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Display Bookcase

p.36

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Like a Pro** p.14

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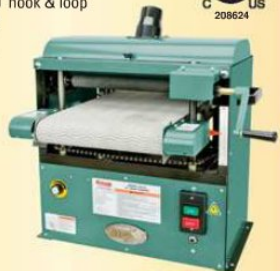


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- Min. stock length: 8"
- Max. cutting depth: 1/4"
- Feed rate: 16 & 30 FPM
- Cutterhead speed: 4800 RPM
- Approx. shipping weight: 666 lbs.



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WOOD

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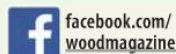
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Make it. Make it yours.

Like them or not, social media sites like Facebook, Twitter, and Pinterest are here to stay. I love them because I get instant feedback on the projects we publish. Case in point: We posted a photo of last issue's Loft Bed (March 2015) on Facebook and within a day or so had more than 100 comments about the plan. Most (thankfully) praised it, but one reader's remark really jumped off the screen at me: "Should be painted."

So, paint it.

When we design a project for *WOOD*® magazine, we always put our best foot forward, from function and proportion to the materials and finish. We try to present each project in a way that inspires you to build it.

But there are no absolutes.

For example, we chose cherry and cherry-veneer plywood to build the Bookcase on [page 36](#). Is the room where you would put that bookcase all done in red oak? Then build it from red oak. Like to reclaim pallet wood? You have our blessing. Too wide to fit that nook in your family room? Shorten the horizontal pieces. Hate the pulls? No worries; find some you like. Don't like to build drawers? Fine, leave 'em off. (But you may change your mind when you see how easy it is to make these.)

We take our best shot at designing projects you'll love, but I've never seen a true one-size-fits-all, one-style-suits-every-taste woodworking project. So look at the plans on these pages as a launching point for your own creativity, or build it exactly as shown. It's *your* project. (Either way, please post or send me a photo when you're done!)


Dave Campbell
dave.campbell@meredith.com



WOOD reader T.R. Gattuso, of Framingham, Mass., made the Chairside Chest from issue 229 (above) his own by replacing the top with a framed glass panel, turning the top into display space (right). He also widened it, changed the leg cutouts and hardware, and built it from cherry instead of pine.



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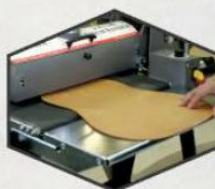
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Fantastic plastic: Reader prints backhoe in 3-D

For Father's Day, my wife and kids got me a kit to build the Construction-grade Backhoe Loader (issue 226, July 2014). Wanting to explore my new 3-D printer's capabilities and expand my modeling skills, I decided to make all the parts for the loader from ABS plastic instead of wood.

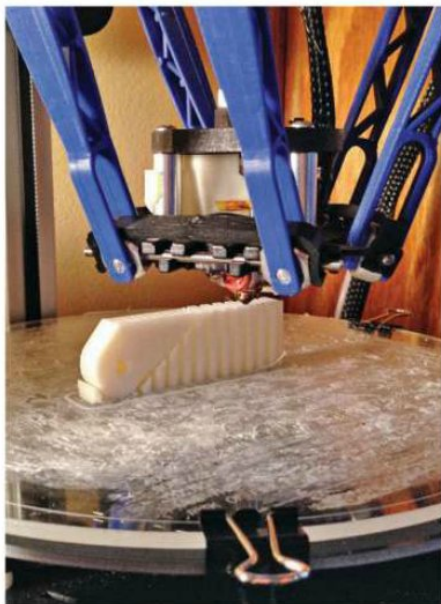
After replicating all the components in SketchUp, I put the printer to work. Eighty-one hours later, I had all the pieces ready for assembly. Though there are a few things I would have

done differently—for example, printing the buckets with brackets in place instead of welding them on with an acetone/ABS slurry—I thought it turned out well for a first attempt. Thanks for the inspiration!

—Christopher Finke, Chanhausen, Minn.

To download the plans for the Construction-grade Backhoe Loader, visit woodmagazine.com/backhoe.

—WOOD® Editors



Turning defects into accents

I built the Tapered Hall Bench in issue 227 (September 2014), using pecan for the base and dogwood for the seat. The wood for the seat came from a neighbor who was building a new house and needed to take down one of the biggest dogwood trees I'd ever seen. He let me harvest the tree, and although bugs had gotten into it and left behind a patchwork of holes, I found the rustic appearance appealing, and decided to showcase it with this project. I even filled some of the larger holes with turquoise liquid inlay (no. 20709, \$29, 888-512-9069, ptreeusa.com) for eye-catching accents.

—Bob Phillipson, Las Cruces, N.M.

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More cope-and-stick tricks

After reading the article about cope-and-stick doors in issue 229 (November 2014), I'd like to add this tip: Before routing the door panel, remove the bulk of the waste by setting your tablesaw's blade to approximately 10° and running the door-panel stock through on edge. This leaves less material for your raised-panel bit to remove, and so will produce a superior cut.

—Paul St. Peter, Williston, Vt.

As excellent as the article on cope-and-stick doors was, I think it could benefit from one additional tip. At least one coat of finish should be applied to the door panel before glue-up. Without this, when the panel contracts due to seasonal wood movement, it could reveal the unfinished wood—pretty unsightly.

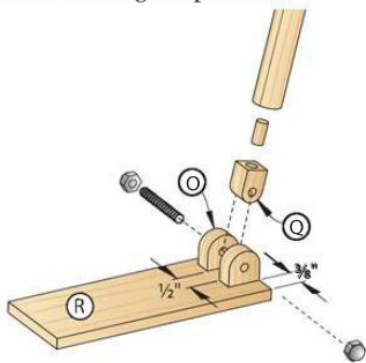
—Peter Bonnell, Medina, Ohio



Article Update

► Construction-grade crane

In issue 229 (November 2014), page 56, Drawing 5, part O should be $\frac{3}{8}$ " from the edge of part R. 🌲



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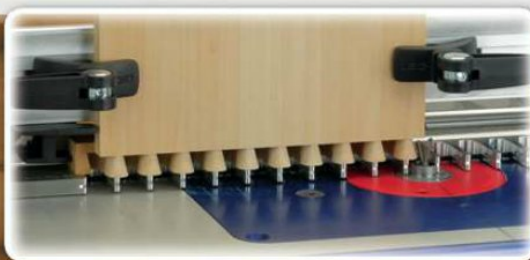
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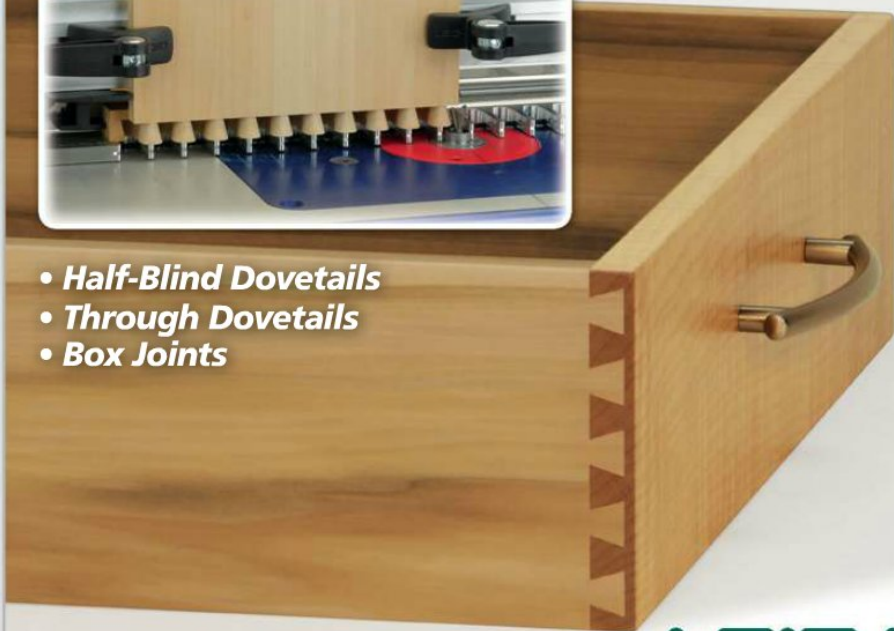
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“X” Out Screwheads

3 ways to keep screws hidden away and under cover

1. Place them out of sight

Perhaps the most obvious way to hide screws is simply locating them where they can't or aren't likely to be seen, such as the underside of a cabinet top or tabletop [Photo A], or on the back face of a cabinet.

OUT OF SIGHT, OUT OF MIND



A The top of this 40"-tall bookcase sits below eye level of most viewers, so only the nosiest inspector will see the screws securing the top to the carcass.

2. Cover them with other parts

If screws must be used on the visible faces of a project, take time during the design process to find or create locations where a length of molding or another part of the project will hide them [Photos B and C, Drawing]. Just

remember that once covered, the screws will be difficult, if not impossible, to access, so make sure you don't need to reposition or disassemble any parts before applying the concealing piece.

NOW YOU SEE THEM...

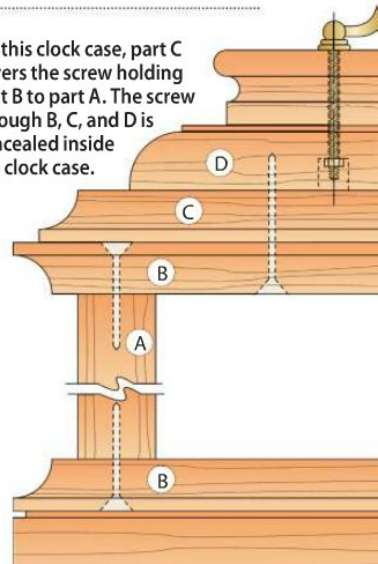


B Screws securing the slats on this planter disappear behind glued-on moldings that create the appearance of a frame.

...NOW YOU DON'T



On this clock case, part C covers the screw holding part B to part A. The screw through B, C, and D is concealed inside the clock case.



continued on page 8



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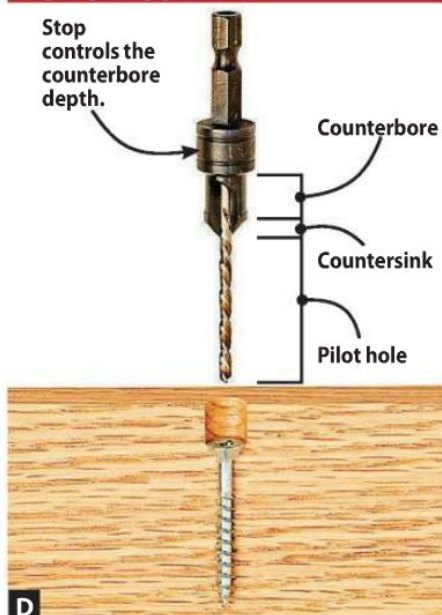
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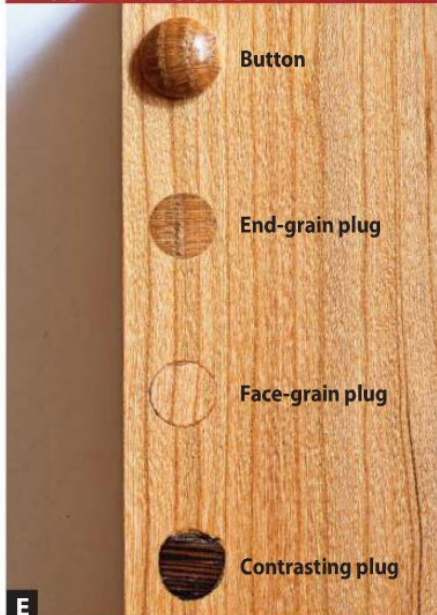
A counterbore bit drills the pilot hole, countersink, and counterbore in one step. A set for #6, #8, and #10 screws [Sources] will cover most situations.

3. Bury them in counterbores

A counterbore recesses a screwhead below the surface of a workpiece [Photo D]. You then plug the counterbore to either hide it or highlight it [Photo E].

You can buy plugs or make your own. Store-bought plugs rarely match the tone of your project stock. And because such plugs are usually cut from dowels, their end grain soaks in more stain than the face grain around them. As a result, they stand out instead of blending in. Of course, you can use this

PLUG 'EM IF YOU GOT 'EM



Buttons or flush-cut plugs fill counterbores. Depending on the desired look, you can make them decorative or blend them in.

difference as a visual detail, even choosing a contrasting species.

To best camouflage a plug, cut your own from scrap material from your project, using a plug cutter in a drill press [Shop Tip]. This gives you a near-perfect match in grain and wood tone once the plugs are glued in place with the grain aligned as closely as possible, as shown above; trimmed with a chisel; and sanded flush.

Buttons stand proud of the wood's surface and serve as pronounced

SHOP TIP

Create plugs in a snap

To make your own wood plugs, use a plug cutter [Sources, below]. Sold in 1/4", 3/8", and 1/2" diameters, plug cutters resemble drill bits with multiple fluted cutting edges. As they spin, they create plugs of wood that you then pop free with the tip of a chisel. Tapered cutters create slightly cone-shape plugs that wedge tightly into counterbores for a gap-free fit.

Because they lack pilot bits, do not use plug cutters in a handheld drill; you'll achieve the best results using a drill press.



decorative elements. Find them in many different sizes and styles—even square-head types for an Arts and Crafts look.

By chiseling out a shallow rectangular recess around screw locations, you can insert plugs that make screwed butt joints resemble through-tenons. (To learn how, see **More Resources**.)

Sources: Insty-bit countersink bit set, #6, #8, and #10, \$24.75, woodmagazine.com/countersinks
Snappy plug cutter set, 1/4", 3/8", 1/2", \$28.32, woodmagazine.com/plugcutters

More Resources

What appear to be the through-tenons of the lower rails extending through the sides of this bookcase, right, are actually chamfered plugs covering screws that secure butt joints, far right. To create this look, rout or drill the recesses before assembly, then chisel the ends square. Shape the chamfered tenon ends on a long blank, and cut them free.

For the full detailed technique, check out issue 180 (November 2007) of *WOOD*® magazine or read the article for free at woodmagazine.com/fauxthru.



TRACK SAW

- Motor: 120V, 9A, 1100 watt, 5500 RPM
- Blade diameter: 160mm (6¼")
- Cutting capacity:
With track: 1³¹/₃₂" @ 90°, 1⁷/₁₆" @ 45°
Without track: 2⁵/₃₂" @ 90°, 1⁵/₈" @ 45°



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Includes: Saw, Guide Rail, and Accessory Pack



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D4362 Guide Rails

14" BANDSAW

- Motor: 1 HP, 110V/220V
- Precision-ground cast iron table size: 14" x 14" x 1½"
- Blade size: 93½" (½" to ¾" wide)
- Cutting capacity 13½" (throat)
- Cast iron frame and wheels
- Ball bearing blade guides
- Includes fence and miter gauge



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W1706 14" Bandsaw

PLANER MOULDER with Stand

- Motor: 2 HP, 240V, single-phase, 10.8A, 3450 RPM
- Precision-ground cast iron table size: 14½" x 10" x 7/16"
- Max planing width: 7"
- Max planing height: 7½"
- Cuts per minute: 14,000
- 2 HSS knives



W1812 Planer Moulder with Stand

10" TABLE SAWS with Riving Knife

- Motor: 3 HP, 220V, single-phase motor
- Precision-ground cast iron table size: 27" x 40¼"; (W1819) 53½" with extension; (W1820) 74" with extension
- Max. rip capacity: (W1819) 29½", (W1820) 50"
- Camlock fence with HDPE face



*Free 10"
Carbide-Tipped
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W1819
SHOWN

W1819 10" Table Saw

W1820 10" Table Saw with Long Ext. Table

¾ HP 13" BENCH-TOP DRILL PRESS

- Motor: ¾ HP, 110V, 1725 RPM
- Overall height: 38"
- Spindle travel: 3¼"
- Swing: 13¼"
- Drill chuck: 5/8"
- Speeds: 12, 250–3050 RPM
- Table: 12½" dia.
- Table swing: 360°
- Table tilt: 45° left & 45° right

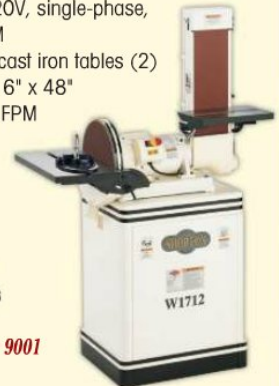


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W1668 ¾ HP 13" Bench-Top Drill Press

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- Precision-ground cast iron tables (2)
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- Belt Speed: 1066 FPM
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- Disc speed: 1725 RPM



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W1712 6" x 12" HD Combination Sander



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- Motor: ½ HP, 120V, 3.5A
- 58 oscillations per minute
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- Sanding drum length: 4½"
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- Dust port size: 1½"
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W1831 Oscillating Spindle Sander

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- Standard bag filtration: 2.5 micron
- Static pressure: 7.2"



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W1830 Hanging Air Filter

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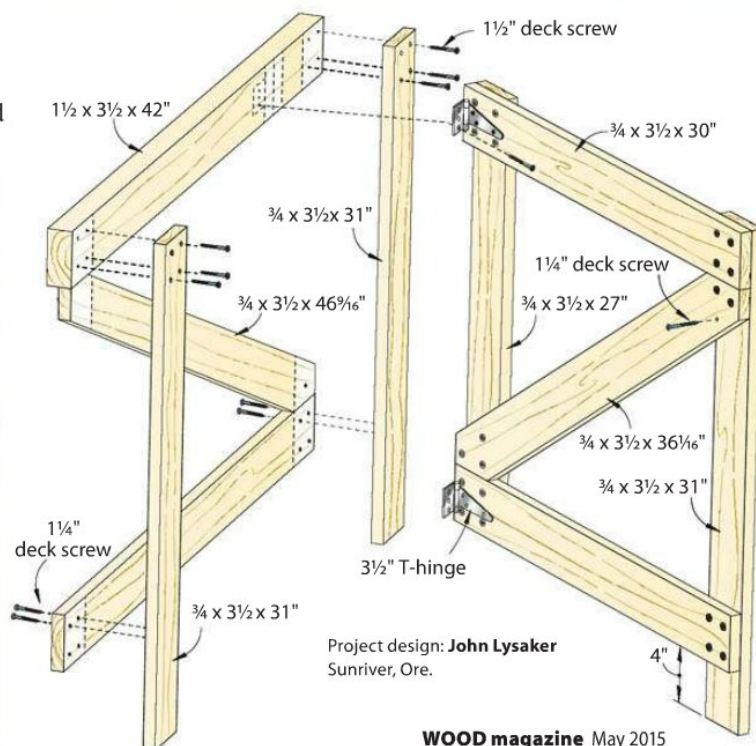
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► For more fold-flat shop projects, visit woodmagazine.com/foldflat.



WOOD magazine May 2015

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3

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Cut perfect rabbets with a router bit

Virtually every cabinet you build uses rabbet joinery somewhere: for lock-rabbet drawers, on inset doors, as a recess to house the back of a bookcase, or to rest glass in a door. A rabbeting router bit helps you make them all, and cuts rascally rabbets on curved edges, such as an arch-topped door—something not possible with a tablesaw.

ANATOMY OF A RABBETING BIT



Bearings give bits versatility

Rabbeting bits typically come in one of two diameters— $1\frac{1}{4}$ " or $1\frac{3}{8}$ "—and can be purchased alone or with a set of replaceable bearings that alter the cutting width of the bit.

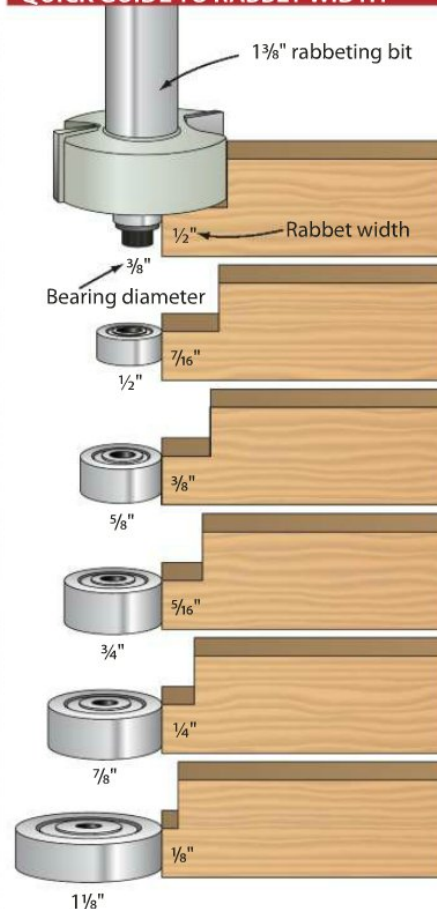
Quick Tip! Check the spin of the bearing before using a rabbeting bit. Some bits use stepped washers between the bearing and bit, as shown at left, and if installed upside down, will keep the bearing from spinning.

The chart, right, shows the rabbet that results from using various bearings with a $1\frac{3}{8}$ "-diameter rabbeting bit. If you have a different diameter bit—or bearing—you can easily calculate the resulting rabbet.

To determine the width of your rabbet with a specific bearing, subtract the bearing's diameter from that of the bit; then divide that result by two. Or, to determine which bearing to use for a specific rabbet size, simply multiply the rabbet width by two; then subtract the result from the bit diameter.

Rabbeting bits hog out large amounts of material, so minimize tear-out by making several light passes rather than a single deep one. Begin your rabbet with the router set to take a $\frac{3}{8}$ "-deep cut at full width, making increasingly deep passes. Also, the large diameter of a rabbeting bit requires a slower router speed—from 16,000 to 18,000 rpm—to perform at its best. 🌿

QUICK GUIDE TO RABBIT WIDTH



The wider the bearing, the narrower the rabbet. Some kits come with bearings that match the bit diameter for flush-cutting or template-routing.

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24kt Gold shown with refill retracted

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A look at Pre-cat Lacquer

If you love lacquer but wish it was more durable, take a look at pre-catalyzed (pre-cat) lacquer. It retains the best qualities of traditional lacquer but provides a harder surface that better resists abrasion, thanks to a catalyst (think of two-part epoxy) that initiates a chemical reaction as the finish dries. Lacquer thinner remains the vehicle for pre-cat, but the resins vary from traditional lacquer formulations.

“Pre-catalyzed” means the manufacturer or dealer adds the hardening agent before you receive the product [photo, next page]; you would mix post-catalyzed material in your shop.

When to use pre-cat lacquer

Versatile and durable pre-cat lacquer makes a great finish for indoor furniture and cabinetry. Think of it mainly as a big-project finish (see **A question of quantity**, page 16). Once dry, pre-cat lacquer rates safe for food contact and resists damage from most food items, water, and alcohol. But, it isn't as impervious to damage as polyurethane. Lacquer imparts a rich glow, and the finish feels nice to the touch.

Applying pre-cat lacquer

Lacquer works best as a spray finish, applied to dry wood finish-sanded to at least 220 grit. High-volume, low-pressure (HVLP) spray equipment proves best for application because it greatly reduces bounce-back and overspray compared with conventional high-pressure spray guns. Nonetheless, you should wear safety goggles and a respirator suitable for organic vapors when spraying pre-cat lacquer.

continued on page 16



Avoid breathing lacquer mist or getting it in your eyes. Ventilate the finishing area and keep the air moving to prevent vapor concentration.

The lowdown on lacquer

Lacquer, consisting of various resins dissolved in lacquer thinner, has proven a versatile finish for almost a century. Pro finishers and furniture manufacturers love lacquer because it sprays on smoothly and evenly without sagging or running, builds fast, and dries quickly. It can be clear or pigmented, and its hard, flexible surface polishes to a high shine.

And it's forgiving: To repair damage, just spray on more lacquer. The new coat partially dissolves the existing film and blends into it.

The unique nature of lacquer thinner—it's a blend of several solvents that evaporate at different rates—accounts for those winning properties. The thinner starts to evaporate as soon as the spray leaves the nozzle. By the time the finish hits the wood, it has already started to dry. This quick drying makes lacquer challenging to apply with a brush—for brush application, buy a specific “brushing lacquer” formulation.



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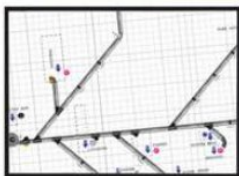


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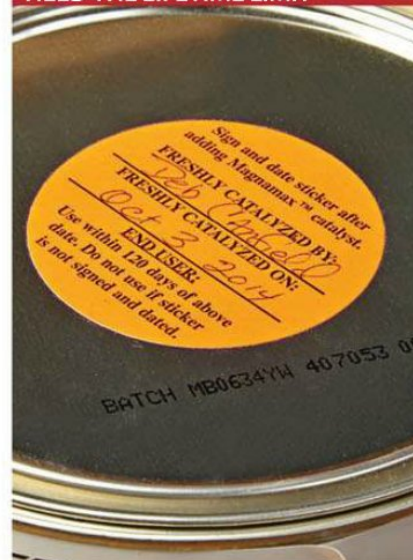


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When your paint dealer adds catalyst to the lacquer, its shelf-life countdown begins—usually 6 months or less. Do not use expired finish.

Provide adequate ventilation [photo, page 14]. On a nice day, spray outside in your driveway or on the patio; the lacquer dries quickly enough that bugs and dust won't mar the finish.

Spray light coats to build the finish. Smooth, slightly wet coats reduce the need for between-coats sanding. If you do sand, let the finish dry an hour or so. (Follow the manufacturer's recommendations.) Wear a particulate mask when sanding. 🌿

A question of quantity

Sold primarily by paint dealers for commercial and industrial use, pre-cat lacquer generally comes in 1-gallon and larger containers. Before you buy a gallon of pre-cat, which costs more than traditional lacquer or polyurethane, be sure you'll be able to use it up within its shelf life—usually 6 months or less. If you'll be building several pieces of large furniture over a few months, or if you can accumulate a number of smaller pieces to finish at once, a gallon may serve your needs. But properly disposing of unused, expired material could prove difficult. And it would certainly waste money.

