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PAGE 10

Tablesaw Dovetails?!

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#155, AUG/SEPT 2011



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Tablesaw Dovetails

American Woodworker

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American Woodworker

#155, August/September 2011

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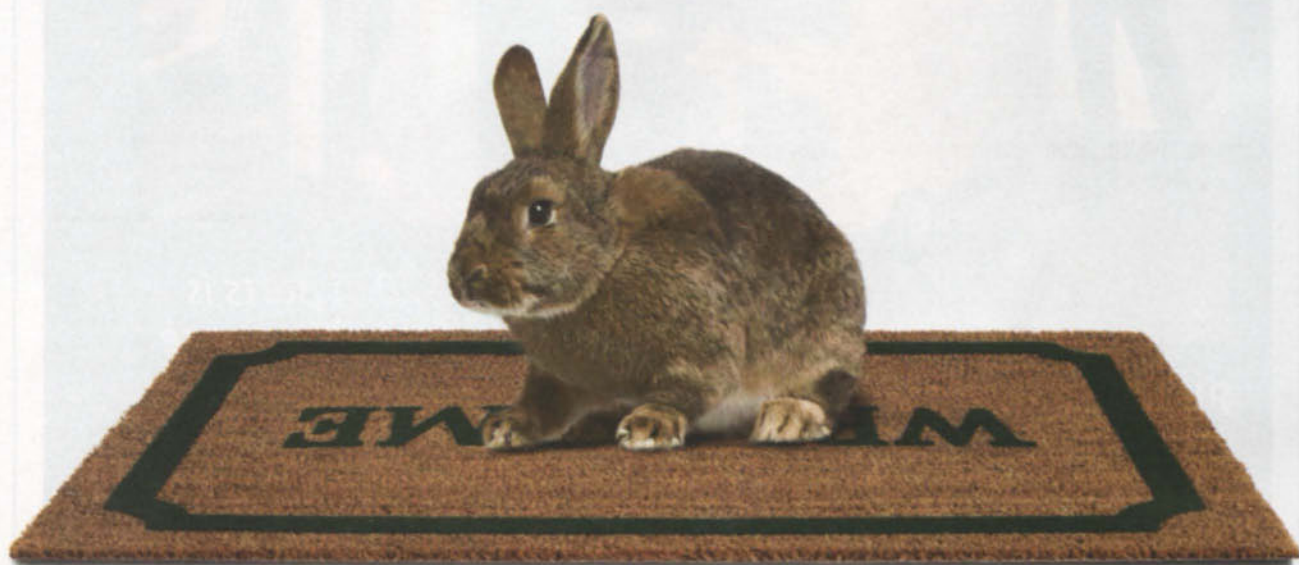
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JASON ZEITNER

Plywood Caddy

CARRYING PLYWOOD BY YOURSELF is really a pain. Here's a helper that allows you to roll it around instead. Just clamp this caddy to the board's edge, tip the sheet down onto the wheels and off you go.

The caddy will fit plywood that's 1/2" to 3/4" thick. Its sides aren't glued together—they just slide on bolts. I put 7" lawn mower wheels on my caddy so I can roll it over an uneven driveway or my yard when I'm unloading plywood from my truck. Large wheels are ideal for a shop floor, too, because they roll easier than small wheels. Of course, you can use wheels of almost any size.

To make the caddy, temporarily nail together its three parts, flush at the bottom. Drill a 1/2" hole for the axle through all three pieces, 1" up from the bottom and centered between the ends. Drill two 5/16" holes for the 1/4" clamping bolts. Position the holes 2" from the bottom and 2" from each end. Disassemble the parts.

To assemble the caddy, slip a washer onto the axle bolt and slide the bolt through one wheel. Slip on a nylon bushing, then slide the bolt through the axle hole. Slip on the other nylon bushing, the other wheel, washer and two nuts. Lock the nuts together, leaving about 1/4" on either side of the spacer. On the 1/4" bolts, slip on a lock washer and a fender washer, then slide them through the 5/16" holes. Slip on the other fender washers and thread on the jig knobs.

Ken Bailey

Terrific Tip!

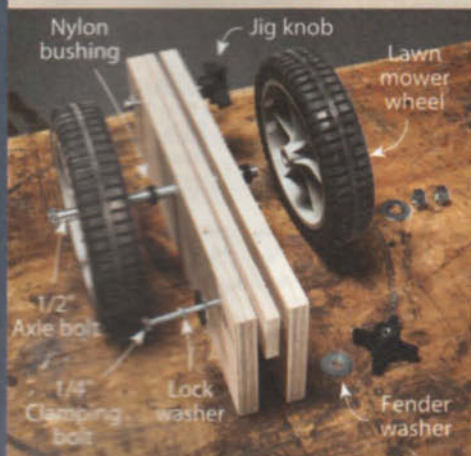


JASON ZEITNER

\$20 in parts is cheap insurance for your back.

Shopping List:

- Two pieces of plywood 3/4" x 5" x 16"
- One piece of plywood 1/2" x 2-1/2" x 16"
- One 1/2" x 8" bolt
- Two 1/2" nuts
- Two 1/4" x 3" bolts
- Two 1/4-20 female jig knobs
- Four 1/4" fender washers
- Two 1/4" lock washers
- Two 1/2" washers
- Two 1/2" x 3/8" nylon bushings
- Two 7" lawn mower wheels



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JASON ZENTNER



The Best Brush: A Paint Pad

LEAVE NO BRUSH MARKS! That's the holy grail for finishing a large, flat surface. If you use a water-based finish, here's a new twist for achieving that goal: Try a paint pad.

I use a pad that's designed for edging around doors and trim with latex paint. Its surface consists of hundreds of short synthetic bristles. You can find pads like this in the paint department of most hardware stores and home centers, and they're relatively inexpensive.

With a paint pad, you can cover a lot of ground in no time at all. That's the key to avoiding lap marks. But best of all, a paint pad leaves a very flat, even surface, as if the finish had been sprayed. This saves a lot of sanding time between coats and delivers a final surface that doesn't need to be rubbed out.

Tom Caspar



See a video on applying a finish with a paint pad at AmericanWoodworker.com/WebExtras



Drawer Helper

DESPERATION is the mother of invention—isn't that how the old saying should go for woodworkers? I invented this device when I realized that the drawers in my new armoire tipped down way too much (see "Cabinetmaker's Armoire," page 34). Two of these helpers, one at each corner, now keep each drawer level when opened. They act as stops, too.

I'd made these drawer sides less than full height, out of habit. (I also succumbed to an urge to use scrap wood that was "close enough.") That approach is fine for drawers that ride on metal slides, but I had decided not to use slides on this project. Oops.

The 1" dia. ball bearing on top of the helper rides on the drawer support or shelf above. These parts are 3/4" or so above the bottom edge of the face frame, so the helper actually sticks up into the cabinet. That's how it acts as a stop.

I rounded the bottom edge of each helper and installed it with a single screw at the pivot point. To install or remove a drawer, I just tip the helper forward.

John English



Two-Minute Clamp Rack

FOR A SIMPLE WAY to store spring clamps, just screw a piece of aluminum angle to the bottom or side of a cabinet.

Len Urban



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All Bases Covered

EVERY FEW YEARS, I give my shop a thorough cleaning. When I discovered that the base of my drill press had been harboring fugitives—drill bits, driver bits, screws, nails, bolts and a mouse that had gone on to his great reward—I decided something had to be done.

With this simple plywood cover, I'll rest easier knowing that the next shop mouse will have to find a new place to hide my tools and hardware.

Oneil Long

JASON ZENTNER



Centering A Hollow Grind

A FELT-TIP PEN is the best tool I've found for adjusting a grinder's tool rest.

When you need to find the center of a bevel in order to duplicate an angle, color the whole bevel with a Magic Marker or a Sharpie. Adjust the rest to the approximate angle of the bevel, then start up the grinder and slowly advance the tool into the wheel. Pull the tool back and take a look at the bevel.

You'll be able to tell exactly where the wheel touched the tool—the ink will be gone from that area. Color the whole bevel again and adjust the rest with a tap or two until you get the angle just right.

Bill Wells

Precision Planing Jig

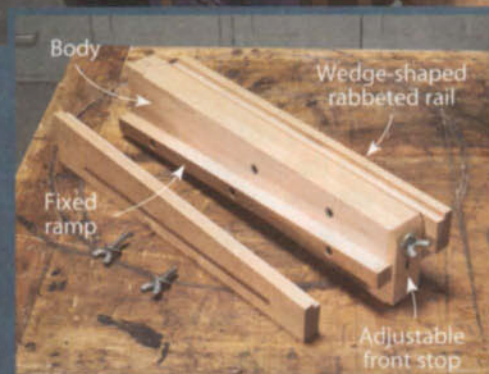
ACHIEVING EXACT THICKNESS is really important when making splines to reinforce box corners. The splines have to fit perfectly in the saw kerfs—a few thousandths of an inch one way or the other can make a big difference.

I cut my spline material on the tablesaw, making it a bit thicker than needed, then plane it by hand to exact thickness using this adjustable jig.

Here's how the jig works. The plane rides on rabbets cut into two rails. Both rails are tapered, like a wedge. You adjust the height of each rail by sliding it on a fixed ramp attached to the jig's body. To plane a spline, place it on the body of the jig, snugged up against the adjustable front stop, and start in. When the plane stops making shavings, you've reached final thickness.

My jig holds pieces up to 1-1/2" wide, 12" long and 1/4" thick. It's designed for a No. 3 plane, but it would be easy to make a larger version to fit a wider plane. All of the parts are 3/4" thick hard maple; the body is glued up from two pieces.

Doug Perlick



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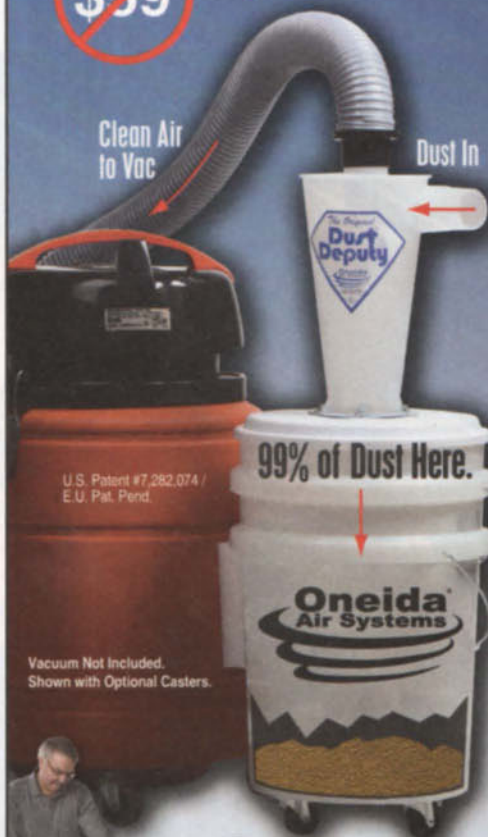
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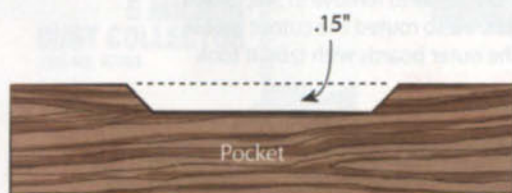
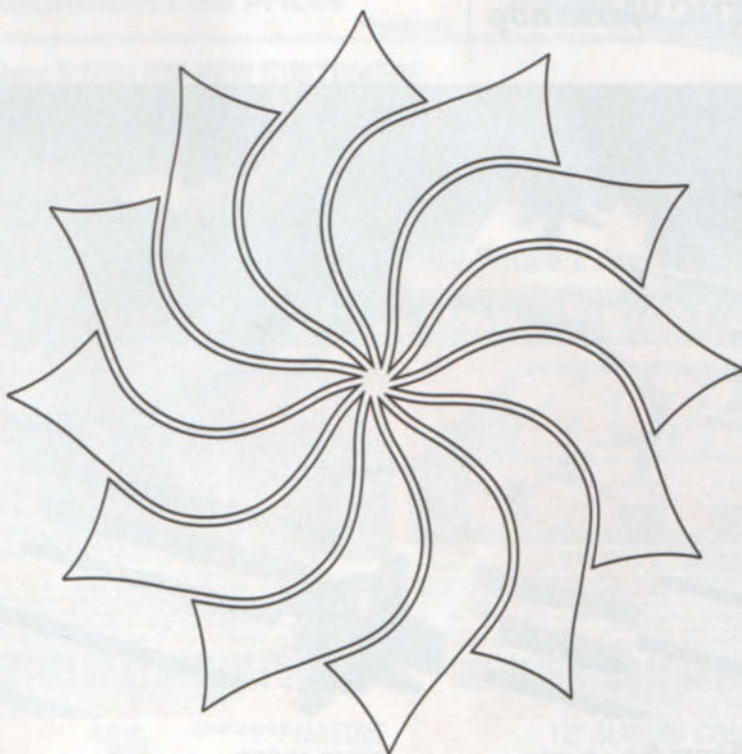


V-CARVE INLAY TAKES ADVANTAGE of a CNC's ability to precisely rout matching parts. In this case the parts are made as opposites and fit together to create a precise-fitting inlay. The sides of the parts are beveled and fit together like the lid on jack-o'-lantern pumpkin. The technique is surprisingly easy to learn and implement, in spite of the fact that it

would be nearly impossible to create these parts any other machine or by hand. It's truly a technique that's unique to the CNC. The fact that almost any design can be used, opens up many creative opportunities. As CNC's become more common in small shops, I fully expect to see v-carve inlays showing up on furniture in some interesting ways.

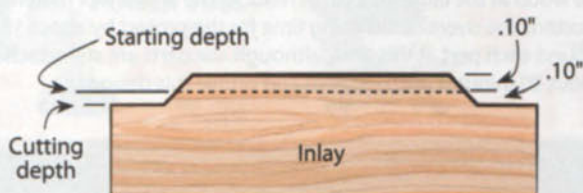
Step 1

Layout your design. Almost any design will work, but all individual parts of the design must be made with a single continuous line so the router has a complete path to follow. A shape that is open-ended or has a gap in the line will not be recognized by the v-carving program. I designed this pattern (right) in about 15 minutes, using V-Carve Pro from Vectric. I started with a single "petal" shape and then copied it using a function called "copy circular array" to create the 12 identical shapes. There's no need to shy away from sharp details such as corners or points. V-carving programs excel at capturing such detail. For more information on v-carving see "V-Carving in 10 Easy Steps," —AW #153, April/May 2011, page 17.



Step 2

Set the flat area cutting depth for the pocket portion of the inlay to .15". Setting the depth to this dimension provides clearance under the inlay to ensure that it doesn't bottom out in the pocket. The dotted line represents the location of the pattern, which in this case is the surface of the board.

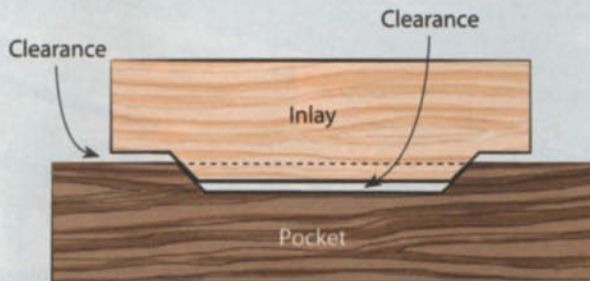


Step 3

Set the cutting depth for the inlay in two stages. First set the "start" cutting depth at .10" and then the cutting depth at .10". Setting the cutting depths in this fashion will ensure a small amount of clearance between the inlay and pocket boards. The dotted line also represents the elevation or the location of the pattern in the board.

How it works

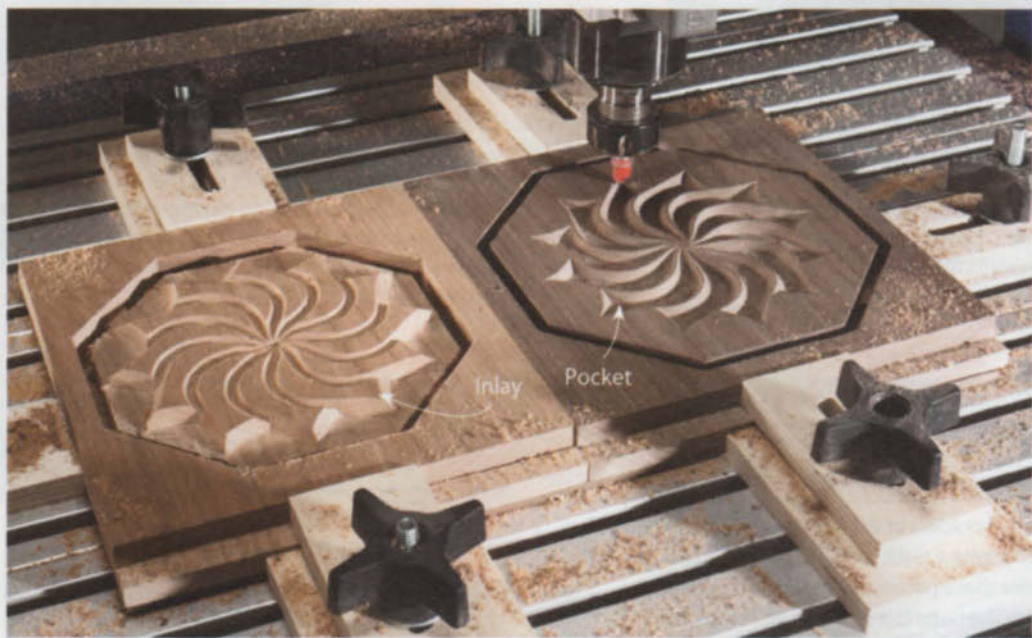
The angled shoulders of the inlay and pocket intersect to create a tight, wedged fit. The cutting depths for these parts are set to provide clearance between the parts (Steps 2 and 3). The excess top portion of the inlay is removed down to the dotted line to reveal the final pattern (Step 7).





Step 4

Rough rout the background and wide areas with a straight bit. Rough routing removes the majority of the wood in the large areas. This reduces the amount of material the v-bit needs to remove in Step 5 and shortens the overall machining time for the project by about 15 minutes. I also routed the cutout profile around each part at this time, although the parts are still attached to the outer boards with tabs. It took about 20 minutes to rough rout and profile this design.



Step 5

V-carve the design details with a 90° v-bit. Notice that the inlay on the left is a mirror image of the design on the right. They must be opposites in both relief and orientation in order to fit together. This is important to remember when laying out and programming your design. This step took about 25 minutes.

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Step 6

Apply glue to both parts. A small brush makes it easy to get the glue into the v-carved areas. The inlay portion has been trimmed to rough size on the bandsaw.



Step 7

Tighten the clamps lightly at first and then add a little pressure to each clamp until they are all fully tightened. Applying uneven pressure can cause misalignment of the parts. Leave clamped until glue is completely dried.



