LOGS TO LUMBER!

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#157, DEC/JAN 2012

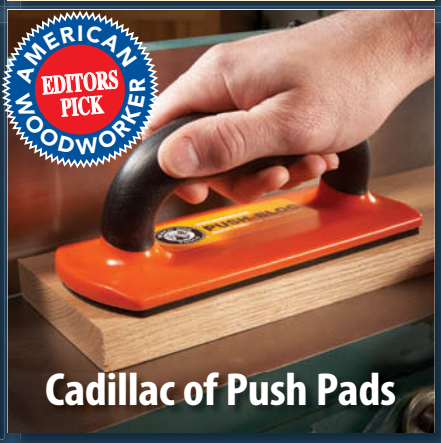
Planer with Great Abs!

CNC Magic

Dovetailing at its Best

Turn a Doorknob

Mastering Classic Inlay



Cadillac of Push Pads

Weekend Project: 6-Piece Footstool

Why You Need a Moisture Meter

Doors on Your Tablesaw

Brush Cleaning Tips

How to Saw Small Parts

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Introducing Quadra-Cut™ Sets

The Most Innovative Bits Now Offered In Popular Profile Combinations!

Quadra-Cut™ 4 Cutter Design

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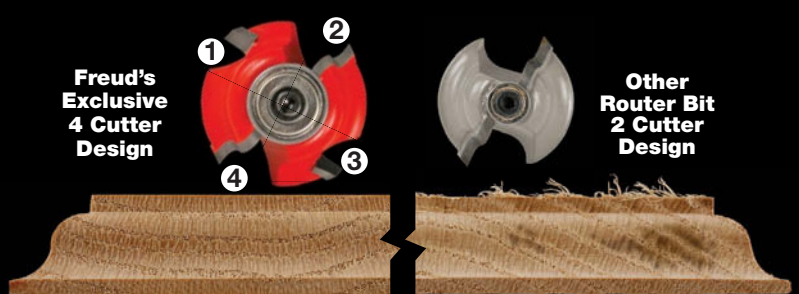
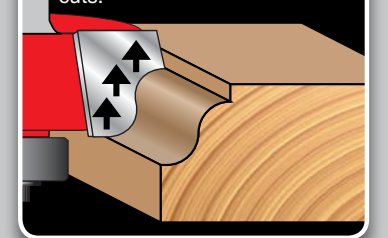


How It Works!

Two large cutter wings shear upward to remove most of the stock for fast, extremely smooth cuts.



Two small cutter wings shear downward for an ultra-fine finish, even when routing cross-grain in delicate materials!

U.S. Patent No. 8,899,252

Look For Freud's NEW Quadra-Cut™ Sets

4 Piece Set

#89-672

- 3/8" Rounding Over Bit, *#34-124*
- 1/2" Rounding Over Bit, *#34-126*
- 5/32" Roman Ogee Bit, *#38-104*
- Classical Cove & Bead Bit, *#38-362*

3 Piece Set

#89-674

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- Classical Cove & Bead Bit, *#38-362*
- Classical Cove & Round Bit, *#38-614*

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#157, December/January 2012

Features

Departments

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*KILZ brand received the highest numerical Equity Score, Trust Score and Quality Score among Paint Coatings included in the 2011 Harris Poll EquiTrend® Study. Please go to **www.kilz.com** for further details.

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Moisture Meters

Pin or pinless? Learn more at
AmericanWoodworker.com/WebExtras

Handcut Dovetails

See how Mario Rodriguez cuts dovetails for his blanket chest (p. 40) at
AmericanWoodworker.com/WebExtras

Stringing by Hand

We use a router (p. 56), but you can also use hand tools. See them at
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Divided-Light Doors

Learn how to make doors with multiple panes at
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New Heads for Planers and Jointers

Get a closer look at helical heads and carbide inserts at
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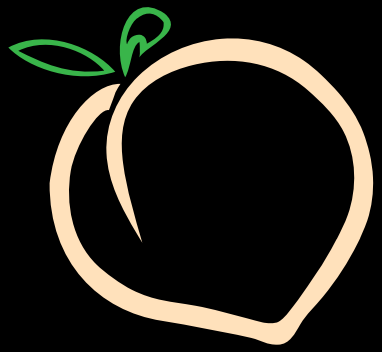

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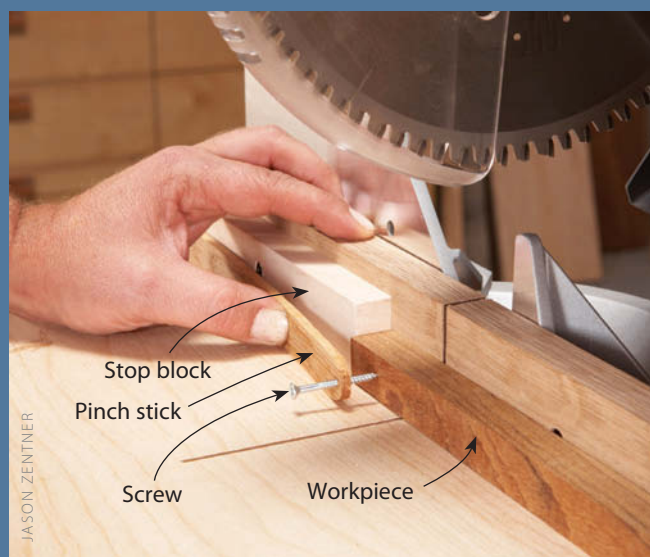

Terrific Tip!

Add a Pinch of Safety

CUTTING SMALL PARTS on a miter saw doesn't have to be scary or dangerous. I've adopted a method that keeps your fingers well away from the blade and prevents the piece you're cutting from zinging across the shop.

First, make a zero-clearance table. It's composed of just two parts: a base and a fence. Make the base from a piece of 1/4" plywood that's a few inches wider than the turntable of your saw, so that your blade doesn't cut it in half. Make the fence from one piece of 3/4" hardwood that's about 2" wide.

Glue the fence to the base, then screw the table to both sides of the saw's fence. Usually, there are holes in the fence to allow this; if not, drill a couple. When the table is secure, turn on the saw and cut a kerf through both the fence and the base.

This zero-clearance table has a number of benefits. First, it shows you exactly where the saw will cut, which makes it much easier to position a stop block. Second, it backs up the workpiece. You'll get an absolutely clean cut on all four sides of the wood, without any splinters. And third, because the table's base is level and smooth, and the fence's gap is minimal, the pieces you're cutting will stay put.

You'll need one more essential item: a pinch stick. It's simply a 3/16" x 3/4" x 12" piece of hardwood. Drill a pilot hole about 1/4" in from one end, then run a screw through the hole so the screw's point extends about 1/4".

Use the stick—not your fingers—to hold the offcut. First, slide your part against the stop block. Place the screw's point on the part being cut off and the stick's other end against the stop block. Flex the pinch stick's center to hold the part in place, then squeeze the saw's trigger and cut. Always let the blade come to a full stop before lifting it back up.

Charles Mak

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Lumber-Drying Clamps

I'VE DRIED MY OWN LUMBER for years, but I always had a problem getting enough weight on top of the stack, to keep the upper boards from warping. Here's a solution: Use clamps made from threaded rods.

Start building the stack by placing short pieces of 2x4 on your shop's floor. Next, place 2x4s across them. You'll need one about every two feet. Cut these pieces about 6" longer than the width of your lumber pile. Drill a 3/8" hole, 1" from the ends of each of these 2x4s.

Insert 5/16" threaded rods through all the holes, then put a fender washer and nut on the bottom end of each rod. Stack your lumber in the normal fashion, placing dry stickers between each layer.

When the stack is complete, place pre-drilled 2x4s on the threaded rods and use another fender washer and nut to squeeze the stack. Tighten the nuts down nice and snug.

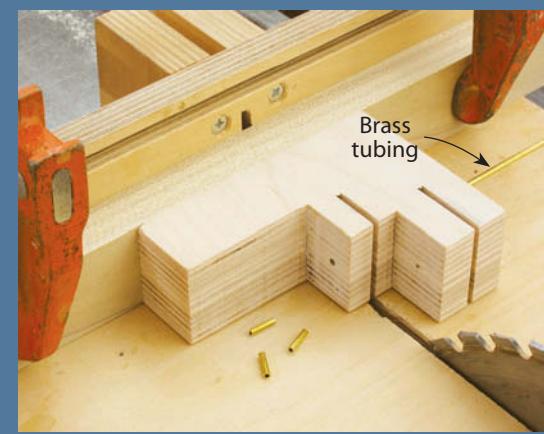
Luke Steeves

Lamp Safety Screen

MY LATHE CAME with a lamp, but the lathe's manual has this weird warning: "Position the work lamp so that wood chips do not accumulate inside the lamp shade and pose a fire hazard."

Now, where in the world could the lamp go? When I turn, chips fly everywhere! It occurred to me that metal screening from the hardware store would prevent chips from getting into the lamp, no matter where it was placed. I used a scissors to cut out a circle about 1/2" larger in diameter than the lamp's shade and pressed it into the shade. Friction holds the screen in place. It worked so well, I added screens to my drill press and bandsaw lamps, too.

John English



Mini Shelf Pins

FOR SMALL CABINETS, I prefer to use small, discreet shelf pins that I make myself. I also make sleeves for the pins to fit into. Sleeves help hold the pins firmly in place.

I make the pins from 1/16" brass rod and the sleeves from 1/16" i.d. brass tubing. Both of these are available at most hardware stores.

You can cut both parts on your tablesaw using a cutoff jig. (This brass is very soft, so it won't damage the teeth of a carbide blade.) The jig is a block with two holes drilled through it—one to fit the rod and one to fit the tubing.

Loosely clamp the jig to a crosscut sled. Position the jig so that the pins will be cut to the correct length and clamp it tight. Insert the rod into its hole so that the end of the rod is flush with the right-hand side of the jig. Cut all of the pins—four for each shelf.

To cut the sleeves, insert the tubing into its hole. Reposition the jig in order to cut the sleeves to the correct length. It's important that the tubing be fully supported on both sides of the saw kerf; otherwise, the tubing may be crushed or distorted by the blade. Cut one sleeve for each hole in the cabinet. After installing the sleeves, file or sand them flat.

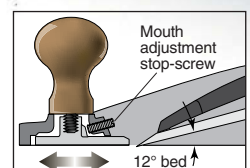
Richard Helgeson

Our Latest Additions To Our Family Of Planes

Veritas® Small Bevel-Up Smooth Plane

Comparable in size to a #3 bench plane, this low-angle smoother is 9″ long, 2 5/16″ wide and weighs only 2 lb 12 oz. Useful for final finishing of surfaces, end-grain work and for shooting miters, it is easier to maneuver and less fatiguing to use than a full-size smoother. The narrower (1 3/4″ wide) blade makes cuts easier to push through. The machined and surface ground ductile cast iron body has a 12° bed angle and a movable toe fully enclosed by the body casting. The locking front knob controls the toe to set the mouth opening, while a stop-screw in the throat allows repeatable mouth setting and prevents contact between the blade and toe. The Norris-type adjuster mechanism combines feed and lateral adjustments for accurate and easy blade setting. Set screws on either side of the blade prevent shifting. Yielding an effective cutting angle of 37° to minimize fiber tearing, the included 25° bevel blade is 1/8″ thick, lapped, and available in A2 or O1 tool steel. Bubinga front knob and rear handle. Made in Canada. Patented.

05P39.01 Small BU Smooth Plane, A2 **$179.00**
05P39.51 Small BU Smooth Plane, O1 **$179.00**



Adjust mouth by loosening front ball knob and sliding forward or backward.

Enclosed toe can be adjusted for fine shavings (minimum tear-out) or opened for heavier cuts.

Size Comparison of Planes

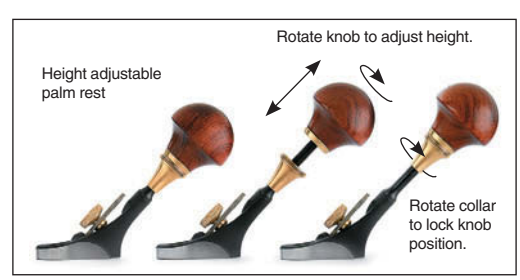
Low-Angle Block Plane with tote and knob | **Small Bevel-Up Low-Angle Smooth Plane** | Bevel-Up Low-Angle Smooth Plane | Bevel-Up Smooth Plane | Low-Angle Jack Plane

Veritas® Detail Palm Planes

With a height-adjustable palm rest for better in-hand registration, these miniature planes are easily maneuvered and permit fine, controlled cuts. The investment-cast steel body has a 45° bed angle and a fixed mouth, and uses a brass retention screw to secure the included 30° bevel A2 tool steel blade (0.06″ thick by 3/8″ wide). The soles are approximately 1 1/2″ long by 5/8″ wide and are available in four profiles. The concave and convex planes have curved soles with a side-to-side radius of 1/2″. The double-convex (spoon) version has a 1/2″ side-to-side radius and a 4″ front-to-back radius. The bubinga palm rest is removable for work in tight spaces. Made in Canada. Patent pending.

Flat | Double Convex | Convex | Concave

05P90.01 Flat Plane **$59.00**
05P90.05 Double-Convex Plane **$59.00**
05P90.09 Convex Plane **$59.00**
05P90.13 Concave Plane **$59.00**
05P90.20 Detail Palm Planes, set of 4 **$199.00**



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JASON ZENTNER

Premeasured Shellac

SHELLAC is a mainstay in my shop, both as a sealer and as a finish. I mix my shellac from flakes and usually go with a 1 lb. cut, which is ideal for brushing ultra-smooth coats. I used to measure out the flakes each time I made a new batch, but here's an easier way.

After buying a jar of flakes, I get out a postage scale and about a dozen sandwich bags. I fill each bag with 1 oz. of flakes and place the bags back in the jar. Now, whenever I need a new batch of shellac, I just dump the contents of one bag into an 8 oz. Mason jar and fill it up with denatured alcohol. That makes a 1 lb. cut, no measuring required. If I want a 2 lb. cut, I put in 2 bags.

Tom Caspar

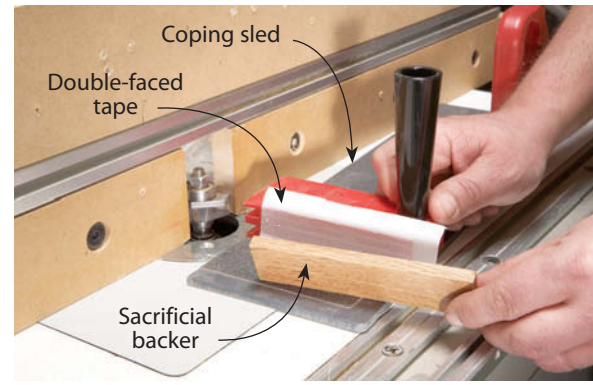
Learn how to brush shellac like a pro at **AmericanWoodworker.com/WebExtras**

JASON ZENTNER

Homemade Bench Grips

BENCH GRIPS are handy for holding parts above the bench for routing, sanding or finishing. To make them, just cut some wood and rubber shelf liner into 2" to 3" squares. Glue the shelf liner onto both sides of each square using spray adhesive, such as 3M Super 77.

Marlin Davis



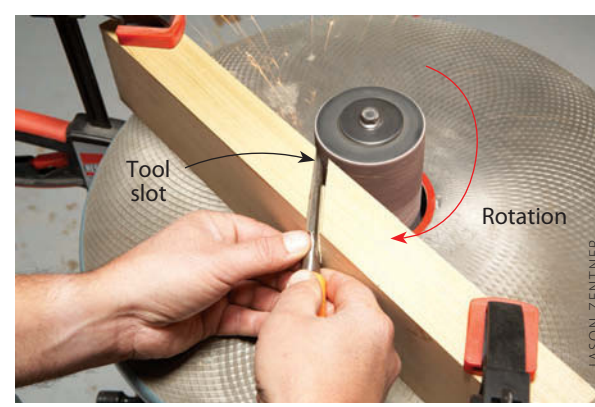
JASON ZENTNER

Blowout Beater

A COPING SLED is a must-have accessory for router table work. It helps you hold a narrow piece, such as a door rail, perpendicular to the fence and backs up the cut to prevent blowout.

At least, it's supposed to. On my sled, the backup piece is an integral part. Once you've cut one profile in it, it won't sufficiently back up a new profile. The solution is to use sacrificial backup boards. Whenever I change bits, I attach a new piece of 3/8" thick hardwood to the sled's fence with double-faced tape.

Zack Fleming



JASON ZENTNER

Spindle-Sander Sharpening

HERE'S A SIMPLE WAY to sharpen chisels using a 3" sanding drum mounted in an oscillating spindle sander or a drill press.

Cut a squared-up 2x4 the length of the sander's table. Cut a 2" deep by 1/2" wide slot at 45° near the 2x4's center. Clamp the 2x4 to your sander's table. Place the chisel in the slot and reposition the 2x4 so that the center of the tool's bevel contacts the spindle.

Go slow when you sharpen, to avoid overheating the steel. Quench it in water fairly often. Continue until a wire edge forms on the tool's back. Remove the wire edge with 600 grit sandpaper taped on a flat surface, such as the top of your tablesaw.

Benjamin Parran

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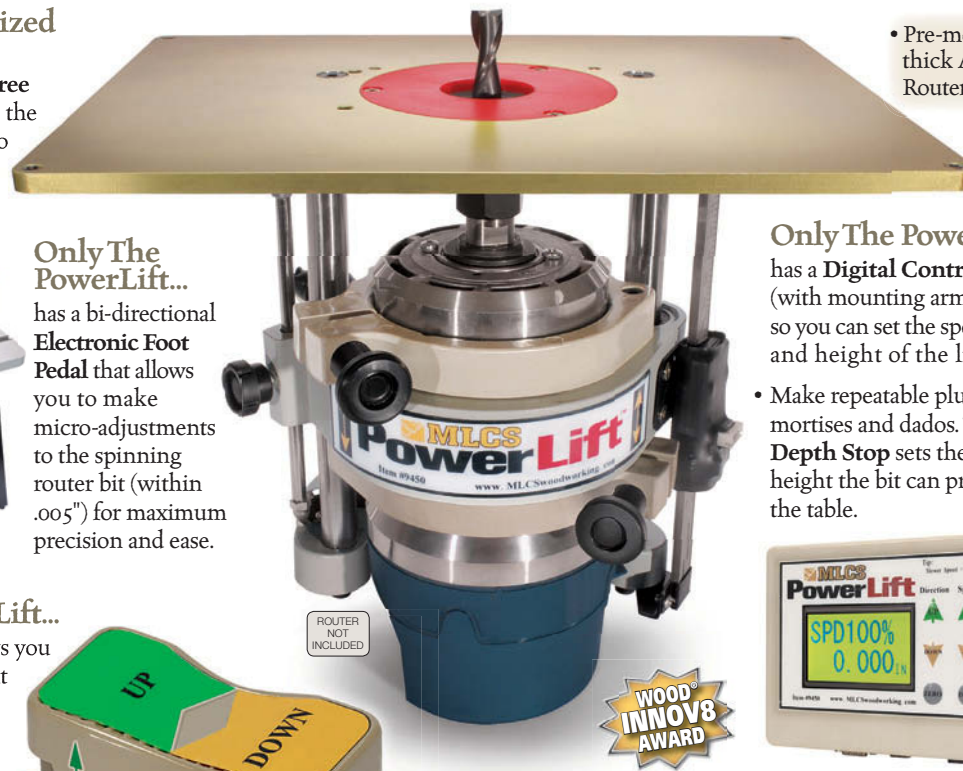

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has a bi-directional **Electronic Foot Pedal** that allows you to make micro-adjustments to the spinning router bit (within .005") for maximum precision and ease.