H. Behlen markets pre-cat in 13-ounce aerosol cans, which suits small projects. You can buy it from mail-order sources, including Woodworker's Supply (800-645-9292, woodworker.com).

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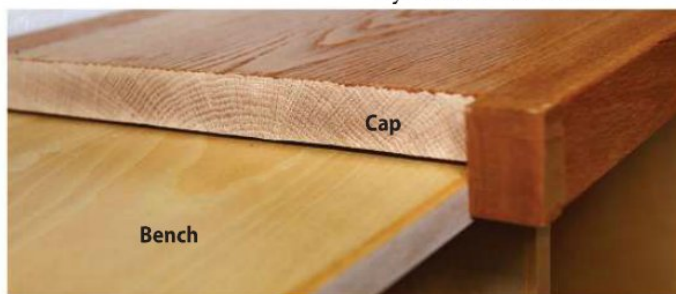
Unvarnished

Straight talk from the WOOD-wide web

Embrace the Slop to Eliminate the Slop

by Frank Howarth

The stars of Frank Howarth's stop-motion viral videos are the projects themselves—lawn chairs and bookcases—that seem to come alive as they self-assemble in his shop. An architect by trade, Frank's fascinating videos and blog can be found at www.frankmakes.com.



The cap to this bench allows sturdy joinery below while hiding the inexpensive plywood construction of the carcase.

When you first imagine a design you want to build, it is perfect in its form. You sketch it on paper or draw it on a computer. Its dimensions are flawless. All of its joints are tight. Then you go into the shop, and all of that perfection slips away into the irregularity of reality. You can spend a lot of time and effort trying to cling to that perfection, or you can just figure out the best place for the slop.

Hide it

One of the most useful outcomes of a design is figuring out where to hide the slop. For instance, the seam between a table frame and the top is rarely tight. You don't need to spend time making it so because the top usually overhangs the frame, and that seam ends up on the underside of the table, where we don't see it. It helps to think of many woodworking projects as a stage set; there is a side you see, and a side you don't.

Cover it

The most common way to hide a seam is with trim. Trim is usually seen as decoration, but its real function is to conceal. Traditional trim—ogees and quarter rounds, for example—works well to cover a seam or ragged edge. Or you can incorporate a covering or trim to be part of the form. I worked on a bench recently where I made the edge of the bench thicker. This thicker piece also worked as the trim, covering the seam between the bench and its base.

Celebrate it

The opposite of trim is to separate two pieces with a reveal. You celebrate the seam to a point where the slop is in plain sight but unnoticed. A $\frac{1}{16}$ " gap in a seam is much more noticeable than that same $\frac{1}{16}$ " variance in a reveal. Recently I made a bookcase that I wanted to sit flush with its base.

continued on page 20

WOOD magazine May 2015

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Slight inconsistencies in the sizes of the base and case of this bookshelf disappear in the reveal, making them effectively invisible.

Making the case and base exactly the same length and width is almost impossible, as is making a seamless fit between the two. Instead, I created a 1/2" gap between them so the case "floats" above the base. Your eye now reads them as flush, and the silhouette is not broken by a piece of trim.

Cut it off

Woodworking is about cutting apart and reattaching wood. This process can continue over and over, working toward the final form. At each step, there is an opportunity to cut off the slop of the previous assembly. A well-used example of this is when making a rail-and-stile panel door. In the first step, I make the panel the size I want it and make the rails and stiles a little bit big. Once glued up, I cut the door to the final size. This cleans up the top and bottom giving a perfect joint between each rail and stile. I noticed this in Sam Maloof's chairs where he would make the joint perfect on the inside and not worry about what the outside looked like. Then, when dry, he would carve the joint, cutting off the slop on the outside to make the final form.

A master woodworker isn't one who is invariably able to overcome the gap between the perfection of their design and the imperfection of their medium. Rather, he or she is a woodworker who embraces that gap to arrive at a project of which to be proud. 🌲



Adding slop to the stile length adds a buffer and places the responsibility for slop elimination on the tablesaw rather than the glue-up.



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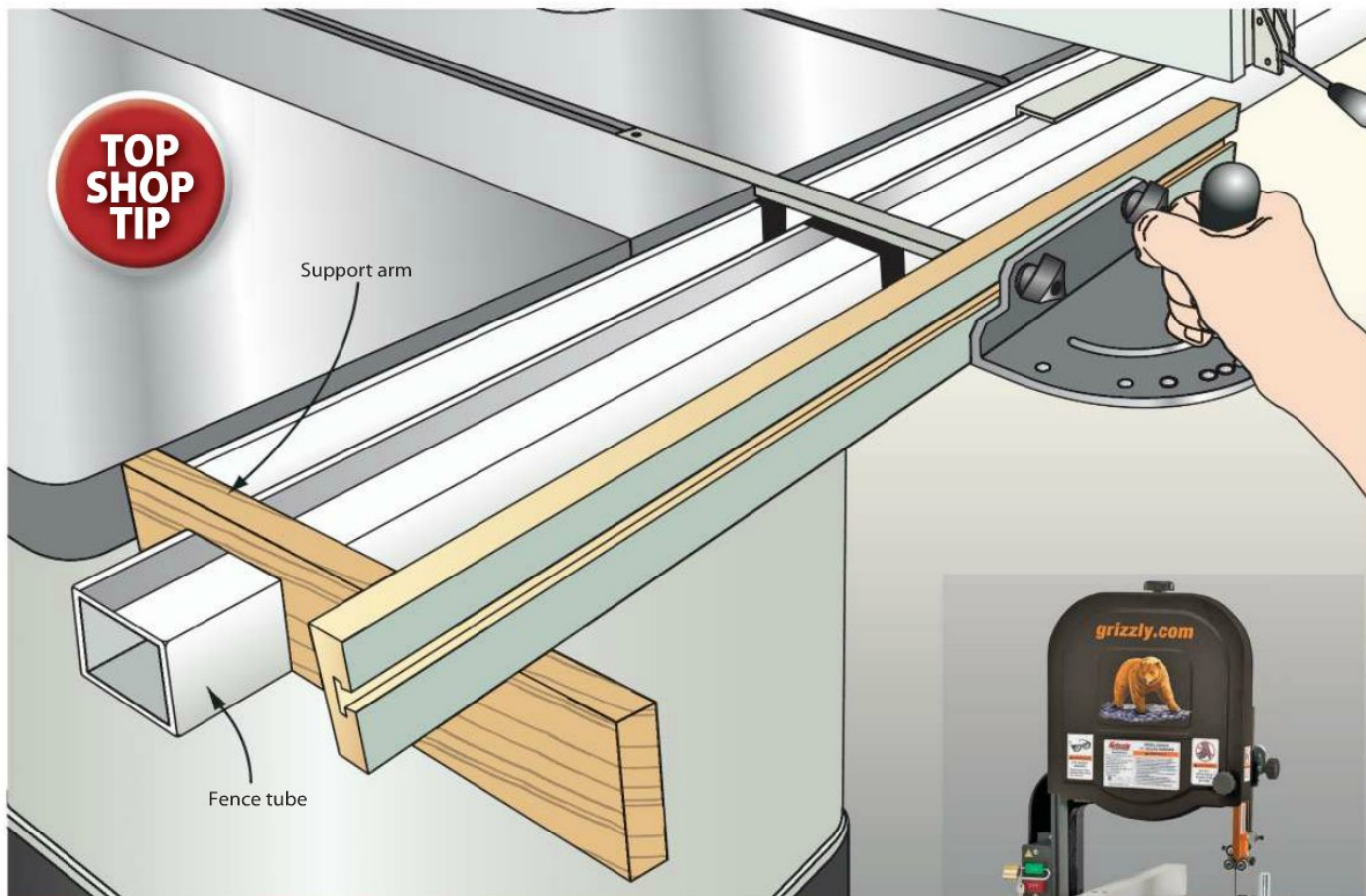
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continued on page 24

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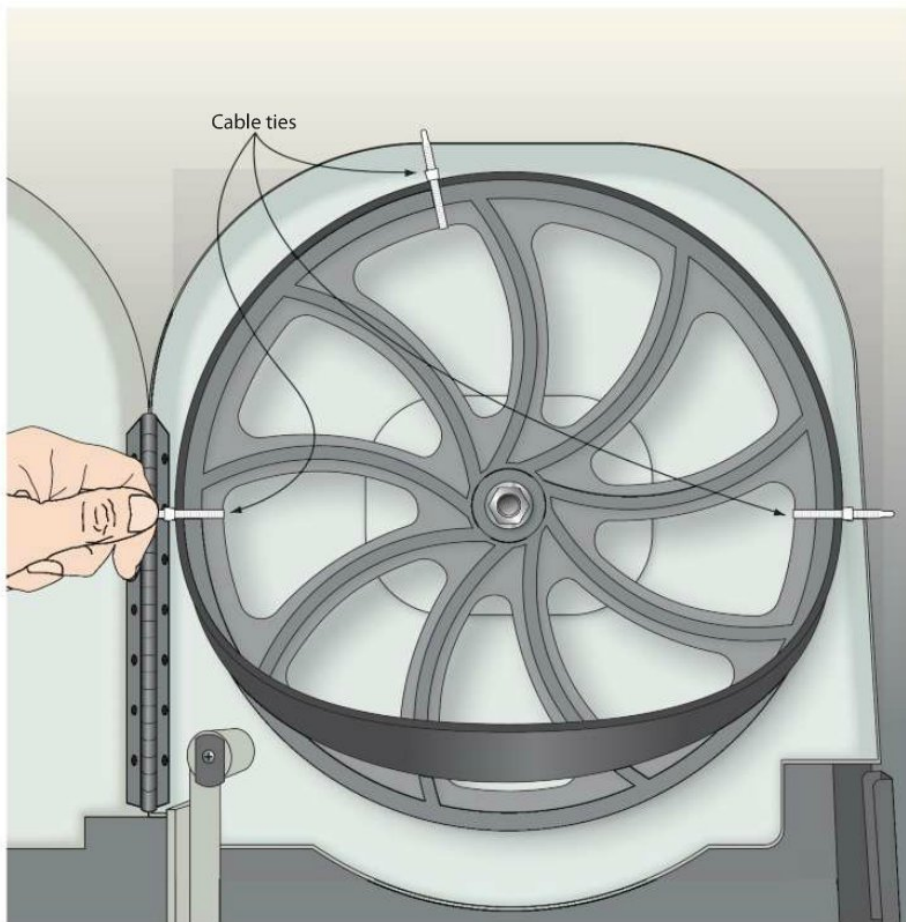
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Quick-change tire trick

When changing the tires on a bandsaw, I found myself in need of an extra hand or two. My solution: Simply loop the top of the new tire over the wheel, secure it with a cable tie, and repeat as I work my way around the wheel. After installing, I simply cut away the ties.

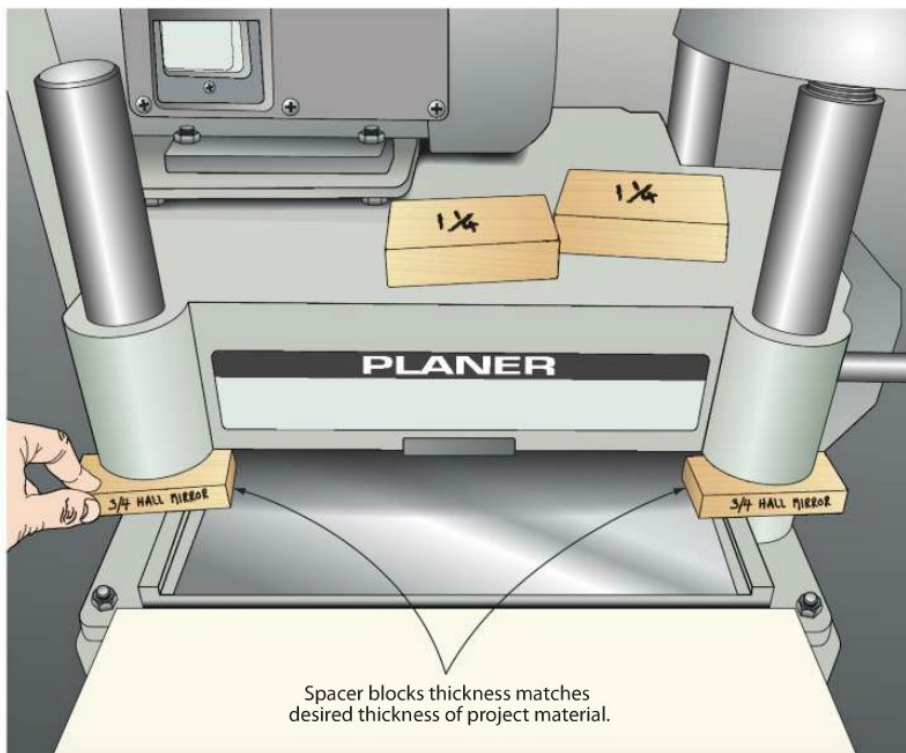
—Pat Glover, Evans, Ga.



Slip-in spacers make great no-check depth stops

I place hardwood spacers matching the desired material thickness beneath my 15" stationary planer's cutterhead assembly to gauge stock thickness when planing boards. Doing so cuts out the need for repetitive checking with my micrometer, and doesn't force me to constantly stoop to check the planer's built-in depth gauge.

—Rex Cavanaugh, Alvin, Texas



continued on [page 26](#)

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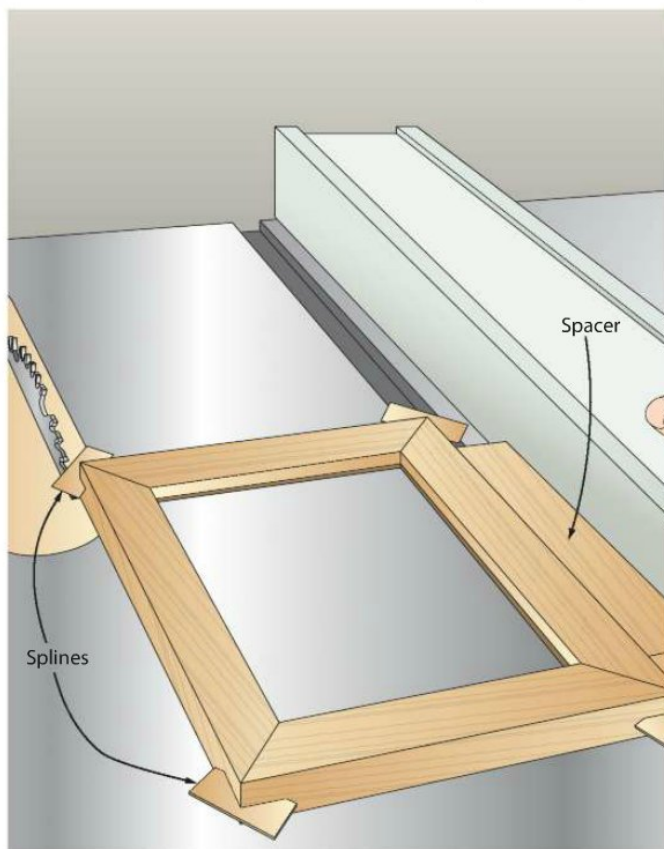
Shop Tips

Give splined frames a close shave

After gluing spline stock into the mitered corners of a large batch of frames, I was faced with spending the next half hour bandsawing away the protruding spline stock and sanding the rough surfaces smooth. Instead, I turned to my tablesaw.

With a spacer offsetting each frame so the frames would ride smoothly against the saw's rip fence, I trimmed the spline stock. After a few quick passes with a sanding block, the frames were complete.

—Larry Schaller, Edgerton, Wis.

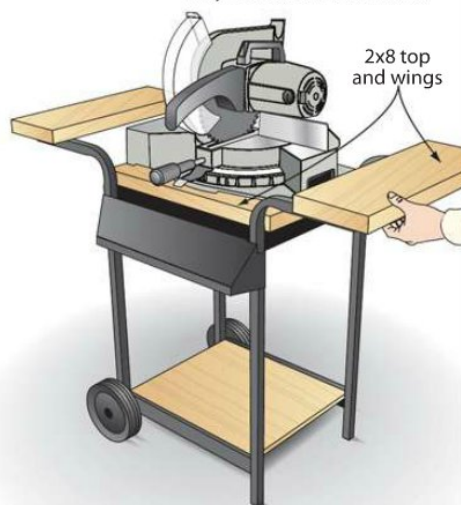


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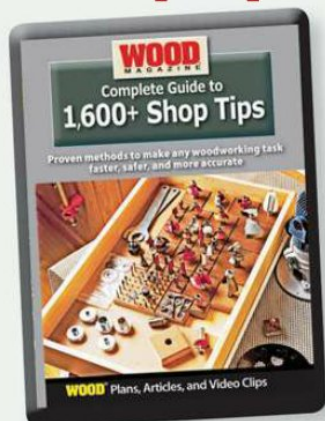
Hot-off-the-grill mitersaw stand

When my old gas barbecue grill stopped working, I stripped the frame and turned it into a rolling miter saw stand. With the miter saw mounted between the stand's wings, I measured the difference between the wing supports and the miter saw's table. After planing two 2x8s to that thickness, I mounted them on the wings to provide support for long pieces during cuts.

—Jerry Barnhill, Chewelah, Wash.



More Terrific Shop Tips



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continued on page 29

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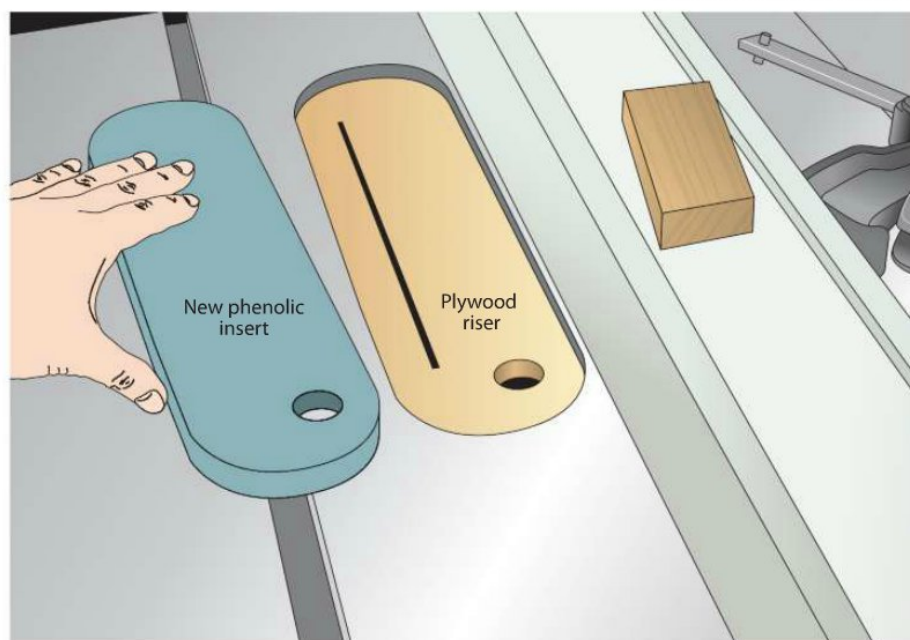


Shop Tips

Shop-made zero-clearance insert gets a lift

When making replacement zero-clearance inserts for my tablesaw, I found that, when equipped with a standard 10" blade, my tablesaw couldn't lower the blade far enough to make the initial cut in the inserts. By making a 1/4"-plywood "riser" (clamping the riser blank over the regular throat insert while raising the blade), I was able to lift each new phenolic insert high enough above the blade to safely make the starting cut. Just drop the new insert onto the riser to align it perfectly, then clamp a board over both to hold them in place during the cut.

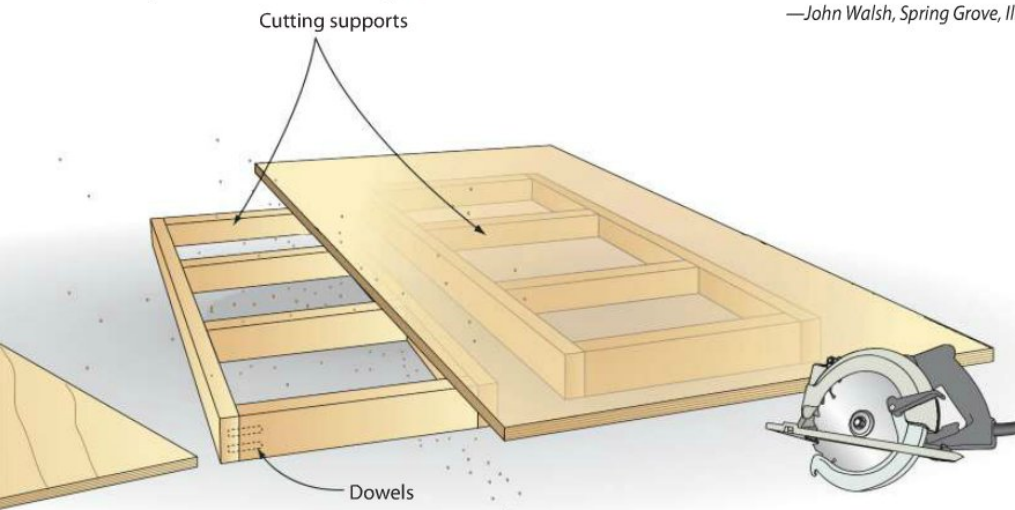
—Jim Moorehead, Barrigada, Guam



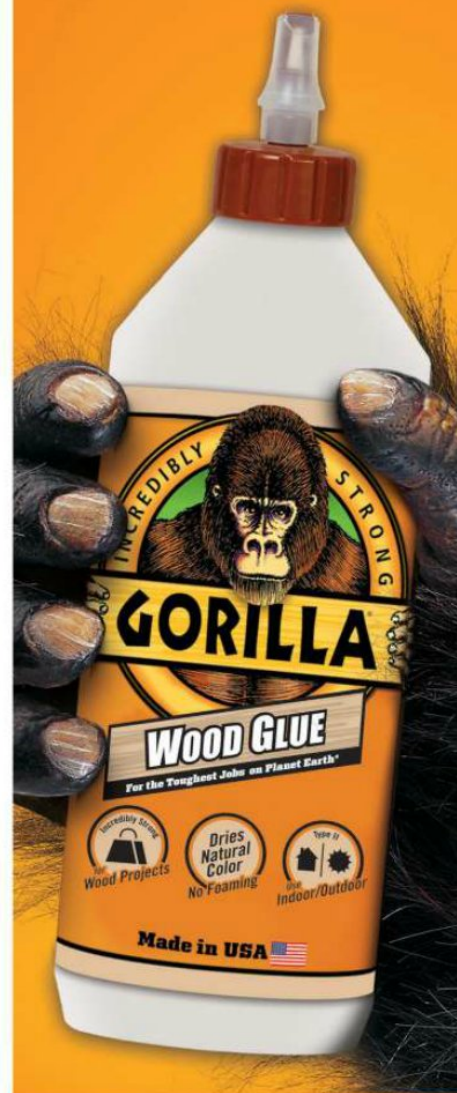
Saw-safe sheet-goods cutting supports

The unwieldy nature of sheet goods makes cutting them a clumsy operation. To make the task easier, I built these inexpensive 2x4 frames. They support the material fully, so you don't have to worry about pieces falling as they tend to do on sawhorses. Because they're assembled with dowels, any accidental cuts into a joint in the frame won't cause blade damage or kickback. When you finish using them, they stack and store easily.

—John Walsh, Spring Grove, Ill.



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Simple & Sturdy Picnic Set

Easy to build, and
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Table dimensions: 92"Wx47¼"Dx31"H
Bench dimensions: 72"Wx19¼"Dx18"H
Approximate materials cost: \$450 (cypress) or
\$225 (pressure-treated construction lumber).

Basic joinery ensures that you can build this heavy-duty outdoor table and benches with little fuss. We built them from 2x cypress, but you could use pressure-treated lumber, cedar, or any other wood suitable for outdoor exposure. If lumber you buy has rounded edges, consider buying wider stock and ripping off the edges to create the square corners shown.

Start with the bench ends

- 1** Cut the outside legs (A), inside legs (B), and end rails (C) to size [Materials List, [page 35](#)]. Cut stock 3" longer than shown for the braces (D).
- 2** Glue the outside legs (A) and inside legs (B) together in pairs, flush at the edges and bottom ends [Drawing 1].



Quick Tip! Assemble the benches and table with rust-resistant fasteners and waterproof glue for maximum durability.

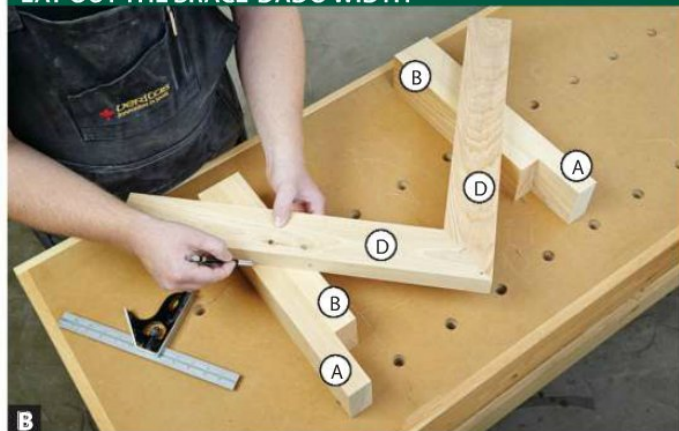
3 Miter-cut one end of each brace (D) at 45° [Drawing 1]. Cut biscuit slots in the mating faces, insert biscuits, and glue the braces together [Photo A, Drawing 1].