Step 8

Route off the excess material to reveal the final inlay. The ability to control the cutting depth in increments as small as .001" makes it easy to precisely remove the extra material. For this project I used a 3/4" straight bit and programmed it to remove the majority of the material in 1/8" deep passes until it got to within .02" of the surface. I then continued with .005" passes until the bit removed just enough material to expose the inlay and get rid of the dried glue. This step took about 10 minutes.



To watch a video of v-carving inlay in action and to download this pattern, visit AmericanWoodworker.com/CNC

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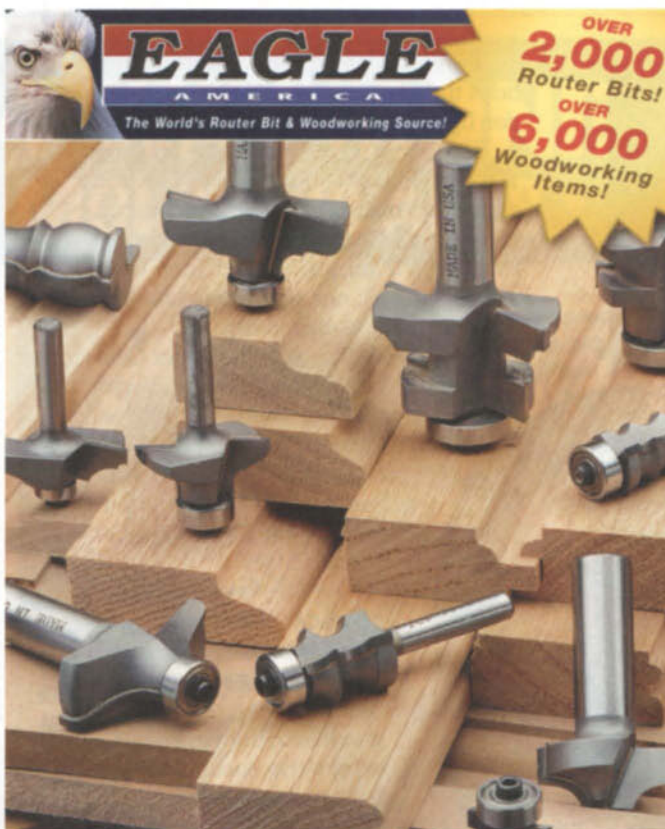
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A Real Stand-Up Clamp

THERE ARE FEW TOOLS that couldn't use an improvement or two—even the humble bar clamp. Rockler's new Sure-Foot F-Style Clamps have three improved features.

First, Rockler has added 1-1/2" wide feet to the clamps. When stood on edge, the Sure-Foots are more stable than many other bar clamps. When gluing up the leg shown at right, we found that this wide stance allowed us to concentrate on aligning the parts because we didn't have to worry that the clamps would tip over.

Second, the Sure-Foot's handle is very large and comfortable. Its rounded triangular shape allows you to apply plenty of torque. Other bar clamps have smaller-diameter round handles, which are harder to tighten.

Third, the clutch release is extra-long and has a soft pad. This new design makes it easier to move the sliding head for a quick adjustment.

With a bar that's 1" wide and almost 1/4" thick, the Sure-Foots can exert quite a lot of pressure. They have a 2-1/2" throat depth and faces that are larger than average. The clamps come in 6", 12", 18" and 24" lengths.



SOURCE Rockler Woodworking and Hardware, rockler.com, 800-279-4441, Sure-Foot F-Style Clamps, \$17 - \$20.

The Vortex Cone

BETTER DUST COLLECTION is always good news. Jet has added a new feature to their dust collectors that reduces the number of times you have to empty the bag. It also helps keep the filter clean in order to maximize cfm. They call it "the Vortex Cone."

The Cone is a conical filter that separates the dust collector's bottom collection bag from the top filter bag or canister. The dust stream enters directly below it. Essentially, the Vortex Cone makes a single-stage dust collector act like a two-stage dust collector, according to Jet.

The swirling action created by the Vortex Cone forces wood chips and heavier dust particles down, while pushing the smaller dust particles up to the filtration bag or canister.

Jet says that the Vortex technology increases the packing density in the collection bag, resulting in fewer bag changes, and that it also "prevents the central airflow from floating chips into the filter chamber, decreasing rapid performance drop due to premature clogging."



Translated, this means that the cone helps the dust collector maintain peak suction by keeping chips away from the filter.

The Vortex Cone is available on three 1-1/2 hp models featuring either a 2 micron canister, a 5 micron bag or a 30 micron bag. It's also available on four 2 hp models; two featuring a 2 micron canister (one has a 3-phase motor), one with a 5 micron bag and one with a 30 micron bag.

Jet dust collectors with the Vortex Cone are about \$20 more than their non-Vortex counterparts. For more information, visit vortexcone.com.

Powermatic offers the same technology—they call it the Turbo Cone—on six of their dust collectors.

SOURCE

- Jet Tools, vortexcone.com, 800-274-6848, 7 models from \$450 - \$700.
- Powermatic, powermatic.com, 888-804-7129, 6 models from \$550 - \$1200.

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New Wave in Sanding

SANDING A CONCAVE SURFACE is no simple task—at least, not with a power tool. Eagle America's new Bowl Sanding Kit has now made power sanding much easier.

The kit consists of a set of wavy-edge hook-and-loop sanding discs and a soft pad with a 1/4" arbor. When you're sanding, the wavy edges of the discs curl around the edge of the pad. This allows the sander to get into tight areas, such as the inside corners of the router-made bowl shown above. The waves also prevent the pad from gouging the sides or bottom of the bowl.

The arbor can be chucked into a drill press or a hand-held drill. The vinyl-nitrile pad has the perfect combination of firmness and flexibility that makes it possible to get into even a very tight radius.

The kit contains 60 wavy edge sanding discs (10 each at 80, 120, 180, 220, 320 and 400 grit).

SOURCE Eagle America, eagleamerica.com, 800-872-2511, 2" Bowl Sanding Kit, #502-3000, \$50; 3-1/2" Bowl Sanding Kit, #502-4000, \$55.



Wood Hog

SAY YOU'VE GOT a huge, uneven roughsawn board. It would make a fantastic top for a coffee table, but how are you going to level it? Well, one way is to use a power planer, such as this new unit from Porter-Cable.

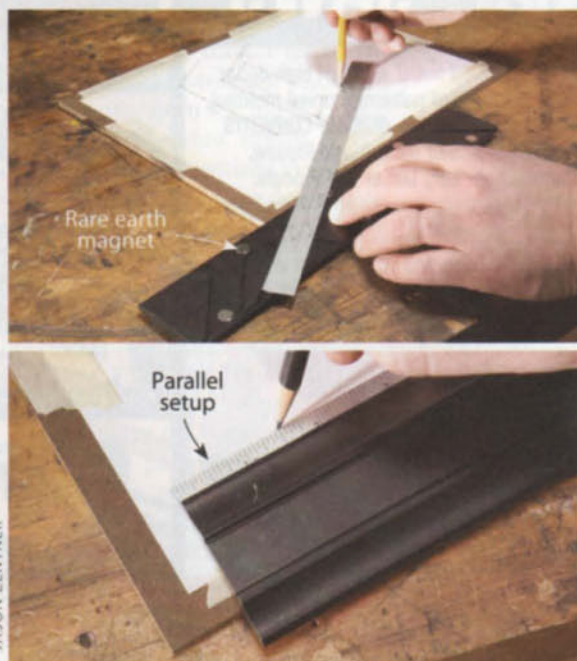
A power planer is usually thought of as a carpenter's tool, but it definitely has a place in the woodshop. Just think of it as a really aggressive scrub plane or belt sander.

This newly redesigned planer features a 6 amp, 16,500 rpm motor. Its depth-of-cut dial has 11 positive stops, 1/128" apart; the maximum depth of cut is 5/64". The planer's sole is 11-1/2" long and the blades are 3-1/4" wide. Three V-grooves in the sole allow you to make chamfers of various widths.

The planer comes with two sets of blades: high-speed steel and carbide. Porter-Cable suggests that you use the high-speed steel knives, which are less brittle, when there's a chance of hitting a screw or nail.

The planer comes with a mesh-filtered bag to catch debris and dust. You can place the bag on either side of the machine to get into a tight space.

SOURCE Porter-Cable, portercable.com, 888-848-5175, 6 Amp Power Planer, #PC60THPK, \$90.



Isometric Drawing Tool

DON'T HAVE A DRAFTING TABLE? Can't draw freehand to save your life? Here's a new tool from Lee Valley that lets you easily make isometric shop sketches.

The tool has two parts: a standard 12" ruler with a matte finish and an innovative black straightedge. Seven slots are milled into the back of the straightedge corresponding to commonly used angles (30°, 45° and 60° in both directions, plus 90°). Two rare earth magnets embedded in each slot hold the ruler in place at any of these angles, like a T-square with an adjustable arm. A small amount of play between ruler and slot makes the angles only accurate to within 2°, but that's OK for a sketch. The ruler can also be attached parallel to the straightedge.

While playing around with this new tool, we found that it's best to tape the paper to a 9" x 12" piece of 1/4" hardboard and turn the tool over. The paper stays put and the board provides a reference edge.

SOURCE Lee Valley Tools, leevalley.com, 800-871-8158, Magnetic Straightedge, #15N03.01, \$40.

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Set 'Em Up, Knock 'Em Down

AN EXTRA WORK SURFACE is always handy in the shop. We've all thrown a large piece of plywood down on a couple of sawhorses when we need a temporary bench, but let's admit it—a top that can flex and sag is less than ideal. This set of steel brackets from Rockler can solve that problem.

They slide right over your horses. Cut a couple of 2x4s, fasten them to the brackets and you have a much stronger and more stable base to work on.

SOURCE Rockler Woodworking and Hardware, rockler.com, 800-279-4441, pack of 4 Sawhorse Supports, #40544, \$13.



Simple Splines

EXPOSED SPLINES are often used to reinforce a joint and add decorative details to a box or picture frame. This jig from Eagle America makes it very easy to cut the slots for those splines.

The jig consists of a large V-shaped cradle mounted on a large bed. The bed has a bar that slides in your table saw's miter slot. The bar's width is adjustable, so you can fine-tune the fit between the bar and slot. Having only a single bar, we were concerned that the jig might wobble too much—but it worked just fine.

Inside the cradle, there's a T-track and two adjustable right-angled stop blocks. When cutting slots in a picture frame, you position the blocks as shown. When cutting multiple slots in a box, you would remove one of the stops and reposition the other one for each cut.

The jig's base is made from 1/2" HDPE plastic. Its smooth surface slides easily across a saw. The rest of the jig's parts are made from expanded PVC, a lightweight but very stable material.

SOURCE Eagle America, eagleamerica.com, 800-872-2511, Spline Jig, #400-1038, \$120.



JASON ZENTNER

Right-Handed Tape Measure

HAVE YOU EVER NOTICED that the numbers on a tape measure read upside down?

Think about it. If you're right-handed, like me, you hold a pencil in your right hand and a tape in your left. Whenever you pull the tape from right to left to make a mark, the numbers are upside down, aren't they?

You've probably become used to this arrangement, but it really bugged the folks at M. Power tools. The numbers on their R1 tape run the other way—right-side up, for me.

I'd like the tape a whole lot better, though, if it didn't have a metric scale on one side. I'd prefer lines that run all the way across the rule for the times that I pull the tape in the opposite direction. I don't think I'll be measuring in centimeters anytime soon!

SOURCE M-Power Tools, m-powertools.com, R1 Tape Measure, \$13.

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Brandon Morrison

Working with head, heart and hands (both of 'em).

by Spike Carlsen

LIKE MOST PASSIONATE WOODWORKERS, Brandon Morrison works with his hands, head and heart. But one thing that makes Brandon unique is his near-loss of one of those hands and how that factored into his decision to dedicate himself to woodworking.

"I was cutting bevels on a tablesaw, hit a knot and the wood started binding," Brandon explains. "I decided to push it through. The next thing I knew I wasn't pushing the board and my hand was hot." The outcome was severed tendons and nerves and 190 stitches. But there was another outcome as well. During the days after the accident, Brandon made a deal



Glass Series No. 2
Lyptus, glass | 33" x 10"

with the universe: If he could make it through one of the worst scenarios in woodworking, he could make it through anything the field had to dish out. "I decided I was going to dedicate myself in a way that was nuts. I was going to set the world on fire. I was going to do something incredible." And he has: Brandon received the 2010 "Star of Design" award for product design from L.A.'s eminent Pacific Design Center.

From L.A. to L.A.

Brandon grew up in the small town of Olla, Louisiana, knowing he was somehow different. "Most people



Wood Series No. 1
FSC walnut, zebrawood veneer
62" x 16"



Glass Series No. 1
Walnut, glass | 36" x 16"



High Chair
FAC Walnut, brass
45" x 13-1/2" x 16"

made their living working on oil rigs or logging and I knew I didn't want to do that." An early interest in music (and drumming in particular) awakened his creative side—a side that's never gone back to sleep. In high school Brandon pulled together a band and was determined to be a rock star. After the band moved to Los Angeles to record and play, it soon lost momentum and fell apart. But losing one dream awakened another, as Brandon realized he loved the energy of L.A.

He sold everything he owned in Louisiana and moved to L.A. permanently—intent upon pursuing a career in acting. While some aspiring actors pay the bills and make important Hollywood connections working as waiters, Brandon accomplished these missions by working as a handyman through a Hollywood hardware store. He worked for the likes of Billy Bob Thornton, David Spade, William Shatner and the former chairman of Paramount Pictures. Even though he landed a bit part or two, the acting part of the equation never panned out. Instead, he began getting requests to repair and build furniture. "I needed the money," Brandon recalls. "Even if I didn't know how to build something I'd say, 'Sure, I can do that.' After I built my first table I felt like I'd built the Taj Mahal. Using a tablesaw was intoxicating; I got the same great rush

I'd gotten when playing music and began thinking, 'Maybe I can make a living at this.'"

His first workshop was a 4' x 15' lean-to shed that doubled as a laundry room. "The workspace was small and the door was only 2' wide, so anything of any size I'd have to work on outside. I'd chain pieces to a porch post at night so people wouldn't steal them."

His collection of tools, skills and customers grew. Brandon attributes much of his early success to the

Kalifornia Rocker
FSC European beech,
milk paint, ivory vinyl
48" x 24" x 48"





Metropolis Series No. 8
FAS walnut | 72" x 18" x 30"

internet, first through artist-friendly sites and eventually his own website. He named his fledgling business whyrHymer—a Louisiana dialectal twist of his family's dog's breed: Weimaraner.

Inspiration and perspiration

Without formal training or mentors, Brandon, now 36, has acquired most of his skills through close observation of others' furniture, trial-and-error and woodworking magazines. Lacking the know-how to make tapered legs for one of his first pieces, for example, he scanned back issues until he found an article showing how to make them.

Brandon is equally independent when it comes to design. While some of his pieces have a James Krenov, Sam Maloof or Frank Lloyd Wright feel, he's more influenced by how other woodworkers think than what they produce. "I don't want to be that other guy or turn out things that look like the other guy's; but I'm very curious about how others approach the creative process." His design inspirations often come from unusual sources. The flowing curves and peaked grill of a '41 Chrysler coupe inspired Brandon's *Kalifornia Rocker* (see photo, page 27, bottom). "California is known for its car culture, so I decided to design a chair that felt drive-able," he says. A picture of a skeleton inspired his *Wood Series No. 1* floor lamp (see photo, page 27, top left). "Figuring out joinery that would work for my design helped me appreciate the intricacy of nature's own design."

Brandon has indeed created a style uniquely his own. Many of his pieces have sculptural elements that are shaped by hand, so even his production

pieces are individually unique. "A few hours spent on the sculptural aspect of a piece pays a big dividend," he says. "It creates 80% of the value, like a small voice that somehow creates a big sound." Some of his sculpting and shaping is done with a flea market drawknife and some is done with a sanding drum chucked into a hand-held electric drill (a tool often used by guitar makers).

Brandon is an artist, but he's also a realist. "I can't spend a crazy amount of time shaping a part; it's not economical for me and it's unaffordable for customers," he explains. "I'm always trying to figure out ways to be more efficient, trying to figure how I can get a piece out of the shop without sacrificing quality." Once he's geared up to make a specific piece of furniture, he'll often do short production runs of four or five pieces.

Brandon's workspace, a few steps from his back door, consists of a menagerie of interconnected garages and sheds. He has one space dedicated to heavy machinery, another to assembly and others for finishing and storage. "It forces me to walk around a lot," Morrison explains. "It's like a built-in health club." He uses only eco-friendly materials. All of his finishes are plant- or water-based and all of his hardwoods and sheet goods are FSC certified. Black walnut, beech, maple and cherry dominate his woodpile.



Glass Series #8
Lumber, recycled glass
98" x 16"



Los Galos Series No. 1
FSC walnut, FSC cherry, black suede
49" x 49" x 22"

Atomic Series No. 1
FSC walnut
30" x 20" x 20"



Brandon is active beyond the four walls of his workshop. The videos on his website—some instructional, others inspirational—attest to his love of filmmaking. He was a recent participant on "DIY Dominator," a DIY Network reality show in which three woodworkers competed against one another to build a kitchen nook in 10 hours. And he dedicates 3% of the price of every piece of furniture he sells to a charitable organization, and invites his customers to do the same. Why? "There are so many people in this world who cannot do what they want to do," Brandon says. "And I am so fortunate to be able to wake up every morning and have that choice." 

Contact Brandon and see more of his work at www.whyrHymer.com.

Spike Carlsen is author of *A Splintered History of Wood: Belt Sander Races, Blind Woodworkers and Baseball Bats*. His newest book, *Ridiculously Simple Furniture Projects* (Linden Publishing), is now available.



See Brandon talk about finishing at AmericanWoodworker.com/WebExtras

Seeing the light

Though few people think of lamps and lighting as furniture, Brandon has illuminated this dark corner of the woodworking world. His inspiration dates back to his days of working at the hardware store. One day, while viewing sunlight coming through a bushel basket, he began pondering the possibility of crafting lampshades from wood. That notion lead to the lamps he builds today.