Only The PowerLift...

has a **Digital Control Panel** (with mounting arm included), so you can set the speed, direction, and height of the lift.

- Make repeatable plunge cuts for mortises and dados. The built in **Depth Stop** sets the maximum height the bit can protrude above the table.

Only The PowerLift...

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- Tap the footswitch to make incremental passes, achieving clean cuts without turning off the router.

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PowerLift • #9450 ..... $389.95

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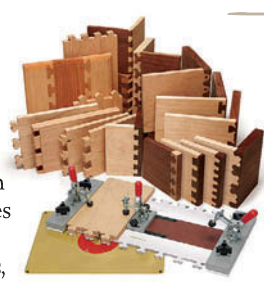

The Fast Joint System makes unique custom joints. Includes an aluminum jig, five clamps, two router bits, and bushings. The four template set includes heart, key, half-blind and thru dovetail joints. See additional 11 and 20 template sets at "**MLCSwoodworking.com**".

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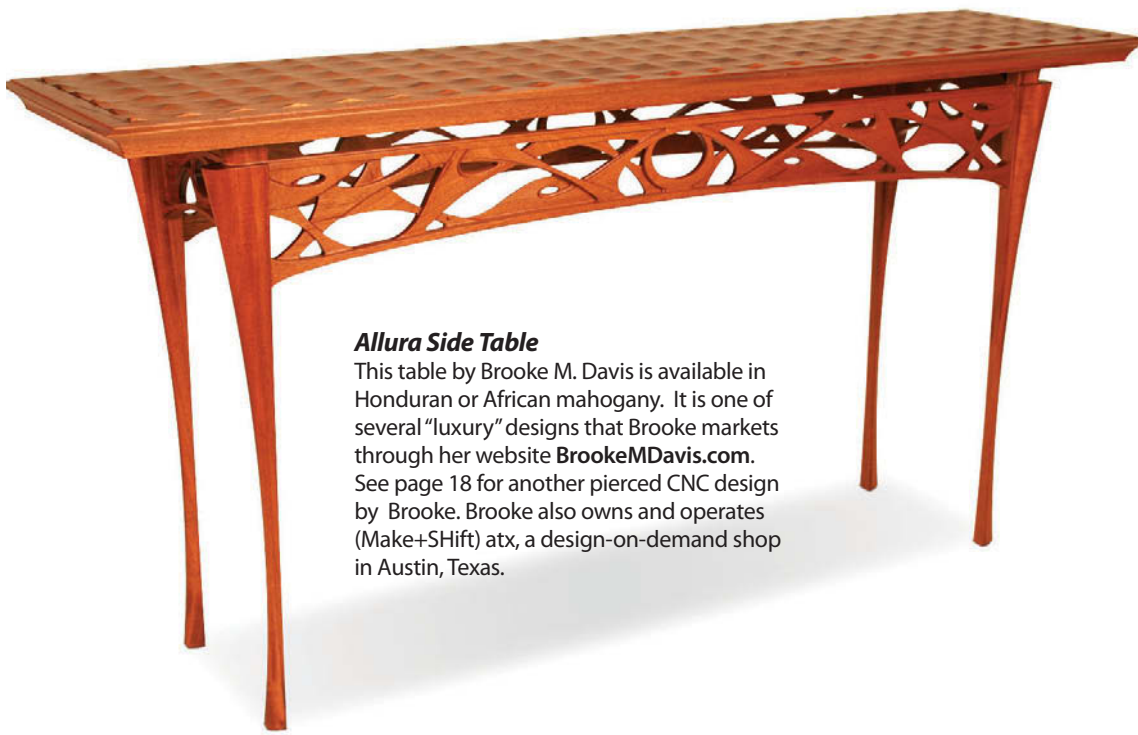
CNC Project Gallery

AS CNCS BECOME increasingly common in small woodshops, an amazing variety of work is emerging. Although this confirms the technical versatility of CNCs, it's an even greater testimony to the creativity and ingenuity of woodworkers, designers and artists alike. The following projects are but a sampling. To see more, follow the web links in this article.



Allura Side Table
This table by Brooke M. Davis is available in Honduran or African mahogany. It is one of several "luxury" designs that Brooke markets through her website **BrookeMDavis.com**. See page 18 for another pierced CNC design by Brooke. Brooke also owns and operates (Make+SHift) atx, a design-on-demand shop in Austin, Texas.

Rinaldo Chair
Plydea, a furniture company in Seattle, Washington, manufactures this chair from zero-VOC prefinished birch plywood. Plydea makes a growing line of ready-to-assemble products utilizing snap-together joinery. See more at **Plydea.com.**

My Home Made Chair
Richard Garsthagen, of the United Kingdom, designed this chair in Adobe Illustrator and cut it from 12mm birch plywood. An animated slide show of the chair being assembled can be viewed at **AmericanWoodworker.com/cnc.**

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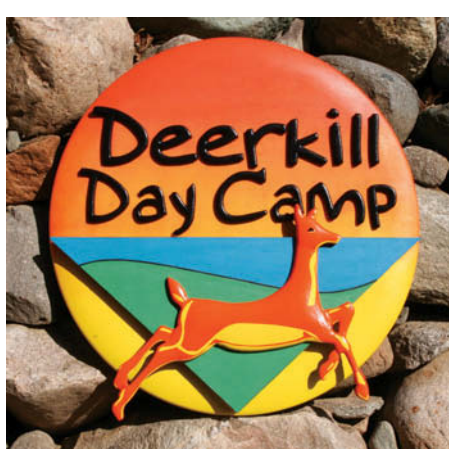
Pattern Study
Jennifer Anderson, of San Diego, explored the versatility of CNC in creating this piece; the deep pleating in couture fashion provided inspiration for the pattern. Jennifer finished the table with milk paint and shellac. More at **JenniferAndersonStudio.com.**

Shelter 2.0
Robert Bridges designed this for Design It: Shelter Competition, a 3-D design contest organized by the Guggenheim Museum and Google SketchUp. Robert and collaborator Bill Young envision this design as an inexpensive, quick-to-construct shelter for homeless and disaster-stricken people around the world. Cutting the project on a CNC takes about 12 hours; it requires 36 sheets of plywood plus hardware and vinyl sheeting. More information at **Shelter2.0.com.**

Bronzed Mahogany Bowl
Ed MacDonal turned this bowl on a wood lathe and then embellished it on his shopmade digital CNC ornamental lathe. The bowl measures 5-1/4" tall by 7" dia. The exterior is finished with Sculpt Nouveau Bronze B and Tiffany Green Patina to create the look of aged bronze. The interior is finished with Minwax wipe-on gloss polyurethane. To view pictures of Ed's ornamental lathe, visit **Vectric.com/forum** and search for the post "Wrapped and Sculpt Nouveau."



Nice Carvings is the name of Melissa Jones' sign business—a fitting name given the quality of her work. Melissa started her business carving signs by hand and many of the details in her current work are still added by hand, such as the distressed look of the Maximum sign. Most of Melissa's signs are made of high-density urethane (HDU) foam sign board, such as the 36" dia. Deerkill Day Camp sign, while wood is the material of choice for others, such as the Maximum sign. Melissa finishes most of her signs with a primer coat of Kilz and top coats of Sherwin Williams latex paint. Melissa creates her designs with Vectric Aspire CNC design software and cuts them on a Shopbot CNC. View more of Melissa's work at **NiceCarvings.com.**

Intertwined
Brooke M. Davis designed this 55" x 18" mahogany table top. While this elaborate carving would likely be a one-of-kind table if done by hand, the CNC allows Brooke to reproduce versions in other woods and finishes to suit a customer's needs. You can view the complete table (with legs) at **BrookeMDavis.com.**

Doug Haffner, owner of Haffner Signs, Wyoming, Illinois, creates what he calls "dimensional signs — ones that you can walk around." His own business sign (photo far left) highlights his "dimensional" approach to signmaking, as well as his designing and sculpting talents. The base of the sign reads "THE SKY IS THE LIMIT UNTIL YOU DECIDE IT'S NOT." and the other side says "A GOOD SIGN CAN TAKE YOU A LONG WAY." Doug works in multiple materials including wood, foam, sculpting clay, plastic and metal. He's very pragmatic about his approach; while he uses a CarveWright CNC for much of his work—such as shaping the inner foam layers for his rocket and carving letters for the panels on the sign's base—many of the details are modeled by hand. This includes the rivet heads on the base. So each rivet would look unique, he added and shaped each one by hand. See more of Doug's work at **HaffnerSigns.com**. While you're there, make sure to check out his award-winning Robot sign.

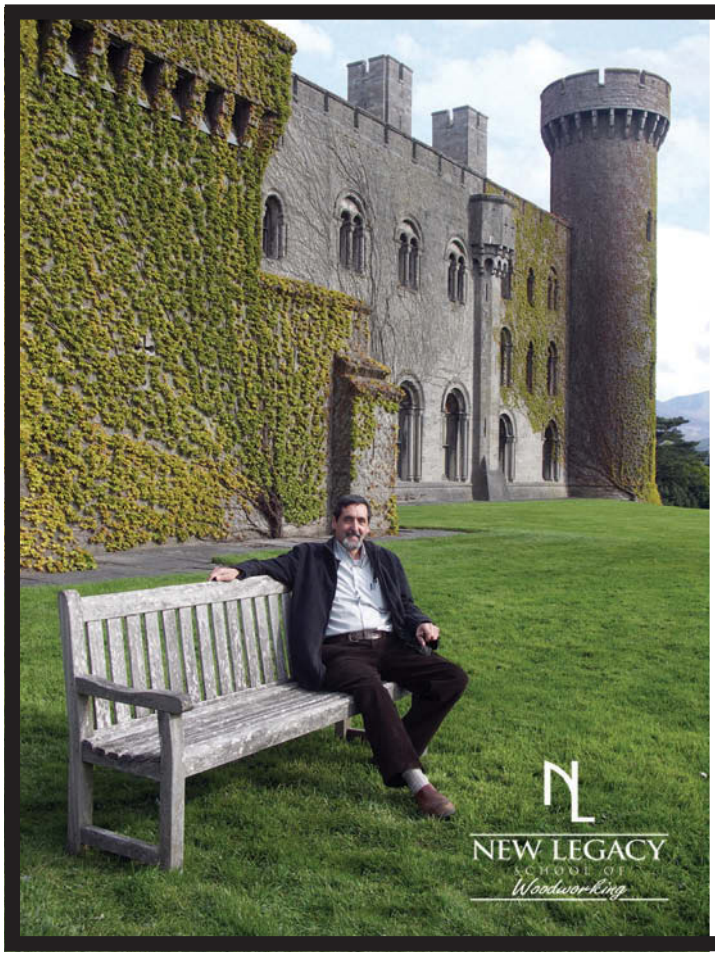
Rose Window
Using Vectric Aspire software, Michael Mezalick designed this small-scale replica of the famed window of Notre Dame Cathedral. Michael machined his replica out of 3/4" MDF on his CAMaster CNC, and finished it with Valspar "Stone" spray paint. This window and other CNC-made products are available at Michael's website **Shop.CarvedDetails.com.**

Autumn Wreath
Jim Creco of Mebane, North Carolina, machined and finished this project. The design was created by Michael Taylor, a graphic artist turned CNC project designer. This is one of hundreds of CNC designs that Michael has created. His plans are available through his website **CarveBuddy.com**, as well as **CarveWright.com** and **VectorArt3D.com.**

JASON ZENTNER

Bison Plaque
Tim Merrill, of Henderson, North Carolina, carved this bison out of mahogany. He highlighted it with a dark stain and set it in an alder backboard. The bison and landscape background designs are available through **VectorArt3D.com**. Tim holds the well-deserved title of "Vectric Archimage" on the **Vectric.com** forum for being the member with the most posts and a reliable source of helpful information.

Carved Blanket Chest
Reuben Foat, a graduate student, made this in the furniture design program at San Diego State University. Although most of his designs start on paper, Reuben is also an avid Rhino CAD user. As for the CNC, Ruben says, "It wasn't until graduate school that I got my hands on a CNC. It has been a game-changer for me." See more of Ruben's CNC (and laser) work at **ReubenFoat.com.**



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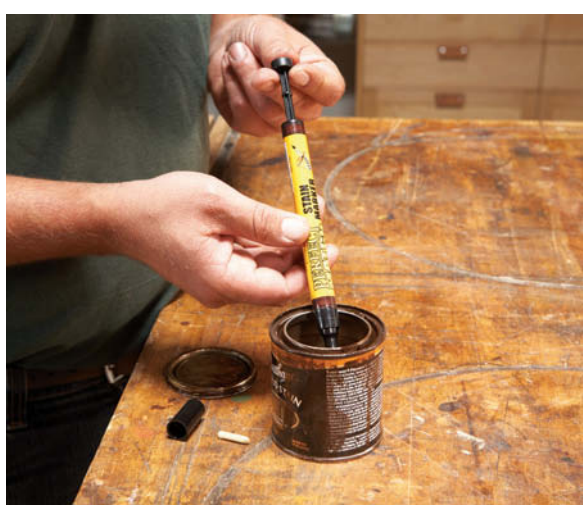
A Better Grip

LIKE RODNEY DANGERFIELD, push blocks "don't get no respect." But they deserve it. By keeping your fingers out of harm's way, they should be treated like VIPs. Many push blocks don't seem to provide enough grip, though, especially on dusty surfaces. The new Ultra Push-Bloc from Bench Dog is a big improvement. It just won't slip—even on melamine.

The Push-Bloc's pad is made from soft, high-friction rubber. It resists sliding better than any material I've ever tried. Measuring 3-1/2" x 8", the pad provides plenty of surface area—about 50% more than a standard-issue model. The Push-Bloc's handle is covered with a soft overmold and leans to one side, an arrangement I really like. It's generously sized and quite comfortable.

SOURCE

Rockler, rockler.com, 800-279-4441, Bench Dog Ultra Push-Bloc, #42790, $9.99 each.



JASON ZENTNER

Make Your Own Stain Marker

FINDING A FELT-TIP MARKER or touch-up stick that actually matches the color of your project is a real crapshoot. What if you could make your own, using your own stain?

You can, using the Perfect Match Stain Marker. It works like an old-fashioned refillable fountain pen and will hold any water, oil or lacquer-based stain.

It's simple to fill. First, you remove the felt tip. Then you pull on a plunger to suck up the stain. Replace the tip and you're ready to go.

In addition to touch-ups, you can use the Stain Marker for accents or highlighting.

SOURCE

Perfect Match Stain Marker, perfectmatchstainmarker.com, 866-962-7537, Perfect Match Stain Marker, $6.

Thicker Glue

YOU'RE ASSEMBLING A CASE with dadoes, holding the pieces vertically. You apply the glue … and it runs right down each dado, pooling at the bottom. Ever wanted a thicker glue that would stay put?

Titebond thinks so. They've just come out with something they call No-Run, No-Drip glue. Titebond says that it's the highest-viscosity PVA wood glue on the market. No-Run, No-Drip also has a strong initial tack and an open time from three to five minutes.

This glue seems ideal for trim carpentry, where you'd like a piece of molding to stay put once you stick it in place and also have enough time to wrangle that pin nailer. A thick glue certainly has a home in the shop, too, for situations where you want glue to stay in place, not run down and drip all over your bench or other parts of the project. But it's not for pieces that have to slide past one another, like a mortise and tenon joint. Thick is good, just not all the time!

SOURCE

Franklin International, titebond.com, 800-347-4583, No-Run, No-Drip Wood Glue, 8 oz., $5; 16 oz., $7.

EDITOR: TOM CASPAR • PHOTOGRAPHY: COURTESY OF MANUFACTURER UNLESS NOTED

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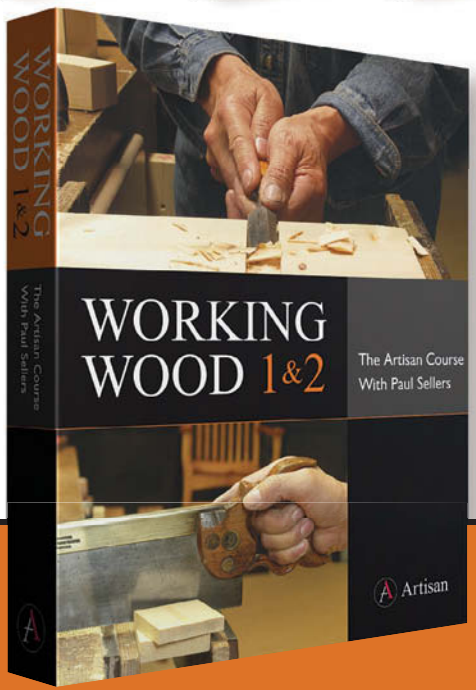

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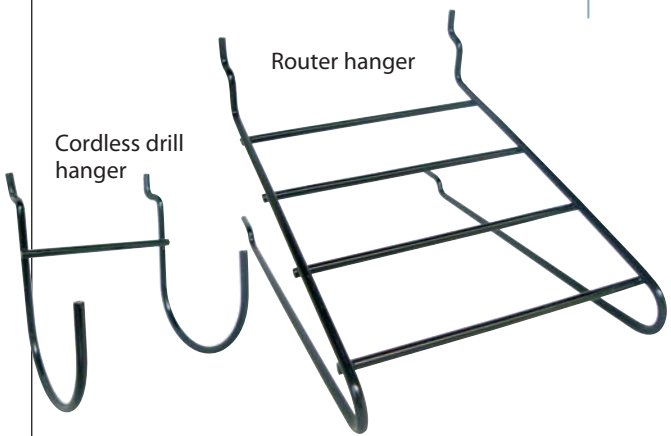


Universal Tool Hangers

EFFICIENT TOOL STORAGE is the holy grail of a small shop. Portable power tools need to be out of the way, yet easy to grab. That often means hanging them on a wall. But tools have such odd shapes—how are you going to do it?