ASSEMBLE THE BRACES IN PAIRS

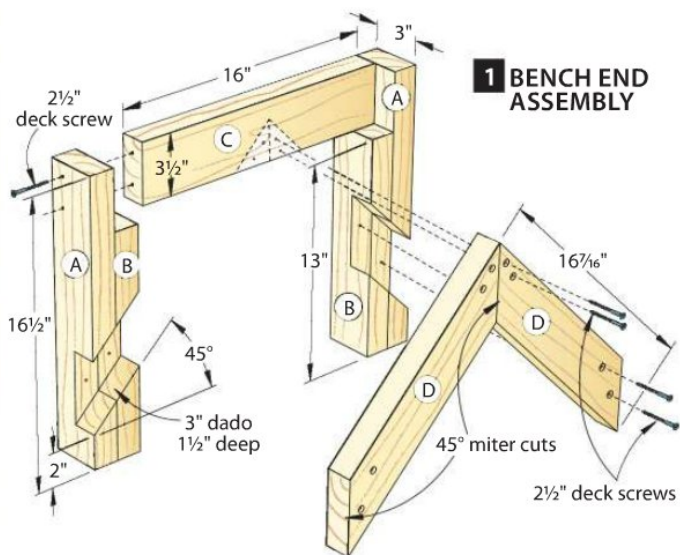


Glue the miter-cut ends of two braces (D) together with two #20 biscuits. Make sure the arms form a 90° angle. Construct four D/D assemblies.

LAY OUT THE BRACE-DADO WIDTH



Scribe the width of the dado on each leg assembly (A/B). Mark each leg using the brace (D) that will fit into the dado. Label mating legs and braces.



4 Lay out a 45° angle 2" from the bottom of each outer leg (A), running upward toward the inner leg (B) [Drawing 1]. Place the bottom edge of a brace assembly (D/D) on the line, and mark along the top edge onto the leg assembly (A/B) [Photo B]. Cut the angled dados in the legs (A/B) [Shop Tip, next page].

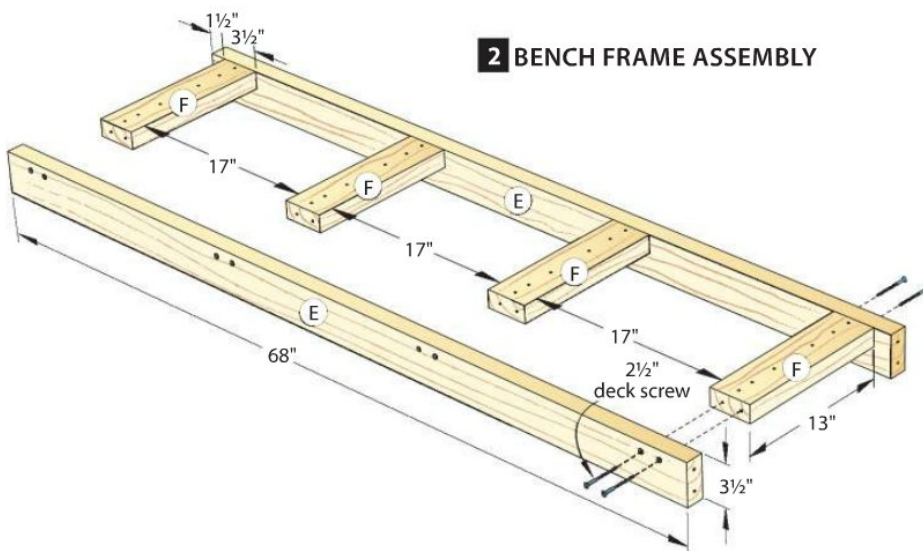
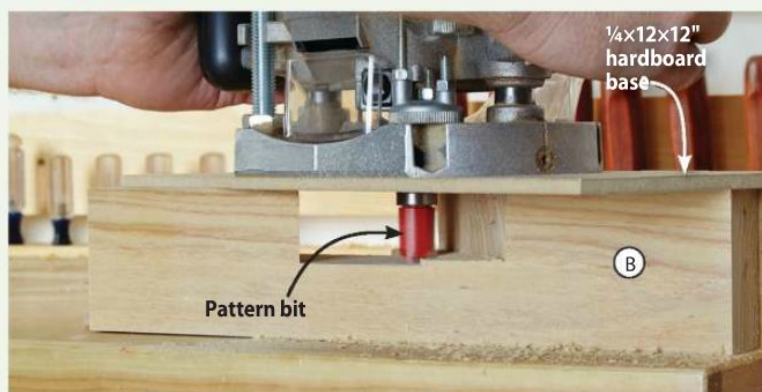
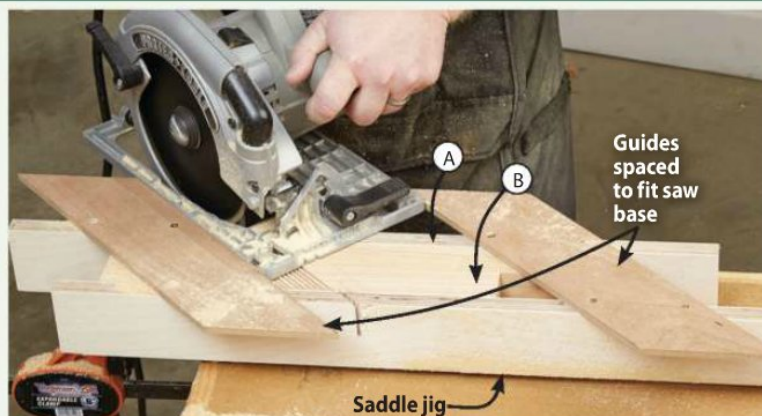
SHOP TIP

Cut wide, deep dados with a circular-saw jig

Construct two sliding saddles like the one shown *right* to fit snug over a leg assembly (A/B), one for the left-side legs and the other for the right-side legs. Take care to set the saw guides at exactly 45° to cut the dados accurately. Adjust your circular saw's cutting depth to 1½", and saw a kerf through both jig sides.

Place the jig over the leg assembly (A/B), aligning the saw kerf with the bottom dado layout line. Saw across the leg assembly. Then move the jig about ¼" toward the top dado layout line and cut again. Repeat until you reach the top layout line (*right*). (For more about cutting joints with a circular saw, see woodmagazine.com/circsawjoinery.)

Remove the waste (*below*) and clean up the dado with a chisel. You can clean up the dado with a router and pattern bit, but you'll need to add an oversize base to your router so it will span the dado (*right*). Repeat for the other legs.



2 BENCH FRAME ASSEMBLY

5 Glue and screw the end rails (C) between the leg assemblies (A/B) [Drawing 1]. Align the back of each rail flush with the outside of the legs (the side with no dado).

6 Dry-fit the brace assemblies (D/D) into the dados in the leg assemblies (A/B). Mark the trimmed length on each brace assembly and cut to length.

7 Glue and screw the brace assemblies (D/D) to the leg assemblies (A/B) [Drawing 1]. Set the end assemblies (A-D) aside while the glue dries.

ATTACH THE CLEATS TO THE RAILS



Place the top face of the cleats (F) flush with the top edge of the rails (E) as you assemble the frame. A spare cleat placed on edge positions the end cleats.

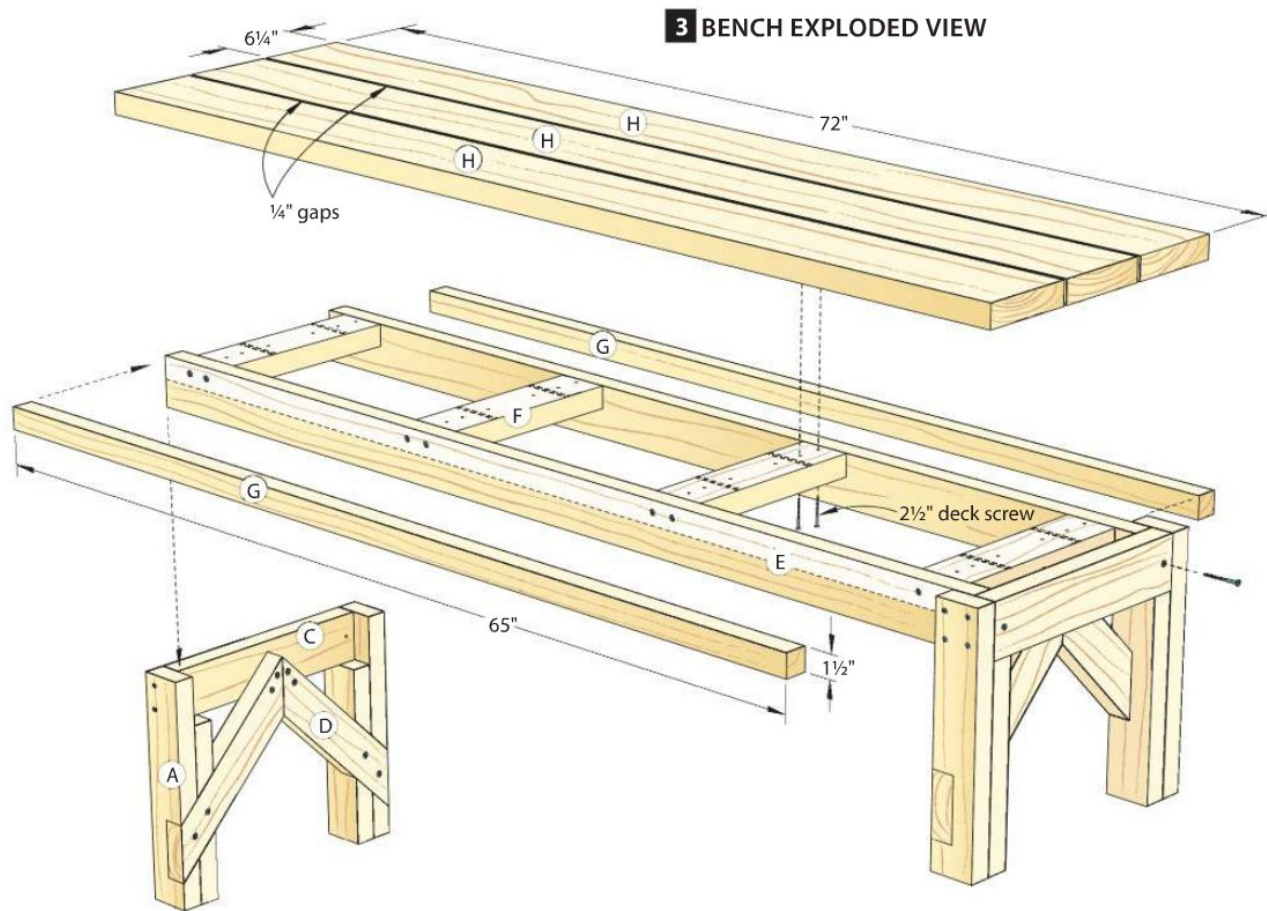
Top off the benches

1 Cut the bench side rails (E) and support cleats (F) to size [Drawing 2].

Quick Tip! Cut one extra support cleat to aid in properly positioning the end cleats when you assemble the rails and cleats.

2 Glue and screw the support cleats (F) to the side rails (E) [Drawing 2, Photo C].

3 Glue and screw an end assembly (A-D) to each end of each bench frame assembly (E/F) [Drawing 3].



4 Cut the side trim (G) and the seat boards (H) to size. Glue the trim (G) to the side rails flush with the top of the rails [Drawing 3].

5 Sand all surfaces of the bench bases (A-G) and seat boards (H) to 150 grit and apply finish. We wiped on three coats of Penofin Ultra Premium penetrating oil finish, transparent cedar color.

6 Attach the seat boards (H) to the bench bases (A-G) [Drawing 3].

Turn to the table legs

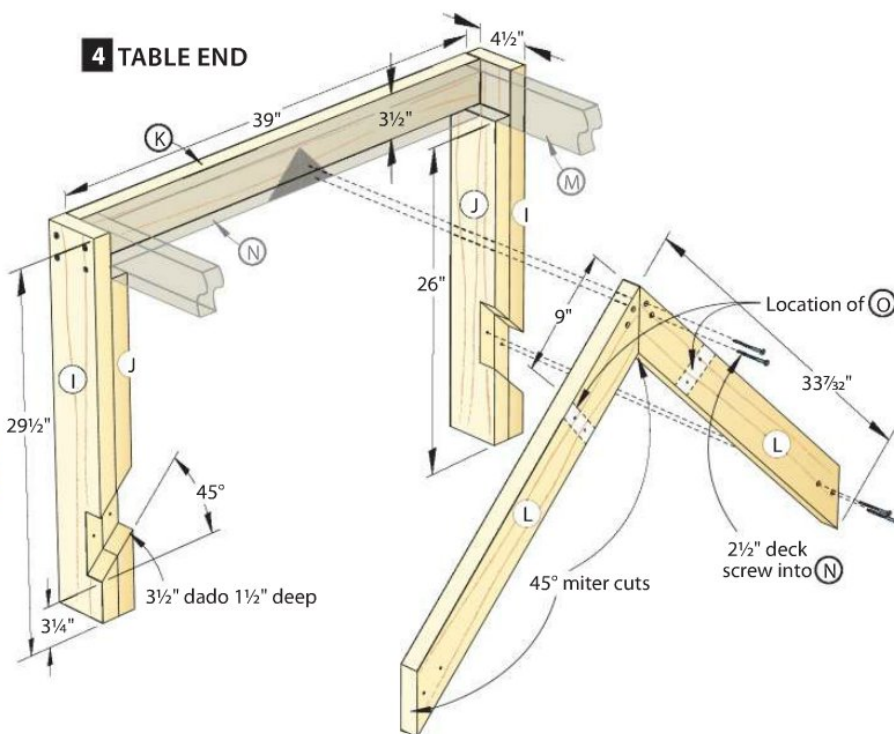
Note: Have someone help you handle the large, heavy table during assembly. Make sure the table will fit out through your shop door; consider assembling it on-site.

1 Cut the outside legs (I), inside legs (J), and outside end rails (K) to size. Set the end rails aside for now.

2 Glue the outside legs (I) and inside legs (J) together in pairs, flush at the edges and bottom ends [Drawing 4].

3 Cut the braces (L) to width, but 3" longer than shown. Miter-cut one end of each brace to 45°.

4 Cut two mating biscuit slots on the mitered ends, insert biscuits, and glue the braces together in pairs to make the right-angle brace assemblies (L/L) [Drawing 4].



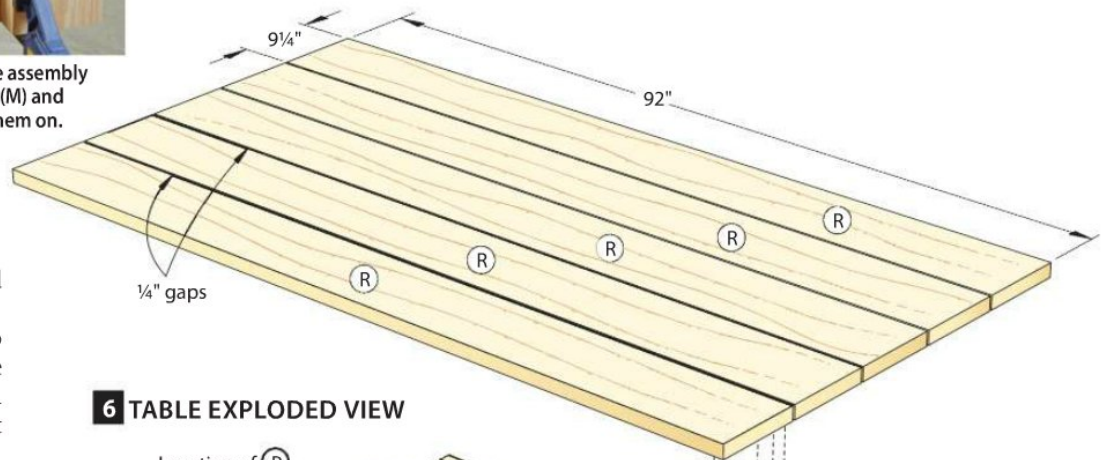
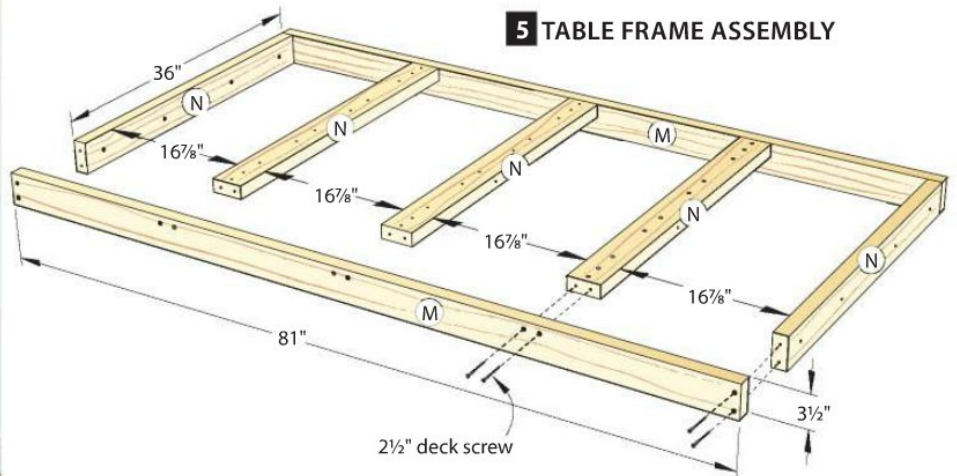
5 Lay out the angled dadoes on the legs following the procedure in **Start with the bench ends, Step 4**, except mark the initial line 3 1/4" from the leg (I/J) bottom [Drawing 4]. Cut the angled dadoes in the legs (I/J).

INSTALL THE TABLE LEGS

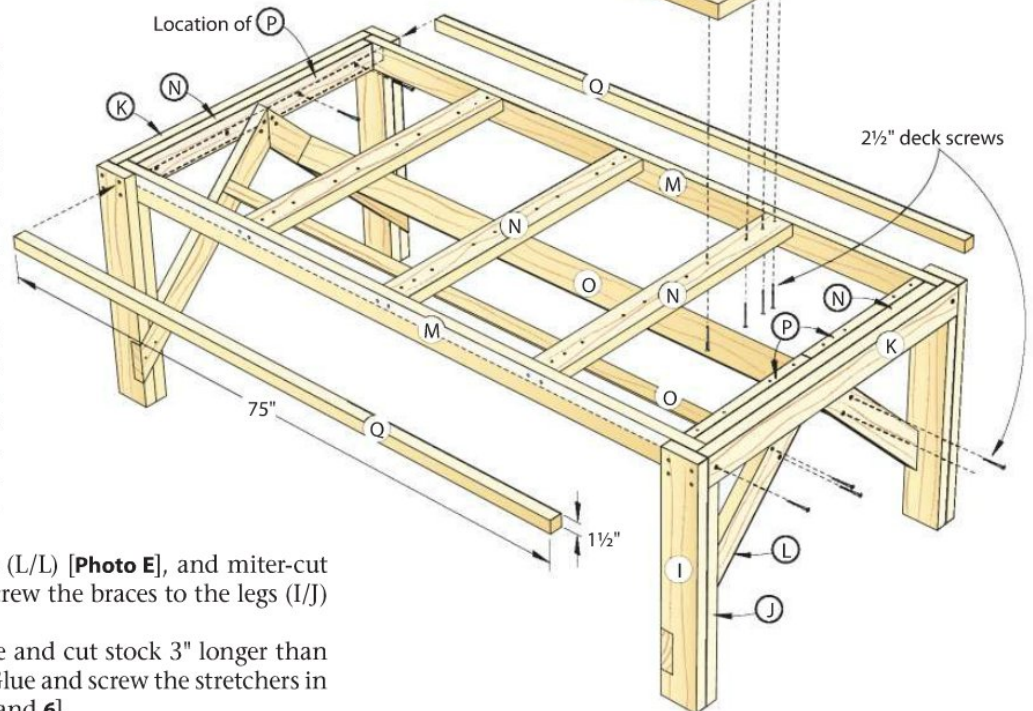


D Glue and clamp the legs (I/J) to the frame assembly (K/M/N). Square the legs to the side rails (M) and end rails/cleats (K/N) before you screw them on.

5 TABLE FRAME ASSEMBLY



6 TABLE EXPLODED VIEW



Build a solid table base

1 Cut the side rails (M) and cleats (N) to size.

2 Glue and screw on edge two end cleats between the side rails (M) [Drawing 5]. Glue and screw the remaining cleats flat between the side rails.

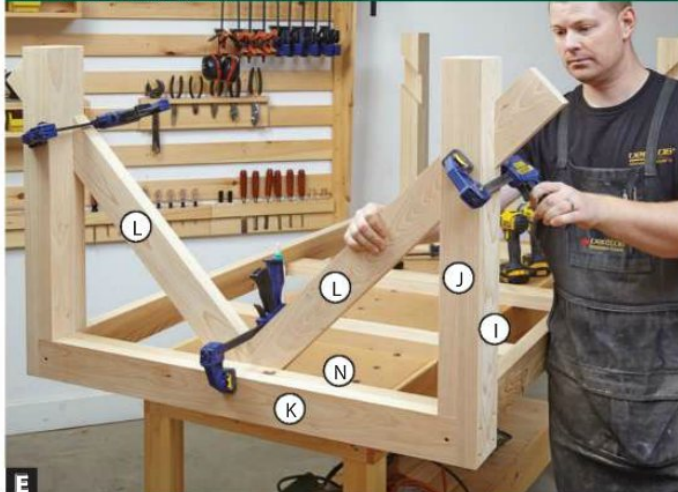
3 Retrieve the outside end rails (K), and glue and screw them to the cleats (N) [Drawing 6]. Drive screws through the end cleats (N) into the back of the outside end rails for a cleaner finished appearance. Screw the outer ends of the outside end rails to the ends of the side rails (M).

4 Glue and clamp the legs (I/J) to the table frame assembly (K/M/N) [Photo D]. Fasten the legs with 2 1/2 inch deck screws driven through the outside legs (I) into the outside end rails (K) and side rails (M) [Drawing 6].

5 Dry-fit the brace assemblies (L/L) [Photo E], and miter-cut them to length. Glue and screw the braces to the legs (I/J) and end cleats (N) [Drawing 6].

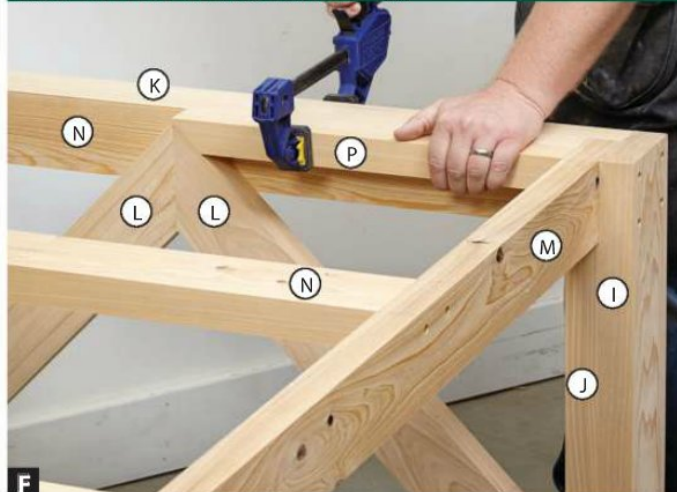
6 Cut the stretchers (O) to size and cut stock 3 inch longer than listed for the end cleats (P). Glue and screw the stretchers in place where shown [Drawings 4 and 6].

FIT THE BRACES TO THE LEGS



E Clamp each brace assembly (L/L) in place to mark the length of each brace along the outside faces of the legs (I/J).

ADD THE END CLEATS FOR THE TOP



F Glue the end cleats (P) between the braces (L) and the side rails (M) to allow fastening the ends of the top boards (R) from beneath the tabletop.

Put the top on the table

- 1** Turn the table over to stand on its legs, and trim the end cleats (P) to fit [Drawing 6]. Glue the cleats in place [Photo F].
- 2** Cut the side trim (Q) and top boards (R) to size. Glue the side trim to the side rails (M) [Drawing 6].
- 3** Sand all surfaces and apply finish [Top off the benches, Step 5].

- 4** After the finish dries, attach the top boards (R) to the table base (I–Q) [Drawing 6]. Then, gather your family and friends, pull up the benches, and enjoy the first of many outdoor meals at your sturdy picnic table. 🌲

Materials List

Part		FINISHED SIZE			Matl.	Qty.
		T	W	L		
Benches						
A	outside legs	1½"	3"	16½"	C	8
B	inside legs	1½"	3"	13"	C	8
C	rails	1½"	3½"	16"	C	4
D*	braces	1½"	3"	16⅞"	C	8
E	side rails	1½"	3½"	68"	C	4
F	support cleats	1½"	3½"	13"	C	8
G	side trim	1½"	1½"	65"	C	4
H	seat boards	1½"	6¼"	72"	C	6
Table						
I	outside legs	1½"	4½"	29½"	C	4
J	inside legs	1½"	4½"	26"	C	4
K	outside end rails	1½"	3½"	39"	C	2
L*	braces	1½"	3½"	33⅝"	C	4
M	side rails	1½"	3½"	81"	C	2
N	cleats	1½"	3½"	36"	C	5
O	stretchers	1½"	3½"	75"	C	2
P*	end cleats	1½"	1½"	18"	C	4
Q	side trim	1½"	1½"	75"	C	2
R	top boards	1½"	9¼"	92"	C	5

*Parts initially cut oversize. See the instructions.

Material key: C—cypress.

Supplies: 2½" deck screws (258), #20 biscuits (8).