One element that factors into all of his lighting designs is the importance of good lighting. "It's one thing to make a novelty lamp that people 'ooh' and 'aah' over," he explains. "But it's another thing to make one that's truly functional." Referring to his *Manhattan Series No. 1* floor lamp (at right) Brandon explains, "Perched next to a couch or chair it's good for reading; positioned in a corner it provides good general lighting; and wherever it is, it illuminates and highlights both the beauty of



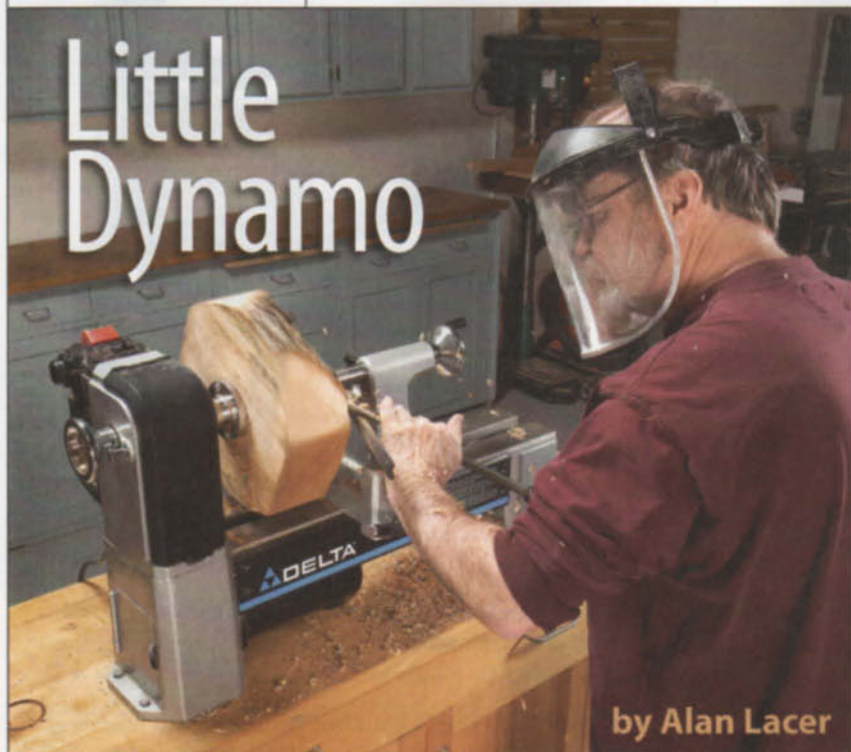
the wood and the joinery."

Brandon's shades are small works of art in themselves. Some are made from organic linen, silk shantung, aluminum, recycled glass and other unique materials. Others are made using wood veneers combined with a special backing membrane.

"Building a good light is a challenge," he explains. "It needs to be not only beautiful and useful, but also constructed to deal with heat buildup and expansion and contraction. You have to figure out how to hide the cord and how to make the bulbs easy to change. It has to be safe (my lights are all UL certified), and you need to think about what it will look like in five years."

Manhattan Series No. 1
FSC walnut, silk shantung
57" x 24"

Little Dynamo



by Alan Lacer



AN IDEAL BALANCE between size and capability is the promise that most mini lathes present: small enough to store on a shelf or under a bench, but big enough (having sufficient mass, power and capacity) to turn sizeable bowls. Delta's 46-460 variable speed midi lathe actually makes good on this promise.

What sets the 46-460 apart is that its 1-hp motor actually has adequate low-end power to match its 12-1/2" swing. The 46-460 allows making hefty cuts (for a small benchtop lathe) at slow speed in heavy green-wood bowl blanks without significant stalling. This is a real acid test for green bowl turning—a test that mini lathes typically fail.

The 46-460's electronic variable speed system is impressive. It has three speed ranges (250–700 rpm, 600–1800 rpm, 1350–4000 rpm) and is extremely quiet in operation. Speed ranges are important for both performance and safety. Headstock spindle speeds above 750 rpm are best for spindle work. For bowl turning, especially

for roughing out the blank, slow speed (with power) is critical. The 46-460's slowest speed range (250–700 rpm) is significant because it allows maintaining reasonable rim speed when turning large or out-of-balance bowls and plates. Rim speed (the rpm at the edge of the bowl) increases as the bowl's diameter increases; hence, larger bowls require slower spindle speeds.

Changing speed ranges is simple: Pop open the covers, lift a lever, slide the belt and lower the lever. That's it; you don't have to lift a motor, loosen handles or make any other awkward maneuver. A handy numbered dial makes it easy to monitor and change speeds within each speed range.

The 46-460 is equipped with a 1" spindle, a headstock spindle lock, an indexing wheel and a reversing switch. (Some turners prefer reverse rotation for finish sanding.) It comes with a good-quality 3" faceplate that's plated, so it won't rust from green bowl blanks, and 6" and 10" tool rests that are functional, rather than being cheap

toys. Capacity between centers (for spindle turning) is 16-1/2" or 42" with the available bed extension.

A few minuses must be noted. You have to reach over the top of the headstock to reach the on/off and reversing switches. There's a pinch point between the hand-wheel and the spindle lock. And the weight (97 lbs) that helps to make the 46-460 stable during use also makes it hard to move around.

The 46-460 is perfect for turning pens, lidded boxes, jewelry and the tiniest miniatures, but its bowl-turning capability at slow speed is the big news. This balance makes the 46-460 a great choice for anyone who wants to start turning, has limited space or intends to do relatively small work. 

See Alan's work at alanlacer.com.

SOURCE

Delta Power Equipment Corp.,
deltamachinery.com, 800-223-7278,
12-1/2" Variable-Speed Midi Lathe,
#46-460, \$649.99; Modular Midi-Lathe
Bed Extension, #46-463, \$159.99.

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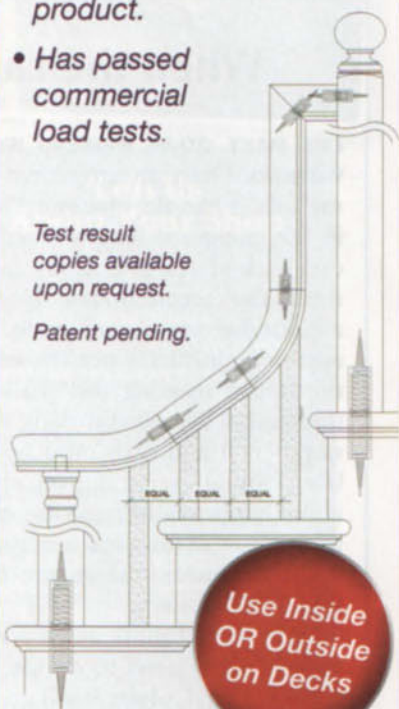
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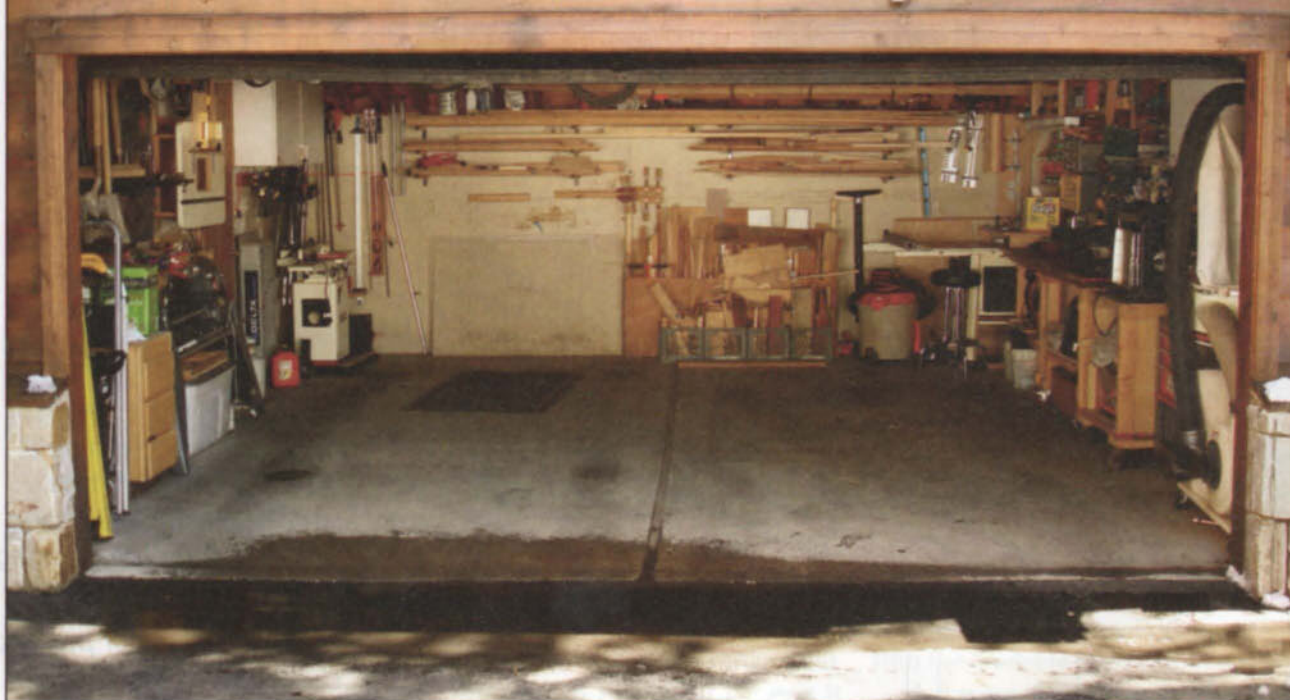
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Hidden Shop



When the cars go away, the tools come out to play.

LIKE MANY OTHER WEEKEND WOODWORKERS, I have an agreement with my wife. I can do whatever I want in the garage, as long as I put the cars back in at night. As my garage must also accommodate bicycles, automotive tools, yard tools and anything else that's not allowed in the house, meeting this challenge means that my woodworking tools, workbench and carts must be mobile. Putting everything on wheels is also important because the snowy winters in this mountainous part of California mean the garage floor frequently gets wet.

Whenever I think about adding a new tool, I need to decide how badly I need it, where it will go, and most importantly, what I'll have to get rid of to make room for it. And because of the tight space, I don't

have the luxury of building large projects. But if I need to store an uncompleted project overnight, our agreement does allow temporarily moving it into the house, as long as

it moves back out the next day.

The heart of my shop is the tablesaw, of course, which stores neatly under a shelf in a corner. When it gets pulled out, so do the infeed





and outfeed carts. They're built to table-saw height with locking casters and shelves underneath for storing tools such as the compressor, grinder and miter saw. The added weight of these tools helps the carts stay put during use. These carts, which also serve as mobile work stations, store against the wall, where they tuck under a plywood work surface. Shims inserted between the carts and the work surface turn it into a rock-solid workbench.

Another mobile cart does double-duty as a stand for the planer and oscillating spindle sander. These tools are fixed to wooden bases and can be exchanged, depending on which tool is needed. The Shop-

smith, with its multiple tool functions, also respects my space-saving and double-duty mantra. As you can see by the walls and ceiling, every square foot counts, including the space underneath the mobile carts.

Once the cars are out and the tools are set up, my creativity stretches to fill the open space. This is when all my carefully planned organization really pays off. 

*Dave Hunter
Truckee, CA*

Tell Us About Your Shop

Send us photos of your shop, a layout drawing and a description of what makes your shop interesting. Tell us what you make in it and what makes your shop important to you. If "My Shop" features your shop, you'll receive \$100.

E-mail your entry to myshop@americanwoodworker.com with digital photos attached. Or mail your description with digital photos on a disc to My Shop, American Woodworker, 1285 Corporate Center Drive, Suite 180, Eagan, MN 55121. Please include your phone number. Submissions cannot be returned and become our property upon acceptance and payment. We may edit submissions and use them in all print and electronic media.

Cabinetmaker's Armoire

Layered construction makes a huge project easy to build.

by John English



LARGE PROJECTS often require dozens of complicated joints, but not this one. I've simplified this armoire's design so that it goes together in easy stages, much like the cabinets made in a large production shop.

Although the armoire looks like it has classic frame-and-panel construction, underneath some applied pieces it's really just a plywood box. That's where we'll start.

Build the box

You'll need two sheets of 3/4" plywood and one sheet of 3/8" plywood. Begin by cutting the cabinet sides, top, bottom, divider and shelf (A1-A4, see Cutting List, page 38). Rout dados and rabbets in these pieces (**Photo 1** and Fig. C). Use an undersized bit for the dados, so the plywood will fit tight (see Sources, page 38).

The box will be screwed and glued together. Drill holes for the screws from the inside of each piece to ensure that the holes are centered in the dados.



Three or four screws per dado should do it. Countersink the holes on the outside. Assemble the box without glue and drill pilot holes the full length of the screws. Cut the back (A5) to fit. Take the box apart.

Glue the box in stages, adding one piece at a time. This method helps ensure that the box remains square—an essential requirement for a project with doors and drawers. Wait for the glue to dry before moving on to the next step. Begin with the shelf and divider (**Photo 2**). Add the top, then the bottom. Next, add each side. Make glue blocks (A6) and place them underneath the top and bottom to reinforce the joints. Just rub the blocks in place; they don't have to be clamped or nailed.

Build a face frame

The front of the box is covered with a face frame (Fig. A). Cut the parts (B1–B4) so that the completed frame is about 1/8" wider and taller than the box. Clamp the frame together without glue and drill pilot holes for the screws. Take the frame apart and countersink the holes. Counterbore two of the holes for plugs (the ones on the right side of the shelf; see Fig. A). The rest of the screw heads won't show. Glue and screw the frame together.

*This clothes closet has
full-length mirrors inside
both doors.*

Glue the face frame to the box (**Photo 3**). Make sure that it overhangs each side by about 1/16". Use a router and a flush-trim bit to even up the frame with the sides and top of the box.

Build two leg frames

The sides of the armoire are also frames. Each one consists of two legs (C1) and three rails (C2 and C3). The legs and rails are quite thick; it's OK to laminate them from thinner stock. Mill the legs and rails to size, then taper the ends of the legs with a bandsaw or plane.

Cut mortises in the legs (Fig. D). Mill the tenons on the tablesaw with a stacked dado set (**Photo 4**). Split the large tenons on the bottom rails by ripping the tenons on the bandsaw (**Photo 5**). Clean out the waste with a chisel, working from both sides.

Glue up the leg frames, checking that they're both flat and square. When they're dry, glue and screw them to the box (**Photo 6**). Install the cabinet's back.

Add side panels

Each side of the cabinet has two panels (C4 and C5). Make each set of panels from one large blank so the wood's figure will run continuously from the



1 Begin by building a plywood box. Rout dados in its three vertical pieces to receive the top, bottom, shelf and back.

Assemble the box with glue and screws.

Start with just two pieces: the shelf and center divider. Make sure this assembly is square before moving on to the next glue-up.



3 Build a face frame and glue it to the front of the box. The face frame consists of parts that are just butted and screwed together.

Next, build two frames with legs to go on the sides of the cabinet. These frames carry the cabinet's weight, so they're constructed with strong mortise and tenon joints.



upper panel down to the lower panel. After gluing up the blank, crosscut it into two pieces. (Be sure that the blanks are about 1/8" narrower than the openings in the leg frames, so the panels will have room to expand in humid weather.) Apply a medium walnut stain to the face sides of the panels to even out the sap and heartwood colors (**Photo 7**).

Make the molding (C6) that goes around the panels. Start by milling boards that are about 5" to 7" wide. Rout profiles on both sides of the boards using a 3/8" radius bearing-guided cove bit mounted in a router table. Rip the boards to create molding strips, then rout the boards again. Repeat this process until the boards are about 2" wide. (Pieces narrower than this are difficult to rout.) Apply stain to all of the molding.

Place the panels in the frames, one at a time. Don't use any glue. Cut the molding pieces to length and install them with a brad nailer (**Photo 8**).

Attach the two-part crown (D1–D4, Fig. B). Make the lower assembly first, routing the profile after mitering and gluing the pieces together. Make the upper half of the crown, and glue it to the lower half. Stain the entire crown and screw and glue it to the case.

Doors and drawers

Each door has two layers (Fig. F). In front, a frame surrounds two panels; in back, there's a full-length mirror. The panels and mirror are held in place by a rabbeted molding (Fig. G).

Cut the stiles (E1) and rails (E2 and E3) to size. Cut

Fig. A Exploded View

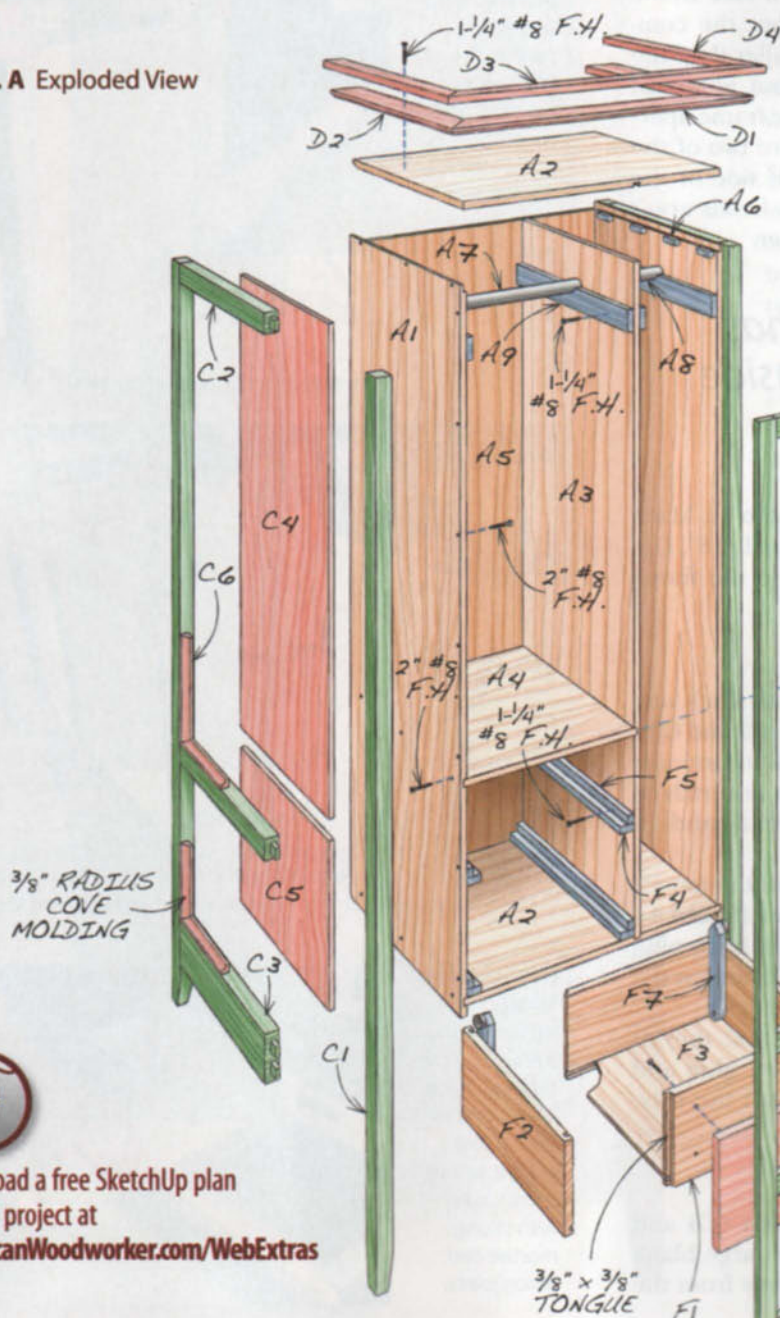
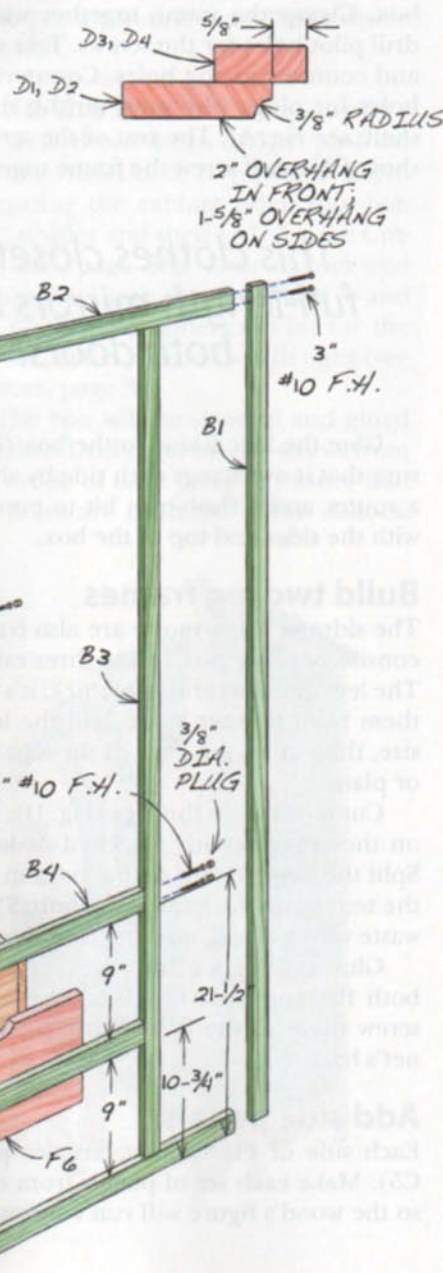