Check out these wire shelves from Toolhangerz. Each one is specifically designed for the tools we count on each day, such as cordless drills, routers, circular saws, nail guns, reciprocating saws and saber saws. According to the manufacturer, they're designed to work with every major brand of power tool. Toolhangerz also offers non-tool-specific 8" or 14" flat shelves.

The hangers are designed for a slat-wall, perf-board or steel gridwall system.

SOURCE

Toolhangerz, toolhangerz.com, 513-520-2660, Individual hangers, $9-$14; #100, 10 Piece Kit, $90.

Nice Clamp, Nice Price

THE BESSEY K-BODY REVO is an industry icon. Now it has an offspring—the Revo Jr.—which is about 15% less expensive.

Comparing the two, you're not losing a lot by going with the Jr. The Jr. delivers 900 lbs. of clamping force, while the "Sr." is capable of 1,500 lbs. (The Jr.'s 900 lbs. is still more force than you need for many clamping jobs, such as gluing up doors or panels.)

The difference in force is mainly due to the size of the bar. The Jr.'s bar is 1/4" thick x 15/16" wide; the Sr.'s bar is 3/8" thick x 1-1/8" wide. The smaller bar makes the Jr. about 50% lighter than the Sr. That's actually an advantage when you're trying to precisely position a clamp on a cabinet.

Two other minor differences: The throat depth of the Jr. is 1/2" less than the depth of a Sr., and while the Jr. comes in 12", 18", 24", 36" and 50" lengths, the Sr. has a wider range.

If you need a clamp's jaws to stay absolutely parallel when you apply extreme pressure, stick with the standard Revo. If your clamping jobs don't require as much muscle, the Jr. is a pretty good deal.

SOURCE

Bessey, besseytools.com,
800-828-1004, KRJR-12, -18, -24, -36 and -50, $28-$40 ea.

Trigger-Switch Router Combo

THERE'S SOMETHING NEW in the world of combo routers: an on/off switch built right into the handle of both bases. Bosch's 2.3 hp fixed-base/plunge-base combination kit allows you to power up or power down without taking either hand off the machine.

A trigger switch by itself isn't exactly news. Some routers with D-handle bases have a switch built into the grip, but there's always an inconvenient extra cord connecting the base to the motor. You won't find that cord on the Bosch routers. The engineers at Bosch have devised a method of carrying a low-voltage current from the base to the motor via a sliding track. Switching the current on and off at the handle turns the motor on and off.

The motor moves straight up and down on the track, so you can set it at any height you want without breaking the connection. Switching the motor from one base to another is quite easy, too—the track never gets in the way.

This router has all the features you'd want on an up-to-date machine: variable speed, soft start, electronic feedback control, a micro-adjust depth setting and LED lights. If you put it in a router table, you can adjust the height of the bit from above the table using a long-handled T-wrench. Unfortunately—and here's the one feature new to routers that I missed having—you can't raise the collet above the table in order to change bits. You'll have to reach underneath the table, the old-fashioned way.

The combo kit includes the fixed base, plunge base, 1/4" collet, 1/2" collet, shaft and collet nut wrenches, T-handle height adjustment wrench, screws for table mounting and carrying case.

SOURCE

Bosch, boschtools.com, 877-267-2499, 2.3 HP Combination Plunge & Fixed-Base Router Pack, #MRC23EVSK, $330.

Custom Dovetail Blades

CUTTING DOVETAILS on the tablesaw presents a pesky problem. Sure, you can cut the pins with a standard blade, but when it comes to sawing the tails, as shown above, that blade won't go all the way into the angled corners.

Forrest has a solution: a blade with angled teeth. Forrest stocks blades with 7°, 9° or 11.5° angles, tilted left or right, but they will also custom-grind a blade for you at virtually any angle you wish. (You won't need both a left and a right, by the way—you just reverse the workpiece to make a cut angled in the opposite direction.)

These blades are part of the Woodworker II line. They have 40 teeth, a 1/8" kerf, 5/8" bore and a 20° hook. Blades ship in 7 to 10 days.

SOURCE

Forrest Manufacturing, forrestblades.com, 800-733-7111, #WW1040D125, Dovetail Grind, $138.

Happy Feet

IF YOUR SHOP has a concrete floor, you know how uncomfortable it is to stand on a hard surface all day. Your feet are sore and tired. Your back and knees ache. Well, here's an answer: the New-Life anti-fatigue mat from GelPro.

I've been using one of these mats in my shop for the last few weeks, and my feet, back and legs have been thanking me ever since.

New-Life mats come in two sizes and four colors. I prefer the larger size for a workbench because I have more room to change my stance. The mats are 5/8" thick and made from renewable soy-based material. They're very soft—much softer than any other mat I've used—and have just enough resilience to keep a spring in your step. The top surface is durable; a non-skid underside prevents slipping.

SOURCE

GelPro, gelpro.com, 866-435-6287, 20" x 32" mat, $80; 20" x 48" mat, $120.

Buff Bandsaw

IF A BANDSAW could take steroids, it might look something like this. Everything about the new 22" 90-380 from General is large and robust. Here's a saw that will handle pretty much anything you can throw at it.

Weighing in at 825 lbs., the 90-380 has a one-piece steel frame and 22" cast-iron wheels. Its resaw capacity is 16". Cutting that much wood requires lots of power, and this machine's got it. It comes with a 5 hp single-phase motor wired for 220v or a 7.5 hp three-phase motor wired for 220v, 440v or 600v. The saw accepts blades from 1/4" to 1-1/4" wide.

The table is huge: 30" wide x 22-3/4" deep. You won't find one this large on most bandsaws. The advantage is pretty obvious: more support for big wood. The table also has two miter slots and tilts 45° to the right. The saw's throat depth is 21-5/8" (19-5/8" with the rip fence in place).

Two safety-related features are worth noting. First, there's the odd-looking handle to the left of the upper blade guides. It's a built-in push stick. The handle connects to an arm that pushes a workpiece at the end of a cut, keeping your fingers away from the blade. The saw also has a foot brake that simultaneously slows down the blade and disconnects the electrical circuit. If you need to stop the saw in a hurry, just stomp on the brake.

SOURCE

General International, general.ca, 888-949-1161, #90-380, 22" Heavy Duty Woodcutting Bandsaw, 5 hp and 7.5 hp models, $3,750.

Michelle Holzapfel

Turner-carver-machinist-philosopher.

by Spike Carlsen

IT'S TEMPTING (especially for magazines) to pigeonhole woodworkers as cabinetmakers, or chair builders, or turners, for example. But there's not a pigeonhole wide or deep enough to contain Michelle Holzapfel's talents. If there were, it would be accompanied by a very long label. "Turner-carver-machinist-philosopher" would be a good start. Her techniques and attitudes and the way she approaches her work are as unique and intense as her finished pieces.

Lucky Leaf
2008
Cherry burl, gilded, polished and burned
12" x 12" x 5"

A roundabout journey

Michelle has worked with her hands for as long as she can remember. "I grew up in a big family where people were self-sufficient and knew how to make things," she recalls. "My father was a machinist with a big workshop and my mother was a very good seamstress, so whether I was helping guide a piece of plywood through a tablesaw or helping around the house, I absorbed my attitudes toward working with my hands at an early age."

Her carving skills were inadvertently awakened in a high school printmaking class. "We were making wood blocks for printing and I discovered I didn't care about the printing, but I loved carving the

EDITOR: TIM JOHNSON | PHOTOGRAPHY: COURTESY OF MICHELLE AND JOHN HOLZAPFEL

Terra Incognita
2009
Spalted maple burl
8" x 22" x 24"

Dragon Panel (detail)
2008
Quilted maple
42" x 30" x 6"

blocks." From there she began to carve address signs for neighbors' houses. "Using hand tools trained the hand, mind and eye in a particular way that has put me in good stead," she explains.

She attended Marlboro College in Vermont for a few semesters, married, and then in 1976, opened a woodworking business in rural Vermont with her husband David. They created mostly furniture. She took on the task of turning the legs "on a crappy little Craftsman lathe," she says. "I got bored after turning the first set of legs, but I *loved* working on the lathe." Michelle began turning little weed pots from scrap stock and shortly thereafter—remembering how much she loved carving—began embellishing her turnings. The technique remains dominant in her work today.

Though most of Michelle's works involve some degree of lathe work, creating a vessel, plate or other "roundish" object is only the start of her creative process. Carving, painting, integrating, transforming and pyrographic shading come next.

For reasons of both sentimentality and bodily preservation, Michelle does her turning on a machinist's lathe built by her father. Rather than using standard

Rage Correctly
2009
Basswood, gilding and copper wire
14" x 25" x 2"

continued

handheld turning tools, she uses a sharpened blade of steel as a cutter that's secured to a tool rest. On a machinist's lathe, handwheels are used to adjust the tool rest on both the X and Y axes, guiding the cutter to create the desired shape. The blade can be ground to create the necessary cutting profile. While this may not create the ultra-smooth, ultra-detailed surfaces some woodturners strive for, perfection isn't Michelle's goal at this point.

Once the rough shape has been created, Michelle begins working on it with carving gouges, air-powered grinders, electric chainsaws, and her fathomless imagination. Her work is inspired by quilt makers, old Dutch masters and her love of gardening, cooking and sewing. "I've taken things from my daily life and the life of the mind and mined them for imagery, textures, form and narrative." Her works speak for themselves. In fact, many of her pieces have entire stories to tell.

Turning wood into art and viewers into participants

In rural Vermont, Michelle has access to a cornucopia of fabulous native hardwoods and burls. When asked if she plans each piece or lets it evolve she chuckles, "Often, when I look at a piece of wood, I feel like Coyote when he looks at Road Runner and sees a roasted dinner. I can sort of see the piece in it. But 99.9% of the time that's not the piece I wind up with. The wood won't let me do it or I change my mind. It may be a cliché, but I have a dialogue with the wood." The dialogue is often lengthy and complex, as Michelle spends an average of one month per piece. "I try to pace myself so I don't fall apart," she says. Most of her works sell for between $5,000 and $10,000, but through galleries, some pieces have sold for as much as $20,000.

Arrangement in black & white
2008
Spalted sugar maple, burned fabric, curly red maple, spalted maple, turned and bleached
36" x 22" x 4"

Ophelia's Mirror
2009
Cherry, maple burl, birch bark and birch burl/limb scar
34" x 17" x 8"

Phantom Limb
2009
Base: turned and scorched sugar maple
Vessels: ash limbscar and turned and bleached spalted maple
18" x 10" x 10"

As one idea leads to another, Michelle sometimes works in themes and variations. Recently, upon discovering a stash of boards with limb scars and rot, she began integrating turned pots into the cracks and crevices (see *Phantom Limb*, at left). "It makes it clear that these vessels are not for your Cheerios," she explains. "They're more like actors in little dramas of the viewers' own making."

Michelle loves mysteries and puzzles, and likes to intrigue and challenge viewers. "I like viewers to participate, because that's what really brings a piece to life," she explains. She equates her work to black and white television or radio, where the absence of color

or a picture makes the viewer fill in the information. They feel more invested and connected to the piece. "While the viewer isn't making the piece," she explains, "they're making sense of the piece for themselves. They feel an ownership even when they don't buy the piece. That can be a big difference between a successful and a not-so-successful piece."

Michelle may be a philosopher, but having weathered the ups and downs of professional woodworking for over 35 years, she's also a realist. "Being a woodworker requires chutzpah," she says. "Some people have this romantic notion of woodworkers sitting around communing with nature or gliding along on a magic carpet—but it's strenuous in every sense. You struggle to wrench the work out of the wood. You fight for the viewer's attention. You struggle with the economics of the business. You really have to sharpen your elbows and move ahead." Michelle moves with amazing vigor, stamina and creativity.

Spike Carlsen is the author of *A Splintered History of Wood: Belt Sander Races, Blind Woodworkers and Baseball Bats* and the newly released *Ridiculously Simple Furniture Projects*. His upcoming book, *The Woodworking Answer Book*, will be available in the spring of 2012.

Vermont Spoons
2010
Maple burl and gold leaf
36" x 42" x 6"

A marriage made in the woodshop

David Hozapfel has been Michelle's partner in the workshop and life for nearly four decades. He too specializes in one-of-a-kind sculptural woodworking, but on a larger scale. Most of his furniture makes use of mammoth burls and chunky natural-edge slabs. And while Michelle states, "Our work is like two different solar systems," the Holzapfels recently have begun to collaborate (see *Counter Chairs*, at right). Do they have any words of advice to other woodworking wanna-be couples wishing to collaborate? "Whoever's job it is gets to be the director," explains David. "The other is the mule."

What's it like living in a two-woodworker marriage? "Michelle is left handed and I'm right," David says. "The biggest area of conflict is when we have to pick up and carry something heavy. We each want to flip it a different way." Beyond toting heavy things, they've developed a peaceful, successful relationship. David is the more talented salesperson and photographer, while Michelle is better at keeping books and designing literature. They influence one another more through osmosis than direct conversation. Since their styles differ from one another, much of their collaboration simply involves giving one another support. "After 40 years we've learned to figure things out," explains Michelle.

They share materials and tools, but they have their own workspaces. David's is larger, because he works on larger pieces. Since their work is mostly sculptural, their workshop is atypical; there are no tablesaws, jointers or planers and many of their tools are powered by a compressor.

The world of artistic woodworking is cyclical and both of their careers have had ups and downs. At times Michelle's work has been in the limelight; other times David has been the shining star. Through the years it's balanced out.

Counter Chairs
2011
Spalted and burled yellow birch, walnut and beech
37" x 22" x 17"

Turned Door Knobs

Get a grip on unique interior door openers.

WHEN'S THE LAST TIME you noticed a doorknob? They're so ordinary these days, they're virtually invisible. Here's a chance to return to those exciting days of yesteryear when wooden doorknobs were the rule rather than a rarity. Make matching sets for every door if you like. But why not mix things up? Using different woods and shaping each knob to fit the style of its room is a creative way to add a distinctive, personal touch to the decor.

Turning a wooden doorknob requires only basic turning tools and skills, and the idea is as old as the hills. The difficulty lies in obtaining decent hardware—that's why turned wooden doorknobs are so uncommon. Until recently, the only options were to purchase a new or antique porcelain knob set and break off the porcelain (and melt out the lead inside the antique set). These options work quite well, but a new interior door hardware kit promises to change the game (**Photo 1** and Sources, page 35).

Tools and materials

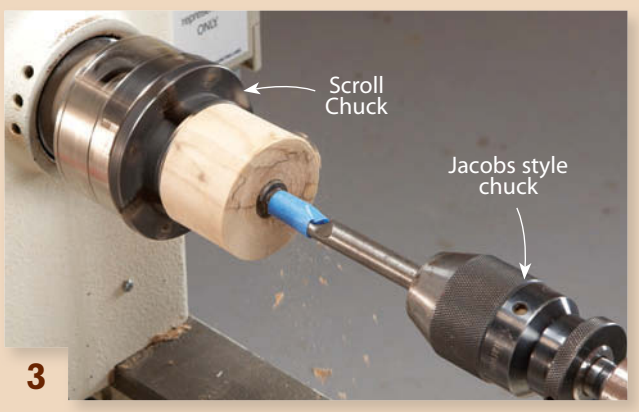
To turn the knobs and escutcheons, you'll need a spindle roughing gouge, a 3/8" or 1/2" spindle/detail gouge and a parting tool. A 1/2" or larger skew chisel is optional. For the lathe, you'll need a four-jaw scroll chuck, a 3" dia. faceplate, a Jacobs style chuck to fit the tailstock and a 3/4" high-speed steel or carbide Forstner drill bit (see Sources).

The sky is the limit when it comes to wood species—and even the knob's length—as both are issues of design and personal preference. I prefer to work with solid wood rather than laminated stock.

Each knob set requires a hardware kit or the metal parts stripped from an existing doorknob set. You'll also need woodturner's double-faced tape and glue, such as E6000 or slow-set epoxy (see Sources).

A new hardware kit includes the metal shanks and square spindle needed to make wooden doorknob sets for interior doors (see Sources, page 35).

Make the doorknob first. Turn the blank to a cylinder. Then cut a tenon on the front end with a parting tool or a skew chisel, so you can mount the blank in a scroll chuck.



Turn the blank end-for-end and mount it in the scroll chuck. Then use a Jacobs style chuck to bore a hole for the doorknob's metal shank.

Use the spindle/detail gouge to shape the back of the knob. Make a rolling cut toward the hole in the end of the blank.

Turn the knobs

For each knob, use dried wood ranging from 2-1/2" to 3" square and approximately 3" long. Mount the blank between centers and turn it into a cylinder with the roughing gouge. Turn a 1/4" long tenon on the tailstock end—this will be the outside (front) face of the knob (**Photo 2**). Size the tenon's diameter to fit the scroll chuck's jaws.

Remove the blank, turn it around and mount it in the scroll chuck. Then use the Jacobs style chuck to drill a 3/4" dia. x 1" deep hole in the end (**Photo 3**). Use the spindle/detail gouge to roughly shape the back of the knob (**Photo 4**). At its base, leave a flat or slightly concave area around the hole for the metal shank to seat against. This seating area should be no smaller than 1-1/4" in diameter. Check the shank's fit to make sure it slides in without binding and seats flat against the wood. Then remove the knob from the lathe.

Create a jam chuck by mounting a 3" x 3" x 2" long waste block in the scroll chuck and turning a 3/4" dia. x 3/4" long tenon on the end (**Photo 5**). The roughed knob will mount onto this tenon, so true it slowly with a parting tool or skew chisel. The goal is to create a fit that's tight enough to hold the knob securely, but loose enough to allow removing it when the time comes—not a very large window!

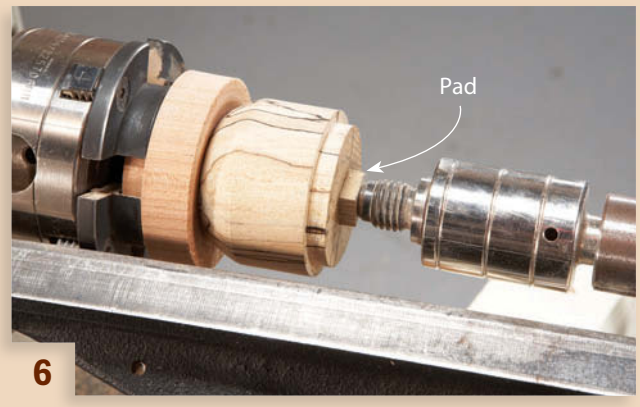
Mount the partially turned knob on the jam chuck and make sure it runs true. It's helpful for initial shaping to bring up the tailstock for extra support. Be sure to cover the point of the center with a small piece of wood or other material so it won't mar the knob's front face (**Photo 6**).