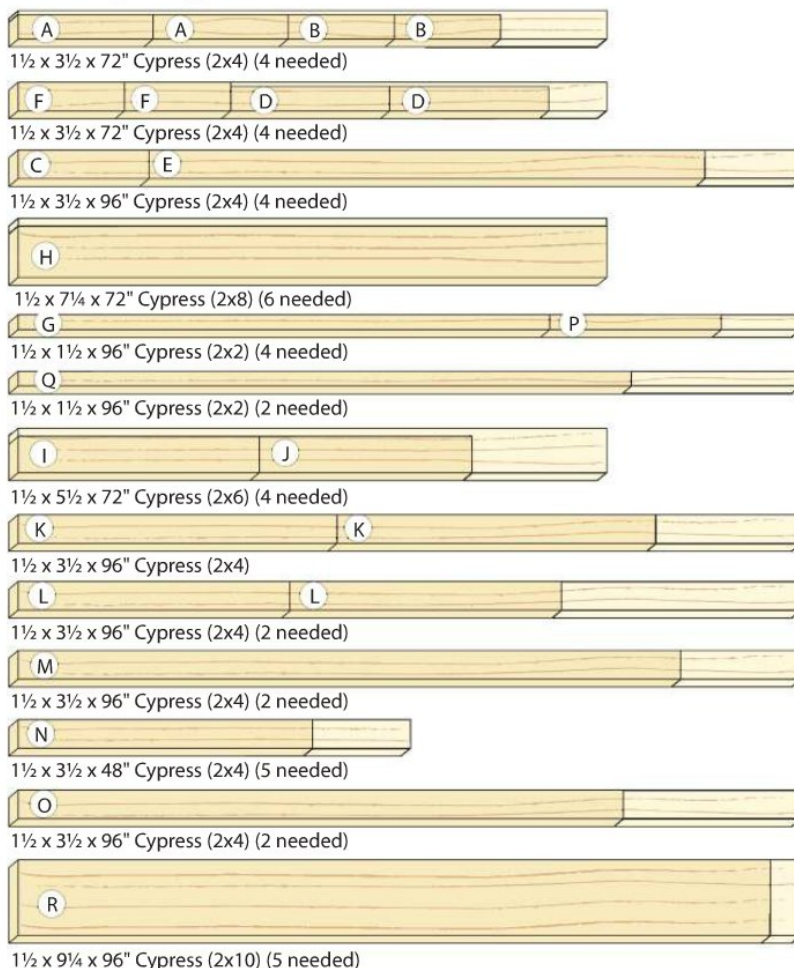
Produced by **Larry Johnston** with **John Olson**

Project design: **John Olson**

Illustrations: **Lorna Johnson**

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Cutting Diagram





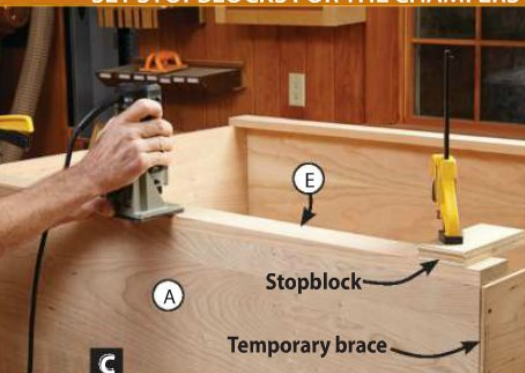
Dimensions: 19½"D × 38¾"W × 58"H
Materials cost: Lumber \$325; Hardware \$60; Glass \$36

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SET STOPBLOCKS FOR THE CHAMFERS



Position the stopblocks to end the chamfer 5" from each end of the side trim (E). Rout the $\frac{1}{4}$ " chamfer in two progressively deeper passes.

INSET BISCUIT SLOTS TO MAKE A LIP



The sides (A) sit $\frac{1}{4}$ " in from the edge of the base top (H), so set the biscuit-joiner fence to cut $\frac{5}{8}$ " from the edge of the base top and blocking (I).

the side trim and rout a stopped chamfer on the outside edge of each [Photo C, Drawing 1].

7 Cut the back (F) to fit the rear of the carcass (A–E), test its fit, then set it aside so you can easily access the inside of the carcass during the rest of construction.

8 Cut four corbels (G) to size [Materials List]. Make four photocopies of Drawing 1a, spray-adhere one to each blank, and bandsaw and sand the corbels to shape. Round over the front edges where shown, remove the patterns, and finish-sand the corbels. Set them aside for now.

Build a base with classic detail

1 From $\frac{3}{4}$ " plywood, cut an $18\frac{7}{8} \times 37\frac{1}{4}$ " blank for the base top (H). Rip a 2"-wide strip from the front edge. Cross-cut 3" from each end of the strip, and glue these blocks back to the base top in their original locations [Drawing 2a, Photo D].

2 Rest the carcass (A–E) on its back on a flat surface. Position the base top

THE EASY WAY TO NOTCH THE TOP



Cutting short blocks from a strip ripped from the base top (H) allows you to maintain a grain match while quickly creating the stepped profile.

A QUICK TICK FOR EACH BISCUIT



With the rear edges of the base top (H) and carcass (A–E) aligned, mark three evenly spaced biscuit locations across both pieces on each side.

(H) flush with the back of the carcass, and mark biscuit locations on the sides (A) and base top [Drawing 2, Photo E]. Do not cut the slots yet.

3 Cut two $\frac{3}{4} \times 2 \times 23$ " blanks and one $\frac{3}{4} \times 2 \times 33$ " blank for the blocking (I). (Because the blocking is hidden, this can be from any type of wood.) Crosscut the blocking to fit under the front and sides of the base top (H) and glue it in place, flush with the edges [Drawing 2].

4 While the glue dries, cut biscuit slots in the ends of the sides (A) centered $\frac{3}{8}$ " from the outside face. Reset the fence of your biscuit joiner and cut mating slots in the base top (H) centered $\frac{5}{8}$ " from the edge [Photo F].

5 For the base trim (J), prepare three $\frac{3}{4} \times 4 \times 31\frac{1}{2}$ " blanks.

Quick Tip! If you can get all three blanks from one length of lumber, with careful mitering you can create a continuous grain pattern around the base. Mark the blanks so you keep them in proper order and orientation as you work.

Rout a $\frac{1}{2}$ " cove along the top edge of each blank.

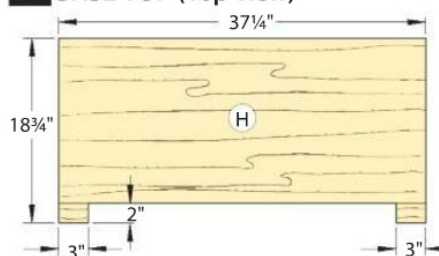
6 Miter the center base-trim (J) blank to fit the center portion of the base (H/I). Then, glue it in place [Photo G].

7 Miter the left end of the right-side blank, removing as little material as possible. Dry-fit the miters, and mark the opposite miter [Photo H]. Cut this piece of trim to length [Photo I].

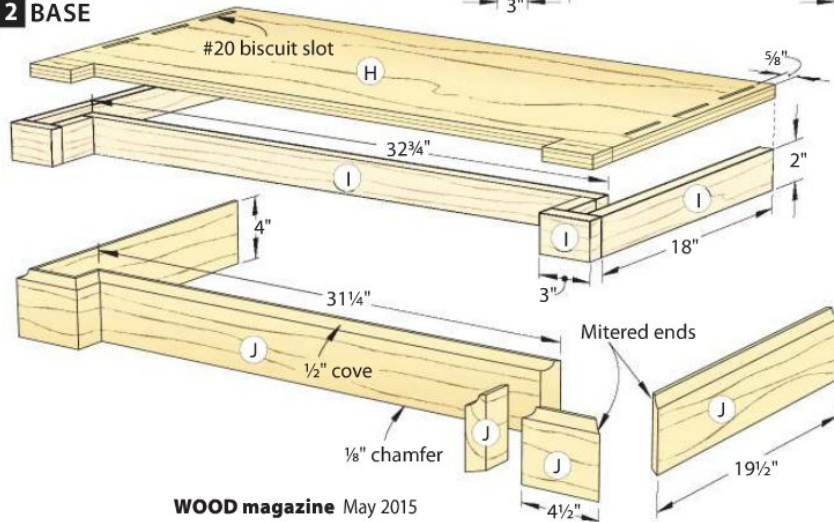
Quick Tip! A miter shooting board and a block plane can help you make very fine adjustments to a mitered piece's length while preserving the miter angle. See More Resources, page 42.

Work your way around the right side of the base, mitering each piece to fit, then gluing it in place.

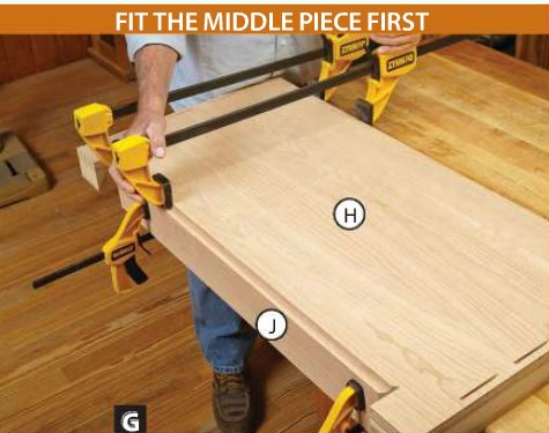
2a BASE TOP (Top view)



2 BASE



FIT THE MIDDLE PIECE FIRST



Miter-cut each end of the center base-trim blank to achieve a gap-free fit in the recess in the base (H/I). Clamp the top and bottom edges.

MITER AND MARK FOR A PERFECT FIT



Mark the top and bottom of the miter. Extend the marks around the trim (J) using a square. Mark parallel miters for the trim in the location shown.

LEAVE A TINY AMOUNT FOR FITTING



To preserve a grain match as closely as possible, cut to leave the pencil line, then fine-tune the miter with a block plane and shooting board.

8 Repeat this process on the opposite side of the base. After the glue dries, sand a $\frac{1}{8}$ " chamfer around the bottom edge of the trim. Glue the base to the carcass with #20 biscuits in the slots.

A drawer box tops it off

1 Cut the drawer-box top (K), bottom (L), and divider (N) to size.

2 Cut and miter the trim pieces (O, P, Q, R) to fit around the drawer-box top (K) and bottom (L) [Drawing 3]. Glue the trim in place. After the glue dries, finish-sand the panels.

3 Retrieve the drawer-box sides (M) cut earlier. Make a story stick for marking biscuit locations on the drawer-box top (K), bottom side trim (R), sides (M), and divider (N) [Photo J]. **Note:** Center the slots in the sides and divider on the thickness of the panels. Slots in the bottom side trim (R) are $\frac{3}{8}$ " from the edge, and those in the drawer-box top are $1\frac{1}{8}$ " from the edge of the trim (P) [Drawing 3a]. Dry-fit the top and bottom assemblies (K/O/P, L/Q/R), sides, and divider with biscuits to check alignment. Then disassemble the dry-fit.

4 Next, cut the front blocks (S) to size, finish-sand them, and glue them to the drawer-box sides (M) and the divider (N) [Drawing 3].

5 While the glue dries on those assemblies, rout the round-over on the top trim (O, P) [Drawing 3a]. For the bullnose

on the bottom trim (Q, R), mount a $\frac{1}{2}$ " round-over bit in your router table and raise the top of the cutting edge $\frac{3}{8}$ " above the table. Align the fence with the bit's bearing, and rout both faces of the trim.

6 Finish-sand the top and bottom assemblies (K/O/P, L/Q/R). Then glue up the drawer box [Drawing 3].

7 Cut the drawer guides (T) to size and glue them in place aligned with the edges of the front blocks (S) [Drawing 3]. Cut the drawer-box back (U) to size, check its fit, then set it aside.

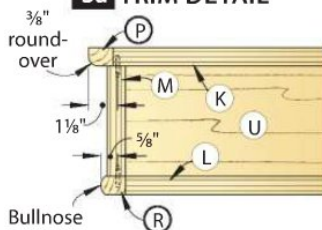
8 Lay the carcass and drawer box on their backs. Center the drawer box side-to-side on the carcass and flush at the rear. Screw the two assemblies together [Photo K, Drawing 4].

STICK TO YOUR STORY STICK

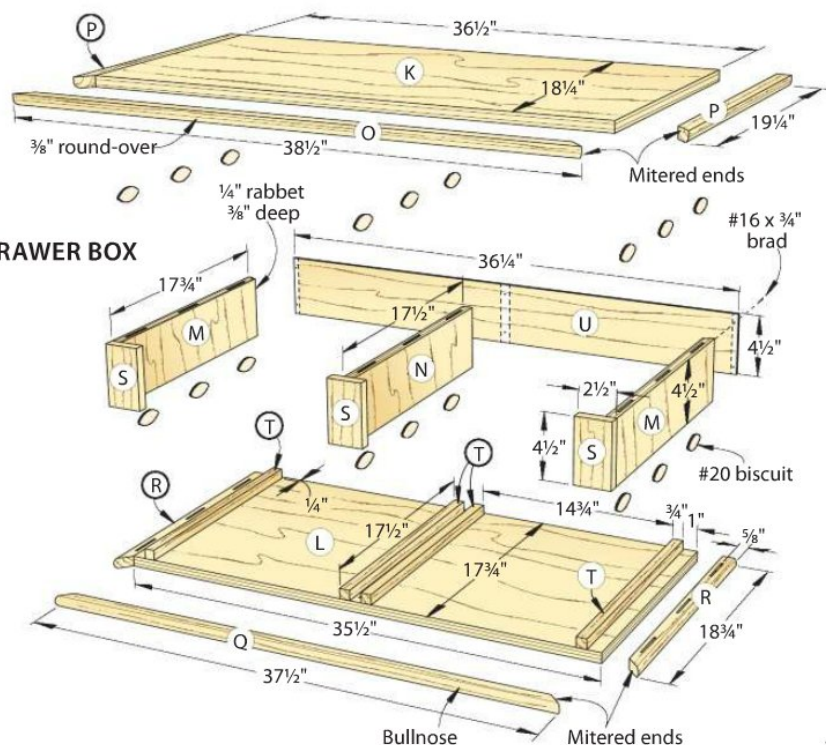


Lay out evenly spaced biscuit-slot locations once on a story stick, then register your biscuit joiner against it as you cut slots.

3a TRIM DETAIL



3 DRAWER BOX



9 Retrieve the corbels (G) and glue each one in place, centered on the side trim (E) [Drawing 4].

Build two basic drawers

Note: We used a drawer-lock joint on our drawers. If you'd like to try your hand at handcut dovetails, see **More Resources** for pointers.

1 Cut the drawer fronts (V), sides (W), and backs (X) to size [Drawing 5].

Quick Tip! Cut an extra drawer front and side to use when setting up the tablesaw for joinery.

Cut a groove to fit the plywood for the drawer bottom (Y) near the bottom edge of the fronts and sides.

2 Set up your tablesaw as shown in **Cut 1** of Drawing 6. Using your test pieces to check the setups first, cut a dado near the front end of each drawer side (W). Raise the blade and cut a groove across each end of each drawer front (V) [Cut 2]. Reposition the rip fence and lower the blade [Cut 3], and remove part of each tongue on the inside face of each drawer front. Complete the joinery by cutting a dado in each drawer side to fit the back (X) [Drawing 5].

3 From 1/4" plywood, cut the bottoms (Y) to size. Dry-fit the drawers and check their fit in the drawer box. If the fit is satisfactory, disassemble the drawers, finish-sand the parts, then glue and clamp the drawers together.

4 After the glue dries, slide each drawer into its opening, and note the gap above and at each side. Plane a chamfer along the front bottom edge of the drawer front (V) to match this gap [Photo L].

5 Install the drawer handles centered on the drawer fronts (V) [Drawing 5].

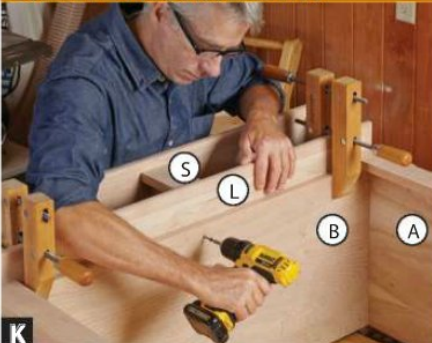
Add doors with a clear view

1 Measure the height of the door opening and cut the door stiles (Z) 1/8" less than this dimension. Place the four stiles side by side, measure their combined width, and write down this measurement. Measure the width of the door opening, subtract the combined width of the stiles, and divide the result by 2. Add 2 1/16" to the result and cut the door rails (AA) to this length.

2 Rout the mortises in the stiles (Z) and chisel the ends square [Drawing 7a, **More Resources**], or drill and chisel them to size. Set up a dado blade in your tablesaw, and cut the tenons on the rails (AA) to fit the mortises.

3 Dry-fit the rails and stiles and check the fit of both doors in the carcase.

JOIN THE TWO ASSEMBLIES



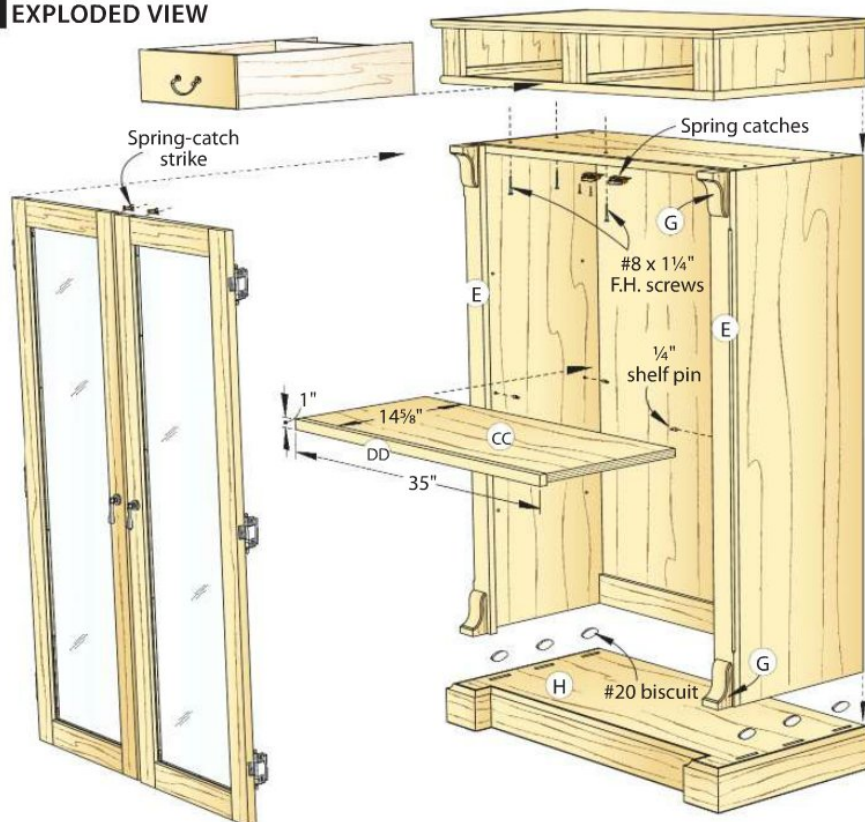
K Center the drawer box side-to-side on the carcase. Clamp them together and drive screws through the top (B) into the drawer-box bottom (L).

A CHAMFER SIMULATES A GAP



L Plane a chamfer below the drawer front (V) to create a shadow line that mimics the gap above and at the sides of the drawer front.

4 EXPLODED VIEW



With the doors resting on the base top (H) and clamped to each side trim (E), you should have even 1/8" gaps above them and between them. Trim the doors if needed, then glue and clamp them.

4 Rout the rabbet around the back of each door and square up the corners with a chisel [Drawing 7]. Attach the hinges to the outside stiles (Z).

5 Rest the doors in the carcase on 1/16"-thick spacers and screw the hinges to the side trim (E). Swing the doors closed; they will likely contact each other before you can fully close them. Lay one door over the other and mark along the inside stile (Z) onto the outermost door [Photo M]. Tilt your tablesaw blade to 5° and rip

the marked door stile to remove the pencil line plus 1/16". Reinstall the door and check the fit and reveal.

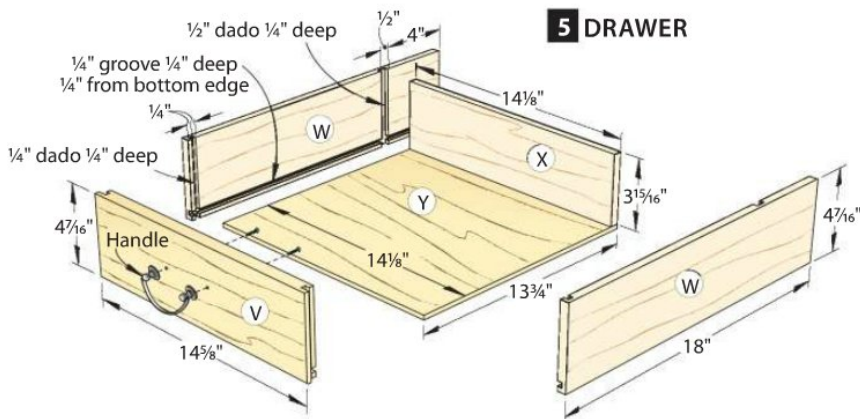
6 Mark the locations of the door pulls, drill holes on the marks, and install the pulls. Install the spring catches as well [Drawings 4, 7].

7 Cut four 60"-long glass-stop blanks (BB) and set them aside.

8 Cut the shelves (CC) and shelf trim (DD) to size [Drawing 4]. Glue a length of trim to each shelf with the top faces and ends flush. Finish-sand the shelves.

9 Remove the hinges and pulls, and apply a finish to all pieces. (We sprayed on three coats of satin lacquer.) After the finish dries, secure the glass in

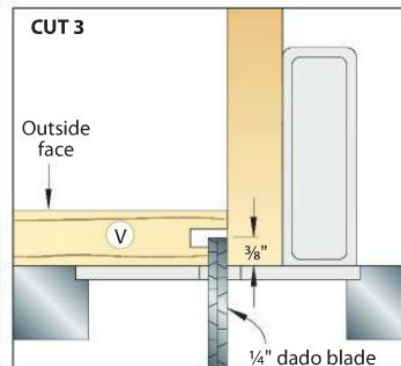
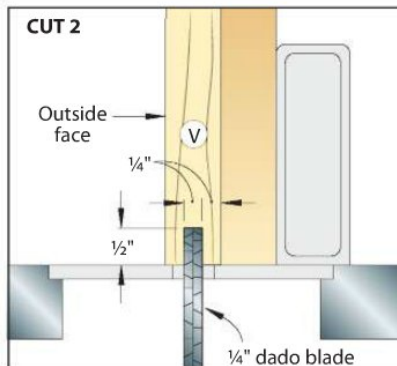
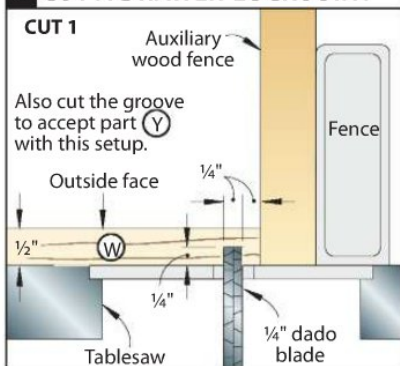
5 DRAWER



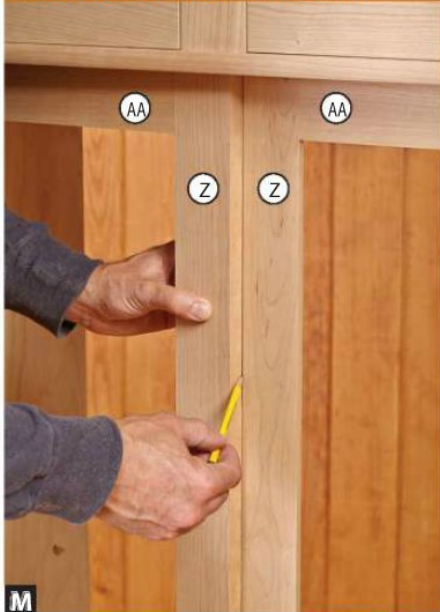
More Resources

- ▶ Get a free shooting-board plan for fine-tuning miters with a block plane at woodmagazine.com/blockplanemiter.
- ▶ Learn four ways to cut a mortise-and-tenon joint: woodmagazine.com/mt4ways.
- ▶ Download a free tutorial for handcutting dovetails at woodmagazine.com/handcutdoveys.