Fig. B Crown Molding Details



Download a free SketchUp plan for this project at AmericanWoodworker.com/WebExtras

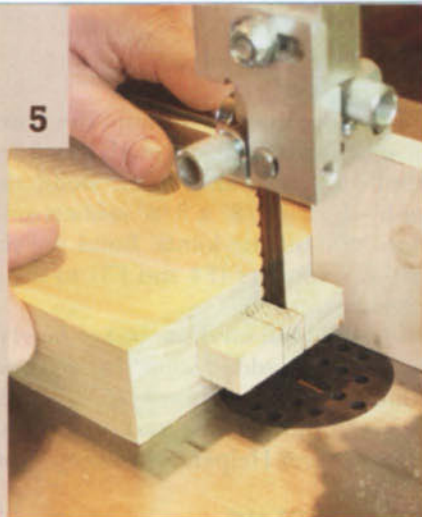
mortises in the stiles (Fig. E). Mill tenons on the rails, then glue the frames together. Use a bearing-guided bit to rout a rabbet in the back of each of the four openings (**Photo 9**). Leave the corners round.

Make the door panels (E4 and E5) in the same manner as the side panels. Round their corners to match the rabbets. Rout a profile on the face of the panels using a vertical panel-raising bit chucked in the router table. Support the work with a tall fence. Start with a shallow pass, then go deeper. Test the fit of the panels in the frames as you go; the backs of the panels should be flush with the back of the door frame when you're done (see inset to **Photo 9**).

Have the mirror (E6) cut at least 1/16" undersize all around (like a piece of window glass) and buy some standard self-adhesive sponge weather-stripping tape. (The tape protects the mirror by absorbing the shock of closing the door.) Make the molding that goes on the back of the door (E7 through E9). Use a test piece to figure out the depth of the rabbet on the back of the molding (**Photo 10**). Cut the molding to length and fasten it to the door (**Photo 11**).

After the doors are assembled, turn them face-up and rout a cove along the outside edges of the fronts. As the doors are inset between the legs, they won't

Saw the largest tenons into two parts. Use a fence to guide the cut. Clamp a stop block to the fence to limit the cut. Glue the leg frames together.



Glue and screw the leg frames to the sides of the cabinet.



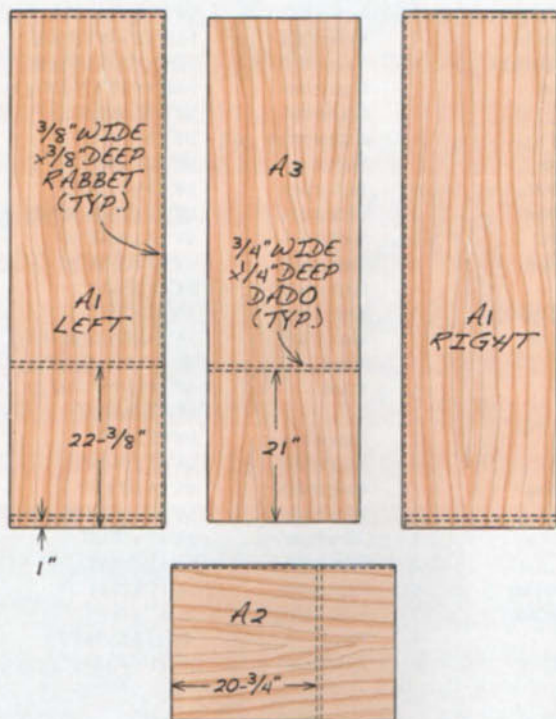
Make large walnut panels to fit into the frames. Stain the panels to even out their color.



Place the panels in the leg frames, then add molding all the way around. The panels are slightly undersized, so they're free to expand and contract.



Fig. C Plywood Dadoes and Rabbets



Learn more about finishing walnut at
AmericanWoodworker.com/WebExtras

open more than 90° without this cove.

The drawers (F1 through F3) are simple boxes with applied walnut faces (F6). Build them any way you wish—I used 3/8" x 3/8" rabbets and dados to make hook-and-tongue joints. Build the drawer boxes first, add the runners (F4 and F5) to the case and add the faces last.

After I built my drawers, I noticed that they drooped too much. I added some anti-tip devices (F7, Fig. H) which also act as drawer stops. To install or remove a drawer from the case, you just lean the sticks forward (see "Drawer Helper," Workshop Tips, page 11).

Finishing up

Turn or purchase walnut dowels for the closet rods (A7

and A8, see Sources). Make brackets for the rods (A9) and install them in the cabinet. Hang the doors with overlay hinges, then apply three coats of wipe-on poly (Photo 12). Last, install the door pulls (see Sources). Open the door, look in the mirror and smile! 

SOURCES

- Freud, freudtools.com, 800-334-4107, 23/32" straight bit for undersized plywood, #12-150, \$30.
- California Dowel and Turnings, woodproducts.caldowel.com, 714-523-8278, 1-1/4" walnut dowel rod, 36" long, \$11.30.
- Myknobs.com, 866-695-6627, Amerock Traditional Classics Bright Brass Knob, 1 1/2", #AME-12037, \$4.60 ea.; Amerock Self-Closing Face Mount Variable Overlay Hinge in Bright Brass, #AME-50962, \$2.60 ea.

Fig. D Leg Frame Joinery

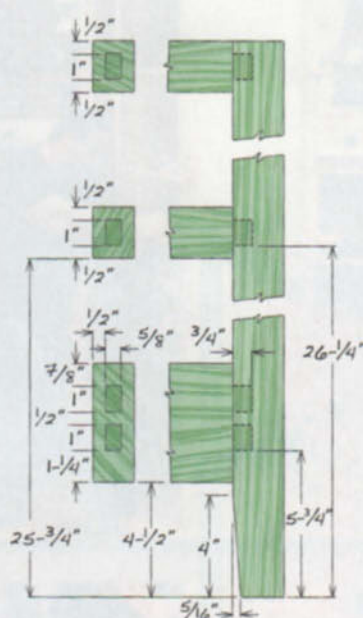
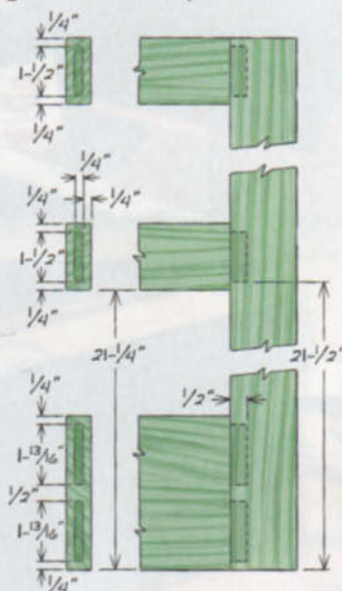


Fig. E Door Joinery



Cutting List

Overall Dimensions: 78" H x 40-1/8" W x 25-3/4" D

Section	Part	Name	Qty.	Material	Th x W x L
Carcase	A1	Side	2	Maple or birch plywood	3/4" x 21-3/4" x 72"
	A2	Top and bottom	2	Maple or birch plywood	3/4" x 21-3/4" x 31-1/2"
	A3	Divider	1	Maple or birch plywood	3/4" x 21-3/8" x 70-1/4"
	A4	Shelf	1	Maple or birch plywood	3/4" x 21-3/8" x 21"
	A5	Back	1	Maple or birch plywood	3/8" x 31-3/4" x 70-1/4"
	A6	Glue block	16	Yellow Poplar	3/4" x 3/4" x 2"
	A7	Closet rod, long	1	Walnut	1-1/4" dia. x 20-3/8"
	A8	Closet rod, short	1	Walnut	1-1/4" dia. x 9-7/8"
	A9	Closet rod bracket	4	Maple or birch	3/4" x 2-3/8" x 21-3/8"
	B1	Outside stile	2	Maple or birch	3/4" x 1-3/4" x 72"
Face Frame	B2	Top and bottom rail	2	Maple or birch	3/4" x 1-3/4" x 29"
	B3	Center stile	1	Maple or birch	3/4" x 1-3/4" x 68-1/2"
	B4	Drawer rail	2	Maple or birch	3/4" x 1-3/4" x 18-3/8"
	C1	Front and back leg	4	Maple or birch	1-5/8" x 2" x 76-1/2" (a, b)
	C2	Top and middle leg rail	4	Maple or birch	1-5/8" x 2" x 20-3/4" (a, b)
Sides	C3	Bottom leg rail	2	Maple or birch	1-5/8" x 4-5/8" x 20-3/4" (a, b)
	C4	Upper panel	2	Maple or birch	3/4" x 19" x 46-5/8" (c)
	C5	Lower panel	2	Maple or birch	3/4" x 19" x 16-1/2" (c)
	C6	Panel molding		Maple or birch	3/4" x 3/4" x 408"
	D1	Base piece, front	1	Maple or birch	3/4" x 3-1/4" x 39" (e)
Crown Molding	D2	Base piece, return	2	Maple or birch	3/4" x 3-1/4" x 25-1/4" (e)
	D3	Cap piece, front	1	Maple or birch	3/4" x 2" x 40-1/8" (e)
	D4	Cap piece, return	2	Maple or birch	3/4" x 2" x 25-3/4" (e)
	E1	Door stile	4	Maple or birch	3/4" x 2" x 71-3/4"
	E2	Door top and middle rail	4	Maple or birch	3/4" x 2" x 12" (d)
Doors	E3	Door bottom rail	2	Maple or birch	3/4" x 4-5/8" x 12" (d)
	E4	Upper panel	2	Walnut	3/4" x 11-3/4" x 47-3/8" (c)
	E5	Lower panel	2	Walnut	3/4" x 11-3/4" x 17-1/2" (c)
	E6	Mirror	2		1/8" x 12" x 65-3/4"
	E7	Top molding	2	Maple or birch	3/4" x 2" x 15"
	E8	Side molding	4	Maple or birch	3/4" x 2" x 69-3/8"
	E9	Bottom molding	2	Maple or birch	3/4" x 4-3/8" x 15"
	F1	Front and back	4	Yellow Poplar	3/4" x 7" x 17-1/2" (f)
	F2	Side	4	Yellow Poplar	3/4" x 7" x 20-3/8"
	F3	Bottom	2	Yellow Poplar	3/8" x 16-3/4" x 19-5/8"
Drawers	F4	Runner, lower plate	4	Maple or birch	3/4" x 2" x 21-3/8"
	F5	Runner, upper plate	2	Maple or birch	3/4" x 1" x 21-3/8"
	F6	Face	2	Walnut	3/4" x 8-7/8" x 18-1/4"
	F7	Anti-tip stick	4	Yellow Poplar	3/4" x 1-1/2" x 8-1/8"

Notes:

- Glue two or three thinner pieces together, then plane to final thickness.
- Length includes two 3/4" long tenons.
- Panels are undersized 1/4" side-to-side and 1/8" in length to allow for wood movement.
- Length includes two 1/2" long tenons.
- Miter to fit.
- Length includes two 3/8" long tenons.

Fig. F Door Construction

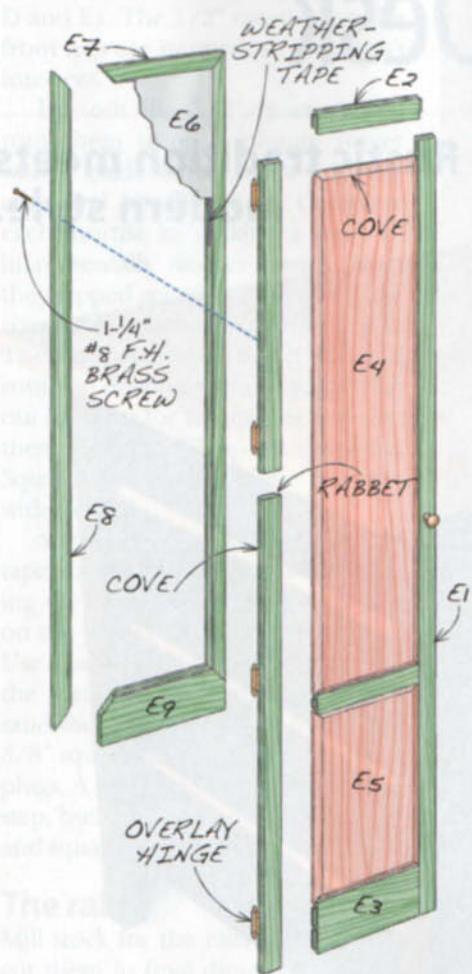
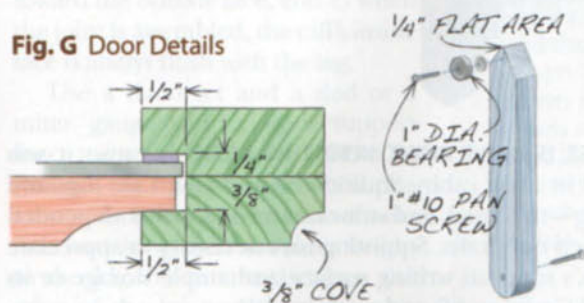


Fig. H Drawer Anti-Tip Device

Fig. G Door Details



Now, on to the doors. After gluing them together, rout rabbets all the way around the inside of the openings. Make walnut panels with round corners to fill the openings (see inset).



Make a molding to hold mirrors on the back of the doors. Use foam weatherstripping to cushion the mirrors. Test the depth of the molding's rabbet to make sure it holds the mirror tight.



Install the molding with brass screws. If the mirror ever needs to be replaced, it will be easy to remove.



Apply a wipe-on poly finish to the whole cabinet.



John English has been writing how-to articles and books for more than 15 years. He and his wife, Meg, live in South Dakota, where he teaches joinery and furniture building at the Black Hills School of Woodworking.

Log Cabin Writing Desk

Rustic tradition meets modern style.



by Chris Cander
and Mark Love



COZINESS IS BUILT RIGHT INTO THIS DESK, because it was inspired by a log cabin. Squint a bit and you'll see logs and chinking—the muck-and-straw mixture pioneers depended on to keep out drafts. Squinting isn't necessary to appreciate the desk's spacious writing surface and ample storage or its Arts and Crafts motifs and modern style.

Like a log cabin, this desk is heavily built; its legs are made from 8/4 walnut, its rails from 6/4 walnut and its figured maple top is fully 1" thick. Figured maple splines fitted between the rails create the chinking.

The legs

Mill the legs to final size as rectangular blanks (A1, Fig. A, page 42 and Cutting List, page 47). Two of the legs go on the paneled front; three legs separate the drawers on the back. The front legs have mortises on the inside edge and the adjacent inside face. The back legs have mortises on the inside face only. The 1/2" mortises are always spaced 11/16" from the inside edge; the 3/8" mortises are always spaced

1/2" from the inside edge (Figs. B, D and E). The 1/2" mortises on the front legs are stepped, so they don't intersect.

Lay out the 1/2" mortises and rout them using a plunge router with a guide fence and a 1/2" up-cut spiral bit (**Photo 1**). Complete each mortise by making a series of incrementally deeper passes. Rout the stepped mortises in stages. First, rout full-length to the shallow depth. Then adjust the plunge depth and rout the deep portion. Similarly, lay out mortises for the splines and rout them with a 3/8" up-cut spiral bit. Square the ends of these mortises with a chisel.

Shape the legs (Fig. C). Cut the tapers a tiny bit wide to allow removing the saw marks by making a pass on the jointer or with a hand plane. Use a jar or a lid to draw the arcs on the feet. Then saw the curves and sand them smooth. Cut 3/8" deep x 3/8" square holes for the decorative plugs. A mortiser does the job in one step, but you can also drill the holes and square them with a chisel.

The rails

Mill stock for the rails (A2-A4) and cut them to final dimensions. Then lay out the tenons (Fig. G). Note that 1) the rail tenons are always offset toward the outside face, and 2) when the joint is assembled, the rail's inside face is always flush with the leg.

Use a dado set and a sled or a miter gauge with a stout support fence to cut the rail tenons (**Photo 2**). Position the rip fence to establish the tenons' length. Cut the inside cheeks first, matching their shoulder height to the 11/16" distance between the edge of the leg and the 1/2" mortises. Lower the blade to cut the outside cheeks. Start by making a shallow cut on one rail, so the tenon is too thick to fit the mortise. Then make additional passes, raising the blade in small increments until the tenon fits without binding or wobbling. Only the corner of the tenon will fit into the mortise at this point, so it's a good idea to verify the correct thickness with a dial caliper. When you've dialed in a perfect fit, finish cutting all the tenons' outside cheeks.

Rout mortises in the legs for the rails and figured maple splines.



Cut tenons on the rails with a dado set. The tenons are offset from center, so cut one cheek and then adjust the blade height to cut the other cheek.