Use the spindle/detail gouge to refine the shape of the knob (**Photo 7**). At this point, you can shorten its overall length, detail its face, add a bead—whatever you desire. A ball shape or an asymmetrical form both function well as a shape for the hand. Finalize the shape and then pull away the tailstock to complete the turning on the very end. On the headstock end, turn the back of the knob to its final shape (**Photo 8**). Finish-sand the knob to 220 or 320 grit. If you plan to apply a finish such as melamine on the lathe, now is the time to do it. Melamine is a pre-catalyzed lacquer that's easily applied while the lathe is running (see Sources).

EDITOR: TIM JOHNSON | PHOTOGRAPHY: JASON ZENTNER

5

Make a jam chuck to remount the knob for final turning. It's a disc with a flat face and a tenon. The fit between the tenon and the knob's hole must be snug, so the knob stays put.



6

Bring up the tailstock to support the blank. Install a pad so the point of the tailstock's center doesn't mar the end of the blank.

7

Shape the front of the knob with the spindle/detail gouge. Pull back the tailstock when you near the final shape, so you can finish turning the front end.

8

Refine the shape at the base of the knob, turning away the jam chuck as required for access. The final diameter at the base must be the same size or larger than the metal shank.

Turn the escutcheons

Make the escutcheons from a dry face-grain blank that's between 1/4" and 1/2" thick and has one flat face. Cut the blank into 3" dia. discs, one for each escutcheon. Mount a 3-1/2" dia. x 3/4" thick disc of MDF, plywood or scrap solid stock onto a 3" faceplate. This disc provides a cushion of waste material that can be cut into when you turn the escutcheon. True this "waste disc" round and flatten its outside face (check with a ruler).

Use woodturner's double-faced tape to fasten the escutcheon blank to the waste disc (**Photo 9**). Align the tape with the grain and place it on the blank's flat face. Usually two 3" long strips of 1" wide tape is sufficient. Center the blank and press it onto the disc. Bring up the tailstock to serve as a clamp. Install a 2" square pad or disc to evenly distribute the pressure. Wait about 20 minutes before turning.

Turn the escutcheon to the desired diameter. As the blank is face-grain material, you must cut across its edge to reduce the diameter, rather than into its edge. Using the spindle/detail gouge, work from the face of the blank toward (and into) the waste disc. Do not use a parting tool or a skew chisel for this step.

Drill a 3/4" dia. hole through the center of the blank (**Photo 10**). Then shape the face of the escutcheon with the spindle/detail gouge, working from small to large diameter (**Photo 11**). Finish-sand the escutcheon and apply the finish while it's still on the lathe, if desired.

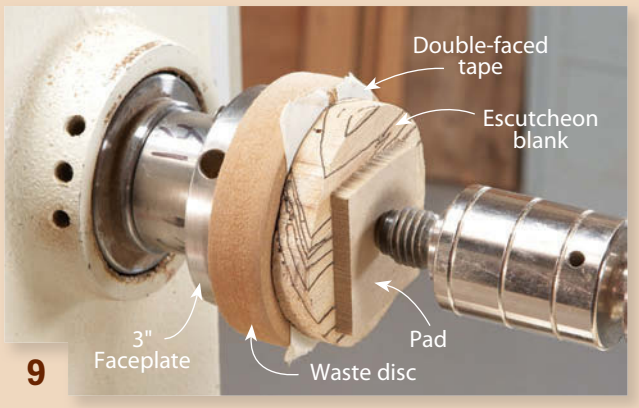
To remove the escutcheon from the waste disc, carefully slide a chisel under an end-grain edge. Then gently apply slow, steady pressure to break the tape's bond and pry off the escutcheon.

Assemble and mount the doorknobs

Glue the metal shank into the turned knob, using flexible epoxy or glue such as E6000 (**Photo 12** and Sources). Allow plenty of curing time (two to three days) before you mount the knobs on the door.

You'll need some screws and a latch assembly to mount the doorknobs. Usually the door's existing latch assembly works fine. For new installations, you can purchase the latch assembly alone at almost any hardware store or home center for $10 or less.

The screw lengths depend on the thickness of the door and the thickness of the escutcheon. I typically use black or brass oval-head sheet metal screws to con-



9

Use double-faced tape and pressure from the tailstock to mount the rough-sawn escutcheon blank on a waste disc that's mounted to a faceplate.

10

Drill a hole for the doorknob's metal shank after turning the escutcheon blank to its final diameter.

11

Turn the escutcheon's face with the spindle/detail gouge. Avoid tearout by working from the center to the outside edge.

12

Glue the shank into the knob, using E6000 adhesive—it's flexible, so it's excellent for adhering wood to metal, because it allows for the wood's seasonal movement.

trast or complement the wood. The doorknob hardware kit has two nylon barrels that the screws thread into from each side to hold the escutcheons in place. If you use the existing latch assembly, you may be able to use its screws and metal spacers instead of new screws and the nylon barrels from the kit.

Drill a pair of matching countersunk mounting holes in each escutcheon. Align the holes with the grain to allow seasonal movement and drill the holes slightly larger than the screw shanks. Sometimes the screw size and spacing are determined by holes in the latch assembly.

Install the latch assembly and mount the escutcheons. Don't over-tighten the screws. Mount one knob on the spindle and secure it with the setscrew. Slide the spindle through the door and latch assembly. Then thread the remaining knob onto the spindle until it fits softly against the escutcheon—neither so tight that the knobs won't turn nor so loose that the knobs wobble. When the fit is satisfactory, fasten the loose knob to the spindle with the setscrew.

See how to turn furniture knobs at **AmericanWoodworker.com/WebExtras**

Finish options

For a natural appearance that will patinate over time, use a drying-type oil (such as pure tung oil or boiled linseed oil), or an oil/varnish blend. For a more durable finish, use brushing varnish that's been reduced with mineral spirits so you can wipe it on, or melamine, as mentioned earlier.

SOURCES

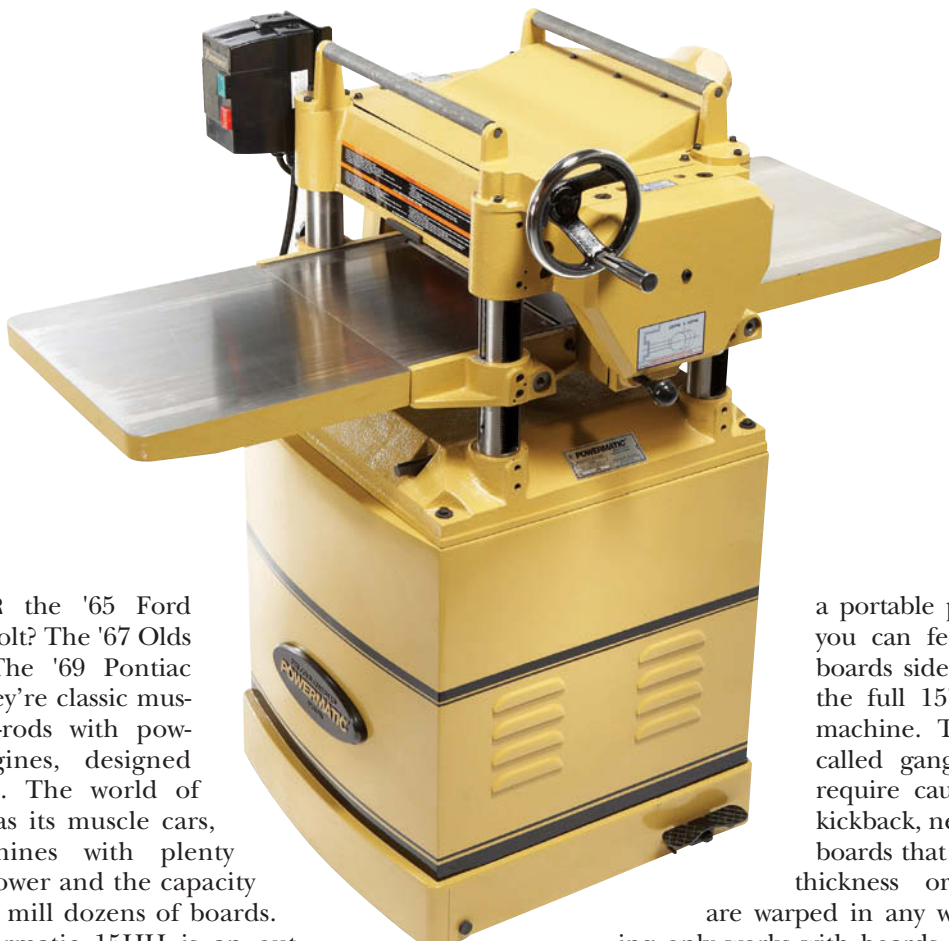
- Alan Lacer Woodturning, alanlacer.com, 715-426-9451, Doorknob Kit (includes 2 shanks, 1 spindle and 2 nylon barrels for mounting the escutcheons), $21.95 each.
- Craft Supplies USA, woodturnerscatalogue.com, 800-551-8876, Vicmarc Four-Jaw Scroll Chuck, #991-0222, $239.99; Keyless Chuck, #2MT, #964-2200, $44.99; 1" Double Face Tape, #028-0100, $20.99; Melamine Lacquer, 16.2 oz. can, #049-1800, $17.99.
- Eclectic Products, Inc., eclecticproducts.com, 800-767-4667, E6000 Industrial Strength Adhesive, clear, med. viscosity, 3.7 oz., $6.54.

Alan Lacer is a woodturner, writer and instructor who lives near River Falls, WI. To see more of Alan's work visit **alanlacer.com**.

Muscle Machine

by Tom Caspar

A powerful planer gets the job done much faster.



REMEMBER the '65 Ford Thunderbolt? The '67 Olds Cutlass? The '69 Pontiac GTO? They're classic muscle cars—rods with powerful engines, designed for speed. The world of planers has its muscle cars, too—machines with plenty of horsepower and the capacity to quickly mill dozens of boards. The Powermatic 15HH is an outstanding example.

Check out the specs: a 3hp, 240 volt induction motor, a 15" wide helical cutterhead and a 4' long cast-iron bed, all totaling more than 500 lbs. of wood-eating metal. This is a huge step up from most portable planers, which have less power and mass. If you have a portable planer and are frustrated by how long it takes to remove a lot of material, maybe it's time to get out of the sedan and move up to the muscle-car class.

More work in less time

There are two ways in which a planer like the 15HH can get the job done faster. First, you can take a much deeper bite with each pass—about twice as much as a portable planer. Second, you can feed in multiple boards side by side, up to the full 15" width of the machine. This technique, called gang-planing, does require caution. To avoid kickback, never gang plane boards that are of unequal thickness or boards that are warped in any way. Gang planing only works with boards that have been jointed first, then planed to the same thickness, one board at a time.

A planer with an induction motor, such as the 15HH, will last much longer than a planer with a universal motor (the type found on most portable planers). This planer's motor is rated to run continuously—all day, if necessary. If you see a lot of planing in your future, and want a machine that won't wear out anytime soon, then the 15HH or a similar 240 volt planer is the way to go.

Tames big boards

A big planer is better equipped than a portable planer to handle big boards, particularly long and heavy ones. The infeed roller on the 15HH, which pulls the

PHOTOGRAPHY: JASON ZENTNER

Cruise through huge boards

This planer's 4' long cast-iron bed can easily support this 3" thick, 80 lb. monster board.

Hog off a big bite

Powered by a 3 hp motor, this planer can cut 3/16" deep on material up to 5-1/2" wide, 1/8" deep on 15" wide stock.

Under the hood: a helical head

The carbide inserts on this planer's cutterhead are skewed at 14°. They make a shearing cut, which produces a smoother surface with less tearout. A planer with a helical head is also much quieter than one with a straight cutterhead.

wood through the planer, is a 2" dia. steel rod with serrated ridges that bite into the wood. The infeed roller of a portable planer, by contrast, is smaller in diameter and has a smooth surface; it relies on friction alone to pull the wood through the machine. A serrated roller, backed by a 3 hp motor, can pull heavy timbers through a planer much better than a smooth roller. Muscle planers like the 15HH also have two smooth non-powered rollers on the planer's bed, under the cutterhead, for a heavy timber to ride on. (They're adjustable from 0" to 1/16" in height). Portable planers don't have this feature.

The bed of the 15HH, like other muscle planers, is a long, solid cast-iron surface. It won't deflect or twist under the weight of a large timber. The bed of a portable planer is not nearly as strong or stiff, because most of its length is composed of two folding stamped-steel wings.

Snipe: not beat yet

There's one aggravating problem that a muscle planer won't solve for you, however: snipe. It's still there. (Snipe is the slightly deeper cut that a planer takes on the leading and trailing edges of a board.)

The best work-around to eliminate snipe is the same method you'd use with a portable planer: Butt your boards end-to-end as you feed them.

Superior performance

Muscle is just half the story with the 15HH. Outstanding performance is the other part, and that's mostly due to the planer's carbide insert cutters and helical head (the "HH" in "15HH"). According to Powermatic, this head delivers a smoother surface, with less tearout, than a standard straight-line cutterhead. Plus—and this is a huge deal—it's much quieter.

Carbide cutters will plane many more board feet than standard HSS knives before getting dull. When it comes time to put a new set of edges to work, you just unscrew and rotate the inserts. No leveling is required.

The 15HH uses a Byrd Shelix head, which is currently state of the art in planers. All of the inserts cut at a skew angle. Some muscle planers have somewhat similar heads with carbide inserts arranged in a helical pattern, but the inserts aren't skewed. They make a chopping cut, like a straight knife, rather than a shear cut. According to Powermatic (and this agrees with our own observations), a shearing cut minimizes tearout.

SOURCE: Powermatic, powermatic.com, 800-274-6848, 15HH Planer, $2,999.

Get a closer look at helical heads and carbide inserts at **AmericanWoodworker.com/WebExtras**

Limbert Footstool

Build a replica of an Arts and Crafts classic.

by Spike Carlsen

TWENTY-FIVE years ago I fell in love with an old oak stool. Since then, I've used it as a computer desk, kid seat, snack table and stepladder. My stool was built more than 100 years ago by the Limbert Arts and Crafts Furniture company of Michigan, and it's still as attractive, useful and sturdy as the day it was made. Here's how you can make your own.

You'll be able to use typical 3/4" oak boards found at a home center. You'll need a 4' board that is 11-1/4" wide (it will be labeled as a "1x12"), a 3' board that is 2" wide and a 2' board that is 1-1/2" wide. Cut the legs (A) and top (C) from the wide board. Note that both ends of each leg are cut at a 5° bevel (Fig. A). Cut the aprons (B) to final length from the 2" wide material.

Copy and enlarge the half-patterns for the legs and aprons (Fig. C). Use carbon paper to trace them as mirror images onto the wood. Drill holes with a 1-1/8" spade bit to start making the leg cutouts (**Photo 1**), then finish with a jigsaw equipped with a fine-tooth blade. (You could also use a scroll saw.) Cut the outline of the apron with the jigsaw or use a bandsaw with a fine-tooth 1/4" blade. Wrap sandpaper around a short length of dowel to smooth the sawn surfaces. Cut notches in the legs for receiving the aprons. Note that the bottom edges of these notches lean at 5°, like the tops of the legs; cut them on a tablesaw or use a handsaw.

Glue and nail the aprons to the legs (**Photo 2**). First, mark the top edges of both aprons to indicate the position of the legs (Fig. A). Place one apron on the legs, then use a sliding bevel to make sure both legs lean at 5°. Double-check this by measuring the distance between the bottoms of the legs. Pre-drill holes before pounding in the nails. Flip the stool over and install the second apron.

Cut the top (C) to length. Use the same 1-1/8" spade bit to drill holes for the ends of the cutout (Fig. B), then cut between the holes with a jigsaw. Round the corners of the top. Center the leg assembly on the top and drill pilot holes for mounting screws (**Photo 3**). Glue and screw the leg assembly to the top.

Cut the stretcher (D) to length. Position it between the legs, then locate the centers of the screw holes on the outside of the legs. Drill holes for the decorative plugs first, then drill pilot holes for the screws. Glue and screw the stretcher in place (**Photo 4**), then glue in the plugs.

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Drill holes with a spade bit to begin making the leg cutouts. Use a jigsaw or scroll saw to cut the rest of the pattern.

Nail the aprons to the legs. Use a sliding bevel to make sure both legs angle out at 5°.

Drill pilot holes through the aprons for fastening the top with screws. Use a combination bit adjusted to drill a hole that's the full length of the screw.

Fasten the stretcher between the legs with screws. Install decorative buttons to conceal the screw heads.

Fig. A Exploded View

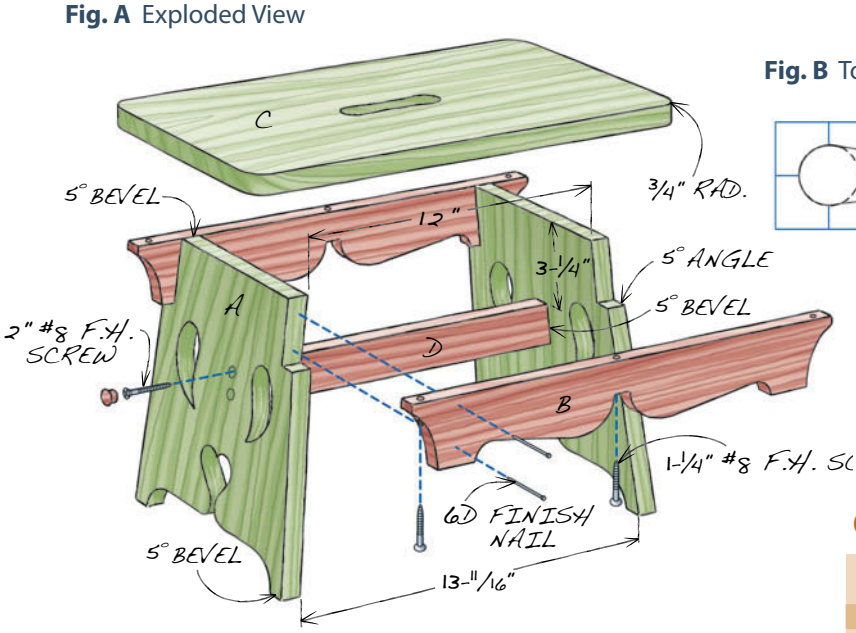


Fig. B Top Cutout

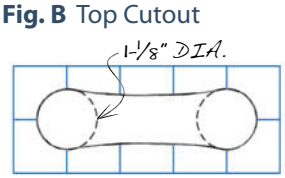
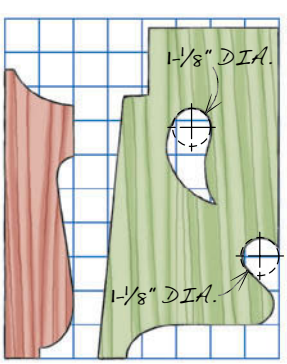


Fig. C Leg and Apron Patterns



Cutting List

Overall Dimensions:
10-1/2" H x 10-1/2" W x 18" L

Part	Name	Qty.	Th x W x L
A	Leg	2	3/4" x 10-1/2" x 9-3/4"
B	Apron	2	3/4" x 2" x 17"
C	Top	1	3/4" x 11-1/4" x 18"
D	Stretcher	1	3/4" x 1-1/2" x 12-13/16"

To download full-size plans of the leg and apron, go to **AmericanWoodworker.com/WebExtras**

New Hope Blanket Chest

by Mario Rodriguez

Inspired by traditional Pennsylvania design, this chest is a dovetailer's delight.