6 CUT A DRAWER-LOCK JOINT



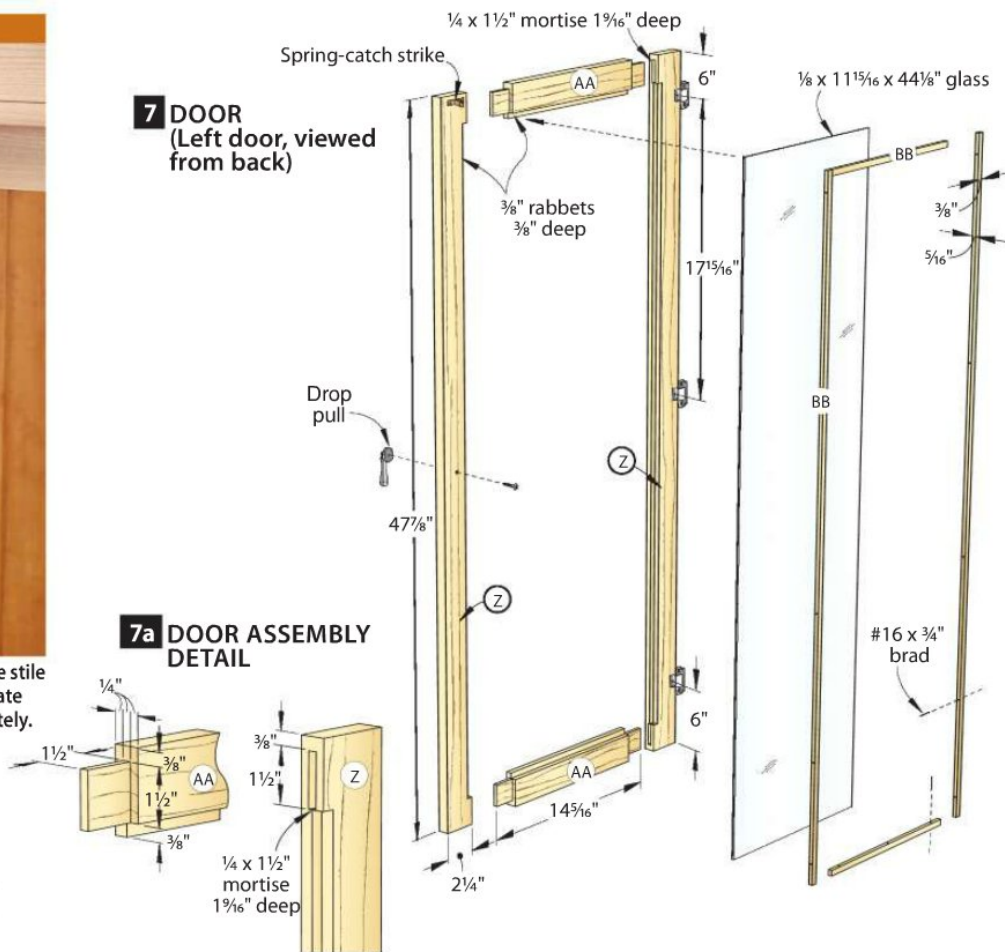
MAKE A MARK FOR CLEARANCE



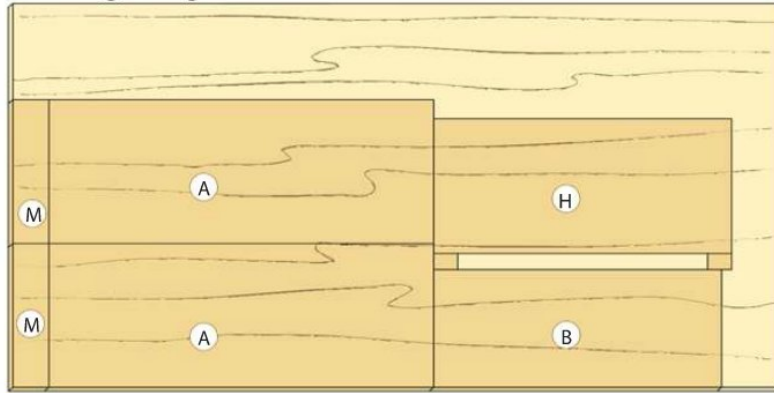
With one door resting atop the other, mark the stile of the topmost door. Then trim the stile to create clearance, allowing the doors to close completely.

the doors with the glass stop (BB). Reinstall the hardware, drawers, and doors. Nail the backs (F, U) in place [Drawings 1 and 3]. Your new cabinet is ready to showcase your favorite items. 🌳

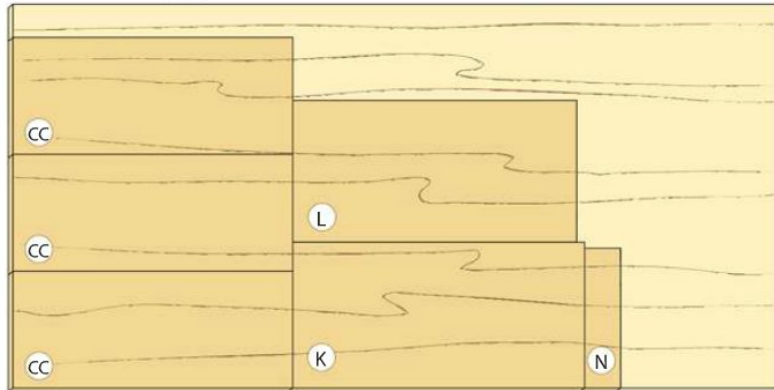
7 DOOR
(Left door, viewed
from back)



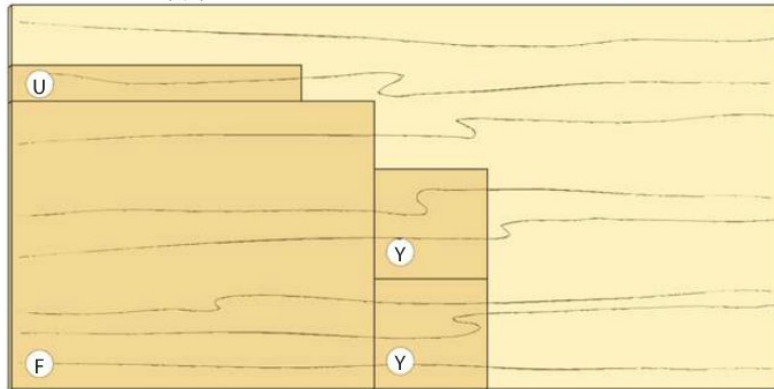
Cutting Diagram



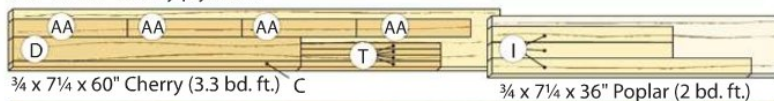
¾ x 48 x 96" Cherry plywood



¾ x 48 x 96" Cherry plywood



¼ x 48 x 96" Cherry plywood



¾ x 7¼ x 60" Cherry (3.3 bd. ft.) C

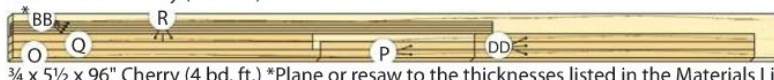
¾ x 7¼ x 36" Poplar (2 bd. ft.)



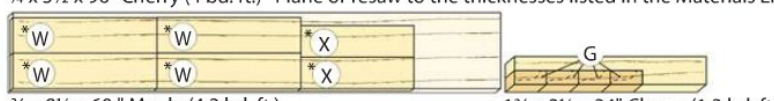
¾ x 5½ x 96" Cherry (4 bd. ft.)



¾ x 5½ x 96" Cherry (4 bd. ft.)



¾ x 5½ x 96" Cherry (4 bd. ft.) *Plane or resaw to the thicknesses listed in the Materials List.



¾ x 9¼ x 60" Maple (4.2 bd. ft.)

1¾ x 3½ x 24" Cherry (1.3 bd. ft.)



¾ x 5½ x 96" Cherry (4 bd. ft.)

Materials List

Part		FINISHED SIZE			Matl.	Qty.
		T	W	L		
Carcase						
A*	sides	¾"	15¾"	48"	CP	2
B	top	¾"	14¾"	36"	CP	1
C	top trim	¾"	¾"	36"	C	1
D	bottom rail	¾"	3"	36"	C	1
E	side trim	¾"	2½"	48"	C	2
F	back	¼"	36"	45⅝"	CP	1
G	corbels	1¾"	2"	4"	C	4
Base						
H*	base top	¾"	18¾"	37¼"	CP	1
I†	blocking	¾"	2"	33"	P	3
J†	base trim	¾"	4"	31½"	C	3
Drawer box						
K	drawer-box top	¾"	18¼"	36½"	CP	1
L	drawer-box bottom	¾"	17¾"	35½"	CP	1
M*	drawer-box sides	¾"	17¾"	4½"	CP	2
N	divider	¾"	17½"	4½"	CP	1
O	top front trim	¾"	1"	38½"	C	1
P	top side trim	¾"	1"	19¼"	C	2
Q	bottom front trim	¾"	1"	37½"	C	1
R	bottom side trim	¾"	1"	18¾"	C	2
S	front blocks	¾"	2½"	4½"	C	3
T	drawer guides	¾"	¾"	17½"	C	4
U	drawer-box back	¼"	4½"	36¼"	CP	1
Drawers, doors, and shelves						
V	drawer fronts	¾"	4⅞"	14⅝"	C	2
W	drawer sides	½"	4⅞"	18"	M	4
X	drawer backs	½"	3⅝"	14⅝"	M	2
Y	drawer bottoms	¼"	13¾"	14⅝"	CP	2
Z	door stiles	¾"	2¼"	47⅞"	C	4
AA	door rails	¾"	2¼"	14⅝"	C	4
BB†	glass stops	⅝"	⅜"	60"	C	4
CC	shelves	¾"	14⅝"	35"	CP	3
DD	shelf trim	¾"	1"	35"	C	3

*Parts initially cut oversize. See the instructions.

†Crosscut these blanks into shorter sections. See the instructions.

Materials key: CP—cherry plywood, C—cherry, P—poplar or other secondary wood, M—maple.

Supplies: #8 x 1¼" flathead screws (7), #16 x ¾" brads (48), #20 biscuits (24), ⅞ x 11½ x 44⅞" glass (2).

Blade and bits: Stacked dado set; ⅞", ⅜", and ½" round-over, 45° chamfer, ½" cove, ⅜" rabbeting router bits; ¼" drill bit, countersink.

Source: 18mm x 58mm drop pulls (2) no. 01A68.21, \$5.60; 96mm handles (2) no. 01A67.11, \$7.50; 1¼" spring catches (2) no. 00W11.02, \$1.40; 2¼" wrap inset hinges (6) no. 01H30.12, \$4.60; ¼" shelf supports [pack of 20] no. 00S10.10, \$3.10; Lee Valley, 800-871-8158, leevalley.com.

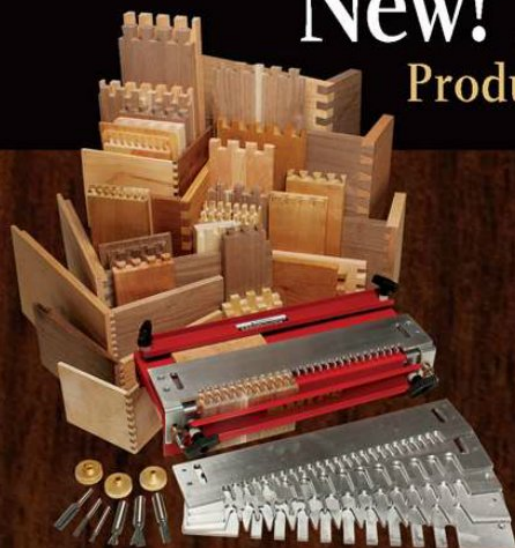
Produced by **Craig Ruegsegger** with **Kevin Boyle**

Project design: **Kevin Boyle**

Illustrations: **Roxanne LeMoine**; **Lorna Johnson**

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SHOP TESTED

10" Compound MiterSaws

You can buy miterSaws in many types and sizes today, but these sell better than all others because of their combination of capacity, compactness, simple operation, cut quality, and attractive pricing.





Back in the late 1970s, my dad was trimming out new houses, and my brothers and I helped him weekends and summers. I distinctly remember when he bought his first miter saw, a Rockwell 10" model with a particleboard table. I was amazed at how much easier it became to cut accurate miters. Fast-forward 20 years, and I bought my first miter saw—a Craftsman 10" compound saw that served me well for a decade. If you're looking for a miter saw,

consider one of the eight models reviewed on these pages. If you rarely need to crosscut more than a 2x6, are trimming out your own house, or are on a tight budget, one of these will fill the bill nicely.

Bob



Bob Hunter
Tools Editor

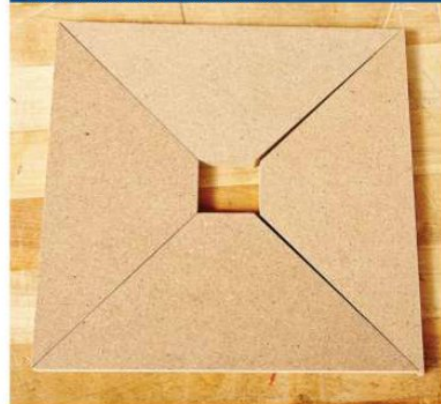
The 5 most important qualities of a miter saw

Throughout our extensive testing, the four premium-priced "pro"-brand saws (DeWalt, Hitachi, Makita, and Ridgid) demonstrated significant performance advantages over the four lower-priced DIY-brand saws (Chicago Electric, Craftsman, Ryobi, and Skil). That's not surprising given their price differences, but it's important to keep that performance gap in mind when considering how you use a saw.

► **Power.** All the saws cut through 2x6 pine nicely, but as we started cutting thicker and harder woods, the DIY saws began to bog down, while the pro models powered through all cuts with ease.

► **Miter accuracy.** Out of the box, the pro saws delivered precise cuts at all angles. The DIY saws proved accurate at 90° (labeled as 0° on each saw's scale), but we could not calibrate these saws to also make accurate 45° cuts (shown above, right) without losing that 90° calibration.

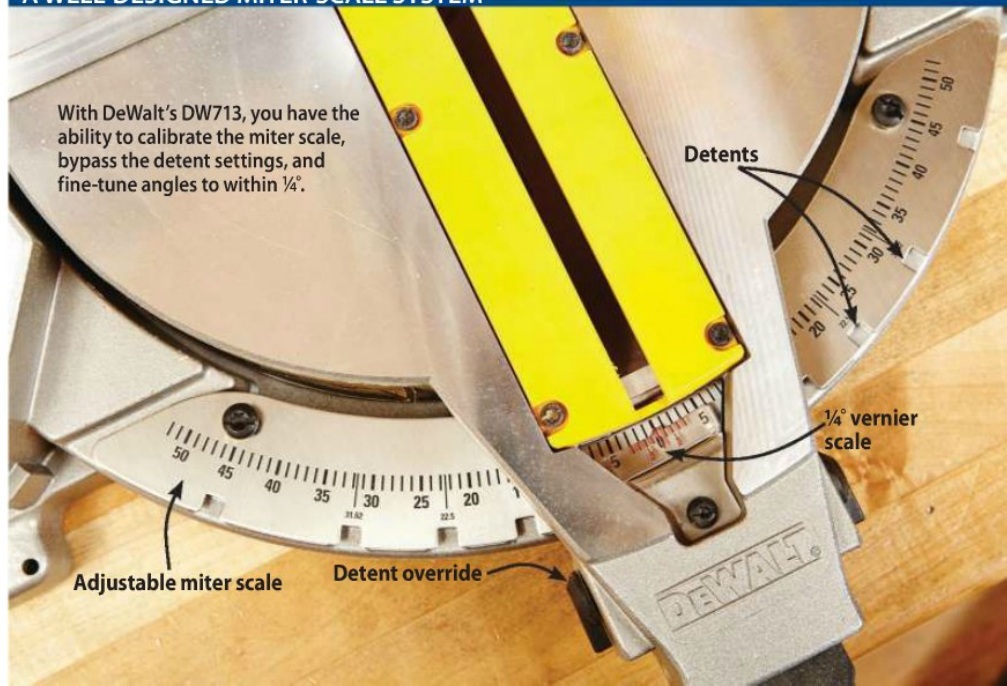
INACCURACY ADDS UP



We cut these eight 45° miters on a DIY-brand saw, and because each one was just a few tenths of a degree off, the joints could not come together.

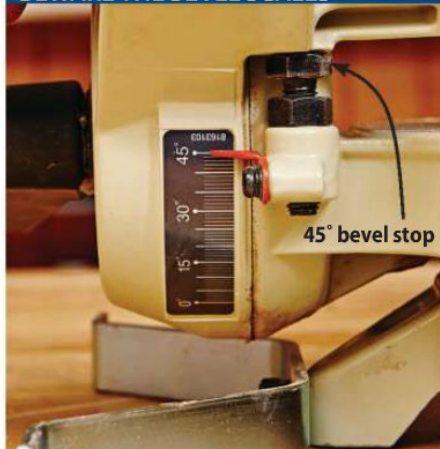
The head on each tested saw pivots right and left up to at least 45°, with some as much as 52°. Detent stops ensure a positive "lock" at commonly used angles. Only the DeWalt DW713, shown below, has a detent override, allowing you to lock in an angle just slightly to one side of a detent without it falling into the notch.

A WELL-DESIGNED MITER-SCALE SYSTEM



► **Bevel capacity.** Each of the saws tilts to the left with adjustable stops at 45° (shown *below*) and 90°. But the Ridgid R4112 also tilts right, a handy feature when it's difficult to position a workpiece for a left-tilt cut. Accurately setting a bevel angle other than 45° or 90° on any of the saws requires you to align markings on the saw and base, a difficult chore.

BEWARE THE BEVEL SCALES



The bevel scales on all the saws prove more difficult to read than miter scales because of their tiny size and location at the rear of the saw.

► **Helpful table and fence.** These saws have small tables capable of supporting workpieces 8" or narrower without issue, but wider boards can get tippy. We like that the tables on the DeWalt, Hitachi

SHORT-FENCE WOES



The short fence on the Ryobi TS1345L provides little to no support for workpieces cut when held in a vertical position.

C10FCH2, Ridgid, and Skil 3317 stand 3½" tall, making it handy to stand a 2x4 on edge for supporting long workpieces.

The fences on the DIY saws prove too short for use in cutting crown molding at

DOUBLE-DUTY TALL FENCE



The tall sliding fence sections on the Ridgid R4112 can be swapped side-for-side, making it easier to support crown molding in its nested position.

10" Compound miter saws: Where value and function meet

BRAND	MODEL	PERFORMANCE RATINGS (1)														MITER SETTINGS				
		PRIMARY								SECONDARY						MAX. ANGLE (RIGHT AND LEFT), DEGREES	LEFT AND RIGHT DETENTS, DEGREES			
		OBSERVED POWER	MITER				BEVEL				EFFECTIVENESS OF FENCE	QUALITY OF CUT WITH PREMIUM BLADE	QUALITY OF FACTORY BLADE	PORTABILITY	EASE OF CHANGING BLADE				ACCURACY OF LASER	DUST COLLECTION, WITH EQUIPPED BAG
			ACCURACY OF STOPS	EASE OF CHANGING POSITION	RELIABILITY OF LOCK	SCALE READABILITY	ACCURACY OF STOPS	EASE OF CHANGING POSITION	RELIABILITY OF LOCK	SCALE READABILITY										
CHICAGO ELECTRIC	69683	C	B	C	B	B	B	B	B	B	C	C	D	B	B	B	C	45	0, 8, 15, 22.5, 31.6, 45	
CRAFTSMAN	21236	C	B	C	B	B	B	B	B	B	C	C	D	B	B	B	C	45	0, 8, 15, 22.5, 31.6, 38, 45	
DEWALT	DW713	A	A	A	A	A	A	A	A	B+	A	B+	C	B	B+	N/A	B	52	0, 10, 15, 22.5, 31.6, 45	
HITACHI	C10FCH2	A	A	A	A	A	A	A	A	B+	A	B+	C	A	B-	A	B	52	0, 15, 22.5, 31.6, 45	
MAKITA	LS1040	A	A	A	A	A	A	A	A	B+	A	B+	C+	A	A	N/A	A-	50	0, 15, 22.5, 30, 45	
RIDGID	R4112	A-	A	A	A	A	A	A	A	B+	A	B+	C	B	A	A	A-	51	0, 15, 22.5, 31.6, 45	
RYOBI	TS1345L	B-	D	D	C	B	B	B	B	C	C	B-	D	A-	A	A	D	47	0, 15, 22.5, 31.6, 45	
SKIL	3317	B	D	D	C	B	B	B	B	B	B	C	D+	B	C	B	D	47	0, 15, 22.5, 31.6, 45	

1. **A** Excellent **D** Poor
B Good **N/A** Not applicable
C Fair

2.(*) Lifetime service upon registration

3. (C) China
(M) Mexico
(T) Taiwan

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

its nested spring angle (shown below). Instead, we prefer the taller fences of the pro saws. Parts of these fences also slide or pivot out of the way to allow you to tilt the blade through its full range.



► **Cut quality.** All of the saws come with a blade best suited for cutting construction lumber. When we outfitted each saw with a new Freud LU74R010 thin-kerf 80-tooth crosscut blade, the quality of cut improved

at least one letter grade. (See the performance chart below.) After making the blade upgrade, only the pro-brand saws made cuts free of tear-out with only light scoring marks.



The miter-detent lever release on the Chicago Electric and Craftsman saws protrudes above table height, impeding wide workpieces, such as this 2×10 (which you'd have to cut, flip, and cut on this size saw anyway).

		BEVEL SETTINGS		DIMENSIONS, INCHES	CUTTING CAPACITIES, INCHES					LASER POWER SOURCE	NOISE LEVEL, DECIBELS (NO LOAD)	CORD LENGTH, INCHES	WEIGHT, POUNDS	WARRANTY, YEARS (2)	COUNTRY OF ASSEMBLY (3)	SELLING PRICE (4)
	DETENT OVERRIDE? (YES, NO)	MAX. ANGLE (LEFT/RIGHT), DEGREES	STOPS, DEGREES	OVERALL DIMENSIONS (WITH EXTENSION WINGS, IF SO EQUIPPED) (W×D×H)	0° BEVEL		45° BEVEL		MAX. DEPTH AT FENCE (¾" STOCK)							
					AT 0° MITER	AT 45° MITER	AT 0° MITER	AT 45° MITER								
	N	45/0	0, 45	26⅞×21×22½	5⅞	4¼	6	4¼	3⅞	110V	91	72	27	90 days	C	80
	N	45/0	0, 45	18×21×22½	5⅞	4⅝	6	4⅝	3¼	Battery	90	75	27	1	C	130
	Y	45/3	0, 45	20×25×22	6⅝ ₁₆	4⅝ ₈	6⅝ ₁₆	4⅝ ₈	3⅞	N/A	89	75	34	3	M	220
	N	45/0	0, 45	25¾×24×21¾	5⅞	4⅞ ₁₆	6	4⅞ ₁₆	3⅞	110V	89	75	27	5	T	170
	N	45/0	0, 45	18×20×21	5¼	3⅞ ₁₆	5¼	3⅞ ₁₆	4	N/A	91	88	27	3	T	200
	N	48/48	0, 33.9, 45, 48	20×22¼×23½	5¼	4	5¼	4	4	110V	90	74	31	3/Life*	C	200
	N	45/0	0, 45	17⅞×21×20	5⅞	3⅞	5¼	3⅞	3⅞ ₁₆	Battery	90	75	21	3	C	120
	N	47/0	0, 45	37×21×22½	5⅞ ₁₆	4	5⅞ ₁₆	4	3¼	110V	91	72	25	3	C	150



Chicago Electric 69683, \$80

800-423-2567, harborfreight.com

Pros: A lightweight saw, this model delivers few frills for the lowest price in our test group. It performed as well as or better than the three other DIY-level saws.

Cons: The motor creates a hot, burnt smell; though we found no damage, it does make us wonder about the saw's longevity. Its miter detents do not engage as solidly and reliably as other saws, and the detent release interferes with wide workpieces (*previous page*). Because of limited vertical capacity, this is the only saw in the test that cannot cut through a standard 4x4. The blade-changing wrench does not store on the saw. You get only a 90-day warranty with this saw.



Craftsman 21236, \$130

800-349-4358, craftsman.com

Pros: Nearly identical to the Chicago Electric, the 21236 comes with a full-year warranty, has two miter detents more in each direction than on other saws, and it cuts slightly wider when you tilt the blade.

Cons: It shares the Chicago Electric's detriments except for the motor smell, and it does not come with table extension wings.



DeWalt DW713, \$220

800-433-9258, dewalt.com

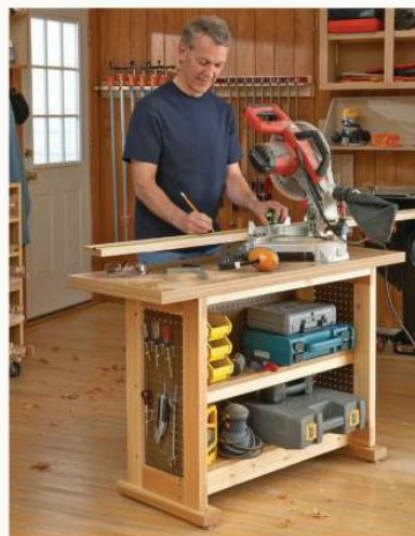
Pros: A robust miter saw, the DW713 cuts accurately out of the box, but when needed, miter and bevel adjustments prove easiest to make among this group. It has plenty of power, smooth-gliding movements, an easy-to-read stainless steel miter scale, a vernier scale (shown on *page 45*) for fine-tuning miters to within $\frac{1}{4}^\circ$, and the tallest (5") easy-slide fence. Because its fence mounts farther back from the blade's arbor compared to the other saws, it has the most crosscut capacity. The blade-changing wrench stores on the saw.

Con: At 34 lbs, this is the heaviest saw in our test (a con only if you lug it around). You do not get a workpiece clamp as standard equipment.

More Resources

- Find helpful tips for getting the most from your miter saw at woodmagazine.com/mitersaw.
- Not interested in one of these saws? Read reviews of other miter saws as well as stands, blades, and accessories from *WOOD*® editors and readers at reviewatool.com/mitersawreviews.
- Check out our plans for shop projects to accompany your miter saw at woodmagazine.com/mitersawplans.
- Want to learn more about buying a miter saw? Read our guide at woodmagazine.com/buyamitersaw.

WOOD® MAGAZINE'S REVIEW A TOOL





Hitachi C10FCH2, \$170

800-829-4752, hitachipowertools.com

Pros: Sporting plenty of power, easy-to-read and accurate miter scales, a tall fence, and a 5-year warranty, this saw performs well at a middle-tier price. Its electric laser is accurate, shows up well in the shop and outdoors, and has an on/off switch for times you want to bypass it. The blade-changing wrench stores on the saw.

Cons: When tilting the blade to 45°, the hold-down clamp interferes with the blade guard; we had to cut this angle without it.