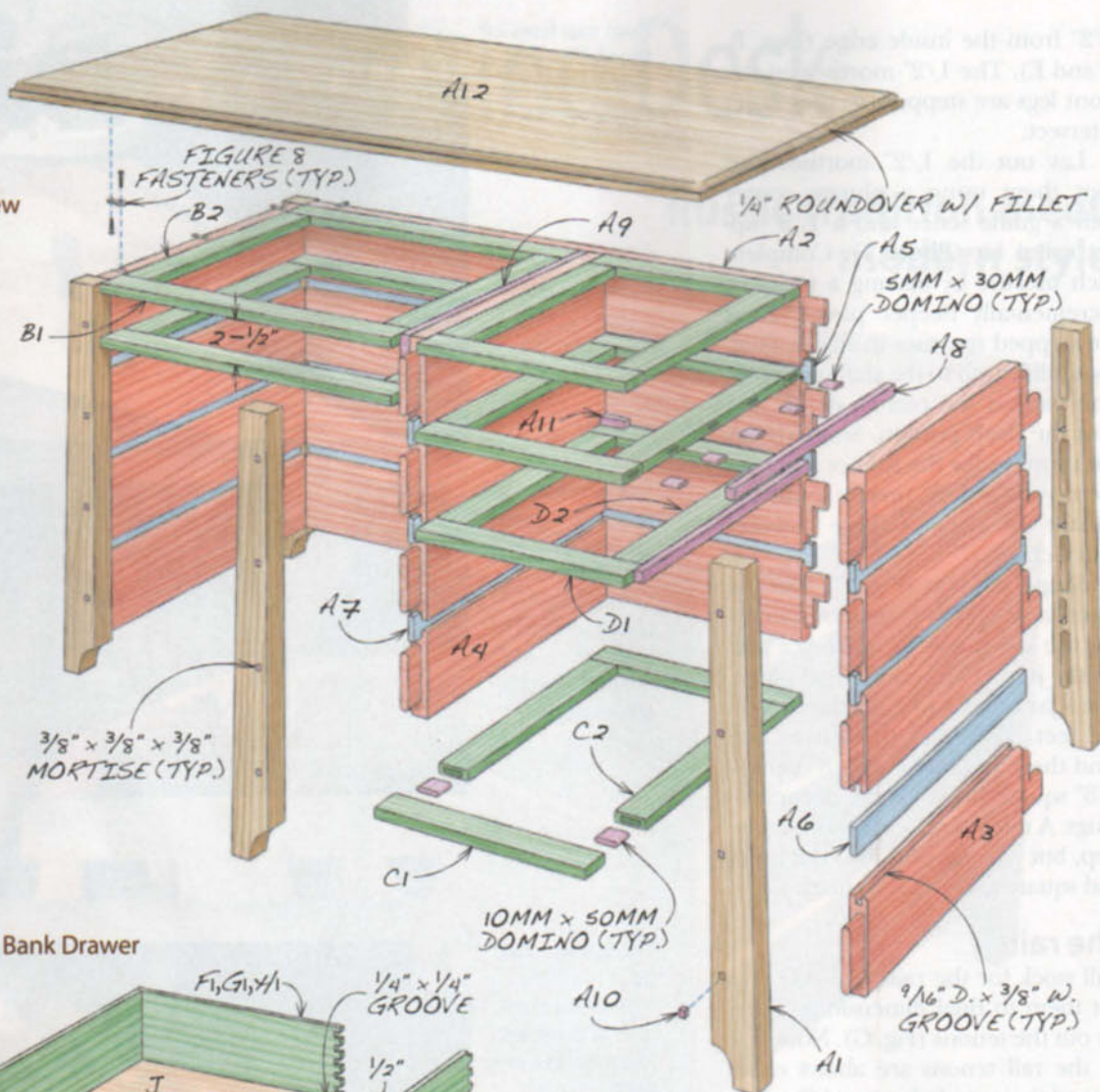
The tenons that go in the front legs are stepped to nest together. This creates a long tenon on each rail and a haunch for additional strength. The mortises are similarly stepped. Round the ends of the tenons to match the mortises.



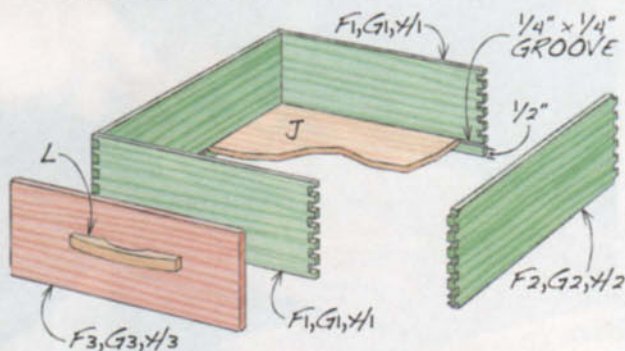
Test-fit all the panel assemblies. The rails for the side panels (shown here) have wide tenons at the back and stepped tenons at the front.



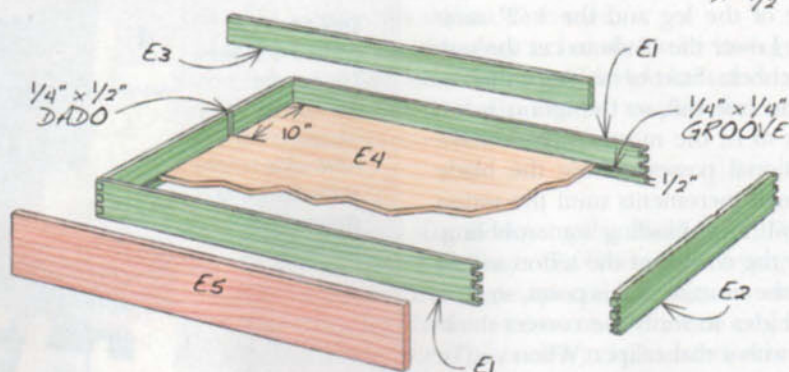
Fig. A
Exploded View



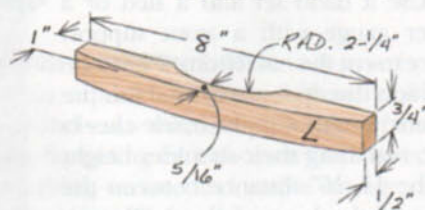
Detail 1 Bank Drawer



Detail 2 Pencil Drawer



Detail 3 Drawer Pull



Read the story of figured wood at
AmericanWoodworker.com/WebExtras

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Reposition the blade and stand each rail on edge to cut the end shoulders. Next, use the bandsaw equipped with a fence to cut the stepped tenons. Then round the ends of the tenons to fit the mortises (**Photo 3**).

The panels

Leave square the top edges of the four top rails and the inside edges of the rails on the side panel and inside panel that form the drawer bank. Round over the rest of the rail edges.

Cut centered grooves for the figured maple spline on the appropriate rail edges. Mill the spline stock to fit the grooves and then cut the splines (A5-A7) to length and width. Apply one coat of finish to the splines.

Test-fit each panel assembly without glue (**Photo 4**). Mark the top edges of the four middle drawer bank rails. Disassemble the panels and carefully glue cleats (A8) on the marked edges (Fig. F). These cleats allow installing the two middle web frames. Sand all the parts to 180 grit.

Rout mortises in the front assembly for the inside rail tenons and

Rout mortises for the inside panel's rails and splines in the front panel, which is clamped together without glue. The inside panel's rails have wide tenons on both ends.

5

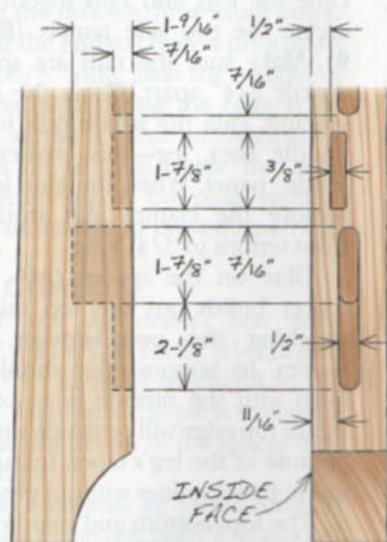


Assemble the web frames with loose tenons. A Domino joiner works like a biscuit joiner, but it creates mortises rather than slots.

6

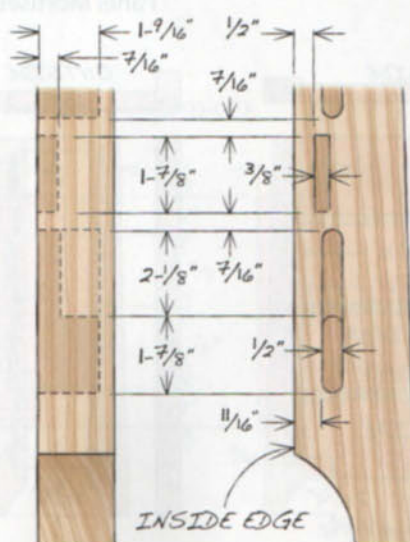


Fig. B Leg Mortise Dimensions

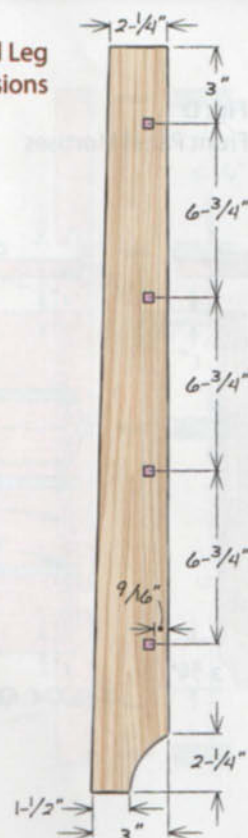


Front Panel Legs

Fig. C Tapered Leg Dimensions



Side Panel and Inside Panel Legs



7

Install Domino tenons in both sides of the assembled web frames. They'll position the frames in the case.



8

Burnish the web frames so the drawers slide smoothly. Melt paraffin wax into the wood with an iron. Allow the wax to cool, then vigorously rub the surface with an abrasive pad.



splines (**Photo 5** and Fig. D). Note that the $1\frac{1}{2}$ " mortises are $13/16$ " deep. Clamp the assembly square and make sure each rail is correctly positioned. Use a T-square and measure from the assembly's leg to locate the $1\frac{1}{2}$ " mortises. Make sure these mortises perfectly align with the mortises you've already cut on the leg that goes with the inside rails. Position a straightedge to guide the router, then plunge-route the mortises. Repeat the procedure to rout the $3/8$ " mortises.

The web frames

The web frames support the drawers, provide structure for the case and continue the chinking detail (note that the two middle web frame stiles are made of curly maple). Make each frame about $1/8$ " oversize in width, so it can be trimmed to fit just before installation. Use Domino tenons or biscuits to join the stiles and rails (B1-B2, C1-C2, D1-D2 and **Photo 6**). Glue and clamp, making sure every frame is square and flat. Mill centered mortises for Domino tenons (or biscuit slots) in both sides of each frame. Install the Domino tenons (**Photo 7**). Then sand the frames to 180 grit and burnish their top surfaces with paraffin (**Photo 8**).

The side panels

Glue the legs and rails together to create the two side panels (**Photo 9**). Make sure the rails are spaced exactly $3/4$ " apart. Using the same spacing, glue the inside rails to the middle back leg—this creates the inside panel. When the glue is dry, remove the clamps and trim the front tenons to $3/4$ " long.

Glue on the spacer (A9). The spacer builds out the top rail for attaching the pencil-drawer face frames. Its bottom edge should be flush with the outside edge of the leg; its top edge will protrude slightly, because of the leg's taper. Install the inside panel splines without glue.

The top, bottom and middle web frames fit between the side panel and the inside panel to form the drawer bank. Transfer the mortise locations from these web frames to the two panels (Fig E.). Then cut the mor-

Fig. D
Front Panel Mortises

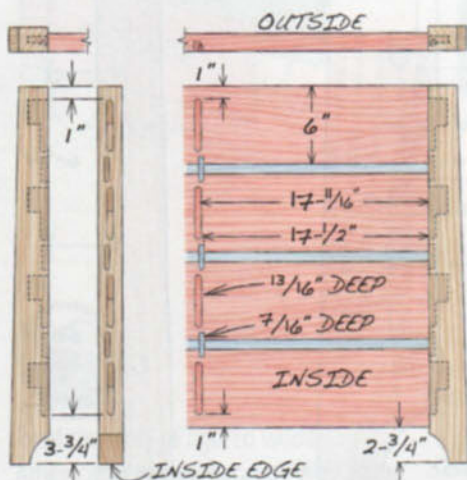
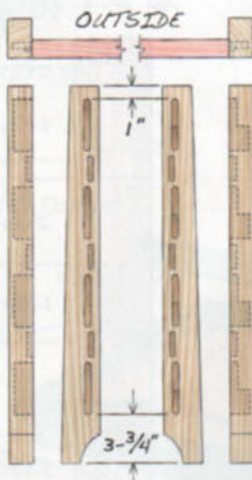


Fig. E
Side and Inside Panel Mortises



tises in the rails and cleats (**Photo 10**). Burnish the inside surfaces with paraffin to help the drawers slide easily. (Keep wax away from the open joints and the leg fronts.) Repeat the process to rout mortises for the two pencil-drawer web frames.

The case

Assemble the front panel rails and splines without glue. Square this assembly and then glue and clamp the inside panel to it (**Photo 11**). As before, don't glue the splines. Make sure the inside panel is square to the front panel. Note: This unusual assembly will be somewhat unstable as the following steps are completed.

Apply glue and slide the drawer-bank web frames into position against the inside panel. Similarly, apply glue and slide on the drawer bank side panel (**Photo 12**). Make sure everything's aligned and square, then clamp. Repeat the process to install the pencil-drawer web frames and the remaining side panel.

Create the decorative plugs (A10) from a length of wenge milled just over $3/8"$ square. Create facets on the end using a disc sander with a worn-out 220 grit disc. Clamp a fence to the table, facing the disc about $10"$ from perpendicular. Set the wenge on the fence and gently push it forward to touch the disc. Turn it, and repeat the process three more times. Cut off the end to create a plug that's about $3/8"$ long. Ease the rough-cut corners by dragging the plug at an angle across a piece of sandpaper. Dab a bit of glue inside the hole and gently tap in the plug, using a piece of leather to prevent marring.

The drawers

Rough out the drawer box parts (E1-E4, F1-F2, G1-G2, H1-H2 and J) and let them sit overnight to stabilize. Then mill the parts exactly as wide as the height of the spaces they will fit into.

Use a dovetail jig to cut through dovetails in the box parts. Cut grooves for the drawer bottoms and dados in the pencil drawer sides for the divider.

Mark each drawer side according to where it will go and slide it into the appropriate opening in the case

Glue the side panels together. Apply glue to the large mortises in the legs and to the rail tenons. Don't glue the splines—they float between the rails to disguise seasonal movement.

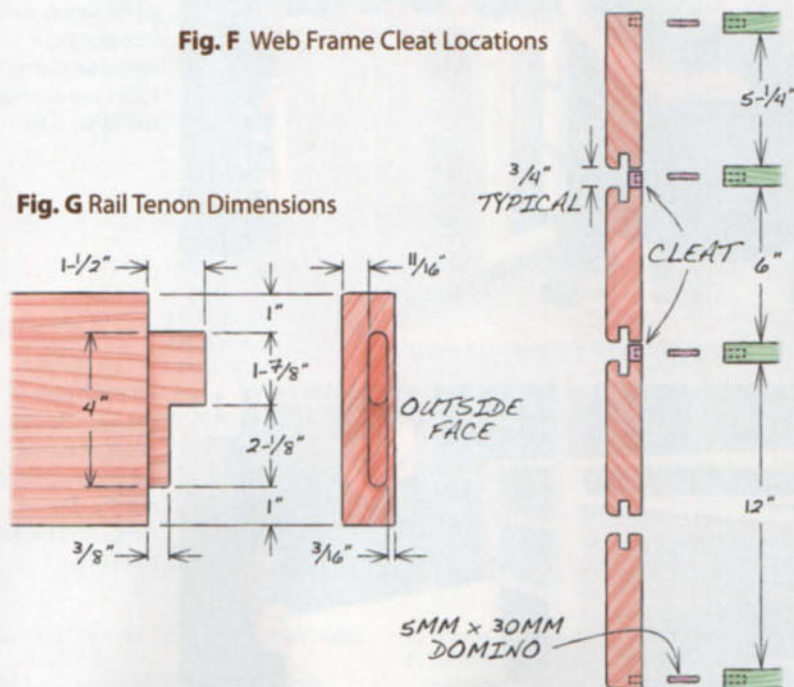


Cut mortises for the web frames in the side panels and in the inside panel.



Fig. F Web Frame Cleat Locations

Fig. G Rail Tenon Dimensions




11

Glue the inside panel assembly to the front panel rails, which are assembled without glue. Before clamping, make sure the front rail assembly is square and the edges of the inside panel rails and front rails are flush.

Inside panel assembly

Assembled front rails


12

Install the web frames and the side panels. The parts simply slide into position because all the joints are oriented the same way.


13

Fit each pair of drawer sides to allow seasonal movement. Then cut the drawer fronts and backs to match.

(Photo 13). The sides will either fit very tightly or not at all. Joint the top edges (away from the dado) to create adequate room for seasonal movement between the drawer and the frame above it. The optimal amount depends on a number of factors, but a good rule of thumb is to allow at least 1/16" for the top two drawers and 1/8" for the bottom drawer. Sand and finish the inside faces of all the drawer box parts. Assemble the drawer boxes and mark where the sides meet the fronts and backs. Then joint the fronts and backs to match the sides. Sand and finish the inside faces of the five main drawer box parts—tape off the glue joints before applying the finish. Then glue and clamp together the drawer boxes. Sand and finish the pencil drawer divider and glue it in—drive nails through the bottom to serve as clamps and to stiffen the 1/4" plywood.

Test-fit the boxes in the drawer openings. The fit is ideal if you can pull the box two-thirds out and then close it by pushing with a finger at the side of the front, rather than the center. If the fit is too tight, lightly plane or sand one side and try again. Burnish the outside faces and bottom edges of the drawer box sides with paraffin.

Cut, fit and install the drawer fronts (E5, F3, G3 and H3). The bank's top drawer front extends above the box to cover the web frame, its bottom drawer front extends below the box and its middle drawer front is flush, so it fits between the middle web frames (which protrude farther than the top and bottom frames). The pencil drawer front extends above and below the drawer box. Angle one end to match the slope of the inside panel's leg. Install drawer stops (A11) to position the middle drawer flush with the others.

Cut blanks for the drawer pulls (L) and shape the curves by sawing and sanding (Fig. A, Detail 3). Center the pulls on the drawer fronts and fasten them with screws from inside the drawer box.

The top

Mill the top boards to within 1/4" of the finished thickness and let them

stabilize overnight. The next day, mill the boards to final thickness. Planing figured wood such as the curly maple shown here is likely to cause substantial tearout, unless you know this nifty trick. Simply dampen the surface of the board with a sponge just before running it through the machine. Dampening virtually eliminates tearout and it won't harm your machine as long as you keep the tables waxed and dry off the cutterhead as soon as you've finished.