Dovetail-friendly wood

This chest is made from butternut, a relatively soft wood that's perfect for cutting dovetails by hand.

Built-in till

The chest has a small storage box—a "till"—built right into it. To prop up the chest's lid, just open the till.

Breadboard ends

These pieces keep the chest's lid from warping. I made them from red oak, for strength.

I'LL BET that there's a blanket chest somewhere on your honey-do list. It's a useful piece that looks great in almost any room. And it's also the perfect project to develop—or test—your dovetailing skills.

Choosing the right wood for dovetailing can make all the difference in the world. If you use a dense wood that splinters easily or has squirrely grain—watch out! So let me share with you just one magical word: butternut. This wood is a dovetailer's dream come true.

Butternut is relatively soft, like basswood. It takes little effort to saw and easily surrenders paper-thin shavings to a sharp chisel. Your dovetails will really stand out when the wood is finished because butternut's end grain strongly contrasts in color with its face grain. Plus, butternut has beautiful figure: It looks a lot like walnut, a close relation.

While most of this chest is made from butternut, I used red oak for the lid's breadboard ends and the cove molding that runs around the base. These parts will probably get dinged over the years, so I chose a wood that is more durable than butternut. Combining woods like this may sound unusual, but cabinetmakers of long ago adopted the same practice, particularly on chests that were going to be painted. I wouldn't paint this chest, of course, but I like the effect. It's quite striking, and honors those craftsmen's practicality.

Dovetail the case

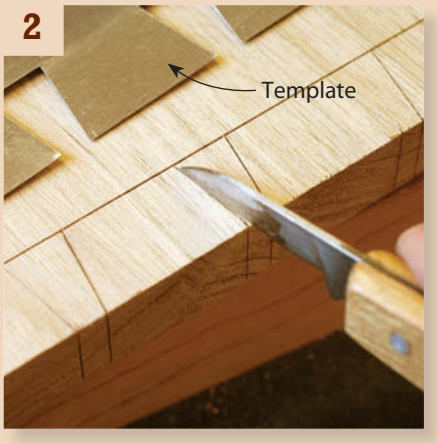
The front (A), back (B) and sides (C) of the chest are 16" wide, so you'll probably have to glue them up. I used two wide boards for the front and sides and a number of narrower boards for the back. When you glue these pieces, take every precaution to make sure that the joints are even and the whole assembly stays flat. Rip the panels to final width, then trim them to final length using a crosscut sled (**Photo 1**).

Lay out the dovetails (Fig. C). I start with the tails (they go on the front and back pieces). With so many tails to lay out, I make a template from aluminum flashing (**Photo 2**). On the wood, I first mark the baseline of the tails with a marking gauge. Then I place the template in position and use a knife to score lines for the sides of the tails. Finally, I remove the template and score the baseline and the side lines even deeper.

I cut the tails to the line, saw most of the waste between them with a jeweler's saw (**Photo 3**), then pare the baseline from both sides. I lay out the pins directly from the tails, again using a marking knife. I cut the pins a little fat, then undercut them a bit and chamfer their inside edges—to make assembly easier—and pare to the lines.

Mario Rodriguez shows you much more about his dovetailing methods at **AmericanWoodworker.com/WebExtras**

1 **Begin** building the chest by gluing up large panels for the front, back and sides. Trim them to length using a crosscut sled.



2 **Lay out** the dovetails by using a template. I made this one from aluminum flashing. Deepen all of the lines by scoring them with a knife.

3 **Cutting** dovetails requires many careful steps; you can find out more about how I do it on the AW website. Here, I use a jeweler's saw to remove most of the waste between the tails.

4 **Make** the parts for the till before assembling the chest. The till's lid pivots on this dowel.

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Fig. A Side View

Fig. B
Exploded View

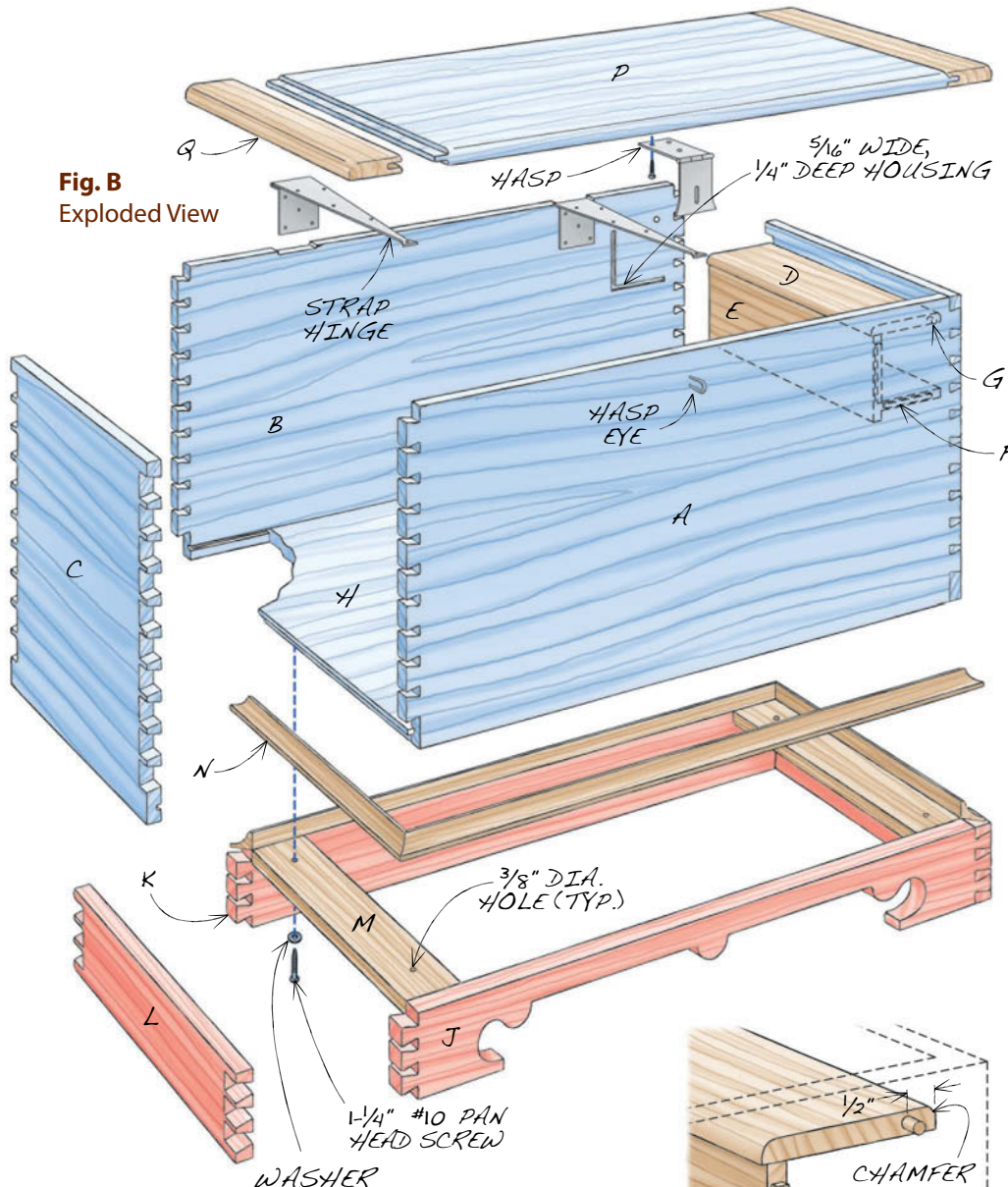


Fig. C
Dovetail Layout and Base Detail

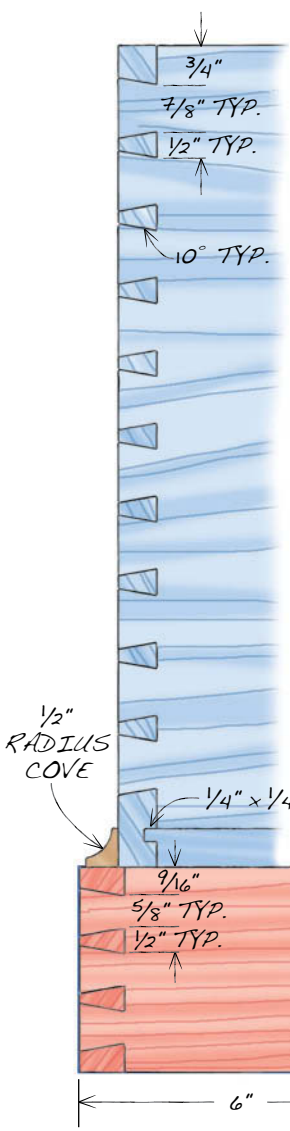


Fig. D Cross Section of Lid

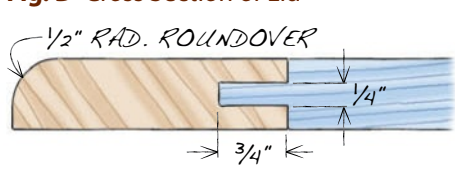


Fig. E
End View of Till

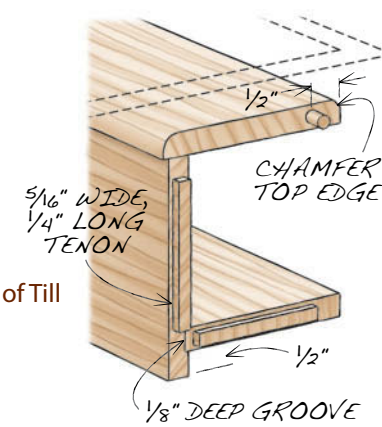
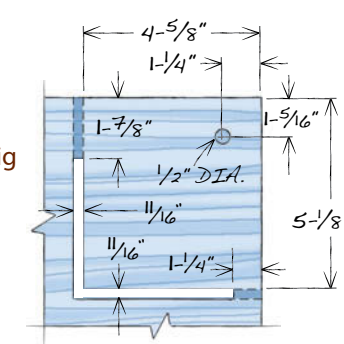


Fig. F
Till Housing Jig
(see Photo 5)



Make the till and bottom

After all that dovetailing, you're not quite ready to glue the case together. First, you must make and fit the parts for the till (D through G) and the bottom (H). These pieces will go inside the case as you assemble it.

The front (E) and bottom (F) of the till fit into housings let into the front and back of the case (Fig. B). The till's lid (D) pivots on a dowel (G, **Photo 4**). Make a template to rout the housings and to drill the dowel holes in the front and back pieces (Fig. F). (The easiest way to make this template is to glue separate pieces together, as shown in the drawing.) When you rout the housings (**Photo 5**), use a 5/8" o.d. guide bushing and a 1/4" bit; this will result in housings that are 5/16" wide. Make the till's front and bottom pieces. Cut tenons on their ends to fit the housings (Fig. E). Make the lid. Drill dowel holes in its ends and insert the dowels. Bevel the back edge of this piece so it will swing freely. Test fit all three pieces of the till so you don't run into any trouble when gluing up the case (**Photo 6**).

Liquid hide glue takes the rush out of gluing and clamping

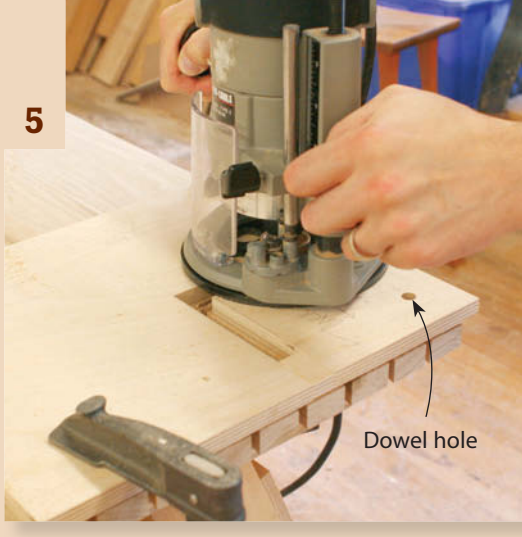
Saw or rout a groove on the bottom edge of all four sides of the chest (Fig. C). When you assemble the chest, the ends of these grooves will be visible on the side pieces; that's OK, because they will be covered by the cove molding (N) that runs all the way around the chest. Glue the chest's bottom from a number of pieces of yellow poplar. Rip it 1/4" narrower than the distance between the bottom of the grooves in the front and back pieces (to allow for expansion and contraction). Trim it about 1/16" shorter than the distance between the bottom of the grooves in the side pieces (so it will slide in easily). Cut a 1/4" tongue all the way around the bottom piece and test its fit.

Glue the case

A lot has to happen all at once when you assemble the case, so you'll need plenty of time before the glue sets up. I use a liquid hide glue which has an open time of about 1 hour (see Sources, page 43). To start the process, apply glue to the dovetails on the back panel and the rear pins of the side panels. Assemble these three pieces and drive the joints home, forming a "U" (**Photo 7**).

Next, slip the bottom panel into place. Add the front and bottom of the till, then the till's lid. Apply glue to the front pins of the side panels and the tails of the front panel. Put the front panel in position and gradually tap it into place; you'll have to line up the till pieces at the same time.

5 **Rout** grooves into the front and back panels to hold the till. This router template also locates the hole for the dowel in the till's lid.

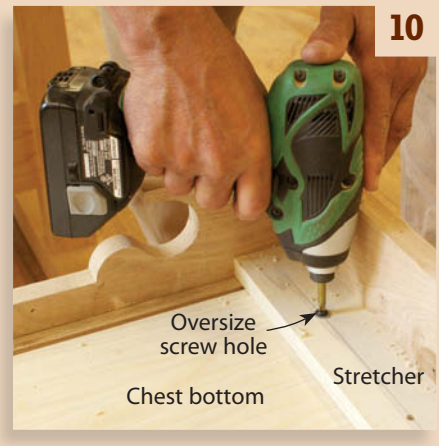


6 **Cut** tenons on the ends of the till's front and bottom pieces. Make sure they fit in the grooves you routed. All of these parts, plus the bottom of the chest, must easily slide into place when you glue the case together.

7 **Glue** all of the case together in one shot. With so many dovetails to assemble, this can take a while. Use a slow-setting liquid hide glue to give yourself plenty of time.

8 **Plane** the joints flush. For cutting end grain without chatter, I use a low-angle jack plane.

9 **Cut** the front of the base on the bandsaw. The sides and back of the base are just straight boards. Dovetail all of these pieces and glue them together. Glue two horizontal stretchers inside the base.



10 **Fasten** the base to the bottom of the chest. Drill oversize holes in the stretchers, so the bottom is free to expand and contract.

11 **Glue** and nail a cove molding all around the chest. Shoot the nails into the base pieces.

After the glue dries overnight, soften the squeeze-out with warm water and remove it with a putty knife or chisel. Plane all of the joints even (**Photo 8**). Plane all around the top and bottom edges to even them up as well.

Attach the base

Mill the base's front (J), back (K) and sides (L). Cut their dovetails (Fig. C) and saw the cutout in the front piece. Start the cutout by drilling large-diameter holes at each end, then saw the rest on the bandsaw (**Photo 9**). Glue the pieces together and even up the joints.

Glue two stretchers (M) inside the base. Drill oversized holes near the end of each stretcher, then fasten the base to the case with screws and washers (**Photo 10**).

Forged strap hinges complement the chest's handmade look

Rout the cove molding (N) on two sides of a long board that's at least 3" wide. Note that it's not square: the molding is 5/8" deep, front to back, but 3/4" tall, in order to cover the groove for the chest's bottom. Sand the molding, then rip both sides of the board to make the final pieces. Cut the molding to length and attach it to the base with glue and 1" pin nails (**Photo 11**).

Make the lid

Mill the boards for the main panel of the lid (P) and the breadboard ends (Q) to exactly the same thickness. Glue the panel. Rip it 1/4" extra-wide, but trim it to final length. Rip the breadboard ends to final width, but trim them about 1/4" extra-long.

Cut the grooves for the breadboard ends (Fig. D) on the tablesaw. To ensure that the grooves are exactly centered, I use a standard 1/8" thick blade and make two passes, one from each side of the board (**Photo 12**). Cut the tenons on the ends of the main panel using a dado set (**Photo 13**). I cut them just a hair fat, then use a shoulder plane to get a perfect fit.

Glue the breadboard ends to the panel (**Photo 14**). Apply glue only to the front half of the joint, leaving the back half unglued to ensure that the panel won't split when it expands or contracts. After the glue dries, rip a little bit off of both sides of the lid to arrive at the final width. Soften the front and side edges of the lid using a 1/2" roundover bit.

To fasten the lid, I use forged hinges that have a hand-made look (see Sources). Cut mortises for the hinges and screw the hinges into the mortises. Place the lid upside down on your bench, then center the

chest on the lid (Fig. A). Roll the chest over on its side and install the screws at the ends of the hinges (**Photo 15**). Stand the chest up on its base and readjust the position of the lid, if necessary. Once the lid's overhang is even all around, install the remaining screws. Finally, install the hasp (it doesn't require a mortise) and nail its eye to the front of the chest.

SOURCES

Tools for Working Wood, toolsforworkingwood.com, 800-426-4613, Patrick Edward's Old Brown Glue, 20 oz. bottle, $20.95.

Nathan's Forge, nathansforge.com, 410-848-7903, Blanket Chest Hinges, 12" L, $75/pr; hasp and eye are special order.

