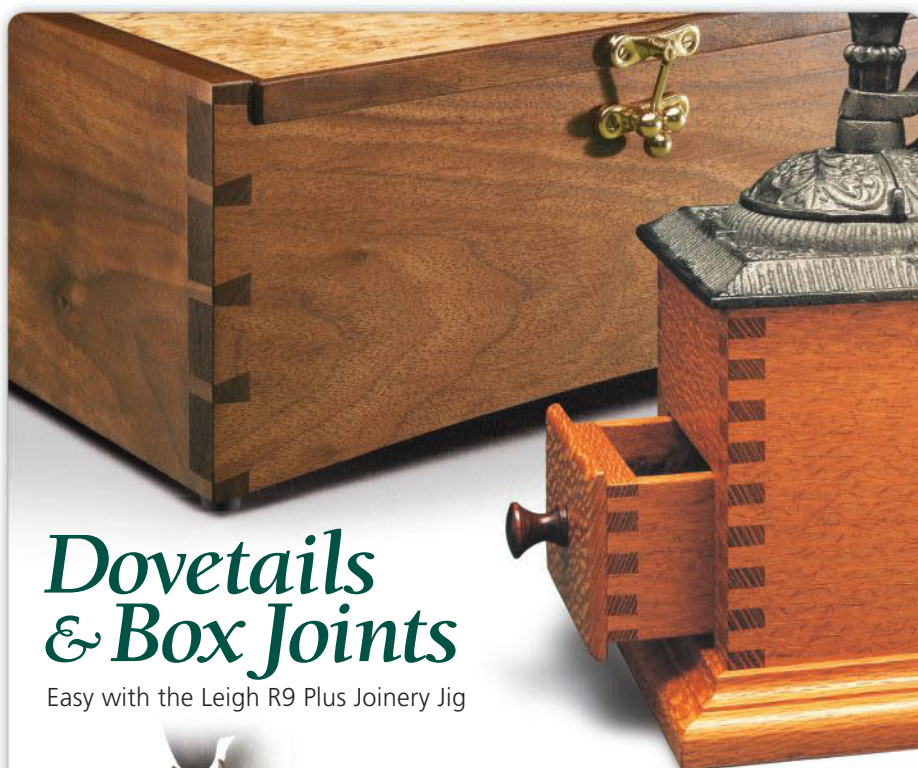
Picture-frame router bits, 5-pc. set

Performance	★★★★★
Price	1/4"-shank bits, (199-1652) \$190 1/2"-shank bits, (199-1655) \$190

Eagle America
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continued on page 70



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Heavy-duty bandsaw resaws with power and finesse

There's a lot to like about Rikon's robust 14" Professional bandsaw. Its 2½-hp motor powers the blade through even the maximum 14" resaw cut in hardwoods. With dual-bearing, tool-free blade guides and easy-to-adjust wheels and rip fence, I resawed ¼" veneers with no blade deflection or drift. And I like that the table surface sits just 36" from the floor, making it easier to resaw large, heavy workpieces.

Rikon built in welcome safety measures on this saw as well. A foot-activated brake stops the blade and motor in just a couple of seconds. And electric microswitches on the doors and blade-tension release—mounted conveniently below the top door—prevent accidental start-ups.

Still, a few small details—a wobbly handwheel, a too-long fence-handle bolt, a not-quite-large-enough opening for the blade-guidepost cap—detract from the overall fit and finish of a top-performing bandsaw. 🌲

—Tested by John Olson,
Design Editor



14" Professional bandsaw (10-350)