Makita LS1040, \$200

800-462-5482, makitatools.com

Pros: This saw scored high marks in almost every category: power, accuracy, miter and bevel scales, saw and table movement, cut quality, fence height and ease of use, and dust collection. Plus, it weighs just 27 lbs and comes with a 3-year warranty.

Cons: The blade-change wrench does not store on the saw, and the hold-down clamp prevents the saw from tilting a full 45°; we had to cut without it.



Ridgid R4112, \$200

866-539-1710, ridgid.com

Pros: The angle-mounted motor and bevel gears make possible right tilting and smooth startup without the jerkiness common to the sidewinder-style motors of the other saws. The miter scale has markings in 1/2° increments so you can easily fine-tune angles. When tilting the saw, a rotating stop provides settings for 33.9° (for cutting crown molding lying flat), 45°, and 48°. You can turn the electric laser off when not needed, and it works well when used. The blade-change wrench stores on the saw. Dust collection was excellent. The 3-year warranty becomes lifetime coverage when you register after purchase.

Cons: The horizontal clamp occasionally lifted workpieces slightly off the table, and it won't work with boards wider than 5 1/2".



Ryobi TS1345L, \$120

800-525-2579, ryobitools.com

Pros: At 21 lbs, it's the lightest saw in our test and carries easily. The blade wrench stores on the saw.

Cons: This saw's shallow miter detents lack the positive lock of other models, and like the other DIY saws, could not all be calibrated simultaneously. The short fence provides little support for cutting workpieces held vertically, and the horizontal clamp won't hold boards wider than 4 1/2". The laser, though accurate, has no adjustment if bumped, and runs on a battery.



Skil 3317, \$150

877-754-5999, skiltools.com

Pros: Extension wings on each side and a table extension on the left give this saw the most workpiece support side-to-side. It demonstrated more power than the other DIY saws. The blade wrench stores on the saw.

Cons: Like the other DIY saws, the miter detents on the 3317 proved unreliable. The horizontal clamp occasionally lifted workpieces and won't work with boards wider than 5 1/2". The laser proved unreliable and has no adjustment.

Time to pick a winner

You'd be happy owning any of the pro-brand saws in this review, but the DeWalt DW713 and Makita LS1040 rose to the top of that group to share Top Tool honors. The DeWalt is all about accuracy and workpiece capacity. The Makita is accurate, lightweight, and better at trapping its own dust.

The Hitachi C10FCH2, selling for \$30–\$50 less than the other top performers, earns the Top Value award. It's accurate, powerful, easy to use, and covered by a 5-year warranty.

Produced by **Bob Hunter** with **Steve Feeny**

East meets West

Woven-Seat Bench

Asian-influenced design merges with a traditional Shaker woven seat for a universally great place to sit.

Overall dimensions: 45"W x 18½"D x 25¾"H
Materials cost: approx. \$230

Make the bench components

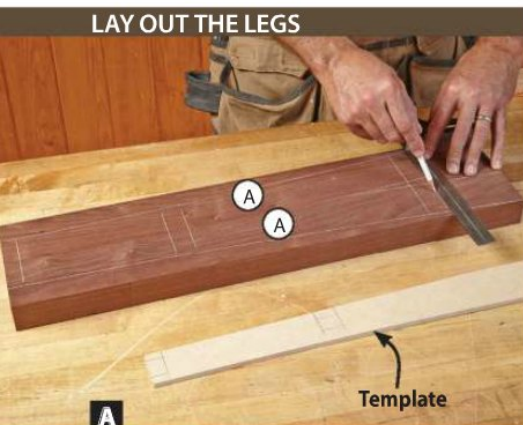
1 From 1½"-thick stock, cut four 3×25¾" blanks for the legs (A). Following **Drawing 1**, make a template of the leg from ¼" hardboard or MDF, including the locations of the tenon and mortises. Use that template to lay out the curve on each leg and the mortise locations on one leg of each pair. Transfer

the mortise lines to the opposing legs [**Drawing 2, Photo A**].

Quick Tip! Because regular pencil marks don't show up well on walnut, use a white-lead pencil to draw layout lines.

2 At the drill press, bore out the 1¼"-deep mortises on each leg (A) for the short rails (B) and long rails (C) [**Drawing 1, Photos B and C**].

LAY OUT THE LEGS



To ensure that mating mortises on opposing legs line up, place those legs side by side and transfer the locations from one to the other.

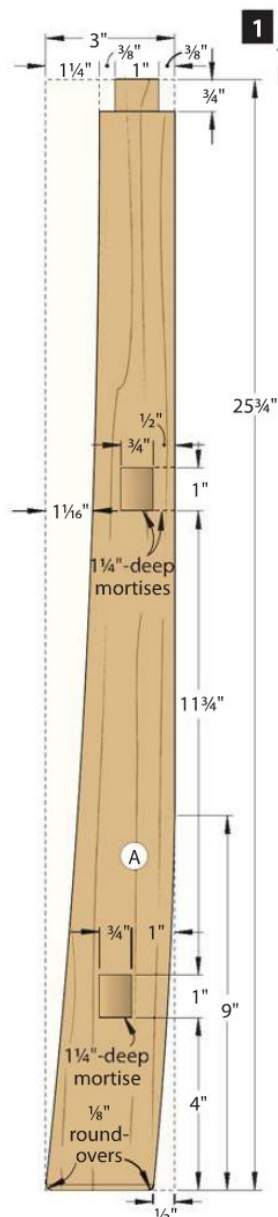
MAKE THE MORTISES



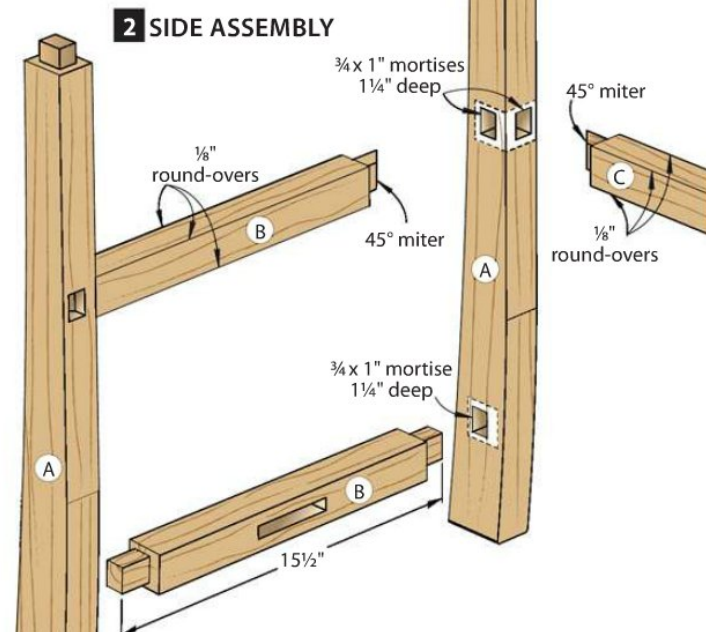
Make the mortises by boring a pair of overlapping holes in ¼" successive depths within the mortise locations on each leg.



Square up the mortise corners by registering a sharp ¾" chisel against a square. This ensures mortise walls perpendicular to the leg edges.

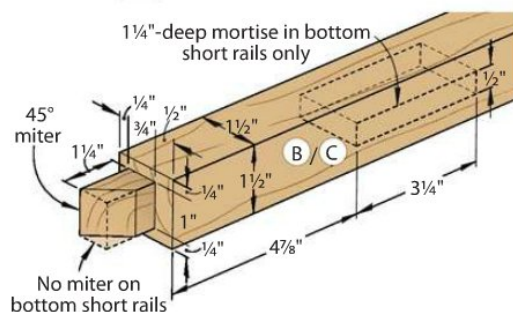


1 LEG (Left rear and right front shown, right rear and left front are mirror image)

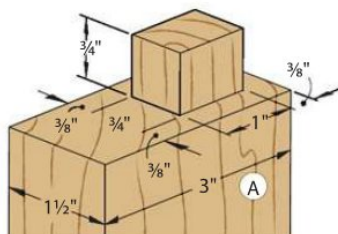


2 SIDE ASSEMBLY

2a RAIL TENON DETAIL



1a LEG TENON DETAIL



3 Install a $\frac{1}{2}$ " stacked dado set in your tablesaw and cut the tenon on each leg (A) [Drawings 1 and 1a, Photo D].

Quick Tip! Because the tenons extend through the arms (E), make the tenons $\frac{1}{32}$ " longer than finished length, allowing you to sand them flush with the arms after assembly.

4 Cut the leg (A) curve to shape. Sand smooth or flush-trim using a router, pattern bit, and the template.

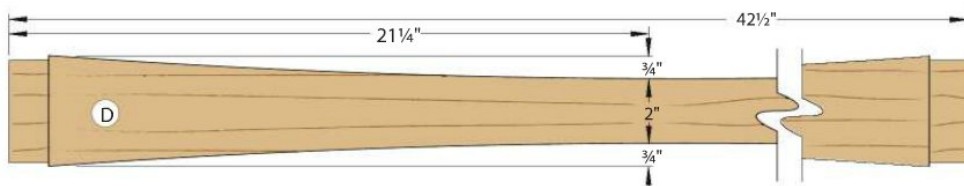
5 Cut four short rails (B) and two long rails (C) to size [Materials List]. Use the dado set to cut tenons on the ends of each rail [Drawings 2, 2a]. Miter-cut the ends of the tenons on the

TABLESAW THE LEG TENONS



Set the fence $\frac{2}{32}$ " from the far side of the dado stack, then cut each tenon cheek in two passes, adjusting blade height for opposing sides.

3 STRETCHER

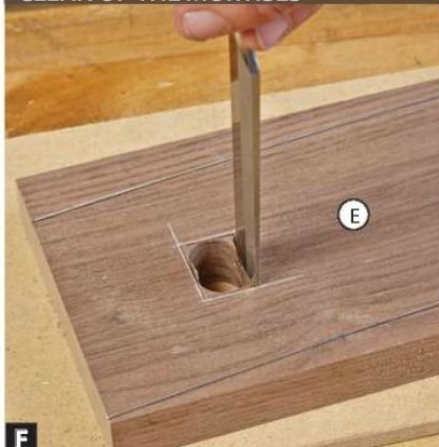


PINPOINT THE MORTISE LOCATIONS



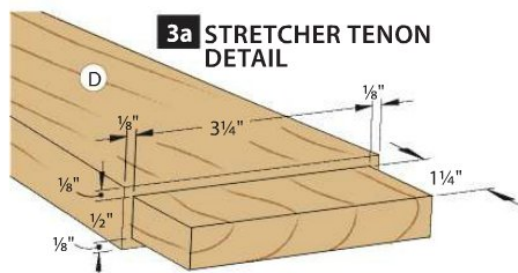
E With an end assembly (A/B) parallel to the edge of the arm (E), mark the actual size and locations of the mortises. This ensures a perfect fit.

CLEAN UP THE MORTISES

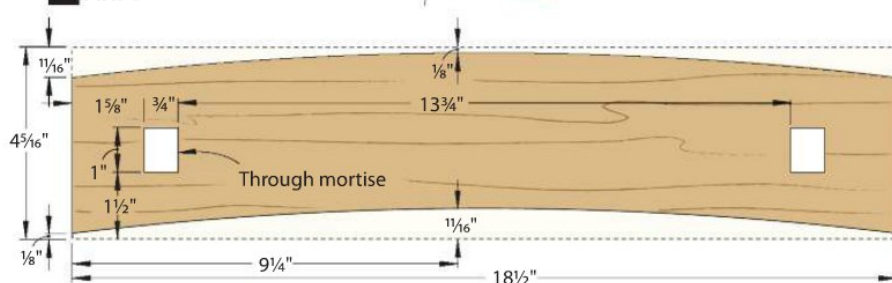


F Carefully pare away the waste to form the mortise walls, staying inside the white lines. Check the fit with the tenon as you work to ensure a tight joint.

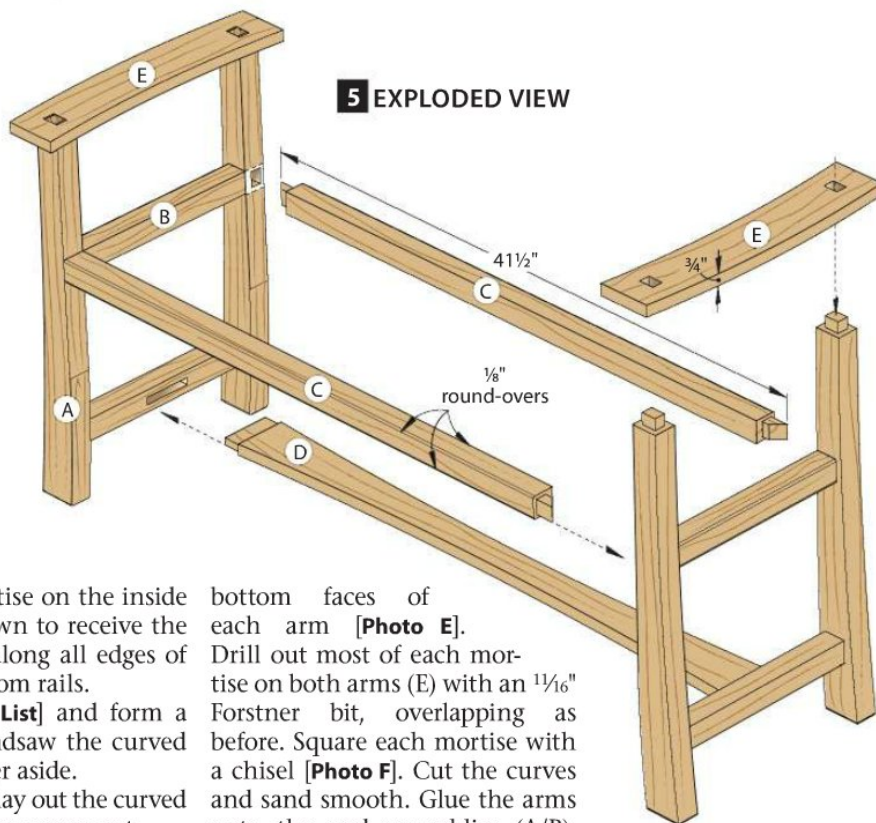
3a STRETCHER TENON DETAIL



4 ARM



5 EXPLODED VIEW



long rails and the top short rails. Cut a mortise on the inside edge of the two lower short rails where shown to receive the stretcher (D) tenons. Rout $\frac{1}{8}$ " round-overs along all edges of the top long and short rails, but not the bottom rails.

6 Cut the stretcher (D) to size [Materials List] and form a tenon on each end [Drawings 3, 3a]. Bandsaw the curved edges and sand smooth, then set the stretcher aside.

7 Make two arm (E) blanks [Drawing 4], and lay out the curved edges on the bottom faces, but don't cut the curves yet.

Assemble the bench

1 Retrieve the legs (A) and short rails (B) and dry-assemble two end assemblies [Drawing 2] that mirror each other. When satisfied with the fit, glue up each assembly.

2 Lay out the locations of all mortises on the arms (E) [Drawing 4] by standing an inverted end assembly (A/B) on the

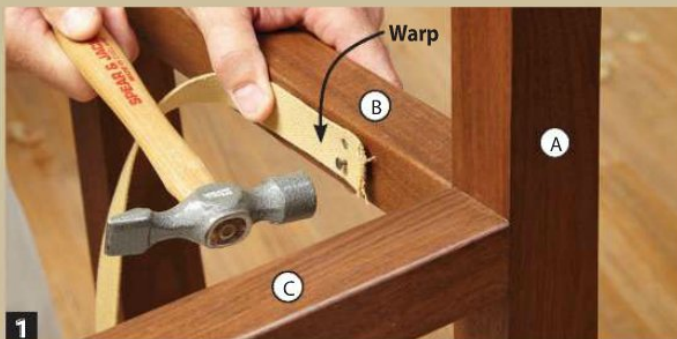
bottom faces of each arm [Photo E].

Drill out most of each mortise on both arms (E) with an $\frac{1}{16}$ " Forstner bit, overlapping as before. Square each mortise with a chisel [Photo F]. Cut the curves and sand smooth. Glue the arms onto the end assemblies (A/B). After the glue dries, sand the tenon ends flush with the arms.

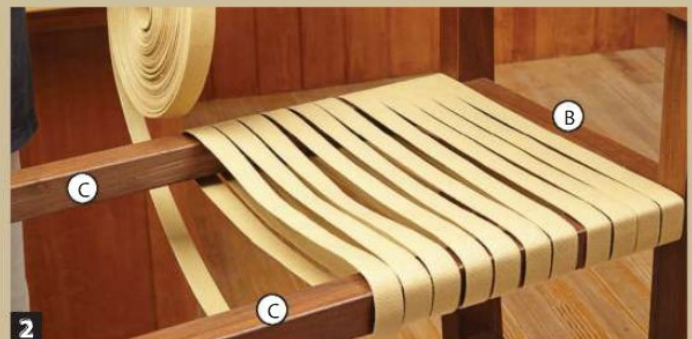
4 Glue together the end assemblies (A/B/E), long rails (C), and stretcher (D) [Drawing 5].

5 Finish-sand as needed, and then apply a finish to the bench. We applied boiled linseed oil and top-coated it with General Finishes Enduro-Var water-based polyurethane.

Custom-weave a seat in just a few easy steps



1 Start by securing one end of the warp tape to the inside face of a top short rail (B) with a couple of #4 tacks.



2 Wrap the warp loosely around the long rails 10-12 times. Place the roll below the bench.



3 Cut a piece of 1½"-thick upholstery foam to fit inside the rails and slip it into the warp. With the foam in place, tighten the warp while butting each loop together.



4 Continue wrapping the warp. Upon reaching the end of the bench, cut the warp on the bottom of the bench and tack it to the short rail (B) as before.



5 To begin the woof, tack its end to the inside corner of a short rail (B), and then loop it around the rail so it emerges on the top side of that rail.



6 Weave the woof through the warp, alternating over and under the loops, pulling the excess length through occasionally. Turn the bench over to weave the bottom side. Tack the tape to a short rail (B) when finished.

Now, cast a web

The seat weave in our design requires about 57 yards of 1" Shaker chair tape. We bought a 75-yard roll, even though it cost more than shorter rolls, because it helped us avoid stitching rolls together—and having unsightly seams show. If you plan to use contrasting colors of tape to create a checkerboard pattern, order a 34-yard roll of each color.

When weaving the seat, know that the "warp" is one continuous length of fabric tape wrapped around the long rails front to back. The "woof" is one continuous length of tape wrapped around the short rails side-to-side and woven under and over the warp on the top and bottom. 🌿

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More Resources

- Learn more about mortise-and-tenon joinery at woodmagazine.com/m&t.
- Learn more about making and using templates for duplicating parts at woodmagazine.com/templates.
- Discover more Asian-influenced project plans at woodmagazine.com/asiandesigns.

Produced by **Bob Hunter** with **Kevin Boyle**
Project design: **Kevin Boyle**
Illustrations: **Lorna Johnson**

Materials List

Part		FINISHED SIZE			Matl.	Qty.
		T	W	L		
A	legs	1½"	3"	25¾"	W	4
B	short rails	1½"	1½"	15½"	W	4
C	long rails	1½"	1½"	41½"	W	2
D	stretcher	¾"	3½"	42½"	W	1
E*	arms	¾"	4⅞"	18½"	W	2

*Parts initially cut oversize. See the instructions.

Material key: W—walnut.

Supplies: #4 tacks (8), 1½"-thick upholstery foam 13×39".

Blade and bits: Stacked dado set, 1⅛" Forstner drill bit, ⅝" round-over router bit.

Source

Shaker chair tape (seat webbing): 1"×75 yards, raffia (no. 2612E), \$105.95, The Basket Maker's Catalog, 800-447-7008, basketmakerscatalog.com.

Simple Start to Relief Carving

For an easy way to add eye-catching ornamentation to a project, try your hand at relief carving. Use Nedra Herr's simple approach and a few inexpensive tools to carve this elegant fleur-de-lis in a couple of hours.

A regular finalist in woodcarving competitions, Nedra Herr of Newton, Iowa, began woodcarving years ago after taking an introductory class. If you're ready to get started in carving, Nedra suggests checking your local woodworking clubs to find a group with similar interests. Then, "Study what you want to carve, and go for it," she says. "Even when you're not carving, observe the works of others and the world around you for inspiration."



Start out sharp

Carving with dull tools is like driving a car with bad steering—you can do it, but the results aren't likely to be good, or safe. If small chips break off your workpiece rather than one winding shaving, it's time to sharpen your knives. In the case of a relatively new tool, odds are good you'll only need to hone the cutting edge. But if you're trying to get an old tool [right] back in shape for carving, you have a little more work to do.

First, use a bullnose bit or round-over bit to rout a rounded profile on the edge of a piece of scrapwood to match the hollow of the gouge. Apply adhesive-backed sandpaper to the rounded edge, starting with 120- or 160-grit. Make repeated passes in the gouge's channel to smooth it [Step 1]. Continue the process, working your way to 800-grit sandpaper, until the channel is perfectly smooth.

With the channel cleaned up, square the gouge's end using a coarse diamond whetstone [Step 2]. Then, using a slow-speed wet grinder, regrind the bevel [Step 3]. To hone the cutting edge, use a medium-grit India stone. With the bevel flat against the stone's face, rock it side-to-side until the entire surface has been smoothed [Step 4]. Repeat that process using a fine-grit Arkansas stone. Finally, strop the blade with a piece of leather and polishing compound to bring it to a high shine. Now you can get back to carving!

Bevel is uneven

Cutting edge is not straight or square to sides

Grind flat to here.



Tools and materials

Although you can carve any wood, start out with a soft, consistently dense, easy-to-carve species such as basswood or butternut. You need only a few tools to begin, but as with any hobby, as your skills improve, so too will the number of tools you'll employ. To start, a #16 (6mm) V-parting tool, a #3 (12 mm) gouge, and a #9 (10mm) gouge (right) will work well as your primary carving tools, and a pointed file or dental pick will help with detail work. Keep your tools sharp; dull ones yield poor cuts and require more pressure to push through the wood, making them more likely to slip and cause injury. (See "Start out sharp," above.)

woodmagazine.com

#16 (6mm) V-parting tool:
no. 05H19, \$54

#3 (12mm) gouge:
no. 05C07, \$41

Order from Woodcraft,
800-225-1153,
woodcraft.com

#9 (10mm) gouge:
no. 05G07, \$42



TRANSFER THE PATTERN



A Nedra prefers graphite paper over carbon paper for transferring patterns because it gives you the option to erase should you stray from the lines.

DEFINE THE CROSSBAND



B When using the V-parting tool, hold it so the outside face of the blade—closest to the outside of the pattern—stands perpendicular to the worksurface.

OUTLINE THE CENTER PETAL



C As you carve from the top of the fleur-de-lis toward the crossband using the V-parting tool, approach the band slowly to avoid cutting into it.

COMPLETE THE OUTLINE



D Wait until later to fix small imperfections. For now, focus on keeping the depth of your cuts equal all the way around and closely following your outline.

SEPARATE THE PETALS AND THE BAND



E Use a #3 gouge to pare away material above and below the crossband to make the petals taper down to, and appear to go under, the crossband.

Trace the pattern

Use transfer paper [Sources] to trace the pattern—on the *next page*—onto your workpiece [Photo A]. Secure the workpiece by placing it on a nonskid mat.

Consider wearing a cut-resistant glove [Sources] on your non-dominant hand to prevent nicks and cuts.

Nedra's Notes: Be mindful of grain patterns when carving, as the tool will want to follow the grain rather than your outline. Take shallower passes when cutting across the grain to prevent tear-out.

Carve the outline

Start with the V-parting tool, outlining the crossband and working your way to

a final depth of approximately $\frac{1}{8}$ " [Photo B]. Push the tool using your dominant hand, guiding it with your non-dominant hand. Try to make smooth, uninterrupted cuts.

Nedra's Notes: Don't try to cut to final depth all at once. Shallow passes prevent splintering and provide greater control. Never cut toward yourself. Reposition the carving, if need be, so you cut parallel to, or away from, your body.

With the crossband outline complete, start at the top point of the fleur-de-lis to outline the centermost upper petal [Photo C]. Outline all the other petals above and below the crossband [Photo D]. With the outlines at a final depth of

$\frac{1}{8}$ ", pare away material above and below the crossband [Photo E]. Recut the outline around the crossband with your V-parting tool to redefine its edges.

Round the petals

Use a #9 gouge to cut a $\frac{1}{16}$ "-deep groove along each side of the upper petal's centerline [Photo F]. Begin rounding all the petals using the #3 gouge [Photos G and H]. Smooth the transitions between the center petal face and the vertical grooves along the upper centerline, shaving away material to create a slight concavity on each side of the center ridge that smoothly transitions into a convex curve along the outside edges of the center petal.

ADD AN ACCENT TO THE CENTER PETAL



F

Carve two grooves parallel to the upper centerline, leaving the line intact. This adds dimension to the fleur-de-lis' center petal.

SMOOTH THINGS OVER



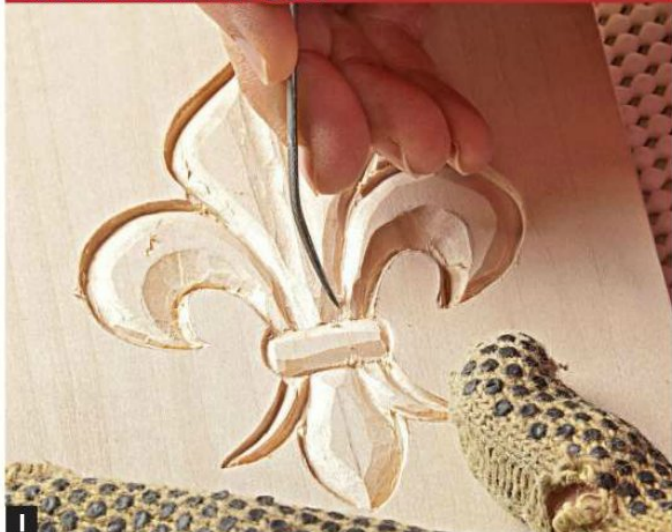
G



H

Use the #3 gouge to scoop the underside of the side petals, making cuts at a flatter angle in the center of the petal, raising the angle to make shallower cuts as you work your way to the tips (above, left). Then, with the gouge's concave surface facing the workpiece, round over the petals and crossband (above, right).