Mario Rodriguez has been a professional woodworker for over 25 years. He teaches at Philadelphia Furniture Workshop, philadelphiafurnitureworkshop.com.

Cutting List

Overall Dimensions: 22" H x 38" W x 19-1/2" D

Part	Name	Qty.	Material	Th x W x L
A	Front	1	Butternut	3/4" x 16" x 36"
B	Back	1	Butternut	3/4" x 16" x 36"
C	Side	2	Butternut	3/4" x 16" x 17-3/4"
D	Till lid	1	Red oak	5/8" x 4-5/8" x 16-1/4"
E	Till front	1	Yellow poplar	1/2" x 4-1/2" x 16-3/4" (a)
F	Till bottom	1	Yellow poplar	1/2" x 4-1/8" x 16-3/4" (b)
G	Till dowel	2	Oak	3/8" dia. x 1-1/4"
H	Chest bottom	1	Yellow poplar	3/4" x 16-3/4" x 35" (c)
J	Base front	1	Butternut	7/8" x 4" x 37-1/2"
K	Base back	1	Butternut	7/8" x 4" x 37-1/2"
L	Base side	2	Butternut	7/8" x 4" x 19-1/4"
M	Base stretcher	2	Yellow poplar	3/4" x 2-1/2" x 17-1/2"
N	Cove molding	10 ft.	Red oak	5/8" x 3/4" x 10'
P	Chest lid	1	Butternut	3/4" x 19-1/4" x 33-1/2" (d)
Q	Breadboard end	2	Red oak	3/4" x 3" x 19-1/4"

Notes:
a) Includes two 1/4" tenons.
b) Width is slightly oversize. Plane to fit.
c) The width of the bottom is 1/4" narrower than the distance between the grooves in the front and back of the chest.
d) Includes two 3/4" tenons.

12

Make the chest's lid. Plow grooves down the full length of the breadboard ends. While most of the chest is butternut, I make these pieces from red oak, for strength.

13

Cut tenons on the main section of the lid using a dado set. Start out making the tenons a little fat, then raise the blade until they almost fit the breadboard ends. Use a shoulder plane or rabbet plane to fine-tune the fit.

14

Glue the breadboard ends to the lid's main panel. I put glue only halfway down the length of the joint, so the panel is free to move later on.

15

Install the hinges. Start out with only one screw per hinge, then close the lid and see if the overhang is even all around. Adjust as necessary, then put in all the screws.

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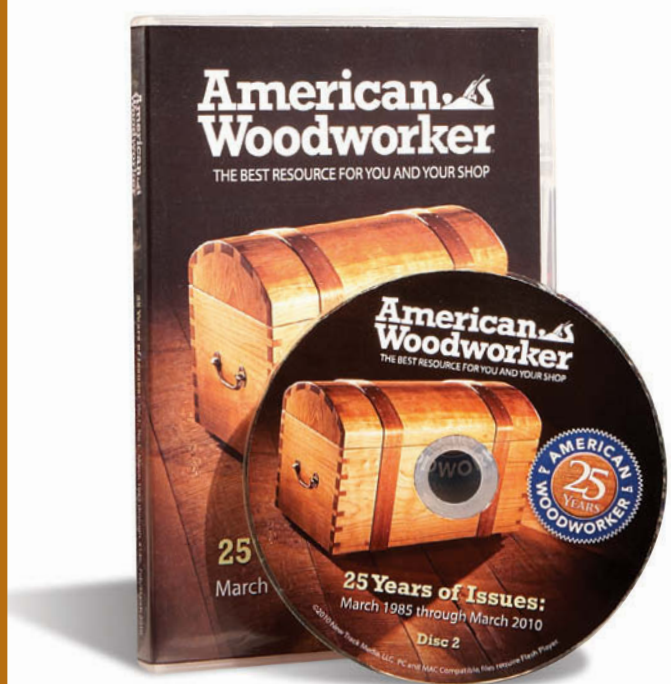

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Brush Care 101

How to choose, condition and clean a finishing brush.

by Scott Holmes

IT'S REALLY TEMPTING to buy an inexpensive brush for finishing. Say you spend $4 on a standard paint brush and throw it away rather than taking the time to clean it. You may buy 40 such brushes over the next 10 years … that's $160! A much better plan is to buy one or two high-quality finishing brushes (about $60) and take care of them. This is a win-win proposition: Not only do you save big bucks, your finishes will look like a million bucks, too.

A high-quality brush is a joy to use, because it distributes finish evenly, leaving a consistent layer on the surface, without any brush marks. It won't lose bristles and it holds more finish than a standard brush, so you're not constantly reloading it. Once you've used a high-quality finishing brush, you'll never go back.

It's true that cleaning a brush is a chore. Well, so is washing the dog, but he sure smells better afterwards! My point is that there's a reward: Take care of your brush and it will last a lifetime. In fact, just like a good bottle of wine, a high-quality brush will get better with age. Here's how to choose and care for a brush for applying film-forming finishes such as oil-based polyurethane varnish.

Features of a high-quality brush

A thick head. The more bristles a brush has, the more finish it can hold and the better it will flow the finish onto the wood. A high-quality finishing brush has a visibly thick head that probably contains three to four times the number of bristles in a standard brush (**Photo 1**). Standard brush heads have a hollow reservoir in the middle, because they're designed to apply thick paint. Varnish is thinner, so a high-quality finishing brush has no such hollow space.

Soft, flexible bristles. The stiffer the bristles, the longer they must be to flex enough to lay down the finish. The longer the bristles, the more difficult a brush is to control.

Choose a brush with natural bristles for oil-based varnish. Natural bristles are usually China bristle, ox hair or a combination of the two. China bristle is Chinese boar hair, a long, tapered hair that works well for oil-based varnish. China bristles are naturally black or white—the white bristles are a bit finer and softer. The best China bristles are sometimes dyed to imitate badger hair (a superb bristle that's become so expensive it's rarely used in finishing brushes). One of my favorite brushes has China bristles that are dyed this way (see Sources, page 49).

Ox hair bristles are finer, softer and more flexible than China bristles. They're usually shorter, too, to optimize control. Ox hair bristles are especially good for detail work, because they flow beautifully over and around contoured surfaces (see Sources).

A hand-sculpted tip. A tip that's chisel-shaped allows more bristles to contact the surface, resulting in a smoother flow of finish. The high-quality brush maker actually binds the hairs in this shape while forming the brush. Cutting the bristles to create the shape after the brush is bound defeats the advantage of using naturally tapered hairs.

EDITOR: TIM JOHNSON | PHOTOGRAPHY: SCOTT HOLMES

1 **The head** of a high-quality brush will be thick and hand-shaped to a chisel point. Look for bristles made from top-quality China bristle (sometimes called "imitation badger hair") or ox hair.

2 **A quick soak** before each use fills the bristles and coats them with mineral spirits, so the varnish flows easily from the brush onto the surface. Watch as you insert the brush—you can actually see the solvent wick up the bristles.

3 **A four-step rinse** with previously used mineral spirits removes the varnish. Notice that the solvent in the three rinse containers gets clearer as the brush gets cleaner. Use fresh mineral spirits for the last rinse only.

4 **Citrus cleaner** removes most of the mineral spirits. Spray it into the bristles and work it through. Then rinse it out.

Brushes that are 2" wide are the workhorses in my shop, because they're the most versatile. For large, flat surfaces, though, I often use wider brushes.

A heavy-gauge ferrule. High-quality brushes have thick ferrules made of metal that won't rust; the best are stainless steel.

A quick soak conditions the bristles

One simple step ensures the varnish will flow smoothly from your brush onto the surface. Before each use, soak the bristles in mineral spirits to fill them and coat them all the way up into the ferrule (**Photo 2**). After a minute or two, gently flex the brush against the side of the container to remove the excess solvent. There's no need to shake or spin the brush, because the goal is to leave solvent in the bristles. *Now* your brush is ready to apply varnish. And cleaning is easier when the job is done, because the varnish won't get up into the ferrule.

Tip: It's best to use a brush for only one type of finish, so don't use your varnish brush for anything but varnish.

How to clean and maintain your brush

Cleaning isn't glamorous, but it takes less than 10 minutes to do the job right, and it's rewarding how soft and luxurious the bristles feel at the end of the process. It may help to whistle while you work.

Stage 1: Remove the varnish

Start with a four-step rinse to remove the varnish (**Photo 3**). This system reuses mineral spirits from previous cleanings for all but the last rinse—and it cleans your varnishing pan at the same time. **Tip**: To keep from contaminating an entire can of varnish, always work from a pan rather than the can. And when the job is done, never pour the varnish remaining in the pan back into the can.

After emptying the pan, wipe it with a paper towel to remove any remaining varnish. Then gently pour a few ounces of the first-rinse mineral spirits into the pan. This previously-used solvent can be used again because it's been stored long enough to let the varnish from the previous cleaning settle to the bottom of the container.

Vigorously work the brush in the mineral spirits. The goal is to remove as much varnish as possible. Sweep the bottom and the edges of the pan as you work. Shake out the brush and pour the dirty mineral spirits back into the first-rinse container. Then repeat the process using the second-rinse mineral spirits and again using the third rinse.

After three rinses the brush is nearly clean. Wipe out the pan with a clean paper towel and rinse the brush one more time, using fresh mineral spirits. When you're finished, pour these spirits into the third-rinse container. If you see any color in the solvent after this fourth rinse, *do it again*. Store the three containers until the varnish has settled out, and they'll be ready for the next cleaning.

Stage 2: Remove the mineral spirits

Mineral spirits can leave an oily residue, so to thoroughly clean the bristles you have to remove all the mineral spirits. To do this, I recommend giving the spirits a double-

whammy. Start by spraying citrus cleaner into the bristles, working it through the brush and rinsing it out with water (**Photo 4**). Next, squirt dishwashing soap into the bristles and vigorously work them into the palm of your hand (**Photo 5**). It's OK to really give the bristles a workout. Grab them and pull them, so the cleaning process also removes any loose bristles. Thoroughly rinse the brush and then repeat the process. The soap will lather much more easily the second time, an indication that the bristles are clean. Make sure to rinse all the soap from the brush before you proceed to the next step. Keep working the bristles even after you think the brush is soap-free—you'll be amazed how long suds keep forming.

Shake out the brush and then spin it to remove the water it still holds (**Photo 6**). Spinning fans the brush head. Work your fingers through the damp bristles to reshape the head, or use a brush comb. Notice that the bristles feel soft and clean, like your hair feels after shampooing. Wrap the brush in a paper towel (**Photo 7**). Then hang it up and let it dry for at least 24 hours. As water makes natural bristles go limp, the brush won't be usable again until the bristles are completely dry.

Keep the brush wrapped in the paper towel until the next use or transfer it to a cardboard or plastic sleeve for traveling to a jobsite. When you remove the brush, it will be soft and flexible, as good or better than new.

Scott Holmes owns and operates An Esoteric Finish in Houston, TX, where he specializes in custom finishing and woodworking. Scott also teaches finishing classes at area woodworking stores.

SOURCES

- Rockler, rockler.com, 800-279-4441, Natural Badger-Style China Bristle Brush, 2", #23466, $23.49.
- Tools For Working Wood, toolsforworkingwood.com, 800-426-4613 Gramercy Tools Finishing Brush, 2", #GT-SHEBRU.20, $43.95.

See Scott demonstrate brush cleaning at **AmericanWoodworker.com/WebExtras**

5 **Dishwashing soap** removes any mineral sprits the citrus cleaner missed. Work the bristles hard to work up a lather and dislodge any loose bristles. Then thoroughly rinse the brush.

6 **Spin the brush** to fan the bristles and shed the excess water.

7 **Wrap the brush** in a shop towel to hold its shape. Then hang it up to dry.

Short term storage

There's no need to completely clean the brush if you plan to use it again within a day or two. Instead, just complete Stage 1 of the cleaning process described above to remove all the varnish. Then suspend the brush in fresh mineral spirits. Make sure the bristles don't touch the bottom. This is different from conditioning the bristles for a few minutes before using the brush (**Photo 2**). Letting the brush stand on the bottom of a container for an extended length of time will distort the bristles.

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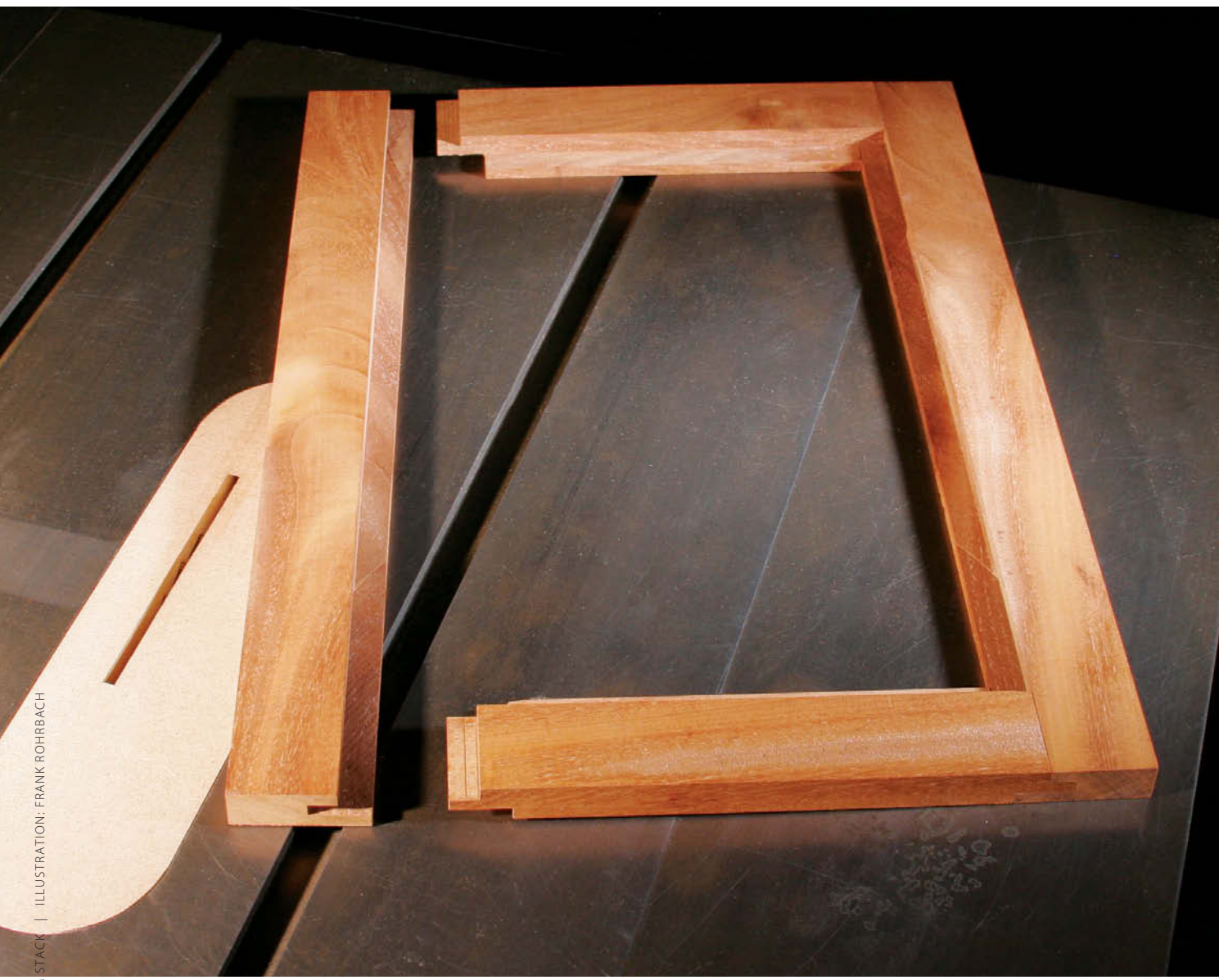
Tablesawn Glass-Panel Doors

Make see-through doors in 6 easy steps.

by Jim Stack



EDITOR: TIM JOHNSON | PHOTOGRAPHY: JIM STACK | ILLUSTRATION: FRANK ROHRBACH

HERE'S A NIFTY WAY to make frame-and-panel door frames with built-in rabbets for glass. The offset shoulders on the stiles and rails make the joinery look complicated, but it's actually just a clever variation on ordinary tongue-and-groove joinery(see Fig. A, page 53) If you plan to make a kitchen-full of doors, this is the way to go. It's much faster than routing rabbets in all the assembled frames, and then squaring all the corners.

Mill stock to 3/4" and cut the parts to width and length. Be sure to add 2" to the length of the rails to allow for their 1" tenons.

The stiles and rails shown here are all 2-1/4" wide, but this method will work for stiles and rails of different widths, too. Consider increasing the mortise depths and tenon lengths for larger, heavier door frames. Include extra parts for making and adjusting your setups.

1

Cut a centered groove in one edge of all the stiles and rails, using a dado set.

2

Raise the blade and cut a deeper stopped groove in both ends of both stiles. These stopped grooves are the mortises.

3

Cut a rabbet on the inside face of all four pieces. Don't bother to change blades—just use the dado set and set the fence accordingly. This rabbet will house the glass panel.

Cut grooves and mortises

Install a 1/4" wide dado set in the tablesaw and position the fence to exactly center the groove in the frame stock. Make one pass on each face of a test piece and then check the groove. If the second pass widens the groove or leaves fresh saw marks on one shoulder, the groove isn't exactly centered.

Once you've dialed in the setup, raise the blade to 1/2" and cut a groove in all the stiles and rails (**Photo 1**). Then raise the blade to 1" and make stopped cuts on both ends of each stile to create the mortises (**Photo 2**). As the groove is perfectly centered, the blade simply deepens it. To position the stop block for these cuts, mark a vertical line on the saw's fence at the center of the blade's arc. Then mark the width of a rail's inside face (measure from the outside edge to the rabbet) on the top edge of a test stile. Carefully cut a groove in the test stile, stopping when the two lines meet. Shut off the saw—hold the stile in position until the blade stops spinning. Then butt the stop block against the end of the stile and clamp it.

A dado set cuts both the tenons and the mortises.

To cut each mortise, hold the stile against the fence and advance it into the blade until it meets the stop block. Turn off the saw and let the blade stop. Then remove the stile and flip it end-for-end to cut the other mortise.