Performance ★★★★★
Price \$1,400

Rikon Tools
877-884-5167; rikontools.com



Blade tension release/adjuster



Brake

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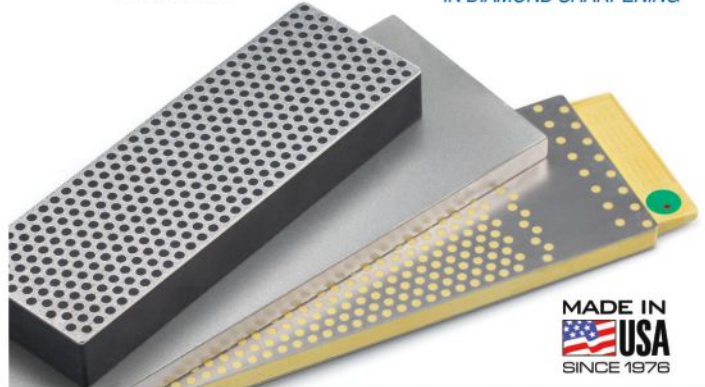
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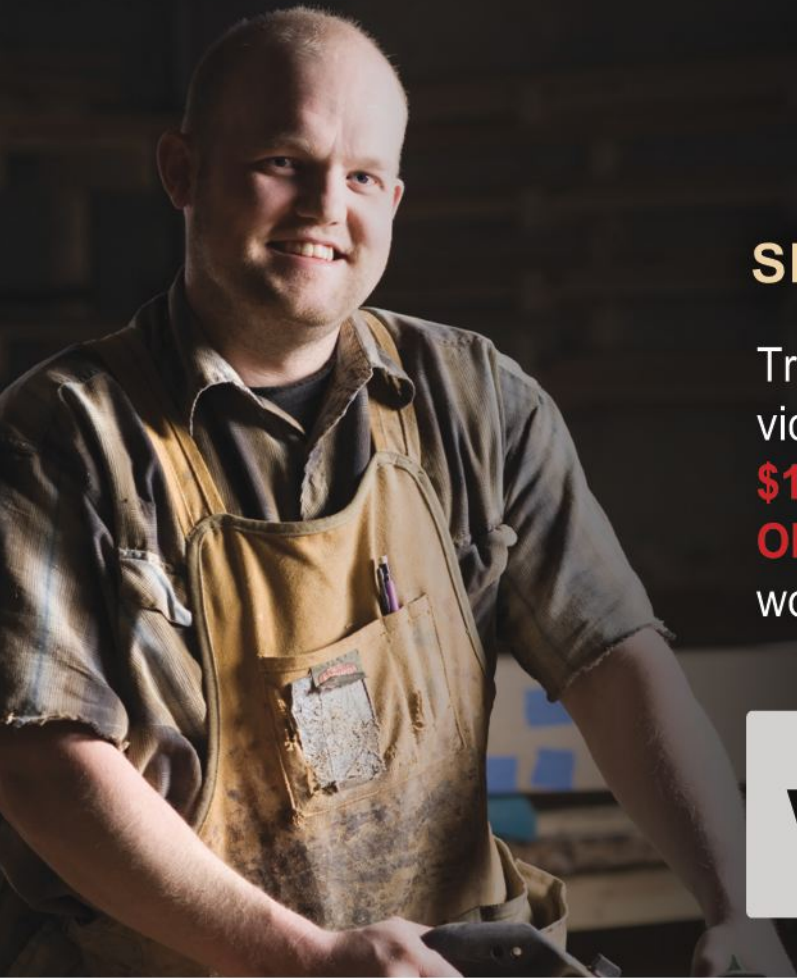
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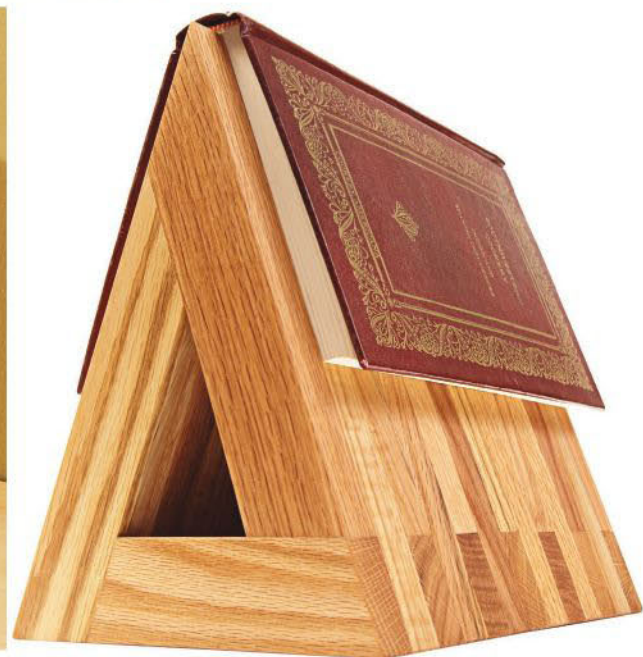
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