Lay out the boards in a pleasing arrangement that's about 1" oversize in width. Then cut the boards to length, about 2" oversize. Joint the edges (get out the sponge again). Then glue and clamp the top (A12).

Cut the top to final width and length and then sand it to 180 grit (Photo 14).

Create the edge profile using a 1/4" roundover bit with a smaller bearing installed to create the fillet. Cut notches about every 10" around the top of the case and install the "figure 8" desktop fasteners. These fasteners swivel to allow the top's seasonal movement. Center the top on the case and install additional screws through the fasteners to secure it.

The finish

Remove the top. Sand all the parts to 180 grit—be sure to remove the scratches from the previous grit with each step up. Then apply your favorite finish. Tip: Oil finishes look better when the surfaces are sanded to a higher grit. 

SOURCE

Rockler Woodworking and Hardware, rockler.com, 800-279-4441, Desk Top Fasteners, #21650, \$3.89 for a pack of eight.

Chris Cander is a freelance writer and novelist. In addition to writing for *American Woodworker*, Chris is a contributing editor to *Oxygen*, *Maximum Fitness* and *Clean Eating* magazines.

Mark Love is a professional furniture maker in Wimberly, Texas. To see more of his work, visit marklovefurniture.com.

Build the top. It's the perfect place for extraordinary wood such as this curly maple. The same stock was used to make the splines that ornament the case.

14



Cutting List

Overall Dimensions: 60" L x 30" W x 30" H

Section	Part	Name	Qty.	Material	Th x W x L
Case	A1	Leg	5	Walnut	1-7/8" x 3" x 29" (a)
	A2	Front rail	4	Walnut	1-3/8" x 6" x 53" (b)
	A3	Side rail	8	Walnut	1-3/8" x 6" x 26-3/4" (c)
	A4	Inside rail	4	Walnut	1-3/8" x 6" x 26-3/4" (d)
	A5	Front spline	3	Curly maple	3/8" x 1-3/4" x 50-3/4"
	A6	Side spline	6	Curly maple	3/8" x 1-3/4" x 24-1/2"
	A7	Inside spline	3	Curly maple	3/8" x 1-3/4" x 24-1/2"
	A8	Web frame cleat	4	Walnut	5/8" x 5/8" x 23-3/4"
	A9	Spacer	1	Walnut	1" x 4" x 23-3/4"
	A10	Decorative plug	20	Wenge	3/8" x 3/8" x 3/8" (e)
	A11	Drawer stop	2	Maple	1/2" x 3/4" x 1-1/2"
	A12	Top	1	Curly maple	1" x 30" x 60"
Web frames	B	Pencil drawer	2	Maple	3/4" x 30-3/4" x 24-1/2" (f)
	B1	Stile	4	Maple	3/4" x 2-1/2" x 30-3/4"
	B2	Rail	4	Maple	3/4" x 2-1/2" x 19-1/2"
	C	Drawer bank top and bottom	2	Maple	3/4" x 17-1/8" x 24-1/2" (f)
	C1	Stile	4	Maple	3/4" x 2-1/2" x 17-1/8"
	C2	Rail	4	Maple	3/4" x 2-1/2" x 19-1/2"
	D	Drawer bank middle	2		3/4" x 17-1/8" x 24-3/4" (f)
	D1	Stile	4	Curly maple	3/4" x 2-1/2" x 17-1/8"
	D2	Rail	4	Maple	3/4" x 2-1/2" x 19-3/4"
	E	Pencil drawer	1		4" x 30-5/8" x 24-5/8"
Drawers	E1	Box front and back	2	Maple	1/2" x 2-1/2" x 30-5/8" (g)
	E2	Box side	2	Maple	1/2" x 2-1/2" x 24" (g)
	E3	Divider	1	Maple	1/2" x 1-3/4" x 30-1/8"
	E4	Bottom	1	Baltic birch	1/4" x 23-1/2" x 30-1/8"
	E5	Drawer front	1	Walnut	5/8" x 4" x 31" (h)
	F	Top drawer	1		6" x 17" x 24-5/8"
	F1	Box front and back	2	Maple	1/2" x 5-1/4" x 17" (g)
	F2	Box side	2	Maple	1/2" x 5-1/4" x 24" (g)
	F3	Drawer front	1	Walnut	5/8" x 6" x 17"
	G	Middle drawer	1		6" x 17" x 24-5/8"
	G1	Box front and back	2	Maple	1/2" x 6" x 17" (g)
	G2	Box side	2	Maple	1/2" x 6" x 24" (g)
	G3	Drawer front	1	Walnut	5/8" x 6" x 17"
	H	Bottom drawer	1		12-3/4" x 17" x 25-1/8"
	H1	Box front and back	2	Maple	1/2" x 12" x 17" (g)
	H2	Box side	2	Maple	1/2" x 12" x 24" (g)
	H3	Drawer front	1	Walnut	5/8" x 12-3/4" x 17"
	J	Bank drawer bottom	3	Baltic birch	1/4" x 16-1/2" x 23-1/2"
	L	Pull	3	Curly maple	3/4" x 1" x 8"

Notes:

- a) Width tapers to 2-1/4" at the top; 2-5/8" radius cutout at bottom.
- b) 1-1/2" long stepped tenons on both ends.
- c) 1-1/2" long tenons on both ends; the tenons are stepped on one end.
- d) 1-1/2" long tenons on both ends; the front-end tenons will eventually be shortened to 3/4".

- e) One end is faceted to form a center point.
- f) Web frame width is 1/8" oversize; trim each assembled frame to fit the case.
- g) Cut 1/4" x 1/4" groove on the inside face for the drawer bottom.
- h) Cut length to fit and angle one end to match the leg's taper.

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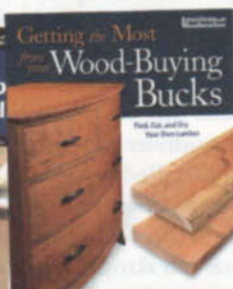
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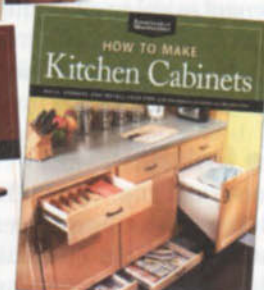
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Sliding Bookrack

Organize your reading with only one board foot of lumber.

by Doug Stowe

GOT BOOKS? Add a benchtop mortiser and a weekend in your shop, and you're set to create a useful and attractive way to display them. Check it out: Building this Arts and Crafts style cutie, including a template for cutting the mortises, requires only 1 bd. ft. of lumber. That means you can use primo wood, such as quarter-sawn white oak. And once you've made the template, you can build these bookracks by the dozens.

Cut the five parts

Plane the stock to 5/8" thickness and rip the parts to width (A-D Fig. A and Cutting List, page 50). Set aside the rod blanks. Then cut all the remaining parts, including the template, to length on the tablesaw, using a sled or a miter gauge equipped with a fence and a stop block. The template should be identical in size to the fixed brace (A) and the adjustable brace (B). Sand both braces and the fixed end (C) to 220 grit. This will minimize sanding after the bookrack is assembled.

Cut the mortises

Create a template that will make it easy to accurately position the pieces for mortising. Lay out the mortises on the template. The rod mortises are spaced 1" from the bottom and 3/4" from the edges. The decorative mortises

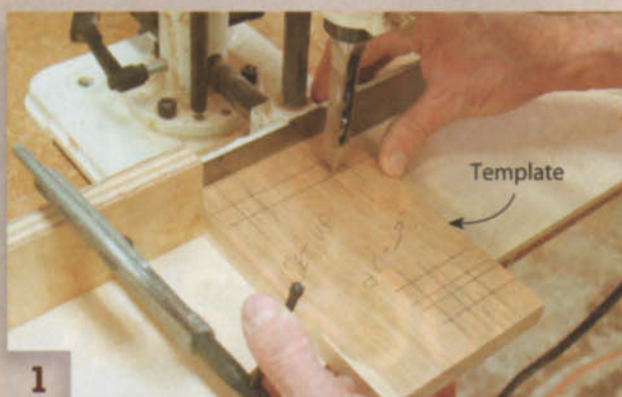
are 1" from the top, 3/4" from the edge and spaced 1/4" apart. Install a 1/2" mortising chisel in the mortiser and set the fence 1" from the bit.

Position the template on the mortiser with the bit centered on one of the bottom mortises. Clamp on a stop block (**Photo 1**). Then cut a through mortise (**Photo 2**). Flip over the template, lower the bit into the mortise and clamp on a second stop block (**Photo 3**).

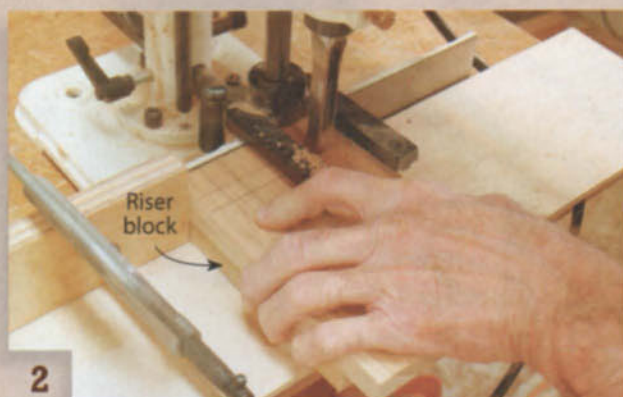
Use the two stop blocks to cut the bottom mortises in both braces and the fixed end (**Photo 4**). Complete each mortise by cutting partway through on both faces. This prevents the splintering and blowout that can occur on the back face when a mortise is cut through from one face.

Turn the braces around and use the same setup and method to cut one mortise at the top—the first decorative mortise. Make sure to position the workpiece against the appropriate stop block when you flip it over to complete the mortise.

Cutting the three remaining decorative mortises in the two braces requires a slightly different approach, because each mortise requires a separate setup. Clamp on both stop blocks after cutting each through mortise in the template (**Photo 5**). Then cut that mortise in both braces. Repeat the process to cut the remaining decorative mortises (**Photo 6**).



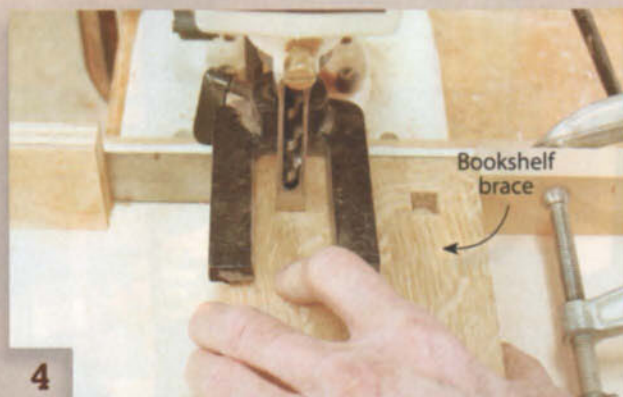
1 **Create a template** to set up the mortiser. Position the bit to cut the first mortise by adjusting the fence and clamping on a stop block.



2 **Cut a through mortise.** Use a riser block to lift the template above the fence so the mortiser's hold-down works properly.

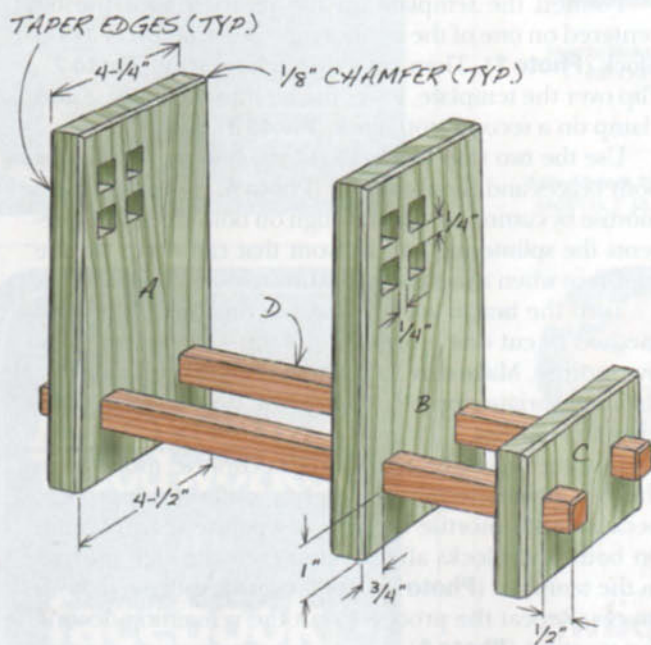


3 **Flip over the template** and lower the mortising bit into the mortise. Then install a second stop block.



4 **Use the two stop blocks** to cut the bottom mortises. Cut three-quarters through each workpiece, then flip it over and use the opposite stop block to complete the cut.

Fig. A Sliding Bookrack



Final shaping and fitting

Cut $1/16$ " off the bottom of the adjustable brace so it will slide freely as it's moved from one position to another. Taper the outside edges of both braces by hand (**Photo 7**). Taper both ends of the fixed end on the tablesaw, using the miter gauge outfitted with a fence and a stop block. Set the miter gauge at a shallow angle (2° – 3° from square) to match the tapers on the braces.

Plane the two rod blanks down to fit the mortises. Make sure the rods (D) freely pass through the mortises in the adjustable brace, but fit the mortises in the

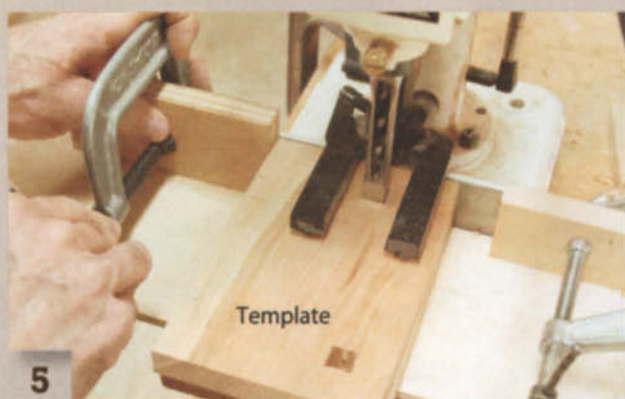
Cutting List

Overall Dimensions: $4\text{--}1/2" \times 7" \times 12"$

Part	Name	Qty.	Material	Th x W x L
A	Fixed brace	1	Oak	$5/8" \times 4\text{--}1/2" \times 7"$ (a)
B	Adjustable brace	1	Oak	$5/8" \times 4\text{--}1/2" \times 7"$ (a, b)
C	Fixed end	1	Oak	$5/8" \times 2\text{--}1/4" \times 4\text{--}1/2"$ (c)
D	Rod	2	Oak	$1/2" \times 1/2" \times 12"$

Notes:

- a) Taper both outside edges by $1/8$ ", so the top end measures $4\text{--}1/4"$.
- b) Cut $1/16$ " from bottom after a mortises and tapers have been cut.
- c) Taper the ends to match the slope of the braces.



5 Each decorative mortise requires a unique setup. After cutting each new through mortise, flip over the template, engage the bit and install the second stop block.



6 Use the appropriate stop-block setup to cut each decorative mortise. As before, cut three-quarters through each workpiece, flip it over and use the opposite stop block to complete the job.



7 Slightly taper all the edges from bottom to top. Reducing the mass at the top helps the bookrack's overall appearance.



8 Apply glue to the rods and then slide the fixed brace and fixed end into position. Tape marks the spot and protects the surfaces from glue that squeezes out.

fixed brace and fixed end tightly enough to be effectively glued. If the rods bind on the adjustable brace, sand them lightly between the points where the fixed brace and fixed end will be glued. Using a chisel to enlarge the mortises on the adjustable brace is a more difficult option.

Slightly chamfer the edges of both braces and the fixed end. Chamfer the ends of the rods, but leave their long edges square.

Assembly and finish

Before assembly, tape the faces of the fixed brace and fixed end to keep them free of glue. Slide both braces and the fixed end onto the rods—make sure the decorative mortises are oriented correctly. Then use tape to mark the locations of the two fixed pieces on the ends of the rods. Place the assembled rack on a flat surface. Carefully apply glue to the rods and slide the fixed brace and the fixed end into position (**Photo 8**). Make sure these pieces remain perpendicular. A small amount of glue may squeeze out and puddle where the pieces of tape meet. Use a chisel to remove this glue after it has hardened to a leather-like consistency.

When the glue is dry, remove the tape and sand lightly as necessary. Then apply a finish such as Deft Danish Oil. 🛠️



Doug Stowe's woodworking program at Arkansas' Clear Spring School stimulates and reinforces learning by integrating woodworking activities into the school's academic curriculum. In 2009, the Arkansas Department of Heritage and Arkansas Arts Council named

Doug an "Arkansas Living Treasure" for his contributions to traditional crafts and craft education.



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A Simple Headboard

This weekend project lets you show off one dazzling board.

by Tom Caspar

TRUE STORY. I first built a headboard like this years ago using only a miter saw, router, sander and a drill. My shop was just a driveway.

The project really is that simple. For materials, all you'll need is a huge board (this one is a piece of African ribbon-stripe mahogany) and some poplar 1x4s from a home center. The joinery consists of just gluing together some of the 1x4s.

Most hardwood lumberyards have a few odd boards that are over 12" wide—ideal candidates for this project. If you find one that's already been planed and is reasonably flat, you're good to go. If the board needs

to be flattened, don't walk away. There are a handful of ways you can do this yourself (see 5 Ways to Flatten Wide Boards, p. 54).

Make the front and top

The front board (A) can be virtually any width. It will have the most dramatic effect if it's 12" to 16" wide. Cut this board two inches extra-long using a jigsaw or a handsaw. Make the long sides of the board straight and parallel using a router, a top-bearing pattern bit and a long straightedge, such as one of your 1x4s.