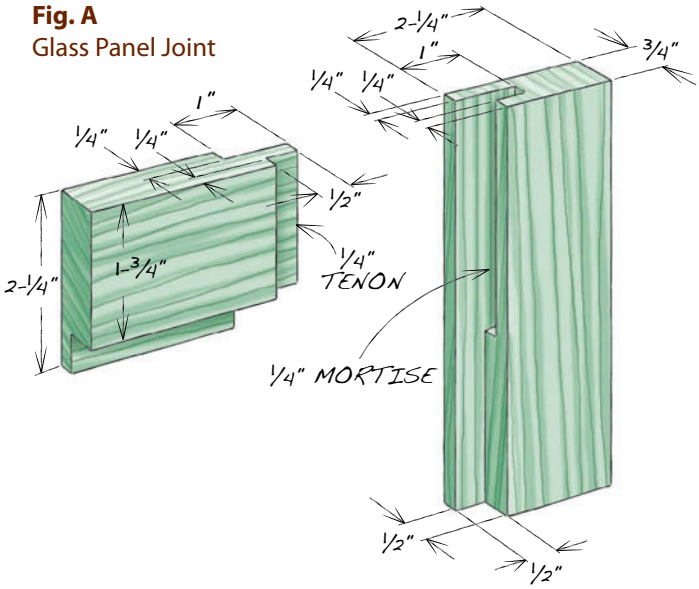
Cut rabbets and tenons

Lower the dado set to 1/2", set the fence and cut 1/2" wide x 1/2" deep rabbets for the glass on the back faces of all the stiles and rails (**Photo 3**). As you're using the dado set rather than a regular blade, cut a rabbet on a test piece first, to make sure the rabbet's width is correct.

Use a miter gauge to cut the tenon cheeks on the rails (**Photo 4**). Add cutters to widen the dado set to 13/16" and install a sacrificial fence on your saw's rip fence. Start by making test cuts to dial in the tenon thickness. Set the blade height to 1/4" and make a pass on each face of a test rail to cut a tenon. Test-fit this tenon in one of the mortises. If it wobbles, the tenon is too loose; lower the blade and start over. If the tenon binds, it's too tight; raise the blade a tiny bit and try again.

Once you've dialed in the tenon thickness, you can cut the cheeks and shoulders. The shoulders are offset, though, so you have to cut the tenons one side at a time. Mark the outside face on each rail and cut the cheeks and shoulders on those faces first. Set the sacrificial fence 1" (the depth of the mortises) from the far edge of the blade. Make a test cut on a scrap

Fig. A
Glass Panel Joint



piece. Then check the tenon's length to make sure it matches the mortise. It's OK for the tenon to be a tiny bit shorter than the mortise, but it can't be longer. Adjust the fence, if necessary. Then cut the tenon cheeks and shoulders on the outside faces of both rails.

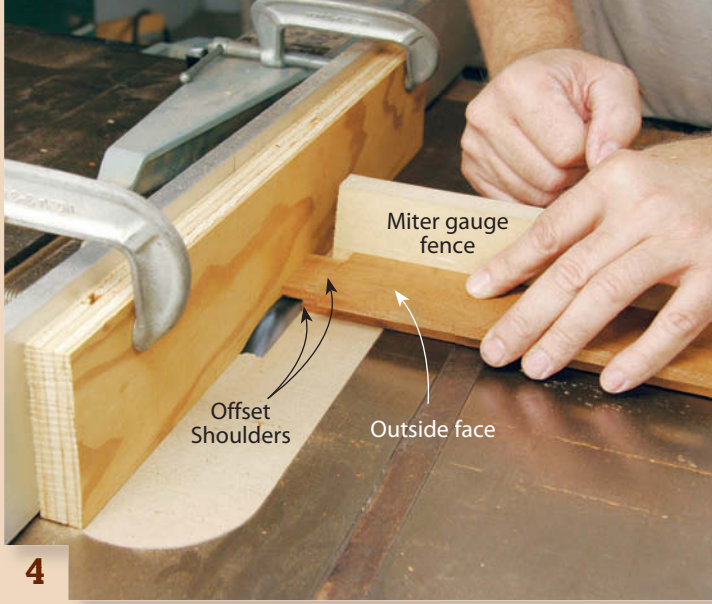
To cut the cheeks and shoulders on the inside faces, just set the sacrificial fence 1/2" from the far edge of the blade and repeat the process. It's a good idea to give yourself some wiggle room when you cut these cheeks, so you can true the fit (**Photo 5**).

Install the glass

Glue the stiles and rails together, cut mortises (or drill holes) for the hinges and knob and apply the finish. Then install the glass. Thin wooden strips that surround the glass and hide the rabbets look the best (**Photo 6**), but metal or plastic retainer clips will also do the job.

Jim Stack worked for 20 years in commercial cabinetmaking and furniture making shops. He has written seven woodworking books and most recently was Senior Editor of Popular Woodworking books.

See how to make divided-light door frames at **AmericanWoodworker.com/WebExtras**



4

Cut tenons with offset shoulders on the rails. The tenon's length on the outside face matches the depth of the mortise in the stile. Its length on the inside face matches the width of the rabbet.

5

Test fit the joint. It's best to cut the tenon shoulder on the inside face a little short at first. This allows you to to dial in a perfect fit by adjusting the fence and making a second pass.

6

Secure the glass by nailing in wooden retainer strips with predrilled nail holes. Lay a hammer on the glass with a paper towel in between. Then just swivel the hammer to drive the nails.

Stringing Inlay

Learn how to embellish fine furniture with a master cabinetmaker.

by Mario Rodriguez

STRINGING is a form of inlay that's somewhat like pinstriping on a hot rod. It outlines a particular area, such as the bellflowers on the leg at left, and then directs your eye to a new spot, such as the banding at the bottom of the leg (see photo below). Once you've taken that in, the stringing leads your eye back up the leg again. It's powerful stuff.

The art of stringing reached its peak in late 18th century Federal-style furniture. If you like making period pieces, mastering this art is a skill you'll really enjoy. You can use power tools for almost all the work or step back 200 years and use specialized hand tools that are still available today.

I teach both methods in my classes. I like using traditional tools, but I'll admit that power tools are faster and easier to figure out. So, let's start with a router.

Rout the grooves

Stringing is set into very narrow and shallow grooves. I use a Dremel rotary tool for routing them. It's lighter and more maneuverable than a laminate trimmer, but more importantly, it accepts small-diameter solid-carbide endmill bits (see Sources, page 57). Dremel makes a plunge base for its tool, but I use a different base that's specifically designed for stringing work (**Photo 1**; see Sources).

Lay out the stringing with a pencil and compass before you start routing. The stringing on the leg shown here will be 1/32" wide, but you don't have to draw its full width—just draw a centerline for each piece.

Rout the straight grooves first.

The Portsmouth Card Table

This article is the first in a series on making a masterpiece of American design from the Federal Period (1790-1830). In this series, I'll be showing you how to make banding, create bellflower inlay, shade veneer with hot sand, cut and lay thick veneer on straight and curved surfaces, and make a knuckle joint. We'll publish the plans for the entire table at the end of the series.

I teach a five-weekend long Master Class on making this card table at Philadelphia Furniture Workshop (PhiladelphiaFurnitureWorkshop.com). Join me! —*Mario Rodriguez*

Adjust the stops on the plunge base so the bit will cut a groove that's about 3/32" deep. Attach a fence to the base and adjust it to the proper distance from the bit. Rout the grooves, starting and stopping at intersecting centerlines (**Photo 2**).

Use a template (**Photo 3**) or a trammel for cutting curves. (Both bases can be set up like a trammel to pivot on a point.) A template is more versatile than a trammel and easier to set up. With a template, you can make elliptical or serpentine curves. With a trammel, you can only make circular arcs.

The exact thickness of the template is critical. To explain this, let me show you how the bit and template work together. After making the straight cuts, you'll adjust the bit so that its shank extends below the base (**Photo 4**). The shank will then ride directly against the template, like a router bit with a solid pilot. Here's where the thickness of the template comes in—it should be sufficiently thick to guide the bit, but not so thick as to force you to extend the bit too far out of the chuck. That could lead to excessive run-out or cause the bit to slip. For this particular bit and base, I make my templates from 3/8" Baltic birch plywood.

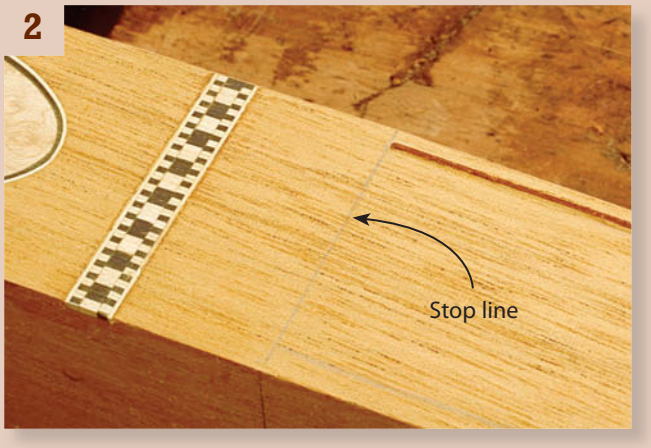
Experiment with your template on scrap so you know how to position it in order to hit your lines—there is an offset involved. Reversing the template allows you to make mirror-image curves (**Photo 5**).

When you're done routing, clean the debris out of the grooves. Sharpen the corners and intersections with an X-Acto knife. No groove should end with the radiused cut made by the router bit.

Make the stringing

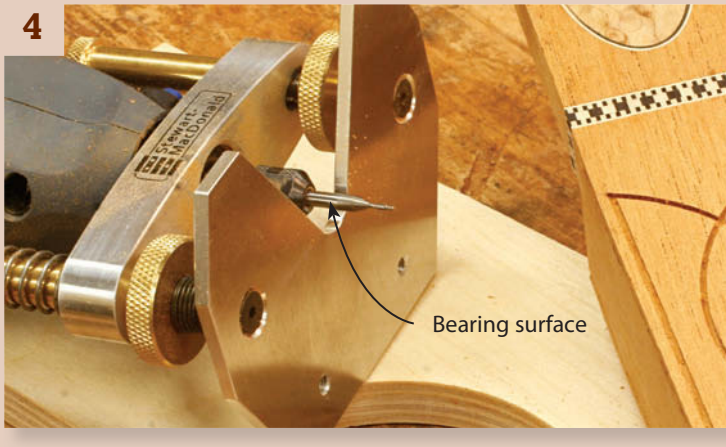
I make my own stringing, although you can certainly buy it, too (see Sources). Pale, uniformly textured woods such as holly, hard maple, yellowheart and satinwood work best. Making your own stringing allows you to use any wood you want and saves a few bucks. Start with solid pieces and mill them foursquare, 1" thick. Install a zero-clearance insert and a thin-kerf blade that's suitable

1 **Begin by routing** the straight grooves with a 1/32" bit. I use a Dremel equipped with a Stewart-MacDonald base. The base has a shop-made wooden fence attached to it.



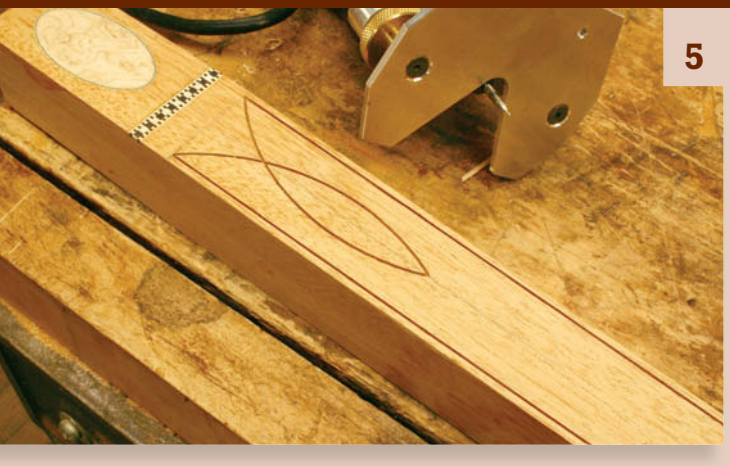
2 **Rout** up to a marked line. This base's open design allows you to easily see where to stop the cut.

3 **Make a template** for cutting the curved grooves. The closed ends of the template prevent you from overshooting your marks.

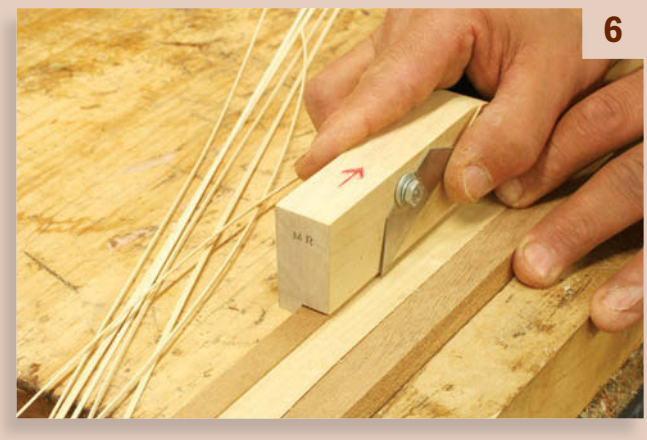


4 **Extend the bit** so that its shank extends below the router's base. This part of the bit will ride against the template. Cut the groove.

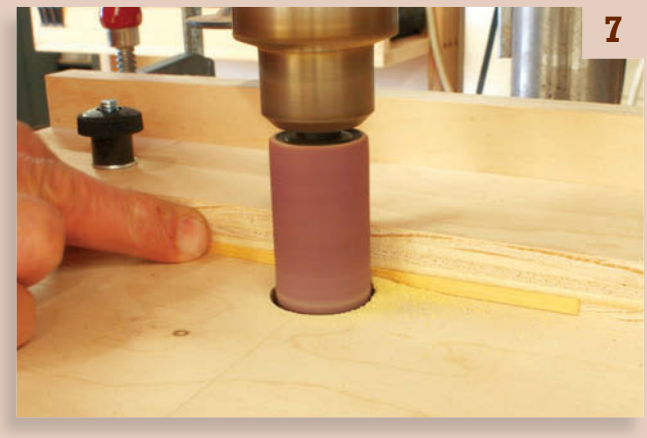
EDITOR: TOM CASPAR | PHOTOGRAPHY: MARIO RODRIGUEZ



5 **Flip over the template** to make the same curve, going the opposite way.



6 **I make my own stringing** with a shop-made slitting tool. First I cut some pieces on the tablesaw that are slightly more than 1/32" thick. Then I use the tool to cut them into strips of equal width.



7 **Sand the strips** to exact thickness on the drill press, using a jig with an adjustable fence. If you bevel the front edge of the fence, the stringing will come out with a slight taper. This makes it much easier to install.

8 **Run yellow glue** into the straight grooves. Use a small syringe to avoid overfilling them.

for ripping in your tablesaw. Adjust the fence to rip pieces that are about 1/64" thicker than the widths of the grooves you routed (in this case, the pieces should be just a bit over 1/32" thick). Saw them using a featherboard and a push stick.

Rip the strips about 3/16" wide (**Photo 6**). This operation isn't really practical on a tablesaw, so I use a shop-made slitting tool. Pulling the tool down the sawn pieces a few times results in uniform stringing that's pliable enough to bend into most curves. Stringing that's substantially narrower than this breaks too easily, I've found.

Next, take the strips down to their final thickness. I've made a drum sander jig for this job that also gives the stringing a very slight taper, top to bottom (**Photo 7**). (Commercial stringing isn't tapered). Shaved to the correct thickness and taper, the stringing should enter the grooves quite easily and fit tight when fully seated. Use a fine-grit sanding sleeve.

While the drum-sander jig works pretty well, I prefer a manual jig that uses a blade to shave the pieces. It's quieter and works almost as fast. No matter how you do it, the tapering process is a bit fussy. The payoff comes when you can lay a mile of stringing, with no trouble, in a matter of minutes.

Install the stringing

Cut the stringing to length. Corners and intersections don't have to be mitered; butt joints are OK. However, all joints should be tight and absolutely free of gaps. Any gaps or shortcomings are glaring, often detracting from the overall effect. Be careful and take your time. I usually feed a blunt end into a groove, remove it, then adjust the end's angle with a marking knife or X-Acto knife so the piece fits tight. Then I'll cut the intersecting piece to fit against it. I usually dry-fit all the pieces before gluing them in. They're not very dif-

For more information on how to use hand tools to make stringing, go to **AmericanWoodworker.com/WebExtras**

ficult to remove, but they will break on occasion.

Use a syringe with a narrow tip to inject just the right amount of yellow glue into the grooves (**Photo 8**). Start with the straight stringing, one piece at a time. Fill the groove with glue, then push in the stringing with your fingers until it bottoms out (**Photo 9**). If necessary, apply extra pressure with a small block. When the stringing is seated, wipe away any excess glue.

Use either a block plane or a card scraper to level the stringing (**Photo 10**). With either tool, first make a couple of light passes to determine the stringing's grain direction. Be careful. Aggressive scraping or planing can dislodge the stringing or cause the grain to tear out, creating a flaw that's nearly impossible to repair. When the stringing is flush, sand it with 180 or 220 grit paper.

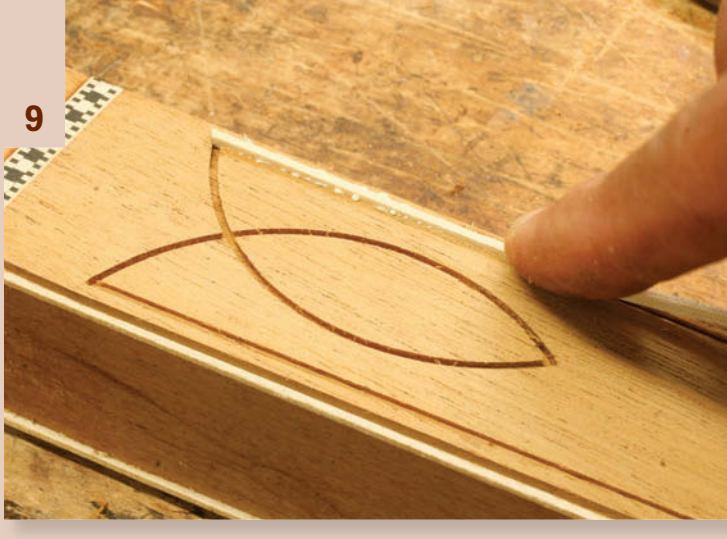
Curved pieces

Curves require special attention. Some pieces can be bent sufficiently by slowly feeding them partway in the groove. If you feel that this might cause the piece to kink or break, heat it on a curved iron (**Photo 11**; see Sources). Heat will make the stringing more pliable; when it cools, it will remain bent. If this doesn't work well enough, dampen the piece with water before pressing it onto the iron.

In any case, cut a curved piece of stringing a bit extra long before bending it. Trim one of its ends and butt it up to a corner or intersection. Press the piece partway into the groove in order to mark its final length (**Photo 12**).