TOOLS FOR CLEANUP DUTY



I



J

Nedra uses a dental pick or pointed file for reaching down into narrow areas (above, left), a broad, flat eraser wrapped in 120-grit sandpaper for rounded surfaces, and thin lengths of scrapwood wrapped in sandpaper (above, right) for everything in between.

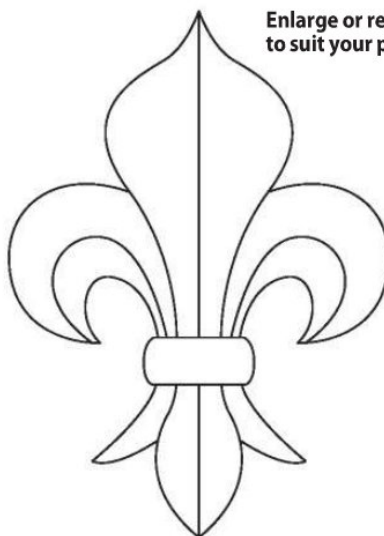
Clean up the carving

Although you should strive to make precise, clean cuts throughout the carving process, you'll likely still have a few rough spots that need some cleaning up or refinement when you're finished [Photos I and J].

Nedra's Notes: Wipe your carving with a rag dipped in mineral spirits to reveal small imperfections you might not spot otherwise.

After adding the final touches to your carving, apply a finish. While clear finishes preserve the natural appearance of the work, you can accent the depth of the carving with a stain—adding additional coats to areas you wish to give the appearance of shadow. 🌲

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Enlarge or reduce this pattern to suit your project.

Sources

Black graphite transfer paper:
woodmagazine.com/transfer
Dental picks and cut-resistant glove:
woodmagazine.com/carvingpicks

More Resources

► For a free video overview of Nedra carving this fleur-de-lis, visit woodmagazine.com/carvingvid.

Darling Doll Stroller

Add another piece
to a growing girl's
collection.



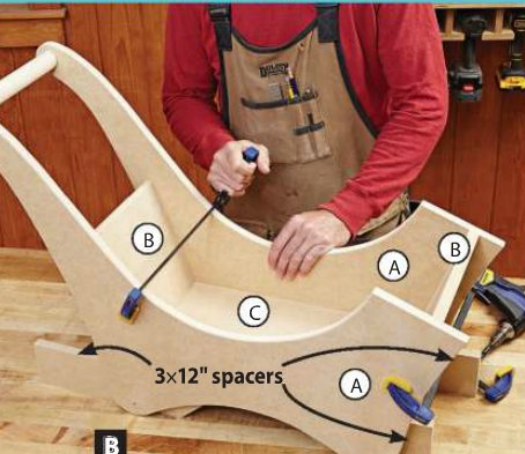


3 From a 1" dowel, cut the handle (D) to 10" long. Screw this to one side (A) only.

1 Cut the front and back (B) and bottom (C) to size. Cut 20° bevels on



PULL THE BODY TOGETHER



B To attach the sides (A) to the body assembly (B/C) evenly, cut four 3x12" spacers and place them under the bottom (C) while clamping.

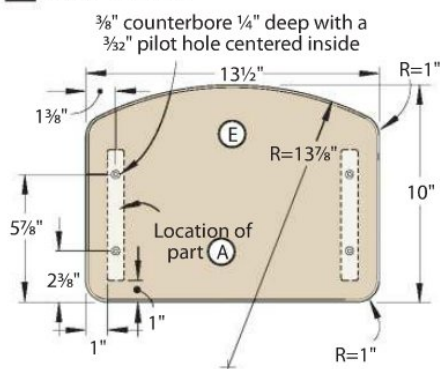
Assemble the body

1 Glue and clamp the sides (A) to the body assembly (B/C) [Photo B], then drill counterbores and pilot holes and drive the screws [Drawing 1]. Make sure the handle's (D) ends are perpendicular to the inside faces of the sides, and then screw the free end of the handle to the side. Fill the counterbores with plugs and sand them flush.

2 Cut the tray (E) to size. Lay out the arc along the top edge using a fairing stick or trammel, and mark 1" radii on all four corners [Drawing 2]. Bandsaw to shape. Sand the edges smooth, and then rout 1/8" round-overs along all edges.

3 Clamp the tray (E) in place atop the body assembly (A-D). Drill counter-bored pilot holes through the tray and into the sides (A) [Drawing 1]. Remove the tray and apply glue to the top edge of the front (B) and to the flat top edges of the sides. Screw the tray in place and plug the holes. Sand the surface smooth.

2 TRAY DETAIL



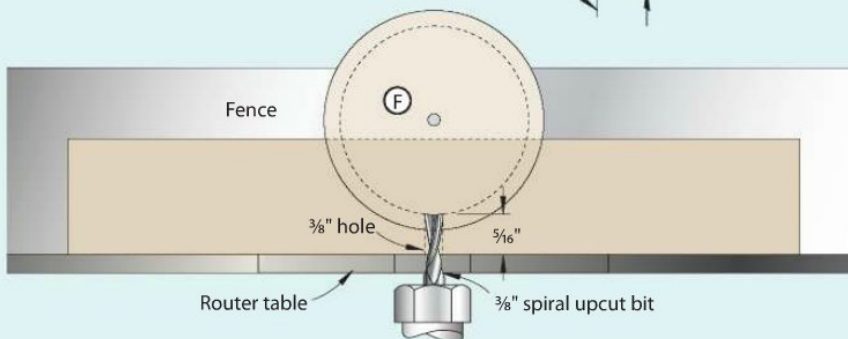
No-pressure tire trick

To create a perfectly centered tire-holding groove in the edge of the wheels (F), begin by building this simple jig. (Don't drill the 3/8" hole—you'll make that later.) The jig traps the wheel during the cut, resulting in perfectly smooth and centered grooves.

With the jig made, mount a 3/8" spiral upcut bit in your router table. Locate the router's fence so the bit will be centered front-to-back and side-to-side on the jig's middle lamination. Carefully raise the bit through the bottom of the jig. Turn off the router and clamp the jig to the fence.

Then, with the router running, carefully move the router fence and attached jig back 1/16". Secure the fence. Raise the bit to a cutting depth in the wheel of 3/16" and slide a wheel into the jig's opening. Spin the wheel 360°, keeping it bottomed out in the slot as you cut. Flip the wheel to the opposite face and repeat. Repeat for the other three wheels.

TIRE-HOLDING JIG



4 To make the wheels (F), begin by cutting four 4½"-square, ¾"-thick blanks. Lay out 4½" circles on the blanks and bandsaw them to shape. We used the bandsaw circle jig from issue 219 (July 2013) [More Resources]. Sand their edges smooth. Then, see "No-pressure tire trick," previous page, for how to rout centered grooves in the wheels to accept the rubber tires [Sources]. Drill a ¼" hole in the center of each wheel.

Add a head-turning paint job

1 Sand any rough parts to 120 grit, then apply primer and paint. We used a latex primer and semigloss interior latex paint (Dover White from Sherwin-Williams).

2 Press the rubber tires over the painted wheels (F). Bolt the wheels to the sides (A) [Drawing 1]. Finally, apply the decals, and this ride is ready to roll! 🌳

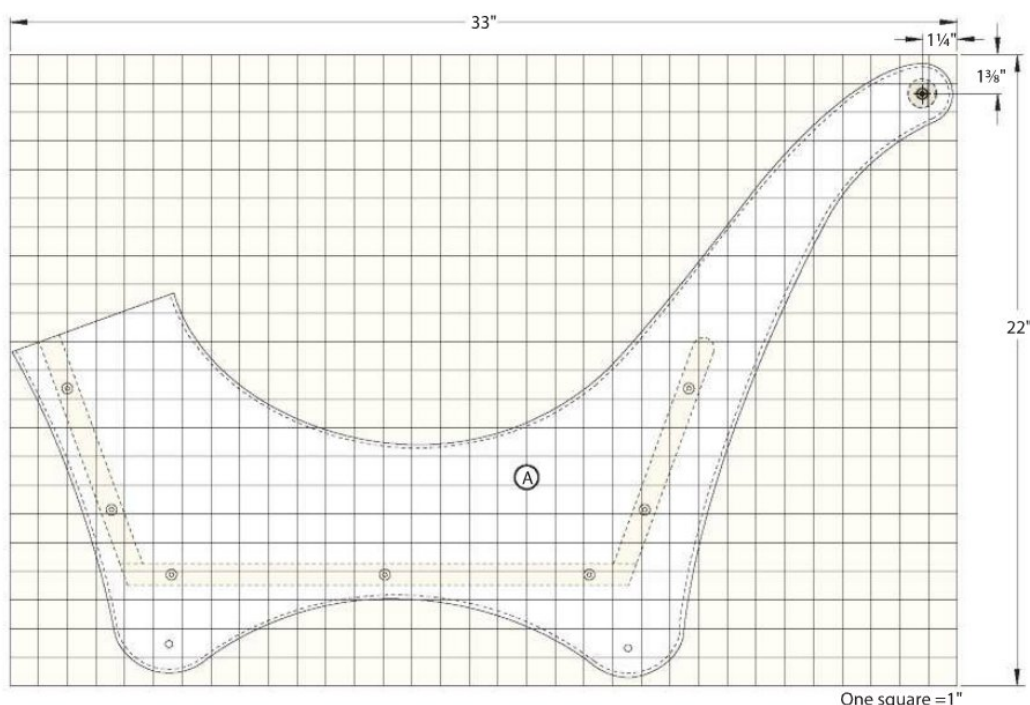
More Resources

- ▶ For this project's downloadable pattern, see woodmagazine.com/strollerpattern.
- ▶ For free plans to make a bandsaw circle jig like the one used to make the wheels, see woodmagazine.com/bandsawcircle.

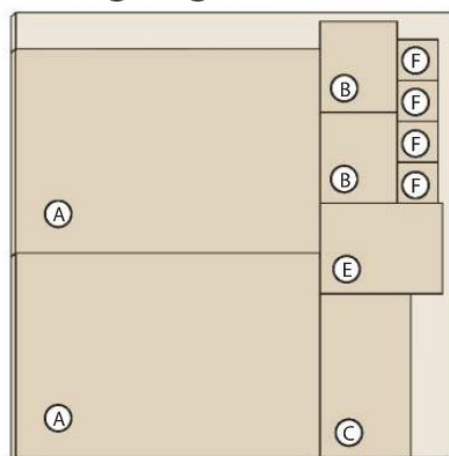
Produced by **Nate Granzow** with **Kevin Boyle**

Project design: **Kevin Boyle**

Illustrations: **Lorna Johnson**



Cutting Diagram



¾ x 49 x 48" Medium-density fiberboard



1" diam. x 12" Poplar dowel

Materials List

Part	FINISHED SIZE			Matl.	Qty.
	T	W	L		
A* sides	¾"	22"	33"	MDF	2
B front/back	¾"	8½"	10"	MDF	2
C bottom	¾"	18"	10"	MDF	1
D handle	1" diam.		10"	P	1
E tray	¾"	10"	13½"	MDF	1
F wheels	¾"	4½" diam.		MDF	4

*Parts initially cut oversize. See the instructions.

Materials key: MDF—medium-density fiberboard, P—poplar.

Supplies: Spray adhesive, #8x1½" flathead screws (24), ⅜" plugs ⅜" long (24), ¼"-20 bolts 2" long (4), ¼" washers (20), ¼"-20 lock nuts (4).

Bits: ⅛" round-over, ¾" bullnose, ⅜" spiral upcut router bits.

Sources

5" rubber-tread tires: no. RT-50 (4), \$5 each,

360-354-3448, toysandjoys.com.

Decals: no. IMD-P_RETROFLOWERS, \$9, instantmurals.com.

This piece was built to complement the doll chair in issue 227 (September 2014), the doll bed featured in issue 223 (Dec/Jan 2013/2014), and the changing table in issue 230 (Dec/Jan 2014/2015).



HARBOR FREIGHT

QUALITY TOOLS AT RIDICULOUSLY LOW PRICES

How Does Harbor Freight Sell GREAT QUALITY Tools at the LOWEST Prices?

We have invested millions of dollars in our own state-of-the-art quality test labs and millions more in our factories, so our tools will go toe-to-toe with the top professional brands. And we can sell them for a fraction of the price because we cut out the middle man and pass the savings on to you. It's just that simple! Come visit one of our 550 Stores Nationwide.

SUPER COUPON

20% OFF

ANY SINGLE ITEM

LIMIT 1 - Save 20% on any one item purchased at our stores or HarborFreight.com, or by calling 800-423-2567. *Cannot be used with other discount, coupon, gift cards, Inside Track Club membership, extended service plans or on any of the following: compressors, generators, tool storage or carts, welders, floor jacks, Towable Ride-On Trencher, Saw Mill (Item 61712/62366/67138), Predator Gas Power Items, open box items, in-store event or parking lot sale items. Not valid on prior purchases after 30 days from original purchase date with original receipt. Non-transferable. Original coupon must be presented. Valid through 7/3/15. Limit one coupon per customer per day.

SUPER COUPON

FREE

WITH ANY PURCHASE
**3-1/2" SUPER BRIGHT
NINE LED ALUMINUM
FLASHLIGHT**

ITEM 69052/69111
62522/62573

Item 69052 shown

\$6.99 VALUE

LIMIT 1 - Cannot be used with other discount, coupon or prior purchase. Coupon good at our stores. HarborFreight.com or by calling 800-423-2567. Offer good while supplies last. Shipping & Handling charges may apply if not picked up in-store. Non-transferable. Original coupon must be presented. Valid through 7/3/15. Limit one FREE GIFT coupon per customer per day.

SUPER COUPON

PITTSBURGH

24" CLAMP AND CUT EDGE GUIDE

LOT NO. 66126

SAVE 53%

\$6.99

REG. PRICE \$14.99

Item 10500742 shown

LIMIT 9 - Good at our stores or HarborFreight.com or by calling 800-423-2567. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 7/3/15. Limit one coupon per customer per day.

SUPER COUPON

US GENERAL

30", 5 DRAWER TOOL CART

WINNER
Best Mechanic's
Tool Cart
Trackin' Magazine

LOT NO. 95272
69397
61427

SAVE \$185

\$164.99

REG. PRICE \$349.99

Item 95272 shown

• 704 lb. Capacity

LIMIT 5 - Good at our stores or HarborFreight.com or by calling 800-423-2567. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 7/3/15. Limit one coupon per customer per day.

SUPER COUPON

PITTSBURGH

16 OZ. HAMMERS WITH FIBERGLASS HANDLE

CLAW | **RIP**

LOT NO. 47872 | LOT NO. 47873
69006/60715/60714 | 69005/61262

Item 47872 shown

YOUR CHOICE!

\$2.99

REG. PRICE \$7.99

LIMIT 8 - Good at our stores or HarborFreight.com or by calling 800-423-2567. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 7/3/15. Limit one coupon per customer per day.

SUPER COUPON

CENTRAL MACHINERY

2 HP INDUSTRIAL 5 MICRON DUST COLLECTOR

• 70 Gallon Capacity

SAVE \$90

\$159.99

~~\$209.99~~

REG. PRICE \$249.99

Item 97869 shown

LOT NO. 97869/61790

LIMIT 4 - Good at our stores or HarborFreight.com or by calling 800-423-2567. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 7/3/15. Limit one coupon per customer per day.

SUPER COUPON

WINDSOR DESIGN

60", 4 DRAWER HARDWOOD WORKBENCH

SAVE \$110

\$139.99

REG. PRICE \$249.99

Item 93454 shown

LOT NO. 93454
69054

LIMIT 3 - Good at our stores or HarborFreight.com or by calling 800-423-2567. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 7/3/15. Limit one coupon per customer per day.

SUPER COUPON

CENTRAL PNEUMATIC

2.5 HP, 21 GALLON 125 PSI VERTICAL AIR COMPRESSOR

SAVE \$70

\$149.99

~~\$219.99~~

REG. PRICE \$219.99

Item 67847 shown

LOT NO. 67847
61454/61693

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SUPER COUPON

**1/4" TRIM ROUTER
drillmaster**

SAVE 42%

\$19.99

REG. PRICE \$34.99

Item 44914 shown

LOT NO. 44914/61626

LIMIT 5 - Good at our stores or HarborFreight.com or by calling 800-423-2567. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 7/3/15. Limit one coupon per customer per day.

SUPER COUPON

CHICAGO ELECTRIC POWER TOOL

10" SLIDING COMPOUND MITER SAW

SAVE \$115

\$84.99

REG. PRICE \$199.99

Item 98199 shown

LOT NO. 98199/61307
61971/61972

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SUPER COUPON

HankMaster

72" x 80" MOVER'S BLANKET

SAVE 66%

\$5.99

REG. PRICE \$17.99

Item 66537 shown

LOT NO. 66537
69505/62418

LIMIT 9 - Good at our stores or HarborFreight.com or by calling 800-423-2567. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 7/3/15. Limit one coupon per customer per day.

SUPER COUPON

NEW

900 PEAK/ 700 RUNNING WATTS 2 HP (63 CC) 2 CYCLE GAS RECREATIONAL GENERATOR

SAVE \$80

\$99.99

~~\$179.99~~

REG. PRICE \$179.99

Item 69381 shown

LOT NO. 69381
60338/62472/66619

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SUPER COUPON

CHICAGO WELDING

90 AMP FLUX WIRE WELDER

• No Gas Required

**WE CARRY
A FULL LINE OF
WELDING WIRE**

SAVE \$50

\$99.99

REG. PRICE \$149.99

Item 68887 shown

LOT NO. 68887
61849

LIMIT 3 - Good at our stores or HarborFreight.com or by calling 800-423-2567. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 7/3/15. Limit one coupon per customer per day.

SUPER COUPON

PITTSBURGH

RAPID PUMP® 3 TON HEAVY DUTY STEEL FLOOR JACK

SAVE \$85

\$74.99

REG. PRICE \$159.99

Item 68048 shown

LOT NO. 68048/69227/62116

• Weighs 74 lbs.

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SUPER COUPON!

2.5 HP, 10" TILE/BRICK SAW
 Item 69275 shown

LOT NO. 69275/62391

\$214.99
 REG. PRICE \$399.99

SAVE \$185

10609087

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SUPER COUPON!

29 PIECE TITANIUM NITRIDE COATED HIGH SPEED STEEL DRILL BIT SET
 LOT NO. 5889/61637/62281

\$9.99
 REG. PRICE \$24.99

SAVE 60%

Item 61637 shown

10626879

LIMIT 7 - Good at our stores or HarborFreight.com or by calling 800-423-2567. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 7/31/15. Limit one coupon per customer per day.

SUPER COUPON!

4" x 36" BELT/6" DISC SANDER
 Item 97181 shown

LOT NO. 97181/62502

\$59.99
 REG. PRICE \$139.99

SAVE \$80

10631260

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SUPER COUPON!

MOVER'S DOLLY
 HaulMaster
 • 1000 lb. Capacity

LOT NO. 93888/60497
 61899/62399

Item 93888 shown

\$8.99
 REG. PRICE \$14.99

SAVE 40%

10645844

LIMIT 9 - Good at our stores or HarborFreight.com or by calling 800-423-2567. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 7/31/15. Limit one coupon per customer per day.

SUPER COUPON!

44", 13 DRAWER INDUSTRIAL QUALITY ROLLER CABINET
 US • GENERAL CO.

Item 68784 shown

LOT NO. 68784
 69387/62270

\$359.99
 REG. PRICE \$569.99

SAVE \$340

10565965

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SUPER COUPON!

12" RATCHET BAR CLAMP/SPREADER
 PITTSBURGH

LOT NO. 46807/68975
 69221/69222/62123

Item 69222 shown

\$1.99
 REG. PRICE \$5.99

SAVE 66%

10651828

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SUPER COUPON!

1500 WATT DUAL TEMPERATURE HEAT GUN (572°/1112°)
 drillmaster

Item 96289 LOT NO. 96289
 62340/62546

\$8.99
 REG. PRICE \$29.99

SAVE 70%

10571913

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SUPER COUPON!

CENTECH AUTOMATIC BATTERY FLOAT CHARGER

Item 42292 shown

LOT NO. 42292
 69594/69955

\$5.99
 REG. PRICE \$19.99

SAVE 70%

10578270

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SUPER COUPON!

17 FT. TYPE 1A MULTI-TASK LADDER

Item 67646 shown

LOT NO. 67646/62514
 • 300 lb. Capacity
 • 23 Configurations

\$117.99
 REG. PRICE \$199.99

SAVE \$82

10589691

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SUPER COUPON!

10", 12 SPEED BENCH MOUNT DRILL PRESS
 CENTRAL MACHINERY

Item 60237 shown

LOT NO. 60237/44836/62408

\$99.99
 REG. PRICE \$199.99

SAVE \$100

10608698

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SUPER COUPON!

12,000 LB. ELECTRIC WINCH WITH REMOTE CONTROL AND AUTOMATIC BRAKE
 BADLAND

Item 68142 shown

LOT NO. 68142/61256
 60813/61889

\$299.99
 REG. PRICE \$599.99

SAVE \$300

10624872

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SUPER COUPON!

RECIPROCATING SAW WITH ROTATING HANDLE
 CHICAGO ELECTRIC

Item 65570 shown

LOT NO. 65570
 61884/62370

\$21.99
 REG. PRICE \$54.99

SAVE 60%

10643902

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SUPER COUPON!

9" x 72" 2 PIECE STEEL LOADING RAMPS
 HaulMaster

Item 44649 shown

LOT NO. 44649
 69591/69646

\$44.99
 REG. PRICE \$99.99

SAVE \$55

10563981

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SUPER COUPON!

MECHANIC'S GLOVES

Item 93640 shown

MEDIUM LOT NO. 61235
 LARGE LOT NO. 93640/60447
 X-LARGE LOT NO. 93641/60448

\$3.99
 REG. PRICE \$9.99

SAVE 60%

10647078

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SUPER COUPON!

RETRACTABLE AIR HOSE REEL WITH 3/8" x 50 FT. HOSE
 CENTRAL PNEUMATIC

Item 93897 shown

LOT NO. 93897
 69265/62344

\$59.99
 REG. PRICE \$149.99

SAVE \$90

10570697

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SUPER COUPON!

18 GAUGE BRAD NAILER CENTRAL PNEUMATIC

Item 68021 shown

LOT NO. 68021/62255

\$13.99
 REG. PRICE \$34.99

SAVE 60%

10576829

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SUPER COUPON!

PACIFIC HYDROSTAR 1500 PSI PRESSURE WASHER

Item 68333 shown

LOT NO. 68333/69488

\$179.99
 REG. PRICE \$199.99

SAVE \$50

10579370

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SUPER COUPON!

EIGHT DRAWER WOOD TOOL CHEST
 WINDSOR DESIGN

Item 94538 shown

LOT NO. 94538

\$69.99
 REG. PRICE \$99.99

SAVE \$30

10601126

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• 100% Satisfaction Guaranteed
 • Over 25 Million Satisfied Customers

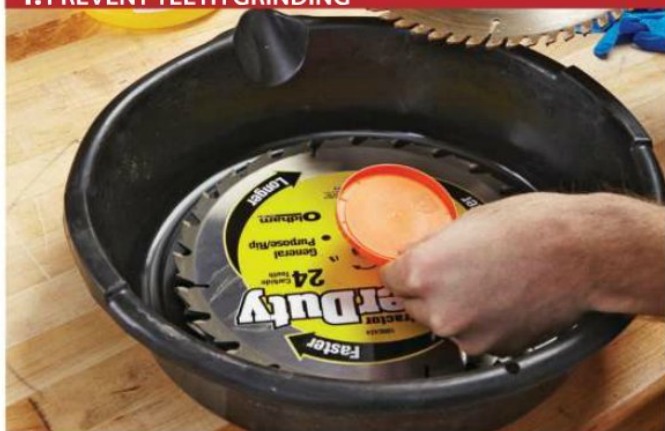
• No Hassle Return Policy
 • Lifetime Warranty On All Hand Tools

• 550 Stores Nationwide
 • HarborFreight.com 800-423-2567

Clean your Cutters

Pitch, tar, and resin build up quickly when cutting wood (especially soft woods, such as pine) and can gum up saw blades until they cut like dull ones, leaving behind burn marks and tearout. A few dollars worth of supplies—an oil-change pan or 5-gallon-bucket lid, a brush, and some blade cleaner (we like CMT Formula 2050, no. 817541, \$13.19, woodcraft.com)—combined with a little elbow grease could save you a trip to the sharpening shop. Just follow this simple process to restore your blades. For safety, work in a well-ventilated area and wear gloves and eye protection. 🌿

1. PREVENT TEETH GRINDING



When soaking multiple blades, slide plastic lids (such as those from yogurt or margarine containers) between the blades to prevent the teeth from chipping.

3. SPLASH ON THE SOLUTION



Spray or pour the cleaning solution on your blades. Let the blade sit for 15–20 minutes; then scrub the cutting edges and the gullets between the teeth.



2. SELECT A SCRUBBER



Steel-bristle brushes cut through grime quickly, but they can also damage or dull your blade's carbide teeth. Scrub with nylon or brass brushes instead.