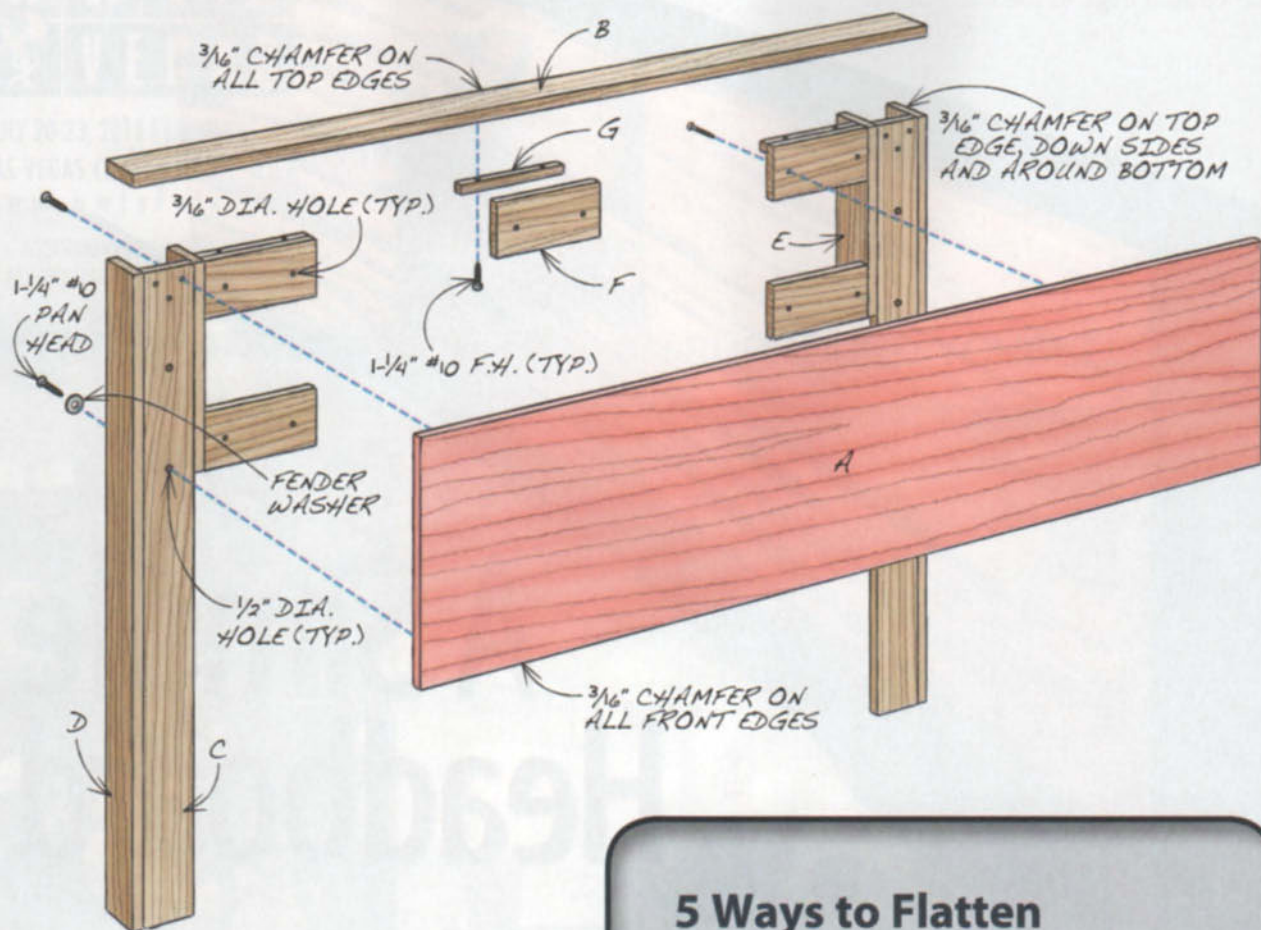
Mark the finished length of the front board, then draw lines across

both ends of the board using a carpenter's square. Crosscut the board $1/8$ " longer than these lines. Clamp a 1x4 along each line and trim the board to final length with your router (**Photo 1**). Cut the top board (B) to the same length.

Make the legs

First, figure out how long the legs should be. This dimension depends on two things: the height of your mattress, as it sits on a box spring and frame, and the width of your front board. To calculate the legs' length, add the mattress height to the width of the board. Then subtract $1-3/4$ ",

Fig. A Exploded View



Cutting List

Overall Dimensions: 41" H x 62" W x 4-1/4" D

Part	Name	Qty.	Th x W x L
A	Front	1	3/4" x 15" x 62" (a)
B	Top	1	3/4" x 3-1/2" x 62"
C	Leg	2	3/4" x 3-1/2" x 40-1/4" (b)
D	Leg return	2	3/4" x 3-1/2" x 40-1/4" (b)
E	Brace	2	3/4" x 3-1/2" x 14" (c)
F	Stiffener	5	3/4" x 3-1/2" x 8"
G	Cleat	3	3/4" x 1" x 8"

Notes:

- a) This piece can be 12" to 16" wide.
 b) The length of the legs and leg returns will depend on the height of your mattress and the width of the front (A). Length equals height of mattress plus width of A, minus 1-3/4". In this example, the mattress is 27" high.
 c) The length of this piece should be 1" less than the width of the front board.

5 Ways to Flatten Wide Boards

If you're good with planes, you can certainly level a wide board by hand. But you can also do the job using small-shop power tools. Here are five methods:

1) **Use a handheld power planer.** This method will work on a board of any size. The trick is to figure out how much to take off—and where.

2) **Joint and hand plane.** If a board is only an inch or two wider than your jointer, you can use the jointer to flatten most of the board, then remove the remaining material by hand.

3) **Rip, joint and reglue.** If the board is more than 2" wider than your jointer, rip the board into two pieces and flatten each one separately. The critical step is figuring out where to make the rip cut to best conceal the joint.

4) **Turn your planer into a jointer.** Running a warped board through a planer doesn't necessarily make it flat—just thinner. Build a special sled with some strategically placed shims to keep the board from rocking.

5) **Use a router carriage.** To level a board of any width, build a gantry for your router with two pieces of aluminum angle.



Learn more about these methods for flattening wide boards at AmericanWoodworker.com/WebExtras

and you've got it. Using this formula, the bottom edge of the front board will be 1" below the top of the mattress.

Cut the legs (C) and leg returns (D) to length. Cut the leg braces (E) to length. (These pieces help keep the front board from warping by stiffening the legs.) Glue the legs and leg returns together, making sure that they are flush. Glue the braces to the legs (**Photo 2**). Note that the final assemblies will be mirror images of each other.

Drill screw holes in the legs (Fig. A). Use a spade bit to make the large holes. Plane, rout or sand a chamfer all around the legs, including the ends. Chamfer the front four edges of the front (A) and all four top edges of the top (B). Sand all of these pieces to 120 grit.

Cut all the stiffeners (F) and cleats (G). Drill two screw holes in each piece. Glue the cleats to three of the stiffeners. After the glue is dry, trim 1/16" off both ends of each piece to ensure that the blocks are square and even.

Finishing and assembly

Finish both sides of the front board with an equal number of coats. This will help prevent it from warping. To bring out the figure in my mahogany board, I first applied two coats of 2-lb. dewaxed blonde shellac (mixed from flakes) to both sides. Then I applied three coats of Minwax Polycrylic water-based finish (see Workshop Tips, "The Best Brush for Water-Based Finishes," page 10).

Stain the legs. I used two coats of ebony Minwax Wood Finish (it's actually an oil-based stain), followed by two coats of Polycrylic finish.

Start assembling the headboard by fastening each leg to the front board (**Photo 3**). Using a scrap piece of poplar, make sure the legs are 3/4" below the top edge of the front board. They should be flush with the end of the front board, too. Then install all the stiffeners. The upper three pieces should also be positioned 3/4" below the top edge of the front board. Lastly, install the top board (**Photo 4**). 

Trim the end of the big board with a large top-bearing pattern bit. Guide the router with a straightedge. Clamp a scrap piece to the board to prevent blowout at the end of the cut.



Glue the legs together. Place a cutoff under the board you're gluing to ensure that the joint comes out square. Apply two coats of black stain to the legs.



Fasten the legs to the front board. Use a spacer to position the leg below the board's top edge. The screws with fender washers pass through oversize holes, allowing the front board to expand and contract.



Fasten the top board from underneath. Position this piece, and the one below it, snug up against the leg to prevent the headboard from racking side to side.



How to Install Butt Hinges

For this work, hand tools are better than power tools.

by Lonnie Bird



FITTING BUTT HINGES is exacting work. For precision, you might think that power tools are the way to go, but I always turn to a small set of hand tools to do the job. Using a marking knife, pin gauge and chisel, you can precisely lay out and cut hinge mortises in a very short time.

First, let me share a few thoughts with you about the hinges themselves. When selecting butt hinges, I steer clear of the inexpensive stamped variety and instead purchase high-quality extruded and machined hinges made from solid brass. The leaves of these hinges are typically thicker and stronger than those found on stamped hinges. They pivot smoothly and precisely. Look for hinges that appear proportional in size to the door and cabinet. I usually select a hinge that's approximately the same height as the lower rail of the door.

Bevel the lock stile

After carefully fitting the door to the cabinet, with a small but even margin all around, bevel the edge of the lock stile (the stile opposite to the one that receives the hinges). A bevel here prevents the back edge of the stile from striking or binding on the case as the door closes. To determine the degree of bevel required, use a compass to strike an arc with a radius equal to the width of the door.



I use an edge-trimming block plane, which has a built-in 90° fence, to cut the bevel (**Photo 1**). I change the angle of the fence by attaching a wooden wedge to it with spray adhesive. (You could use a standard block plane without a fence for this operation, too.) Pencil a reference line on the outside corner of the stile and stop planing when the shaving reaches the line.

Mortise the door

The next step is to layout the hinge mortises on the door. First determine where you'd like to locate the hinges along the length of the door stile. This is primarily an aesthetic decision; as a rule of thumb, I position each hinge so that it aligns with the inside edge of the door rail.

Invert the hinge and position the barrel against the corner of the door stile. Use a thin knife to scribe lines around the hinge (**Photo 2**). A knife is more accurate than a pencil—it creates an incision that serves as an indelible stopping point during the mortising process. The edge of a chisel will slip into the incision; you simply cannot achieve an equally high level of accuracy by trying to cut along a pencil line.

Mark the mortise depth with a marking gauge. Set the gauge by aligning the end of its pin adjacent to the hinge leaf (**Photo 3**). Then scribe the face of the door stile (**Photo 4**).

Begin cutting the mortise by making a row of shallow chisel cuts within the layout lines (**Photo 5**). It's important to make these cuts across the grain; chopping parallel with the grain risks splitting the stile. Gently tap the chisel with a mallet nearly to the full depth of the mortise. Next, pare to the layout lines (**Photo 6**). Be sure your chisel is sharp; if it's slightly dull, greater pressure is required and you may overshoot the lines.

Once you reach the lines, test the fit of the hinge in the mortise (**Photo 7**). Ideally, the hinge leaf should be flush with the stile, but it's best to err on the side of a slightly shallow mortise. You can easily pare the mortise a shaving deeper to fine tune the door's fit later on, if necessary. If the mortise is too deep, shim the hinge with veneer.

Finally, drill pilot holes for the screws. Tap each hole with a steel screw (**Photo 8**). Tapping the holes reduces the torque and strain on the soft brass screws that typically come with hinges. Tapping also prevents damaging their slotted heads, or worse, twisting off the screws. Fasten each hinge in its mortise (**Photo 9**).

Mortise the cabinet

Before marking the cabinet, make certain that the door is accurately positioned in the cabinet opening; if necessary, use shims of paper or veneer between the door and cabinet stiles to hold the door in place. Use the layout knife to make a small incision at the ends of the hinges to mark their locations (**Photo 10**). This

Fit the door to the opening before laying out the hinges. To minimize the gap on the side opposite the hinges, I bevel the lock stile using a Veritas edge-trimming block plane.



Lay out the mortises on the door first. Mark each mortise by tracing around the hinge with a knife.



Set a marking gauge to the thickness of the hinge's leaf.



Mark the depth of the mortises along the inside face of the hinge stile.





- 5** **Make a row of** shallow chisel cuts the full length of the mortise. Gently tap the chisel with a mallet for each cut.



- 6** **Pare across the grain** to remove the waste. For the best control, your chisel must be very sharp.



- 7** **Test the fit.** The hinge should be flush with the surface of the rail. Use a self-centering bit to drill pilot holes for the screws.



- 8** **Tap the holes** with a steel screw. A steel screw is stronger than a brass screw and is less likely to break.

method ensures that the door and cabinet mortises will be in perfect alignment. Once you've marked the corner of the cabinet stile, simply extend the incised lines.

Using the same layout process that you used on the door, mark around the leaf of the hinge with a knife. To avoid removing the hinges from the door, I keep a spare hinge on hand. Chiseling the mortises on the cabinet is easier if the cabinet is lying on the side and supported at bench height.

Once the mortises on the cabinet are cut, you're ready to hang the door and test the fit. The door should swing smoothly without binding on the rails or stiles, but you may find it necessary to trim a shaving or two from one edge of the door. As another test, shut the door to see if it remains closed. If it springs open when released, the mortises are too deep. This causes the stiles of the door and cabinet to bind; a thin shim of veneer under the hinges will correct the problem. 

Lonnie Bird

Long-time woodworker, author and teacher, Lonnie runs a school in East Tennessee. Find out more about this project and his school at lonniebird.com.



- 9** **Install the brass screws.** Mount both hinges on the door. Install the door in the cabinet, centering it with shims.



- 10** **Mark the ends** of the mortises on the cabinet's side. Lift off the door, remove the hinges and cut the mortises using the same method as above.

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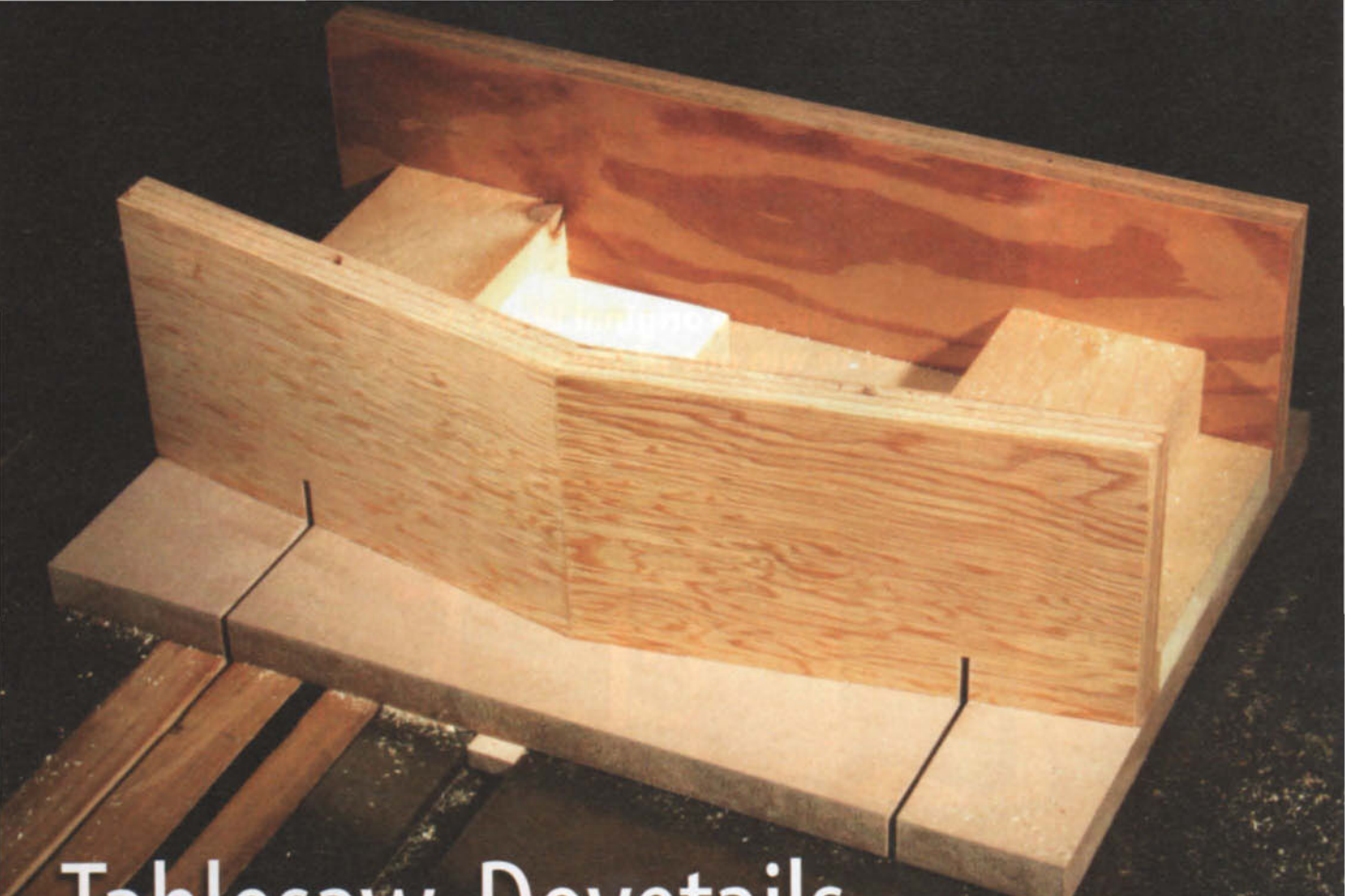
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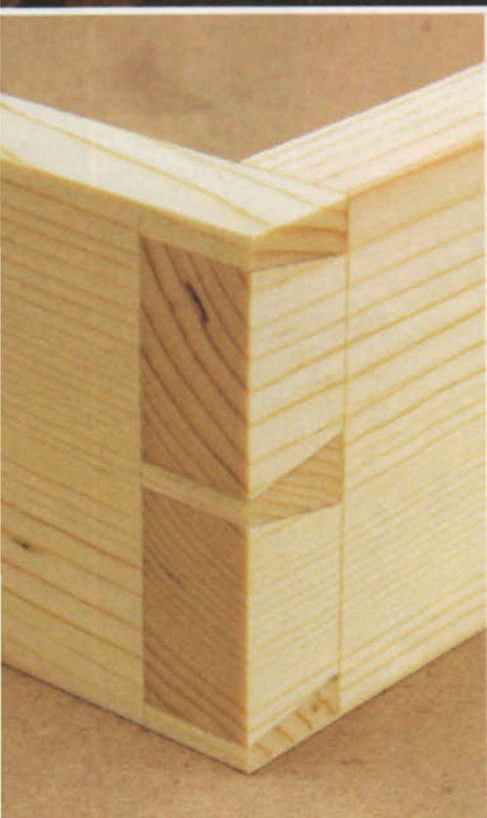
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Tablesaw Dovetails

by Jim Stack

Machine joints that look hand-made.



IMAGINE CUTTING through dovetails with pins and sockets spaced any way you like—as if they were cut by hand. Now imagine cutting them without using a dovetail saw or a router. The humble fixture showcased above allows you to do just that—using your tablesaw. It allows cutting both pins and tails that require only minimal cleanup, and it can be used to make unique pieces or production runs (simply clamp a stop on the fences to locate the identical parts). This fixture is easy to build and it can be adapted for use on virtually any saw. The first time I used this method to cut dovetails, they came out perfectly—and they have ever since. Am I that good? Nah, it's because this fixture is that easy to use.