SOURCES

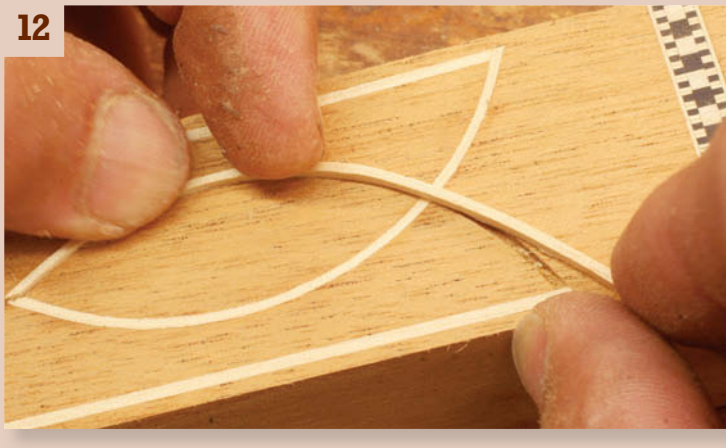
- Stewart-MacDonald, stewmac.com, 800-848-2273, Precision router base, #5260, $53.65.
- Drill Technology, drilltechnology.com, 616-676-1792, Solid carbide endmill bit, SAPFM 1/32", $9.50.
- Lee Valley, leevalley.com, 800-871-8158, Curved-Tip Syringe, #25K07.05, $2.95.
- Coverite, coverite.com, Sealing Iron (for bending stringing), #COVR2700, $30.
- Ready-made stringing is available from Inlay Banding, inlaybanding.com, 704-221-2147.



9 **Push the stringing** into the groove. It should stand proud by about 1/32". Glue in the second straight piece.

10 **Level the stringing** with a block plane or a card scraper.

11 **Tight curves** might require you to heat the stringing with an iron to render it more pliable.



12 **Determine the length** of a curved segment by inserting an extra-long piece in the groove. Once most of the piece is inserted, mark the end to be cut. Butt joints are fine; intersections don't have to be mitered.

Logs to Lumber

by Lonnie Bird

In a search for wide boards, it pays to buy whole logs.

VISITORS TO MY SHOP often ask where I buy the wide, matched cherry and walnut boards I use for reproducing classic American furniture. Their curiosity ratchets up a notch or two when I tell them that I usually buy logs, not boards.

"Ervin, a local farmer who has a bandsaw mill, saws the logs for me," I say. "I dry the lumber myself in that old metal barn down the hill."

That's when the questions really fly: How do I find those logs? Do I have a kiln? Why not just purchase dried lumber from a retailer?

Let me give you the short answers to those questions first, and then we'll go into the details. I find the logs through local suppliers—you'll often find many sources in your area, if you ask around. No, I don't have a kiln, nor do I need one. I air dry the lumber in that barn, then move the particular boards I need for a project to a corner of my shop, where they continue to dry until they're ready to be milled.

As for buying wide, dry boards at retail—well, that gets to the heart of the matter. It's a question of cost and quality. There are a number of very good lumber dealers who stock wide, matched boards that all come from the same tree—but often that wood is expensive! Those dealers must charge you for all the work involved in sawing, grading, stacking and drying the lumber. Doing this work yourself can save a lot of money.

As to quality, I really prefer working with air-dried boards. Some dealers do air dry their wood, or use dehumidification kilns, but most lumber is quickly processed through standard kilns. What's the difference? In

1

For reproducing old furniture, I buy whole logs that are large in diameter. This walnut log came from a local forest and measures 27" across at the butt end.

EDITOR: TOM CASPAR | PHOTOGRAPHY: LONNIE BIRD

my experience, air-dried lumber doesn't have the stress that is sometimes present in commercially available kiln-dried lumber, because it dries slowly. Air-dried wood is less prone to warping and requires less effort to work, both with machines and hand tools.

And then there's the matter of color. Surprisingly, the natural color of air-dried walnut and cherry is much richer than kiln-dried stock. There's more variation in the color, too—which I like—and the colors are more saturated.

Before you get too excited, let me warn you: Processing lumber from a log is not for everyone. To be honest, it's a lot of hard work. Green lumber is heavy! It takes time to dig around for a source for good logs. Then you have to find a competent sawyer that can handle them. You'll need a pickup truck or a trailer to haul the heavy, wet lumber home. And you'll have to find the space for stacking and drying it.

But weigh all that against the satisfaction of transforming a local tree into a beautiful piece of furniture made with your own hands. It's worth it.

Finding logs

If you live in a rural area, like me—or even in the suburbs—finding suitable logs isn't as difficult as it may seem. Over the years I've purchased logs from a variety of sources including farmers, small sawmill operators, loggers, tree surgeons and even large, commercial sawmills.

Essentially, I've found that the key to finding logs is just to ask around and develop a rapport with local loggers and sawmills.

Many rural areas have small sawmills that keep the local farmers and barn builders supplied with construction lumber. These sawmill operators often have sources for furniture-grade logs as well. Although loggers usually prefer to sell logs by the truckload to large commercial mills, sometimes they are willing to sell a few logs to individuals at the current market price.

Some large commercial mills specialize in oak or some other hardwood. They usually don't want to deal with small quantities of other woods, so they sell off the few walnut or cherry logs that come through their gates each year.

2

Green wood is heavy! Rather than use my truck, I asked the man who cut the log to deliver it to my sawyer using his heavy equipment.

3

A local farmer runs a small bandsaw mill as a side business. First, he cuts the log into a square.

4

Next, the log is sliced into sequential boards by a series of parallel cuts. This method of sawing yields the greatest number of wide boards.

Selecting suitable logs

Once you find a good source for logs, you'll need to learn a little about what to look for and what to avoid. Loggers and sawmill operators are typically a friendly bunch. I've picked up a lot of helpful information simply by listening to them.

To get the wide boards I need, I look for relatively straight logs that have a large diameter. They should have smooth bark and solid ends.

Large diameter is the most important quality. Beautiful furniture starts with wide, beautifully figured boards. When selecting lumber to construct a desk, for example, I look for pieces that will yield a one-board lid, one-board drawer fronts and wide, book-matched door panels.

Crooked logs yield narrow lumber; however, if a log has enough length, I may opt to cut it into two shorter sections. Or I may decide to cut off a foot or two and either discard the waste or save it for turning blanks. Eliminating the crook yields wider boards.

A bulge or distortion in the bark, sometimes referred to as a "cat face," indicates that there is a large encased knot under the bark from a limb. That knot could produce either a lot of tightly figured wood or a lot of waste. You never know.

As trees age, the heartwood at the base of the trunk will begin to decay; large old walnut and cherry trees often have a nest of carpenter ants in the base. However, some of the widest, most beautiful boards in my stash were sawn from logs damaged by insects or rot. Before I buy, I'll carefully check this type of log to determine the degree of damage. As long as it's limited to a few inches in the base, damage on the end of a log can be trimmed off before the log is sawn into planks.

No matter how closely you examine a log, you'll probably be either pleasantly surprised or disappointed after it has been sawn. Logs are like Christmas gifts: You can guess all you want about what's inside by examining the outside, but you won't know for certain until you open it.

Sawing the logs

Let me tell you the story of two walnut logs that I purchased from a local logger. Both were butt logs, which simply means that they were cut from the stump end of the tree. (Butt logs are the prime part of the tree and typically yield the widest boards with the fewest defects.) They were large in diameter, solid on the ends and had smooth bark (**Photo 1**). Although I'd rather not haul large logs with my truck (which I've done many times), I had the logger drop off the logs at Ervin's sawmill (**Photo 2**).

Ervin has a small farm where he raises cattle, cuts hay and operates a bandsaw mill. Ervin has milled a lot of lumber for me over the years, so he knows how I want the log sawn. He begins by squaring the log to remove the bark and most, but not all, of the sapwood (**Photo 3**). This process also removes the flair, or bell end, at the base of the log. However, it's important not to remove all of the sapwood from the square, otherwise a lot of width will be lost.

Note the waxy sealer that I applied to the end of the log before sawing. As a log dries, moisture migrates faster from its ends than from its sides. The result is large splits, called checks, at the ends. The sealer slows drying on the ends and helps prevent checking by keeping drying and shrinkage steady and uniform throughout the log. The same holds true for boards. I always make sure that the ends of each board are sealed right after they're sawn.

5

Here's the gold. This log yielded a stack of seven 18" wide boards and some narrower ones, too. Total cost: about $1.60 per bd. ft.

6

The green boards are left to dry in a barn near my shop. They're raised off the ground and separated by stickers to promote air circulation.

Once the bark and sapwood was trimmed, Ervin made a series of parallel cuts (**Photo 4**). This method is called "through-and-through" sawing and yields the widest boards. Large, commercial mills typically saw a different way to maximize the number of high-grade boards. They rotate the log to a new "clean" face after a few cuts. The drawback to this method is that it creates a stack of narrow boards. Although through-and-through sawing produces boards with a greater number of knots, each board is wide. Later on, when the dry lumber is cut to length for furniture parts, it's easy to simply cut parts from in between the knots. Boards created by sawing through-and-through also have more character and, to my eye, appear more natural.

The first of the two logs yielded a stack of seven 1-1/4" thick boards 18" wide and a few narrower boards that are useful for smaller furniture parts (**Photo 5**). It also yielded quite a number of slabs (boards that are mostly bark) and sapwood trimmings. To the uninitiated, the amount of waste in a log is always a surprise.

The second log was a different story. Unfortunately, barbed wire was embedded about 3' up its length. This wasn't totally mysterious: The log must have come from an old tree that once doubled as a fence post. I doubt that the logger knew this because the wire was completely buried under years of growth and was not visible from the outside. To get rid of this nuisance, we had to shorten the log and settle on boards that were just 5' long.

Even so, my cost for the lumber, including the logs and sawing, came to $1.60 per bd. ft. Not bad for a set of wide, matched premium boards.

Initial drying

The next step is to haul the cache home and stack it for drying. If lumber dries too quickly it usually

warps and cracks severely, sometimes to the point of being rendered useless. If it dries too slowly it can develop mold, which stains the boards. One key to success is to find the best location. My first choice is a well-ventilated shed or barn. A barn keeps the lumber shaded from the harsh summer sun and sheltered from driving rainstorms. However, I've stacked green lumber outside and covered the stack with plywood with good results.

The first step in drying is to build a solid platform to support the lumber (**Photo 6**). I use stacks of concrete blocks spanned with 4x4s. The blocks provide a solid foundation to bear the heavy weight of the green lumber. They also raise the pile well above the moist ground (my barn has a dirt floor). In order to prevent the lumber from sagging under its own weight, I space the blocks on 3' centers. I typically create a platform about 4' wide; this width allows me to easily reach across the pile.

As I stack the boards, I place 1" x 1" sticks between them, directly over the 4x4s. By separating the pile's layers, these "stickers" allow air to circulate around the boards and carry away the moisture emitted as they dry. The stickers must be made from wood that's already been dried; green stickers may create mold and stain the wood.

As a rule of thumb, you should allow one year of drying for each inch of thickness. (However, I've found that if the tree is cut during the winter months, when the sap is down, drying takes less time.) At this point, the wood will be about as dry as it can get while stored outdoors. In my area, that's about 15% MC (moisture content). Just to be sure, I check the wood with a moisture meter (**Photo 7**). At 15%, the wood isn't dry enough to be turned into furniture, though—I have to bring the MC down even lower.

7

Air-drying lumber in my barn will bring the wood down to about 15% moisture content (MC). That's not dry enough for making fine furniture.

8

I bring the wood indoors to air dry it some more. After a few weeks, the MC should be 6% to 8%, and I'm ready to get to work.

Final drying

The second and final stage of drying takes place in my shop. Let me explain why this is necessary. As lumber dries, it shrinks and warps. I want the majority of shrinking and warping to occur before I construct a piece of furniture, not after. So it's important for the moisture content of the lumber to be in balance—in equilibrium—with the environment in which the furniture will eventually reside. And that environment isn't outdoors, or my barn.

Today's homes are heated and cooled to an average of 70° to create a comfortable living environment; indoor relative humidity averages 40%. This combination of temperature and humidity creates a moisture content in furniture and other wood products of 6% to 8%. That's the target. Lumber can be stored in a barn for decades, but it will never get this dry.

A drier environment is required for the final stage. This is why lumber dealers use a kiln to complete the drying process (and to speed it up, which is why kiln-dried lumber is sometimes stressed and pinches the saw blade as you rip it).

But you don't need a kiln. All you have to do is stack the lumber in a corner of your shop, if the shop is kept at the same temperature and humidity level as your house. (If your shop isn't heated, or if it's in a basement, run a dehumidifier to remove some of the moisture from the air. This, in turn, removes moisture from the wood.) You could also stack the wood in a room inside your house—that would be ideal.

To minimize problems with warping and shrinking, I cut the lumber to a rough length and width (slightly over the final dimensions on the project cut list) before storing it in my shop. I'll label each piece with the part name and again stack it with stickers to promote drying (**Photo 8**).

After three or four weeks I check the lumber. I want to know the moisture content of its interior, so I stick the prongs of my moisture meter into the center of a board's end (see the photo on page 58). If the wood isn't quite dry enough I wait a little longer. After all that hard work and patient waiting, I want those boards to stay flat and straight!

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.

Why You Need a Moisture Meter

It can save you lots of money—and grief!

ARE YOU A SCROUNGER? Always looking for a deal? Self-reliant? Those words fit a lot of woodworkers, particularly those who search for unusual or inexpensive sources of wood. Once you stray from a lumberyard, there's one tool you really ought to have: a moisture meter.

A moisture meter, as you probably know, measures the percentage of water in a piece of wood, or moisture content (MC for short). When freshly cut, a piece of hardwood is quite wet, having an MC anywhere from 50% to 160%, depending on the species. When fully dried, the wood's MC usually is 6% to 11%, depending on where you live. That's a huge range! You can't figure out MC merely by looking at or handling a board; the most practical way is to use a meter.

Why does MC matter? As a piece of wood dries, it also shrinks, like a sponge. But unlike a sponge, it doesn't shrink uniformly. It can bow, twist or kink in a variety of ways. When you build a piece of furniture meant for indoor use, you want the wood to be thoroughly dry, so all that shrinking and warping has already taken place.

When you buy wood at the lumberyard, you can be pretty sure that it's dry enough to use right away (although a moisture meter is handy to confirm this). But if you come across a stash in a barn or a pile in somebody's basement, or if you cut your own wood, you'll want a moisture meter to tell you what state it's in now. If it's too wet, you can easily dry it further by stacking it in your shop or house and just letting it sit for a while. The moisture meter will tell you when it's ready to work.

What type to buy?

There are two types of meters: pin and pinless. A pin meter has a pair of sharp probes that you push deep into the wood. A pinless meter has a sensing plate that you hold against the wood's surface.

The beauty of a pinless meter is that it can quickly scan a whole board without putting holes in the wood. However, the entire sensing plate must contact the wood's surface. If the board is too rough or too warped, you won't get an accurate reading. (A few swipes with a block plane can make a surface that's flat enough, though.) Here's another limitation: You won't get a good reading from the edge of a 4/4 (1") board, because the sensing plates of most meters are too large. This factor makes it awkward to use a pinless meter on boards stacked in a pile. You have to unstack the pile and take readings from the faces of each board.

Pin meters, on the other hand, can take readings on virtually any piece of wood. The board doesn't have to be flat, smooth or a minimum size. All that's required is that both pins make contact with the wood. Unlike pinless meters, pin meters can take readings on the edges of 4/4 boards stacked on top of each other.

If you dry your own wood, pin meters have another advantage: They allow you to connect to remote probes. You can drive nails into a sample board in a stack of lumber, connect the nails to the meter with a couple of wires and monitor the wood as it dries.

So should you buy a pin or pinless meter? If you tend to buy surfaced stock and can't bear the thought of poking holes in expensive lumber, then a pinless meter is probably your best bet. If you buy rough stock, dry your own wood, use wood thicker than 2" or have a weakness for piles of rough lumber languishing in some old barn, a pin meter is for you.

For more information on buying a moisture meter, go to **AmericanWoodworker.com/WebExtras**

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Marketplace

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Oops! Crazy Mistakes Woodworkers Make

Blowin' in the Wind

MY WIFE AND I ran out of plywood as we were adding shelves to the garage, so we headed to the home center for another sheet.

We hadn't noticed how windy it was until we came out of the store with the plywood propped sideways on a cart. We more or less sailed to our SUV and with considerable effort maneuvered the sheet onto the roof rack. I reached for the tie-down straps as my wife tried to hold the sheet in place. Bad idea. "I can't hold it!" she yelled, and I looked up to see the sheet flipping over my head. I made a grab for it, but missed. The sheet cartwheeled across the parking lot and wrapped itself around the bumper of a pickup truck, setting off its alarm.

The truck was unscathed, but not the plywood. A volunteer who had witnessed the gymnastics helped us lash what was left of it to our SUV. From now on, I'll check the wind before shopping for plywood.

Gus Carlson

Hidden Dovetails

I WAS PROUD of myself for figuring out how to cut half-blind dovetails on the drawers of the new dresser I was building for my daughter. The dovetails fit so perfectly, I decided the joints didn't even need to be clamped. So, after gluing and assembling the drawers, I simply slid them into the dresser frame, without bothering to remove the squeezed-out glue.

Unfortunately, when I returned the next day, the drawers had glued themselves inside the frame. Argh! To free them, I had to whack them from the back with a big mallet. I felt like giving myself a big whack, too.

Paul Duvendack

Make your woodworking mistakes pay! Send us your most memorable "What was I thinking?" blunders. You'll receive $100 for each one we print. E-mail to: **oops@AmericanWoodworker.com** or send to AW Oops!, American Woodworker, 1285 Corporate Center Drive, Suite180, Eagan, MN 55121. Submissions can't be returned and become our property upon acceptance and payment. We may edit submissions and use them in all print and electronic media.

EDITOR: TIM "OOPS!" JOHNSON | ILLUSTRATION: STEVE BJÖRKMAN

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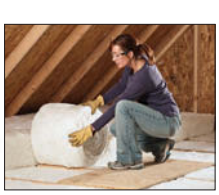

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- 1/4" and 1/2" Router Collets
- Table Height: 34"
- Spindle Travel: 3"
- Deluxe Fence System

8" JOINTER SHEARTEC II

- Motor: 3hp
- ShearTech II Spiral Cutter Head
- Length of bed: 76"
- Speed: 5,200rpm
- Fence Size: 36"x5"
- Weight: 648ibs.

See us in action.

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