4. PUT ON A PROTECTIVE COAT

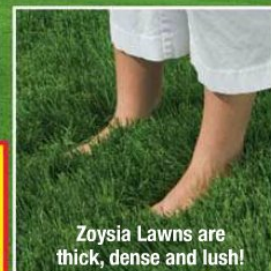


Wipe the blade dry with a clean cloth; then apply a rust-blocking sealant, such as Bostik BladeCote (no.124626, \$18.99, woodcraft.com).

SAVE When You Grow A Zoysia Lawn From Plugs!

From Plugs

To A Fabulous Lawn



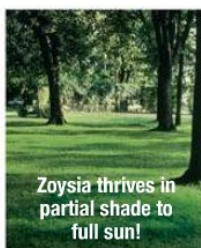
Zoysia Lawns are thick, dense and lush!

GRASS SEED WILL NEVER GROW A LAWN LIKE THIS!

Save Water! Save Time! Save Work! Save Money!

Grass Seed Is For The Birds!

Stop wasting money, time and work sowing new grass seed each spring, only to see birds eat the seed – or rain wash it away – before it can root. Plant a genuine Amazoy™ Zoysia lawn from our living Plugs only once... and never plant a new lawn again!



Zoysia thrives in partial shade to full sun!

Zoysia Grows Where Other Grass Doesn't!

Zoysia is the perfect choice for hard-to-cover spots, areas that are play-worn or have partial shade, and for stopping erosion on slopes. North, South, East, West – Zoysia will grow in any soil, no ifs, ands or buts!

Each Zoysia Plug You Plant In Your Soil Is **GUARANTEED TO GROW** Within 45 Days Or We'll Replace It FREE!

To ensure best results, we ship you living sheets of genuine Amazoy™ Zoysia Grass, harvested direct from our farms. Plugs are not cut all the way through. Before planting, simply finish the separation by cutting 1"-sq. Plugs with shears or knife. Then follow the included easy instructions to plant Plugs into small plug holes about a foot apart. Our guarantee and planting method are your assurance of lawn success backed by more than 6 decades of specialized lawn experience.

Eliminates Endless Weeds And Weeding!

No more pulling out weeds by hand or weeds sprouting up all over your lawn. Zoysia Plugs spread into a dense, plush, deep-rooted, established lawn that drives out unwanted growth and stops crabgrass and summer weeds from germinating.

Environmentally Friendly, No Chemicals Needed!

No weeding means no chemicals. You'll never have to spray poisonous pesticides and weed killers again! Zoysia lawns are safer for the environment, as well as for family and pets!

Cuts Watering & Mowing By As Much As 2/3!

Many established Zoysia lawns only need to be mowed once or twice a season. Watering is rarely, if ever, needed – even in summer!



We ship at the best planting time for you!

Meyer Zoysia Grass was perfected by the U.S. Gov't, released in cooperation with the U.S. Golf Association as a superior grass.

Stays Green In Summer Through Heat & Drought!

When ordinary lawns brown up in summer heat and drought, your Zoysia lawn stays green and beautiful. The hotter it gets, the better it grows. Zoysia thrives in blistering heat (120°), yet it won't winter-kill to 30° below zero. It only goes off its green color after killing frosts, but color returns with consistent spring warmth. Zoysia is the perfect choice for water restrictions and drought areas!

Our Customers Love Their Zoysia Lawns!

One of our typical customers, Mrs. M.R. Mitter of PA, wrote how "I've never watered it, only when I put the Plugs in... Last summer we had it mowed 2 times... When everybody's lawns here are brown from drought, ours just stays as green as ever!"

Order Now And Save!

The more Amazoy™ Zoysia Plugs you order, the more you SAVE! And remember, once your Zoysia lawn is established, you'll have an endless supply of new Plugs for planting wherever you need them. Order now!

FREE! PLANTING TOOL With Order of 500 Plugs or More! Saves time, work and effort when making holes for Plugs!

©2015 Zoysia Farm Nurseries, 3617 Old Taneytown Rd, Taneytown, MD 21787

www.ZoysiaFarms.com/mag

Order Now and Save Over 50% – Harvested Daily From Our Farms And Shipped To You Direct!

SAVE Even More With FREE Shipping!
PLUS Get Up To 900 Plugs-FREE!

Please send me guaranteed Amazoy plug packs as marked:

QTY	# PLUGS	+ FREE Plugs	+FREE Planting Tool	Retail Value	Your Price	+ Shipping	Save
	150	—	—	\$14.95	\$ 14.95	\$ 5.00	
	500	+ 100	+ Free Step-on Plugger	\$84.00	\$45.60	\$ 7.00	38%
	750	+ 150	+ Free Step-on Plugger	\$128.00	\$74.50	\$10.00 FREE	42%
	1100	+ 400	+ Free Amazoy Power Auger	\$220.00	\$99.10	\$15.00 FREE	52%
	1500	+ 900	+ Free Amazoy Power Auger AND Step-on Plugger	\$355.00	\$147.50	\$25.00 FREE	59%

☐ Extra Step-on Plugger \$8.95 + \$3 Shipping ☐ Extra Amazoy Power Auger™ for 3/8" Drill \$24.95 + \$5 Shipping

Amazoy is the trademark registered U.S. Patent Office for our Meyer Zoysia grass.

Mail to: **ZOYSIA FARM NURSERIES**
3617 Old Taneytown Road, Taneytown, MD 21787

Dept. 5575

Write price of order here \$ _____

Md. residents add 6% tax \$ _____

Shipping \$ _____

ENCLOSED TOTAL \$ _____

Card # _____

Name _____

Address _____

City _____ State _____

Zip _____ Phone _____

Payment method (check one)

☐ Check ☐ MO

☐ MasterCard

☐ Visa

Exp. Date _____

We ship all orders the same day plugs are packed at earliest correct planting time in your area.

Order Now! www.ZoysiaFarms.com/mag

Not shipped outside the USA or into WA or OR

Pay attention to veneers with furniture-grade plywood

I've built a handful of shop projects from plywood and never paid much attention to the material's face veneers. But now my wife wants a sewing table, which I'll build primarily from hardwood-veneered plywood. After researching plywood, I'm still confused by the different veneer options. Can you help?

—Donald Oliver, Bluffton, Ind.

With plywood, you have two things to think about, Donald: how the veneer was cut from the log, and how it was applied to the substrate. Let's talk about the cuts first.

Rotary slicing, shown *top right*, is the easiest and least costly way to produce veneer, and the only method that can provide veneers wide enough to cover a 4'-wide sheet of plywood with one continuous piece. But it can also produce wildly different grain within one sheet. With **plain slicing**, a half log moves up and down against a stationary knife, producing a more consistent cathedral grain.

Mills use less-common **quarter-sliced** and **rift-sliced** veneers primarily for red and white oak, species with tight vertical grain and secondary ray flecks. These veneers cost more because they require more effort to produce.

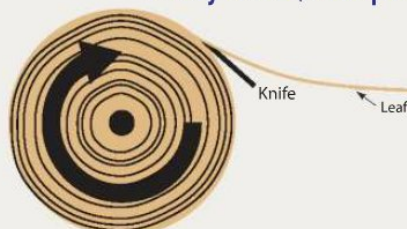
Because appearance matters when building furniture, skip the rotary-sliced veneer. Instead, seek out plywood with plain-, quarter-, or rift-sliced veneers. Here are three ways manufacturers lay out these leaves of non-rotary-sliced veneers to cover the substrate:

► **Book-match:** Every other leaf from a sequentially cut stack is flipped over. Laid side by side, the leaves exhibit a mirror-image pattern at their seams.

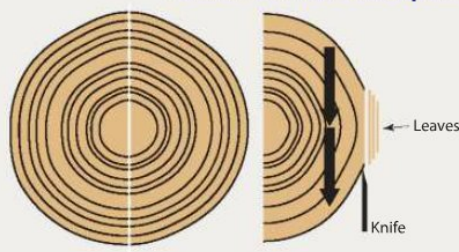
► **Slip-match:** Leaves are laid in sequence without turning any over, producing a repeating pattern.

► **Random-match:** The veneer leaves may come from different logs or various parts of the same log, and these create a different effect for each sheet. (As with rotary-sliced veneers, avoid random-match veneers for making furniture.)

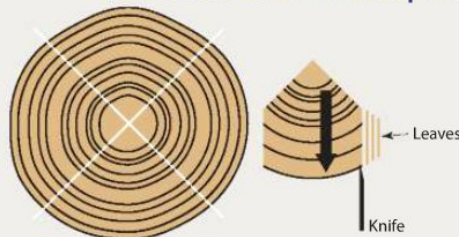
Rotary sliced (Broad pattern)



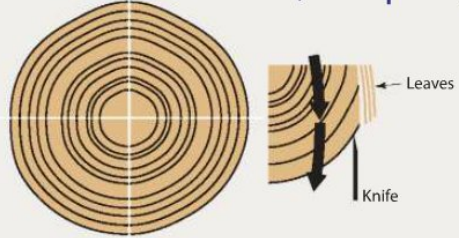
Plain sliced (Cathedral pattern)



Quarter sliced (Narrow pattern)



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Ask WOOD

Jointer actions cause a ripple effect

I'm suddenly seeing ripples along edges of boards after I joint them. Because this never used to happen, and I don't think my technique has changed, I'm at a loss. What's wrong?

—Bill Harris, Laramie, Wyo.

Two things cause ripples (also known as scallops, shown *below*) when machining boards on a jointer with straight knives, Bill: excessive feed rate or a misaligned knife.

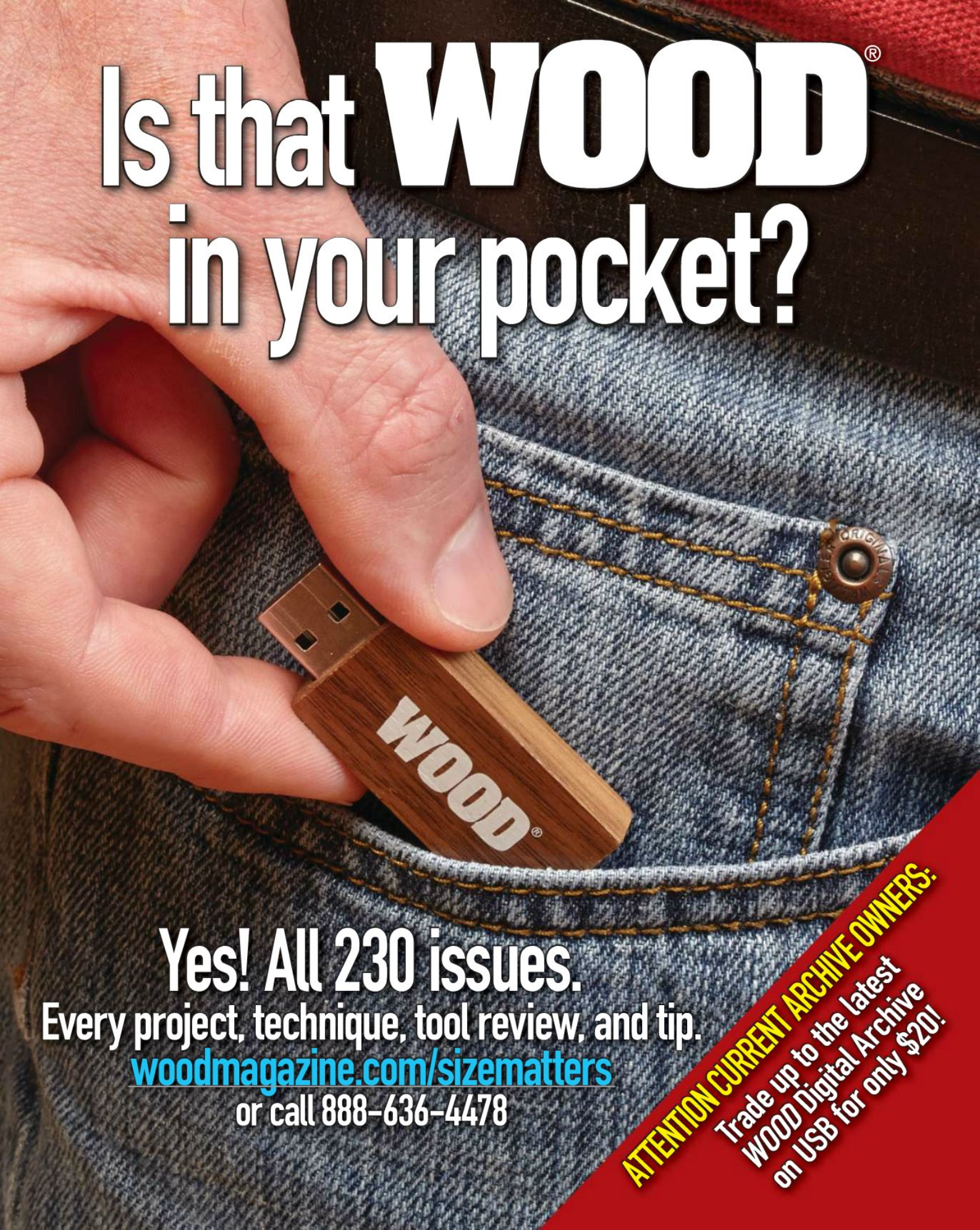
Although you say you haven't changed your technique, try the simplest tactic first. Grab a scrap board and joint the edge as you normally would, and then check the edges for ripples. Now do it again, but at a much slower feed rate, and compare the results. If the ripples go away, you've found the solution.

If that doesn't do the trick, check the knives: Each one must be set at precisely the same height. One that protrudes a hair more than the others will make a slightly deeper scallop with every cutterhead revolution. Carefully reset each knife, securely tightening all the gib bolts, and you should have smooth sailing from there.



Check your jointer knives with a straightedge resting on the outfeed table. Adjust each knife so at its peak it just touches the straightedge.

continued on page 70



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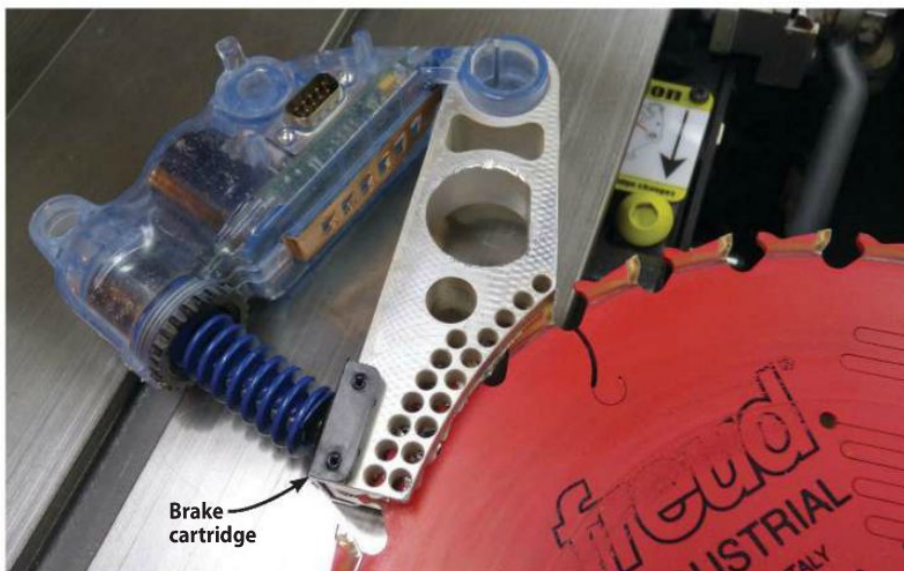
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Is my SawStop blade trashed?

I accidentally triggered the safety blade brake on my SawStop tablesaw. Thankfully, I wasn't hurt, but, obviously, had to replace the brake cartridge. Do I also need to replace the blade, or can I peel the spent brake off and reuse the blade? Also, are there any adjustments I need to make to the saw now that I've triggered the brake?

—Dale Cunningham, Rochester, N.Y.

You might not have to discard the blade, Dale. Although SawStop's Matt Howard recommends against repairing a blade caught in a brake activation, you may want to check with the blade manufacturer—particularly if it's a premium-priced blade—to see if they can repair it or possibly replace it at a discounted price. For example, Tony Ferrato of Forrest Manufacturing says his company can often repair a damaged blade if you return it to them (minus the brake cartridge).



After you've installed a new cartridge, you should not need to make any adjustments. But if the saw won't power up after replacing the cartridge and

blade, check the gap between them. (Refer to the owner's manual.) If that's not the issue, call SawStop customer service.

Stainless doesn't always mean magnet-resistant

I sometimes use stainless steel hardware on projects. When I'm not sure if a nut or bolt is stainless, I touch them to a magnet because I've always been told that stainless steel won't stick to a magnet. However, I have some hand tools made from stainless steel that adhere to a magnet. How can this be?

—Tim Koehler, Dubuque, Iowa

Basic carbon steel consists of iron and carbon, Tim, and the iron atoms line up like tiny magnets, adding to the overall magnetism of the steel. Stainless steel also starts with iron and carbon; however, elements, such as chromium, nickel, and molybdenum, are added for corrosion resistance. These additions change how the iron atoms align and reduce or

eliminate their natural magnetism. Stainless steel comes in various alloys to meet differing requirements for corrosion resistance or ease of welding or forming. While the alloys used for marine-grade nuts and bolts aren't magnetic, the alloys used in stainless knife blades or shop tools might well attract a magnet.

This stainless steel rule, which doesn't require extreme corrosion resistance, is magnetic, while none of the stainless steel hardware shown in the background has that quality.



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Oscillating Multi-tools

You might not use one regularly in your shop, but these versatile helpers often do jobs no other tools can. Here are four newer models we like.

Rockwell Sonicrafter F50, \$150

866-514-7625, rockwelltools.com

Includes: 5 saw blades, 1 scraper blade, sanding pad, 26 sanding sheets, plastic storage case.

An updated version from an existing line, this Sonicrafter runs smoothly with plenty of power. We also like the LED lights on each side of its head, a welcome addition when working in tight, dimly lit spaces.



Fein MultiMaster FMM 350 Q, \$200

800-441-9878, feinus.com

Includes: 1 saw blade, sanding pad, 9 sanding sheets, nylon storage bag.

This lower-cost version of Fein's iconic MultiMaster runs smoothly with low vibration, yet cuts and sands quickly. You don't get many accessories with it, though, so be prepared to buy those as you need them.



Bosch 18V Multi-X MXH180BL, \$230

877-267-2499, boschtools.com

Includes: 1 saw blade, plastic storage box with fitted tray, accessory storage box.

This "bare" cordless tool comes with a higher price tag—especially considering you don't get a battery or charger. But if you've already invested in Bosch 18-volt tools, you won't need to buy a battery. We found it handy to use a few times when a power outlet wasn't conveniently within reach.



DeWalt DWE315K, \$160

800-433-9258, dewalt.com

Includes: 3 saw blades, sanding pad, 25 sanding sheets, accessory storage box, attachment adaptor (for using other-brand accessories), canvas storage bag.

We love the lever-action accessory clamp that makes it quick and easy to change attachments without tools. And you activate the tool by depressing a variable-speed trigger in either of two places, giving you better control when using the tool.

continued on page 74

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Shop-Proven Products

Setup gauge speeds up perfect lock-miter joints

Lock-miter router bits have a reputation for being so finicky to set up correctly that some woodworkers steer clear of them altogether. That inspired Infinity Cutting Tools to find a simple solution: the Lock-Miter Master Jig. Admittedly skeptical of the manufacturer's promise of one-time, spot-on setup, I set aside an entire morning to figure out this gadget. To my amazement, I had a perfect-fitting joint, *above*, in about 10 minutes.

To use the Lock-Miter Master Jig, mount it to your installed bit and adjust the bit's height until it matches a centerline drawn on the edge of a drawer side, as shown *right*. Now repeat the process to set the fence using the vertical lines on the jig, as shown *far right*. Then cut the mating drawer pieces without changing any settings. Remarkably, I achieved an airtight joint

the first time, so I tried it with lock-miter bits from two other manufacturers, thinking minor variances in the bits might affect the results. But again, perfection.

Infinity sells these jigs as a pair: one for workpieces $\frac{3}{8}$ – $\frac{3}{4}$ " thick, and the other for $\frac{3}{8}$ – $1\frac{1}{8}$ " stock.

—Tested by Bob Hunter,
Tools Editor



Lock-Miter Master Jig set (00-LMM)

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Jig must touch the bit below this cutter.



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Festool Domino joiner (DF500), \$850

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— Reviewed by BK Shelby

Overall rating ★★★★★ 4.8



Penn State Barracuda2 lathe chuck, \$180

"This is an excellent chuck at a very reasonable price. It is built very well and should last me a lifetime."

— Reviewed by Kenneth

Overall rating ★★★★★ 5

Jorgensen 41012 bench vise, \$155

"The quick-release on this vise is excellent. The big jaw faces are fantastic and a welcome tool to hold whatever I am working on. It grabs and holds your workpiece like a pit bull on a mission."

— Reviewed by John Verreault

Overall rating ★★★★★ 5

Jet parallel-jaw clamps (12–98"), \$40–\$90 each

"These are great. One thing I like is the foot at the end of the bar that keeps the clamp sitting flat on the bench, no matter where the jaws are."

— Reviewed by Steve

Overall rating ★★★★★ 4.6



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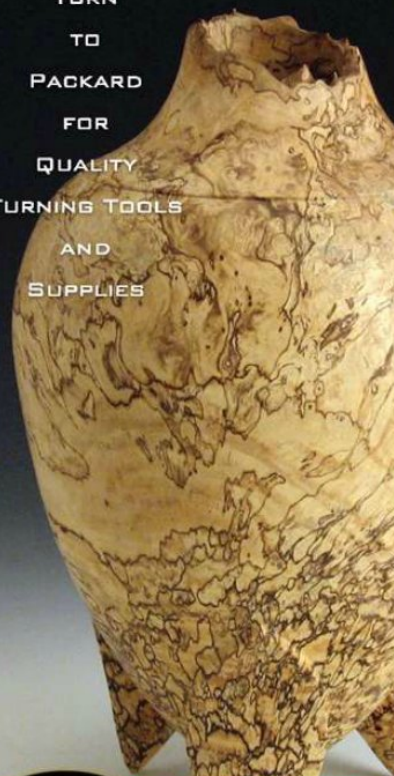
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Under pressure

Another Construction-grade toy rolls your way, ready to flatten the asphalt jungle.



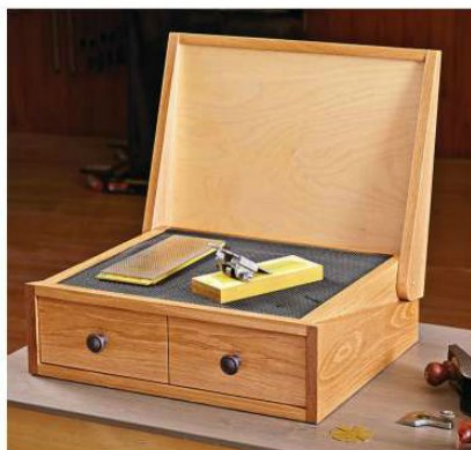
Cedar cooler stand

At your next outdoor gathering, serve cold beverages from this stylish, stoop-free stand.



Grow up!

This deck-flattering A-frame packs a profusion of flowers into a pint-size footprint. Purchased liners make planting and cleanup fuss-free.



Sharpening station

With a flip-open, no-slip work surface, and no-tip drawers for storing stones and honing guides, this sharpening center proves as functional as it is fetching.



Block planes

We test 15 models head-to-head in search of the best one for your shop.

Professional. Performance. Portability.

Delta is proud to introduce a new portable table saw line. This line not only carries the brand that is identified with quality and dependability, but is the next step in the ongoing development of new products. It is positive proof that we are still moving forward in design and production of quality products for both the small home and larger professional shops.



120V, 15 Amp Motor, 1PH, 60 Hz
Blade Speed 5,000 RPM
Depth of Cut: 2 1/2 in. @ 45° & 3 1/2 in. @ 90°
Max. Rip Right of Blade: 30 in.
Height: 14.62 in.

NEW

36-6010

- Unique tubular frame structure for maximum support and stability
- Aluminum table top with anti-friction coating
- Blade fully retracts below table top for easy clean-up
- Onboard accessory storage
- Rear power cord wrap



NEW

36-6020

- Unique tubular frame structure for maximum support and stability
- Easy "One Step" folding stand for fast removal and storage
- Stand and saw are one piece framework for better stability
- Aluminum table top with anti-friction coating
- Blade fully retracts below table top for easy clean-up
- Onboard accessory storage
- Rear power cord wrap

120V, 15 Amp Motor, 1PH, 60 Hz
Blade Speed 5,000 RPM
Depth of Cut: 2 1/2 in. @ 45° & 3 1/2 in. @ 90°
Max. Rip Right of Blade: 30 in.
Height: 34.75 in.



 **DELTA**®

POWER EQUIPMENT CORPORATION

The Measure of Precision™

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1-864-231-5888



Introducing the Next Generation Premier Fusion

Item# P410

with Radical New Fusion Trio Tooth Design

Now the most technologically advanced general purpose blade on the market includes an one-of-a-kind tooth geometry with 30 degree Hi-ATB, a double side grind design, and an Axial Shear Face Grind to produce the ultimate polished finish with minimal resistance! Whether you're ripping or crosscutting, the next generation Premier Fusion blade is the best for flawless cuts in laminates, melamine, veneered plywoods, hardwoods, softwoods, and thick stock lumber.

NEW FUSION TRIO TOOTH GEOMETRY

DOUBLE SIDE GRIND
design for delivering
polished cross cuts

30° Hi-ATB
for slicing through
plywood and melamine

AXIAL SHEAR FACE GRIND
that glides through wood
and sheet goods with
minimal resistance



Premier

FUSION

For more information visit: www.freudtools.com/premierfusion

To find a Freud Certified Sharpener near you visit: www.freudtools.com/sharpen

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