Build the fixture

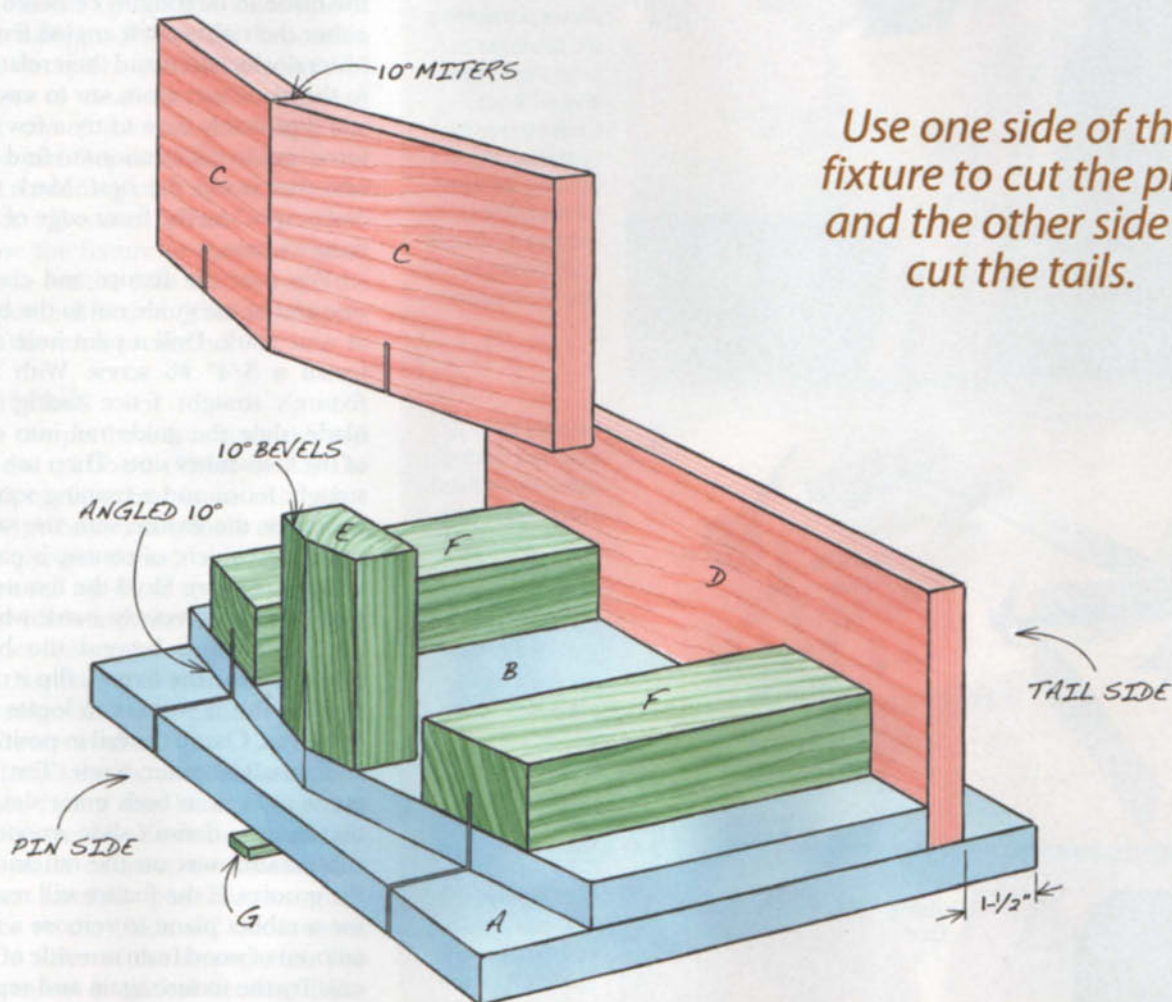
The fixture's length depends on 1)

the distance between your saw's two miter slots, and 2) the width of the pieces it's designed to cut. This fixture is sized for use with slots spaced 10"-12" and workpieces up to 5" wide (Fig. A and Cutting List, page 61). Use a hardwood such as maple to make the guide rail; use pine, plywood or MDF for the other parts. Cut the base (A) to final width and length.

Make the cleat (B) from a rectangular blank. On the leading edge, precisely cut 10° angles that meet at the middle. This angle determines the slope of the pins and sockets. (To change the slope, use a different angle.) Glue the cleat to the base, making sure its straight back edge is parallel to the back edge of the base.

Miter one end of each angled fence (C) at 10°. Then cut both fences to length—it's OK if they're

Fig. A Dovetailing Fixture



Use one side of this fixture to cut the pins and the other side to cut the tails.

longer than the base, but they shouldn't be shorter. Glue the fences to the cleat's angled edge, making sure they're square to the base—install shims, if necessary. Similarly, cut and glue on the straight fence (D). Shape the glue block (E) to fit behind the angled fences. Clamp the block in your vise and have at it with a hand plane. Then glue it in place. Cut, fit and glue on the blade guards (F).

Install the guide rail

Fit the guide rail (G) to your saw's miter slots. The rail should fit snugly yet slide easily, without binding or wobbling. Locate the guide rail by roughly centering the fixture (with its angled fences facing the blade) on one of the table-saw's miter slots (**Photo 1**). Mark the slot's location on the fixture. This mark represents a possible location for the guide rail. Move the fixture so the mark is centered on the saw's other miter

Cutting List

Overall Dimensions 16" L x 11" W x 5-1/4" H

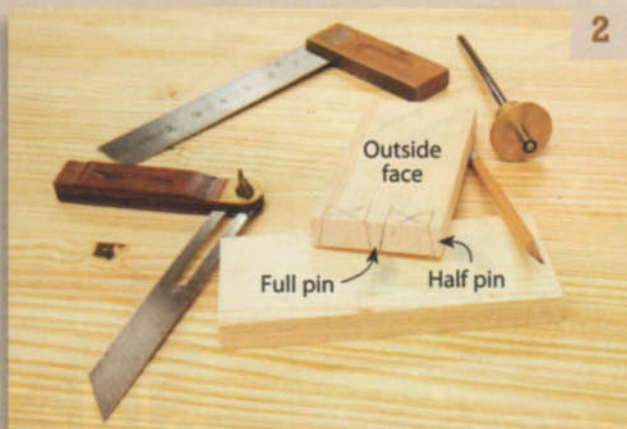
Part	Name	Qty.	Material	Th x W x L
A	Base	1	MDF	3/4" x 11" x 16"
B	Cleat	1	MDF	3/4" x 6-1/2" x 16" (a)
C	Angled fence	2	Plywood	3/4" x 4-1/2" x 16" (b, c)
D	Straight fence	1	Plywood	3/4" x 4-1/2" x 16"
E	Glue block	1	Pine	1-1/2" x 3" x 3-3/4" (d)
F	Blade guard block	2	Pine	1-1/2" x 3" x 7" (c)
G	Guide rail	1	Hardwood	1/4" x 3/4" x 12"

Notes:

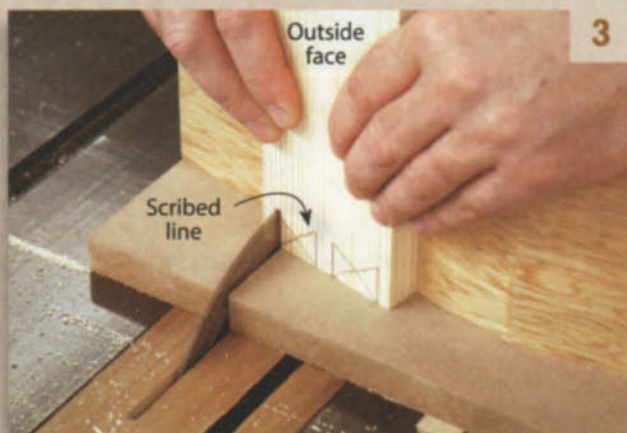
- a) Angle the front edge at 10° from both ends to the center.
- b) Bevel one end at 10°.
- c) Cut length to fit.
- d) Bevel the front face to fit behind the angled fence.



1 **Locate the guide rail** so the fixture allows positioning the blade on both sides of the angled fence. Find the sweet spot by marking a possible location for the rail and moving the fixture from one miter slot to the other.



2 **Lay out the pins** as if cutting dovetails by hand. Their slope must match the angle of the fixture's fences. Mark the waste on the outside face (where the pins are wide).



3 **Cut the first half-pin.** Use the scribed layout line to set the blade height. The fixture's angled fence automatically sets the slope. Clear the waste by making successive adjacent cuts.



4 **Jump to the same side** of the next pin and repeat the process. Use a rip blade to make these cuts—its square-topped teeth leave flat shoulders.

slot. At both locations, the goal is for the blade to be roughly centered on either the right or left angled fence. Miter slot locations and their relation to the blade vary from saw to saw, so you'll probably have to try a few different guide rail locations to find the one that works the best. Mark this "sweet spot" on the front edge of the fixture's base.

Flip over the fixture and clamp one end of the guide rail to the base at your mark. Drill a pilot hole and install a 3/4" #6 screw. With the fixture's straight fence facing the blade, slide the guide rail into one of the saw's miter slots. Then use the straight fence and a framing square to square the fixture with the saw's rip fence (which, of course, is parallel to the blade). Hold the fixture in position and precisely mark where the rail extends beyond the back edge. Remove the fixture, flip it over and use this new mark to locate the guide rail. Clamp the rail in position, and install another screw. Test the guide rail's fit in both miter slots. If the fixture doesn't slide smoothly, rub paraffin wax on the rail and in the grooves. If the fixture still resists, use a rabbet plane to remove a tiny amount of wood from one side of the rail. Try the fixture again and repeat until the fixture glides smoothly in both slots. Remember that any side-to-side movement in the slots is bad.

Cut pins

Start by laying out the pin board (Photo 2). Use a scoring tool to mark the length of the pins—their length is determined by the thickness of the tail board. The scored marks will prevent tearout when you remove the waste between the pins. Use a sliding bevel square to mark the angled pins. Set the bevel to match the angle of the fixture's front fence (80° in this case). Mark the waste between the pins.

Place the workpiece on the fixture with its inside face against the angled fence—make sure it's on the correct side of the fence. Use the scored mark to set the blade height. I install a rip blade to make these cuts because its flat-topped teeth cut flat shoulders, virtually

eliminating clean-up.

Make a cut on the waste side of the half-pin (**Photo 3**). Reposition the workpiece and make additional passes to clear the waste, stopping just shy of the line indicating the next pin. Repeat this process to cut the remaining pins that slope in the same direction (**Photo 4**). Then move the fixture to the other miter slot to cut the pins that slope in the opposite direction (**Photo 5**). Nibble out the waste as needed.

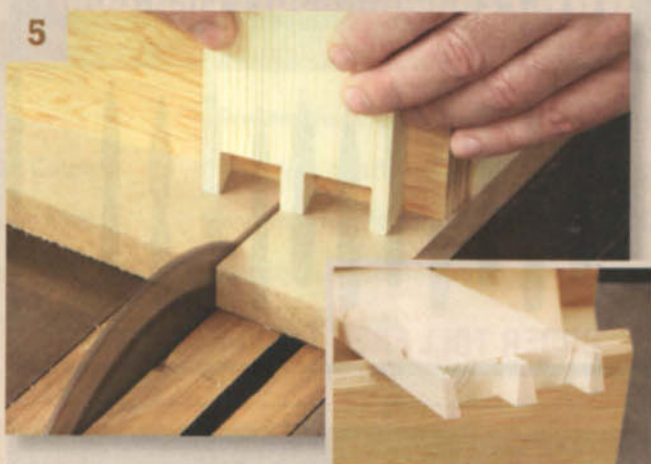
Cut tails

Use the pin board to mark the tails on the tail board (**Photo 6**). Tilt the saw's blade to match the tails' slope (10°). Whether the blade tilts to the left or right doesn't matter. I switch from the rip blade to a general purpose blade to make these cuts. Both blades leave ridges at the top of the cut that have to be removed later, but the ridges left by the general purpose blade are smaller.

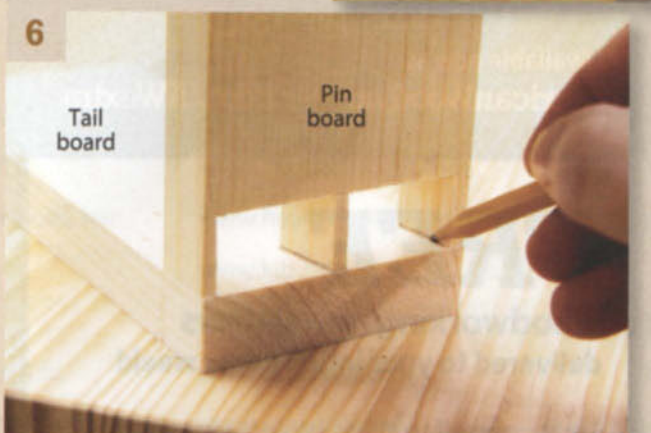
Install the fixture with its straight fence facing the blade. Place the workpiece on the fixture and raise the blade to meet the scored line. Next, carefully position the workpiece so the blade will cut away all but a sliver of the sloped line. The placement is critical because these angled cuts determine the joint's fit: Remove too little and the joint won't go together; remove too much and the joint will be too loose.

Make angled cuts on one side of each tail (**Photo 7**). Then flip over the stock to cut the other sides. Use a chisel to remove the waste that remains between the tails (**Photo 8**). Keep the chisel handy for fine-tuning when you test fit the joint. 

Finish cutting the pins by moving the workpiece to the other side of the angled fence. This side slopes the cut in the opposite direction.



Use the pins to locate the tails. Use a sharp pencil, so there's no gap between the pencil mark and the pin.



Tilt the blade, turn the fixture around and use its straight fence to cut the tails. Make all the cuts that angle one direction, then flip the workpiece to its opposite face to complete the job.



Square the shoulders at the scribe line, using a chisel.



Jim Stack

worked for 20 years in commercial cabinetmaking and furniture making shops.

He has writ-

ten seven woodworking books and most recently was Senior Editor of *Popular Woodworking* books.

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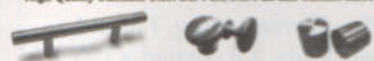
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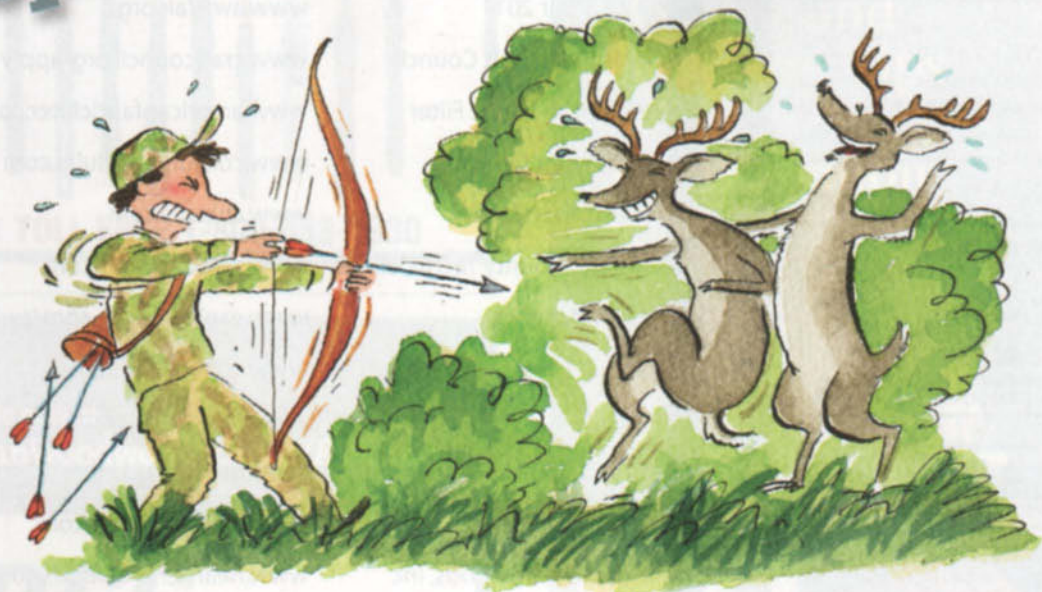
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Woodmaster Tools	www.woodmastertools.com	21
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Bow Blues

AFTER PREPARING THE LAMINATIONS, bending form and heat box for the fiberglass longbow I planned to build, I mixed the epoxy—and promptly began to mess up the entire project.

First, I laid down the laminations in the wrong order, so I had to pry the sticky mess apart and start over. Then, while clamping the laminations to the bending form, I forgot to add the aluminum pressure strips that protect the fiberglass from the C-clamps. I didn't notice this mistake until I pulled the bow out of the heat box and saw that its belly was covered with deep dimples. It looked like a washboard.

I persevered, determined to save the bow. I drew

on the lines to shape the limbs, arrow shelf and grip section and cut them out on the bandsaw. Then I noticed that I'd cut the arrow shelf on the wrong side. I now had a left-handed bow.

After calming down, I glued the offcut back on the grip section, cut a new arrow shelf on the correct side and congratulated myself for once again saving the bow.

But after putting on the tillering string, I found that I could barely bend the limbs. I'd created a 120 lb. monster bow with a dimpled belly and a funny-looking grip that I would never be able to use.

James E. Wadsworth

Extension Cord Rack

I WAS NEARLY DONE installing the trim in a custom kitchen when I heard my generator falter and quit. The jobsite was in the backwoods, 25 miles from the power lines, so the generator was my only power source. I put down my nail gun and headed to my pickup truck (my portable cabinet shop) for a look-see.

I was stunned to find a bull elk attacking my generator. Tangled in its antlers (the most spectacular rack of antlers I'd ever seen) was my 100' heavy-

duty extension cord. Thinking quickly, I ran to the kitchen, grabbed my nail gun and fired it into the air to startle the elk. The loud shots did the trick; the elk stopped smashing my generator—but it took off with my extension cord. I figured the cord was a goner.

However, on the way home that evening, about five miles from the jobsite, I spotted the cord draped over the bruised limbs of a fir tree. I guess the elk wasn't into jewelry.

Dale Thompson

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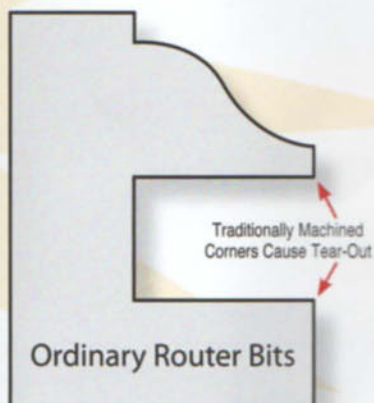
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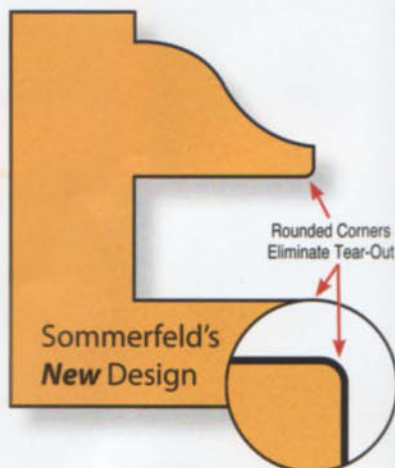


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